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Design Experience:
A Holistic, Multi-Sensory, and Multi-Dimensional Perspective

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DANKE

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München, Juli 2017 Kathrin Scheubeck

TABLE OF CONTENTS

List of Figures

List of Tables

List of Abbreviations and Acronyms

ANOVA	Analysis of variance
APA	Approach - Avoidance
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CVPA	Centrality of Visual Product Aesthetics
DX	Design Experience
EF	Emotional freeze
EFA	Exploratory factor analysis
e.g.	exempli gratia (lat.): for example
et al.	et alii; et aliae; et alia (lat.): and others
etc.	et cetera (lat.): and so on
EUR	Euro
fMRI	Functional magnetic resonance imaging
GFI	Goodness-of-fit index
H	Hypothesis
KMO	Kaiser-Meyer-Olkin
LMM	Linear Mixed Model
Min	Minimum
Max	Maximum
NFT	Need for Touch
OCE	Online community experience
p.	Page
PAD	Pleasure, Arousal, Dominance Scale
PI	Purchase intention
SD	Standard Deviation
S-O-R	Stimulus-Organism-Responses
TCE	Transcendent customer experiences
VIP	Very important person
vs.	Versus

List of Symbols[1]

α	Cronbach's alpha reliability coefficient
b	*Random effects dependent on subject*
B	Unstandardized regression coefficient
$\beta_{1\ldots x}$	*Fixed-effects*
CI	Confidence interval
d.f.	Degrees of freedom
F	Fisher-Snedecor distribution
e_{ij}	*Observation error term*
$H_{1\ldots X}$	Hypotheses
$i_{1\ldots n}$	*Individual*
$j_{1\ldots x}$	*Measurement*
LL	Lower limit
M	Mean value
N	Number of participants / stimuli
p	Significance level
r	Regression coefficient
SD	Standard deviation
SE	Standard error
t	t-distribution
t	*Time of measurement*
UL	Upper limit
χ^2	Chi squared
Y	*Linear mixed-effects model*
z	*Sobel-test*

[1] italics = formula of LMM

1 Introduction

1.1 Motivation and Scope

"Design is hot: it is the topic of the day."

(Hekkert and Schifferstein 2008, p. XiX)

This dissertation sets out to conceptualize and validate a new construct: the design experience construct. It further contributes to consumer behavior, marketing and design research by adding a valid, reliable, and objective measurement scale: the design experience scale.

Products with an attractive visual language convey associations, emotions, innovation, quality, functionality, and therefore orientation and benefit for the consumer (Markenverband, Scholz & Friends, and Rat für Formgebung 2010). As a result, they are bought and used more often and cherished by consumers (Borja De Mozota 2003; Creusen, Veryzer, and Schoormans 2010). One of Germany's biggest surveys on the importance of design for corporate success conducted by the German Brand Association, the German Design Council, and Scholz & Friends confirmed the important role of design for economic success. In an online survey among 100 leading German brand-name companies, 400 participants stated that product design has a major influence on their overall returns, and is in particular an important additional economic value for launching new products (95%), gaining new market shares (87%), pricing (84%), and unique selling propositions (94%) (Markenverband, Scholz & Friends, and Rat für Formgebung 2010). The above-cited study underlines the powerful influence of product design on market success and consumer behavior. Several streams of research provide preliminary evidence in support of this assumption; yet, they also show gaps in existing knowledge that call for closing.

First, recent design (Crilly, Moultrie, and Clarkson 2004) and consumer psychology (Bloch 1995; Orth and Malkewitz 2008) research has significantly advanced our understanding of how individuals perceive design cues. Particularly notable is the recognition that product and package designs provide consumers with multi-sensory inputs (such as vision, haptics, olfaction, and audition (Hekkert 2006; Lindstrom 2005; Ludden, Schifferstein, and Hekkert 2009) in turn relating to several dimensions of cognitive, affective, and behavioral responses

(e.g., Bitner 1992; Bloch 1995; Brunel 2006; Chang and Wu 2007; Mugge, Govers, and Schoormans 2009). Traditionally research has focused on uni-modal perception. Researchers have recently focused on bi- or multi-modal perception, as well as on cross-modal correspondence and on interaction between different modes and their effects on consumer behavior confirming the fact that design perception is a multi-sensory phenomenon (Littel and Orth 2013; Schifferstein 2009; Schifferstein and Spence 2008; Shimojo and Shams 2001). Regarding the variety of design evoked responses, academia confirms the propositions that design evokes cognitive reactions (e.g., associations, metaphors, and product personalities (Brunel and Kumar 2007; Creusen, Veryzer, and Schoormans 2010; Mugge 2011; Özcan and van Egmond 2012), affective reactions (positive and negative (Demirbilek and Sener 2003; Desmet, Overbeeke, and Tax 2001)), as well as behavioral responses (approach and avoidance (Berkowitz 1987; Bitner 1992)). Current scientific research is often still limited to one-sensory approaches and focuses on either psychometric or behavioral response, although it is acknowledged by prior research that affective and cognitive reactions interact, are intertwined, and happen simultaneously (Bitner 1992; Crozier 1994; Hoegg and Alba 2008; Norman 2005) as well as that perception is a multi-sensorial phenomenon. Yet, since the multi-sensory design of products simultaneously influences their perception and at the same time evokes affective, cognitive and behavioral responses, the findings obtained from previous studies may neither comprehensively model the consumer-design-interaction nor offer a holistic and suitable approach to understand and assess the influence of design on consumer behavior. This gap stands in stark contrast to the recognition that products and packages provide consumers with multi-sensory inputs and evoke different responses.

Second, creating a superior experience for customers and engaging consumers in unique experiences has been a major goal of marketers for several years now. As a consequence, international companies incorporate customer experience management into mission statements and corporate marketing strategies (Haeckel, Carbone, and Berry 2003; Pine and Gilmore 1999; Pullman and Gross 2004; Verhoef et al. 2009; Zomerdijk and Voss 2011). A steadily growing body of managerial guidelines reflects the increasing interest in the experience phenomenon among practitioners (Carbone and Haeckel 1994; Palmer 2010). Academia has acknowledged experiential theory as a new holistic approach to understand consumer behavior besides the prevailing but restricted scientific perspective focusing on rational choice and logical flow models of bounded rationality (Holbrook and Hirschman 1982; Pine and Gilmore 1998; Schmitt 1999a). Specific concepts of service experience

(Gupta and Vajic 2000; Zomerdijk and Voss 2010), brand experience (Brakus, Schmitt, and Zarantonello 2009), and customer experience (Nambisan and Watt 2011; Verhoef et al. 2009) have recently been added and refined. Yet, only highly specific, fragmented or context-dependent concepts of experience exist and validated measurements are still rare.

Third, to close existing knowledge gaps in design and experience research and hence, to understand the interaction with design and its impact on consumer behavior more holistically, this dissertation suggests combining findings of design research and experience theory. The present research proposes that this approach offers the chance to understand and analyze the design-consumer-interaction from a more holistic perspective, as well as to take its multi-dimensionality and multi-sensory requirements into account. Therefore, this work applies the experience concept to the product design context and hence conceptualizes the new construct design experience. This approach offers a chance not only of closing existing knowledge gaps in design research, but also in experience research.

Fourth, screening scientific experience literature and measurement scales, one can detect a lack of empirical evidence and valid, reliable, and objective measurement tools (Brakus, Schmitt, and Zarantonello 2009). As most experience concepts, also the few experience measurement scales are highly context-dependent and often lack empirical validation. Yet, an increasing interest in scales assessing the different experience constructs can be observed from academia and also marketing managers aiming for improved realistic and reliable measurement methods.

The present research aims at closing gaps in prior research and in doing so, makes five **contributions**: Specifically, (1.) by applying and transferring an experience-based approach to the design context the thesis adds a new perspective to understand design-consumer-interaction and its impacts on consumer behavior, (2.) by adding a new experience concept based on an extensive literature research to experience research, (3.) by empirically validating the concept, (4.) by developing and validating a new scaling measurement, and (5.) by providing empirical evidence about direct, indirect, and interaction effects of design experience on consumer behavior variables.
Hence, the present work combines design and experience research to conceptualize a new holistic, multi-dimensional, and multi-sensory construct and integrates qualitative and quantitative research methods. Further, to empirically test the relation of an affective route

and design experience, and their impact on consumer behavior, this dissertation applies research on mood induction and emotional freeze. To capture a comprehensive understanding of design experience, the research tackles the development and validation from several perspectives using in-depth expert interviews and psychometric measures, includes different samples (consumers, university students, Experts: design, marketing, and editorial), and collects an encompassing item pool.

The theoretical framework design experience is operationalized by a three-step empirical validation and measurement scale development procedure including four empirical studies and four expert evaluations. Step 1 is designed to explore the design experience construct and to generate an initial item pool. It includes Study I (qualitative expert interviews), a research of relevant literature, and a first evaluation (an item-judging task). Step 2 pursues the construct validation and analysis of the dimensional structure of the concept, as well the refinement of the scale. It includes Study II and Study III, as well as the second and third expert evaluation. Finally, Step 3 composed of Study IV and a last expert evaluation, pursues the analysis of direct, indirect, and interaction effects. More precisely, Study IV tests whether the affective route influences the impact of design experience on consumer behavior. For a more detailed and graphical overview see Figure 1.

Overall, this research offers a new approach to consumer behavior and design research by integrating experience theory to design research and hence, conceptualizing consumer interaction with design as design experience, operationalizing the design experience concept, validating it, developing a valid, reliable measurement scale, and providing empirical evidence on the impact of design experience on consumer behavior relevant variables such as satisfaction and purchase behavior.

1.2 Organization of the Thesis

The present work is organized as follows. After this introduction, chapter 2 gives insights to the nature of product design with an emphasis on the holistic, multi-sensorial, and multi-dimensional aspects and the lack of research on it. The chapter concludes with a summary and highlights existing research gaps. Chapter 3 presents research on experience in general, gives an overview of its nature, and introduces different approaches and concepts as well as their characteristics. At the end, findings are summarized and the importance for the conceptualization and operationalization is emphasized. Chapter 4 focuses on the conceptualization of design experience. After an introduction to theoretical concept and scale

development procedure in chapter 4.1, chapter 4.2 sheds light on the design experience concept in detail. Chapter 5 operationalizes design experience by empirically validating the concept and developing a design experience measurement scale in a three-step approach including four empirical studies and four expert evaluations. All studies address respective study objectives and give details on applied methods. Interpretations of study findings and discussions follow. Chapter 5 concludes with a general discussion of the results including advancement of theory, implications for management, and limitations that applied to the current studies and corresponding opportunities for related future research. Chapter 6 summarizes the findings of all empirical studies and evaluations followed by a German summary in chapter 7. In the appendix of this thesis questionnaires, interview guidelines, and stimuli (Study I, II, III, IV) are located.

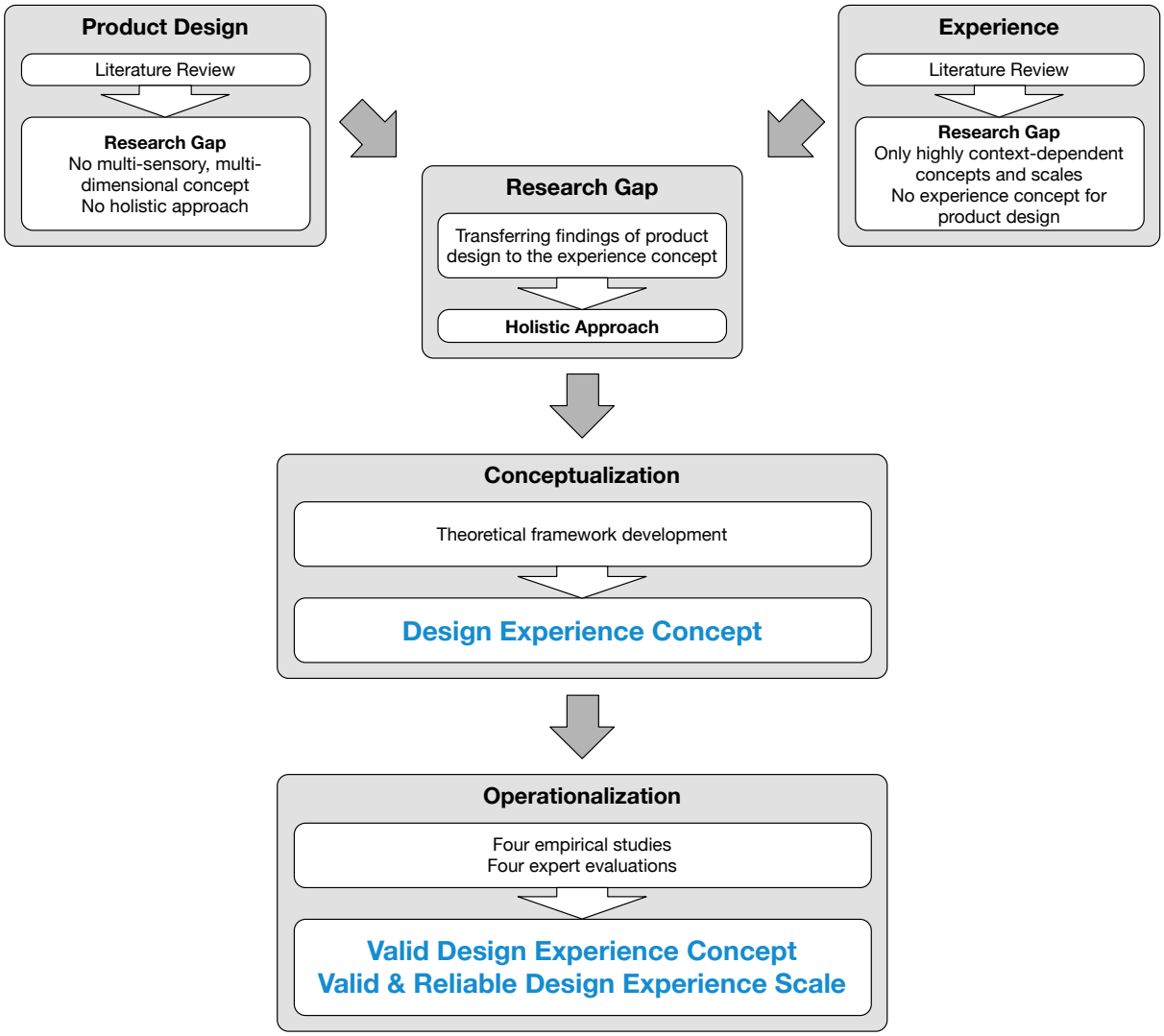


Figure 1: Structure and Approach of this Dissertation
Source: author's own illustration

2 The Nature of Product Design

Product design is a key driver for sales and market success (Bloch 1995; Purucker 2012). It attracts consumers to a product, conveys associations and messages to them, and adds additional value to the product (Bloch, Brunel, and Arnold 2003, p. 16). Yet, surprisingly only in recent years marketing or psychology research has analyzed the role of product design more in detail. Moreover, the understanding of design or more particular of product design are often vague und inconsistent. However, research activities and findings in the design, particular product design context suggest the development of an exciting and crucial field of research offering great possibilities for researchers and practitioners alike (Purucker 2012). The aim of chapter 2 is to give an overview of research activities and results discussing the design concept and particular product design in order to highlight main research fields, to understand its characteristics, how it is perceived, to show its impact on and significance for consumer behavior. Further, by giving a detailed overview this work emphasizes its complexity and multidisciplinarity, identifies research gaps and stresses the need for a meta-level approach.

Therefore, chapter 2.1 starts with an introduction to product design by defining the term design followed by a literature review of research activities and research disciplines. Next, in chapter 2.2 this dissertation presents how product designs are perceived in detail and emphasizes the effect of product design on consumer responses. Chapter 2.3 sums up results, highlights major research gaps and underlines the relevance for further investigation and empirical studies. For a graphical overview illustrating and supporting the procedure of this dissertation see Figure 1.

2.1 Fundamentals and Research Streams

People use the term “design” almost inflationary for numerous usages: a nuclear power plant design, a wallpaper design, a user interface design, or a software design. They all describe some sort of design but emphasize totally different design skills. Recently, marketers have applied the term design to refer and promote higher priced products, e.g., designer jeans (Kotler and Rath 1984; Schneider 2005, 1977). Therefore, people often associate with the term “design” special, valuable and expensive products such as smart phones (e.g., iPhone by Apple) or high-priced cars (e.g., by BMW or Ferrari). Because of these different kind of usages Bruce and Bessant even refer to the term “design” as a “Humpty Dumpty word” (Bruce and Bessant 2002, p. 19).

Etymologically the term “design” originates from the Italian word “*disegno*” and describes a draft, a drawing or even any basic idea of work (Hauffe 1995). According to Erlhoff and Marshall (2008), today the term “design” is used in a broad and narrow interpretation. Especially in the Anglo-American countries the term “design” refers to any planning, drafting or creating activity such as IT-development (software design), engineering (machine design), company organization (organizational design) and any goal-oriented actions (Hermann and Moeller 2015). On the contrary, in the German language area a narrow interpretation predominates. The term “design” encompasses the creation of objects in an economical-commercial context such as two- and three-dimensional drafts, conceptions and implementations of any idea and object combining and intertwining psychological, social, economical, ecological and creative processes with each other (Erlhoff and Marshall 2008). Further, a distinction is made between an aesthetic and a functional interpretation. Is to say, emphasizing the form, shape and color of the created object (e.g., furniture design) or its technical and functional requirements (e.g., medical equipment) (Hermann and Moeller 2015). Marketing and consumer psychology concentrate on aesthetics aspects of products. In contrast to art, design pursuits the goal to create objects either durable or non-durable that fulfill a utilitarian need.

Over the last thirty years human reaction to the outer appearance of objects has increasingly attracted researchers of many different disciplines: psychology, consumer research, design research, and marketing. In 2010 the Journal of Consumer Psychology published a special issue on aesthetics in consumer psychology reflecting the importance of aesthetics for academia and also for practitioners (Patrick and Peracchino 2010). Especially psychologists of different specializations built various theoretical frameworks to explain how objects are perceived, processed, appraised and which basic principles and theories trigger which kind of reactions (for an overview see table Table 1).

Table 1: Overview of Research on Human Reactions to Design

Study	Research Discipline	Research Focus
Berkowitz 1987	Product Innovation Management	Shape as innovation strategy
Bitner 1992	Marketing	Impact of physical surroundings on customers and employees
Blijlevens, Creusen, and Schoormans 2009	Design Research	Product appearance attributes
Bloch 1995	Marketing	Relation of product form and consumer response
Brunel 2006	Marketing	Visual product aesthetics and product personality

Study	Research Discipline	Research Focus
Creusen and Schoormans 2005	Product Innovation Management	Role of product appearance in consumer choice
Creusen, Veryzer, and Schoormans 2010	Marketing	Relation of preference for visual complexity and symmetry and product value
Crilly, Moultrie, and Clarkson 2004	Design Research	Consumer response to product visual form
Hekkert and Schifferstein 2008	Design Research	Volume about product experience
Hoegg, Alba, and Dahl 2010	Consumer Psychology	Influence of aesthetics on product feature judgments
Kotler and Rath 1984	Marketing Strategy	Product design as powerful strategic tool in marketing
Limon, Orth, and Kahle 2009	Marketing	Package design as communications for brand values
Orth, Campana, and Malkewitz 2010	Marketing	Relation of price expectations and package design
Orth and Malkewitz 2008	Marketing	Relation of package design and consumer response
Page and Herr 2002	Consumer Psychology	Relation of product on initial affect and quality judgments
Veryzer 1999	Psychology	Relation of product design and consumer response
Veryzer and Hutchinson 1998	Consumer Research	Influence of unity and prototypicality on aesthetic response

Source: author's own selection

As mentioned, design, in particular product design has gained growing attention in various disciplines. Regarding their main research focus, the research approach and research question differences can be observed.

Psychology, marketing and consumer research focus on the consumption of products, mainly the first contact with and the purchase of products. Research shows that the outer appearance plays a major role for these purchase intentions (Bloch 1995). Therefore, the form of a product, its color and material are of main interest to marketing and consumer behavior researchers as well as practitioners.

Applied research such as ergonomics and human-factors design differ in regards of approach, applied theories, method, investigated aspects as well as their goals from marketing, psychology, and consumer behavior. Their major focus is the usage of products. The importance of ergonomics, usability, and function increases with the duration of ownership and product usage. Therefore, not the consumer but the user and the technical product development are the key interest of research.

Ergonomics and human-factors focus on usability and functional aspects of products and systems (Fulton Suri 2002). Hence, cognitive, physical or motor skills and processes

necessary for the use and handling of products have been the main research objective for many years. Recent research amplified this approach and analyzed product usage in combination with satisfaction and pleasure as well as comfort and convenience (Green and Jordan 2002; Hekkert and Schifferstein 2008; Jordan 2000).

Mechanical and material engineering analyze mainly technical properties of artifacts and their effects on e.g., durability and production. However, theses disciplines have also broadened their research activities and have investigated, e.g., the relationship between these material properties and sensorial reactions in terms of evoked associations and aesthetics (Hekkert and Schifferstein 2008; Karana, Hekkert, and Kandachar 2009).

A similar movement can be observed in the field of technology-driven research. The former main focus on new technologies and how they can be used to create new devices has shifted to a more human-user-centered perspective. Due to the omnipresence of digital interfaces in daily devices human-computer-interaction has gained major attention. Issues like fun, trust, and engagement are equally relevant for human-product/computer-interaction as e.g., ease-of-use. Hekkert and Schifferstein describe this movement as a "shift from usability research to user experience research" (2008, p. 7). Not diminishing the importance of product usage, ergonomics, and functionality, the present dissertation concentrates on the outer appearance of products (shape, size, geometry, proportions, textures, materials, colors, graphics, etc.).

2.2 The Perception of Product Design and its Impact on Consumer Responses

To illustrate the complex interaction with product design and to organize popular psychology, marketing and consumer research theories regarding the perception of design and the effects on consumer behavior this research presents Crilly, Moultrie, and Clarkson's framework for consumer response to product design (2004) (also compare Bloch's (Bloch, 1995, p. 17) Model of Consumer Responses to Product Form).

They conceptualize the perception and effect of outer appearance of products on consumers like a communication process. The design itself can be seen as a transmitter of a certain message embedded in the context of consumption (Figure 2). The individual perceives the outer appearance of a product consisting of geometry, dimensions, textures, materials, colors, graphics, and details with his physiological senses (vision, touch, taste, smell, and hearing). The reception of the message is processed cognitively and affectively and evokes behavioral responses (compare chapter 2.2.2). This process of perception, processing, and behavior is influenced by cultural and situational factors as well as personal characteristics such as age, gender and individual preferences. Crilly, Moultrie, and Clarkson (2004) refer to the affective

and cognitive processing also as affective and cognitive responses. The present work orientates itself at their wording.

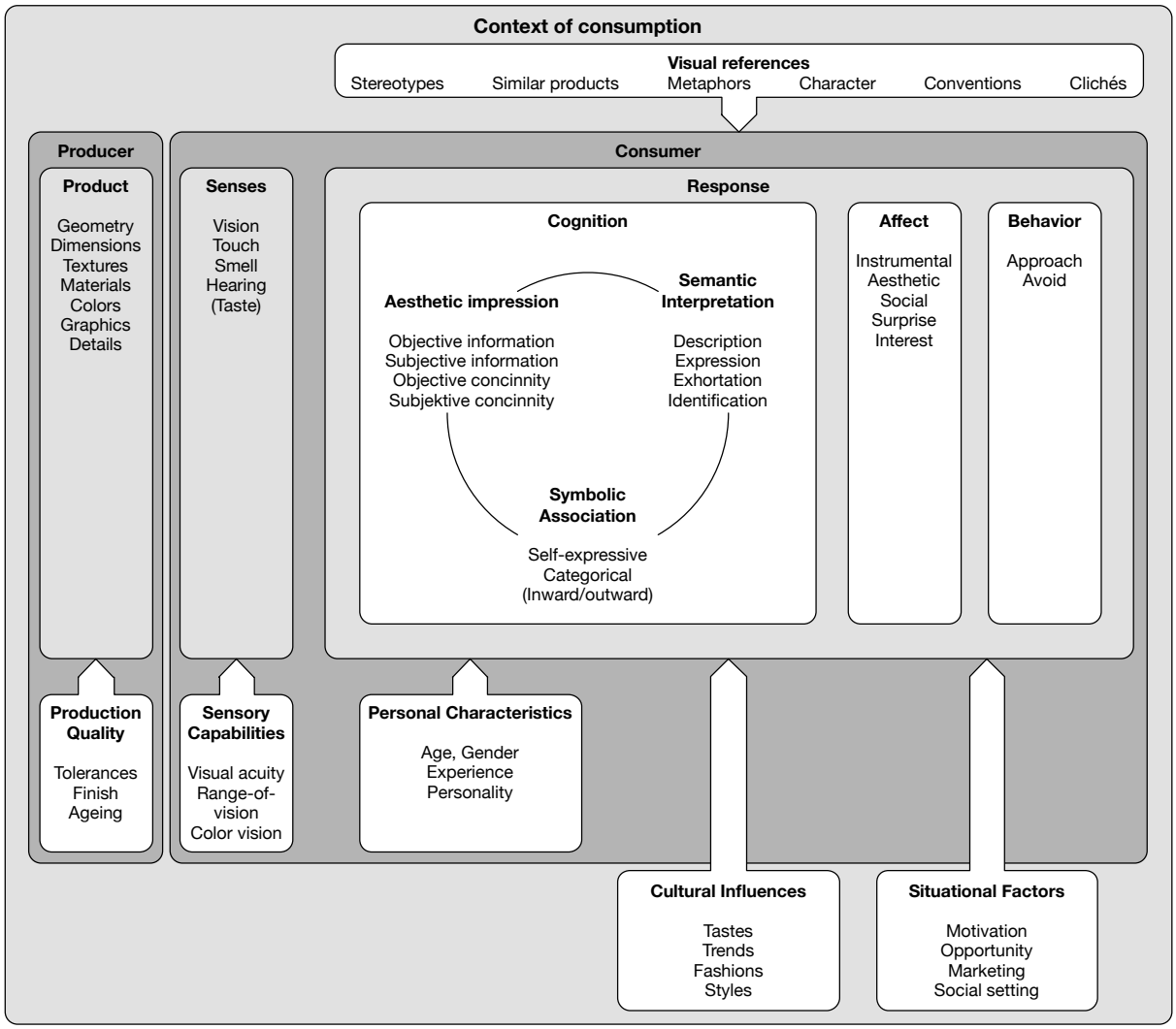


Figure 2: Framework for Consumer Response to Product Design
Source: Crilly, Moultrie, and Clarkson 2004, p. 555

In accordance with the approach of Crilly, Moultrie, and Clarkson (2004), this work first discusses sensory perception of objects, then illustrates cognitive and affective response (processing) and finally presents behavioral responses to product design. In order to present important findings, to emphasize the complexity and the interwoven relation of the phenomena, this work summarizes in detail design perception and its special requirements as well as each response type separately. Comprehensive tables of the most-popular and significant studies extend the summary of theoretical frameworks and description of findings.

2.2.1 The Nature of Design Perception

Human beings perceive environment and objects that surround them with specialized sensory organs. A sense is a physiological capacity that reacts to a stimulus and provides data for perception (Schmidt and Lang 2011). Traditionally, one distinguishes five senses: vision, touch, smell, taste, and hearing (Schmidt and Schaible 2006; Schmielau 1987). Sensory organs generate specific sensory impressions that together can be designated as sensory modalities. The perception, processing and registration of a product design happen as well on a nonconscious as a conscious level. While the attending to a product as well as noticing ones reactions to it are consciously perceived, the actual perception and comparison with acquired rules happen without the notice of the observer (Veryzer 1999).

Traditionally research has mainly focused on uni-modal perception. Only recently bi- or multi-modal approaches to design perception have been of growing interest. In order to map the territory of current research, the following starts with a brief overview of uni-modal perception of product and packaging design with special focus on the two most researched modes vision and haptic. The aim is to conclude major established relationships, but further elaboration is beyond the scope oft the current research, because, recent research activities have shifted their main attention to the more realistic multi-modal approaches. Therefore, this work then focuses on multi-modal perception more in detail in the subsequent subchapter.

2.2.1.1 Uni-Modal Perception

Although all five senses are important for the perception of one's environment, many scientists have concentrated mainly on the visual perception of marketing stimuli and objects so far. Due to a long scientific history, to the amount of research activities and to diversity of studies investigating visual perception of objects, product design, marketing stimuli, and art, this dissertation limits the overview to a short insight of a few recent studies and findings regarding product design (compare Table 2).

Table 2: Overview of Research on Visual or Haptic Stimuli

Author	Vision	Haptic	Stimuli	Dependent Variable	Findings
Batra, Brunel, and Chandran 2009	X		Visually attractive product design	Perception of quality and performance	A U- shaped relationship exists between visual attractiveness and perceived performance moderated by both brand information and access to processing capabilities.

Author	Vision	Haptic	Stimuli	Dependent Variable	Findings
Blijlevens, Mugge, and Schoormans 2009	X		Prototype product shapes (curved and angular)	Product meaning	Dependent on the typical design of the prototype of a product category, curved shapes correlate positively with the perceived meaning 'modernity'.
Blijlevens et al. 2012	X		Prototype product shapes and color saturation	Aesthetic appraisal	Typicality of product designs has a curvilinear relationship with aesthetic appraisal.
Brunel and Kumar 2007	X		Consumer Products	Consumers' perceptions of brand and product personality	Product aesthetic facets are linked to perceptions of product personality.
Creusen and Schoormans 2005	X		Telephone answering machines	Consumer product evaluation and choice	Identification and analysis of six different roles of product appearance and their effect on consumer choice.
Creusen, Veryzer, and Schoormans 2010	X		Pictures of video recorders	Consumer preference for visual complexity and symmetry	Visual complexity and symmetry effect consumers' preferences depend on their product value.
Klatzky, Lederman, and Metzger 1985		X	100 common objects[2] small enough to be held with hands	Reaction time and errors in a haptic and visual identification task as indicator for recognition capabilities.	Haptic object recognition can be rapid and accurate.
Orth and Malkewitz 2008	X		Package design (wine and perfume bottles), product design (eyewear, casual shoes, MP3 players, watches)	Consumer brand impression	Five key types of package design (massive, contrasting, natural, delicate, nondescript)
Peck and Childers 2003a		X	Sweater	Confidence in judgment	Development and testing of a "Need-for-Touch"Scale.
Peck and Childers 2003b		X	Sweater, cellular phones	Confidence in judgment	Haptic information differs significantly across products, consumers, and situations.
Peck and Wiggins 2006		X	Pamphlets with different or without touch elements	Affection, persuasion, attitude toward the stimuli, likelihood of donating time or money	Touch leads to increased affective response persuasion dependent on people's motivation to touch.
Spence and Gallace 2011*		X	–	–	The authors suggest that touch has a significant effect product evaluation and on sales
Veryzer and Hutchinson 1998	X		Line drawings of existing consumer products	Perception of aesthetic	Unity and prototypicality affect aesthetic response.
Westerman et al. 2012	X		Packaging with angular and rounded design elements	Preference for consumer products	Preference for rounded designs with additive effects of contour and graphics shape.

*Literature review
Source: author's own selection

In general, the visual perception of objects and their outer appearance is the most obvious one to the observer. By at looking at the outer appearance of a product the observer receives information about its form, geometry, proportion, dimensions, size, color, graphics,

[2] Personal articles, foods, clothing, tools, kitchen and office supplies, household articles

reflectivity, material, textures, and surface, etc. (Crilly, Moultrie, and Clarkson 2004). Based on this information input the observer makes judgments about the product, for example its aesthetic appraisal (Blijlevens et al. 2012), attractiveness (Bloch 1995), quality and performance (Batra, Brunel, and Chandran 2009), brand or product personality (Brunel and Kumar 2007), or consumer evaluation in general (Creusen and Schoormans 2005). Lately researchers have investigated the impact of visual complex designs, symmetry, or prototypicality on consumer behavior such as preference or purchase intentions (Creusen, Veryzer, and Schoormans 2010; Orth and Malkewitz 2008). Exemplarily, this research introduces the empirical investigation of Orth and Malkewitz (2008) analyzing holistic package designs and their impact on consumer reactions. In their studies, they identified five prototypical holistic designs, their underlying design factors and analyzed their reactions to it. Further, their findings proposed that single design elements such as shape and color are perceived as and organized into more complex design dimensions and impact relevant marketing variables such as liking, preference, perception of quality and purchase intention. Hence, they demonstrated that prototypical holistic designs are systematically related to generalizable response dimensions.

Besides the role and impact of the visual domain in product design, researchers also investigated how human beings collect information by touching products (see Table 2). Empirical studies focusing on touch, suggest that touching is directly linked to emotion. Further, the absence of tactile information results in confusion and uneasiness because of missing necessary information. It is supposed that this is a result of the important role touch plays for inter-human intimacy (Field 2001; Littel and Orth 2013).
Peck and Wiggins (2006) suggest that touch has a substantial effect on affective responses and persuasion. They explore the effectiveness of various types of touch on evoking affective responses in general and dependent on the motivation to touch. In two large experiments Peck and Wiggins (2006) test the effect of touch on the donation behavior of participants. Each participant receives a small booklet containing a description of the experiment and the charity organization in question. Dependent on the manipulation condition, to each booklet a small piece of material was attached or it was coted with a different material (e.g., fleece, sandpaper, steel wool). The authors replicated the results in a real-life setting collecting donations for a children nature museum using brochures with manipulated touch elements. For people who are high in autotelic “Need-for-Touch” (NFT) a positively valenced or neutral touch element was more persuasive than one with a negative sensory feedback.

Summarizing, also touch plays an important role in design perception. Especially its effects on affective responses have been confirmed.

2.2.1.2 Multi-Modal Perception

Recent research activities and findings in neuroscience, psychology, and consumer behavior suggest and confirm that the perception of products in particular its design is a multi-sensory phenomenon. Further, academic interest in multi-sensory design, its effects on consumer behavior as well as the interplay of different modalities has increased continuously. Some researchers even demand a new broader perspective and approaches to design research (Patrick and Peracchino 2010; Shimojo and Shams 2001; Spence and Gallace 2011).
To illustrate this phenomenon, it's various facets, relations, and effects, Table 3 gives an overview of the most prominent studies taking into account more than one mode analyzing design perception and consumer behavior. Afterwards, the present work exemplarily introduces important research activities concentrating on the following aspects: (1) Role and hierarchy of different modes, (2) cross-modal correspondence and congruence, and (3) multi-modal perception and strategies.

Table 3: Overview of Research on Multi-Modal Perception

Author	Stimuli	Analyzed Aspects	Vision	Touch	Audition	Smell	Taste	Dependent Variable	Findings
Becker et al. 2011	Different yoghurt packages (shape curvature, color saturation)	Cross-modal correspondence & congruence	X	X				Taste intensity evaluation, product evaluation, price expectation	Transfer of potency-related association portrayed by shape to taste experience dependent on participants' sensitivity to design.
Fenko et al. 2009	Beverages, cleaning and personal care products	Role & hierarchy of different modes	X			X		Perceived freshness of different product categories	The dominance of a sensory modality for the product experience of freshness depends on characteristics of a particular product.
Fenko, Schifferstein, and Hekkert 2010a	Consumer products during various episodes of product usage	Role & hierarchy of different modes	X	X	X	X	X	Importance of sensory modalities	The dominance of a particular modality depends on appropriateness for the particular task.
Fenko, Schifferstein, and Hekkert 2010b	Scarves, breakfast trays	Role & hierarchy of different modes	X	X				Warmth, Pleasantness	The results suggest that color and material contribute equally to the judgments of warmth. General pleasantness of a product is not only based on pleasantness of color and material.
Gottfried and Dolan 2003	Odors and pictures of products	Multi-modal perception and strategies	X			X		Crossmodal semantic associations	Indication that human hippocampus mediates reactivation of crossmodal semantic associations, even in the absence of explicit memory processing.

Author	Stimuli	Analyzed Aspects	Vision	Touch	Audition	Smell	Taste	Dependent Variable	Findings
Krishna, Elder, and Caldara 2010	Products with two different properties of touch (texture, temperature) and smell (feminine and masculine scent)	Cross-modal correspondence & congruence	X			X		Semantic associations, haptic perception, aesthetic experience and product evaluation	Multi-sensory semantic congruence of a stimulus enhances haptic perception and product evaluation.
Krishna and Morrin 2008	Product Container	Cross-modal correspondence & congruence	X	X				Consumers' judgments of container content (water)	Consumers high in the autotelic need for touch are less affected by nondiagnostic haptic cues compared to consumers low in the autotelic need for touch.
Lindstrom 2005	-	Multi-modal perception & strategies	X	X	X	X	X	-	Collection of managerial guideline for multi-sensual branding
Littel and Orth 2013	Bottled water	Cross-modal correspondence & congruence	X	X				Brand personality, quality, evaluation, attractiveness, price expectation, congruence	Identification of 6 holistic bimodal key designs based on brand visual & haptic factors. Relating key designs to unique single-modal brand impressions. Analysis of brand evaluation dependent on semantic congruency (haptics & visuals).
Ludden and Schifferstein 2009	Products with typical and atypical scents	Cross-modal correspondence & congruence	X			X		Overall product evaluation	Scented products evoke surprise and are evaluated moderately positively.
Ludden, Schifferstein, and Hekkert 2009	12 products with visual or tactual incongruities	Cross-modal correspondence & congruence	X	X				Consumer response surprise	Use of unknown materials can contribute to surprises in products. Positive evaluation depends on product category and the individual.
Reimann et al. 2010	Packaging design	Cross-modal correspondence & congruence	X	X	X	X		Reward value, product evaluation, product preference, reaction time	Based on functional magnetic resonance imaging, the authors suggest that esthetic packages significantly influence the reaction time and preference, and show increased activation in the nucleus accumbens and the ventromedial prefrontal cortex.
Schifferstein 2006	45 consumer products	Cross-modal correspondence & congruence	X	X	X	X	X	Importance for product usage, frequency of use	Author suggests that relative importance of the different modalities depends on the product type and performed task.
Schifferstein and Cleiren 2005	Three food and three non-food products	Multi-modal perception & strategies	X	X	X	X	X	Associations, memories	Based on a split-modality approach authors suggest that visual and tactual information provides the most functional information and that vision dominates the other senses .
Schifferstein and Desmet 2007	Common daily activities (such as squeezing an orange)	Role & hierarchy of different modes	X	X	X	X		Product evaluation, personal well-being	Results suggest that sensory impairments affect product experience and personal well-being. Blocking vision has the largest loss of functional information.
Schifferstein and Spence 2008*	-	Cross-modal correspondence & congruence	X	X	X	X	X	-	Literature overview of multi-sensory product experience.
Schifferstein et al. 2010	Products with different pleasantness scores	Cross-modal correspondence & congruence	X	X	X	X		Pleasantness	Vision is the dominating modality for the two investigated products. Smell affects the activity while touch and sound the potency dimension of product experience.

Author	Stimuli	Analyzed Aspects	Vision	Touch	Audition	Smell	Taste	Dependent Variable	Findings
Shimojo and Shams 2001*	-	Cross-modal correspondence & congruence	X	X	X			-	Based on behavioral and brain imaging literature review authors suggest that cross-modal interactions are the rule and the cortical pathways are modulated by signals from other modalities.

*Literature review
Source: author's own selection

Role and Hierarchy of Modalities

Recently, consumer researches have investigated which role different modalities play in communicating information (e.g., functional, emotional) about an object (e.g., Fenko, Schifferstein, and Hekkert 2010a). They imply that vision and haptic information offer the most useful and detailed information about a product, its function, form, size, and quality. Various studies suggest that vision is central for the correct and fast task completion (e.g., Schifferstein and Cleiren 2005)). Information input derived by vision is easier and quicker to process and most of the time earlier available, provides the most function-related information, and is linked to stored knowledge providing additional background information about the product. For example, by looking at a big skyscraper in New York, the person can easily make judgments about the size, the form, the proportions and the materials used by looking at it. In theory, he also could get the same information by touching it. Due to the product type and its nature (size) it is impossible or will take much longer than by looking at it (Schifferstein and Desmet 2007; Schifferstein and Spence 2008). But vision also blocks and masks the perception of other senses (Schifferstein and Desmet 2007; Schifferstein and Spence 2008).

Audition and olfaction alone were not useful to provide information to identify the product (Schifferstein and Cleiren 2005; Schifferstein and Spence 2008). Although olfactory and auditory sensory input does not provide much functional information alone, both senses trigger affective responses. It is acknowledged that memories based on smell tend to be more intense and emotional than memories evoked by other senses (Chrea et al. 2009; Herz 2004; Herz and Schooler 2002).

The absence of one or more modalities results in a decrease of reactions. Hence, all senses contribute to how an object is experienced. Depending on the type of senses this may be more function, emotion, or memory related (Schifferstein and Desmet 2007; Schifferstein and Spence 2008).

Regarding the hierarchy of senses, researchers conclude that some senses dominate other senses perceiving a product design and hence, providing different types of information at different levels of intensity. Sensory dominance is defined as the relative importance of different sensory modalities (Fenko, Schifferstein, and Hekkert 2008). The particular importance of one sense depends on different aspects (Peck and Childers 2008; Schifferstein 2006; Schifferstein et al. 2010; Schifferstein and Spence 2008; Spence and Gallace 2011): first, the situation (location and time), second, the product type and the product itself, and third, the individual.

First, both the location and moment of contact (also referred to as stage of ownership) determine which sense dominates the perception (Fenko, Schifferstein, and Hekkert 2008, 2010a). During the process of acquisition vision may play a much more important role than after some time of usage and ownership when tactile impressions deliver the major information input and feedback (Schifferstein and Spence 2008). For example, Fenko, Schifferstein, and Hekkert (2010a) investigated sensory dominance for product experience in the relation to time. They asked participants to describe their product experience at different stages of ownership: the moment of purchasing, owning it one week, one month, and one year. Based on the results, the authors concluded that the dominance of one sensory mode changes over time of consumer-product-interaction. Although vision is the most important sense during purchasing, touch gets increasingly more important over time. After one year, vision, touch, and audition have the same importance for a positive product experience. The authors noted that the sensory dominance is closely linked to the product category and hence is strongly product-dependent.

Second, the product type and the product itself determine which sense may dominate its perception. Eating a meal in a restaurant, its taste is the crucial aspect for consumer liking. Buying a car, its visual impression may dominate customer liking. Yet, the feeling of textures, the sounds of doors and engines, as well as the smell of the interior play an important role (Schifferstein and Cleiren 2005; Schifferstein and Spence 2008).

Third, the dominance of one or two modalities also may depend on the individual (Peck and Childers 2003a, 2008). Depending on capacities, preferences, product type or the context one may use a certain sense more frequently or it is more important for oneself. Based on the long established knowledge that haptic information influences consumer reactions as well as the understanding that the need for and ability to process haptic information differs among humans, Peck and Childers (2003a) developed the 12-item “Need for Touch” (NFT) scale. In seven experimental studies the authors demonstrated the effect of haptic sensations on direct

experience and product evaluation moderated by NFT. Is to say, the induced lack of direct experience for people higher in NFT results in less confident judging.

Cross-Modal Correspondence and Sensory-Congruity

Sensory perception is also influenced by cross-modal correspondence between single modalities. Recent behavioral and brain imaging studies challenge single modal approaches by suggesting that cross-modal interactions are the rule and not the exception, and that cortical pathways previously thought to be sensory-specific are modulated by signals from other modalities (Reimann et al. 2010). Is to say, people receive the same, congruent information looking at and touching an object (e.g., looks like a sharp corner and feels like a sharp corner) (Lederman and Klatzky 2004; Lindstrom 2005; Reimann et al. 2010; Spence and Gallace 2011). This is based on two different aspects. On the one hand cross-modal correspondence is formed and influenced by prior experiences and stored knowledge. Prior experiences evoke certain expectations regarding sensory input. Seeing a certain material, for example leather, people expect a certain sensation touching it based on their prior experiences (Schifferstein and Spence 2008). On the other hand cross-modal correspondence also may occur based on resemblance and not on prior experiences. In particular, studies confirm this proposition for the relation between olfaction and vision. People combine a certain color or certain ornaments with certain types of smells. Perfume industry uses this insight in order to visualize and communicate their fragrances (Gottfried and Dolan 2003; Scharf and Volkmer 2000; Schifferstein and Spence 2008).

Further, Krishna, Elder, and Caldara (2010) showed in two experiments the impact of smell on touch by exploring the semantic associations of texture and temperature. In particular they investigated how the multi-sensory semantic congruence of smell and touch properties enhances haptic perception and product evaluation. It is acknowledged that a sensory congruity is positively correlated to preference and liking of an object and its design (Bell, Holbrook, and Solomon 1991; Schifferstein and Spence 2008; Veryzer and Hutchinson 1998). Schifferstein and Spence (2008) introduce the design strategy of congruity describing Alessi's "Mary Biscuit", a cookie box made of plastic. The designers of the box consequently integrated elements that not only evoke the associations of cookies but which all evoke the same kind of mood and associations (e.g., warm plastics, form of a cookie, plastic smells of vanilla cookies) (Ludden and Schifferstein 2009).

Using different design elements or materials to evoke incongruent sensory perceptions can also be applied on purpose to evoke surprise. Ludden, Schifferstein, and Hekkert (2009) investigated the effect of vision-touch incongruent sensory perception on consumer reactions.

Dependent on the product category and product category knowledge, the reactions of surprise differ. Interacting with products of well-known product categories participants show immediate reaction of surprise and understand the incongruent application of design elements, whereas participants interacting with more unknown categories need more cognitive effort to understand the incongruent sensory information input. Moreover, participants in the well-known product category group showed stronger reactions than the other group.

Multi-Modal Perception

As discussed in this chapter (2.2.1.2), recent studies in neuroscience, psychology, and marketing have confirmed that human beings perceive an object and its appearance in a multi-modal way (Lindstrom 2005; Reimann et al. 2010; Schifferstein and Spence 2008; Shimojo and Shams 2001; Spence and Gallace 2011). Especially, for practitioners a multi-modal approach seems to be currently a key element regarding the success of products. Hence, multi-modal approaches and strategies are very popular in marketing. Using several case studies and real life examples Spence and Gallace (2011) explain the effects of multi-sensual marketing and products on consumer reactions. Further, Lindstrom (2005) develops guidelines for practitioners how to use a multi-modal strategy to engage consumers and strengthen the brand. Using several case studies and real life examples the author explains the effects of multi-sensual marketing and products on consumer reactions.
Some researchers and practitioners even expect a change of consumer behavior regarding the interaction with products due to increased application of multi-sensory design strategies and the use of congruent and incongruent elements (Brakus, Schmitt, and Zarantonello 2009; Lindstrom 2005; Raz et al. 2008; Schifferstein and Spence 2008; Schmitt 1999a, 2010; Spence and Gallace 2011).

Summing up, researchers from different disciplines have thoroughly investigated sensory perception of objects. Historically, perception mostly has been viewed with a single-mode perspective based on the conviction that sensory modalities operate independently of each other. By now it is generally accepted that a product and its design are perceived by all senses. Not all senses play the same role, are perceived consciously, or fulfill the same function interacting with and experiencing objects, but they all influence the perception of the design of a product and its impact on consumer behavior. Hence, analyzing senses separately can only display partly the object-consumer-interaction. In order to receive a full picture and analyze the perception of a design as whole, one has to apply a holistic approach and framework.

2.2.2 Design-Evoked Consumer Responses

Besides the perception of product design, researchers have assessed consumers' psychological and behavioral responses to the outer appearance to products (e.g., Blijlevens, Mugge, and Schoormans 2009; Bloch 1995; Littel and Orth 2013). As the authors Crilly, Moultrie, and Clarkson (2004), conceptualized a design acts as a transmitter of a certain message embedded in the context of consumption (compare chapter 2.1.1.3). Reception of the encoded message arouses cognitive, affective, and behavioral responses. Behavioral responses summarize behavioral and social response such as approaching the object or talking to others (see Figure 3).

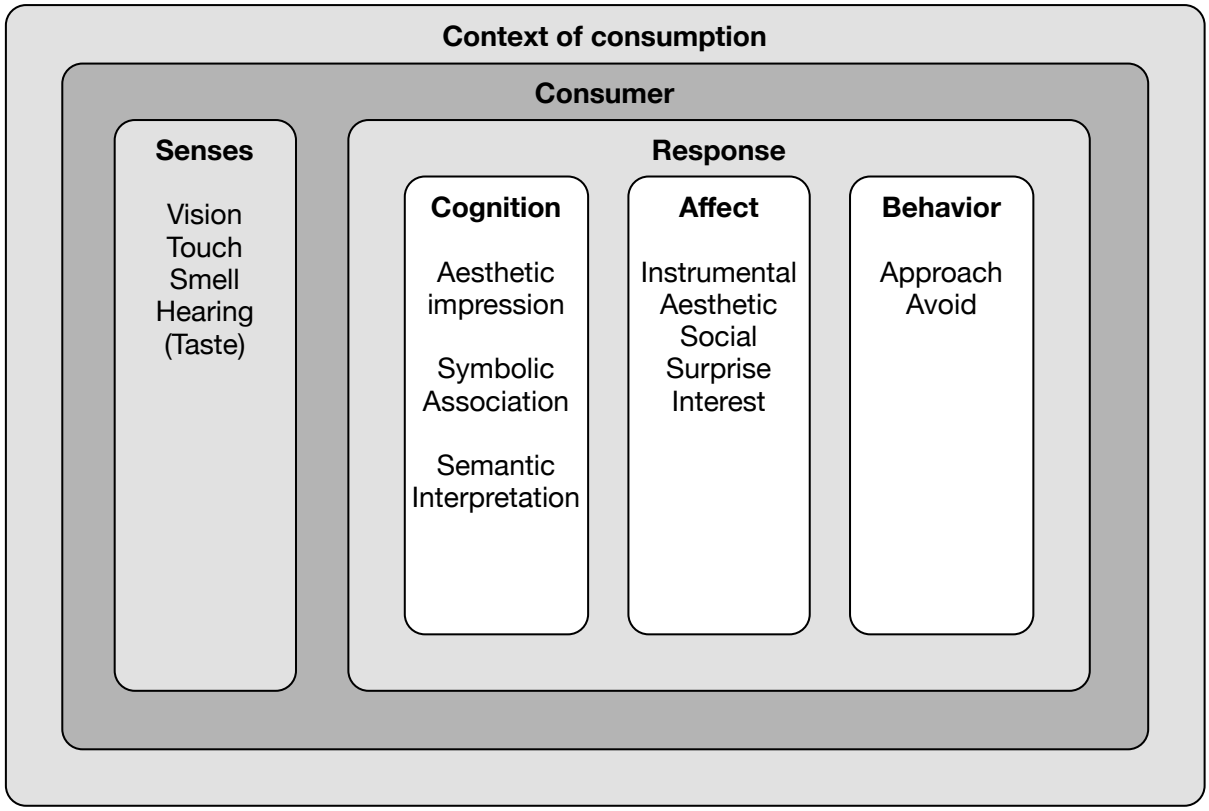


Figure 3: Detail of Framework for Consumer Response to Product Design
Source: Crilly, Moultrie, and Clarkson 2004, p. 555

In order to map the territory of current research, this dissertation applies the framework of Crilly, Moultrie, and Clarkson (2004) and presents separately cognitive, affective, and behavioral responses in the following. Numerous researchers have focuses on cognitive responses, while affective responses and especially behavioral responses have attracted less attention so far. To conclude major established findings and relationships as well as to highlight research gaps, this work summarizes studies and their findings in various tables and introduces some studies and their findings more in detail starting with cognitive responses.

2.2.2.1 Cognitive Responses

A significant body of research attests to the importance that managers and scholars attach to the impact of product design on consumer behavior. In general, consumers' interactions with products involve cognitive evaluations and comparing a particular product to others of the same category (Bitner 1992; Bloch 1995). Beside its effect on evaluation, researchers have investigated design as an indicator for product attributes (Berkowitz 1987; Blijlevens, Creusen, and Schoormans 2009; Mugge, Schoormans, and Schifferstein 2008), for quality and performance (Mugge, Govers, and Schoormans 2009; Page and Herr 2002; Teas and Agarwal 2000), or as a source for associations (Ampuero and Vila 2006), beliefs (Orth and Malkewitz 2008), attitudes (Bloch, Brunel, and Arnold 2003), product and brand personality (Brunel 2006).

The following Table 4 gives a selection of existing research activities that analyze cognitive reactions evoked by design.

Table 4: Overview of Research on Cognitive Reactions to Design

Study	Stimuli	Semantic Interpretations	Symbolic Associations	Dependent Variable	Findings
Aggarwal and McGill 2007	Automobiles, beverages		X	Affect, product, anthropomorphism, evaluation	Findings suggest that the ability to anthropomorphize a product and their consequent evaluation of that product depend on the extent to which that product is endowed with characteristics congruent with the proposed human schema.
Ampuero and Vila 2006	Packages differing in colors, typography, graphical forms, and images		X	Product-positioning strategy	Each positioning strategy seems to be associated to some particular packaging graphical elements transmitting desired consumer perception.
Batra, Brunel, and Chandran 2009	Visually attractive product design		X	Perception of quality and performance	A U- shaped relationship exists between visual attractiveness and perceived performance moderated by both brand information and access to processing capabilities.
Bitner 1992**	Physical surroundings	X	X	-	Development of a conceptual framework exploring the impact of physical surroundings on customers and employees.
Blijlevens, Creusen, and Schoormans 2009***	Pictures of 30 durable consumer products (e.g., household appliances, furniture, wall clocks)		X	-	Identification of appearance attributes (Modernity, Simplicity, Playfulness) based on consumer perception.
Blijlevens, Mugge, and Schoormans 2009	Pictures of 20 durable products from four product categories (wall clocks, dinner chairs, coffee-makers and mp3-players)		X	Perceived meaning "modernity"	Physical property "curvature" has a positive effect on the perceived meaning "modernity".
Bloch 1995**	Visual product form	X	X	-	Conceptualization of consumer responses to product form.
Brunel and Kumar 2007	Black and white picture of products (automobiles, telephones, TV sets, and wall- clocks)			Product evaluation	Aesthetic facets and personality evaluation differ based on the visual information about products; Evaluations of product aesthetic facets are linked to perceptions of product personality.

Study	Stimuli	Semantic Interpretations	Symbolic Associations	Dependent Variable	Findings
Creusen and Schoormans 2005	Telephone answering machines		X	Consumer product evaluation and choice	Identification and analysis of six different roles of product appearance and their effect on consumer choice.
Crilly, Moultrie, and Clarkson 2004**	Visual aspects of product design in general	X	X	-	Conceptualization of framework explaining consumers' response to visual domain in product design as communication process.
Desmet, Ortíz Nicolás, and Schoormans 2008	Combined visual and interaction stimuli (sel-made)		X	Product personality	The results indicate that it was possible to design interaction devices with different personalities, and that the effect of appearance is stronger than that of interaction style.
Govers and Mugge 2004	Pictures of toasters			Product attachment	Respondents indicated stronger attachments to products that were congruent with the owner's personality.
Govers and Schoormans 2005	12 real products: screwdrivers, coffeemakers, soap-dispensers, table wine.		X	Consumer preference	Consumers prefer self-image matching products. Product-personality congruence is independent of user-image congruence effect.
Hsu, Chuang, and Chang 2000	Telephones		X	-	Differences in the product form perception depending on professional background (designer / non-designer)
Karjalainen 2006**	Design elements of automobiles		X	-	Communication of brand identity by semantics evoked by product design.
Kumar and Garg 2010	Product Design		X	Pleasantness, attentional activity	Findings indicate an interactive relationship between harmony and typicality and affect appraisals of pleasantness and attentional activity. Results suggest a preference for designs with balanced levels of attentional resources needed and pleasantness in visually evaluating the design.
Kumar, Townsend, and Vorhies 2015	Automobiles		X	Brand affection, pride of ownership, passion	Conceptualizing the relationship between design-based values and affective brand-level relational outcomes and providing empirical evidence that product design-related values are multifaceted and can contribute to relational outcomes, such as brand affection.
Limon, Orth, and Kahle 2009	Packages of salt and chocolate		X	Brand values	Ability of packages to convey meaning in terms of brand values. Affirmation of their role as predictors of consumer purchase intentions depending on cultural groups.
Littel and Orth 2013	Bottled water		X	Brand impression	
Mugge 2011	Pictures of CD players, alarm clocks, water kettles, toasters, compact cameras		X	Performance quality	Product personality is a cue people use evaluating product's functional attributes.
Mugge, Govers, and Schoormans 2009**	Cars, Vacuum Cleaners		X	-	Development of a 20-item scale assessing product personality based on product appearance.
Orth and Malkewitz 2008	Package design (wine and perfume bottles), product design (eyewear, casual shoes, MP3 players, watches)		X	Brand impression	Five key types of package design (massive, contrasting, natural, delicate, nondescript).
Özcan and van Egmond 2012**	Three sounds of six product sound categories (air, alarm, cyclic, impact, liquid, mechanical)		X	-	Indication that perceptual factors (attention, roughness, smoothness, and temporal constancy) influence cognitive factors (power, machinery, and (un)familiarity) and emotional factors (unpleasantness).
Page and Herr 2002	Product treatments of consumer products		X	Liking, quality evaluations	Design and brand strength differentially affect liking and quality judgments.

Study	Stimuli	Semantic Interpretations	Symbolic Associations	Dependent Variable	Findings
Van Rompay et al. 2005	Jug, alarm clock		X	Product meaning	Confirmation of relation of object's figurative meaning and image schemas and their dependency of one's cultural background.
Van Rompay, Pruyn, and Tieke 2009	Water bottle		X	Product attitude, brand evaluation	Effects of advertising slogan –product shape (in)congruence depends on consumers' tolerance for information ambiguity.
Zhang, Feick, and Price 2006	Logos, trademark design		X	Aesthetic preference	Self-construal impacts preference for angular or rounded shapes. Individuals with independent self-construals perceive angular shapes as more attractive, while ones with interdependent self-construals prefer rounded shapes.

*Literature review only
**Conceptualization of theoretical framework
Source: author's own selection

The conceptualization of Crilly, Moultrie, and Clarkson (2004) offers a systematized approach to these cognitive aspects. They classify cognitive responses into aesthetic impressions, semantic interpretations and symbolic meaning (See Figure 4).

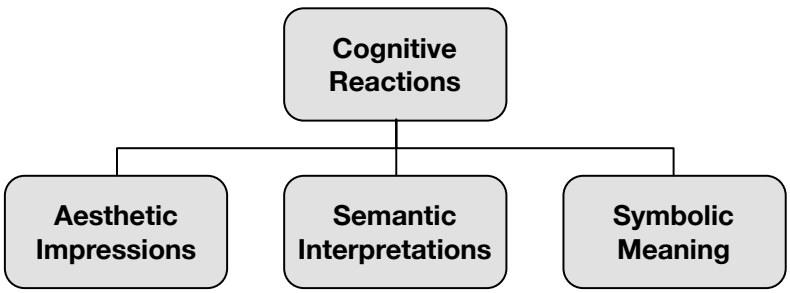


Figure 4: Types of Cognitive Consumer Reactions Evoked by Product Design
Source: author's own illustration adapted from Crilly, Moultrie, and Clarkson 2004

Aesthetic impressions reflect perception of a product as attractive or unattractive. Contrasting semantic interpretations also referred to as product semantics deal with the comprehensibility of a product and its functions. Symbolic associations also referred to as symbolic or product meaning include meanings and symbolic associations about a product, brand and user. Due to the complexity of the later two groups and the growing research interest, this dissertation describes semantic interpretations and symbolic associations more in detail in the following.

Semantic Interpretations

As Krippendorff and Butter (1984) claim, consumers must easily understand a product, its function and how it works. Hence, the design of a product has to explain the product itself, its

functions and usage. Krippendorff and Butter (1984) call this aspect product semantics. The shape, color, and material of a product have to communicate where to touch and how to push. For example, based on product semantics communicated by a product design a user knows how to use or handle a product. Is to say, seeing a round doorknob one is guided to place the whole hand on it and to push or pull. While a door handle slightly curved like a downward pointing half moon invites to place the whole hand on it and to push it downwards (See Table 5).

Table 5: Comparison of Door Knob and Handle

Source: author's own composition, pictures: FSB, 2015; Türen Shop, 2015

Further, based on cognitive comparisons consumers try to understand, identify and categorize products. Regarding the perceived similarities between a product and representatives of product categories a consumer cognitively evaluates a product and places it in an adequate category. Depending on the level of unusual shape or color-coding, a new product is difficult to process and categorize. In general, consumers prefer products that are only moderately incongruent with respect to existing products (Bloch 1995).

Symbolic Meaning

Besides delivering aesthetic delight and information about its category and usage, a product design also transports symbolic meaning, also referred to as symbolic associations, or product meaning (Creusen and Schoormans 2005). In general, symbolic meanings represent those properties consumers perceive in products that are not literally part of a product design (Van Rompay, Pruyn, and Tieke 2009). The communicated meanings help the individual to evaluate the product on different motives: aesthetic, functional, ergonomic, and symbolic (Blijlevens, Mugge, and Schoormans 2009).

Recently, symbolic meaning with respect to consumer decision-making, formation of brand and product impressions has gained importance in consumer behavior, marketing, and design research (Bloch 1995; Creusen and Schoormans 2005; Karjalainen 2006; Orth and Malkewitz 2008; Van Rompay, Pruyn, and Tieke 2009). It is acknowledged that by communicating predefined meanings through the visual appearance of a product, a company can gain a competitive advantage and make a product more successful (Blijlevens, Mugge, and

Schoormans 2009; Bloch 1995; Hertenstein, Platt, and Veryzer 2005; Yamamoto and Lambert 1994). Hence, also practitioners show a growing interest in symbolic meaning transferred by design. Symbolic meaning can be divided into two subgroups: appearance attributes and symbolic brand and product characteristics.

First, while looking at a product one perceives certain physical aspects that together add up to a product's design. Physical aspects can be for example, the color, the overall form or the material of a button (Blijlevens, Creusen, and Schoormans 2009). The combination of these aspects creates a special look. A certain **appearance attribute** describes the combination of the utilized aspects - the look. In comparison to single physical aspects, attributes are more abstract. The sum of appearance attributes provides the overall impression of a design and the product (Blijlevens, Creusen, and Schoormans 2009). Over the last years various appearance attributes have been analyzed and investigated: proportion and typicality (Veryzer and Hutchinson 1998); modernity, simplicity, and playfulness (Blijlevens, Creusen, and Schoormans 2009); massiveness, naturalness, and delicateness (Orth and Malkewitz 2008). For example, Van Rompay et al. (2005) confirm a relation between a product's relative height and its perceived dominance. Depending on height a product is typified as aggressive, cute, modern, or old-fashioned. Zhang, Feick, and Price (2006) showed that rounded shapes are generally perceived more harmonious and less aggressive than angular ones. In two consumer studies Blijlevens, Creusen, and Schoormans (2009) identified and classified three generalizable appearance attributes that consumers use to differentiate the appearance of durable products. The authors confirm the attributes modernity, simplicity, and playfulness for different product categories and give guidelines for designers how to evoke pre-specified meanings. For packaging design, Orth and Malkewitz (2008) developed empirically-based guidelines to create package design types that evoke desired consumer responses by identifying five holistic key design types: massive, contrasting, natural, delicate, and nondescript design. In seven empirical studies they identified design elements that differentiate these types and assess the relation of design types and brand impression using perfume and wine bottles as stimuli.

Second, also **beliefs about a brand** or **symbolic brand characteristics** such as a brand's image or personality are created and conveyed by the design and design style applied to a product (Aaker 1997; Henderson, Giese, and Cote 2004; Karjalainen 2006; Orth and Malkewitz 2008; Underwood 2003). According to Bloch (1995), the shape of a product

affects the perception and beliefs regarding technical characteristics such as durability, ease of use, and technical sophistication. Moreover, also beliefs about its dollar value and quality are derived based on a product's form (Mugge 2011). Batra, Brunel, and Chandran (2009) investigated the effect of visually attractive design upon consumers' perceptions of quality. Based on a model of visual information processing, in particular assimilation-contrast and implicit personality theory, they found out that a U-shaped relationship exists between the perceived visual attractiveness and performance. This relationship is moderated by available brand information and the access to processing capabilities.

Besides the obvious visual elements such as color, shape, and proportion also design aspects such as product sounds elicit semantic associations (Özcan and van Egmond 2012). For example, pushing a button of an automatic water kettle evokes either a solid sound with smooth travel or a tinny sound with a cheap feel evoking different associations of quality. Besides the formation of brand impression and the communication of brand personality, the product itself also connotes symbolic meaning about its own personality (Govers 2004; Govers and Schoormans 2005; Jordan 2000; Mugge, Govers, and Schoormans 2009). Brand and product personalities summarize human personality characteristics that are used to describe a specific brand (represented by a product) or product variants based on its overall appearance (Aaker 1997; Aaker, Benet-Martínez, and Garolera 2001; Brunel and Kumar 2007; Govers and Schoormans 2005). Brand personality conceptualized by Aaker (1997) consists of five dimensions and is one of the key tools to systematically assess and evaluate brand impressions. Due to its importance, marketing, consumer behavior, and design research have given a considerable amount of attention to the concept in combination with personality impression based on design (Govers and Schoormans 2005; Johar, Sengupta, and Aaker 2005; Mugge, Govers, and Schoormans 2009; Underwood 2003). In contrast to brand personality, product personality applies to one product variant, is less abstract, and directly related to the product itself (Govers and Schoormans 2005). Recent studies investigated the effect of variation in physical propositions such as shapes (Govers, Hekkert, and Schoormans 2004), material (Kersteren, Stappers, and Kandachar 2005), sound, texture, or smell (Janlert and Stolterman 1997), and person-product interaction (Desmet, Ortíz Nicolás, and Schoormans 2008) on consumers' perception of product personality.

For example, comparing a Fiat 500 and Lamborghini Gallardo, a very different predefined meaning is communicated by the design of these two cars (See Table 6 and Table 7) (also compare (Aggarwal and McGill 2007).

Table 6: Comparison of Car Design Elements and References

Brand and Type	Picture of Car	Pictorial Representation of Evoked Charateristics
Fiat 500	 Picture Topspeed 2015	 (opnews 2015
Lamborghini Gallardo	 HD Wallpapers 2015	 123RF 2015

Source: author's own composition

The design language of the Fiat 500 creates the image of a cheeky, but friendly personality. In contrast, the Lamborghini Gallardo is perceived as aggressive, powerful, and sporty. Using certain design elements the design teams create a certain picture and associations, e.g., circular versus angular forms for the overall shape, headlights, bonnet, or grill. By designing the front of the car like a face, positioning headlights like eyes or the grill like a nose or mouth, designers apply deliberately metaphors and references to human beings or animals and the car has human- or animal like features. By applying typical baby face elements such as letting the headlights appear as round, big eyes and the grill as a smiling mouth, a friendly appearance can be created. On the other hand by using angular shapes for the recessed headlights, hard edges and strong, straight lines for the bonnet, grill or headlights, references to wild big-cats are made. In proportion to the size of the whole car the windows of the Fiat 500 are comparably big, while the windows of the Lamborghini Gallardo are much smaller. They also differ in shape. The Fiat 500 has round corners creating the image of openness and trust, while the form of windows of the Lamborghini are almond-shaped and narrow, reminding of narrowed eyes of a big-cat alarmed or ready to attack. The following Table 7 gives a compact overview of the used design elements.

Table 7: Comparison of Car Design Elements of Two Brands

Design Element	Fiat	Lamborghini
Shape	Compact, round, cohesive	Angular, flat, aggressive stance
Roof line	High, roundish	Low, flat
Waste line	High	Very low
Proportion	Small	Large
Side windows	Round, big in proportion to the rest	Almond-shaped, narrow, small in proportion to the rest
Wheels	Regular size	Big in proportion to the rest
Bonnet	Rounded corners, small	Large in proportion to the rest
Grill position	Front	Two at each side and one in front split into to parts separated by bonnet bridge
Grill form	Rounded off corners,	Angular, recessed
Head lights	Circular	Polygonal shape, angular, deeply recessed

Source: author's own composition

Additional, Brunel and Kumar (2007) confirm the existence of a systematic relationships between visual product aesthetics and product personality. Further, Brunel (2006) conceptually and empirically linked consumers' assessment of visual product aesthetics to the perception of product personality. In a large experimental study with 250 participants Brunel assessed attitude, personality and aesthetic perception of four product categories (automobiles, TV sets, wall-clocks, and telephones). Each participant received randomly two experimental booklets containing a black and white picture of one stimulus and set of measurement scales. Brunel confirms a systematic relationship between visual aesthetic dimensions of products and product personality and that each investigated product personality trait is represented by a product design. This relation also applies for different design styles and product categories. Mugge, Govers, and Schoormans (2009) support designers in creating visual appearances that connoted predefined meanings by developing a product personality scale to assess validly, reliably and objectively a product's personality.

For packaging design, Orth and Malkewitz (2008) developed empirically based guidelines containing five holistic design types and analyzed how these types are related to consumer brand impressions.

Consumer preference for products is influenced by the congruence of the symbolic meanings of a product/brand connoted by a product design and their self-concept (Aaker 1997; Govers and Schoormans 2005; Janlert and Stolterman 1997). This applies to both, brand and product personality, both derived through symbolic meaning of the visual appearance of a product.

Further, Govers and Mugge (2004) proved that a product-consumer-personality congruence influences product attachment positively[3].

Taken together, the results suggest that product design is one very influential means for shaping cognitive consumer reactions. As shown, product design evokes different kinds of cognitive reactions such as aesthetic impressions, semantic interpretations and symbolic meanings. The design of a product can be interpreted as a guideline to use and handle the product (semantic interpretations) as well as a source of attributes, brand and product characteristics (symbolic meaning). Hence associations, product and brand personalities are conveyed by a design, and managers actively use the design to support their competitive advantage. As demonstrated, scholars and practitioners alike assign great importance to cognitive dimension of product design. Academia has investigated with great enthusiasm single aspects and types of cognitive reactions, yet a holistic approach on the meta-level combining the different aspects is still missing.

2.2.2.2 Affective Responses

Also theoretical and empirical support exists for affective responses to the outer appearance of products, their design in general or single design aspects (e.g., color, shape) (Bloch 1995; Chang and Wu 2007; Crilly, Moultrie, and Clarkson 2004; Desmet 2003; Hsiao and Chen 2006; Miesler, Leder, and Herrmann 2011; Mugge, Schoormans, and Schifferstein 2008; Orth and Malkewitz 2008; Spence and Gallace 2011) (see Table 8). The steadily growing importance of emotional aspects in design cumulated in the foundation of the first research conference focusing solely on design and emotion in 1999 (Demir 2008).
Some researchers are convinced that emotional reactions to a product derived through its design are more important and critical for its success than the practical and functional elements (Bloch 1995; Hsiao and Chen 2006; Norman 2005; Page and Herr 2002). Further, it is established that consumption, buying and owning of products elicit emotions and that the outer appearance of products strongly influence the consumption and shopping experience (Desmet, Overbeeke, and Tax 2001).

[3] Assessing symbolic meaning and cognitive reactions in general, one has to bear in mind that perceptions depend on the background and prior experiences of the observers (Demirbilek and Sener 2003). Recent studies have confirmed the proposition that the perception of appearance attributes and derived meaning based on product design differs depending on the professional background of the observer (professional designers versus non-designers) (Blijlevens, Creusen, and Schoormans 2009; Hsu, Chuang, and Chang 2000; Krippendorff 1989). In addition, Van Rompay, Hekkert, Saakes, and Russo (2005) empirically investigated and confirmed the impact of cross-cultural differences on connoted symbolic meaning in product design. For more indepth elaboration of person related influencing factors, see Chapter 4.2.4.

In general, almost all our interactions involve or imply emotions. The interaction with products and their outer appearance elicit all kinds of different emotions; positive or negative ones (Bloch 1995; Desmet, Hekkert, and Jacobs 2000). Yet Crilly, Moultrie, and Clarkson (2004) suggest that emotions evoked by a product or a design are in general less intense than emotions evoked by an event or another person.

Additionally, the proposition that affective and cognitive reactions happen simultaneously was confirmed in consumer behavior (Bitner 1992; Blijlevens et al. 2012; Hoegg, Alba, and Dahl 2010; Norman 2002) and recently by neuroscience using functional Magnetic Resonance Imaging (Khalid and Helander 2006).

Table 8: Overview of Research on Affective Reactions to Design

Study	Stimuli	Dependent Variable	Findings
Bitner 1992**	Physical surroundings	-	Development of a conceptual framework exploring the impact of physical surroundings on customers and employees.
Blijlevens et al. 2012	Toaster	Aesthetic appraisal	Analysis of effects and relationship with typicality and arousal on aesthetic appraisal of product designs. Typicality has a curvilinear and arousal a positive linear relationship and influences aesthetic appraisal independent from typicality.
Bloch 1995	Product form	Positive and negative affective responses	Affective responses to product form can be negative or positive (valence), moderate or strong (intensity). Formed on basis of intrinsic elements. Derive more likely on sensory properties and design of product than functional elements.
Chang and Wu 2007	Images of household products (kitchen and high-tech products, household appliances)	Consumer attention, pleasure	Identification of 14 product forms characteristics that could be categorized into five types of pleasurable forms (Aesthetic, Bios, Cultural, Novelty, Ideo).
Chrea et al. 2009	24 odorants	-	Analysis of affective responses to odors that differ from the classical taxonomies of emotion such as posited by discrete or bidimensional emotion theories.
Crilly, Moultrie, and Clarkson 2004**	Visual aspects of product design in general	-	Conceptualization of framework explaining consumers' response to visual domain in product design as communication process.
Demir 2008*	-	-	Overview of three interrelated emotional concepts for consumer-product-interaction: emotional responses, emotional experiences, and emotional relationships.
Demirbilek and Sener 2003	Good Design Award winning products	Happiness	Emotional responses to products and product attributes vary between different generations, social groups, nationalities and cultures.
Desmet 2003**	Product design	-	Conceptualization of framework explaining emotional reactions to product design resulting from an appraisal process based on cognitive evaluations.
Desmet, Hekkert, and Jacobs 2000	Cars	-	This paper introduces the Product Emotion Measure (PrEmo), an instrument to assess emotions elicited by product appearance. The non-verbal self-report instrument is based on a set of 18 product emotions. he paper discusses the development of PrEmo in the context of existing instruments.

Study	Stimuli	Dependent Variable	Findings
Desmet, Overbeeke, and Tax 2001	Mobile telephones	Emotional value	Developing and testing of a framework and a non-verbal instrument to measure emotional responses.
Green and Jordan 2002**	-	-	Developing a guideline to enhance the appeal to use holistically, leading to products that are a joy to own.
Fenko, Otten, and Schifferstein 2010b	Product properties of consumer products	-	Development and testing of questionnaire to measure the importance of the five sensory modalities for various descriptors of product experience.
Hassenzahl, Beu, and Burmester 2001	User interfaces	-	Developing a systematic approach to joy in user experience taking into account hedonic quality, and its complex interplay with usability and utility.
Hsiao and Chen 2006	Automobile, sofa, kettle (large, medium, small products)	Dimensions of affective responses	Identification of four fundamental dimensions underlying affective judgment: trend, emotional, complexity, and potency factor. Extraction of shape features for each dimension.
Khalid 2006**	Product Design	-	Framework, called Hedonomics, which incorporates characteristics of users, tasks, products, and use environment highlighting the importance of emotions in enhancing the value of products and linking affect to cognition.
Khalid and Helander 2006**	Product Design	Pleasure, satisfaction	Conceptualization of framework analyzing customer emotional needs in relation to the designer's environment to achieve a pleasurable and satisfying product.
Miesler, Leder, and Herrmann 2011	Car fronts manipulated in accordance with the baby schema	Affective consumer response	Conformation of positive affect of evolutionarily-implemented features (baby-schema) to visual product design (automobiles) on affective responses.
Mugge, Schoormans, and Schifferstein 2008	Toaster	Attachment	The degree of attachment to a product is determined by pleasure, self-expression, group affiliation, and memories.
Norman 2002**	Consumer products	-	Norman argues that aesthetically pleasing objects appear to be more effective, by virtue of their sensual appeal based on the formation of an emotional connection with an aesthetically appealing object.
Norman 2005**	Consumer products	-	Developing of framework to explain advantages and characteristics of emotional design.
Orth and Malkewitz 2008	Package design (wine and perfume bottles), product design (eyewear, casual shoes, MP3 players, watches)	Brand impression	Five key types of package design (massive, contrasting, natural, delicate, nondescript).
Roehm and Roehm 2010	Packaging	Arousal	Variety seeking is greater in product categories where packaging is similar among competitor and packaging display has relatively low arousal potential.
Ortony, Norman, and Revelle 2005**	Computational artifacts	-	Development of effective functioning model depending on the interplay of four relatively independent domains, namely, affect, motivation cognition, and behavior.
Van Rompay and Pruyn 2011	Consumer products	Brand credibility, brand aesthetics, and brand value, price expectations	Based on processing fluency accounts, the authors argue that shape-typeface congruence facilitates stimulus processing.
Westerman et al. 2012	Packaging with angular and rounded design elements	Preference for consumer products	Preference for rounded designs with additive effects of contour and graphics shape.
Zhang, Feick, and Price 2006	Logos, trademark design	Aesthetic preference	Self-construal impacts preference for angular or rounded shapes. Individuals with independent self-construals perceive angular shapes as more attractive, while ones with interdependent self-construals prefer rounded shapes.

*Literature review only
**Conceptualization of theoretical framework
Source: author's own selection

Based on the multidisciplinarity of design research, a variety of different approaches to emotional responses to design exists (Demir 2008). While human-interaction, ergonomics, and applied design research focus on the actual design process, product development concentrates more on practical methods and the question which particular aspects (e.g., color, shape) evoke which kind of emotions. Disciplines with a consumer behavior and psychological view focus more on theoretical concepts based on universal emotion processes (Desmet 2008).

Emotional responses, such as emotions or feelings (Crilly, Moultrie, and Clarkson 2004) are summarized by affective states or affect [4]. Affect is seen as the simplest and most universal positive or negative feeling (Desmet 2008; Zajonc 2000). It encompasses all subjective experiences that are valenced (Desmet and Hekkert 2007). This means that they include the subjective perception to be good or bad, pleasant or unpleasant. In experimental research valence is generally used as a bipolar dimension (pleasure – arousal[5]) to explain and distinguish affective states (Bradley and Lang 1994; Desmet and Hekkert 2007; Plutchik and Kellerman 1989).

Various studies analyzed the effect of store layout and design (Ballantine, Jack, and Parsons 2010; Bellizzi and Hite 1992; Bitner 1992; Orth and Wirtz 2014), packaging design (Lupold 2010; Roehm and Roehm 2010; Westerman et al. 2012) and product design (Blijlevens et al. 2012) on these two dimensions. Blijlevens, Carbon, Mugge, and Schoormans (2012) investigate the effect of typicality and arousal on aesthetic appraisal by manipulating prototype deviation and color saturation. In an experimental study using five hand-juicers as stimuli the authors confirmed that aesthetic appraisal was positively influenced by induced arousal. The advantage of dimensional theories regarding visual product emotions is that all types of emotions ranging form low to high arousal and from positive to negative ones are included. Further, dynamic continuous changes can be described using dimensional models (Desmet 2008).

[4] Mood and attitudes are also counted as affective states. Yet for the present work, these two are not of further importance and therefore, this work is not further elaborating and analyzing the relation of mood or attitudes and design in the present work (compare Desmet 2008; Wensveen 2005).

[5] The often-cited Pleasure-Arousal-Dominance scale developed by Russell and Mehrabian (1977) assess emotions based on the assumption that all emotions share the same underlying bipolar dimensions. The dimension pleasure is measured with a semantic differential (pleasure – displeasure) while arousal is assessed measuring the level of emotional arousal (Mehrabian and Russel 1974). By adding physiological arousal in a circular two-dimensional model, Russell (2003) expanded the concept of general affect to core-affect. Core-affect is always experienced and can range from extreme to neutral. It can occur directed on a particular stimulus or can be experienced without an obvious trigger. Visualizing core-affect in a coordinate system the horizontal axis stands for valence ranging from pleasant to unpleasant while the vertical axis represents arousal ranging from calm to excitement (compare Desmet 2008; Russell 2003).

In contrast to affect, emotion is always evoked by a particular stimulus; a specific person, event, or object. Further, this stimulus triggers a substantial and acute change in core affect (Desmet 2008; Ekman 1994; Russell 2003) that is attributed to the above-mentioned particular stimulus. Emotions can be summarized as subjective affective experiences (Demir 2008; Izard 1977). In other words: an individual is happy about his or her new scarf, disappointed by a good friend and satisfied with the surface of his or her smart phone and not with smart phones in general. Emotions are regarded as functional, because they structure one's position toward his or her surroundings, pull him or her to particular objects and away from others (Desmet and Hekkert 2007; Frijda 1986). In general, a product design can evoke positive as well as negative emotions (Bloch 1995).
Scholars have analyzed the effect of product design on single emotions such as surprise or satisfaction, pride, happiness, attraction, disgust, shame, or anger (Bitner 1992; Bloch 1995; Chang and Wu 2007; Demirbilek and Sener 2003; Desmet 2003; Desmet, Overbeeke, and Tax 2001; Fenko, Schifferstein, and Hekkert 2010b; Hassenzahl, Beu, and Burmester 2001; Holbrook and Zirlin 1985). For example, Zhang, Feick, and Price (2006) demonstrate that round shapes evoke more friendly emotions while angular shapes elicit more unfriendly and aggressive emotions. Moreover, Van Rompay and Pruyn (2011) suggest that congruent design elements evoke more positive emotions and are more liked by participants.
Further, Chrea et al. (2009) confirmed that multi-sensory design with special focus on odor is a powerful elicitor of emotions. By analyzing the structure of the relationship between product shapes and affective responses exemplarily for the three product categories automobile, sofa, and kettle, Hsiao and Chen (2006) detected the existence of a common perception structure making affective judgments.

Product and design emotions are emotions that are evoked by interacting with a product and / or its outer appearance. Hence, human-product-interaction and human-design-interaction should be regarded as a holistic phenomenon including emotions. To analyze the relation of product and emotion, different emotion concepts have been developed lately in design and related research disciplines (pleasure approach by Jordan (2000)[6], process-level approach[7] by Norman (2002, 2005), and the appraisal approach by by Desmet (2003)).

[6] Jordan bases his approach on a pleasure framework defining pleasure as the "emotional, hedonic, and practical benefits associated with products" (Desmet 2008, p. 387, cited in Jordan 2000). Jordan (2000) differentiates four types of pleasures: physio-pleasure (based on sensory input), socio-pleasure (derived from relationships with others), psycho-pleasure (based on cognitive and emotional responses), and ideo-pleasure (based on personal values). As Jordan (2000) shows, a product does not only evoke one kind of pleasure, but all four types are

Also a variety of methods and tools exist to support designers during the design process in order to create products that evoke predefined, specific emotions. Kansei Engineering is the most popular and wide spread among those[8]. These concepts focus on practical aspects, such as the creation and implementation of new design projects.
The present work concentrates on the appraisal approach by Desmet (2003), because it is the most applied and holistic approach to explain emotions evoked by a product and / or design (Desmet and Hekkert 2007).

The appraisal approach supporters consider cognition as a part of all three steps of processing. Hence, also visceral and behavioral emotions involve cognitive processing. In general, the appraisal theory among emotion theories is currently the most adopted one (Desmet and Hekkert 2007). Based on the assumption and the knowledge that cognition is always included in the emotion eliciting process, Desmet (2003) developed a basic framework of product emotions. The concept is characterized by its applicability to all possible emotions evoked by a product, its structuring of the emotion eliciting process and three key variables: appraisal, concern, and stimulus (see Figure 5 for a visualization of the appraisal process).

triggered and add up to the overall pleasure. Jordan's (2000) main goal of this approach is to give practical designers a guideline to understand the variety and profoundness of pleasures a product elicits.

[7] The process-level approach by Norman (2005) is built on the information processing concept by Ortony, Norman, Revelle (2005) and combines affect and information processing at all three levels. The three levels (reactive, routine, reflective) are hierarchically and chronologically organized. Norman proposes that at each level a different affect type and a different design focus are activated. Hence, affective responses to design are clustered by levels of processing in the brain and the importance of cognition in the process of product and design emotion is explained. The first type, the reactive information processing involves visceral affect. Is to say, information processing follows fixed action pattern responses that are biologically determined. The affect level at this step focuses on the outer appearance, sensory input and is viscerally perceived. The second type, the routine information processing follows well-learned behavior patterns and skills and elicits behavioral emotion. This affect type is expectation-based and corresponds with behavioral design that elicits pleasure and effectiveness of use. The third type, the reflective information processing includes higher-level cognitive processing and evokes reflective emotions that are intellectually based such as self-image, memories, associations.

[8] Kansei Engineering was originally developed in Japan in the 70ties. It is a product development methodology that enables designers and engineers to translate customers' and users' feelings and emotions into specific design parameters (Nagamachi 2002). The term Kansei describes the phenomena of the general impression an individual gets by perceiving an object with all his / her senses, Further, it includes all cognitive and affective reactions triggered by the sensory input (Schütte et al. 2008).

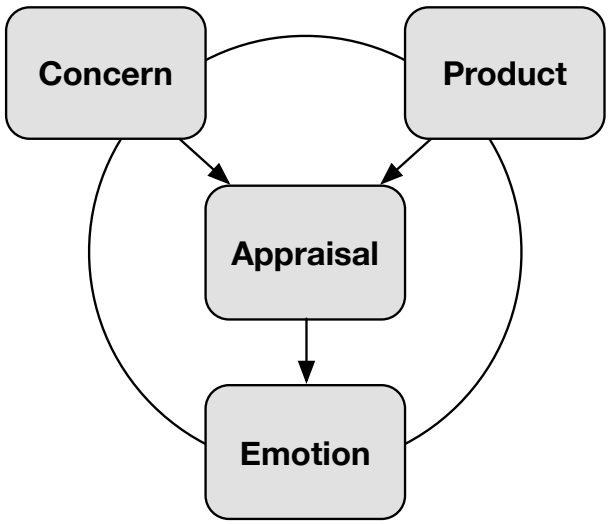


Figure 5: Basic Model of Product Emotions
Source: Desmet 2008, p. 38)

Appraisal is defined as the evaluation process whether a product, object, event, or person is relevant or important for one's own well being. Central to this approach is the assumption that human beings constantly evaluate stimuli regarding their significance and relevance. Thus, emotions are a result of cognitive processes, though often automatic and unconscious (for a visualization of this process (see Figure 5). Due to one's personal significance and relevance the elicited emotional response varies from individual to individual.
The point of reference is the individual concern described as a relatively stable preference for distinct aspects and states. The types of concern are categorized into three groups: attitudes, goals, and standards. They include for example one's goals, motives, needs, instincts and values, etc. Basic concerns such as the need for safety and love are universal while others depend on the context.
Finally, the stimulus and its interaction with it, is the third key variable of the appraisal approach. Besides the obvious product as stimulus, also its usage and consequences are included. Is to say, owning a product with a special design that is en vogue evokes admiring comments from friends and thereby as a consequence making one feel proud. Moreover, consequences not only include actual events, but also ones that are remembered, anticipated, imagined, or dreamed of (Ekman 1994).

Concluding, scholars and practitioners alike consider emotions evoked by a product or design as a key variable analyzing the interaction with products as well as for consumer behavior. Although in comparison to the body of research dealing with cognitive responses evoked by

the outer appearance of a product is still small, research analyzing the affective reactions to the design of a product is constantly growing.

A product and its design elicit distinct emotions that are strong, neutral or low in intensity and either negative or positive. The type of emotion depends on the appraisal process including the stimulus and individual concerns. Hence, the design of a car may elicit strong positive emotions for one person, negative ones for the next and almost none for another person. Yet, the activated processes are similar for all and over all products. Moreover, Crilly, Moultrie, and Clarkson (2004) suggest, emotions evoked by a product or a design being less intense in general.

Further, cognitive and affective reactions happen at the same time, influence each other, and therefore, should not be investigated separately. However, to the author's knowledge the holistic approach to analyze product design evoked reactions has not been elaborated in detail yet.

2.2.2.3 Behavioral Responses

According to Crilly, Moultrie, and Clarkson (2004), besides cognitive and affective responses behavioral responses, especially social behavior play a role for the relation of consumer behavior and product design. In the following behavioral responses such as approaching a car and the subtype social behavioral responses such as talking with friends about the design of the car are presented.

Behavioral Reactions

Consumer behavior research confirms the significance that academia and industry ascribe to behavioral reactions[9] evoked by product design. According to the environmental psychologists Mehrabian and Russell (1974), behavioral responses can be summarized as approach and avoidance behaviors (Berkowitz 1987; Bitner 1992; Crilly, Moultrie, and Clarkson 2004). In 1974 they introduced the approach- avoidance-paradigm suggesting that an environmental stimulus (e.g., store environment) leads to an emotional reaction that in turn, drives behavioral responses. This paradigm is also known as Stimulus-Organism-Responses framework (S-O-R). The model theorizes that consumers have three emotional states in response to environmental stimuli: pleasure, arousal, and dominance (Mehrabian and Russel 1974). These emotional responses result in two contrasting behaviors: either approach or avoidance. While approach behaviors summarize behaviors such as staying longer, exploring the shop more in detail, avoidance behaviors reflect behaviors such as leaving or

[9] Bloch (1995) describes these as psycholgical reactions.

not entering a shop (Jang and Namkung 2009). The approach-avoidance-paradigm categorizes responses into four groups based on the type of behavior: time, exploration, communication, and satisfaction (Mehrabian and Russel 1974). Developing it further, Bitner (1992) defined different forms of approach and avoidance behaviors, such as: attraction, exploration, staying, lingering, etc. evoked by a store design. Applying Mehrabian and Russell's (1974) model, various researchers applied their approach as a predictor of consumer behaviors in different contexts and for different stimuli: services (Foxall and Greenley 1999; Jang and Namkung 2009), retail stores (Baker, Levy, and Grewal 1992; Mattila and Wirtz 2001), and products (Bloch 1995; Lee, Ha, and Widdows 2011) (see Table 9).

Table 9: Overview of Research on Behavioral and Social Reactions to Design

Study	Stimuli	Dependent Variable	Findings
Berkowitz 1987	Product shape	Product attributes (freshness, etc.), product preferences	The more natural shaped product was preferred and consumers (not involved in frozen products) prefer a natural shaped variant. Perceptual categorization has more influence than aesthetic appeal of shape.
Bitner 1992*	Physical surroundings	-	Development of a conceptual framework exploring the impact of physical surroundings on customers and employees.
Bloch 1995	Product form	Positive and negative affective responses	Affective responses to product form can be negative or positive (valence), moderate or strong (intensity). Formed on basis of intrinsic elements. Derive more likely on sensory properties and design of product than functional elements.
Crilly, Moultrie, and Clarkson 2004**	Visual aspects of product design in general	-	Conceptualization of framework explaining consumers' response to visual domain in product design as communication process.
Lee, Ha, and Widdows 2011	High-technology product attribute based on participants' experiences with their technology product	Attitude, pleasure, arousal, approach-avoidance behavior	Four high-technology product attributes (innovativeness of technology, visual appeal, prototypicality, and self-expression) have major influences on approach behavior through attitude (cognitive state) and pleasure (affective state).
Mattila and Wirtz 2001	Ambient scent, music	Evaluation, approach, impulse buying behavior, satisfaction	Congruent scent and music influence consumer approach and satisfaction positively.
Mehta and Zhu 2009	Sheets of papers containing different colored parts, background screen color	Approach, avoidance, creativity level, attention to details	Color red (versus blue) induces primarily an avoidance (versus approach) motivation.

* Conceptualization of theoretical framework
Source: author's own selection

Mattila and Wirtz (2001) investigated the effect of ambient scent in combination with music on consumer evaluation and approach behaviors using an eight-item seven-point Likert scale

representing approach-avoidance behaviors[10]. Based on the results of a 3-factorial design in a field setting, they suggested congruent scent and music influence the approach behavior of consumers positively and that consumers' experience a higher level of satisfaction.

Crilly, Moultrie, and Clarkson (2004) transfer the approach-avoidance approach to the product design context. Hence, approach behaviors in a product design related context are tendencies and behaviors such as willingness to approach, moving toward an object, spending more time exploring or touching it. On the opposite, behaviors such as moving away from an object, distancing oneself from it, avoiding looking at it, touching it or interacting with it or even hiding or disposing it are typical avoidance behaviors (e.g., a rather common avoiding behavior is hiding an ugly Christmas present received from one's mother-in-law because one can neither throw it away nor want to look at it everyday) (compare Table 10).

Table 10: Types of Behavioral Reactions

Approach	Avoidance
Further investigation	Ignoring the product
Product purchase	Failure to purchase it
Product use	Product abuse
Showing the product	Hiding the product

Source: Berkowitz 1987; Bitner 1992; Crilly, Moultrie, and Clarkson 2004; Mehrabian and Russel 1974

Hence, objects, especially their design can encourage people to spend more time with them, to have a closer look at them and to explore them, or to avoid any contact with them because they do not like their outer appearance at all. These responses may lead to the most important consumer approach behavior for marketers: purchasing (Berkowitz 1987).
Moreover, approach-avoidance behaviors are a continuum. They are based on sensorial and psychological reactions. If an object evokes positive psychological reactions, the individual engages in approach behaviors. In case a design evokes negative sensorial (rough surfaces) and psychological (unpleasantness, dislike) reactions, avoidance tendencies and reactions are the consequence (e.g., putting it back on the shelf and turning to another object that is more attractive).

Based on the Mehrabian's and Russell's (1974) S-O-R framework, Lee, Ha, and Widdows (2011) analyze the effect of high-technology attributes on consumer responses. In a paper-

[10] e.g.: enjoyment, return intention, propensity to talk to strangers, spending more money than originally planned, avoiding other people.

pencil-survey among undergraduates they empirically confirmed that consumer approach-avoidance behavior is influenced by high-technology attributes like usefulness, ease of use, innovativeness of technology, visual appeal, prototypicality, and self-expression.
Mehta and Zhu (2009) investigated the influence of color (red and blue) on approach-avoidance responses within a certain timeframe. Results indicate that depending on the color approach-avoidance tendencies differ significantly. The color red triggers more approach tendencies, while participants confronted with blue engaged more in avoidance responses.

Social Reactions

In comparison to the aforementioned reactions (cognitive and affective), academia has barely paid interest to the subtype social behavior as a response to product design. Therefore, it is the least investigated response evoked by products and their design so far. Bitner (1992) conceptualized and investigated the effects of a product's appearance on the social interaction of people, especially among customers and between customers and employees. Others mentioned the moderating effects of fellow customers on one's behavior (crowding), but less social interaction as a direct response to objects or their design (Zomerdijk and Voss 2010). But there is a gap in literature investigating effects of the outer appearance of a product on social responses such as discussing the design or showing it to others surrounding oneself.

Since 1974 a steadily growing body of research has emerged analyzing responses to environments and products. Based on Mehrabian and Russel's (1974) S-O-R framework approach-avoidance behaviors summarizes behavioral responses to environments (store, service, online), products (different product categories), and product design. To date, the amount of research regarding service escapes considerably outweighs scientific works about products and their design. Empirically based studies analyzing cognitive or affective responses predominate compared to research concerning behavioral responses. Mainly design research and industry supported organizations release literature or case-study-based frameworks or guidelines how to evoke certain approach behaviors. Nevertheless, it is well acknowledged that a product design evokes behavioral responses. The bright coloring or smooth surface of a product design effects a consumer's behavioral response and therefore, he may approach it. Hence, in line with Crilly, Moultrie, and Clarkson's (2004) conceptualization, behavioral responses evoked by a product's design are part of general consumer responses to product design such as affection or cognition.

2.3 Summary and Relevance for the Conceptual Development and the Empirical Studies

According to the literature review on product design, the perception of product design and human responses to it have been widely established in various research disciplines. Chapter 2 highlights the role of product design as a strategic communication element. In a competitive marketplace, companies can differentiate their products and brands by generating unique, consistent and easily recognizable design languages and elements. The manifold reactions and substantial influence of outer appearance of durable, utilitarian products on perception and consumer behavior have been further established in a steadily-growing body of scientific research (, e.g., special issue on aesthetics in the Journal of Consumer Psychology (Patrick and Peracchino 2010).
The relation of a design and a human being is conceptualized as a communication process. The product design acts as a transmitter of a certain message embedded in the context of consumption. Messages are perceived in a multi-sensory way and the reception of the encoded message arouses cognitive, affective, and behavioral responses.

A considerable multidisciplinary amount of research exists investigating the perception of objects and their outer appearance. Historically, perception mostly has been viewed with a uni-modal perspective based on the conviction that sensory modalities operate independently of each other. By now it is generally accepted that a product and its design are perceived by all senses, that perception is a holistic, multi-modal phenomenon and that it is the sum of information gained by all senses. Not all senses play the same role, are perceived consciously or fulfill the same function interacting with and experiencing objects, but they all influence the perception of the design of a product and its impact on consumer behavior. Therefore, it is a prerequisite to apply a multi-modal approach when analyzing the perception of a design or its impact on the consumer.

Besides perception, many researchers have investigated how humans react to objects and their design. Up to date, the impact of design on consumer behavior is well established. As demonstrated, these reactions can be clustered into three categories: cognitive, affective, and behavioral reactions. Numerous authors focused only on single responses, traditionally most often on cognitive responses. However, research notes that these reactions happen simultaneously and are closely intertwined. Is to say, that cognitive responses influence affective responses or vice versa and these are in turn antecedents of behavioral responses.

Concluding, all senses together influence holistic perception of design and design-evoked responses also influence each other. To the author's knowledge, no empirically validated meta-concept exists that approaches design-human-interaction holistically encompassing all triggered dimensions and stimulated senses simultaneously. Hence, the existing approaches just partly reflect design-consumer-interaction and its consequences, and cannot illustrate or explain this relation satisfactorily. One goal of the present dissertation is to close this research gap and to identify a more holistic approach and concept. To close this gap, this dissertation presents and introduces in detail the experience concept in the next section offering a new approach to design-consumer-interaction based on a broad literature review of existing concepts, recent research activities, and findings (see section 3).

The second goal of this dissertation is to apply the experience concept on the design context and to analyze whether it offers a possible approach to explain design-consumer-interaction holistically, multi-dimensionally and in a multi-sensory way. Therefore, this work conceptualizes design experience by building a theoretical framework (see section 4 for the design experience concept). Finally, the present work aims at validating the design experience concept as well as to operationalize it by developing a measurement scale (see section 5 for empirical Study I - IV and four expert evaluations).

3 The Experience Concept

Recently managers have become increasingly aware of the need to create additional value for consumers and are in need for new possibilities of understanding consumer behavior. Prominent researchers and managers propose the experience concept as a solution to understand current consumer behavior (Addis and Holbrook 2001; Brakus, Schmitt, and Zarantonello 2009; Carù and Cova 2003; Holbrook and Hirschman 1982; Pine and Gilmore 1999). The Marketing Science Institute's 70+ member companies consider experience as a critical driver for a company's long-term success and therefore declared as it to the topic with the highest research priority for 2014-2016 (Marketing Science Institute 2016). International companies incorporate customer experience management into mission statements and corporate marketing strategies. Hence, creating a superior customer experience seems to be the main goal in retailing environments and many service companies like Starbucks, Dell, or IBM focus on service experience as their core offering (Haeckel, Carbone, and Berry 2003; Pine and Gilmore 1999; Pullman and Gross 2004; Verhoef et al. 2009; Zomerdijk and Voss 2011). Further, unique consumption experiences are proposed and connected to all kind of offered products: driving experience (BMW), coffee making and drinking experience (Nespresso), and even restroom experience (SANIFAIR) (see Table 71 in Appendix A for pictures).

The experience concept is known for its holistic approach acknowledging explicitly multi-sensory and multi-dimensional aspects. Recently the experience idea has been applied to various stimuli multi-dimensional in nature such as brands, services, or products. In line with the Marketing Science Institute (2016), the present work assumes that the experience concept offers a new fruitful, holistic approach to understand consumer behavior in the design context from a multi-dimensional and multi-sensory perspective and is convinced that the experience concept allows an exciting and crucial field of research. Therefore, this research suggests closing the research gap highlighted in the previous chapter by transferring the experience concept to the design context, in particular to the design-human-interaction phenomenon. Several streams of research provide preliminary evidence in support of these suggestions; yet, they also show gaps in existing knowledge that call for closing.
Hence, the next chapter aims at introducing and presenting in detail the experience concept from different perspectives in order to examine whether it allows a new approach to design-consumer-interaction. Therefore, chapter 3 sheds light on important research activities and

results, defines and distinguishes the experience concept in general, discusses different types of experience concepts in particular and their internal structure, summarizes possible impacts on consumer behavior and influencing aspects, and presents various experience measuring scales. Chapter 3 focuses on general experience aspects as well as introduces different experience types while chapter 4 applies the experience approach to the design context focusing only on design-design-interaction.

In particular chapter 3.1 starts with an introduction to experience by giving an overview of research activities and discussing different discipline-dependent definitions. Further, this work looks at the stimulus-subject-interaction and presents conceptually related but distinct consumer behavior concepts. Then, in chapter 3.2 different experience concepts, their characteristics, and features are described and illustrated in detail. Chapter 3.3 concentrates on the internal structure of the experience concept. The following section 3.4 summarizes experience-caused consequences and the impact of experiences on consumer behavior. Chapter 3.5 analyzes moderating and influencing factors regarding the relationship of experience and consumer behavior. Chapter 3.6 collects and discusses existing measurement scales to evaluate the experience concept. Finally, chapter 3.7 summarizes important facets of the experience concept and emphasizes the relevance for further investigation and empirical studies. For a graphical overview of the procedure of this dissertation see Table 22.

3.1 Fundamentals and Research Streams

Recently scientists and practitioners alike have applied the experience approach to several different occurrences. Therefore, different experience concepts based in diverse academic disciplines exist. This dissertation uses the following chapter to define the experience term in general and within different research fields. Further, research activities are presented. Afterwards the interaction as main driver of experience is presented more in detail (chapter 3.1.2) and the experience concept is differentiated from related concepts (chapter 3.1.3).

3.1.1 Definition and Research Activities

In general, the term experience can describe any occurrence a person may have in his daily life. Philosophy defines experience as a personal trial that may transform the person. In sociology and psychology experiences are subjective and cognitive activities that allow the individual to develop. By contrast, in anthropology and ethnology the term experience describes the way in which people live their own culture (Carù and Cova 2003).

In economics researchers started to question the prevailing limited scientific perspective focusing only on rational choice and logical flow models of bounded rationality in the early eighties. The information processing models treat consumers as logical thinkers and purchasing decisions are based only on problem solving (Holbrook and Hirschman 1982). However, researchers started to enhance these concepts by adding an experience view involving hedonic aspects, such as fantasies, feelings, and fun (Holbrook and Hirschman 1982, p. 132). In contrast to other approaches, consumption is seen as a subjective state of consciousness full of symbolic meanings, hedonism and aesthetics (Holbrook and Hirschman 1982, p. 132).

Hence, consumer behavior defines experience as a personal occurrence and key element of everyday consumption (Carù and Cova 2003; Holbrook and Hirschman 1982). Experiences are seen as the aggregate and cumulative customer perception created during the process of learning about, acquiring, using, maintaining, and (sometimes) disposing of a product or service (Carbone and Haeckel 1994). Central to it are its multi-sensory, imaginary and affective aspects. Hedonic consumption arises from products that evoke levels of fantasies, feelings, fun and for which such aspects of consumption are pursued as intrinsically valued ends in themselves rather than extrinsically valued means to some other end (Addis and Holbrook 2001). For example, for a woman, who needs a new pair of winter shoes, the rational need of owning warm shoes for cold weather is not the only and crucial component of the shopping experience. Additionally and maybe even more important for the experience are aspects just marginally linked to the shoes; such as looking for them, being inspired by well-decorated shop windows, spending time with a good friend, having fun and enjoying being pampered and well cared for in the shop, trying new things on and imagining oneself wearing different kind of shoes and experiencing nice events while wearing them. All these elements together influence and determine the shopping experience “buying a new pair of winter shoes”.

A seminal publication accelerating the emergence of an experience paradigm in marketing and economy is Pine and Gilmore’s (1999) “Experience Economy”. By illustrating the chronological development of the “Experience Economy”, the authors argue that the actual economy is an advancement of service economy in line with great former transformations from the agrarian, to industrial, to service economy, and to the current experience economy

(See Figure 6). Central to this experience economy is the actively staging and designing of memorable experiences instead of "just" selling services (Pine and Gilmore 1999).

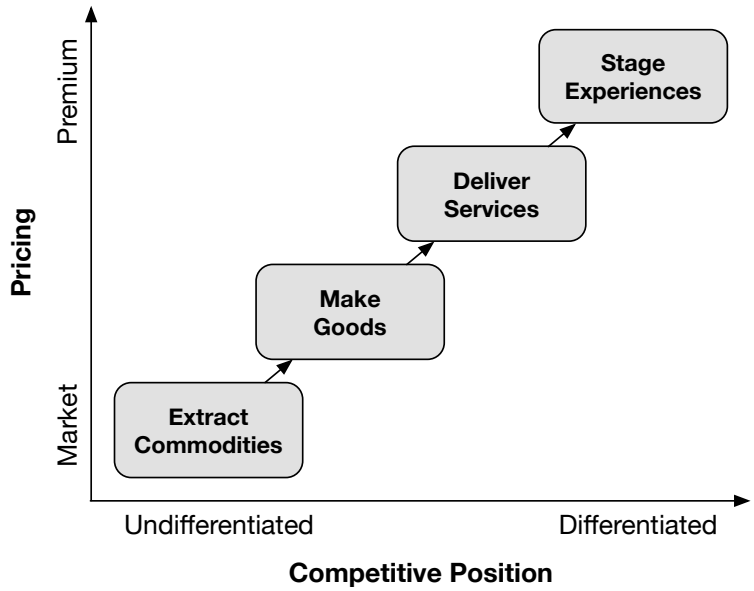


Figure 6: The Progression of Economic Value
Source: own illustration adapted from Pine and Gilmore 1998, p. 98

Hence, one stream of marketing thought sees experience as an add-on, as something that is supplementary to existing products, or services to increase the value of a product or service (Carù and Cova 2003; Gupta and Vajic 2000; Pine and Gilmore 1999; Schmitt 1999a). The term experience is characterized by a postmodern, US-American perspective looking for unforgettable, extraordinary occurrences that involve all senses, engage the consumer intellectually and emotionally and has impact on his social interactions (Arnould and Price 1993; Carù and Cova 2003; Fornerino, Helme-Guizon, and Gotteland 2008; Pine and Gilmore 1999; Schmitt 1999a).

However, depending on the cultural background and language, the term "experience" encompasses different levels of experiences regarding their intensity. Translated into German, the term "experience" represents two different words and hence concepts: "*Erfahrung*" – summarizing all experiences of a person, including normal day-to-day experiences and "*Erlebnis*" – describing special, unique events that a person will remember for a long time. Experience marketing refers to the German word "*Erlebnis*" designing a special unique moment. This point of view is enforced by the American way of life and their popular theme park industry staging unforgettable, desirable, and artificial experiences. In other disciplines, especially engineering, human factors, and design driven ones, experience also refers to

normal day-to-day encounters, is to say to "*Erfahrungen*". For example, according to Hekkert and Schifferstein (2008), product experiences are also normal day-to-day encounters of utilitarian human-product interaction like brushing one's teeth. In general, experiences evoked by a product are less intense as experience evoked by a person or event (Hekkert and Schifferstein 2008).

A broad body of marketing and management literature exists in practitioner-orientated journals and textbooks containing guidelines to create total experiences and presenting managerial actions (compare e.g., Carbone and Haeckel 1994; Haeckel, Carbone, and Berry 2003; Pine and Gilmore 1999; Schmitt 1999b). Yet despite its popularity among practitioners and its thirty-year anniversary of the first seminal publication of Holbrook and Hirschman (1982), the concept of experience is still ill-defined and based on ideological terms (Brakus, Schmitt, and Zarantonello 2009; Carù and Cova 2003; Marketing Science Institute 2016). Moreover, there is still a lack of empirical research and just a few valid, reliable and distinct measuring scales exist to measure experiences. But marketing and consumer behavior related literature has started to recognize its importance and value for understanding consumer behavior. Therefore, the body of research analyzing the experience construct itself, its underlying theories, determinants, antecedents, or moderators has been constantly growing. Nevertheless, a main focus is put on conceptual and not on empirical works. The following table (Table 11) gives an overview of the most relevant research activities:

Table 11: Overview of Research on Experience

Study	Stimuli	Experience Type	Dependent Variable	Findings
Arnould and Price 1993	River rafting	Extraordinary Experience	Overall satisfaction	Overall satisfaction results from personal growth, self-renewal, "communitas," and harmony with nature evolved and woven together during the trip. There is a complex relationship between client expectations and satisfaction.
Berry, Carbone, and Haeckel 2002**	-	Customer Experience Practical Guideline		Guideline to create satisfactory experiences.
Brakus, Schmitt, and Zarantonello 2009	Consumer brands	Brand	Loyalty, satisfaction, brand personality	Conceptualization, development and testing of a valid, reliable, distinct brand experience scale. Brand experience affects consumer satisfaction and loyalty directly and indirectly through brand personality associations.
Carbone and Haeckel 1994**	-	Practical Guideline	-	Guidelines to engineer customer experiences.
Carù and Cova 2003*	-	Extraordinary Experience	-	Literature overview and definition of the term "experience".
Carù and Cova 2006	Classical music concert	Immersion Flow	-	Results suggest that immersion is a progressive process and can be facilitated by guiding operations of appropriation.

Study	Stimuli	Experience Type	Dependent Variable	Findings
Chhetri, Arrowsmith, and Jackson 2004	Natural landscape	Tourist	-	Conceptualization and empirical validation of hiking and visitor experience.
Csíkszentmihályi 1997	-	Flow	-	Introduction to flow and optimal experiences and how they influence the feeling of happiness.
Fiore and Kim 2007	Ambient fragrances	Shopping	Global attitude, purchase intention, estimated price, and price the customer is willing to pay, sensory, affective, and cognitive pleasure	Findings suggest that an appropriately fragranced display generates the most positive effect on approach responses and pleasurable experiences.
Fiore, Yah, and Yoh 2000* **	-	Shopping	-	Overview of shopping experience literature and development of stimulus-organism-response based shopping experience framework.
Fornerino, Helme-Guizon, and Gotteland 2008	Movie consumption	Immersion	Satisfaction	Findings suggest immersion and emotions are linked while emotion induces higher satisfaction, whatever the movie context. Further link between immersion and social interaction influencing higher satisfaction for horror movies.
**Gentile, Spiller, and Noci 2007*, ** **	Consumer products (utilitarian and hedonic in nature)	Customer	-	Developing of interpretative model about experiential features supporting managers generating stimuli to activate the various components of the customer experience based on empirical investigation.
Hekkert and Schifferstein 2008*	Consumer products	Product	-	Compilation of existing literature regarding product experience.
Mathwick, Malhotra, and Rigdon 2001	Online and catalog shopping	Service	Playfulness, aesthetics, customer "return on investment", service excellence	Development and empirically testing of experiential value scale as measurement tool detecting differences in shopping preferences and patronage intent in multichannel retail systems.
Mathwick, Malhotra, and Rigdon 2002	Online and catalog shopping	Shopping	Efficiency, economic value, and shopping enjoyment	Development of cognitive continuum theory examining the effect of shopping task on perceived experiential value. Findings suggest that shopping tasks directly influence all active dimensions of value.
Novak, Hoffman, and Yiu-Fai 2000	Web usage	Customer	Searching for product information, participation in chat rooms	Developing and testing a structural model for flow in online environments.
Ofir and Simonson 2007	Supermarket	Shopping	Satisfaction, loyalty	Findings suggest that stating prepurchase expectations leads customers to focus on negative aspects of the shopping experience and perceive the same performance more negatively.
Palmer 2010*	-	Customer	Attitude	Literature review and assessment of customer experience construct. Proposing of model integrating inter-personal relationships, service quality and brands.
Pullman and Gross 2004	VIP hospitality tent	Customer	Loyalty	Findings suggest that emotional behavior mediates relationship between design elements and loyalty behavior.
Schouten, McAlexander, and Koenig 2007	Camp Jeep events	Customer Flow	Beliefs, attitude, integration in brand community	Findings suggest that transcendent customer experiences influences brand and brand community loyalty.
Stuart and Tax 2004	Theater plays	Service	Delight, loyalty	Description of theatre play process, extracting and presenting implications and a management process model.
**Verhoef et al. 2009*, ** **	-	Customer	-	Literature review, conceptualizing customer experience and discussing its determinants, dynamics, and management strategies

Study	Stimuli	Experience Type	Dependent Variable	Findings
Voss, Roth, and Chase 2008 *,* **	Services	Customer	-	Definition and discussion of customer experience concept for classifying experiential service strategies using two dimensions: the depth of use of experience as a source of value creation and the degree of integration of experience internally within the firm.
Zomerdijk and Voss 2010	Retail stores	Service	Loyalty, Satisfaction	Findings confirm designing for experience-centric-services by creating customer journeys, touchpoints, sensory design, dramatic structure of events, engagement of employees, management of fellow customers, close coupling of backstage employees and frontstage activities.

* Literature review
** Practical guideline
*** Conceptual paper
Source: author's own selection

Further, due to communication technology and technological developments, service environments have changed significantly. Consequently, this also influences customer and shopping behavior and experience. Hence, marketing research focus has shifted lately to online shopping and its impact on customer experience; e.g., impact of website design on customer's experience (Novak, Hoffman, and Yiu-Fai 2000), customers interaction with the web (Nambisan and Watt 2011; Novak, Hoffman, and Yiu-Fai 2000), online shopping and retail experience (Nambisan and Watt 2011; Nobel, Griffith, and Weinberger 2005; Overby and Lee 2006). Furthermore, the impact of customer interactions in online product communities has been analyzed recently (Dholakia, Bagozzi, and Klein Pearo 2004; Gruen, Osmonbekov, and Czaplewski 2006; Nambisan and Watt 2011).

Similarly in design research the experience concept plays an increasing role. Due to the multidisciplinarity of the relatively young and diverse field of design research[11] various experience concepts exist differing in theoretical background, research purpose, and impact on practical design guideline (Desmet and Hekkert 2007). In their compilation Hekkert and Schifferstein (2008) introduce product evoked experience and several current design research approaches to it. According to them, experience is a result of a product-human-interaction. These interactions evoke emotional and cognitive responses by stimulating human's senses. All these evoked aspects together are the experience.

[11] E.g.: Psychology, social and behavioral science as well as technology, engineering and ergonomics

3.1.2 Stimulus-Subject-Interaction

As indicated, an experience includes the two entities, stimulus, individual, and their interaction. They both make different contributions to the overall experience, but both of them are necessary for the experience.

The interaction between a subject (human being) and a stimulus (product, event) is the basic requirement for every experience (Arnould and Price 1993; Brakus, Schmitt, and Zarantonello 2009; Fornerino, Helme-Guizon, and Gotteland 2008; Hekkert and Schifferstein 2008; Holbrook and Hirschman 1982; Schmitt 2010). The value of an experience is created through the described interaction, involving such a strong relationship between the subject and the stimulus that the two are sometimes considered to be confused (Addis and Holbrook 2001). These interactions cause subjective reactions, which are crucial to the determination of value.

Experiences are not only the result of a stimulus-subject-interaction but fully intertwined. An experience attends, leads and influences interactions (See Figure 7) (Hekkert and Schifferstein 2008). The relation between an experience and an interaction is mutually reinforcing: the more intense the interaction is, the more intense is the experience. In turn, this animates the individual to interact again (now or later) with the stimulus and creates a more intense experience. This means, on the one hand, that an interaction is a requirement for an experience and on the other hand a result of an experience. Therefore, the interaction motivates the individual to interact again or more intensely with the stimulus resulting in an even more intense experience and motivating to interact again with the stimulus.

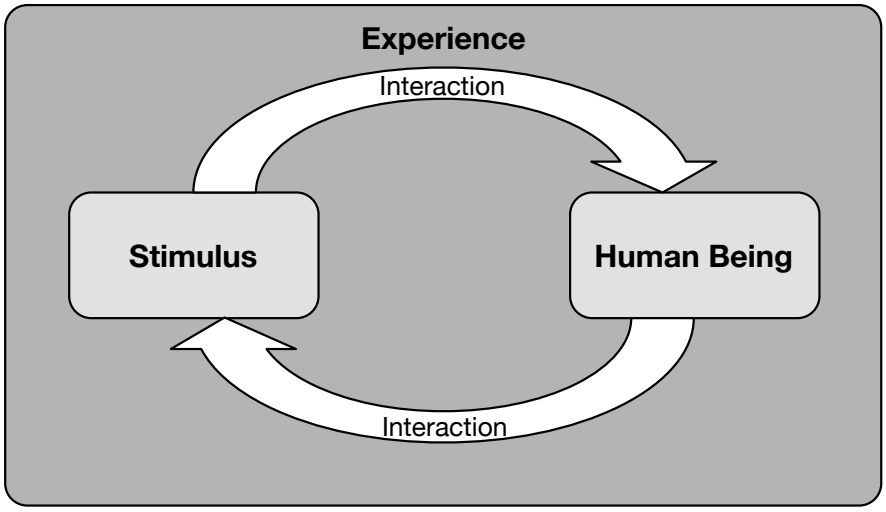


Figure 7: Circular Relation of Stimulus-Human-Being-Interaction
Source: author's own illustration

The interaction between a stimulus and a human being can have various forms depending on the type of stimulus and also on the moment the interaction takes place. Depending on the stimulus the interaction and depth of interaction varies significantly. A stimulus can be some good, service, event, person, or even place (Addis and Holbrook 2001). A theme park engages the visitor with its architecture, stories, theaters, food stores, and employees representing famous characters from movies (e.g., Disneyworld). Hence, the visitor is engaged with all his senses, is attracted emotionally and cognitively (e.g., associations of a movie hero), and totally drawn into the event over a longer period of time. Contrary, the normal day-to-day duty of brushing one's teeth just takes a few minutes, happens daily and is not an once in a lifetime event. Although various senses are involved (taste of toothpaste, tactile sensation of texture of the bristles, visual input of color, style, and layout of handle, etc.), the user is not drawn into the event, because the single aspects are not as strong and the user is not engaged cognitively or emotionally as intense as being in a theme park. Usually, the interaction with a digital product (e.g., tablet) is more demanding than the interaction with a physical product[12]. In general, an event experience is normally more intense than a product experience because of more interaction levels.

The experience concept not only includes the obvious actual interaction between a stimulus and human being but every interaction that is related to it. For example, a consumption experience is not restricted to the moment of consuming itself, but is evident already during searching, dreaming, or imaging about the experience until long time after the actual consumption when the consumer remembers the experience by looking at photographs or talking to friends including all kinds of interaction between stimulus and human being.
For consumption experience, Arnould, Price, and Zinkhahn (2002) summed up the interaction points and divided them into four chronological steps and experiences:

1. Pre-consumption experience: searching, browsing, dreaming, imagining
2. Purchase experience: interacting with the store environment and staff, moment of choice and actual purchase
3. Core consumption experience: sensations, feelings, immersion or flow, satisfaction or dissatisfaction evoked by consumption
4. Remembered experience: memories based on former experiences triggered by friends, similar occurrences, or photos

[12] Digital products engage the user in different ways and on different levels (Hekkert and Schifferstein 2008).

3.1.3 Similarities with and Differences to Related Concepts

The experience construct combines different conceptual ideas and approaches. Nevertheless, although it is related, it is conceptually distinct from other marketing constructs. In the following, the experience construct is differentiated from prominent and marketing-relevant constructs such as associative, evaluative, motivational, and affective ones. To illustrate differences and similarities, this work discusses specific representative concepts starting with personality (e.g., brand or product personality), followed by attitudes, involvement, and finally attachment.

Personality

The concepts of associations and images differ from the experience concept (Keller 1993). Regarding associations the personality construct, in particular the brand personality construct is the most studied one (Aaker 1997). In consumer research, brand personality has gained a lot of attention and is very well established in literature (Aaker 1997; Aaker, Benet-Martínez, and Garolera 2001; Johar, Sengupta, and Aaker 2005). Aaker (1997)defines brand personality as the set of human characteristics one associates with a certain brand. Just as humans have individual characteristics that define their personalities, brands have so as well. Aaker's (1997) brand personality consists of five dimensions: sincerity, excitement, competence, sophistication, and ruggedness (see Figure 8).

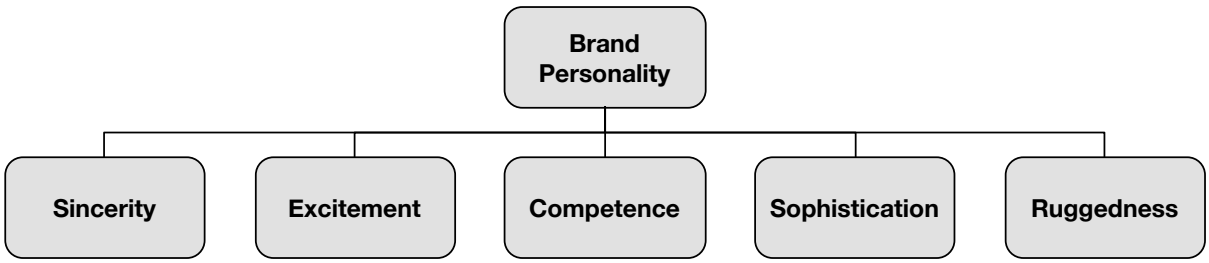


Figure 8: Dimensions of Brand Personality
Source: Aaker 1997, p. 347

A brand's personality is a result of inferential processes (Johar, Sengupta, and Aaker 2005). Is to say, a consumer is not excited or sincere about the brand, but projects these personality traits onto a brand. Hence, a brand personality is a communication vehicle for consumers to express their actual or ideal selves (Aaker 1999; Belk 1988; Malhotra 1988).
Contrary to brand personality, brand experiences are actual sensations, feelings, cognitions, and behavioral responses. Similar to the brand experience construct, any direct or indirect relation the consumer has with the brand forms brand personalities.

As for brands also products convey meaning and have a product personality (Govers and Schoormans 2005). Comparable to brand personality, product personality is a high-level description of the product as a whole and is strongly influenced by product appearance (Govers, Hekkert, and Schoormans 2004). Equally to brand experiences, also product experiences are the actual sensations, feelings, cognitions, and behavioral responses evoked by a product.

Attitudes

Different than experiences, attitudes are general evaluations based on beliefs or automatic affective reactions such as "I like the product / event / brand." (Fishbein and Ajzen 1975; Murphy and Zajonc 1993). Experiences contain precise sensations, feelings, cognitions, and behavioral responses activated by particular stimuli, such as a particular product, event, or brand. These are specific feelings evoked by a stimulus-individual-interaction and not just an overall liking. As Brakus, Schmitt, and Zarantonello 2009 (2009) emphasize, experiences may lead to general evaluations and attitudes. But an overall evaluation of the experience reflects just a fraction of the whole experience and is way more than a general evaluation such as "I like the experience".

Involvement

Besides associative and evaluative constructs, experiences are also distinct from motivational and affective concepts. A prominent and well-researched motivational concept is involvement (Zaichkowsky 1985). In contrast to experience, involvement is built on needs, values, and interests that motivate a consumer toward an object (e.g., a product or brand) (Zaichkowsky 1985) (compare 4.2.4 and 5.3). Hence, a requirement for involvement is the perceived importance or personal relevance of the stimulus for the individual. Contrary, an individual can have an experience without being interested, informed or having any relation to a stimulus. Is to say, a motivational state is not an antecedent for having an experience.

Attachment

Compared to involvement, attachment is a stronger emotional relation between a person and a stimulus. For example, a consumer with a strong brand attachment feels a strong emotional bond between himself and the brand. As experience, also attachment constitutes of various dimensions. However, these are merely emotional ones: affection, passion, and connection (Thomson, MacInnis, and Park 2005) (compare Figure 9). Hence, attachment is just an emotional relationship concept while experience additionally encompasses also sensations,

cognitions, and behavioral responses. As for overall evaluations, experiences may result in strong emotional relationships but are multi-dimensional concepts.

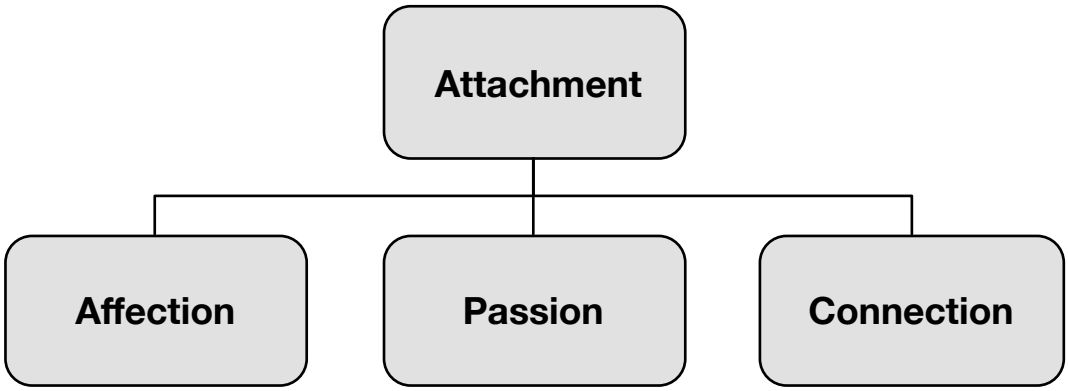


Figure 9: Dimensions of Brand Attachment
Source: Thomson, MacInnis, and Park 2005

3.1.4 Summary

The experience concept is an increasing popular concept in various research disciplines. In general, experiences are subjective internal consumer responses (sensations, feelings, and cognitions) and behavioral responses evoked by a stimulus while dreaming of, searching for, shopping, consuming, and remembering objects, events, or persons. Hence, the experience occurrence is not limited to the actual consumption, but can also be anticipated or remembered. Individuals are sensually, emotionally, cognitively, and behaviorally involved by interacting with objects, services, and products that can be as divers as art or technology. One can distinguish between normal day-to-day experiences, in German also referred to as "*Erfahrungen*" or unique, extraordinary experiences, in German referred to as "*Erlebnisse*".

Central to all experiences is the interaction between a stimulus and an individual. This interaction is on the one hand a requirement and at the same moment fully intertwined and therefore, can intensify the evoked experience. The type of the stimulus determines the type and moment of interaction, hence the experience and its intensity.
Finally, experience is similar yet conceptually distinct from other relevant and well-established constructs such as personality, evaluations, involvement, and also attachment.

Although the importance of the experience concept for explaining consumer behavior is widely acknowledged and its popularity has increased continuously, empirical research activities and findings are still scare.

3.2 Experience Types

Different scientific disciplines have developed their own experience concepts and have applied them to different stimuli. In order to shed light on general similarities and special differences of experience concepts, this dissertation describes the most relevant concepts (consumption, customer and services, brand, product, and intensive experiences) in the following part.

Consumption Experience

As mentioned, one of the first academic articles challenging the domination of the information processing perspective in consumer research, was Holbrook and Hirschman's (1982) article: "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun". The authors criticized the restricted perspective of the dominating information processing approach to the consumption phenomenon and suggested to include feelings, fun, and fantasies to consumption explanations. This complementary view regards consumption as a subjective state of consciousness including leisure activities, aesthetic enjoyment, sensory pleasures, daydreams, and emotional responses. Affect is a core element of their consumption experience concept including the full range of consumer emotions for example love, joy, lust, anxiety, and boredom.

Recently, Schmitt (2010) has further developed the existing consumer experience approaches and defined consumption experience as "perceptions, feelings, and thoughts that consumers have when they encounter products and brands in the marketplace and engage in consumption activities – as well as the memory of such experiences" (Schmitt 2010, p. 6). These experiences take place "here and now", are ongoing perceptions, feelings, and direct observations. They are triggered by a stimulus (e.g., consuming a product) and are a result of the interaction between a person and the stimulus.

As illustrated, consumption experiences not only take place during the consumption itself but also before and after the actual consumption. Based on the assumption that consumption experience includes all perceptions, feelings, and thoughts referring to a product, all possible experience touch-points are included. Consumption experience-touch points are all possible interactions an individual can have with a consumption occurrence. This means already dreaming about the consumption of a certain product (e.g., riding a certain motor bike) evoked by the touch-point advertisement or remembering a consumption experience triggered

by the touch-point community (e.g., motor cycle meeting with friends and talking about the last trip) are part of the overall consumption experience.

Although consumption experience is acknowledged as an important contribution to explain consumer behavior, it is still ill defined and empirical studies are sparse. By contrast, more empirically based articles analyzing services experience have been published recently.

Customer and Services Experience

As indicated, the experience construct plays a crucial role in everyday retailing. These services or customer experiences comprehend the interaction of a customer with a service or shopping environment. This environment is also referred to as context. Context is "the physical and relational setting where the customer consumes the service and everything that a customer interacts with in that setting" (Pullman and Gross 2004, p. 553). The context is the touch-point the retailer can actively influence and design. For Gupta and Vajic (2000) a customer experience already occurs due to any customer service context interaction. As Pullman and Gross (2004) examine with a study of VIP hospitality tents for an international touring circus, context design has a decisive influence on customer experience. By applying certain context design elements the customer can choose between passive or active participation.

Recently, Verhoef et al. (Verhoef et al. 2009) have developed a literature based theoretical framework on dynamic customer experience and its determinants, and examined the influence of social environment, self-service technologies and brand on it. They suggested that customer experience is holistic in nature and encompasses the customers' cognitive, affective, emotional, social, and physical responses to the retailer. A customer experience is evoked by elements that the retailer can actively control and form, such as shop atmosphere, architecture, ambient scent, assortment, brand, or price[13]. Additionally, customer experience is a total experience including pre- and post-moments like searching, purchasing, using different retail channels (off- and online) consuming, and after-sales phases.

[13] Verhoef et al. (2009) put special emphasize on the fact that the customer experience is not limited to customer's interaction in the store itself but conceptualize it as a dynamic process including multiple channels, multiple touch-points over time as well as influenced by personal facts such as prior experiences. Further, consumer and situational aspects such as personality traits, type of store or the general economic climate moderate a customer experience.

Zomerdijk and Voss (2010) discuss and analyze more in detail possible touch-points for experience-centric services (compare Figure 10). They differentiate between back- and fronstage aspects as well as the auditorium. Backstage service design elements include all actions that a back-office can deliver, while frontstage encompasses the physical retail environments, their service employees, their actions, and the service delivery process. The authors complete their framework also by the social environment aspect, fellow customers. Based on 17 case studies they found support that an experience can be designed by offering service cues (as part of the service delivery process), engaging the customer by sensory design elements (physical environment) and dramatically structured events (as part of service delivery process). Moreover, results also confirm the dynamic nature of customer experience already suggested by Verhoef et al. (2009).

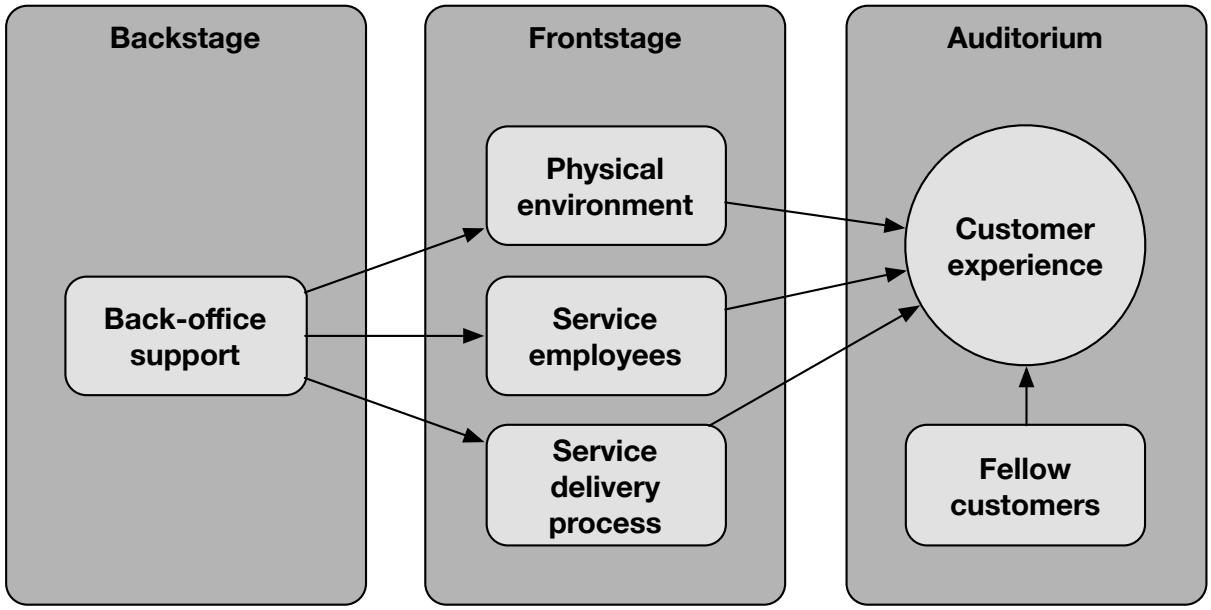


Figure 10: The Five Experience Design Areas
Source: Zomerdijk and Voss 2010

As mentioned, shopping and service environments have changed significantly from offline to online environments. Nambisan and Watt (2011) developed a theoretical framework for customer experience in online communities. Their theoretical framework of online community experience (OCE) based on computer-mediated communication is a four dimensional construct. Based on data of existing online product communities of four software companies (IBM, Adobe, Intel, and Microsoft) the authors developed a multi-item 7-point semantic scale to collect data on customer's OCE and examined the impact of online community experiences on customers' attitude towards a product, company, and service quality. As illustrated in chapter 3.1.2, experience is driven by interaction. Human-online or

human-computer-interaction differs significantly from offline interaction. However, not minimizing its importance, this work does not elaborate online or any digital interaction based experience further.

Brand Experience

Similar to service and shopping experience, brand experience occurs during searching for, shopping, and consuming a brand. Based on a broad multi-disciplinary literature review, the authors Brakus, Schmitt, and Zarantonello (2009) conceptualize and define brand experience as "subjective internal consumer responses (sensations, feelings, and cognitions) and behavioral responses evoked by brand-related stimuli" (Brakus, Schmitt, and Zarantonello 2009, p. 53). These stimuli are all tangible and intangible elements of a brand, like corporate design elements (like brand-identifying colors, packaging design, typeface, or store environments), its personality, and communication (e.g., slogans, advertisements) (Aaker 1997; Brakus, Schmitt, and Zarantonello 2009) (Figure 11).

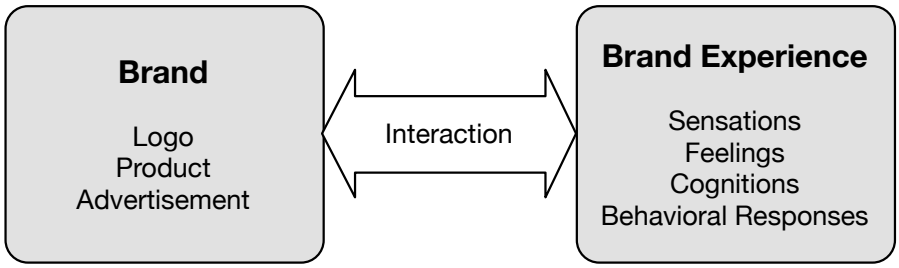


Figure 11: Model of Brand Experience
Source: author's own composition adapted from Brakus, Schmitt, and Zarantonello 2009

Regarding intensity and valence, brand experiences vary in strength and evaluation. Some brands are experienced as strong and positive, while others as strong and negative or weak and positive. For example, Peter is emotionally and cognitively highly affected when looking at and thinking of a Ferrari. He is dreaming of driving one himself one day and is enthusiastic about the power of the car. But seeing his neighbor's car, a Volkswagen Passat, he asks himself how one can drive such an unattractive and boring brand. Hence, Ferrari evokes a strong and positive brand experience while Volkswagen Passat a less strong and negative brand experience.

Findings of Brakus, Schmitt, and Zarantonello (2009) indicate that four experience dimensions (sensory, affective, intellectual, and behavioral) constitute brand experience. A social dimension evident in literature could not be confirmed empirically. Depending on the

brand, different dimensions of distinctive intensity levels are evoked. A one-to-one correspondence between a dimension and a certain stimulus (e.g., color) and only that dimension does not exist. The stimulus color may affect the sensory (e.g., pleasant to look at) but also the cognitive (e.g., association with water and holidays) and affective (e.g., warm, pleasant feeling) dimension. Besides conceptualizing brand experience based on existing literature of various research fields, the authors developed a scale to measure the intensity of evoked brand experience in six empirical studies (compare chapter 3.6).
Moreover, based on their results, the authors suggested that brand experience has a significant direct effect on consumer satisfaction and loyalty. Furthermore, results indicate that consumer satisfaction and loyalty are affected indirectly through brand personality associations.

Product Experience

Subjective product experience is described as "the awareness of the psychological effects elicited by the interaction with a product, including the degree to which all our senses are stimulated, the meanings and values we attach to the product, and the feelings and emotions that are elicited" (Hekkert and Schifferstein 2008, p. 2). Is to say, product experiences are a subjective result of interaction, more precise product-human-interaction. This product-human-interaction activates cognitive reactions like perception and identification, evokes associations and memories, and affective reactions like feelings and emotions. Desmet and Hekkert define "product experience as a change in core affect that is attributed to human-product interaction" (Desmet and Hekkert 2007, p. 59). Their definition focuses on experiences that are affective.
A number of scientific disciplines contribute to product design research. Besides psychology, also applied disciplines such as social and behavioral science such as marketing, consumer science, or human factors as well as technical sciences such as mechanical and material engineering and human-computer-interaction have added insights to product experience research. Especially technical sciences activities focus more on technical and ergonomic requirements and aspects and exclude aesthetic aspects (design) of the product.
As other experience concepts, also product experience is defined as a multi-faceted phenomenon involving affection, behavioral, physiological, and expressive reactions. Desmet and Hekkert (2007) limit these to and cluster these into three components: aesthetic pleasure, attribution of meaning, and emotional response. The interaction between the product and the human being, creating the experience, is a core element of every experience, and is not limited to instrumental or non-instrumental physical action (Hekkert and Schifferstein 2008) (see Figure 12). The interaction can be anticipated, a passive perception, or memories of a former product-human-interaction. As illustrated in chapter 3.1.2, researchers differentiate

between experiences as a special, memorable "*Erlebnis*"[14] and a day-to-day "*Erfahrung*"[15]. Product experiences include both types, but the latter – normal day-today occurrences are more likely due to the nature of product-human-interaction (theme park visit versus daily use of toothbrush, compare chapter 3.1.2). Therefore, compared to consumption and service experiences, product experiences are less intense and more ordinary experiences (Hekkert and Schifferstein 2008). Further, product experience focuses on product usage and not their purchase or consumption.

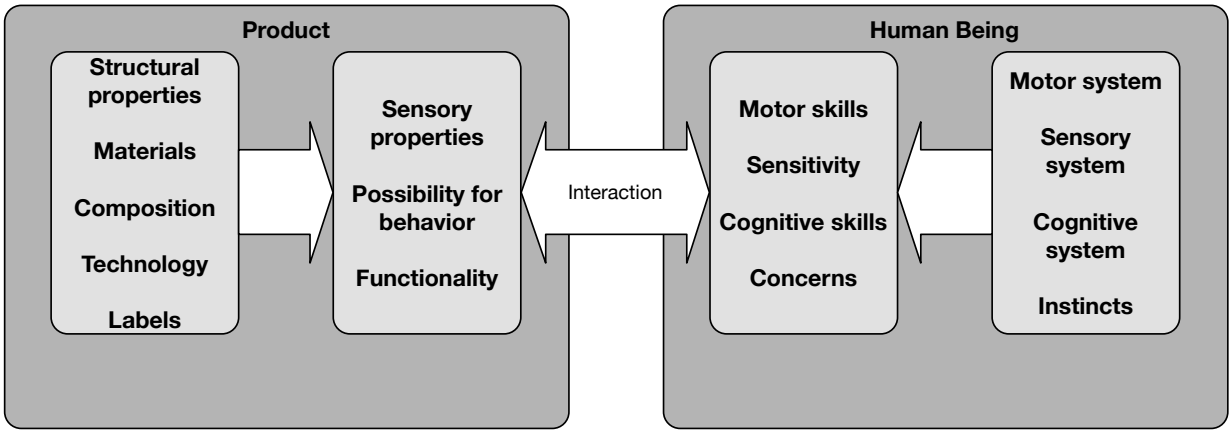


Figure 12: Model of Human-Product-Interaction
Source: own illustration based on Hekkert and Schifferstein 2008, p. 3

The product experience concept is restricted to physical or non-physical objects utilitarian in nature (Hekkert and Schifferstein 2008). Therefore, no-utilitarian artifacts like art are excluded. Structural properties (e.g., size), materials with their specific technical and sensory characteristics (e.g., silicone), composition of different product elements, embedded technology (e.g., sensors), and labels (e.g., brand) define the product. Further sources of human-product-interaction are product function, technical requirements, and symbolic or aesthetic aspects (Addis and Holbrook 2001; Desmet and Hekkert 2007). All these form and influence the experience (see Table 12).

[14] „*Erlebnis*": German word for experience describing a special, extraordinary occurrence
[15] „*Erfahrung*": German word for a normal day-to-day occurrence as well as prior occurrences and knowledge

Table 12: Product Experience of an Electric Toothbrush

	Product function	Cleaning teeth Massaging gum
	Structural properties	Size Shape
	Materials	Silicone Plastics
	Composition	Additive
	Embedded technology	Sensors General electronics
	Technical requirements	Battery-operation Suitable for wet area
	Labels	Brand Price
	Symbolic aspects	Represents modern, groomed lifestyle
	Aesthetic aspects	Pleasant to look at Fits in bathroom context

Source: own composition based on Paul Hekkert & Schifferstein, 2008, picture: Conrad, 2015

Comparing the product experience of a toothbrush with one of an electric brush, the experience differs although the product function and purpose (cleaning one's teeth) are the same. But the use of an electrical toothbrush evokes different sensory responses (humming sounds, vibration of handle and brush) and offers a different and greater functionality (electrical feedback of timer, etc.) than a non-electric one.

Very Intense Experiences

Talking about different experience concepts, one also has to mention the phenomenon of very intensive experiences. Very intensive experiences have been analyzed by various academic disciplines focusing on different intensity levels and relational modes of experiences. Three concepts have emerged: extraordinary experiences, flow, and immersion. Over the time these concepts have constantly been refined (for a more detailed overview see Carù and Cova 2003, 2006; Pine and Gilmore 1999).

Extraordinary, hedonic experiences are evoked by special events or once-in-a-lifetime trips like white water river rafting, skydiving or hot-air balloon trips. Arnould and Price (1993) analyzed the nature of extraordinary experiences within a commercial multi-day river rafting context. Over a two-year-time period, they collected a rich set of data exploring the characteristics of extraordinary experiences. The results of multiple qualitative methods (e.g., focus groups, observation, surveys) suggest that these experiences are highly intense, positive, and intrinsically enjoyable in nature (Arnould and Price 1993). Due to the unusual nature of the events expectations are mostly vague and hard to predict and personal behavior is spontaneous and unrehearsed. Moreover, characteristic for this type of experiences are disclosure of time, absorption and integration, personal control, emotions like joy, and a

certain sense of newness of process and perception and spontaneous letting-be (Arnould and Price 1993). The level of felt intensity is influenced by interpersonal interaction, in case of white water river rafting by the presence of the guide and fellow consumers in the boat, their reactions like their behavior, their facial expressions, and their comments.
Arnould and Price (1993) detected three experiential dimensions evident across all data: communitas (relation and interaction with fellow customers), harmony with nature and personal growth and renewal. These dimensions unfold and are woven together during the trip. The authors put special emphasize on the fact that the three themes are an interactive Gestalt instead of single separate phenomena. Further, extraordinary experiences are triggered by unusual events and determined by high levels of emotional intensity and experiences.

By contrast to extraordinary experiences**,** Csíkszentmihályi (1997) defines flow as an optimal experience while people are concentrated and focused on achieving a challenging goal that in itself is not pleasant. This adds up to the feeling of deep enjoyment and of mastery, concentrating and especially forgetting everything about the real life and daily problems (Csíkszentmihályi 2008). This occurs when people try to solve a challenging riddle or prepare for a difficult exam with an unpopular subject. Studying, people focus on the topic, try to understand and memorize it, maybe feel unhappy or even desperate for a moment and are afraid of not conquering the task. After having taken part in the test people feel proud of themselves and very content for achieving this goal. Flow absorbs the consumer with all his senses and his attention (Pullman and Gross 2004), it describes the idea of total immersion and plunging into the task (Carù and Cova 2003).

Like an experience, immersion also engages all senses and pulls the participant into a virtual or imaginary world. Well acknowledged in academia, the concept of immersion is rooted in various quite diverse disciplines like literature (Ryan 2000), media science (Grau 2004), human computer interaction and gaming (Forlizzi 2007, 2009). Originating from aesthetics and experience research, immersion describes the concept of being drawn into an experience situation and therefore, being – at least temporarily - disconnected from the real world (Fornerino, Helme-Guizon, and Gotteland 2008). Intensely felt moments evoked by a stimulus or an event capture the consumer with all his senses. According to Grigorovici and Constantin (2004), immersion is a continuum that can vary from low to high. A key characteristic of immersion is that people get emotionally, intellectually and physically involved. Consequently, they totally eliminate the distance between the consumer and the

experienced situation (Carù and Cova 2006; Fornerino, Helme-Guizon, and Gotteland 2008). Fornerino, Helme-Guizon, and Gotteland (2008) conceptualize immersion as a two-dimensional construct consisting of connection with the experience and disconnection of the real world. To analyze the relation to consumption experience and the impact on satisfaction, the authors developed their own measurement scale. Results of three studies (three different move settings: horror, comedy, dramatic comedy) indicate that immersion and emotions are closely linked. Further, higher satisfaction is induced by emotions independent of the movie context. Moreover, findings suggest that social interaction and immersion are linked. This is evident within in the horror movie case. The audience feels more drawn into the movie and absorbed by the action, when fellow consumers express their reactions (expressions of fear or disgust such as screams, gasps, groans, etc.) and the watching is a collective experience. The authors showed that the connection of immersion and social interaction results in higher satisfaction of the moviegoers. This applies especially for horror movies.

Taken together, Holbrook and Hirschmann's (1982) seminal article about "Experience Economy" was the beginning for an experimental view to consumer behavior interaction relations with different types of stimuli (such as service settings, events, brands, or products). Lately the publication of Brakus, Schmitt, and Zarantonello (2009) added the theoretical well-constructed and empirical validated brand experience concept and measuring scale to experience research.

Although the different experience concepts are highly specific and strongly stimulus-dependent, general aspects exist among the different concepts. In general, all experience concepts are multi-dimensional and the multi-sensory perception plays an important role. Further, experience can happen before, during, and after the actual consumption or usage. The stimulus determines the interaction, hence the experience and its intensity. Therefore, the general maximal intensity level varies between the different concepts (compare product versus theme park experience versus flow). Moreover, all concepts are very specific in nature and stimulus-orientated.

The product experience concept has great similarities to the proposed design experience concept stimulus-wise. But in contrast to design, product in the context of product experience includes also the function, ergonomics and technical requirements of a product. Moreover, the product usage is of main focus while the term design encompasses only the outer appearance of a product and concentrates on the consumption. The intensity and type of product-human-interaction is product-specific and influenced by the individual (compare toothbrush versus

tablet). Yet the activated processes and reactions are similar over all products. As mentioned, product experiences are less intense than event-based experiences and more ordinary in nature.

3.3 Experience Dimensions

Independent of the academic background, experience literature agrees that experiences are holistic in nature and encompass various dimensions. The following chapter introduces different perspectives, their diversities and commonalities. Table 13 gives an overview of all discussed concepts and summarizes their experience dimensions.

Table 13: Overview of Experience Concepts and Their Dimensions

Study	Academic Background	Experience Concept	Sensory	Affect / Emotion	Cognition	Behavior	Social	Other
Battarbee and Koskinen 2007	Design Research	Product	X	X	X		X	
Brakus, Schmitt, and Zarantonello 2009	Marketing	Brand	X	X	X	X		
Dewey 1998	Philosophy	General	X	X	X	X	(X)*	
Hekkert and Schifferstein 2008	Design Research	Product	X	X	X		X	
Nambisan and Watt 2011	Consumer Behavior	Online		X			X	X
Pinker 1999	Cognitive Science	General	X	X	X	(X)	X	
Pine and Gilmore 1999	Marketing	Economy	(X)*	(X)*	(X)*	X		X
Schmitt 1999b	Marketing	Economy	X	X	X	X	X	

(X)*: different naming but in general same meaning
Source: author's own composition

In general, it is also important to note that a one-to-one correspondence between a certain stimulus and a certain dimension and exclusively only that dimension does not exist (Brakus, Schmitt, and Zarantonello 2009; Schmitt 1999b). That means that due to the holistic nature of experience, a stimulus evokes not only one dimension. It may have a very strong influence on one dimension and only a mild influence on the others, but all dimensions are triggered in some way.

Philosophy and Cognitive Science Experience Concept Dimensions

In the early thirties the philosopher Dewey (1934, 1998) suggested expanding the restricted cognitive approach by behavioral, emotional and perceptional aspects. Besides "knowledge" also "feeling", "perceiving" through one's senses as well as "doing" are all part of experiences. Moreover, all humans are connected with each other.

In cognitive science the research of Pinker (1999) also identifies four dimensions of experiences. These correspond closely to the ones suggested by Dewey (1934). Pinker (Pinker 1999) names "sensory perception", "feelings" and "emotions", "creativity", as well as "reasoning" and "social relationships". In contrast to Dewey (1934), he does not mention "doing" as separate dimensions, but argues that sensory perception encompasses all bodily experiences, motor actions and behaviors (Brakus, Schmitt, and Zarantonello 2009).

Marketing Experience Concepts Dimensions

In marketing, Pine and Gilmore (1998) added the two dimensions "customer participation" and the degree of "consumer engagement" to the predominant economy concept at that time. The first dimension describes a consumer's participation, from passive (weak) to active (strong), while the second the individual's connection with the environment of the experience – or environmental relationship – from absorption (weak) to immersion (strong)[16]. By adding these two dimensions, Pine and Gilmore describe four realms of an experience (Pine and Gilmore 1999, p. 101) (see Figure 13):

1. "Entertainment": passive participation and absorption with the event (watching TV)
2. "Educational"; active participation and absorption with the event (taking a ski lesson)
3. "Esthetic": passive participation without any effect on event and immersion (visitor of an art gallery)
4. "Escapist": active participation and immersion (acting in a play)

[16] Pine and Gilmore describe the terms immersion (being in the middle of the event) and absorption (being outside the event) just briefly. Their understanding of both states differ from the later detailed definitions by Fornerino, Helme-Guizon, Gotteland (2008), Carù and Cova (2006) and Jamieson (2006). Therefore, the present work does not investigate their point of view further.

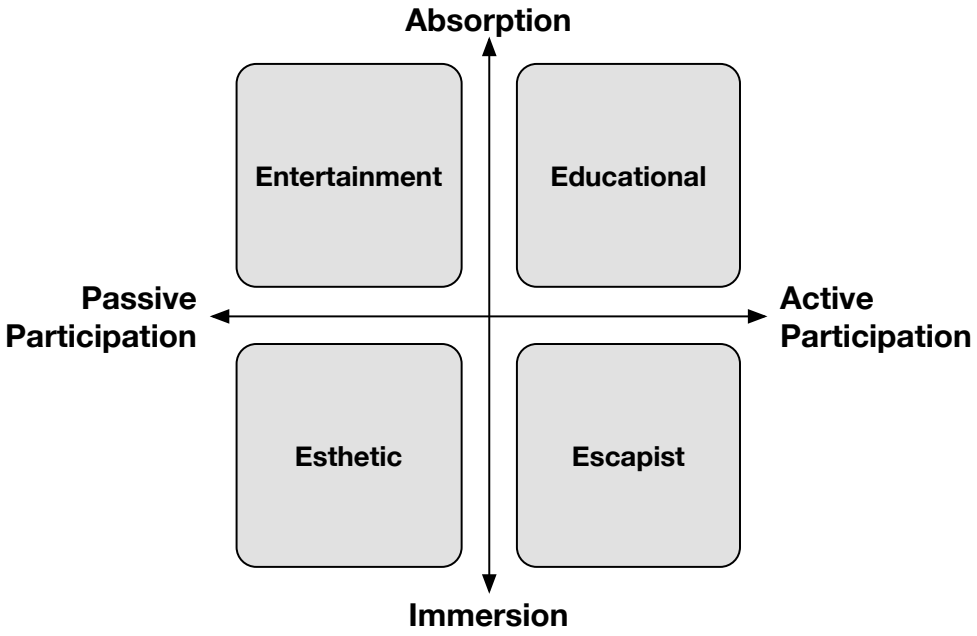


Figure 13: Four Realms of an Experience
Source: author's own diagram adapted from Pine and Gilmore 1999, p. 101

Due to the retail and services focus of their concept, there are some deviations from other concepts (Dewey 1934; Pinker 1999) (e.g., the educational aspect). Nevertheless, there are similarities and overlaps of the different experience dimensions: "Esthetic" encompassing visual, aural, tactile, and olfactory aspects, "educational "including mainly intellectual aspects, "entertaining" consisting of emotional ones. Hence, the need for a multi-dimensional conceptualization of experiences can be confirmed (Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1998).

In contrast, Schmitt's (1999a) concept of experience dimension is closely linked to the above mentioned concept of Dewey (1934). In his work "Experiential Marketing" he suggests five experiential dimensions: "sense", "feel", "think", "act", "relate" (Schmitt 1999b). Like Pine and Gilmore (Pine and Gilmore 1998) he proposes the "sense" dimension that includes aesthetic and sensory qualities and appeals to consumers' senses (sight, sound, touch, taste, and smell). The dimension "feel" consists of moods and emotions referring to consumers' inner emotions and feelings. Depending on the product type and personal involvement, this may range from mildly positive feelings to strong emotions such as joy and being proud. As Schmitt (2010) suggests brands of consumer durable products with a social value may evoke more intense feelings than brands of non-durable products such as grocery. The dimension "think" is composed of convergent/analytical and divergent/imaginative thinking (Brakus,

Schmitt, and Zarantonello 2009; Schmitt 1999b). Appealing to the intellect, cognitive and problem-solving experiences are evoked that engage consumers creatively. The dimension "act" refers to behavior and motor actions. It triggers certain behaviors such as approach to a certain offer or behavioral change. Lastly, the dimension "relate" correlates with social experiences like interactions and connections to reference groups (Brakus, Schmitt, and Zarantonello 2009; Schmitt 1999b). This last dimension takes into account that individuals are part of a social context and desire not only to be perceived by their social surroundings but also be perceived positively. People want to be related to a social system; their family, peer group, city, country, a special subculture, etc.. Schmitt (Schmitt 1999b) names the American motorcycle Harley-Davidson brand as a typical brand that evokes strong brand experiences. Driving a Harley is not only moving form A to B, but it represents a lifestyle, being member of a certain group expressed by the motorcycle itself but also represented by a certain style of clothing, hair cut, and behavior.

Brand Experience Dimensions

As Schmitt (1999b) also Brakus, Schmitt, and Zarantonello (2009) first conceptualized five dimensions for their brand experience scale: the "sensory", "affective", "intellectual", "behavioral", and "social" dimension. However, only four out of the proposed five dimensions could be confirmed during various empirical studies. Conducting explanatory (EFA) and confirmatory factor analysis (CFA), the authors showed that the best model for brand experience was the four-factor model. Therefore, brand experience was revised and conceptualized as a four-dimensional construct consisting of the four dimensions: "sensory", "affective", "behavioral", and "intellectual" (see Figure 14). The dimension "intellectual" represents the "cognitive" dimension. The fifth dimension ("social") had to be eliminated because it could empirically not be confirmed. The authors conducted three more studies (EFA, CFA) to confirm the concepts' and scale's reliability, validity, and distinction to other concepts and scales.

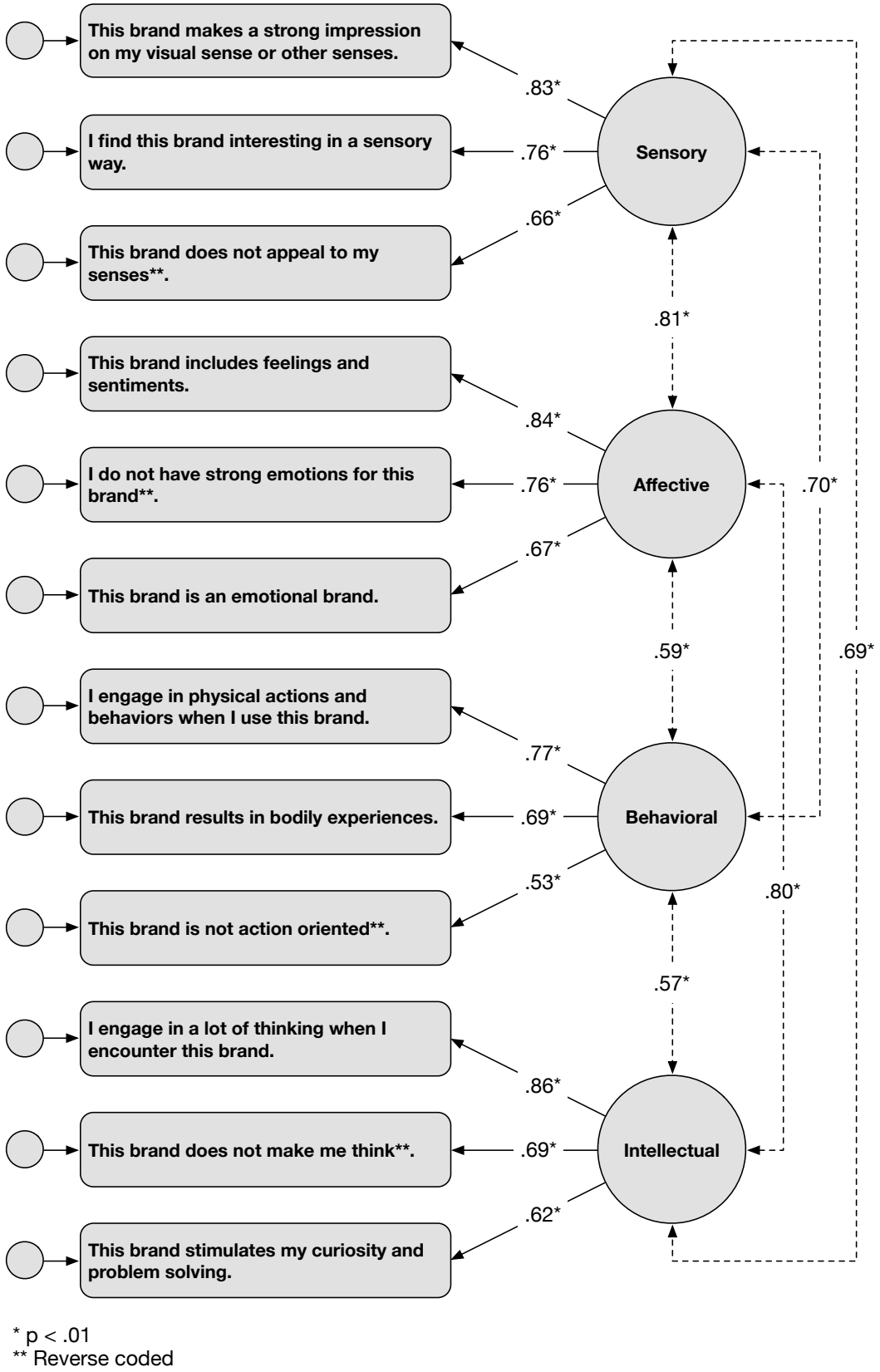


Figure 14: The Brand Experience Factorial Structure
Source: Brakus, Schmitt, and Zarantonello 2009, p. 60

Online Customer Experience Dimensions

Nambisan and Watt (2011) define in their research about online communities the following four dimensions: “pragmatic”, “hedonic”, “sociability”, and “usability”. The first dimension represents the pragmatic or utilitarian value the customer experiences from the interactions with the online product community. This is related to goal-oriented behavior. The second dimension, the “hedonic” one, is described as an intrinsic value the customer derives from the interactions in the online product community. It is expressed through excitement and enjoyment. The third, the “sociability” dimension, is linked to social communities of internet platforms and the experiences the customer gains through interaction with other members. The last dimension, the so-called “usability” dimension is determined through the possibilities of navigating and using the online community. Technical aspects as well as usability aspects of the interface are of great importance for a positive experience. According to the authors, the last two dimensions are prerequisites due to the nature of online communities.

Product Experience Dimensions

Hekkert and Schifferstein (2008) give a broad and detailed overview of different existing product experience concepts and their dimensions form a design research perspective in their compilation “Product Experience”. Regarding the internal structure of product experience, Desmet and Hekkert (2007) define three levels: (1) “aesthetic” experience, (2) “emotional” experience, and (3) experience of “meaning”. First, “aesthetic” experience encompasses sensory experiences involving the capacity to delight one or more sensory modalities. Is to say, the product material pleases the eye and the touch. Due to the nature of products and their perception, senses play a central role regarding product experience. Depending on the product type and the individual, different senses are more or less crucial for the intensity of an experience. Yet all of them together influence the experience. Second, “emotional” experience includes basic emotions evoked by the appraised relational meaning of products. This means that using the product evokes emotions. For example, the electric mixing device making the dough for a cake evokes a warm feeling of home and love. Third, the experience of “meaning” embraces human ability to ascribe expressive characteristics or personality to products, as well as attaching personal or symbolic significance to products. While baking the cake, the person remembers his grandma baking birthday cakes.

Besides these three, other researchers (e.g., Battarbee and Koskinen 2007) also mention “social” experiences or “co-experience”, as a part of a holistic product experience. “Co-experience” describes experience as an individual process within a social context. This means

that the experience process itself is individual and private but its meanings are shared and communicated to others either implicitly or explicitly (Battarbee and Koskinen 2007). Social interaction deepens and enriches the experiences felt (Battarbee and Koskinen 2007, p. 463). The social interaction can be more passive or active. This means noticing others and their reactions without directly interacting with them or actively and directly interacting with others by talking to them about a special object or showing them a certain product. Therefore, one can summarize, that in general, product experiences include a "sensory", an "emotional", a "cognitive", and a "social" dimension.

Taken together, experience literature converges on to conceptualize experience along multiple experience dimensions. Comparing different approaches and perspectives, all experience concepts consist of more than one dimension. They are all multidimensional. However, depending on the academic background the proposed dimensions may differ slightly in number and naming. Common to most of them, are a "cognitive", an "emotional", and a "sensory" dimension. Depending on the type of experience, scientific perspective, and approach, two additional dimensions exist: "behavioral" and "social". The first embraces all bodily experiences, all physical actions and behaviors. The latter encompasses people's social context and their interaction with it during an experience. Because experiences are evoked by environmental cues, social and relational elements play also a role for most concepts. Further, to evoke a strong experience, the stimulus has to appeal to the consumer on as many dimensions as possible. No exclusive one-to-one correspondence between stimulus and dimension exist. Except (Brakus, Schmitt, and Zarantonello's brand experience concept (2009), most experience concepts lack an empirical testing of their internal structure. Hence, they are merely theory-based.

3.4 Experience-Caused Consequences

In general, a stimulus-person-interaction always creates an experience. Hence, a consumer always gets an experience along with a product or service regardless of the intention of the company, of the event manager, or engineer. The experience may be good or bad, strong or weak, lasting or fleeting, a random phenomenon or an engineered perception (Carbone and Haeckel 1994).

The type of experience-caused effects and consequences depend on the stimulus and linked interaction. Is to say, a retail store experience causes different effects than a museum visit experience, or product experience (see Table 14 for an overview). Nevertheless, general

effects of experiences exist. As Holbrook and Hirschman (1982) and Pine and Gilmore (1999) indicated these effects are more intense the more dimensions are involved and triggered. The following outlines experience-caused consequences. Yet, the impact on consumer behavior has to be discussed and analyzed separately and more in detail for each specific experience, its stimuli and interaction. Therefore, the following is just a general and brief overview to get an idea of possible aspects and does not claim completeness. For more detailed and specific aspects see chapter 4.2.3 and 5.3.1 discussing consequences of design experience.

In general, only a limited number of articles explore experience-caused effects in depth from a theoretical perspective. Most studies focus on positive consequences. However, previous studies agree that products, brands or events that cannot create memorable experiences suffer because consumers miss the nowadays-necessary hedonic aspect (Pine and Gilmore 1998). Hence, they will never gain a competitive advantage. Moreover, researchers agree that a stimulus-subject-interaction creates an experience whether it is intended or not, whether it is designed or not (Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1998).
The following table gives an overview of the existing scientific studies analyzing experience-caused consequences. In the subsequent part, this work outlines some studies and the most relevant consequences for marketing and consumer behavior.

Table 14: Overview of Research on Experience-Caused Consequences

Study	Stimuli	Experience Type	Loyalty	Experiential Value	Memory, Repetition	Satisfaction	Personality	Excusing Mistakes	Approach / Avoidance Activities	Dependent Variable	Findings
Arnould and Price 1993	River rafting	Extraordinary Experience				X				Overall satisfaction	Overall satisfaction results from personal growth, self-renewal, "communitas," and harmony with nature evolved and woven together during the trip. There is a complex relationship between client expectations and satisfaction.
Brakus, Schmitt, and Zarantonello 2009	Consumer brands	Brand Experience	X			X	X			Loyalty, satisfaction, brand personality	Conceptualization, development and testing of a valid, reliable, distinct brand experience scale. Brand experience affects consumer satisfaction and loyalty directly and indirectly through brand personality associations.

Study	Stimuli	Experience Type	Loyalty	Experiential Value	Memory, Repetition	Satisfaction	Personality	Excusing Mistakes	Approach / Avoidance Activities	Dependent Variable	Findings
Fornerino, Helme-Guizon, and Gotteland 2008	Movie consumption	Immersion				X				Satisfaction	Findings suggest immersion and emotions are linked while emotion induces higher satisfaction, whatever the movie context. Further link between immersion and social interaction influencing higher satisfaction for horror movies.
Mathwick, Malhotra, and Rigdon 2001	Online, catalog shopping	Services Experience		X						-	Development of the experiential value scale to examine experience based value perceptions of multi-channel retail systems and their effects.
Mathwick, Malhotra, and Rigdon 2002	Last shopping item	Services Experience		X						-	Introduction of cognitive continuum theory (CCT) to examine the effect of consumer shopping tasks and retail information display properties on consumer perceptions of experiential value. Results indicate that the shopping task has a direct influence on active value dimensions (efficiency, economic value, and shopping enjoyment).
Menon and Kahn 2002	Simulated Internet shopping trip	Online Shopping Experience						X	X	Arousal, pleasure	Experienced level of arousal and pleasure during early online browsing has a significant effect on later shopping behavior. Two experiments show that a higher level of pleasure or a higher level of arousal has a positive impact on approach behaviors.
Pullman and Gross 2004	VIP hospitality tent	Customer Experience	X							Loyalty	Findings suggest that emotional behavior mediates relationship between design elements and loyalty behavior.
**Verhoef et al. 2009*, ** **	-	Customer Experience								-	Literature review, conceptualizing customer experience and discussing its determinants, dynamics, and management strategies.
Zomerdijk and Voss 2010	Retail stores	Service Experience	X			X			X	Loyalty, satisfaction	Findings confirm designing for experience-centric-services by creating customer journeys, touch points, sensory design, dramatic structure of events, engagement of employees, management of fellow customers, close coupling of backstage employees and front stage activities.

* Literature review
** Conceptual Paper
Source: author's own selection

Loyalty

Pullman and Gross (2004) investigated the relationship between certain service elements in a hospitality context designed to create enhanced experience and customer loyalty. Based on

the results of a study taking place in a VIP hospitality tent for an internationally renowned touring circus, the authors suggest that certain design elements, have a direct effect on loyalty behavior. Further, results indicate that the tested relationship between design elements and loyalty behavior is strongly mediated by emotional behavior. (Brakus, Schmitt, and Zarantonello (2009) also confirmed the positive impact of (brand) experience on (brand) loyalty behavior.

Experiential Value

The idea of experiential value was formed by Pine and Gillmore (1999) and is considered as a key outcome variable in experience research (Babin, Darden, and Griffin 1994; Havlena and Holbrook 1986; Holbrook and Hirschman 1982). Value is seen as related to hedonic responses as well as tangible consequences. Besides utility, experiences also provide consumer perceived value, which is defined by three dimensions that represent functional, emotional, and social value (Sweeney and Soutar 2001).

Based on the results of an empirical study comparing internet and catalog shopping, Mathwick, Malhotra, and Rigdon (2002) suggest that a consumer's goal has great influence on the perceived experiential value. The authors distinguish between extrinsic value that helps a consumer to achieve a specific objective and intrinsic value that encompasses the enjoyment of consumption for its own sake. Especially experiential shoppers[17], find heightened enjoyment in the task itself (intrinsic value). Therefore, context cues, such as store design significantly affects the level of experience. Goal-orientated shoppers[18] are rewarded with return on their invested time, money, and effort (extrinsic value). Depending on the goal-orientation retailers may evoke with different designed store environments high experiential value, intrinsic or extrinsic in nature.

Long-time Memory and Repetition

Past research showed that a positive relation between intensive experiences evoked by brands or services and consumer memory exists (Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1999). Brakus, Schmitt, and Zarantonello (2009) suggest that experiences that have been evoked various times over a certain time are stored in consumer memory. Pine and Gilmore (1999) propose that a consumer that has felt a unique and distinctive experience will easily remember it for a long time. Moreover, chances are very high that he wants to repeat a successful experience.

[17] Experiential shoppers: shoppers that want to browse
[18] Goal-orientated shoppers: shoppers that want to do their shopping as effectively as possible

Satisfaction

Satisfaction is defined as “an attitude-like judgment following a purchase act or based on a series of consumer-product interactions” (Fournier and Mick 1999, p. 5). Arnould and Price (1993) investigated how extraordinary experience affects consumer satisfaction. Participants of the white water trips felt an overall satisfaction. For Arnould and Price (1993) satisfaction is a result of an extraordinary experience based on the evolving and closely linking of the experiential themes (personal growth and self-renewal, "communitas," and harmony with nature) over a certain amount of time. Further there is a complex relationship between client expectations and satisfaction.

Brakus et al. (2009) analyzed the effect of brand experience on consumer satisfaction. In an empirical study they confirmed that brand experience affects the outcome satisfaction through a direct and indirect route. Based on the knowledge that brand experience also evokes brand-related associations which in turn can evoke satisfaction, they propose that satisfaction is also indirectly evoked and mediated by brand personality (Brakus, Schmitt, and Zarantonello 2009).

Brand and Product Personality

Chang and Chieng (2006) analyzed in a cross-cultural comparative study the influence of experience on brand personality, brand attitude, and consumer-brand relationship. Based on the results of the data collected in coffee shops in Shanghai, China and Taipei, Taiwan, the authors suggest that brand experience affects consumer-brand-relationship indirectly mediated by brand personality and brand attitude. Brakus, Schmitt, and Zarantonello (2009) and Desmet and Hekkert (2007) confirm the suggestions that (brand or product) experience evokes (brand or product) personality associations.

Engaging in Less Arousing Activities and Excusing Mistakes

Based on the results of two empirical studies, analyzing online shopping experience in relation to arousal and pleasure, Menon and Kahn (2002) suggested that the design of an online store website and the offered products influence consumer experience. If the shopping experience evokes a high level of pleasure and / or arousal, online shoppers are more willing to engage even in less arousing activities. Is to say, are more willing to stay and explore the website further and to continue shopping. Moreover, studies could show that experiences encourage participation in online product chat rooms, increase time spent in interactive product environments, and taking more actively part in product and brand communities (Menon and Kahn 2002; Novak, Hoffman, and Yiu-Fai 2000; Schouten, McAlexander, and

Koenig 2007). Scientists even propose that a positive, intense experience increases the willingness to excuse mistakes and minor quality (Schmitt 1999b, 2010).

In sum, experiences cause a series of consumer behavior relevant consequences. The type and intensity of these consequences depend on the experience, hence the stimulus and the interaction with it. Generally speaking, the more dimensions are involved and triggered, the more intense are the effects.
Due to the huge number of possibilities, the present work has only illustrated exemplarily a fraction of possible factors such as: loyalty, experiential value, satisfaction, memorability, and engaging in less arousing activities as a selected overview (for more experience-caused consequences see chapter 4.2.3 and Study IV, chapter 5.3).

3.5 Experience Moderators and Determinants

The interaction between stimulus and subject is influenced by a set of different aspects ranging from surroundings to individual preferences (e.g., individual level of NFT, compare chapter 4.2.4). An experience cannot be observed or analyzed without considering the context it takes place in or without taking into account the subject and its character, concerns and skills. Depending on a stimulus and the interaction it requires, these influencing factors vary a lot (compare online shopping versus offline shopping versus theme park visit) (Nambisan and Watt 2011; Verhoef et al. 2009). In the following, this dissertation elaborates briefly on aspects that influence an experience and its impact on consumer behavior. As for consequences on consumer behavior, also moderators have to be discussed and analyzed separately and more in detail for each specific experience, its stimuli and interaction. Therefore, the following is just small sample to get an idea of possible aspects and does not claim completeness. For more moderators see chapter 4.2.4 and 5.3.1 discussing in detail design experience moderating aspects.

As illustrated, experiences are holistic in nature involving a person's sensorial, cognitive, affective, and behavioral responses to the stimulus and do not occur in isolation. Despite carefully designing and staging all involved elements, experiences cannot be fully controlled by for example, store managers (customer experience) or marketing departments (brand experience) (Carù and Cova 2003). For example, elements, that are out of the retailer's control influence a customer experience, such as purpose of shopping, time pressure, customer's mood, or prior experiences (Verhoef et al. 2009). These elements effect and moderate an experience, its strength and the direction of the relationship between the stimulus

and the experience and can be divided into person- and context-related moderators (see Figure 15).

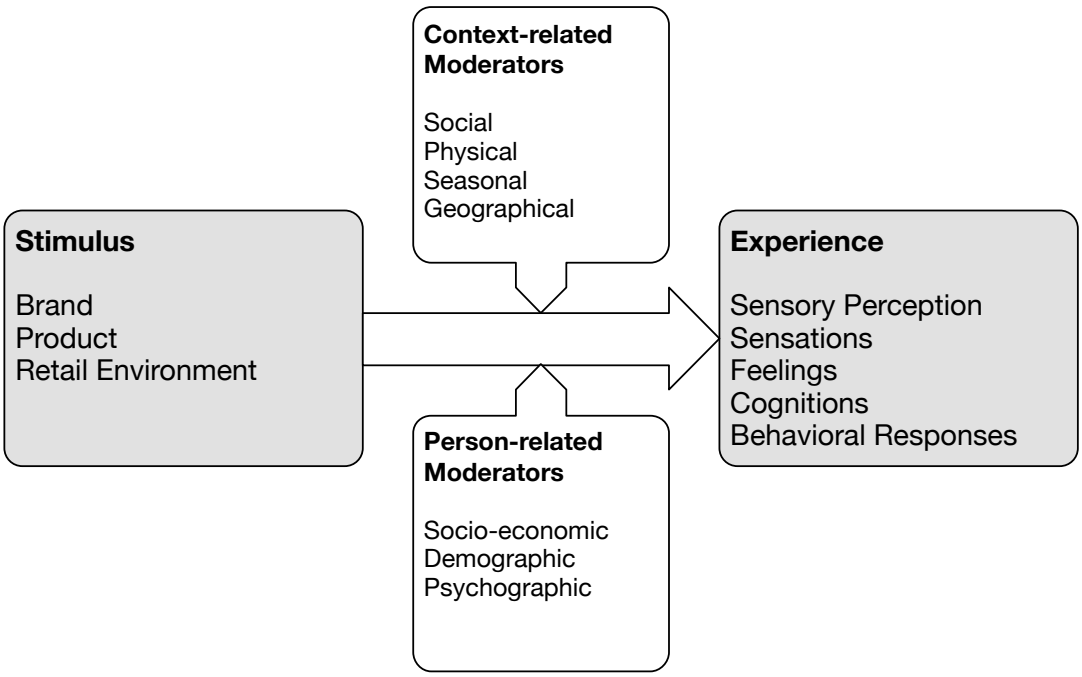


Figure 15: Model of Experience with Focus on Moderators
Source: own illustration adapted from Bloch 1995; Fiore and Kim 2007; Verhoef et al. 2009

As for the experience construct in general, also in particular for its moderators, empirical investigations are still scarce. Nevertheless, various studies discuss possible moderators and their consequences based on literature reviews, related research results, or first empirical investigations (compare Table 15). Depending on the stimulus and its interaction, hence the experience, particular aspects may not occur or be more important (e.g., tactile aspects buying a product in a store or online). Therefore, moderators are experience-type dependent and can vary a lot (online shopping versus theme park). Due to the wide field of experiences, and hence interaction types, a wide range of moderators exists (e.g., customer experience and studies investigating environmental psychology (Mehrabian and Russel 1974)). Table 15 gives an overview of studies investigating experience-influencing moderators. Regarding the purpose and scope of the present work, only general moderators are discussed at this point.

Table 15: Overview of Research on Experience Moderators

Study	Influencing Factor	Person-related	Context-related
Arnould and Price 1993	Ability to experience	X	
Carbone and Haeckel 1994	Mechanic cues		X
Desmet and Hekkert 2007	General context		X
Fiore 2008	Education, income	X	

Study	Influencing Factor	Person-related	Context-related
Fiore and Kim 2007	Sensation Seeking	X	
Fornerino, Helme-Guizon, and Gotteland 2008	Ability to experience	X	
Holbrook and Hirschman 1982	Time, money	X	
Mathwick, Malhotra, and Rigdon 2002	Time, money	X	
Pine and Gilmore 1999	Ability to experience; Physical elements	X	X
Pullman and Gross 2004	Visual elements (location, store design, product design, packaging, ⋯)		X
Verhoef et al. 2009	Staff, customers		X

Source: author's own selection

The following part gives a short overview of important general moderating aspects starting with person-related aspects. For a more detailed description see Fiore and Kim 2007; Verhoef et al. 2009 and compare chapter 4.2.4.

Person-Related Moderators

Person-related moderators are characteristics of the individual and include demographic, socio-economic, and psychographic aspects.

Demographic aspects encompass personal descriptors such as age and gender. They influence the way a person interacts with, for example, an object (e.g., digital product operated by a twenty-year-old versus eighty-year-old person). Socio-economic aspects summarize economic factors as well as social class and background. A person's education and income level influence the way he or she interacts with a stimulus (Fiore 2008). For example, the economic resources such as time and money influence a shopping experience (Holbrook and Hirschman 1982; Mathwick, Malhotra, and Rigdon 2002).

Consumer behavior puts special emphasize on psychographic moderators, is to say the internal processes of a consumer that influence e.g., his decision-making process or interaction with products or within stores. In combination with experience, a variety of different psychographic moderators have been discussed. These include personal traits such as sensation-seeking tendency (Fiore and Kunz 2003, 2004; Steenkamp and Baumgartner 1992), ability to experience (absorption) (Arnould and Price 1993; Fornerino, Helme-Guizon, and Gotteland 2008), level of involvement (Palmer 2010; Pullman and Gross 2004), individual decision-making style (Sharma and Stafford 2000; Wesley, LeHew, and Woodsinde 2006), individual shopper style (Morin and Chebat 2005), personal motives and goals (Mathwick, Malhotra, and Rigdon 2002), and cultural values (Limon, Orth, and Kahle 2009; Overby, Gardial, and Woodruff 2004) (compare Fiore and Kim 2007).

In combination with the experience construct, three aspects have lately been investigated and explored more in detail: sensations seeking tendencies, the ability to submit to experience, and involvement.

First, according to Fiore and Kim (2007), personal differences in sensation seeking can have an influence on the level of an evoked experience. Sensation seeking is described as looking for novelty and intensity, is to say, looking for new objects or events (Arnett 1994). Depending on the individual degree of sensation seeking a totally new and very intense event may evoke more or less positive or negative sensations and experiences.

Second, in order to experience one has to take actively part in and interact with the object (Pine and Gilmore 1999) (compare chapter 4.2.4 and Study IV, chapter 5.3). The ability and willingness to do so varies depending on the individual. Some people lack the ability to get involved or to take part actively in an experience, others easily immerse into an event (Arnould and Price 1993; Fornerino, Helme-Guizon, and Gotteland 2008). For example, to feel a highly intense experience while visiting a theme park like Disneyworld, one has to be able and willing to get involved, to engage with the surroundings, to talk to first-row employees such as a costumed Mickey Mouse and hence, to disconnect to a certain amount from reality (Desmet and Hekkert 2007; Fornerino, Helme-Guizon, and Gotteland 2008; Fulton Suri 2002). As a consequence, some individuals may be excluded from intense experiences. Hence, the ability to get absorbed and to experience determines directly the level of felt brand or theme park experience.

Third, the level of attention or importance an individual assigns to certain product, service, or context properties depends on his involvement with the product category, brand, topic, etc. and may affect the intensity of an evoked experience (Gardner 1985; Hirschman and Holbrook 1982; Palmer 2010; Pullman and Gross 2004) (compare chapter 4.2.4 and Study IV, chapter 5.3). Involvement in general is defined as “a person’s perceived relevance of the object based on inherent needs, values, and interests” (Zaichkowsky 1985, p. 342). Involvement is also a result of a person-product or product category interaction (Beatty and Talpade 1994; Nkwocha et al. 2005; Steenkamp and Baumgartner 1992). Although motivation towards a stimulus is not a prerequisite for an experience, the level of involvement with the stimulus or stimulus-related aspects moderates the person-stimulus-interaction and as a result, the experience.

Context-Related Moderators

Also context-related factors can influence an experience. The term context refers to the situation the interaction takes place in and compasses all surrounding elements such as social,

physical, geographical, seasonal, and economic aspects of it (Desmet and Hekkert 2007) (compare chapter 4.2.4 and Study IV, chapter 5.3).
Social context aspects refer to people surrounding the person experiencing. In a customer experience setting, this includes staff-customer as well as between-customer relations (Verhoef et al. 2009). Fellow customers may have a negative or positive effect on service experience. Especially, in situations in which proximity or resources are influenced by the number of customers (waiting time at cashier, to be attended or noise distraction) as well as reaffirming or disturbing behavior can have a direct or indirect influence (Martin and Pranter 1993). Also the possibility to bond with fellow customers or even be part of a community may satisfy social needs and make the experience more worthwhile (Harris and Baron 2004; Zomerdijk and Voss 2010).
Physical context aspects in particular for customer experience are visual elements such as location, store design, product design, packaging, uniforms of staff, quality control, etc. (Pullman and Gross 2004). Besides the visual elements, all sensual impressions such as music, scents and tactile inputs have an impact and as a consequence add up to the experience. Especially for service experience, the context determines customer participation, his connection (Pine and Gilmore 1998) and his behavior including staying longer, committing himself, spending money (Pullman and Gross 2004). Carbone and Haeckle (1994) term these as mechanic clues and Pine and Gillmore (1998) as physical elements.
Geographical and seasonal context aspects may also influence the experience. Being at the beach in winter evokes different sensations, feelings, etc., as being there in the summer. The same applies to being by the sea in the Caribbean or being by the sea in Norway.

In sum, experiences do not happen in a vacuum but are related to and influenced by the context and the person itself. The intensity and effectiveness of an experience, as well as the possibilities of influencing them depend on all parties involved; hence the stimulus and the interaction it requires as well as the subject and his individual skills, prior knowledge, and, preferences, etc.. The above collection just represents a selection of possible experience moderators. Compare chapter 4.2.4 and Study IV, chapter 5.3.1 for more specific design experience moderating aspects.

3.6 Measuring Experience

Although the experience construct enjoys a widespread popularity, still just a few measuring scales exist to assess experience empirically. The following chapter is designed to take a closer look at different measuring scales, their development procedure, and their content

represented by items, dimensions, and answering options. First, two different brand experience scales are introduced. Second, a movie consumption experience scale is described. Third, two different scales to measure online experience, online community and transcendent customer experience are discussed. Last, a scale to measure the effect on experience design elements is presented.

Brand Experience Scales

In 2009 Brakus, Schmitt, and Zarantonello (2009) developed the Brand Experience Scale and empirically investigated the direct and indirect effects of brand experience on consumer satisfaction and loyalty. The scale measures the intensity of brand experience evoked by a brand stimulus.

According to common scale development procedures, the authors conducted several empirical studies using a broad set of consumer brands as stimuli (e.g., Apple, BMW, Nike) and different samples (students, consumers) to proof the scale's validity, reliability and distinction from related consumer behavior concepts. After a broad item generation and selection process based on a multi-disciplinary literature review, they reduced and analyzed the item structure in an iterative process by conducting expert evaluations and applying various EFAs and CFAs (compare Figure 14 and chapters 3.2 and 3.3).

The final version consists of twelve items on a 7-point Likert scale (with 1 = "strongly disagree," and 7 = "strongly agree). The scale captures in a reliable and stable way four dimensions ("sensory", "affective", "behavioral", and "intellectual") (Cronbach's alpha for each dimension exceeds 0.76). Each dimension is represented by three different items (3 items x 4 dimensions = 12 items in total) (for scale and items see Table 16). In contrast to initial suggestions and due to empirical results of factor analysis, the authors had to drop a possible fifth dimension: "social" experience (see chapters 3.2). Additionally, the construct and scale are distinct form related measures, such as brand involvement and brand attachment.

Table 16: The Brand Experience Scale

Dimension	Item
Sensory	This brand makes a strong impression on my visual sense or other senses.
	I find this brand interesting in a sensory way.
	This brand does not appeal to my senses.*
Affective	This brand induces feelings and sentiments.
	I do not have strong emotions for this brand.*
	This brand is an emotional brand.
Behavioral	I engage in physical actions and behaviors when I use this brand.

Dimension	Item
	This brand results in bodily experiences.
	This brand is not action oriented.*
Intellectual	I engage in a lot of thinking when I encounter this brand.
	This brand does not make me think.*
	This brand stimulates my curiosity and problem solving.

* reversed coded
Source: Brakus, Schmitt, and Zarantonello 2009, p. 60

The second brand experience scale to investigate consumer-brand relationship was developed by Chang and Chieng (2006). In contrast to Brakus, Schmitt, and Zarantonello (2009), they differentiated between individual and shared experiences. The authors suggested a 5-point Likert scale that was adapted from existing literature and afterwards evaluated and pretested by a set of experts and students. Further, to analysis loadings and factor structure, the authors conducted EFA and CFA.

The final scale composes fifteen items. According to the conceptualization, the individual experience consists of nine items which represent equally distributed the three dimensions: "sense", "feel", and "think". The same pattern exists for shared experience, consisting of six items that represent the dimensions "act" and "relate" in equal parts. The Cronbach's alpha exceeds 0.84 for both data sets (Shanghai and Taipei[19]). The dimensions proposed by Chang and Chieng (2006) are in line with Schmitt's conceptualization of experiential marketing (Schmitt 1999b). For an overview of all fifteen items and dimensions see Table 17.

Table 17: The Individual and Shared Experiences Scale

Type	Dimension	Item
Individual experience	Sense	This coffee store is focused on experience sensory appeal.
		This coffee store does not try to engage my senses.
		This coffee store tries to excite my senses.
	Feel	This coffee store tries to put me in a certain mood.
		This coffee store tries to be emotional.
		This coffee store tries to be affective.
	Think	This coffee store tries to intrigue me.
		This coffee store tries to stimulate my curiosity.
		This coffee store appeals to my creative thinking.
Shared experience	Act	This coffee store tries to make me think about lifestyle.
		This coffee store tries to remind me of activities I can do.
		This coffee store tries get me to think about my behavior.
	Relate	This coffee store tries to make me think about bonds.
		I can relate to other people through this coffee store.
		This coffee store tries to get me think about relations.

Source: Chang and Chieng 2006, p. 941

[19] Due to the cross-cultural nature of the study, data was collected in Shanghai, China and Taipei, Taiwan.

Movie Consumption Experience and Immersion Scale

To explore the effect of movie consumption on satisfaction, Fornerino, Helme-Guizon, and Gotteland (2008) conceptualized movie consumption experience and immersion. Further, following established scale procedures, they developed a valid and reliable measurement scale to measure this type of experience. Applying an existential-phenomenological approach, a qualitative study using narrative introspection was conducted to generate a first item pool consisting of twenty-seven items. To assess the scale's dimensional structure, various EFAs and CFAs were conducted. Finally, reliability, convergent validity and robustness of the scale were assessed in two new contexts: dramatic comedy and comedy.

The final ten-item scale consists of two dimensions: "emotions" and "social interaction". "Emotions" and "social interaction" are both represented by five items each (see Table 18). The scale assesses the evoked intensity of the felt experience on a 5-point Likert scale (with 1 = "completely agree" and 5 = "completely disagree").

Table 18: The Movie Consumption Experience Scale

Dimension	Items
Emotions	During the show, I felt strong emotions.
	During the show, I felt emotions that were more intense than those I usually feel in daily life.
	During the show, I experienced a series of very different emotions.
	At times, I was in an unusual emotional state.
	During the show, I experienced moments of intense excitement.
Social Interaction	At time, I interact with the people who were with me.
	I felt very close to certain members of the audience, even complete strangers.
	I wanted to share with others.
	I had the impression of communing with the others, even if I did not know them.
	As the show unfolded, felt more and more a part of the audience.

Source: Fornerino, Helme-Guizon, and Gotteland 2008

Online Experience Scales

Nambisan and Watt (2011) investigated online customer experiences in online product communities and their impact on attitude towards product, company and service quality. To explore these effects, the authors developed a scale to measure online customer experience, the online community experience (OCE).

To develop their scale, the authors adapted items of existing scales. The authors conceptualized the OCE scale as a four dimensional construct. Items representing two of the dimensions – the "pragmatic" and the "hedonic" dimensions – are extracted from existing, related scales: the hedonic / utilitarian scale developed by Voss, Spangenberg, and Grohmann (2003) and the experiential value scale by Mathwick, Malhotra, and Rigdon (2001). The

hedonic / utilitarian scale (Voss, Spangenberg, and Grohmann 2003) measures the hedonic and utilitarian dimension of consumer attitudes towards product categories and different brands within categories, while the experiential value scale (Mathwick, Malhotra, and Rigdon 2001) measures experiential value for different shopping contexts. The other items, encompassing the "sociability" and "usability" dimensions, are part of established scales, but are not directly experience related. The sociability items are derived from a study measuring "sociability" in an online collaborative learning environment and in online communities. For the "usability" dimensions, the authors consulted thematically related literature and identified a set of six items (Nambisan and Watt 2011, p. 4). Factor analysis resulted in a 26-item bipolar measurement scale with reliability score greater than .070. See Table 19 for the detailed scale.

Table 19: The Online Community Experience Scale

Dimension	Item			Dimension	Item	
Pragmatic	worthwhile	worthless		**Hedonic**	happy	sad
	useful	not useful			pleasing	annoying
	productive	not productive			fun	not fun
	valuable	not valuable			exciting	not exciting
	practical	impractical			captivating	not captivating
	informative	non informative			entertaining	not entertaining
	relevant	irrelevant			deeply engrossing	not deeply engrossing
Usability	easy	difficult			enjoyable	not enjoyable
	not tiring	tiring		**Sociability**	friendly	not friendly
	not stressful	stressful			lonesome	communal
	not confusing	confusing			personal	impersonal
	simple	complicated			polite	impolite
	consistent	not consistent			inviting	not inviting

Source: Nambisan and Watt 2011, p. 5

To analyze transcendent customer experiences (TCE) and their impact on customers' integration in brand communities, Schouten, McAlexander, and Koenig (2007) developed a measurement scale to assess TCE. Based on existing literature and ethnographic work, the authors collected an item pool. In order to capture the experience of the special target group, motorcyclists, the authors put special emphasize on the wording of the items.
Based on CFA results, the final scale consists of eleven items on a 5-point Likert scale (with 1 = "strongly disagree" to 5 = "strongly agree"). The scale includes aspects that are typical for flow and/or peak experiences such as altered self-concept, singularity and newness of experience, enjoyment, oneness, ineffability, emotional intensity, focus, and testing of personal limits. See Table 20 for all eleven items.

Table 20: The Transcendent Customer Experience Scale

	Item		Item
1.	Camp Jeep caused me to feel different about myself.	**7.**	My Jeep vehicle felt like part of me during the experience.
2.	I felt like I was having the ideal jeep experience.	**8.**	I learned new things as a result of this experience.
3.	My actions during this experience were new.	**9.**	The experience was emotionally intense.
4.	I truly enjoyed this experience.	**10.**	After the experience, I felt more positive about myself.
5.	This experience tested my limits.	**11.**	My total attention was on the event.
6.	The experience was beyond words.		

Source: Schouten, McAlexander, and Koenig 2007, p. 361

Effect of Service Elements on Experience Scale

Last, to investigate the effect of service elements on experience and loyalty, Pullman and Gross (2004) collected specific items based on expert input and a previous qualitative study. The authors decided to analyze the ability of experience design elements to elicit emotions and loyalty behaviors within the VIP event context.

The final questionnaire consisted of twenty-one context items with four physical context factors specific to the special nature of VIP events and one relational context factor. The participants were asked to rate the extent to which each item contributed to their VIP event experience on a 5-pont Likert scale. Although the authors based the item collection on a previous qualitative study, no further established item selection and scale development procedures were applied. The chosen items mainly are based on qualitative ratings of the authors. Furthermore, the items measure single elements of the event and not individual evoked feelings or thoughts. For an overview of the selected subjects that were measured see Table 21:

Table 21: The Experience Design Elements Scale

Construct	Indicator	Construct	Indicator
Entertainment interaction	animator interaction	**Seating**	couch
	animator stunts		bar stools
Food	variety	**Sensory design**	interactive heads
	quality		interactive masks
	desirability		costumes
	freshness		videos
	quantity		interactive high-wire toys
	display		photos
Beverage	beer		ambiance tent materials
	full bar		ambiance music
			ambiance lightning

Source: Pullman and Gross 2004, p. 563

Comparison of Experience Measurement Scales

In conclusion, the development of measurement scales to assess experience is relatively young. All introduced scales or item pools have been developed within in the last ten years. All mentioned scales have a strong relation to the context in common. This is especially evident for the experience design elements by Pullman and Gross (2004) and the TCE by Schouten, McAlexander, and Koenig (2007). Besides the content of the TCE scale, also the wording is adapted to the context of motorcyclists. Further, almost all scales, except the OCE scale, are measured using a Likert scale varying between five and seven points.

The scales differ regarding the content they aim to measure. Depending on the scale either the quality of the evoked experience or the intensity is assessed. While the "Brand Experience" scale by Brakus, Schmitt, and Zarantonello (2009) measures the actual intensity of the brand experience, the OCE and the experience design elements scale measure the quality of an evoked experience. That means, not the level of intensity, high or low, but its quality is of interest.

Further, the scales differ regarding number and type of dimensions. They range from only two dimensions (movie consumption experience by Fornerino, Helme-Guizon, and Gotteland (2008) to four dimensions (brand experience by Brakus, Schmitt, and Zarantonello (2009). Moreover, differences regarding the item content and wording can be observed. Most scales use a relatively neutral and universal wording. For instance, both brand experience scales ask for general and abstract sensory experiences and not for detailed olfactory or tactile sensations. In contrast, the two scales assessing the quality of an experience, are much more specific due to the nature of the scale's purpose.

All scales use items that are rather short and easy to understand even for laymen with different professional and educational backgrounds.

Comparing the different scale development procedures, one notices that the authors invested different efforts to develop their scale. Brakus, Schmitt, and Zarantonello (2009) followed the established and elaborated scale procedure by testing the scales different types of validity, its reliability, distinction, and consistency. By contrast, Pullman and Gross (2004) used a pragmatic approach without testing any types of validity or consistency.

Concluding, a few empirically sufficient tested scales exist that measure the experience construct. Most of the existing scales are highly context related and some lack empirical testing. Further, an increasing interest in scales assessing the different experience constructs

can be observed. Among the introduced scales, The “Brand Experience Scale“ by Brakus, Schmitt, and Zarantonello (2009) is the most prominent one.

3.7 Summary and Relevance for the Conceptual Development and the Empirical Studies

Chapter 3 sets out to outline the role and possibilities the experience concept offers to academia and its high relevance for managers and companies. Especially in recent years the experience concept has constantly gained attention and academia has published new theoretical frameworks and empirical studies analyzing experience in general and applying it to different stimuli and contexts. Due to its holistic nature, the experience concept is suggested as a promising, alternative approach to consumer behavior including "sensory", "affective", "cognitive", and "behavioral" dimensions.

In general, experiences are subjective, unique, internal consumer occurrences evoking individual sensations, psychographic (affective and cognitive) and behavioral responses interacting with a stimulus (Brakus, Schmitt, and Zarantonello 2009; Haeckel, Carbone, and Berry 2003; Hirschman and Holbrook 1982; Palmer 2010; Pullman and Gross 2004). They are intangible and only exist in the mind of the respondent (Pine and Gilmore 1998). During an experience people are engaged on various dimensions: a "cognitive", "affective", "behavioral", "sensory" dimension as well as a "social interactive" dimension suggested by some authors.

Experiences are a result of interaction and engagement whereby the stimulus defines the interaction. Hence, customer experience depends on the customer-service-context-interaction while a brand experience depends on the interaction with all brand related stimuli (Haeckel, Carbone, and Berry 2003; Pullman and Gross 2004). Moreover, the relation between interaction and experience is fully intertwined and the activated processes are similar for all stimuli. Besides the direct consumption experiences (e.g., shopping) more indirect experiences can arise evoked by advertising or other means of marketing communications (Brakus, Schmitt, and Zarantonello 2009). Further, experiences can also be anticipated or remembered.

The experience concept is related to but at the same time distinct to well-established motivational, associative, and affective consumer behavior concepts such as involvement, personality, attitude, or attachment.

Regarding different experience concepts, a broad variety of constructs can be observed. Consumer experience and service (customer) experience are the most popular among practitioners and the most investigated ones by academia. Besides these two, also brand and product experience have increasingly gained attention. Moreover, research defines different

levels and characteristics of intensity resulting in concepts such as extraordinary experiences, flow, and immersion.
Due to the manifold variety of stimuli, consequences for consumer behavior may vary. An experience may have positive as well as negative consequences. In general, experiences have a significant impact on marketing relevant variables such as satisfaction or loyalty.
The impact on experience-caused consequences further depends on person- as well as context-dependent aspects that influence and moderate the actual experience.
Despite its growing and widespread popularity, there is still a lack of empirically validated concepts and measuring scales. The scarcity of systematic scholarly research on the experience construct and measuring possibilities calls for a theory-based conceptual framework that can serve as theoretical basement for further research and a valid, reliable, and objective measurement scale.
Concluding, the experience concept enjoys a high popularity among academia and practitioners because it is able to explain current consumer behavior and is applicable to many different branches and research questions.

In order to fill existing knowledge gaps in design research, the present research suggests applying the experience construct holistic in nature to the multi-sensory product design context. Hence, this dissertation offers a new, holistic, multi-dimensional, and multi-sensory approach to explain the relation of product design and human beings and its impact on consumer behavior in chapter 4. By developing a profound theoretical experience framework and measurement scale, as well as empirically validating both, the present work also aims at expanding experience research and closing existing gaps. In particular, chapter 4.1 gives a theoretical background to conceptualization and operationalization procedures. In chapter 4.2, a theoretical framework and conceptual model of design experience including antecedents, internal structure, consequences for consumer behavior, and moderators is proposed based on literature. Moreover, the design experience construct is distinguished from related constructs and basic requirements for a measuring scale are defined. Chapter 5 operationalizes the design experience concept by building and testing a design experience measurement scale in line with established scale development procedures. It includes the empirical assessment of the theoretical model, its antecedents, internal structure and moderating influences. The chapter concludes with a general discussion in chapter 5.4. Figure 16 gives a graphical overview of the procedure.

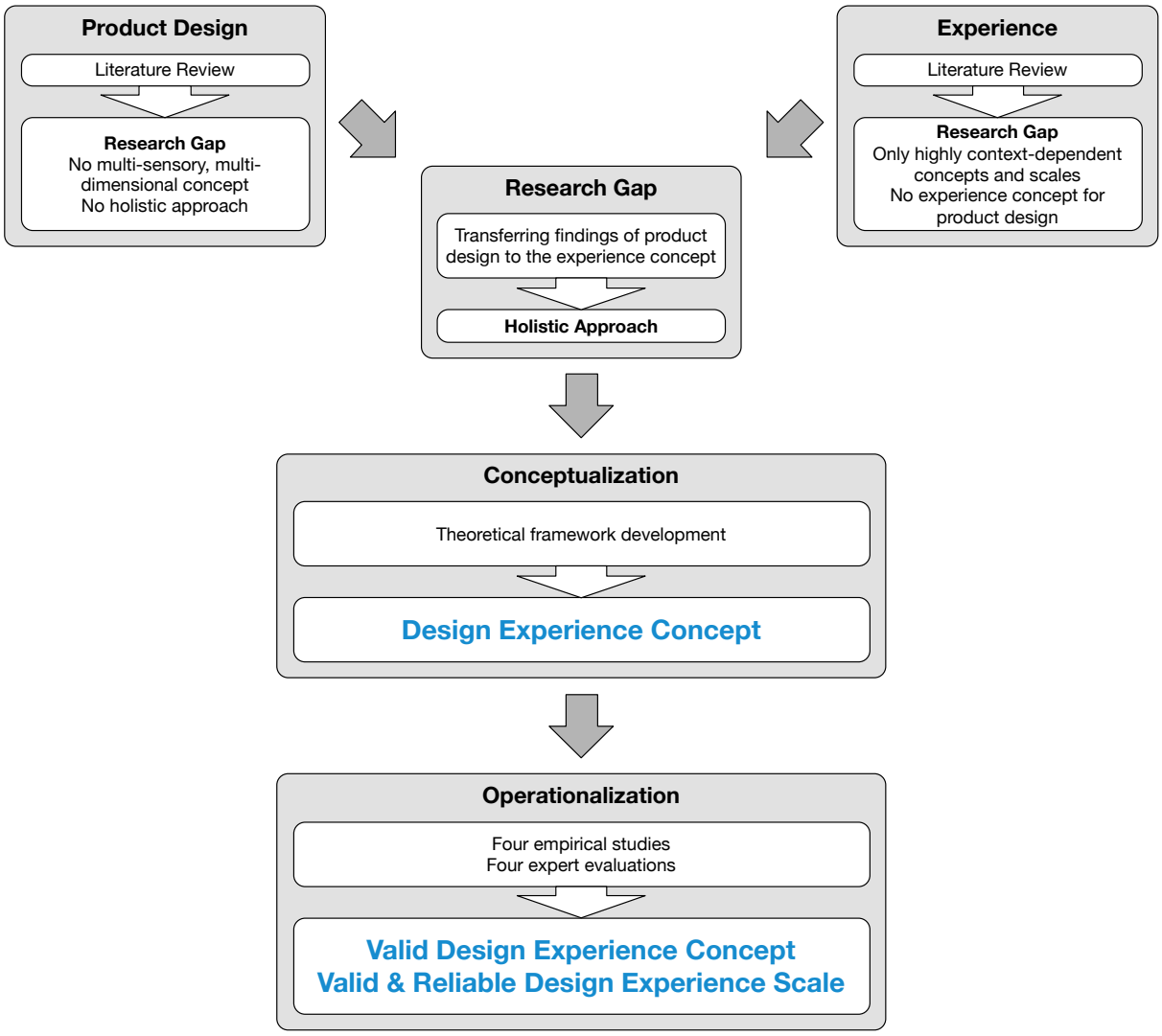


Figure 16: Structure and Approach of this Dissertation
Source: author's own illustration

4 Conceptualizing Design Experience

As seen in chapter 2, consumer interaction with product design and consumer reactions evoked by it are well-researched phenomena that gain growing attention. Nevertheless, to the author's knowledge no theoretical concept exists taking into account the specific characteristics and requirements of human-design-interaction. As presented in detail in chapter 2, design is perceived in a multi-sensory way and evokes affective, cognitive, behavioral, and social consumer reactions. Yet, the existing concepts are limited often to uni- or bi-modal approaches and / or neglect the multi-dimensional nature of design-triggered responses.

This research suggests closing this existing knowledge gap by applying the experience construct to the design context. As elaborated in chapter 3, the experience concept is acknowledged as a promising new approach to consumer behavior that is multi-sensory and multi-dimensional in nature. The present research transfers the experience approach to the design context and hence, offers a new fruitful and promising research area and perspective to analyze design-consumer-interaction and its consequences for consumer behavior in general and especially for marketing relevant variables. Moreover, this dissertation expands the existing, current research on experience by adding a new theoretical based framework and a validated measuring scale. Hence, based on the insights of the broad literature review of chapter 2 and 3 this work conceptualizes and operationalizes design experience by elaborating its characteristics, special requirements and particular features, by developing a measurement scale, and validating both in various empirical studies.

To fulfill the goals of this dissertation, chapter 4 is dedicated to theory on general construct and scale development and particularly on the actual design experience conceptualization, while chapter 5 presents in detail the operationalization including all four empirical studies and four expert sorting.
In particular, chapter 4.1 starts by presenting a theoretical overview of general construct and scale development procedures followed by the special procedure applied to the design experience construct and scale development of this dissertation. Then chapter 4.2 conceptualizes design experience in detail. Chapter 4 concludes with a summary and points out relevant implications for the empirical studies in 4.3.

4.1 Construct and Scale Development Procedure

Theory and measurement scale development are an important and well established field in social and behavioral sciences and are closely intertwined (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Spector 1992). Hence, well-established scale development methods and procedures exist to secure high quality standards in social and behavioral science (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Spector 1992). In contrast to the significance and consequences of scale quality for scientific research, not all existing and applied measurement scales are developed according to these standards (compare chapter 3.6 for an overview of existing scales measuring the experience construct). Therefore, the work aims at closing this knowledge gap by adding a soundly constructed theoretical concept and measurement tool.

Given the importance of construct and scale development and their high quality standards, the following chapter starts giving an overview of the theoretical background of scaling procedure (chapter 4.1.1) followed by an introduction to the applied procedure in the present work (chapter 4.1.2.). Hence, the present work assures to take all necessary requirements into account and to apply a procedure that is in line with these and with well-established methods (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Spector 1992)

4.1.1 Theoretical Background of Construct and Scale Development Procedure

A construct and its scale have to be valid and reliable as well as its dimensionality well defined and analyzed (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003). Hence, this dissertation presents the different requirements regarding construct and scale development starting with an overview of the different validity types, followed by the aspects reliability, objectivity, and dimensionality.

Validity

The validity of a latent construct and its measurement are a central prerequisite. Regarding the hierarchy, definition, and naming of the different validity types researchers still disagree. This research follows the suggestions of Netemeyer, Bearden, and Sharma (2003), DeVellis (2003), and Spector (1992). According to Netemeyer, Bearden, and Sharma (2003) construct validity is the ultimate goal in scaling and encompasses all evidence bearing on a measure. Besides construct validity, also content and face validity, convergent and discriminant validity, nomological and known-group validity, as well as predictive validity play an important role in scaling. The present work focuses on the main validity types: construct, content, face, convergent, discriminant, predictive, and known-group validity.

Construct validity describes how well a scale or other measurement types assess the construct it is supposed to measure. Therefore, consistently researchers stress the importance of theory for building a measurement scale to assess a latent construct empirically (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005). The quality of the new derived theory depends on how it is embedded and grounded in existing theoretical frameworks.
A construct's theory should contain a solid theoretical definition including what the domain includes and what it excludes as well the a priori dimensionality of the construct, potential antecedents and consequences. It must be clear what the latent construct predicts and what predicts the latent construct (Cronbach and Meehl 1955). Further, the new theoretical construct as well as its measuring scale must have a certain theoretical and / or practical relevance to social science. The construct's and scale's benefits have to be proved, made clear and have to be well derived from literature (Netemeyer, Bearden, and Sharma 2003).
Brakus, Schmitt, and Zarantonello (2009) and Aaker (1997) recommend to start the operationalization by verifying the existence of the latent construct and its practical relevance. Is to say, to analyze if the construct is understood by others, is completely theoretically captured, and if there is any need for a new construct and scale. Therefore, scaling procedure suggests starting the operationalization with a qualitative research approach in order to collect unbiased data about the construct from different perspectives and angles as well as to gather expert opinions (DeVellis 2003) (compare Study I).

Part of this validation process is to test content and face validity. Content validity describes whether a measure's items are a proper sample of the theoretical domain of the construct (Nunnally and Bernstein 1994). It reflects "the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose" (Haynes, Richard, and Kubany 1995, p. 238). To prove a scale's content validity a screening by expert judges and pilot tests with a sample of relevant populations to trim and refine the pool are recommended by established scaling procedure literature (compare Netemeyer, Bearden, and Sharma 2003, p. 12) and expert evaluations section 5).
Face validity describes the mere appearance that a measure has validity. This means, that the sample easily can understand the measure and its instructions ensuring a correct use and data collection. Face validity requires an ease-of-use of the scale, a proper reading level and clarity of the individual items, easily read instructions and easy-to-use response formats. To proof

the face validity of a scale it is recommended to test its instructions and items with a population sample (compare Study II).

Convergent validity “refers to the degree to which two measures designed to measure the same construct are related" (Netemeyer, Bearden, and Sharma 2003, p. 12). Evidence is offered if independent measures of the same construct highly correlate with each other. Therefore, correlations between the new developed scale and existing related ones are compared. To test convergent validity, Campbell and Fiske (1959) provide the Multitrait-Multimethod-Matrix. This method involves measuring more than one construct by means of more than one method so that one obtains a fully crossed method-by-measure matrix. Unfortunately, in the particular case of testing the design experience scale, no measurement exists that measures the same construct or closely related constructs. However, the design experience scale is conceptualized as a multi-dimensional construct. Related constructs exist in consumer behavior and psychology that assess aspects of single dimensions of design experience. In case of missing measurements of the same construct, Netemeyer, Bearden, and Sharma (2003) suggest comparing relevant scales with the dimensions of the new scale based on correlations (compare Study III).
Counter-part to convergent validity is discriminant validity. Discriminant validity assesses “the degree to which two measures designed to measure similar, but conceptually different, constructs are related” (Netemeyer, Bearden, and Sharma 2003, p. 13). It requires that two measurements that are supposed to differ do not correlate at all or too highly with each other (compare Study IV).

Predictive validity is referred to the “relation between a predictor and a criterion before, during, after a predictor is applied” (Netemeyer, Bearden, and Sharma 2003, p. 14). Is to say, the extent to which a score on a assessment predicts future performance (compare Study IV).

Known-group validity refers to the scale’s ability to differentiate reliably between different groups of population that are supposed to score high on a certain scale. For example, the centrality of visual product aesthetics (CVPA) scale assesses reliably that people that are interested in design score high and people that are not interested at all score low (Bloch, Brunel, and Arnold 2003). Evidence for known-group validity can be the mean score differences between groups of people that are supposed to rate differently (compare Study IV).

Reliability

In psychometric literature reliability is defined as "the proportion of variance attributable to the true score of the latent variable" (DeVellis 2003, p. 27). Reliability in scaling is an accuracy criterion. It captures the extent to which a scale measures precisely the construct it is supposed to measure. The lower the random error the higher is the reliability of a measurement. Two types of reliability have to be considered during scale development procedure: internal consistency and test-retest reliability.

Internal consistency measures the item interrelatedness of a scale. All items of a scale should have high levels of internal consistency. The most common internal consistency reliability coefficient is Cronbach's coefficient alpha (Cronbach and Meehl 1955; Netemeyer, Bearden, and Sharma 2003; DeVellis 2003). A tradeoff exists between the acceptable level of coefficient alpha and the scale's length. As the number of items rise, alpha also will tend to rise. The right number of items depends on the content and dimensions of the construct itself. A more complex construct with several dimensions needs more items than a uni-dimensional construct. Hence, it is advised that researchers should orientate themselves at related existing scales to get an idea about the maximum and minimum number to administer a scale that captures the construct (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Nunnally and Bernstein 1994) (compare Study III and IV).

Test-retest reliability describes the temporal stability of a scale; the stability of a person's item responses over time. The test-retest reliability results show if the measure reflects the construct and is generalizable to other assessment occasions (Netemeyer, Bearden, and Sharma 2003). Unfortunately, testing test-retest reliability is not very common among scale developers because of the time consuming effort. The present work does not prove the test-retest reliability.

Objectivity

Objectivity in scaling is the extent to which findings of a study or systematic review are independent of the researcher or context. Is to say, various researchers should generate the same data applying the same measurement at the same group of respondents. Further, it means, that the measurement can be applied to another context, e.g., from a lab setting to a natural setting, or from a certain population sample to the general population (Netemeyer, Bearden, and Sharma 2003).

Academia differentiates between three types of objectivity: objectivity of application, analysis, and interpretation (Bortz and Döring 2006). In general, fulfilling perfect objectivity criteria applying well-constructed measurements is accomplished easily, if certain established data collecting, analyzing, and interpretation standards are met. Rules of measurement must be clear, the scale must be practical to apply, not demanding for the administrator or respondent, and results should not depend on the administrator (Netemeyer, Bearden, and Sharma 2003, p. 2; Nunnally and Bernstein 1994). Hence, clear and repetitive instructions are included for respondents and trainings for researchers involved in order to assure objectivity.

Dimensionality

The dimensionality of a measurement describes the homogeneity of its items. A measurement can be hypothesized as uni-dimensional, multi-dimensional and / or as a higher-order factor. A uni-dimensional measurement has statistical properties that indicate that its items build a single construct or factor, while a multi-dimensional measurement underlies several factors (Netemeyer, Bearden, and Sharma 2003). The scale's dimensionality should reflect the hypothesized dimensionality. This means for the present work, that the hypothesized dimensions of the design experience construct (compare chapter 4.2.2) can be detected during the operationalization process.

Established scaling literature recommends various procedures to check the dimensionality of a scale; e.g., item analysis, exploratory and confirmatory factor analysis (Netemeyer, Bearden, and Sharma 2003).

4.1.2 Design Experience Construct and Scale Development Procedure

According to established literature and based on mentioned theoretical aspects, this dissertation proposes the following procedure divided into two main chapters: conceptualization (chapter 4.2) and operationalization (chapter 5).

4.1.2.1 Conceptualizing Design Experience

In chapter 4.2 design experience is conceptualized based on a profound literature review including the construct's definition highlighting special requirements and features of stimulus-human-interaction, as well as a differentiation of design experience from related concepts (compare chapter 4.2.1). Further, chapter 4.2.2 presents the internal structure of design experience. Chapter 4.2.3 presents consequences for consumer behavior. Chapter 4.2.4 focuses on specific boundary conditions and influencing factors. The conceptualization concludes with a description of special requirements and features of the design experience measurement scale (chapter 4.2.5).

4.1.2.2 Operationalizing Design Experience

The operationalization aims at validating the construct and developing a measurement scale to assess the intangible construct. The design experience validation and scale development follows well-established scale construction requirements to fulfill quality standards of social and behavioral sciences. Unfortunately, researchers have not yet agreed upon a universal procedure. Therefore, the present work orientates itself on prominent and highly acknowledged publications dealing with scale development or applying it (Bloch, Brunel, and Arnold 2003; Brakus, Schmitt, and Zarantonello 2009; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Spector 1992). The proposed procedure is a quintessence of the mentioned authors and consists of three steps with the following main purpose: (1) exploration of design experience and item pool generation, (2) validation of the design experience construct and analysis of dimensionality as well as scale refinement, (3) analysis of direct, indirect, and interaction effects. The three steps include four empirical studies, four expert evaluations, and one literature research. All are designed to develop the scale and validate the construct and the scale.

Chapter 5.1 presents the Step 1 including qualitative interviews, a literature research, and the first expert evaluation. The goal of Step 1 is to explore the concept of design experience from a qualitative perspective and generate an initial item pool. Chapter 5.2 presents Step 2 aiming at the validation and analysis of the internal structure of the design experience construct as well as scale refinement including Study II and Study III as well as the 2nd and 3rd expert evaluation. Step 3 encompass Study IV and the 4th expert evaluation presented in chapter 5.3. In contrast to the other empirical studies, Study IV focuses on direct, indirect, and interaction effects of design experience on consumer behavior. All studies address to respective study objectives and give details on applied methods. Interpretations of study findings and discussions follow.

The dissertation pursues the following procedure (compare for more details Table 22):

Step 1: **Exploring DX & Item Pool Generation** (chapter 5.1)

- Study I
- Literature and scale research
- 1st Round of Expert Evaluation

Step 2: **Validation of DX Construct & Scale, Analysis of Dimensionality, & Refinement of Scale** (chapter 5.2)

- Study II
- 2nd Round of Expert Evaluation
- 3rd Round of Expert Evaluation
- Study III

Step 3: **Analysis of Direct, Indirect, and Interaction Effects and Confirmation of Scale** (chapter 5.3)

- Study IV
- 4th Round of Expert Evaluation

Table 22: Overview of Empirical Studies and Evaluations

Step	1			2				3	
Main Goal	**Exploring DX & Item Pool Generation**			**Validation of Construct & Scale, Analysis of Dimensionality, Refinement of Scale**				**Analysis of Direct, Indirect, & Interaction Effects, Confirmation of Scale**	
	Study I	**Literature Research**	**1st Evaluation**	**Study II**	**2nd Evaluation**	**3rd Evaluation**	**Study III**	**Study IV**	**4th Evaluation**
Objective	Construct validation, generation of initial item pool	Generation of initial item pool	Content & face validation of item pool	Construct validation, analysis of dimensionality, purification & reduction of scale	Content & face validation of internal structure	Content & face validation, optimization of comprehensibility	Analysis of reliability, confirmation of dimensionality, convergent validation, analysis of effects on consumer behavior	Discriminant & predictive validation, confirmation of dimensionality, generalizability, direct, indirect, & interaction effects	Content & face validation of internal structure
Method	Semi-structured in-depth expert interviews (design experts, N = 12 main study)	Literature research	Expert and population rating (design expert N = 7, marketing experts N = 8, population N = 6)	Psychological measurement (student sample; N=10 pretest, N=309 main study)	Expert sorting (editorial experts, N = 3)	Expert evaluation (academic experts, N = 2)	Expert judging, psychological measurement (student sample; N=29 pretest, consumer sample; N=280 main study)	Psychological measurement (student sample; N = 36 pretest; student sample, N = 79 main study)	Expert sorting (design experts, N = 3)
Key Findings	Construct validation, generation of items	Generation of items (82), refinement of item pool	Refinement & reduction of item pool (47 dropouts)	Construct validation, 5-dimensional structure of DX	Confirmation of 5-dimensional structure	Refinement of scale	Confirmation 5-dimensional structure, convergent validity	Confirmation of discriminant and predictive validation, 5-dimensional structure, direct, indirect, and interaction effects	Confirmation of 5-dimensional structure
Scale: Number of Items	**141**	**102**	**55**	**24**	**24**	**15**	**12**	**12**	**12**

July 2011 — Passage of Time — March 2013

Source: author's own composition

4.2 Conceptualizing Design Experience

Chapter 4.2 conceptualizes design experience by defining the concept in detail, highlighting its characteristics, illustrating requirements and features of stimulus-human-interaction, differentiating it from related concepts, presenting its internal structure, giving an overview of possible impacts on consumer behavior and moderating effects, and finally by defining its measurement scale. In contrast to chapter 3, the following chapter focuses on the conceptualization of design experience. Hence, it applies knowledge and findings gathered in chapter 3, but only includes relevant aspects linked to the stimulus design.

4.2.1 Construct Definition

Based on the findings of chapter 3, the present research conceptualizes design experience as individual sensations, feelings, cognitions, and behavioral responses evoked by design cues. Consistent with previous experience concepts, design experience is a holistic perspective that explicitly acknowledges sensory input from multiple modes (e.g., vision and haptics). This results in various reactions such as affects (e.g., emotions, sensations), cognitions (e.g., associations, thoughts, metaphors, memories) as well as behavior (e.g., moving toward the object, touching it, talking to friends about it). These reactions affect a variety of outcomes relevant to marketers including behavioral intentions, price expectation, and attachment to the product (Brakus, Schmitt, and Zarantonello 2009) (compare Figure 17).

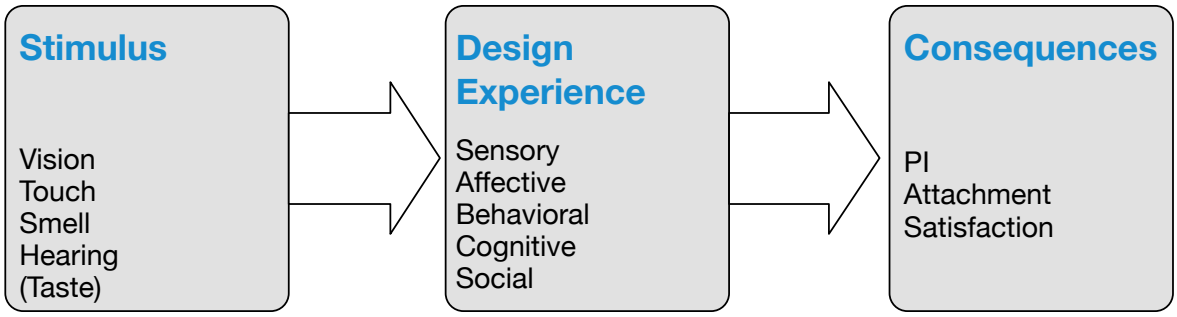


Figure 17: Model of Design Experience
Source: author's own illustration

4.2.1.1 Product Design

Central to any experience is the stimulus with all its related cues. For example, brand experience is evoked by the brand and all its related brand cues such as a brand's identity, including its name, color, and logo, further its marketing communications with advertisements, and web interfaces, as well as certain environments in which the brand is sold such as flagship stores or the point of sale (Brakus, Schmitt, and Zarantonello 2009). For

shopping experience these cues are the act of shopping including browsing, communicating with salespeople, searching for, selecting, and finally purchasing the product (Fiore 2008; Grace and O'Cass 2004; Menon and Kahn 2002; Ofir and Simonson 2007).
Design experience is evoked by the design of an object. As described in chapter 2.1 no universal and generally accepted definition of the term design exists. Depending on the background, the term design is limited to the outer appearance of a product, but can also encompass its function, its ergonomics, and usability (Bloch 1995). In the design experience context, the term design describes the outer appearance of a physical product that has a utilitarian function. Objects that do not serve any utilitarian function like art are excluded (Hekkert and Schifferstein 2008). Design encompasses the holistic outer appearance as well as its single parts. The outer appearance includes its size, form, proportion, color, material, and ornamentation as well as its surface, and reflectivity (Bloch, Brunel, and Arnold 2003). For example, an office chair consists of various single design elements and parts that together create the design of the chair (compare Figure 18).

Figure 18: Office Chair used for Further Steps
Source: Bürostühle 2011

The chair is made of a back and armrest, a seat pan, a chair base as well as some visible adjustment mechanisms. The frames of the back- and the armrests as well as the main visible parts of the adjustment mechanisms are made of plastic. The upper surface of the armrest that gets in touch with the forearm of the user is covered with polyurethane foam creating a different more soft haptic sensation. Beside the plastic frame the backrest also consists of a

woven mash that is soft to touch and adjust to the form of the user's body. The seat pan of the chair is covered with robust slightly rough woven fabric. The chair bases mainly consist of five legs made of reflective chrome steel. The wheels are robust plastic. The color code is mainly dark consisting of different shades of black and dark blue contrasted by the chrome steel chair base. All these single elements together form the holistically perceived design of the chair.

In contrast to engineering-related definitions, ergonomics, usability, use, function, as well as production efficiency, recyclability, and distribution ease of the product are excluded (Bloch, Brunel, and Arnold 2003). Hence, the focus is on the first contact with a design and not on its regular longtime usage. By using this definition, this research follows the approach applied in consumer behavior and marketing (Bloch, Brunel, and Arnold 2003). The role and impact of design experience on consumer behavior over a longer time period is also of high interest and therefore should be investigated in subsequent studies. Due to the time and scope limitations, this doctoral thesis is not further investigating on that aspect.

Further, the scope of design experience is limited to the design of physical products. While not minimizing the importance of non-physical products, these are excluded because the interaction with non-physical products differs fundamentally. That means that products that consist mainly or totally of digital user interfaces are excluded from this concept. This includes capital goods as well as consumer products. Software in general and computer games in particular, as well as any type of web interfaces are not part of design experience.
For example, a computer consists of a durable part, the housing made of plastic or painted steel and the operating system with its graphical user interface, animations, and transitions. Based on the above definition and because of the different modes of interaction, only the durable body of the computer is relevant for the present design experience concept. The same idea and differentiation applies to smart phones or tablets: The physical object made of plastics, metal, or glass (touch screen), as well as its mechanical or capacity buttons and switches are part of the durable product, while its software, Apps and numerous digital additional functions are non-durable and therefore excluded from the design experience concept.

4.2.1.2 Human-Design-Interaction

As explained in chapter 3.1.2, the interaction between the individual and the object is fundamental for any experience. An interaction between the design of an object and the

individual is a basic requirement for any design experience. Experiences are not only a result of the described design-human-interactions but fully intertwined, because the experience accompanies, guides and affects interactions (Hekkert and Schifferstein 2008) (Figure 19). In this dissertation these interactions are restricted to non-digital products.

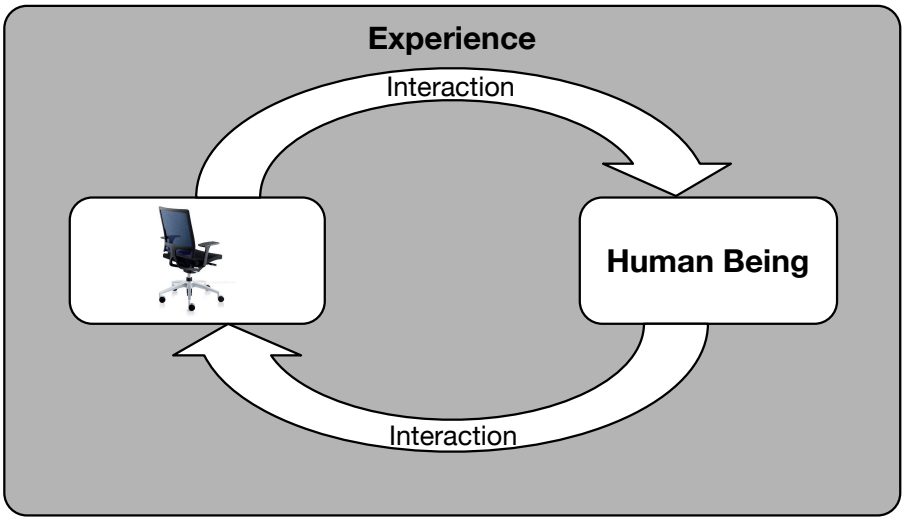


Figure 19: Circular Relation of Design-Human-Being-Interaction
Source: author's own illustration

For example, a person sees the exterior of a car. The design of the car, its overall form and the special greenish, matt car paint interests him and intrigues him to have a closer look at it (1st interaction and 1st experience). Never has he seen matt car paint before and he wonders how this might feel (2nd interaction and 2nd experience). As he touches it, he is surprised by its rough surface and that is cool to the touch (3rd interaction and 3rd experience). Further, coming closer the form and position of the front lights remind him of the eyes of a panther (4th interaction and 4th experience). He looks inside the car and the form of the dashboard emotionally attracts him, he turns around to call his friends to have a closer look, too (5th and 6th interaction and 5th and 6th experience).

Intensity and Valence of Design Experience

The total experience gets more intense with each interaction (compare chapter 3.1.2). Hence, there is a direct relation between the intensity of an interaction and the intensity of a subjective experience evoked by design cues. The more the individual takes part or interacts actively the more intense the experience can be (compare chapter 3.1.2) (Pine and Gilmore 1998). An intensive design experience engages the observer with all his senses, touches his heart, stimulates associations or memories and invites him to interact with the design (to

touch it, feel it, use it, etc.) (Schmitt 1999b). As for product experience, design experiences are less intense than other experience occurrences (Desmet and Hekkert 2007).

A design experience can be either positive or negative. The intensity is not an indicator for the valence of the experience (Brakus, Schmitt, and Zarantonello 2009) (compare chapter 3.1.2). The design of the above mentioned car can evoke intensive feelings, emotions, a lot of thoughts and even bodily reactions, but these feelings may range from absolute excitement to total disgust. It may remind the person of a pleasant memory or of the negative carbon footprint the special car paint produces. The person may be fascinated and moves toward the car or disgustedly turns away from it.

Moment of Interaction

Interactions can be taking place at the moment of question, but can also happen in the mind of a person (compare chapter 3.1.2). The person can remember or anticipate the interaction with the object. Thus, the interactions can be physical and non physical. Is to say, the person remembers the design with all its details some days later and he experiences the design again. Moreover, an interaction takes place, when a person anticipates and imagines the real interaction. If the person tells a friend of the design of the car, the friend imagines the design based on his friend's descriptions and experiences it himself imagining and anticipating it (Richardson 1999).

4.2.1.3 Similarities and Differences to Related Concepts

As demonstrated in chapter 3.1.3, the experience concept combines different conceptual ideas and approaches. Just as the general experience concept the design experience is related but also conceptually distinct from other design or experience concepts. The following chapter differentiates the design experience construct from other experience concepts and well-established constructs such as evaluative, motivational or associative ones. Therefore, the constructs product experience, evaluative judgment, involvement, and finally product personality are presented and discussed (compare also 3.1.3 for more concepts related yet distinct to the general experience concept).

In contrast to product experience, design experience focuses on design cues of physical products. In other words, central to design experience are the form, proportion, color and material of the product and the overall creation of its outer appearance. Product experience is much broader defined and also includes the above excluded aspects like ergonomics, usability

and function. Some product experience definitions are restricted to affective experiences (Desmet and Hekkert 2007). Therefore, they define product experience as " a change in core affect that is attributed to human-product interaction" (Desmet and Hekkert 2007, p. 59). Concluding, in contrast to product experience, design experience is limited to the outer appearance but contains beside the "affective" also a "sensory", "cognitive", "behavioral", and "social" dimension.

General evaluations are based on beliefs and / or automatic affective reactions (Fishbein and Ajzen 1975; Murphy and Zajonc 1993). By contrast, design experiences are not general evaluative judgments such as *"I like the design"* or *"I do not like the design"*. Design experiences are more diverse and encompass more specific and detailed cognitions, affective and behavioral reactions evoked by design-related stimuli. However, general evaluations can be a result of design experience, but they capture just a small part of the entire experience.

Design experience also differs form motivational constructs, such as involvement (Bloch 1981; Brakus, Schmitt, and Zarantonello 2009; Zaichkowsky 1985). Involvement and the experience concept differ regarding their antecedents. Antecedents of involvement include personal relevance and perceived importance of a product or design (Zaichkowsky 1985). Focus is the relationship between a person and a product, product category or maybe a design style, which makes it conceptually distinct from experience (Baumgartner and Steenkamp 2001; Beatty and Talpade 1994). Interaction between the stimulus and the individual is the main driver of an experience. Moreover, involvement is grounded on needs, values, and interests that stimulate a consumer to move toward an object (Baumgartner and Steenkamp 2001; Beatty and Talpade 1994). In contrast, design experience does not require a motivational state. Even when consumers are not interested in or do not have a connection to the product category or the design style a design may evoke an experience. It may be evoked by chance (Hekkert and Schifferstein 2008).

The concept of personality routed on associations and images differs from the experience concept (Keller 1993). As for brands also products convey meaning and have a product personality (Govers and Schoormans 2005). Comparable to brand personality, product personality is a high-level description of the product as a whole and is strongly influenced by product appearance (Govers, Hekkert, and Schoormans 2004). Govers and Mugge (2004) conceptualize product personality as the set of human characteristics one associates with a

certain product. Products have individual characteristics that define their personalities (Brunel and Kumar 2007; Govers and Schoormans 2005; Mugge, Govers, and Schoormans 2009). The personality of a product or brand is the result of inferential processes (Johar, Sengupta, and Aaker 2005). Hence, one is not sincere or excited about a product, but projects these characteristics onto a product (Brakus, Schmitt, and Zarantonello 2009). In contrast, experience summarizes all individual responses evoked by a stimulus. In case of design experience, all actual sensations, feelings, cognitions, and behavioral responses evoked by a design are included.
Moreover, product personality includes the whole product while design experience focuses on the outer appearance of a product.

4.2.1.4 Summary

Design experience encompasses the outer appearance of durable products including size, form, proportion, color, material, ornamentation, surface, and reflectivity that do not classify as art and serve a utilitarian and functional purpose.
Further, design experience is a result of design-human-interaction. It can vary in strength, intensity, and valence. This depends on the one hand on the stimulus itself and on the other hand on its subjective nature. Design experience also can be anticipated and remembered. Moreover, design experience is related to other consumer behavior constructs but a distinct and discrete concept.

4.2.2 Design Experience Dimensions

As thoroughly explained and demonstrated in chapter 3.3, academia conceptualizes experience as a multi-dimensional concept. Although the number and labeling of dimensions varies dependent on the context and stimulus as well as on the academic background, general consistent dimensions exist. A “sensory”, an “emotional”, and a “cognitive” dimension are common to most experience concepts. Moreover, many concepts suggest a “behavioral” dimension including “social behavioral” responses (for more details see chapter 3.3). For example, Brakus, Schmitt, and Zarantonello (2009) define their brand experience concept as a multi-dimensional construct consisting of four dimensions: “sensory”, “intellectual”, “affective”, and “behavioral”. Next, the present work applies the knowledge and findings gathered in chapter 3.3 to the product design context. For a more detailed elaboration on experience dimensions in general see section 3. The following only applies to the design context.

Researchers analyzing product design and its impact on consumer behavior also propose a multi-dimensional approach to product design. As illustrated in detail in chapter 2.2, Crilly, Moultrie, and Clarkson (2004) conceptualize consumer response to product design as a communication process involving sensual perception and cognitive, affective, and behavioral responses (Figure 20). Is to say, the design-human-interaction is defined as a holistic phenomenon that triggers responses on various dimensions.

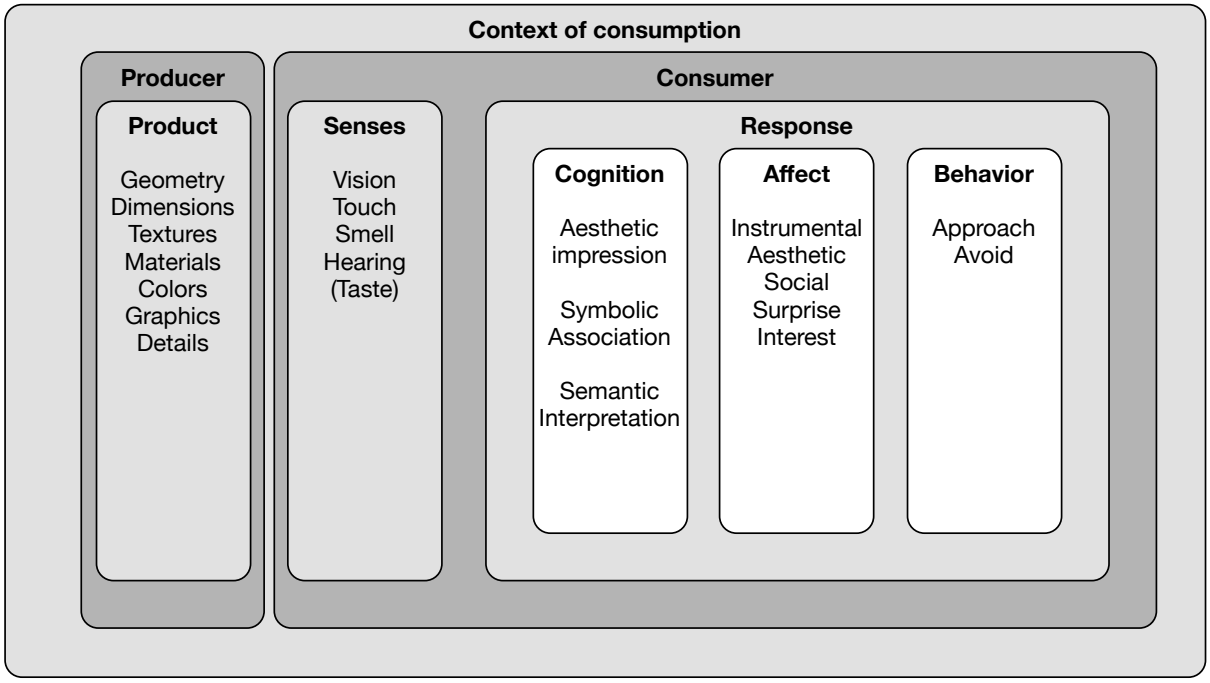


Figure 20: Detail of Framework for Consumer Response to Product Design
Source: adapted from Crilly, Moultrie, and Clarkson 2004, p. 555

Also, design and human factors researchers propose that people are cognitively, sensually, and emotionally involved by interacting with products (Anttonen and Jumisko-Pyykkö 2008). Depending on the context also a "behavioral" and "social" dimension are suggested (compare (Brakus, Schmitt, and Zarantonello 2009; Schmitt 2010) and chapter 2.2.2.3). Further, according to Bitner (1992), affective and cognitive responses do not only interact but can also occur simultaneously (compare chapter 2.2.2). Together they affect behavioral responses of the consumer (Crilly, Moultrie, and Clarkson 2004). It is also important to note, that a one-to-one correspondence between a certain stimulus and a certain dimension and exclusively that dimension does not exist (Brakus, Schmitt, and Zarantonello 2009).

Combining the knowledge of design research and insights of experience research, this research proposes five distinct and independent design experience dimensions:

1. “Sensory” Dimension
2. “Cognitive” Dimension
3. “Affective” Dimension
4. “Behavioral” Dimension
5. “Social” Dimension

Beside the above mentioned responses, design experience can also evoke physiological responses such as pupil dilatation, sweat production or expressive responses such as facial, vocal, and postural expression changes (Desmet and Hekkert 2007). Although this work does not want to minimize the importance of these responses, the focus of the present work is on responses that can be gathered with a psychometric measurement scale and not by observation or additional technical equipment such as eye-tracking software.

Due to the central role of these dimensions for the design experience concept, this research develops and enlarges upon each dimension separately in the following subchapters starting with the “sensory” dimension. The order of presentation follows Crilly, Moultrie, and Clarkson (2004) and has no further significance.

“Sensory” Dimension

People perceive the world around them with all their sensory organs: eyes, ears, nose, mouth, and hands. Sensory perception provides information to orientate and organize oneself. Lately, research has agreed that design is perceived a multi-modal way. Is to say, all information derived from different senses work together and create a holistic experience (compare chapter 2.2.1.2).

For example, a couple is looking for a new sofa. Browsing a furniture store together, the woman sees a sofa in the corner. The classical form catches her attention and she suggests having a closer look at it. By looking at it, they receive information about the size, the form, and proportion. Moreover, they see the color and leather material that attracts them and reminds them of an old sofa at an English castle. They decide to approach the sofa to have a closer look. They wonder if the leather really feels as soft as the look implies and are intrigued to touch it. Touching it they can feel the texture and smell the leather. Based on this information they form a judgment regarding the quality of the sofa and they form their level of preference (compare Schifferstein and Spence 2008).

Hence, analyzing the impact of sensory perception and processing on design experience, all modalities should be regarded simultaneously and equally. Moreover, due to the complex interplay of different modalities and the often-unconscious perception and processing of certain modalities, the observer is not necessarily aware of the impact of one or the other single modality (Schifferstein 2006). Therefore, the design experience concept includes all modalities, all incoming sensory information independent of the fact, whether the observer perceives them consciously or unconsciously. This research suggests that the more sensory modalities a particular design of an object stimulates the richer and more intense is the evoked design experience.

Summing up, the present work proposes that "sensory" experience is part of design experience and includes information and reactions evoked by all sensory modalities. Regarding the internal structure of design experience, it is proposed that sensory experience is an independent dimension.

"Cognitive" Dimension

The second dimension – the "cognitive" dimension – is an inherent part of experience concepts and includes all cognitive reactions evoked by a stimulus (see chapter 3.3).

As illustrated in chapter 2.2.2.1, a broad body of research confirms that product design evokes different kinds of "cognitive" reactions. These reactions include phenomena such as product attributes, quality and performance judgments, associations, and product personalities. For example, the couple looking for a sofa associates with the leather sofa an old sofa at an English castle. Moreover, they form a quality judgment based on the design elements (material, size, form, proportions, etc.). Crilly, Moultrie, and Clarkson (2004) classify cognitive responses to product design into the categories aesthetic impressions, semantic interpretations, and symbolic associations. The proposed cognitive experience includes all types of cognitive responses to product design, hence all categories defined by Crilly, Moultrie, and Clarkson (2004) (compare chapter 2.2.2.1).

Hence, this research suggests that a product design evokes different kinds of cognitive reactions and that these are all part of design experience. Regarding the internal structure of design experience, it is proposed that "cognitive" experience is an independent dimension.

"Affective" Dimension

Further, this work proposes that the "affective" dimension is an inherent component of design experience and builds a distinct dimension of its own.

As chapter 2.2.2.2 demonstrates in detail, scientific findings confirm that product design has a significant influence on affective consumer responses. These affective reactions include emotions, such as positive or negative ones. A design can evoke also emotions like surprise, satisfaction, but also disgust. These emotions can vary regarding intensity. A product design can evoke emotions that are weak, neutral, or strong in intensity. The couple experiencing the sofa feels strong comfort looking at the traditional design of the sofa and smelling its leather material.

Moreover, it is important to note that design experience focuses on the intensity and not the quality or valence of a single affective reaction (compare chapter 3.1). This means, that not the quality of a single affective reaction, such as the feeling of happiness, is important, but how intense all affective reactions are.

Further, it is acknowledged that a design evokes cognitive and affective reactions simultaneously. By applying the experience concept to the design context, this research is able to investigate the effects of these psychological (affective and cognitive) reactions to design holistically. The internal structure of the design experience concept respects their particular characteristics.

Therefore, this dissertation suggests that a product design evokes different kinds of affective responses and that these are part of design experience. Regarding the internal structure of design experience, it is proposed that "affective" experience is an independent dimension.

"Behavioral" Dimension

After describing possible sensorial and psychological (cognitive and affective) responses, the present work focuses now on behavioral responses such as approaching or avoiding a product. These include for example, the urge to touch an intriguing surface or test if the material feels as soft as it implies, to move toward it and have a closer look or putting it back on the shelf (compare chapter 2.2.2.3).

Besides the above-mentioned aspects, some researchers also include behaviors such as purchase intention. For the design experience concept, the present research clearly distinguishes between instantaneous, directly-linked approach-avoidance behaviors and related ones that normally occur at a later moment (Berkowitz 1987; Bloch 1995). Instantaneous, directly-linked behaviors in this context are direct interactions with the product like touching it, looking closer at it, exploring how it feels and how it works or on the contrary putting it back or avoiding it. These behaviors can also occur at a later moment for the first time (not being brave enough or distracted to touch it when seeing for the first time) or again some time later (touching it again and again), but they always have a direct link to

the stimulus and are closely intertwined and embedded in the design experience. In contrast to it, related behaviors include phenomena like purchasing the object or recommending it to friends. Further, this work excludes behaviors such as maintenance of the product or finally disposing it (compare chapter 3.3 and e.g., brand experience (Brakus, Schmitt, and Zarantonello 2009), service experience (Pine and Gilmore 1999; Pullman and Gross 2004; Zomerdijk and Voss 2011), and customer experience (Carbone and Haeckel 1994; Haeckel, Carbone, and Berry 2003; Verhoef et al. 2009)). Although the present work does not want to minimize the importance of related behavioral responses or contradict researchers applying this approach based on the experience concepts, the focus of design experiences is on instantaneous and direct responses. Nevertheless, this research agrees that purchase intention is a major outcome relevant to marketing and consumer behavior. Hence, the present work proposes that a holistic design experience has an impact on marketing relevant outcomes such as purchase intention (compare chapter 4.2.3 for more details).

Social responses such as interacting with one's surroundings and talking to people next to oneself may also be considered as behavioral response. Based on the existing experience concepts (Arnould and Price 1993; Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1999), this dissertation proposes that social responses build an independent dimension and therefore are described separately in the next part.

Summarizing, the present work suggests that a product design evokes different kinds of behavioral responses including approach and avoidance behaviors and that these are part of design experience. Regarding the internal structure of design experience, it is proposed that "behavioral" experience is an independent dimension.

"Social" Dimension

As above-mentioned, most environmental researchers include social behaviors to behavioral responses (Donovan et al. 1994; Jang and Namkung 2009; Mehrabian and Russel 1974). In the special context of product design, social behavioral reactions can be reactions such as talking to others about the design, showing others the design of the product or exploring it together (Forlizzi 2007, 2009). For example, Bloch (1995) mentions showing one's house, its architecture, and the design of single objects to guests. According to Bloch (1995), the shown objects are special to the owner because they are dear to him, he is proud of them or he considers them as especially beautiful.

Restrictively one has to bear in mind that the importance and the impact of "social experiences" depend on the context and type of experiences. For movie experiences, especially horror movies, the reactions of the audience surrounding one in a dark cinema has a

far bigger impact (e.g., gasping, screaming) than for design experience in a department shop looking at mundane products during the pre-Christmas period, when everybody is in a hurry. Nevertheless, it has to be considered and is part of design experience. In the context of the sports car example given at the beginning of this chapter, this means that talking to a friend about the design, its specialties and design key factors intensifies the experience. The level of experience also intensifies, if a person is quietly watching the sports car without actively talking to people, but listing to them while they are commenting their thoughts, feelings, and impressions about this car.

Based on experience concepts within different disciplines (Arnould and Price 1993; Dennis, Brakus, and Alamanos 2013; Pine and Gilmore 1999), the present research regards social behavioral reactions as an independent dimension and not as a part of common behavioral responses. As Fornerino, Helme-Guizon, and Gotteland (2008) and Battarbee and Koskinen (2007), it is proposed that the interaction with others is part of the experience and builds a distinct dimension. It is further suggested that a product design evokes social behavioral responses and that it is part of design experience. Regarding the internal structure of design experience, the present work proposes that "social behavioral" experience is an independent dimension.

Concluding, this dissertation suggests that the internal structure of design experience consists of five separate dimensions: sensory, cognitive, affective, behavioral, and social. Together these create a holistic design experience.

4.2.3 Design Experience-Caused Consequences

Based on experience and design literature, this research suggests that design experience has an effect on a variety of marketing relevant outcomes such as positive evaluation, attractiveness, satisfaction, or attachment (compare chapter 3.4). The following chapter presents possible consequences of design experiences. For more details about direct and indirect effects evoked by design experience, see Study IV. Study IV derives, explains, and analyzes more in detail direct and indirect effects as well as develops and test hypotheses. Possible consequences evoked by design experience will be introduced in the following chapter.

Evaluation

It is widely acknowledged, that the outer appearance of a product plays a major role regarding the evaluation of it (Bloch 1995; Orth and Malkewitz 2008). Depending on the applied design

style, the overall design, the key design elements, and their implementation, the evaluation of a product can range from a mild liking to a strong, intensive evaluative response such as falling in love with a product regardless of its functional aspects (Bloch 1995). Additional experience research confirms a positive relation between intensive, positive experiences and the evaluation of a stimulus (Brakus, Schmitt, and Zarantonello 2009).
Based on these results, this research proposes that a design that evokes an intensive design experience is perceived as more favorable, is to say, liked more than a design that only evokes a minor experience reaction (for more details see Study IV, chapter 5.3). This dissertation restricts the following design-experienced consequences to consequences evoked by a positive, intense design experience. This restriction applies to all design experienced-caused consequences discussed in the present dissertation.

Attractiveness

The assessment whether consumers find a product attractive or not is of major importance for marketers. According to research, perceived attractiveness is directly connected to further marketing relevant variables such as purchase or price expectations (Batra, Brunel, and Chandran 2009; Bloch 1995; Orth, Campana, and Malkewitz 2010). Especially, for consumers that have no prior knowledge about a product category or preferences for a certain brand the attractiveness of a product or packaging design is a key variable (Orth, Campana, and Malkewitz 2010). Moreover, on saturated markets with a broad range of offers without obvious price, quality or functional differentiations consumers choose the product that they consider to be more attractive (Bloch 1995; Kotler and Rath 1984; Nussbaum 1988). Recent studies investigated the effect of multi-sensory design on attractiveness and further effects on brand and quality inferences (Krishna, Elder, and Caldara 2010; Littel and Orth 2013). Results suggest that the more senses are congruent the higher is the perceived attractiveness (Lindstrom 2005; Littel and Orth 2013).
Hence, in line with design and experience research (Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1998; Schifferstein and Spence 2008; Schmitt 2010), the present work suggests that design experience influences product attractiveness (for more details see Study IV, chapter 5.3).

Satisfaction

Consumer satisfaction is also an important behavioral outcome for marketers (Chen and Chuang 2008). Therefore, many recent studies focusing on experience (Brakus, Schmitt, and Zarantonello 2009; Fornerino, Helme-Guizon, and Gotteland 2008; Schmitt 2010; Zomerdijk

and Voss 2010) or the impact of design in general (Chen and Chuang 2008; Fynes and De Burca 2005; Kamali and Loker 2002; Kotler and Rath 1984; Yamamoto and Lambert 1994; Zec and Burkhard 2010; Zhai, Khoo, and Zhong 2009) or product design in particular (Desmet, Overbeeke, and Tax 2001) have investigated their effects on satisfaction.
Satisfaction is defined as "an attitude-like judgment following a purchase act or based on a series of consumer-product interactions" (Fournier and Mick 1999, p. 5). Based on cognitive (Oliver 1980) and emotional evaluation (Mano and Oliver 1993) the consumer compares his or her expectations with the actual performance. Dependent on the degree of expectation fulfillment he or she feels less or more satisfied with the object (Mugge 2007).
Brakus, Schmitt, and Zarantonello (2009) confirm that brand experience affects satisfaction through a direct and indirect route (for more details compare chapter 3.2) and Kotler and Rath (1984) observe that design is a major source of consumer satisfaction.
Hence, in line with design and experience research, the present work suggests that design experience influences the level of satisfaction (for more details see Study IV, chapter 5.3).

Attachment

Besides satisfaction, also attachment to a stimulus is of major interest for researchers and practitioners. Objects consumers feel attached to are more likely to be bought again, used for a long time (Mugge 2007), cared for (Ball and Tasaki 1992; Belk 1988; Schultz, Kleine III, and Kernan 1989), and it is more likely that consumers pay a higher price for them even if they have to make a sacrifice (Thomson, MacInnis, and Park 2005). In general, attachment is described as an "emotion-laden target-specific bond between a person and a specific object" (Thomson, MacInnis, and Park 2005, p. 77). The desire to make and have strong emotional attachments to others and objects is a basic human need (Thomson, MacInnis, and Park 2005).
In particular, product attachment is defined as "the strength of the emotional bond a consumer experiences with a specific product" (Mugge, Schoormans, and Schifferstein 2008, p. 425) and is the result of recurring interactions between a human being and a certain object (Thomson, MacInnis, and Park 2005). Depending on the quality of these interactions and reactions evoked by the product and its outer appearance, the attachment may be a more intense or a looser bond. Antecedent of product attachment are recurring positive emotions such as pleasure (Thomson, MacInnis, and Park 2005). Further, people tend to bond more often with products they feel emotionally connected to (Chang and Wu 2007; Mugge, Schoormans, and Schifferstein 2008). Self-expression, group affiliation and memories determine attachment also positively.

Based on this knowledge, it is expected that the level of felt design experience influences the degree of attachment to the product (for more details see Study IV, chapter 5.3).

Experiential Value

Besides utility, experiences also provide experiential value to consumers (Brakus, Schmitt, and Zarantonello 2009; Sweeney and Soutar 2001). The idea of experiential value was formed by Pine and Gillmore (1999) and is considered as a key outcome variable in experience research (Babin, Darden, and Griffin 1994; Havlena and Holbrook 1986; Holbrook and Hirschman 1982). In connection with experience, value is related to hedonic responses as well as tangible consequences. It is "an interactive relativistic preference experience […] characterizing a subject's experience of interacting with some object. The object may be any thing or event." (Holbrook and Corfman 1985, p. 40). Perceived experiential value is defined by three dimensions that represent functional, emotional, and social value (Sweeney and Soutar 2001).

As an intensive design experience evokes sensory, psychological (cognitive and emotional), behavioral, and social reactions, it is expected that it influences the level of evoked experiential value (for more details see Study IV, chapter 5.3).

Purchase Intention

For most marketers purchase is one of the crucial behavioral outcomes (Berkowitz 1987; Bloch 1995; Nussbaum 1988). Purchase intentions can be defined as "a predictor of subsequent purchase" (Grewal et al. 1998, p. 339). These can be either negative or positive depending on the psychological reaction to the stimulus.

Due to its importance, many researchers have investigated the effects of product design in general (Bloch 1995; Crilly, Moultrie, and Clarkson 2004; Fenko, Schifferstein, and Hekkert 2010a; Seva, Duh, and Helander 2007), of package design (Orth and Malkewitz 2008), of color (Garber, Burke, and Jones 2000), of design-inferred brand values (Limon, Orth, and Kahle 2009), of perceived attractiveness and quality based on design (Orth, Campana, and Malkewitz 2010), of sensory information input (Hekkert 2006; Krishna and Morrin 2008; Lindstrom 2005; Littel and Orth 2013), of design complexity and novelty (Seifert 2011), etc. on consumer purchase intentions. Summing up, researchers found out that design and variation in design elements such as color, complexity or novelty have great influence on consumers' purchase intentions.

Moreover, also an effect of experience (low versus intensive) on purchase behavior was analyzed and confirmed in various studies (Brakus, Schmitt, and Zarantonello 2009; Fiore,

Yah, and Yoh 2000; Nambisan and Watt 2011; Pine and Gilmore 1999). Summarizing, findings predict that the more intense an experience is, the more it influences the level of a consumer's purchase intention.
Hence, this research proposes that design experience has an effect on purchase intention (for more details see Study IV, chapter 5.3).

In chapter 5.3, the author presents design experience-caused consequences on consumer behavior more in detail, develops hypotheses, analyzes these and summarizes the results.

4.2.4 Design Experience Moderators and Influencing Factors

Design experience is a personal, unique and subjective phenomenon. Therefore, every experience, its strength, intensity, and valence depends on the stimulus – the design, but also on the personal disposition and abilities of the individual. Additionally the context, the interaction takes places in, also affects how the design is experienced. Hence, the following part describes boundary conditions and factors that may influence design experience. These aspects can be divided into person-related and context-related factors. First the various person-related moderators and second the context based ones are presented.
In contrast to chapter 3.5, this chapter only focuses on moderators that are relevant for design experience. Due to the stimulus dependency moderators differ depending on the type of experience. In chapter 5.3, Study IV further develops a selection of design experience moderators, derives hypothesis and presents empirical results.

Person-Related Moderators

The following chapter concentrates on a selection of design experience moderators: sensual limitations and preferences, involvement, CVPA, and absorption. For more details see Study IV in chapter 5.3.
First, based on the sensory input derived from different modes, people experience the design of an object (see chapter 2.2.1). However, many people face limitations concerning the sensual perception of a design. This may be a result of age or congenital incapacities. Many elderly people notice a decline of their sensory capabilities (Littel and Orth 2013). For example, some people notice less feeling in their skin. Hence, rough surfaces, raised or embossed patterns cannot be felt and perceived any longer. Further, vision as an important sensory information input can be limited due to severe limitations such as blindness or minor disabilities such as color blindness.
However, even if a person faces limitations of one or more modes, this does not exclude him from a design experience in general. In particular, even if one of the five experience

dimensions is not stimulated this does not result in no experience whatsoever. Hence, even people with severe limitations in their sensory perception have a design experience, as experiences are based on a distinct relation of activated modes (e.g., visually impaired people have a heightened receptivity in olfactory, touch or hearing (Littel and Orth 2013)). Depending on one's capabilities a design experience can be more or less intensely evoked and influenced by different elements.

Moreover, individual skills and preferences influence the way in which an object is perceived, interacted with, and as a consequence experienced. Schifferstein and Smeets (2006) conceptualized the personal perceptual style. Depending on one's perceptual style one may prefer visual or tactile input. Moreover, recent studies have confirmed that eliciting information by touching objects depends on the personal disposition of each single person and their personal level of NFT (Peck and Childers 2003a). For people with a high NFT searching for and buying new products involve touching and evaluating the haptic characteristics of the products, while people low in NFT feel no need at all to evaluate their haptic quality. Therefore, evoked experience may trigger different dimensions for different people. Without limiting the importance of these aspects, the present study does not further elaborate and investigate the impact of sensual limitations and preferences on design experience.

Second, besides people's sensory limitations and preferences also their level of involvement with the product category might influence the interaction with a product and hence, the way they experience it.
Involvement in general is defined as "a person's perceived relevance of the object based on inherent needs, values, and interests" (Zaichkowsky 1985, p. 342). Involvement is further seen as a result of interaction between a person and a product or product category (Baumgartner and Steenkamp 2001; Beatty and Talpade 1994; Bloch 1981; Nkwocha et al. 2005). Recent studies have shown that depending on the level of involvement people's reactions towards brands, products, and the effectiveness of advertising varies (Dens and Pelsmacker 2010) (compare 3.2).
Recently Reimann, Zaichkowsky, Neuhaus, Bender, and Weber showed that affective product involvement correlates with aesthetic product experiences in the brain (Reimann et al. 2010). Based on personal involvement the product is more relevant to the consumer. This heightened relevance influences certain psychological consequences such as a higher motivation and heightened arousal (Bloch, Sherrell, and Ridgway 1986; Burnkrant and Sawyer 1983).

Moreover, this results in an increase of cognitive elaborations (Petty, Cacioppo, and Schumann 1983). As Mano and Oliver (1993) observe interactions between these consequences are not unusual. Based on these findings, Mano and Oliver (1993) stated that involvement is a major element assessing dimensions of interaction with products. They further suggest that arousal is the most direct expression of involvement. The car example showed that a person totally excited about automobiles is likely to be more stimulated to interact by the design of a greenish, matt new sports car than a person not at all involved in cars.
Hence, this research suspects that involvement moderates design experience (for more details see Study IV, chapter 5.3).

Third, according to Bloch, Brunel, and Arnold (2003) the outer appearance of an object is more or less relevant for individuals. The authors conceptualized this phenomenon as centrality of visual product aesthetics (CVPA). CVPA is defined as a general consumer trait and in particular as "the overall level of significance that visual aesthetics hold for a particular consumer in his/ her relationships with products" (Bloch, Brunel, and Arnold 2003, p. 552). It can vary from low to high levels. It represents the general importance a person attributes to visual aesthetics and not its preference for a certain design style. For individuals with high levels in CVPA the visual aesthetics of a good dominates their purchases and usage of goods, because visual aesthetics play a major role for them. Moreover, the level of CVPA not only affects the importance visual aesthetics play for an acquisitions but also influences the preferences for products and brands, their maintenance, usage, and recommendation. Products and brands that are seen as superior in design and are able to satisfy aesthetic needs are favored. The authors conceptualize CVPA as a three-dimensional construct including the dimensions: "value", "acumen", and "response intensity". The first dimension, "value", represents the value a consumer derives from product appearances due to personal and social well being he or she assigns to it. The second one, "acumen", encompasses the ability to recognize and differentiate design and key design elements. The last dimension, "response intensity", represents the level how an individual reacts to visual design aspects of products (Bloch, Brunel, and Arnold 2003).
Various research in psychology, consumer behavior, and marketing has confirmed the proposition that the level of CVPA influences consumer perception and behavior significantly (Littel and Orth 2013; Lupold 2010; Orth and Malkewitz 2008). Therefore, it is proposed that

the level of CVPA moderates the effect on design experience (for more details see Study IV, chapter 5.3).

Fourth, besides the sensual perception, the ability to experience also influences the result. As explained in Chapter 3.1.2, in order to experience one has to take actively part, interact with and get absorbed by the object (Pine and Gilmore 1999). The ability and willingness to do so varies dependent on the individual (Arnould and Price 1993; Fornerino, Helme-Guizon, and Gotteland 2008). The concept absorption describes the individual ability to get caught up in sensory stimulation (Youn and Faber 2000). Depending on the individual ability to get absorbed, the level of response to environmental and sensory cues differs in strength and valence (Youn and Faber 2000). As not everyone is willing to or capable of getting absorbed by a situation, person or object, some human beings are excluded from any immersive experiences.
Hence, this research suspects that the individual absorption capability influences the intensity of an evoked design experience (for more details see Study IV, chapter 5.3).

Context-Related Moderators

As described, moderators can be categorized as person- or context-related factors. Context-related factors summarize aspects such as the cultural, situational, and the physical context in which the experience takes place (compare 3.5).
First, various studies in different academic disciplines have analyzed the effect of cultural values and cross-cultural differences on the perception of products, their overall design (e.g., atomistic or holistic), single design elements (e.g., color), and affective and cognitive reactions (Bloch 1995; Bottomley and Doyle 2006; Clarke III and Honeycutt Jr. 2000; De Leur et al. 2006; Hupka et al. 1997; Jacobs et al. 1991; Kühnen et al. 2001).
Based on one's cultural background the perception is either more holistic or atomistic (Kitayama et al. 2003; Nisbett and Miyamoto 2005). That means, Westerners are more likely to perceive an object context-independent and analytically, while Asians tend to perceive it more context-dependent and holistically (Nisbett and Miyamoto 2005). Especially in advertising and marketing research the relation of color perception and evoked affective or cognitive reactions, or consequences for advertisement or brand strategy have been analyzed in detail. For example, researchers analyzed, if colors evoke different emotions, if there are universal colors and emotions, and which associations and meanings are transmitted by a certain color (e.g., red as a symbol for anger, love, and danger) (Aslam 2006; Hupka et al. 1997; Limon, Orth, and Kahle 2009; Lupold 2010; Salmi and Sharafutdinova 2008). Based on

this knowledge, one can assume that the cultural background of an individual may influence the intensity of a design experience.
Without limiting the importance of this aspect, the present study does not further investigate this aspect.

Second, also the social, situational, and physical context can influence the way a design is experienced. Researchers confirmed that the actual situation and its physical aspects (e.g., alone at home, in a public place, at work, in a crowded store with loud music and shelves full of products, or a small, quiet shop with an attentive shop assistant and just a small range of special offers, in a happy or sad mood) and its design (e.g., shop interior) in which a person interacts in one way or the other with an object can influence perception, reactions, and experience (Belk 1975; Bellizzi and Hite 1992; Goulding 2000; Hoffman and Turley 2002; Hui and Bateson 1991; Mehrabian and Russel 1974; Orth and Wirtz 2014; Turley and Milliman 2000).
Without limiting the importance of situational, and physical context influence, the present work will focus on other influencing factors first.

Summarizing, various factors may influence the intensity of a design experience. These can be either person- or context-related. Hence, a marketer or designer can just design and influence the experience to a certain degree. They can make sure, that the stage and the design itself fulfill all necessary requirements for an intensive experience, but consumers' dispositions and abilities as well as the interaction context influence the design experience. Compare chapter 5.3, Study IV, for hypotheses and empirical results regarding more detailed presentation of moderating factors.

4.2.5 Format of the Design Experience Measurement Scale

The design experience scale will be developed in line with well accepted consumer behavior and marketing scale development procedures (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003) and is supposed to fulfill all requirements regarding validity, reliability, and objectivity (see chapter 4.1.1 for a detailed overview). Based on these scaling requirements this dissertation suggests the following content, response format and operationalization of the design experience scale. Hence, what can be measured with it, how it is built and how it can be used. Chapter 5 aims at implementing and validating this theoretically built scale and its operationalization.

Content

This dissertation conceptualizes the design experience scale to measure the degree to which a stimulus evokes a design experience. As seen, it is essential to distinguish between the intensity and the quality of this experience. The design experience measurement scale developed in the present study is supposed to assess the intensity of design experience and not any specific, qualitative aspects (compare Brakus, Schmitt, and Zarantonello 2009; Schifferstein 2010). Is to say, the scale measures the degree to which a person has a sensory, affective, cognitive, behavioral, and social experience evoked by a certain product design; hence, whether a design evokes a weak or intense experience.

Response Format

Referring to standard procedures in consumer behavior, the design experience scale is designed as a seven-point Likert scale (1 = "total disagree" and 7 = "total agree"*)*. This work suggests this declarative statement measurement for collecting the degree or extent to which a respondent experiences a design. In line with scaling procedure, the well-established and recommended a 7-point scale Likert scale is used (Bortz and Döring 2006), because 7 points are sufficient and more do not enhance scale reliability or validity (Spector 1992). According to general scaling requirements, the wording of each statement has to be easy to understand, not misleading and unequivocal (see chapter 4.1.1 for more details). Each statement follows the same grammatical structure and contains just one aspect in order to assure common understanding, e.g., "This design evokes a lot of memories." (Bühner 2011; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Porst 2011; Raab-Steiner and Benesch 2012). Further, each statement represents only one dimension ("affective", "cognitive", "sensory", "behavioral", or "social"), while each dimension is represented by more than one statement.

Operationalization

This work designs the scale to be operationalized in different types of studies: questionnaires (e.g., paper-pencil or online studies) or face-to face interviews. After presenting a product design to participants (either the real product or a picture of it), they are asked to evaluate their personal design experience by indicating their level of agreement to a set of statements (compare Table 23).

Table 23: Example of the Design Experience Scale

Bitte geben sie an, inwieweit die folgenden Aussagen auf Sie zutreffen.		trifft überhaupt nicht zu	1	2	3	4	5	6	7	trifft voll und ganz zu
1	Dieses Design berührt mich emotional sehr.		0	0	0	0	0	0	0	
2	Dieses Design ruft viele Erinnerungen wach.		0	0	0	0	0	0	0	
3	Ich erzähle anderen von diesem Design.		0	0	0	0	0	0	0	
4	Dieses Design empfinde ich als nichtssagend.		0	0	0	0	0	0	0	
5	Mit diesem Design verbinde ich eine Geschichte.		0	0	0	0	0	0	0	

Source: author's own composition

To assure objectivity of the measurement, clear instructions for respondents will be included. Besides rules of application these also contain an introduction to the terms design and design experience. Reading these before starting with the actual task is a prerequisite to guarantee objectivity. As mentioned, chapter 5 is designed to implement and validate the theoretical considerations of the design experience scale.

4.3 Summary and Relevance for the Empirical Studies

After presenting construct and scale development procedure in general and in particular for this dissertation, chapter 4 combines theoretically well-established knowledge of design with the experience construct. By transferring the experience idea to the design context, this dissertation creates a new experience concept, a new perspective and approach to understand holistically consumer behavior evoked by product design. The present work conceptualizes the concept by defining it, differing it from related concepts, illustrating its internal structure, discussing its effects on consumer behavior, its boundary conditions, and presenting ways of operationalization.

In particular, chapter 4.2.1 defines the design experience concept as individual sensations, feelings, cognitions, and behavioral responses evoked by design cues. The holistic, multi-dimensional phenomenon leads to a variety of outcomes relevant to marketers including attraction, behavioral intentions, or attachment. Further, it is a result of a design-human-interaction. In this context the term design describes the outer appearance of a durable product utilitarian in function. This research illustrates that design experience is related but also conceptually distinct from other experience and design constructs. In particular, design experience differs from product experience, and evaluative, motivational or associative constructs. Chapter 4.2.2 presents the multi-dimensional internal structure formed of a "sensory", "affective", "cognitive", "behavioral", and "social" dimension. Chapter 4.2.3 sheds light on consequences evoked by design experience. These include for example attractiveness and purchase intention. Chapter 4.2.4 summarizes personal- and context-dependent moderators and boundary conditions that influence a design experience. Chapter 4.2.3 and 4.2.4 are a selective collection and are completed by the theoretical background of Study IV, chapter 5.3. Chapter 4.2.5 presents the design experience measurement scale. The scale is supposed to measure the intensity of an evoked experience by a design. The development of the psychometric measurement scale follows standard scale development procedures.

In order to validate empirically the proposed design experience concept and offer a valid measurement scale, chapter 5 tests the proposed construct and develops a measurement scale according to consumer behavior quality standards. Further, the construct, its internal structure, boundary conditions and predictive power, as well as direct, indirect, and interaction effects are empirically assessed in four empirical studies and four evaluations.

5 Operationalizing Design Experience

After conceptualizing design experience, this chapter introduces its operationalization and the empirical studies building upon the theories and findings presented in the previous chapters (see chapter 2.3, chapter 3.7, and chapter 4.3 for summaries). The operationalization of the design experience (DX[20]) scale builds on a three-step approach including four empirical studies and four evaluations closely following established approaches to scale development (Bearden, Netemeyer, and Teel 1989; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003):

Step 1: Exploring DX and Generating an Initial Item Pool

- Exploration of DX with Professionals
- Generating Initial Item Pool
- Content and Face Validation

Step 2: Validation of Construct, Analysis of Dimensionality, and Refinement of Scale

- Construct Validation
- Refinement and Reduction of Item Pool
- Testing of Dimensionality
- Testing of Reliability,
- Convergent Validation
- Content and Face Validation
- Optimization of Length and Wording

Step 3: Analysis of Direct, Indirect, and Interaction Effects, and Confirmation of Scale

- Analysis of Direct, Indirect, and Interaction Effects
- Discriminant and Predictive Validation
- Confirmation of Dimensional Scale Structure
- Generalizability
- Content and Face Validation

[20] In the chapter presenting the empirical studies and evaluations the author uses the acronym DX for design experience.

Each step is an important component of the operationalization of the design experience construct (compare Aaker 1997; Bearden, Netemeyer, and Teel 1989; Brakus, Schmitt, and Zarantonello 2009; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005). All phases are part of the scaling procedure. The construct and scale are repeatedly analyzed and validated in each step.

The empirical studies differ in methodology, but are presented with almost the identical structure in the next sections. First, the study objectives are outlined. Next, insights into study details including information about the sample, data collection, measurement scales, and the stimuli presentation are given in the study method section. The final two sections present study results and a discussion of these results. Study I – III build on the theoretical background of scaling procedures that is summed up and presented already in chapter 4.1. In contrast to Study I – III, for Study IV a chapter "Theoretical Background" is included. Study IV has a more complex study design and hypotheses are developed and tested. Besides the empirical studies, also evaluations are a recurring part of the present work. In total four expert evaluations are conducted. For an overview of all studies and evaluations see Table 22.

Summing up, Chapter 5.1 describes Step 1 in detail aiming at exploring the latent construct design experience and its practical relevance, as well as generating an initial item pool. This chapter encompasses Study I, a literature research, and the 1st evaluation. Chapter 5.2 presents Step 2 aiming at empirical validation and the analysis of the internal structure of design experience, as well as a refinement of the item pool. The second step includes two empirical Studies, Study II and Study III, as well as two evaluations, the 2nd and 3rd rating. Finally, Chapter 5.3 concentrates on Step 3 presenting Study IV and a last evaluation. Study IV is a complex study analyzing direct, indirect, and interaction effects. Chapter 5 concludes with a general discussion (chapter 5.4) including advancement of theory, managerial implications, and an overview of limitations and future research possibilities.

5.1 Step 1: Exploring Design Experience and Generating an Initial Item Pool

Chapter 5.1 introduces Step 1 of the operationalization aiming at the exploration of the DX construct, highlighting its practical relevance, and generating an initial item pool. To pursue the main goals this step includes Study I, a literature research, and the 1st evaluation (see Table 24).

The following chapter is divided into three subchapters:

First, the chapter 5.1.1 highlights the approach and results of Study I. Then, chapter 5.1.2 summarizes the literature research analyzing relevant and related scales to enrich the item pool. Last, chapter 5.1.3 presents the 1st evaluation aiming at an expert and laymen content validation and refinement of the item pool.

Table 24: Overview of Step 1: Study I, Literature Research, and 1st Expert Evaluation

Step	1			2				3	
Main Goal	Exploring DX & Item Pool Generation			Validation of Construct & Scale, Analysis of Dimensionality, Refinement of Scale				Analysis of Direct, Indirect, & Interaction Effects, Confirmation of Scale	
	Study I	Literature Research	1st Evaluation	Study II	2nd Evaluation	3rd Evaluation	Study III	Study IV	4th Evaluation
Objective	Construct validation, generation of initial item pool	Generation of initial item pool	Content & face validation of item pool	Construct validation, analysis of dimensionality, purification & reduction of scale	Content & face validation of internal structure	Content & face validation, optimization of comprehensibility	Analysis of reliability, confirmation of dimensionality, convergent validation, analysis of effects on consumer behavior	Discriminant & predictive validation, confirmation of dimensionality, generalizability, direct, indirect, & interaction effects	Content & face validation of internal structure
Method	Semi-structured in-depth expert interviews (design experts, N = 12 main study)	Literature research	Expert and population rating (design expert N = 7, marketing experts N = 8, population N = 6)	Psychological measurement (student sample; N=10 pretest, N=309 main study)	Expert sorting (editorial experts, N = 3)	Expert evaluation (academic experts, N = 2)	Expert judging, psychological measurement (student sample; N=29 pretest, consumer sample; N=280 main study)	Psychological measurement (student sample; N = 36 pretest; student sample, N = 79 main study)	Expert sorting (design experts, N = 3)
Key Findings	Construct validation, generation of items	Generation of items (82), refinement of item pool	Refinement & reduction of item pool (47 dropouts)	Construct validation, 5-dimensional structure of DX	Confirmation of 5-dimensional structure	Refinement of scale	Confirmation 5-dimensional structure, convergent validity	Confirmation of discriminant and predictive validation, 5-dimensional structure, direct, indirect, and interaction effects	Confirmation of 5-dimensional structure
Scale: Number of Items	141	102	55	24	24	15	12	12	12

July 2011 — Passage of Time — March 2013

Source: author's own composition

5.1.1 Study I: Construct Exploration and Item Pool Generation

5.1.1.1 Objectives

Study I explores the theoretical DX concept from a professional design perspective, generates a broad and extensive item pool, and collects samples of weak and intense DXs.
The main focus of Study I lies on the exploration of the new developed theoretical framework DX. The present work puts special emphasis on the question whether designers' conception of DX is similar to the theoretical framework developed in chapter 4.2. Hence, Study I explores how professional designers interpret experience in general, how they experience design and in particular product design, and what are dimensions and limitations of the concept.
In line with well-established scale development procedures, twelve semi-structured expert interviews are conducted to accomplish the above-mentioned goals. Table 24 gives a short overview of the important details of Study I.

5.1.1.2 Method

In line with conceptualization and operationalization procedures, this dissertation chooses qualitative research to explore understandings, perceptions, and associations connected to experience in general and design experience in particular. To address the goals of Study I, explorative, semi-structured expert interviews are conducted (Kepper 2008; Kurz et al. 2009; Pfadenhauer 2009) (see Appendix B for interview guideline and mind map). Especially for in-depth interviews, the quality of data (reliability and validity) "depend [s] on the selection of appropriately motivated individuals, who understand the nature of the task and who have the necessary verbal or other skills required" (Richardson 1999, p. 471). Due to the special subject of product design and the often observed phenomenon of articulation difficulties in the context of design for laymen (Bloch, Brunel, and Arnold 2003), the present work has limited the circle of participants to professional design experts such as design strategists, industrial designers, color & material designers, interior designers, and design trend experts (for a detail list of all participants see Table 25) (Pfadenhauer 2009). The chosen experts have the necessary experience to articulate special aspects, phenomena, and features of a design, as well as feelings, sensations, and associations evoked by a design. Furthermore, due to their long professional experience (at least 5 years of professional experience) with customers of different backgrounds they can add further insights to their own individual perception and experiences (Chang and Wu 2007; Kepper 2008; Pfadenhauer 2009).
In a test run the semi-structured expert in-depth interviews was tested. The participant was an industrial designer.

Table 25: Participants of Expert Interviews

Participant	Sex	Profession	Field	Position	Face-to-face / telephone	Duration	Date
Iris	Female	Interior Designer	Interior design	Senior, employee	Face	36 min	2011-08-01
Nina	Female	C & M Designer	Agency, consumer products, healthcare, etc.	Director, employee	Face	77 min	2011-07-04
Sonja	Female	Industrial Designer	Household Appliances	Senior, employee	Face	32 min	2011-08-23
Stefanie	Female	C & M Designer	Eyewear	Senior, employee	Face	27 min	2011-08-04
Christian	Male	Design Strategist	Agency, consumer products, healthcare, etc.	Director, employee	Face	49	2011-07-29
Christoph	Male	Industrial Designer	Consumer products	Freelancer	Telephone	34 min	2011-08-22
David	Male	Industrial Designer	Automotive	Senior, employee	Telephone	37 min	2011-08-08
Gottfried	Male	Textile Designer	Design trend research	Creative Director	Telephone	30	2011-08-02
Jürgen	Male	Interior Designer	Interior design	CEO	Face	30 min	2011-08-01
Klaus	Male	Industrial Designer	Consumer products, Healthcare	CEO of design agency, professor at university	Face	34 min	2011-08-08
Michael	Male	Industrial Designer	Agency, consumer products, healthcare, etc.	CEO, professor at university	Face	44	2011-08-03
Stephan	Male	Industrial Designer	Consumer products, furniture	Freelancer	Face	71 min	2011-08-02

Source: author's own composition

Overall twelve interviews were conducted between the 4th of July and 23rd of August in 2011 (9 face-to-face, 3 telephone interviews, $M_{duartion}$ = 39 minutes, 33% females). In line with established procedures, all interviews took place in a familiar environment to make the situation as relaxed as possible. Further, all interviews were audiotaped after asking for permission. Afterwards the author and a trained student assistant transcribed (intercoder reliability) and coded all interviews.

The interviews always followed the same steps and were all conducted by the author herself. All participants were personally invited to take part in the in-depth expert interviews exploring design and how it is experienced. After the interview participants received a small reward for their time. All interview partners received one week prior to their interview an e-mail explaining the procedure and asking them to prepare for the interview by bringing four pictures of two different product categories representing examples that evoke an intense and a weak DX. To ensure the comparability, possible product categories were limited to consumer products (Schifferstein and Zwartkruis-Pelgrim 2008).

The author started the interview by introducing herself and explaining the ground rules of the interview. The actual interview followed a semi-structured interview guideline in order to leave room to explore the topic and questions asked autonomously. Hence, the author made sure to reduce personal influence to a minimum but assured all required aspects to be discussed.

The present research analyzed the data by applying qualitative content analysis (Kassajian 1977; Mayring 2000). Following the coding rules, the author and a trained assistant developed inductive categories while coding and hence, broadened and refined the analysis continuously. Besides the content also gestures, facial expression, as well as intonation were marked down during the interview and coding process (Aghamanoujkjan, Buber, and Meyer 2009; Brakus, Schmitt, and Zarantonello 2009; Kepper 2008).

5.1.1.3 Results

Construct Validity

In general, all participants acknowledged the general concept of DX and could articulate and explain their personal version of DX without further explanation of the author. Further, each participant brought at least two examples to the interview ($M_{number\ of\ examples} = 5.3$) (see Table 72 in Appendix B).

> *David (male, industrial designer):* Und das [Designerlebnis] wird geprägt durch diesen ersten Eindruck, dann durch das Berühren, durch das Anfassen, dann durch das Funktionieren, ja, also, positiv oder negativ usw.. (#00:07:01-6#)

> *Christian (male, design strategist):* ... weil dieses Designerlebnis natürlich nicht nur ein USP im Verkaufsargument ist, sondern sich viel tiefer in Herz, Kopf und Bauch verankert als nur ein Produkt, das nur seine Funktion erfüllt. (#00:42:55-1#)

> *Gottfried (male, trend researcher):* Ja, also, wenn Design mich berührt, so müsste ich das vielleicht ganz romantisch ausdrücken. Also, Design mir sozusagen mehr als nur in die Augen, sondern vielleicht auch so ein bisschen unter die Haut geht. (#00:02:57-3#)

Further, participants mentioned the interaction with the product, with the design as a main component of DX. Without interaction a DX cannot develop. The more interaction takes place the more intense the DX is. All participants expressed that DX is a concept that involves more than one level. They further emphasize the importance that besides including sensory perception also cognitive, affective, and / or behavioral responses are a prerequisite for an intense DX.

> *Christian (male, design strategist):* Um ein Erlebnis zu haben, möchte ich, neben dem, dass ich es auf einer Metaebene besitzen möchte, möchte ich es idealerweise anfassen, streicheln, damit rumhantieren und damit .. es verwenden. (#00:36:37-6#)

> *Sonja (female, industrial designer):* Das Erlebnis kann natürlich in unterschiedlichen Tiefen stattfinden. Entweder total oberflächlich, dass ich es visuell nur kurz wahrnehme und dann entscheide, gefällt mir oder gefällt mir nicht. Oder du setzt dich mehr damit auseinander und fasst es an oder riechst daran oder erlebst den Wind oder du beschäftigst dich mit der Technik und überlegst, was dahinter steckt. Klar, umso intensiver kann das stattfinden. (#00:29:38-6#)

> *Christoph (male, industrial designer):* Also ich finde .. ein Produkt muss immer .. Spaß machen bzw. einladen dazu, dass man es ausprobieren will. Es muss dir .. rein vom Optischen her, natürlich auch vom Haptischen in 2. Instanz .. vermitteln, du möchtest es benutzen, du möchtest es in die Hand nehmen, ausprobieren. [...]. Das ist für mich ein intensives Designerlebnis. (#00:11:41-9#)

> *Iris (female, interior designer):...* ein gewisses Verhalten wird verlangt von der Lampe. Einmal wird eingeladen, dass man drauf zugeht oder das man es sich genauer anschaut...Und dann weckt es erst mal so die Neugierde. Das Bestechende für mich, was da eben so eine Emotion ausgelöst hat, dass das so eine Wärme, so eine Erinnerung an die Sonne oder an Sterne auslöst. (#00:12:33-5#)

> *Sonja (female, industrial designer):* Aber so richtig toll fand ich es erst im Laden, als man es wirklich erfühlen konnte. (#00:12:10-9#)

Besides the interaction with the design itself, also interactions with other people are mentioned as a possible part of a DX. Interacting with others by talking about a certain design or showing others the design or special features of the design can intensify the own, individual DX.

> *Michael (male, industrial designer):* Wenn man was Positives erlebt hat, [...] dann möchte man es mitteilen. Das heißt, du erzählst es deinen Freunden oder sagst: "Schau mal, was ich da Tolles habe, schau mal hier und schau mal da". Versuchst dann eigentlich andere zu überzeugen, nicht überzeugen, aber das positive Erlebnis zu teilen. (#00:32:55-4#)

> *Michael (male, industrial designer):* Nehmen wir wieder das Beispiel Auto. Bist du im Autohaus und tauscht dich dann aus und kannst natürlich durch diesen Austausch und durch das Diskutieren .. Erlebnis verstärken, weil du dann vielleicht mehr Aspekte des Produktes wahrnimmst, als du alleine könntest. Dann stehst du vielleicht und sagst: "Schau doch mal hier und hast du das schon gesehen?" Dann hast du vielleicht ein intensiveres Erlebnis und im positiven Fall bestärkst du dich gegenseitig. Auch wieder dieser Bestätigungseffekt, ich finde das schön und alle sagen super. (#00:36:37-8#)

In contrast to DX, other experience concepts that are related are named. In particular the interior designers mentioned the concept of interior experience. An interior experience represents how a whole room equipped with designed objects is experienced.

> *Iris (female, interior designer):...* Aber die Kombination Design und Erlebnis ist für mich neu. Für mich ganz subjektiv....ich würde es eher als Raumerlebnis bezeichnen. (#00:05:19-5#)

Further, usage experience is mentioned. A usage experience develops overtime. Participants make a difference between first contact and long-term ownership. Aspects such as ergonomics and functionality increase for long-term ownership and are a main factor of usage experience. However, it seems to be difficult for participants to define exactly what includes a first contact and when a long-term ownership starts, to draw a line between usage experience and outer appearance, and between factors such as ergonomics and functionality and outer appearance. Yet participants named this construct usage experience, it resembles a lot the product experience concept by Schifferstein and Hekkert (2008).

> *Stefanie (female, C&M designer):* Ich finde es ist schwierig Designerlebnis als Ganzes zu betrachten, weil ich finde es gibt immer .. den ersten Augenblick und den langfristigen, das langfristige Erlebnis. (#00:01:30-9#)

> *Nina (female, C&M designer):* Das kann aber auch nur sein, dass es einfach nur sehr gut funktioniert. Dann ist es aber fast kein Designerlebnis, sondern fast eher ein Gebrauchserlebnis. (#00:13:12-1#)

The Impact of Design Experience on Consumer Behavior

The interviewees were all convinced that an intense DX impacts the behavior of the user. They named a number of different consumer behavior and marketing relevant aspects that are sustainably influenced by an intense DX.

For example, an intense DX influences positively the memorability of the product, because it is experienced and “anchored” in the heart, head, and stomach.

> *Christian (male, design strategist*): Weil dieses Designerlebnis natürlich nicht nur ein USP im Verkaufsargument ist, sondern sich viel tiefer in Herz, Kopf und Bauch verankert als nur ein Produkt, das nur seine Funktion erfüllt. (#00:42:55-1#)

Moreover, participants mention that an intense DX results in a more intense connection with or even bond to the product. As for brands, people also tend to identify themselves with certain product designs. According to the interviewees, an intense DX evoked by a certain product design can result in a personal identification with the design.

> *Nina (female, C&M designer):* Sobald ich mit etwas interagieren kann, dann ist eine Bindung da. (#00:40:15-9#)

> *Jürgen (male, interior designer):* Wenn das zusammen kommt, wenn du das Optische, das Nutzbare und auch das Gefühlsmäßige auf ein Erlebnis zusammenbringst, dass du sagst: "Ja, das ist meins!" Dann .. dann bist du damit richtig verbunden. Das hat sicherlich auch eine Nachhaltigkeit. (#00:32:33-4#)

> *Michael (male, industrial designer):* Ich bin mir sicher, dass ein intensives Designerlebnis Bindung intensiviert. (#00:19:21-4#)

> Stefanie (*female, C&M designer*): Ich glaube, man definiert sich mit den Dingen mehr als mit Anderen. Also wenn ich jetzt ein Produkt habe, bei dem ich kein Designerlebnis [habe], dann ist das meistens auf den Zweck beschränkt. Wenn ich aber etwas habe, was bei mir ein Designerlebnis auslöst, dann identifiziere ich mich auch ein Stück weit damit. (#00:16:39-4#)

Besides bonding and identification with the design and the product, all participants named a certain wish or desire to own and to enjoy the design. Experiencing an intense DX triggers a demand to experience it again and again and therefore, to posses the object. One participant also emphasizes the fact that a DX created a desire she was not even aware of before interacting with the product.

> *Stefanie (female, C&M designer):* Eigentlich wird letztendlich eine Begierde geweckt. Du möchtest es haben. .. Du wusstest gar nicht .. also das Bedürfnis war dir, im besten Fall noch nicht einmal bekannt. (#00:16:06-5#)

> *Michael (male, industrial designer):* Ja, du weckst Begehrlichkeit. Ich glaube das es auch bei Apple oder bei erfolgreichen Produkten ein Faktor ist. Du erlebst es, also positiv und du bist im positiven Sinne überrascht. Das Produkt bietet eigentlich mehr als du erwartet hättest. Es begeistert dich. Das ist so ein Begeisterungsfaktor. (#00:32:55-4#)

> *Nina (female, C&M designer):* ... weil das ist mein absolutes Must-have. (#00:57:55-9#)

> *Stephan (male, industrial designer):* Ich habe eigentlich Julia auch schon mehrfach gesagt, wenn wir mal einen Garten haben, muss ich 2 von diesen Stühlen haben. (#00:41:54-6#)

> *Stephan (male, industrial designer):*...neben dem Besitzen wollen, sicher auch das Genießen wollen. (#01:02:48-3#)

The wish to own and enjoy a design results in the purchase of it. It can be a spontaneous, not planned purchase; because the experience is so intense that it has to be bought right away. It can also lead to repeated purchases, because the experience is convincing and the person wants to feel it again. Also sharing the experience and buying the design as a present for a dear person, is mentioned as possible reaction.

> Stephan (male, industrial designer): Kaufrausch. (#01:01:26-2#)

> Stefanie (female, C&M designer): Ich wollte eine Tasse für meine Mutter kaufen und kam mit drei so Schüsseln nach Hause. ... wenn ich nicht bewusst mir vornehme so was zu kaufen, würde ich es nie kaufen." (#00:09:20-7#)

> *Stefanie (female, C&M designer):* Dann habe ich irgendwie mir immer mal wieder eine gekauft. (#00:05:05-3#)

Moderating Factors and Boundary Conditions

Besides the impact on consumer behavior, participants also named a series of factors that can influence the way and intensity a person experiences a design. All participants are strongly

convinced that a DX depends on the person and his or her abilities and characteristics. Nevertheless, they think that everybody could be able to experience but personal experiences and traits influence these experiences. In particular, the interviewees mentioned the ability to perceive with one's senses. It is mentioned that the sensory perception ability is decreasing due to less sensory awareness. Further, the ability seems to depend on personal imprinting, knowledge, and education similar as for the interpretation and understanding of art. Further, personal traits and characteristics are comparable to the CVPA construct of Bloch, Brunel, and Arnold (2003) are mentioned.

> *Michael (male, industrial designer):* Das ist ja wieder wie mit der Kunst, wenn du ein Experte bist, dann kannst du .. dem Produkt mehr abgewinnen oder wie beim Wein. (#00:39:38-8#)

> *Klaus (male, industrial designer):* ...so dass wir heute in einer Situation sind, wo .. wo ich mir wünschen würde, dass es so was gäbe wie .. eine gewisse Sinnschulung und Erlebnisschulung für Konsumenten. Und zwar nicht in dem Sinne, dass man sagt, gut und schlecht, sondern in dem Sinne, dass man .. ein Auge, ein Gehör, ein sinnhaftes Wahrnehmen auf mehreren Schichten und mehreren Ebenen und auf verschiedenen Qualitätsstufen ausprägen kann oder auszuprägen lernt. Da gibt es auch Ansätze. Da gibt es auch Kurse an der VHS. (#00:29:47-9#)

> *Klaus (male, industrial designer):* [Fähigkeiten] nicht überwiegend genetisch angelegt sind, sondern einfach auch .. oder hauptsächlich über .. Entwicklung in der Kindheit und der Jugend und Rollenschemata geprägt werden durch Austausch mit der Umwelt, in der jeder sich befindet. Eltern, Freunde, Viertel, Stadt, Land, Kulturraum. (#00:33:23-3#)

> *Michael (male, industrial designer):* Aber das Erleben vom Design hat viel mit Erfahrungen zu tun, die du schon gemacht hast und ob die positiv oder negativ belegt sind und was du mit so einem Produkt verbindest. (#00:18:24-2#)

> *Iris (female, interior designer):* Oder wenn auch immer neue Stoffe kommen. Da ist bei mir immer ein „OH" und ein „AH", da krieg ich mich gar nicht mehr ein. Irgendein anderer, wie jetzt Johannes oder so, der guckt sich das an und sagt "Joa, ist ja schon schön, aber....". Ich sehe da schon alle möglichen Dekorationen vor meinem geistigen Auge und bei ihm ist das eben....da kommt das gar nicht so ran. Das ist auch nicht sein Metier. Er macht dann lieber so technische Sachen. Für ihn ist es interessanter, wie so eine neue Fußbodenheizung aussieht, bevor der Estrich drüber kommt. Für mich .., aber da liegt dann natürlich auch der Unterschied der persönlichen Neigungen. (#00:35:06-6#)

Furthermore, participants mentioned the influence of the observer's age and sex. Female interviewees emphasized emotional aspects more often than the male interviewees. Especially the emotional dimension of an experience seems to be an important driver for the female participants.

> *Michael (male, industrial designer):* Es gibt Unterschiede zwischen Menschen. Es gibt tendenziell einen Unterscheid zwischen Männern und Frauen. (#00:40:32-8#)

> *Iris (female, interior designer):* ... dass ich da auch so ein ganz hoch emotionales Empfinden habe. (#00:06:20-8)

As expected, a few designers were initially concerned by the idea to measure design. After explaining that not the design is supposed to be measured but the experience evoked by the design, all supported the idea and confirmed the usefulness of the concept and scale.

Generation of Items

Besides the exploration of the DX concept from a professional perspective, also the generation of an initial exhaustive item pool is one central goal of the expert interviews. In line with qualitative content analysis und established and before successfully applied coding procedures all transcripts were reviewed for inductive categories while coding (Kassajian 1977; Mayring 2000). By applying the procedure of a continuous and flexible coding procedure, it was assured that not only preset ideas and concepts were confirmed but new, unexpected categories were also detected and listed (Aghamanoujkjan, Buber, and Meyer 2009; Brakus, Schmitt, and Zarantonello 2009; Kepper 2008). Then the author of the present work plus two trained judges[21] reviewed all categories and items regarding lack of clarity, questionable relevance, undesirable similarity (DeVellis 2003). This procedure resulted in 82 consistent categories represented by 141 items. Compare Table 73 for all 82 categories and the 141 preliminary items.

5.1.1.4 Discussion

Overall, Study I supports the notion of DX. All interviewed design experts shared the general idea of DX and confirmed the theoretical DX construct developed in chapter 4.2. Further, all participants named examples of positive and weak DXs and were able to explain why these evoked an intense DX.

In particular findings of the qualitative expert interviews indicate that DX is a result of interaction with the design. Regarding the intensity of an experience, Study I provides support for the assumption that the more intense the interaction with the stimulus is, the more intensely the experience is felt. It is also mentioned that the interaction with others intensifies the experience. These findings confirm previous research on experience (Brakus, Schmitt, and Zarantonello 2009; Desmet and Hekkert 2007; Pine and Gilmore 1998; Schmitt 1999b) and the theoretical framework of DX developed in chapter 4.2. Additionally, findings suggest that

[21] The author trained two colleagues regarding coding procedures, important and necessary requirements.

DX is a multi-dimensional phenomenon. In particular “sensory”, “cognitive”, “affective”, or “behavioral” dimensions are triggered. Again these results are in line with previous research on experience (Brakus, Schmitt, and Zarantonello 2009) and with the DX theory.

Findings provide support that differences exist between DX and usage experience. Results suggest that aspects such as time of owning, functionality, ergonomics, and importance of outer appearance influence the type of experience. These results are in line with the conceptualization of DX in chapter 4.2 and prior research on product experience (Desmet and Hekkert 2007; Hekkert and Schifferstein 2008). These findings further emphasize the theoretical distinction of the DX concept from other related concepts such as product experience.

In Study I all participants stress the influence of DX on consumer behavior. They agree on the effect of a positive, intense DX on various consumer behaviors such as memorability, identification, and the intention to purchase. In general, these statements confirm prior findings of previous research on the effects of product design (Bloch 1995; Crilly, Moultrie, and Clarkson 2004; Mattila and Wirtz 2001; Van Rompay and Pruyn 2011; Westerman et al. 2012) and experience (Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1998; Schmitt 1999b) on consumer behavior as well as the construct DX (compare chapter 3.4 and 4.2).

Finally, a general agreement among participating design experts exists that different aspects moderate DX. Participants name personal traits, past experiences, educational and cultural background as sources of influences. These findings are in line with previous research on moderating effects in relation with product design (compare CVPA (Bloch, Brunel, and Arnold 2003)) and support the conceptualization of DX (compare chapter 4.2).

Besides the confirmation of the theoretical construct developed in chapter 4, the semi-structured expert interviews generated an initial item pool consisting of 141 items. This item pool has to be complemented, refined, and shortened in the following in order to develop a reliable and valid measurement scale.

In sum, findings of Study I clearly confirm the theoretical conceptualization of DX in general and specially its characteristics regarding stimulus, interaction, internal structure,

consequences on consumer behavior, and moderating aspects. Further, a series of examples could be collected and a substantial number of potential items was gathered. In line with concept and scale development procedures, the next step demands an empirical validation of the construct, analysis of its internal structure, and refinement of the scale: this was the rationale for conducting a literature research and the 1st expert evaluation as well as afterwards Step 2 with Study II and Study III and the 2nd and 3rd evaluation.

5.1.2 Item Pool Generation Based on Literature and Scale Research

In general, a measure is composed of a sample of items from a large hypothetical domain of items (Netemeyer, Bearden, and Sharma 2003). Established scale development literature recommends and prefers to start with a larger item pool (250 items (Robinson and Wrightsman 1991), 125 items (Brakus, Schmitt, and Zarantonello 2009), 166 items (Bearden, Netemeyer, and Teel 1989), 86 items (Bloch, Brunel, and Arnold 2003)). All generated items of the initial pool have to be tested regarding their content and face validity, their representativeness of the content domain in general and the single dimensions in particular. Netemeyer, Bearden, and Sharma (2003) observe that it is advisable to include over-inclusive items rather than only tangentially related ones.

Regarding the sources of items, authors from scale development (DeVellis 2003; Thomson, MacInnis, and Park 2005), experience (Brakus, Schmitt, and Zarantonello 2009), and design research (Bloch, Brunel, and Arnold 2003) agree that different sources of items improve the quality of the item pool (Aaker 1997; Thomson, MacInnis, and Park 2005). This dissertation includes insights of population and experts, as well as scholars, researchers and practitioners familiar with the target construct in the collecting and judging procedure to assure a broad and comprehensive approach. Hence, this dissertation generated the item pool from two sources: expert interviews (compare chapter 4.1) and existing scales from related contexts.

As stated in chapter 4.1, the items have to fulfill certain criteria (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Spector 1992). Besides these general item requirements they should measure the intensity of an experience and not any specific sensory, cognitive, affective, or behavioral content or its quality (Brakus, Schmitt, and Zarantonello 2009). For example, “The surface of the product has a soft touch” is not useful, because it measures the quality of the design. Instead items such as “The design affects my senses” are looked for (compare Brakus, Schmitt, and Zarantonello 2009). Therefore, most scales are not suitable for the purpose of the intended DX scale, because they focus on specific aspects and their quality (compare e.g., Govers and Mugge 2004; Mugge, Govers, and Schoormans 2009; Orth and Malkewitz 2008; Richins 1997; Schifferstein 2006). Nevertheless, 82 items in total could be extracted from the following scales for the initial item pool (compare Table 26).

Table 26: Items from Existing Scales

	Name of Scale	Author	Number of Items
Experience	Brand experience	Brakus, Schmitt, and Zarantonello 2009	43
	Movie consumption experience and immersion	Fornerino, Helme-Guizon, and Gotteland 2008	
	Service experience	Otto and Ritchie 1996	
	Transcendent customer experience	Schouten, McAlexander, and Koenig 2007	
	Experiential response to music	Lacher and Mizerski 1994; Mizerski et al. 1988	
Senses	Associations / effects of sensory impairments on product experience	Schifferstein and Desmet 2007	9
	Contextual effects on design fluency and aesthetics	Landwehr and Orth 2009	
Affect	Types and characteristics on product forms	Chang and Wu 2007	17
	Experience of love	Russo and Hekkert 2007	
	Emotional Value	Sweeney and Soutar 2001	
Cognition	Imaginal response to music	Hargreaves 1982; Lacher and Mizerski 1994; Yingling 1962	3
Behavior	Consumer behavioral intentions	Cronin, Brady, and Hult 2000	3
Social	Pleasure concepts	Jordan 2000	7
		Total Number	**82**

Source: author's own composition

After the extraction of 82 items, the author together with two trained student assistants sorted and reviewed all items extracted from literature and from the interviews. All redundant, unclear, or misleading items were dropped resulting in an initial item pool of 102 items. Compare Table 74 in Appendix C for items.

5.1.3 First Evaluation: Content and Face Validation

According to scale development procedures (compare chapter 4.1 and Netemeyer, Bearden, and Sharma 2003), the 1st evaluation task aims at judging and screening the initial item pool for content and face validity, as well as the reduction of items. Hence, multiple expert and population judges are invited to rate all items separately for their representativeness.

In October 2011 the author invited 21 participants representing three different groups (professional designers, professional marketers, laymen) to take part in an evaluation and screening task. In order to test content validity, the author chooses seven professional designers and eight professional marketers. Face validity is tested by six laymen (Bearden, Netemeyer, and Teel 1989; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003). To guarantee a minimum of variance, different participants are selected regarding age, sex, and geographical distribution. Furthermore, all professionals have at least two years of working experience and work for different employers.
Two weeks before the survey participants receive a personal invitation to take part in a short survey regarding the development of a DX scale. The survey, an animated excel sheet, is sent together with detailed instructions and has to be returned within two weeks of time.
After a short introduction and instruction part, the survey starts with a detailed definition of the DX construct followed by the item rating. The survey itself is a combination of qualitative and quantitative research elements (Netemeyer, Bearden, and Sharma 2003). In a 3-point categorization task (1 = “does not describe at all”) participants are asked to state to what extent each single item represents the defined DX construct. Further, they are invited to comment each item regarding content, representativeness, wording, and clarity. To minimize recency and frequency effects, three different versions regarding the displaying order of items are created.

In general, all respondents fulfilled the task satisfactorily without any dropouts.
To analyze the data, this research applies two cut-off-criteria. All items are dropped which mean scores are below midpoint, $M_{Rep} = 2.0$ or which receive more than five times a rating 1 (1 = “does not describe at all”). This results in 62 dropped items. Further, the qualitative responses are taken into account leading to further dropouts (redundancy) and rewritings of several items (clarity).

After Step 1 the item pool counts 55 (see Table 74 in Appendix C) items in total. In the following studies, the item pool is further refined and shortened. The construct, its dimensions, and scale are analyzed statistically.

5.2 Step 2: Construct Validation, Analysis of Dimensionality, and Refinement of Design Experience Scale

Step 2 consists of two empirical studies (Study II and Study III) and two expert evaluations (2nd and 3rd). This step aims at validating the construct and the scale as well as empirically analyzing the internal structure of the DX construct and the dimensionality of the DX measurement scale. Further, this step intents at refining the measurement scale by shortening it and optimizing its wording. Therefore, the step also includes two expert evaluations to improve wording and content based on different expert opinions (editorial and academic). For an overview see Table 27.

The following chapter starts with Study II (chapter 5.2.1), followed by the two expert evaluations (chapter 5.2.2) and concludes with Study III (5.2.3).

Table 27: Overview of Step 2: Study II, Study III, 2nd and 3rd Expert Evaluation

Step	1			2				3	
Main Goal	**Exploring DX & Item Pool Generation**			**Validation of Construct & Scale, Analysis of Dimensionality, Refinement of Scale**				**Analysis of Direct, Indirect, & Interaction Effects, Confirmation of Scale**	
	Study I	**Literature Research**	**1st Evaluation**	**Study II**	**2nd Evaluation**	**3rd Evaluation**	**Study III**	**Study IV**	**4th Evaluation**
Objective	Construct validation, generation of initial item pool	Generation of initial item pool	Content & face validation of item pool	Construct validation, analysis of dimensionality, purification & reduction of scale	Content & face validation of internal structure	Content & face validation, optimization of comprehensibility	Analysis of reliability, confirmation of dimensionality, convergent validation, analysis of effects on consumer behavior	Discriminant & predictive validation, confirmation of dimensionality, generalizability, direct, indirect, & interaction effects	Content & face validation of internal structure
Method	Semi-structured in-depth expert interviews (design experts, N = 12 main study)	Literature research	Expert and population rating (design expert N = 7, marketing experts N = 8, population N = 6)	Psychological measurement (student sample; N=10 pretest, N=309 main study)	Expert sorting (editorial experts, N = 3)	Expert evaluation (academic experts, N = 2)	Expert judging, psychological measurement (student sample; N=29 pretest, consumer sample; N=280 main study)	Psychological measurement (student sample; N = 36 pretest; student sample, N = 79 main study)	Expert sorting (design experts, N = 3)
Key Findings	Construct validation, generation of items	Generation of items (82), refinement of item pool	Refinement & reduction of item pool (47 dropouts)	Construct validation, 5-dimensional structure of DX	Confirmation of 5-dimensional structure	Refinement of scale	Confirmation 5-dimensional structure, convergent validity	Confirmation of discriminant and predictive validation, 5-dimensional structure, direct, indirect, and interaction effects	Confirmation of 5-dimensional structure
Scale: Number of Items	141	102	55	**24**	**24**	**15**	**12**	12	12

July 2011 — Passage of Time — March 2013

Source: author's own composition

5.2.1 Study II: Construct Validation, Analysis of Dimensionality, and Refinement of the Scale

5.2.1.1 Objectives

Following established scale development procedures (Bearden, Netemeyer, and Teel 1989; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003), Study II aims at testing the DX construct and identifying those items that form an internal consistent scale. Further, the reliability of the scale and its dimensionality are investigated. Hence, core items are identified, inadequate items are systematically eliminated, and the internal structure of the scale is analyzed. Central to Study II are validation, dimensionality testing, purification, and reduction of the item pool. Table 27 summarizes important details of Study II.

5.2.1.2 Method

The approach closely follows the methodology successfully employed in research on scale development (e.g., Netemeyer, Bearden, and Sharma 2003; Nunnaly 1978; Spector 1992; Thomson, MacInnis, and Park 2005)). Specific methodological steps include:

1) Analysis of comprehensibility, content, wording, and external criteria
2) Analysis of reliability
3) Test of dimensionality

A survey was conducted to obtain data and evidence that would help to accomplish the goals of Study II. The survey was tested in a small pretest (N = 10, 70% females). Participants were three hundred and nine students (M_{age} = 23.5 years, 64.4% females) at a large public university who participated in the study. They were asked to complete a self-administered, four-pages questionnaire on a voluntary basis. Students received a small incentive for participation in the form of German sweets after they completed the questionnaire. The questionnaire took approximately 15 minutes to complete (see Appendix D for the questionnaire).

Using a paper questionnaire, participants were first asked to name one example for an intense, positive and one example for an intense, negative DX and second to indicate the extent to which the 55 items described their personal positive, intense DX on a seven-point Likert scale (1 = “not at all descriptive”, 7 = “extremely descriptive”). To reduce primacy and recency effects, six different versions of the questionnaire were prepared. In each version the order of the 55 items was varied; each version included all 55 items. Respondents received one of the six versions randomly. According to successfully employed scale development

methodologies, each version contained the same introduction including a detailed instruction as well as a detailed definition of DX. Each participant was asked to read the definition twice before rating the items in order to assure a common understanding of DX.

5.2.1.3 Results

Testing the Design Experience Construct

Almost all participants (97%, N = 300) were able to name an intense, positive DX and 82% (N = 253) participants were able to give an example for a negative DX. Answers ranged from electronic products such as laptops, computers, mobile phones, etc. to cars, packaging, furniture, household appliances, fashion, architecture, and office supplies. Electronic products (19%) and cars (17%) were named most as a positive DX example. Regarding negative DX, cars were also mentioned most (20%), followed by packaging (13.3%), and electronic products (10.2%).

Refining the Item Pool

According to scale development procedures, various tests regarding content and statistical criteria were applied to refine the item pool.

First, following scaling procedure (Brakus, Schmitt, and Zarantonello 2009; Thomson, MacInnis, and Park 2005) items that were not rated by more than 10% of the participants should be removed, assuming that these items were poorly understood. No item fulfilled that criterion. Therefore, no item was removed.

Second, items with mean ratings less than M = 3.0 along the 7-point Likert scale were eliminated (Thomson, MacInnis, and Park 2005), assuming that these items poorly described an intense DX. This resulted in the deletion of six items (DX 3, DX 4, DX 9, DX 17, DX 21, DX 48) (see Table 28).

Third, scaling research suggests testing each item regarding social desirability. It is assumed that the nature of the design experience concept and hence its items are not influenced by social desirability. Therefore, no item was removed.

Fourth, all items were analyzed intensely regarding wording and content. This resulted in the deletion of six items (DX 8, DX 14, DX 15, DX 25, DX 26, DX 37) (see Table 28) due to poor, unclear, or ambiguous wording.

Last, the corrected-item-total correlation of each item was analyzed. The item was deleted, if smaller than M = 0.3 and alpha could be raised by dropping that item (Bühner 2011, p. 249). This resulted in the deletion of one item (DX 1) (see Table 28).

Table 28: 1st Dropping of Items

Item Number	Item	Mean	Reason for Deletion
DX 3	Dieses Design ist der Grund für mein Verhalten.	2.74	poor descriptive power
DX 4	Dieses Design erzeugt eine Gänsehaut.	2.47	poor descriptive power
DX 9	Dieses Design ist nichtssagend.	2.06	poor descriptive power
DX 17	Dieses Design hat ein eigenständiges Geruchserlebnis.	2.86	poor descriptive power
DX 21	An dieses Design kann ich mich nicht mehr erinnern.	1.69	poor descriptive power
DX 48	Dieses Design spricht meine Sinne nicht an.	2.7	poor descriptive power
DX 8	Es ist sehr emotional, an dieses Design zu denken.	3.07	poor wording (mixing sensors + emotional content)
DX 14	Dieses Design berührt mich emotional nicht.	3.03	poor wording (mixing sensors + emotional content)
DX 15	Das Design hat ein eigenständiges Tasterlebnis.	4.08	poor wording
DX 25	Man spürt die Liebe des Designers zum Produkt.	4.84	poor wording (content)
DX 26	Dieses Design ruft eine Reaktion in meinem Körper hervor.	3.56	poor wording
DX 37	Wegen der vielen Sinneseindrücke finde ich dieses Design interessant.	4.07	poor wording (ambiguous)
DX 1	Mit diesem Design verbinde ich einen bestimmten Geruch.	3.07	poor corrected-item-total correlation

Source: author's own calculation

Reliability

To assess reliability of the remaining items, the overall Cronbach's alpha was analyzed. The Cronbach's alpha of the 42 remaining items was 0.93.

In order to further analyze the reliability of the scale, the data was split into three groups. Each group represents a different educational background of the participants: Group A agricultural and nutrition economy students (N = 168), group B social science students (N = 77), group C other students (N = 53). The Cronbach's alpha was more or less stable over all three groups with slight variations ranging from 0.92 to 0.95 (see Table 29).

Table 29: Results of Reliability Analysis

Group	Cronbach's Alpha α	Inter-Item-Correlation
All	.93	.24
Group A: agricultural and nutrition economy students	.93	.23
Group B: social science students	.92	.22
Group C: other students	.95	.30

Source: author's own calculation

Dimensionality

To test dimensionality, an EFA was conducted. Netemeyer, Bearden, and Sharma (2003, p. 122) recommend common factor analysis for the procedure of scale development, identifying theoretical constructs, and testing which items to retain or delete. To test the factors, an EFA was conducted using Varimax rotation according to Brakus, Schmitt, and Zarantonello

(2009). This analysis revealed a six-factor solution with eigenvalues greater than one (variance explained = 63%, KMO = 0.9) (see Table 30).

Table 30: Study II: Results of 1st EFA

Factor		Number of Items	Cronbach's Alpha	Inter-Item-Correlation
1	Affective	9	.9	.47
2	Behavioral	8	.86	.42
3	Social	4	.67	.31
4	Cognitive	3	.81	.58
5	Investigating	2	.77	.63
6	Sensory	2	.40	.25

Source: author's own calculation

To further interpret the six-factor solution, the items that had a loading greater than 0.4 were examined (67% of all items (28 items) had loadings greater than 0.4 on at least one factor). By deleting the two items (DX 24, DX 31) the Cronbach's alpha could be further raised (see Table 31).

Table 31: 2nd Dropping of Items

Item Number	Item	Factor	Factor Loading	Cronbach's Alpha without Item
DX 24	Das Design dieses Produktes lädt mich ein, dieses Produkt auszuprobieren.	2	.46	.85
DX 31	Dieses Design löst keinerlei Emotionen in mir aus.	1	.5	.9

Source: author's own calculation

To further reduce the item pool and to provide a clearer structure, a second EFA was conducted deleting all items that had loading less than 0.4. This resulted again in a six-factor solution (variance explained = 63 %, KMO = 0.9): one factor with nine items, one with eight items, one factor with four, one with three and two with each two items (see Table 32).

Table 32: Study II: Results of 2nd EFA – Dimensions

Factor		Number of Items	Cronbach's Alpha	Inter-Item-Correlation
1	Affective	8	.89	.50
2	Behavioral	7	.85	.46
3	Social	4	.83	.54
4	Cognitive	3	.81	.58
5	Investing	2	.77	.63
6	Sensory	2	.40	.25

Source: author's own calculation

The analysis revealed three factors that were easy to interpret: “social” experience (factor three), “cognitive” experience (factor four), “sensory” experience (factor six). Factor one and two included a mix of several items. Yet factor one focused primarily on affective items (six out of nine) and factor two focused mainly on behavioral items (seven out of eight). Factor five consisted of two items easy to interpret, but was not expected (see Table 33). Factor five may be interpreted as a special form of “behavioral” experience that involves investing something (own time and thoughts) in order to be able to experience. This factor, the time investing factor, was not expected and cannot be found in similar studies or literature. Factor loadings varied between 0.81 and 0.46. For a detailed overview see Table 33. In line with Nunnally’s (1978) criterion of 0.7, the Cronbach’s alphas were mostly satisfactory: They were high for the “affective” (0.89), “behavioral” (0.85), “social” (0.83), and “cognitive” (0.81) factors, and they were adequate for the “time investing” factor (0.78). Only Cronbach’s alpha of the “sensory” factor was poor (0.4). Inter-item correlation varied from 0.63 to 0.25 (see Table 32).

Table 33: Study II: Results of 2nd EFA - Items

Factor		Item Number	Item	Factor Loading
1	**Affective**	DX 2	Dieses Design berührt mich emotional sehr.	.6
		DX 28	Dieses Design ruft eine Reihe verschiedener Emotionen hervor.	.66
		DX 32	Dieses Design regt meine Sinne an.	.60
		DX 38	Dieses Design verursacht intensive Gefühle und Empfindungen.	.76
		DX 43	Dieses Design regt meine Phantasie an.	.59
		DX 46	Dieses Design geht mir unter die Haut.	.64
		DX 47	Dieses Design hat einen starken emotionalen Effekt auf mich.	.73
		DX 51	Dieses Design löst innere Bilder bei mir aus.	.58
2	**Behavioral**	DX 6	Dieses Design ist ein visuelles Erlebnis.	.63
		DX 11	Dieses Design fasziniert mich.	.71
		DX 33	Dieses Design macht neugierig.	.6
		DX 36	Dieses Design ist spannend.	.53
		DX 45	Ich finde dieses Design sehr interessant.	.70
		DX 50	Dieses Design erregt sofort meine Aufmerksamkeit.	.68
		DX 2	Dieses Design lädt mich ein, auf das Produkt zuzugehen.	.53
3	**Social**	DX 10	Ich diskutiere mit anderen sehr gerne über dieses Design.	.54
		DX 18	Ich möchte dieses Design herzeigen.	.66
		DX 19	Ich erzähle anderen von diesem Design.	.84
		DX 23	Ich möchte andere an meinem Designerlebnis teilhaben lassen.	.66
4	**Cognitive**	DX 5	Mit diesem Design verbinde ich eine Geschichte.	.83
		DX 27	Dieses Design ruft viele Erinnerungen wach.	.83

Factor		Item Number	Item	Factor Loading
		DX 41	Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.	.59
5	**Investigating**	DX 39	Ich investiere Zeit, um mehr über dieses Design und dieses Produkt zu erfahren.	.71
		DX 40	Ich mache mir Gedanken über dieses Design.	.66
6	**Sensory**	DX 7	Ich möchte dieses Design mit meinen Händen erleben.	.50
		DX 30	Ich erlebe dieses Design über mehrere Sinne.	.54

Source: author's own calculation

Based on the fact, that no theoretical evidence can be found for an independent factor "investing" a further EFA was conducted deleting these two items (DX 39, DX 40). The third analysis revealed a five-factor solution (variance explained = 62 %, KMO = 0.9): one factor with eight items, one with seven items, one factor with four, one with three and one with two items (see Table 34). The analysis revealed three factors that were easy to interpret: "social" experience (factor three), "cognitive" experience (factor four), and "sensory" experience (factor five). Factor one and two included a mix of several items. Yet factor one focused primarily on affective items (four out of eight) and factor two focused mainly on behavioral items (six out of seven).

Table 34: Study II: Results of 3rd EFA - Items

Item Number	Item	Affective Experience	Behavioral Experience	Social Experience	Cognitive Experience	Sensory Experience
DX 38	Dieses Design verursacht intensive Gefühle und Empfindungen.	**.78**	.00	.09	.26	.15
DX 47	Dieses Design hat einen starken emotionalen Effekt auf mich.	**.71**	.22	.05	.27	-.03
DX 28	Dieses Design ruft eine Reihe verschiedener Emotionen hervor.	**.66**	.04	.11	.45	.11
DX 32	Dieses Design regt meine Sinne an.	**.65**	.23	.00	.06	.25
DX 43	Dieses Design regt meine Phantasie an.	**.65**	.32	.14	.07	-.03
DX 46	Dieses Design geht mir unter die Haut.	**.63**	.21	.14	.17	.04
DX 51	Dieses Design löst innere Bilder bei mir aus.	**.6**	.23	.02	.26	-.12
DX 2	Dieses Design berührt mich emotional sehr.	**.58**	.16	.05	.22	.14
DX 11	Dieses Design fasziniert mich.	.08	**.74**	.29	.12	.05
DX 45	Ich finde dieses Design sehr interessant.	.22	**.71**	.16	.03	.07
DX 50	Dieses Design erregt sofort meine Aufmerksamkeit.	.15	**.69**	.15	-.04	-.15
DX 6	Dieses Design ist ein visuelles Erlebnis.	-.00	**.64**	.14	.06	.22
DX 33	Dieses Design macht neugierig.	.24	**.59**	.20	.05	.11
DX 52	Dieses Design lädt mich ein, auf das Produkt zuzugehen.	.16	**.56**	.16	-.08	-.02
DX 36	Dieses Design ist spannend.	.29	**.53**	.17	.11	.15
DX 19	Ich erzähle anderen von diesem Design.	.00	.21	**.92**	-.02	-.03
DX 23	Ich möchte andere an meinem Designerlebnis teilhaben lassen.	.16	.28	**.65**	.06	.08

Item Number	Item	Affective Experience	Behavioral Experience	Social Experience	Cognitive Experience	Sensory Experience
DX 18	Ich möchte dieses Design herzeigen.	.05	.26	**.64**	.00	.15
DX 10	Ich diskutiere mit anderen sehr gerne über dieses Design.	.16	.28	**.57**	.11	.12
DX 27	Dieses Design ruft viele Erinnerungen wach.	.38	-.02	-.03	**.84**	.11
DX 41	Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.	.38	-.01	.12	**.59**	.02
DX 5	Mit diesem Design verbinde ich eine Geschichte.	.32	.09	.01	**.59**	-.05
DX 7	Ich möchte dieses Design mit meinen Händen erleben.	.05	.31	.20	-.08	**.58**
DX 30	Ich erlebe dieses Design über mehrere Sinne.	.32	-.07	.15	.19	**.43**

Notes: Factor analysis uses Varimax rotation. Bold values indicate the factor on which each item predominately loads.
Source: author's own calculation

Factor loadings varied between 0.87 and 0.49. In line with Nunnally's (1978) criterion of 0.7, Cronbach's alphas were mostly satisfactory and comparable to the second factor solution: high for the "affective" (0.89), "behavioral" (0.85), "social" (0.83), and "cognitive" (0.81) factors. For the "sensory" factor, however, Cronbach's alpha was poor again (0.4). Inter-item correlation varied from 0.58 to 0.25 (see Table 35).

Table 35: Study II: Results of 3rd EFA - Dimensions

Factor		Cronbach's Alpha	Inter-Item-Correlation
1	Affective	.89	.50
2	Behavioral	.85	.46
3	Social	.83	.54
4	Cognitive	.81	.58
5	Sensory	.40	.25

Source: author's own calculation

5.2.1.4 Discussion

Taken together, the findings of Study II suggest that participants share the conception of DX. Further, they can name examples for designs that evoke an intense DX and they differentiate between a positive and a negative DX. It is further noteworthy, that it is easier for participants to remember and to name positive examples than negative ones. These results support findings from previous research on experience (Brakus, Schmitt, and Zarantonello 2009) and confirm results from Study I from this dissertation as well as provide support for the conceptualization of DX (compare chapter 4.2).

Further, Study II identifies five DX factors labeled as "sensory", "cognitive", "affective", "behavior", and "social". The first DX factor affective contains 8 of the 24 items and therefore, is the factor with most items. Items loading on this factor mostly describe strong

emotional reactions to the stimulus. However, also items that refer to sensual and cognitive arousal load on this factor. The factor "behavior" combines six out of 24 items describing mostly fascination of, interest in as well as arousal and curiosity evoked by a design. It has to be mentioned, that similar to the factor "affective", items loading on the factor "behavior" do not only describe behavioral reactions. However, the majority of items loading on these two factors encompass either affective or behavioral items. The factor "social" includes four items concentrating on interacting with others by talking about the design, telling them about the experience, or showing them the design. The factor "cognitive" consists of 3 of the 24 items summarizing items that describe reactions such as associations and memories. Last, the factor "sensory" includes just 2 of the 24 items describing sensual occurrences.
Results are supported content-wise by previous findings in experience research (Brakus, Schmitt, and Zarantonello 2009) as well as by satisfactory statistical results for all factors (Cronbach's alpha ≥ 0.81) except for the factor sensory. In Study II the factor "sensory" just received poor statistical support (Cronbach's alpha = 0.4). Wording of the items or the nature of sensory perception could be possible reasons. Therefore, the wording of all sensory items has to be reworked in a next step (compare 3rd expert evaluations and Study III). The unconscious-nature of sensory perception of design is also assumed as a reason for these results (Becker et al. 2011; Fenko et al. 2009; Fenko, Otten, and Schifferstein 2010; Fenko, Schifferstein, and Hekkert 2008). As mentioned in chapter 2.2.1, sensory perception happens in part unconsciously and is therefore, often impossible to notice or express for laymen (Schifferstein 2006). Therefore, verbalization or indicating the importance of it as a part of DX is difficult. Although the "sensory" factor has poor results regarding factor loadings, Cronbach's alpha and inter-item-correlation, it is crucial for the DX concept. To improve the results, items should be controlled and, if needed, rewritten or the item pool completed. Overall, the results of the analysis of the internal structure support the conceptualization of DX and are in line with results of previous findings of experience research (Brakus, Schmitt, and Zarantonello 2009; Desmet and Hekkert 2007; Hekkert and Schifferstein 2008; Schmitt 1999b).

Further, Study II results in the deletion of 31 items. In line with scaling procedure (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003) and based on factor loadings, Cronbach's alpha and inter-item-correlation, the scale was shortened and condensed to a 24-item scale.

In sum, results of Study II further confirm the conceptualization of DX. Nevertheless, the construct and scale need additional validation and analysis of its internal structure: this was the rationale for conducting the 2nd expert evaluation and Study III. In order to further optimize the scale regarding content, length, and practicability, the scale needs further analysis and reworking: this was the rationale for conducting the 3rd expert evaluation and Study III.

5.2.2 Second and Third Expert Evaluation: Content and Face Validation

As mentioned, after Study II the scale needs further editing and optimization content-, language-, and length-wise to improve adaptability and length of the scale (Bearden, Netemeyer, and Teel 1989; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003) (compare 4.1.2). Therefore, two more expert evaluations were conducted to improve the content of scale and its practicability. To increase insights, editorial experts for the 2nd and academic experts for the 3rd evaluation were chosen. In the following chapter method and results are described in detail.

5.2.2.1 Second Expert Evaluation

To further confirm content validity, three independent judges, all with a professional editorial background and no relationship or involvement in the research project, were asked to sort all items into groups. To avoid too much influence on the judges, the editors just received a general work instruction to cluster the list of items into groups that are similar in content. The items were randomly listed. This resulted in five groups: “affective”, “cognitive”, “social” “interactive”, “behavioral”, and “sensory” experience. Table 36 presents the detailed results. Apart from factor two and three, the clusters are similar to the statistical results based on the EFA. The clustering groups the stimulating items of factor two and three into one factor and the sensory items of factor three into a single cluster.

Table 36: Results of 2nd Expert Evaluation

Factor	Item Number	Item Wording
Affective	DX 2	Dieses Design berührt mich emotional sehr.
	DX 38	Dieses Design verursacht intensive Gefühle und Empfindungen.
	DX 47	Dieses Design hat einen starken emotionalen Effekt auf mich.
	DX 28	Dieses Design ruft eine Reihe verschiedener Emotionen hervor.
Cognitive	DX 5	Mit diesem Design verbinde ich eine Geschichte.
	DX 27	Dieses Design ruft viele Erinnerungen wach.
	DX 51	Dieses Design löst innere Bilder in mir aus.
	DX 41	Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.
Social Interactive	DX 10	Ich diskutiere mit anderen sehr gerne über dieses Design.
	DX 18	Ich möchte dieses Design herzeigen.
	DX 19	Ich erzähle anderen von diesem Design.
	DX 23	Ich möchte andere an meinem Designerlebnis teilhaben lassen.
Behavioral	DX 11	Dieses Design fasziniert mich.
	DX 33	Dieses Design macht neugierig.
	DX 36	Dieses Design ist spannend.
	DX 50	Dieses Design erregt sofort meine Aufmerksamkeit.
	DX 52	Dieses Design lädt mich ein, auf das Produkt zu zugehen.
	DX 45	Ich finde dieses Design sehr interessant.

Factor	Item Number	Item Wording
Sensory	DX 6	Dieses Design ist ein visuelles Erlebnis.
	DX 7	Ich möchte dieses Design mit meinen Händen anfassen.
	DX 30	Ich erlebe dieses Design über mehrere Sinne.
	DX 32	Dieses Design regt meine Sinne an.
	DX 43	Dieses Design regt meine Phantasie an.
	DX 46	Dieses Design geht mir unter die Haut.

Source: author's own calculation

5.2.2.2 Third Expert Evaluation

To optimize comprehensibility and to make sure that each item is clearly distinguishable from each other, again two independent judges with an academic background reviewed all items. The judges suggested dropping out six items due to semantic similarity or misleading wording (see Table 37). They further suggested erasing three items because they were too specific or evaluative (e.g., items measuring sensory experience describing the perception of a particular sense). After the evaluation, the DX scale consists of fifteen items, including three items for each of the five theoretical experience dimensions (Brakus, Schmitt, and Zarantonello 2009).

Table 37: Results of 3rd Expert Evaluation: Dropped Items

Item Number	Item	Reason
10	Ich diskutiere mit anderen sehr gerne über dieses Design.	Semantic similarity, misleading wording
27	Dieses Design ruft viele Erinnerungen wach.	Semantic similarity, misleading wording
43	Dieses Design regt meine Phantasie an.	Semantic similarity, misleading wording
46	Dieses Design geht mir unter die Haut.	Semantic similarity, misleading wording
47	Dieses Design hat einen starken emotionalen Effekt auf mich.	Semantic similarity, misleading wording
51	Dieses Design löst innere Bilder in mir aus.	Semantic similarity, misleading wording
6	Dieses Design ist ein visuelles Erlebnis.	Content
7	Ich möchte dieses Design mit meinen Händen anfassen.	Content
45	Ich finde dieses Design sehr interessant.	Content

Source: author's own calculation

5.2.3 Study III: Confirmation of Dimensionality, Testing of Reliability, and Convergent Validation

5.2.3.1 Objectives

According to established scale development procedures in marketing, Study III was designed to further validate the DX scale. Hence, central to Study III are testing of reliability, confirmation of dimensions, scale validation, and analysis of effects on consumer behavior. See Table 27 for an overview of important details of Study III and general research procedure of this work.

5.2.3.2 Method

Following closely established scale development procedures (Brakus, Schmitt, and Zarantonello 2009; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005), Step 3 includes the following specific methodological steps:

1) Analyzing reliability of the DX scale
2) Analyzing dimensionality of the DX scale
3) Analyzing convergent validity
4) Analyzing effects on consumer behavior

An online survey was conducted to obtain data and evidence that would help accomplish the goals of Study III. To test the stability of the scale, a real-life setting with a non-student population and a new set of stimuli were employed. The study had an experimental between-subjects design. After viewing one randomly selected product design stimulus either high or low in DX, participants evaluated the intensity of the DX evoked by the product design using a seven-point Likert scale (with 1 = “completely disagree” and 7 = “completely agree”). The stimuli were randomly assigned. To further investigate the applicability and stability of the scale, three different product categories were chosen as stimuli: electric kettle, computer mouse, and wall clock (Blijlevens, Mugge, and Schoormans 2009; Bloch, Brunel, and Arnold 2003; Creusen and Schoormans 2005; Fenko et al. 2009) (for selecting stimuli criteria see next subchapter “Stimuli”).

To investigate the scale’s convergent validity, five established constructs related to each DX dimension were included in the questionnaire and compared to the DX scale (Brakus, Schmitt, and Zarantonello 2009; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005) (compare chapter 4.1). To test effects on consumer behavior, Study III also includes established constructs such as purchase intention. This approach is well established

in consumer behavior (Bloch, Brunel, and Arnold 2003; Littel and Orth 2013; Orth and Malkewitz 2008)

Stimuli

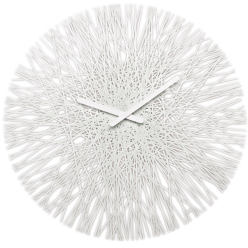
In a mixed team of professional designers and experienced researchers (N = 8) all product categories mentioned in Study II were analyzed regarding their suitability. Taking into account that evaluating a design can be a challenging request for laymen, the team chose product categories that are reduced in their complexity as well are very common in daily life. By choosing common daily life products, it can be assumed that each participant had various encounters with the products from the chosen categories before the survey. Hence, three product categories were chosen to be tested: computer mouse, electric kettle, and wall clock. To make sure that the evaluation of the outer appearance is not disturbed by brand perception, the chosen categories are characterized by not having easily recognizable, outstanding design key elements that are closely connected to certain brands (Orth and Malkewitz 2008). Hence, product categories such as automotive had been excluded. Additionally, all logos and brand relevant factors were removed using Photoshop. Nevertheless, a few examples had to be sorted out due to their unique and characteristic design or obvious brand connection (e.g., "Magic Mouse" by Apple). This approach is similar to recent research procedures in consumer behavior and design research (Blijlevens, Creusen, and Schoormans 2009; Bloch, Brunel, and Arnold 2003; Creusen and Schoormans 2005; Fenko et al. 2009).

Pretest

The objectives of Study III demand stimuli that clearly show either high or low scores in DX. Therefore, a team of professional designers (N = 5) collected 18 pictures of product designs (six for each product category, see Appendix E and Table 75 - Table 77). In a paper-pencil pretest participants (N = 29, women = 62%) were asked to read a definition of DX and to rate the extent to which the chosen eighteen pictures evoke an intense DX. The order within each category was fixed, while the order of the categories was randomly assigned. To assure applicability independent of the participant's background, only half of the respondents had a professional design background. An analysis of variance (ANOVA) was employed with the manipulated product design stimulus as independent variable, and the consumer rating on DX as dependent variable. The results show significant effects of the DX manipulation for each category: mouse ($F(11,336) = 7.42$, $p < .001$., $M_{DXhigh} = 5.14$, $M_{DXlow} = 2.34$); water kettle ($F(5,168) = 11.58$, $p < .01$., $M_{DXhigh} = 5.31$, $M_{DXlow} = 2.86$); wall clock ($F(6,195) = 5.17$, $p <$

.001., $M_{DXhigh} = 5.10$, $M_{DXlow} = 2.69$) (with 1 = "completely disagree" and 7 = "completely agree") (see Table 38).

Table 38: Study III: Results of Pretest Stimuli Manipulation

Product Category	Stimuli low	Mean	SD	Stimuli high	Mean	SD
Computer mouse		2.34**	1.70		5.14**	1.71
Electric kettle		2.86**	1.62	*** 	5.31**	1.20
Wall clock		2.69*	1.81		5.10*	1.72

**The means are significantly different at the 0.01 level.
** *The means are significantly different at the 0.01 level.
Source: author's own calculation

Main Study

Participants were two hundred and eight consumers ($M_{age} = 38.81$) of a German online research consumer panel recruited by the professional recruiting agency *WMM – Weber Marketing- & Marktforschung GmbH* based in Hamburg, Germany. Respondents were compensated for their time and effort. The received a monetary reward according to the panel standards (a voucher to the value of EUR 10). Due to various quotas regarding sex (equal distribution), age (18-55) and design affinity (moderate to high) one hundred and thirty-three people were dropped out. Six participants were excluded because of an obvious response pattern. Further, ten outliers (duration >1700 sec or < 90sec) were identified and excluded from analysis. All together one hundred and ninety-two valid participants were counted. Members of the online research panel administered by *WMM* were invited to complete a self-administered online questionnaire. The questionnaire took approximately 10 minutes to complete and was divided into six parts (see Appendix E for questionnaire). It was

programmed in Unipark, a well-established online survey tool. The field time was five days from 14th till the 18th of November 2012 with a response rate of 97.65%.
To avoid recency and frequency effects, the order of measures and multi-item batteries were randomized. To assess the reaction to product design stimuli, the questionnaire contained five constructs relating to DX and representing each dimensions of DX: "sensory", "affection", "cognition", "behavior", and "social interaction".

Measures

To empirically test the DX scale developed in Study I – II and the 1st – 3rd evaluation, its convergent validity, and effects on consumer behavior, multi-item scales were employed.
To test the DX scale, participants were asked to evaluate their DX evoked by a picture of a product design by using the developed DX scale consisting of 15 items. To test convergent validity and effects on consumer behavior, participants were asked to indicate the extent to which the stimulus evokes sensory, affective, cognitive, behavioral, and social reactions and reactions to certain consumer behaviors.
Most applied scales were reported to be reliable and valid in past research. To make reference to the design context, some of them were modified regarding wording of items. Additionally, some scales had to be translated into German. To assure the correctness of the translation, an English native speaker retranslated all scales. Finally, four experienced researchers verified the content validity of all measures to be used in the present study.

To assess **sensory reactions,** an adequate scale was searched for within related research disciplines such as design research, consumer psychology, consumer behavior, and marketing research. Unfortunately, most existing scales that measure sensory perception focus on the quality and not on the intensity or the behavioral effect. Hence, for the following study five new statements each representing one sense were developed (e.g., visuals: "*Wenn ich dieses Produkt auf einem Bild sehe, dann möchte ich es gerne in echt sehen.*"; seven-point Likert scale with 1 = "strongly disagree" and 7 = "strongly agree"). Factor loadings exceeded 0.87 (exception smell 0.62) and items were averaged to form a single measure of sensory perception ($\alpha = 0.91$, explained variance = 74.5%).

To measure **affective reactions** to product design, a bipolar rating scale developed by Mehrabian and Russel (1974) was employed. The Pleasure, Arousal, Dominance Scale (PAD) contains three dimensions (pleasure, arousal, dominance) measuring the environmental effects on the individual. The participants were asked to rate on a five-point bipolar scale the twelve

pairs (e.g.*,"glücklich - unglücklich", "angeregt – entspannt", "beeinflussend – beeinflusst"*; 1 = "maximal pleasure / maximal stimulation / maximal dominance" to 5 = "maximal displeasure / minimal stimulation / least dominance"). The scale has been tested in various marketing, consumer behavior and particularly in product design and consumer experience related studies (Foxall and Greenley 1999). To form a composite measure, items were averaged ($\alpha = 0.78$, explained variance = 81%).

To assess **cognitive reactions** to product design, the scale Imaginal Response to Music (Hargreaves 1982; Lacher and Mizerski 1994; Yingling 1962) was adopted to the product design context. The three-item scale measures the degree to which a person indicates that a song has evoked images and triggered memories. For rating consistency and to avoid confusion among the participants the original six-point Likert scale was aligned to a seven-point Likert scale (1 = "completely disagree" and 7 = "completely agree"). Factor loading exceeded 0.93, and the items were subsequently averaged to form a single index ($\alpha = 0.83$, explained variance = 85.5%).

To measure **behavioral reactions**, the work employed Mehrabian and Russell's (1974) Approach and Avoidance Scale. The scale's eight statements measure the extent to which a person approaches or avoids a stimulus (seven-point Likert scale, with 1 = "minimal tendency", 7 = "maximal tendency"). Again factor loadings exceeded 0.84 and items were averaged to form a single measure ($\alpha = 0.92$, explained variance = 81.5%).

To test the **social reaction** evoked by the stimuli, the Social Interaction Scale developed by Fornerino, Helme-Guizon, and Gotteland (2008) was employed. In their work the authors developed a scale to measure social interaction in an experience context based on movie consumption experience and immersion. The five items were translated and slightly adapted, e.g., *"Ich habe das Gefühl, dass ich mit anderen kommuniziere, auch wenn ich sie gar nicht kenne."* For consistency the original five-point Likert scale was aligned to a seven-point Likert scale (with 1 = "completely disagree" and 7 = "completely agree"). All factor loadings exceeded 0.86, and again the items were averaged to form a single measure of social interaction ($\alpha = 0.92$, explained variance = 76.5%).

Furthermore, the questionnaire contained the constructs purchase intention and general evaluation. Following current research, purchase intention was measured using a single item

on a 7-point Likert scale (Baker and Churchill 1977). The single item scale assessed, if the participant intents to buy one product out of this product category. At the end, participants evaluated the overall liking of the displayed product design by using a single item. To assess consistency, again a 7-point Likert scale (with 1 = "completely disagree" and 7 = "completely agree") was employed.

5.2.3.3 Results

5.2.3.3.1 Manipulation Check

A set of manipulation checks was conducted. To determine the success of the DX manipulation, an ANOVA was employed with the manipulated product design stimuli as independent variable, and the consumer rating on DX as dependent variable. The results showed only marginal effect of the DX manipulation ($F(1,190) = 3.31$, p = n.s. (0.070), $M_{DXhigh} = 3.74$, $M_{DXlow} = 3.34$, with 1 = "completely disagree" and 7 = "completely agree"). Nevertheless, it can be seen that all stimuli supposed to have a high effect on the DX score tested higher than stimuli supposed to have a low score ($M_{Mouse\ Low} = 3.17$, $M_{Mouse\ High} = 3.72$, $M_{KettleLow} = 3.40$, $M_{KettleHigh} = 3.77$, $M_{ClockLow} = 3.44$, $M_{ClockHigh} = 3.74$) (see Table 39).

Table 39: Study III: Results of Stimuli Manipulation

Product Category	High / Low	Stimuli	Mean	SD	Min	Max
Computer mouse	Low (N=29)		3.17	1.51	1.00	5.83
	High (N = 34)		3.72	1.64	1.00	7.00
Electric kettle	Low (N = 33)		3.40	1.54	1.00	6.50
	High (N = 33)		3.77	1.42	1.00	5.58
Wall clock	Low (N = 32)		3.44	1.64	1.00	6.58
	High (N = 31)		3.74	1.51	1.08	6.67

Product Category	High / Low	Stimuli	Mean	SD	Min	Max
Group comparing	Low (N = 94)		3.34	1.55	1.00	6.58
	High (N =98)		3.75	1.51	1.00	7.00
Overall	(N = 192)		3.55	1.54	1	7

Source: author's own calculation

5.2.3.3.2 Analysis of Design Experience Scale

Reliability

To test stability of the scale, a new sample of product designs and respondents was employed. This enabled the author to examine whether responses to the scale items were truly design and respondent independent and, thus, indicative of a general DX.

Further, the overall Cronbach's alpha was calculated. The Cronbach's alpha of the 15 remaining items was 0.97. Comparing the Cronbach's alpha of Study II and Study III and hence of different samples (students versus consumers) and different sets of stimuli, a high stability of the DX can be demonstrated ($\alpha_{StudyII} = 0.93$, $\alpha_{StudyIII} = 0.97$).

Dimensionality

Following scale development procedures, various EFA with Varimax rotation had been performed in an iterative process to explore dimensionality of the DX scale and to further reduce its length (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005).

The first EFA revealed a two-factor solution with eigenvalues greater than 1 (variance explained = 80.29%). The Kaiser-Meyer-Olkin Criteria was 0.96. Both extracted factors were significant based on a scree plot. To interpret the two-factor solution, items that had a loading greater than 0.5 (100% of items had loadings greater than 0.5 on at least one factor) were

examined. Factor one was easy to interpret. It focused mainly on items representing arousal or approach tendencies (five out of eight). All these items had a loading greater than 0.82. The three other items had a loading less than 0.76 and also loaded on factor two. Factor two included a mix of all other items (cognitive, affective, interactive, social, sensory) (Table 40).

Table 40: Study III: Results of 1st EFA - Items

Item	Factor 1	Factor 2
Dieses Design macht neugierig. (33)	**.87**	.30
Dieses Design ist spannend. (36)	**.85**	.28
Dieses Design fasziniert mich. (11)	**.85**	.37
Dieses Design lädt mich ein, auf das Produkt zu zugehen. (52)	**.83**	.37
Dieses Design erregt sofort meine Aufmerksamkeit. (50)	**.82**	.37
Ich möchte dieses Design herzeigen. (18)	**.75**	.50
Dieses Design regt meine Sinne an. (32)	**.73**	.54
Ich erzähle anderen von diesem Design. (19)	**.63**	.60
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen. (41)	.23	**.87**
Mit diesem Design verbinde ich eine Geschichte. (5)	.21	**.86**
Ich möchte andere an meinem Designerlebnis teilhaben lassen. (23)	.47	**.75**
Dieses Design berührt mich emotional sehr. (2)	.53	**.73**
Dieses Design verursacht intensive Gefühle und Empfindungen. (38)	.56	**.670**
Dieses Design ruft eine Reihe verschiedener Emotionen hervor. (28)	.55	**.68**
Ich erlebe dieses Design über mehrere Sinne. (30)	.58	**.65**

Notes: Factor analysis uses Varimax rotation. Bold values indicate the factor on which item predominately loads.
Source: author's own calculation

To determine whether the two-factor solution could provide a more distinct structure and to reduce the number of items further, a second EFA was conducted (see Table 41). This time the number of factors was restricted to five factors representing the theoretically expected five-factor solution (variance explained = 87.89) (Brakus, Schmitt, and Zarantonello 2009). All fifteen items had a loading greater than 0.5. The analysis showed a clear factor structure. Three factors were easy to interpret: Factor two ("cognitive"), factor three ("behavioral"), and factor five ("social"). Factor one and four contained a mix of items, while factor one again mainly consisted of arousal or approach tendencies. Factor four contained affection and sensory experience items.

Table 41: Study III: Results of 2nd EFA - Items

Item	1	2	3	4	5
Dieses Design lädt mich ein, auf das Produkt zu zugehen. (52)	**.76**	.24	.38	.19	.29
Dieses Design erregt sofort meine Aufmerksamkeit. (50)	**.71**	.21	.40	.34	.18
Ich möchte dieses Design herzeigen. (18)	**.62**	.32	.36	.20	.46
Dieses Design fasziniert mich. (11)	**.59**	.19	.55	.32	.29

Item	1	2	3	4	5
Dieses Design regt meine Sinne an. (32)	**.56**	.30	.37	.50	.26
Mit diesem Design verbinde ich eine Geschichte. (5)	.19	**.89**	.19	.17	.21
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen. (41)	.24	**.76**	.13	.36	.26
Dieses Design ist spannend. (36)	.39	.21	**.82**	.21	.19
Dieses Design macht neugierig. (33)	.48	.17	**.71**	.26	.25
Dieses Design berührt mich emotional sehr. (2)	.29	.41	.31	**.64**	.33
Dieses Design ruft eine Reihe verschiedener Emotionen hervor. (28)	.39	.36	.23	**.63**	.32
Dieses Design verursacht intensive Gefühle und Empfindungen. (38)	.21	.41	.44	**.54**	.41
Ich erlebe dieses Design über mehrere Sinne. (30)	.49	.46	.28	**.50**	.16
Ich möchte andere an meinem Designerlebnis teilhaben lassen. (23)	.25	.41	.22	.38	**.70**
Ich erzähle anderen von diesem Design. (19)	.43	.23	.30	.25	**.70**

Notes: Factor analysis uses Varimax rotation. Bold values indicate the factor on which item predominately loads.
Source: author's own calculation

Following scale development procedures, next the internal reliability of each dimension was assessed. In line with Nunnally (1978) the Cronbach's alpha was calculated for each dimension. All Cronbach's alphas were very satisfactory: They were high for all factors ranging from 0.88 to 0.95. For a detailed overview see table Table 42.

Table 42: Study III: Results of Cronbach's Alpha of 2nd EFA

Factor	Cronbach's alpha
1	.95
2	.88
3	.93
4	.93
5	.90

Source: author's own calculation

To further reduce the scale's length and to make sure that each factor is represented by more or less the same number of items, each factor and the Cronbach's alpha are analyzed in detail. Hence, the item number DX 28 (*"Dieses Design ruft eine Reihe verschiedener Emotionen hervor."*), and the item DX 11 (*"Dieses Design fasziniert mich.")* and DX 18 (*"Ich möchte dieses Design herzeigen."*) were deleted.

This resulted in a very clear 5-factor structure (variance explained = 98.57, all loadings greater than 0.58, Cronbach's alpha for all factors are high ranging from 0.88 to 0.93): Factor one ("cognitive"), factor two ("activating"), factor three ("behavioral" and "sensory" experience), factor four ("social"), and factor five ("affective"). Only factor three is a slight mixture of two different dimensions content-wise (seeTable 42).

Table 43: Study III: Results of 3rd EFA

Item	1	2	3	4	5
Mit diesem Design verbinde ich eine Geschichte. (5)	**.89**	.20	.18	.23	.13
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen. (41)	**.79**	.16	.24	.27	.31
Dieses Design ist spannend. (36)	.21	**.85**	.30	.19	.24
Dieses Design macht neugierig. (33)	.19	**.77**	.41	.304	.19
Dieses Design lädt mich ein, auf das Produkt zu zugehen. (52)	.25	.49	**.70**	.33	.04
Dieses Design erregt sofort meine Aufmerksamkeit. (50)	.19	.44	**.70**	.21	.33
Dieses Design regt meine Sinne an. (32)	.32	.42	**.58**	.32	.35
Ich erlebe dieses Design über mehrere Sinne. (30)	.47	.27	**.58**	.23	.38
Ich möchte andere an meinem Designerlebnis teilhaben lassen. (23)	.43	.24	.24	**.73**	.30
Ich erzähle anderen von diesem Design. (19)	.30	.34	.37	**.72**	.22
Dieses Design berührt mich emotional sehr. (2)	.43	.28	.34	.32	**.65**
Dieses Design verursacht intensive Gefühle und Empfindungen. (38)	.41	.40	.25	.40	**.60**

Notes: Factor analysis uses Varimax rotation. Bold values indicate the factor on which item predominately loads.
Source: author's own calculation

Again the internal reliability for each dimension was analyzed. As before, the Cronbach's alpha for each dimension was very satisfactory according to Nunnally's (1978) criterion of 0.7 (Nunnaly 1978) ($\alpha_{Factor1}$ = .88, $\alpha_{Factor2}$ = 0.93, $\alpha_{Factor3}$ = 0.93, $\alpha_{Factor4}$ = 0.90, $\alpha_{Factor5}$ = 0.90) (see Table 44).

Table 44: Study III: Results of Cronbach's Alpha of 3rd EFA

Factor	Cronbach's Alpha
1	.88
2	.93
3	.93
4	.90
5	.90

Source: author's own calculation

Based on the theoretical framework, it was not anticipated that behavioral and sensory items would load on a single factor. A reason for this could be the wording (all items contain words related to arousal/approach). In addition, the four items could load first on two first-order factors "nested" within the second-order factor three (behavioral/sensory). To test whether factor three is a second-order factor, an additional factor analysis was conducted using only the four items. After Varimax rotation, results revealed a clear two-factor structure: Factor one ("behavioral"), factor two ("sensory") explaining 90% of the variance (compare Table 45).

Table 45: Study III: Results of 4th EFA - Second-Order Factors

Item	1	2
Dieses Design lädt mich ein, auf das Produkt zu zugehen. (52)	**.74**	.53
Dieses Design hat sofort meine Aufmerksamkeit erregt. (50)	**.72**	.52
Dieses Design regt meine Sinne an. (32)	.56	**.73**
Ich erlebe dieses Design über mehrere Sinne. (30)	.48	**.70**

Source: author's own calculation

In line with the prior EFA, the internal reliability of each factor was analyzed. Again all Cronbach's alphas were satisfactory (compare Table 46).

Table 46: Study III: Results Cronbach's Alpha 4th EFA

Factor	Cronbach's alpha
1	.90
2	.88

Source: author's own calculation

5.2.3.3.3 Convergent Validity

Following scale development procedures, the convergent validity of the DX scale was tested (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005) (compare chapter 4.1). To assess convergent validity, the correlation of the DX items with items of related scales are compared. Because no measurement exists so far to measure DX, correlations are analyzed for each DX dimension separately (Netemeyer, Bearden, and Sharma 2003).

First, correlations of DX items representing the "cognitive" dimension are compared to items from the Imaginal response scale (Hargreaves 1982; Lacher and Mizerski 1994; Yingling 1962). Both DX items (DX 5 and DX 41) are highly correlated ($r = 0.78$, $p < 0.001$). A medium correlation ($rs = 0.43$- 0.60, $p < 0.01$) can be observed between items of the Imaginal Response Scale and the DX items (see Table 47).

Table 47: Correlation DX Cognition and Imaginal Response Items

Item	DX 5	DX 41	Memory	Imagination
DX 5	**1**	**.78****	**.43****	**.51****
DX 41	**-**	**1**	**.54****	**.61****
Memory	-	-	1	.71**
Imagination	-	-	-	1

Source: author's own calculation

Second, the correlation of items representing "social interaction" is calculated. One can summarize, that the DX scale items are highly correlated ($r = 0.81$, $p < 0.01$). Moreover, item correlation of the two scales exceeds in general $r > 0.61$ (see Table 48).

Table 48: Correlation DX Social Interaction and General Social Interaction Items

Item	DX 19	DX 23	Interaction Humans	Interaction Connection	Interaction Sharing	Interaction Communication	Interaction Part
DX 19	**1**	**.81****	**.62****	**.59**b)**	**.74****	**.50**a)**	**.66****
DX 23	**-**	**1**	**.63****	**.64****	**.76****	**.58**a)**	**.70****
Interaction Humans	-	-	1	.71**	.75**	.72**	.70**
Interaction Connection	-	-	-	1	.68**	.71**	.71**
Interaction Sharing	-	-	-	-	1	.67**	.75**
Interaction Communication	-	-	-	-	-	1	.66**
Interaction Part	-	-	-	-	-	-	1

a = communication with strangers is a very strong item
b = feeling a connection to strangers is a very strong item
Source: author's own calculation

Third, correlations between the "affective" dimension of the DX scale, pleasure items of the PAD scale, and items form the approach and avoidance (APA) (Mehrabian and Russell 1973) scale are compared. Again a high correlation of the DX items can be observed ($r = 0.82$, $p < 0.001$). Between the items of the DX scale and PAD scale only a low correlation exists. The PAD scale measures mainly the quality of certain emotions, such as "happiness", "pleasure", or "satisfaction", whereas the DX scale measures the extent to which emotions are evoked and not their quality.

Additionally, the present work compared the "affective" dimension items of the DX sale with items from the APA scale, that indicate the level of positive affective state evoked by the design of a product. A high correlation can be observed between theses items (see Table 49).

Table 49: Correlation DX Affection, Pleasure (PAD), and Affective (APA) Items

Item	DX 2	DX 38	Pleasure: Happiness	Pleasure: Pleasure	Pleasure: Satisfaction	APA interact product	APA spending time	APA being close
DX 2	**1**	**.82****	**.35****	**.34****	**.40****	**.70****	**.75****	**.74****
DX 38	**-**	**1**	**.39****	**.38****	**.45****	**.67****	**.69****	**.71****
Pleasure: Happiness	-	-	1	.70**	.71**	-.50**	-.50**	-.53**
Pleasure: Pleasure	-	-	-	1	.75**	-.53**	-.43**	-.52**
Pleasure: Satisfaction	-	-	-	-	1	-.57**	-.53	-.60

Item	DX 2	DX 38	Pleasure: Happiness	Pleasure: Pleasure	Pleasure: Satisfaction	APA interact product	APA spending time	APA being close
APA interact product	-	-	-	-	-	1	.82**	.80**
APA spending time	-	-	-	-	-	-	1	.84**
APA being close	-	-	-	-	-	-	-	1

Source: author's own calculation

Fourth, correlations of items that represent the dimension "behavior" of the DX scale with items of the APA scale, and with items that represent the "arousal" dimension of the PAD scale are compared. Correlation of items of the APA scale with items representing the "behavioral" dimension of the DX scale show high correlations ($rs = 0.54$ -0.80 , $p < 0.001$) (see Table 50).

Results of the PAD scale show poor positive or even negative correlation. This again could be due to the content of the items (compare correlation of affective items) and additional to the type of measuring scale. In contrast to the DX Scale, the PAD scale is a bipolar 5-point Likert scale, this also may have influenced the answering behavior of participants.

Table 50: Correlation DX Behavior, APA, and Arousal (PAD) Items

Item	DX 33	DX 36	DX 50	DX 52	APA interact product	APA spending time	APA being close	APA spend money	Arousal stimulation	Arousal excited	Arousal aroused
DX 33	1	**.86****	**.78****	**.80****	**.72****	**.70****	**.73****	**.61****	**-.26****	**-.31****	**-.45**
DX 36	-	**1**	**.73****	**.76****	**.66****	**.65****	**.67****	**.67****	**-.33****	**-.28****	**-.46****
DX 50	-	**-**	**1**	**.81****	**.65****	**.64****	**.69***	**.55****	**-.23****	**-.30****	**-.35****
DX 52	-	**-**	**-**	**1**	**.78****	**.72****	**.72****	**.61****	**-.22****	**-.34****	**-.32****
APA interact product	-	-	-	-	1	.82**	.80**	.69**	-.24**	-.26**	-.36**
APA spending time	-	-	-	-	-	1	.84**	.70**	-.14**	-.28**	-.33**
APA being close	-	-	-	-	-	-	1	.67**	-.15*	-.28**	-.38**
APA spend money	-	-	-	-	-	-	-	1	-.23**	-.17*	-.40**
Arousal stimulation	-	-	-	-	-	-	-	-	1	.34**	.40**
Arousal excited	-	-	-	-	-	-	-	-	-	1	.33**
Arousal aroused	-	-	-	-	-	-	-	-.	-	-	1

Source: author's own calculation

Fifth, correlation of and with items representing the "sensory" dimension is tested. As expected, both items of the DX scale are highly correlated ($r = 0.78$, $p < 0.01$) (see Table 51). Except one item that represents olfactory senses all correlations exceed $r > 0.52$. The olfactory sense is perceived unconsciously while the design of the study (pictures of stimuli) demand a cognitive processing (Becker et al. 2011; Fenko et al. 2009; Fenko, Schifferstein, and Hekkert 2008, 2010a).

Table 51: Correlation DX Sensory and General Sensory Items

Items	DX 30	DX 32	Haptic	Acoustic	Visual	Touch	Olfactory
DX 30	**1**	**.78****	**.66****	**.55****	**.62****	**.65****	**.41****
DX 32	**-**	**1**	**.68****	**.52****	**.69****	**.67****	**.38****
Haptic	-	-	1	.76*	.81**	.90**	.47**
Acoustic	-	-	-	1	.73**	.76**	.48**
Visual	-	-	-	-	1	.86**	.41**
Touch	-	-	-	-	-	1	.48**
Olfactory	-	-	-	-	-	-	1

Source: author's own calculation

Summarizing, a medium to high correlation can be observed with all scales except the items of the PAD scale. The other correlations show medium to high results indicating that the different scales measure related concepts.

The low or even negative correlations between the DX and PAD scale confirm the approach of this research that the DX scale measures the intensity of an experience while the PAD scale measures the quality of certain affective states (pleasure, arousal, dominance). Hence, the PAD scale is not suitable to proof the convergent validity of the DX scale.

5.2.3.3.4 Effects on Consumer Behavior

In order to test, if a high DX has an effect on consumer behavior, the questionnaire of Study III included two consumer behavior variables: purchase intention and liking. Results are seen as indicators for further assumptions and hypotheses for the next study. Therefore, the analysis and report are rather short and basic at this point. For more elaborated analysis including hypothesis and more aspects see 5.3.1.

If the evoked DX is intense rather than weak, an effect on consumer behavior is expected. To proof this proposition, the author selects two representative consumer behavior constructs: general likability and purchase intention. In a first step two ANOVAs, one for each outcome are conducted. Results indicate a significant effect of DX on likability ($F(1,190) = 114.56$, $p =$

0.000) and purchase intention (F(1,190) = 174.63, p = 0.000). As expected, consumers evaluate a design as more likable (M_{DXhigh} = 5.73 vs. M_{DXlow} = 3.28) and are more willing to purchase it (M_{DXhigh} = 5.11 vs M_{DXlow}= 2.46) when the evoked DX was high rather than low. To further confirm the assumption that an intense, positive DX has an effect on purchase intention and liking, Study IV will analyze, hypothesizes, and investigate theses assumptions more in detail and test these by applying different analysis methods (regression analysis, LMM). For more details on effects of DX on consumer behavior see Study IV, chapter 5.3.1.4.

5.2.3.4 Discussion

Study III as part of step 2 sets out to further validate the DX construct and scale, to analyze the reliability of the scale, and to refine it.

Study III analyzes the convergent validity of DX by comparing correlations of DX dimensions and related constructs. Although results show some medium to high correlation, generally higher correlations between single dimensions and related constructs were expected. It is assumed that a reason for only medium correlation could be an ill fit context-wise of certain measuring scales to certain dimensions (e.g., Imaginal Response and cognitive dimension). Unfortunately, measuring scales for the experience context are still rare and the author was compelled to try to make the best of existing scales. For example, the PAD scale measures the quality of single pleasurable, arousing, and dominating items and not their intensity. Hence, both constructs differ theoretically form each other. Besides content-wise differences, scales had to be translated and wording and context of some scales had to be changed in order to assess each dimensionality. This might be one potential explanation for the lower correlation as expected.

Further, findings of Study III support mainly the suggested dimensional structure of the DX scale. As in Study II results show a five-factor solution confirming the DX conceptualization. In contrast to Study II, four out of five factors are easy to explain: the “cognitive”, “behavior”, “social”, and “affective”. The factor “cognitive” represents again associations and personal previous experiences (2 out of 12 items). The factor “behavior” summarizes items that describe curiosity and interest (2 out of 12 items), while the factor “social” encompasses items referring to interaction between humans like telling somebody else about the design (2 out of 12 items). Last, the factor “affective” summarizes items that indicate emotional effects (2 out of 12 items). In contrast, to the four factors mentioned, factor three is not easy to interpret because it consists of two types of items content-wise (sensory perception and

approach behavior). Because of its content, factor three is supposed to be a second-order factor. Results of further analysis, confirm this notion. Hence, the DX dimensional structure contains four first-order and two first-order factors nested within the second-order factor three (second-order factor consists of 4 out of 12 items). Because results differ from the suggested theoretical framework, the dimensional structure needs to be confirmed in another experiment. Additionally, results of Study III differ from results of Study II regarding the composition of two factors as well as the hierarchy of factors. These findings do not conform with previous studies (e.g., Brakus, Schmitt, and Zarantonello 2009).

Moreover, results of Study III emphasize the stability of the DX scale. In Study III a new set of stimuli (product categories, products, and pictures) as well as a new set of sample (consumers) were employed and reliability criteria were strong.

Study III findings support effects of DX on consumer behavior. Results indicate that consumers evaluate a product design more positively when the evoked (positive) DX is high rather than low. Additionally, the same effect can be observed for purchase intention. Is to say, a more intense DX predicts a higher purchase intention for the stimulus. These findings confirm the conceptualization of DX and previous findings of experience (e.g., Brakus, Schmitt, and Zarantonello 2009; Desmet and Hekkert 2007; Schmitt 1999b) and design research (e.g., Mattila and Wirtz 2001; Van Rompay and Pruyn 2011; Westerman et al. 2012).

It has to be mentioned that the intended stimuli manipulation in the main study was not successful in contrast to the manipulation of the pretest. Reason for this could be a different study design in the pretest and the main study. While in the pretest a 2 (DX: low vs. high) x 3 (product category: water kettle vs. wall clock vs. computer mouse) factorial design was employed, in the main study participants just rated one stimulus (either low or high in DX) from just one product category. Hence, it can be assumed that in the pretest certain priming effects, even if not intended, could have influenced the manipulation successfully. Moreover, due to the design of the main study, each cell for one stimulus was rather small (N = 29 – 34). Nevertheless, for each manipulated stimulus of the main study results confirm the indicated tendencies. Hence, it is suggested using a stimulus set up considering priming rules in order to increase the observed tendencies of Study III, to replicate results of Study II and to receive significant results (compare Herr 1989; Kreuzbauer and Malter 2005; Veryzer and Hutchinson 1998; Yi 1993).

After Step 2 including Study II and Study III as well as two expert evaluations (2nd and 3rd) the DX scale consists of twelve items representing five dimensions.

In sum, the findings of Study III further validate the theoretical conceptualization of DX in chapter 4.2. However, discriminant and predictive validation is still to be determined: motivating Study IV. Moreover, results of the analysis of the internal structure just partly reflect the prediction, theory, and previous studies and findings. Hence, this dissertation suggests analyzing the dimensionality of DX again: this was another rationale for conducting Study IV. So far, findings of Study III only hint at direct effects. To confirm these assumptions and amplify knowledge the present research suggests investigating direct, indirect, and interaction of effects of DX: this was a main rationale for conducting Study IV.

5.3 Step 3: Analysis of Direct, Indirect, and Interaction Effects, Validation, and Confirmation of Scale

Step 3 consists of Study IV and the 4th expert evaluation. This last step sets out to analyze direct, indirect, and interaction effects of design experience, as well as to further validate the concept and the scale. Moreover, it aims at finalizing the measurement scale and to prove its content and face validity.

The following chapter 5.3.1 presents Study IV in detail and then the 4th evaluations is presented in chapter 5.3.2. For an overview and more details of Step 3 see Table 52.

Table 52: Overview of Step 3: Stud IV and 4th Expert Evaluation

Step	1			2				3	
Main Goal	Exploring DX & Item Pool Generation			Validation of Construct & Scale, Analysis of Dimensionality, Refinement of Scale				**Analysis of Direct, Indirect, & Interaction Effects, Confirmation of Scale**	
	Study I	Literature Research	1st Evaluation	Study II	2nd Evaluation	3rd Evaluation	Study III	Study IV	4th Evaluation
Objective	Construct validation, generation of initial item pool	Generation of initial item pool	Content & face validation of item pool	Construct validation, analysis of dimensionality, purification & reduction of scale	Content & face validation of internal structure	Content & face validation, optimization of comprehensibility	Analysis of reliability, confirmation of dimensionality, convergent validation, analysis of effects on consumer behavior	Discriminant & predictive validation, confirmation of dimensionality, generalizability, direct, indirect, & interaction effects	Content & face validation of internal structure
Method	Semi-structured in-depth expert interviews (design experts, N = 12 main study)	Literature research	Expert and population rating (design expert N = 7, marketing experts N = 8, population N = 6)	Psychological measurement (student sample; N=10 pretest, N=309 main study)	Expert sorting (editorial experts, N = 3)	Expert evaluation (academic experts, N = 2)	Expert judging, psychological measurement (student sample; N=29 pretest, consumer sample; N=280 main study)	Psychological measurement (student sample; N = 36 pretest; student sample, N = 79 main study)	Expert sorting (design experts, N = 3)
Key Findings	Construct validation, generation of items	Generation of items (82), refinement of item pool	Refinement & reduction of item pool (47 dropouts)	Construct validation, 5-dimensional structure of DX	Confirmation of 5-dimensional structure	Refinement of scale	Confirmation 5-dimensional structure, convergent validity	Confirmation of discriminant and predictive validation, 5-dimensional structure, direct, indirect, and interaction effects	Confirmation of 5-dimensional structure
Scale: Number of Items	141	102	55	24	24	15	12	**12**	**12**

July 2011 — Passage of Time — March 2013

Source: author's own composition

5.3.1 Study IV: Analysis of Direct, Indirect, and Interaction Effects, Discriminant and Predictive Validation, Confirmation of Dimensional Scale Structure, and Generalizability

5.3.1.1 Objectives

Study IV has several objectives. First, Study IV is designed to further analyze and validate the DX scale. Therefore, dimensional scale structure, criterion and content validity are assessed. Moreover, the discriminant validity of the DX scale is analyzed showing that it is empirically distinguishable from similar constructs. Further, direct effects (predictive validity) are assessed showing that variation in DX scores correspond in theoretically consistent ways to key behavioral outcomes for a marketing related context such as purchase intention, evaluation, satisfaction, or product value (Nunnally and Bernstein 1994). Moreover, Study IV is designed to analyze indirect and interaction effects on predictor variables, hence, determine mediators and moderators that influence the effect of DX on outcome dimensions. Finally, this work sought to collect data from a more diverse sample of respondents and stimuli to address issues of generalizability (compare Table 52).
Central to the Study IV is the analysis of direct, indirect, and interaction effects.

5.3.1.2 Theoretical Background

Study IV pursues a series of objectives and therefore, has a complex theoretical and methodological structure. Hence, the following chapter is divided into four subchapters discussing the theoretical background subsequently starting with discriminant validity.

5.3.1.2.1 Discriminant Validity

As pointed out in chapter 4.2.1.3, DX is related but also conceptually distinct to other design or consumer behavior constructs, e.g., product experience, product personality, evaluative and motivational constructs. Hence, in line with established scale development procedures (Brakus, Schmitt, and Zarantonello 2009; DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005), Study IV is designed to provide proof that DX is empirically distinguishable from related constructs. Due to the complexity of Study IV, this dissertation concentrates on the following concepts: affective reactions such as evaluation and satisfaction, as well as the motivational concept involvement:

<u>Evaluation</u>

In contrast to evaluations (compare 4.2.1.3 for more details), DX is not a general evaluative judgment about a product's design (e.g., "I hate the design!"). DX includes more specific

sensations, emotions, cognitions, and behavioral responses triggered by specific design elements. DX may result in general evaluations or in affective evaluations. But, overall evaluations just capture a fraction of the entire design experience (Brakus, Schmitt, and Zarantonello 2009).

Satisfaction

Like evaluations, consumer satisfaction is an important outcome for marketers (Chen and Chuang 2008). Hence, experience research (Brakus, Schmitt, and Zarantonello 2009; Fornerino, Helme-Guizon, and Gotteland 2008) and design research (Desmet, Overbeeke, and Tax 2001; Fynes and De Burca 2005; Kotler and Rath 1984; Yamamoto and Lambert 1994) have investigated consumer satisfaction in relation to experiences and consumer-design-interaction (compare 4.2.1.3 for more details). According to Fournier and Mick (1999), consumer satisfaction can be defined as "an attitude-like judgment following a purchase act or [is] based on a series of consumer-product interactions" (Fournier and Mick 1999, p. 5). Like experience, consumer satisfaction is a result of consumer-product-interactions. However, DX encompasses more than "attitude-like judgments". As stated above, it includes sensations, emotions, cognitions, and behavioral responses evoked by person-design-interaction independent of any purchase.

Involvement

Another related but distinct construct is the motivational concept involvement. Involvement is based on needs and values that motivate a consumer to approach a certain object (compare 4.2.1.3 for more details). Key element of involvement is the personal relevance and the perceived importance of a certain object or category for a person (Brakus, Schmitt, and Zarantonello 2009; Zaichkowsky 1985). In contrast to the involvement construct, motivation is no antecedent of DX. Experiences in general may happen when consumer do not show any interest or have a certain personal bond or connection to the object or situation. DX may be evoked by chance (Hekkert and Schifferstein 2008). Additionally, according to Brakus, Schmitt, and Zarantonello (2009) objects or brands that a person is highly involved with are not necessarily the ones that evoke the strongest experiences.

Therefore, it is expected that DX is different from general evaluation, satisfaction, and involvement.

5.3.1.2.2 Direct Effects - Predictive Validity

Consumer behavior and design research offer some insights into direct and indirect effects of design or experience on key behavioral outcomes (see chapters 3.4 and 4.2.3 for a detailed

overview). The findings suggest that a certain product design can have significant direct effects on salient dimensions, e.g., purchase intention (Orth, Campana, and Malkewitz 2010), product attachment (Schifferstein and Zwartkruis-Pelgrim 2008) , or product evaluations (Becker et al. 2011).

Research investigating the effect of experiences in various contexts indicates that an intensive experience has a significant influence on marketing relevant outcome variables (Brakus, Schmitt, and Zarantonello 2009; Carù and Cova 2003; Hekkert and Schifferstein 2008). According to these findings, it is expected that the evoked DX impacts salient marketing relevant constructs such as evaluation, attractiveness, satisfaction, attachment, perceived product value, purchase intention, as well as willingness to pay a higher price (see Figure 21).

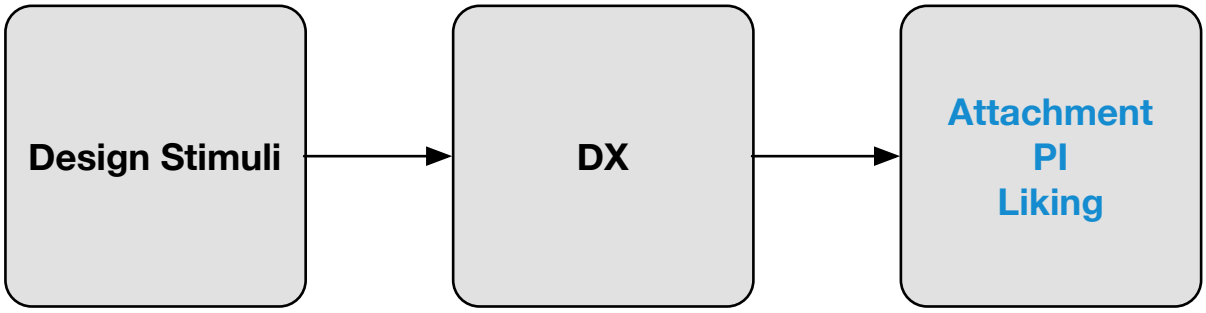


Figure 21: Model of Direct Effects (I)
Source: author's own illustration

Although previous findings do not specify the valence of an intense experience that affects a consumer behavior variable (compare Brakus, Schmitt, and Zarantonello 2009), the present work suggests that a positive, intense DX influences for example purchase intention differently than a negative, intense DX. Therefore, the present work analyzes in a first step only the effect of a positive, intense DX. This restriction applies to all hypotheses developed in the present dissertation analyzing the effect of an intense DX. In the following section each hypothesis is developed step by step:

Evaluation

Within marketing, consumer behavior, and design research it is a common fact, that the outer appearance of a product is one key factor for its evaluation. The design of a product, its overall style and single components influence the consumer (Bloch 1995) (compare chapter 4.2.3). The appearance is considered integral to capturing consumer attention and determining consumers' affective responses toward a product, such as their liking (Page and Herr 2002; Veryzer 1995). Crozier (1994) indicated that the psychological responses to products are influenced by the product's appearance (including, size, shape, and color). By manipulating

the shape of a product designers communicate messages and elicit responses from consumers (Hsiao and Chen 2006).

Regarding the experience construct, recent scientific publications have suggested that the intensity of an evoked experience has a major impact on how the object is evaluated (Brakus, Schmitt, and Zarantonello 2009). Further, sensory design experience is known as one key influence on overall product evaluation (Spence and Gallace 2011).

Based on results of design and experience research, this dissertation proposes that a design that evokes a positive, intense DX is perceived as more favorable, is to say liked more than a design that only evokes a minor experience reaction. Hence, this research hypothesizes:

H1: A product high in DX evokes a higher level of liking as a product low in DX.

Attractiveness

As mentioned in chapter 4.2.3, the attractiveness of a product is crucial for academia and industry due to its connection to purchase intention (Batra, Brunel, and Chandran 2009; Bloch 1995; Orth, Campana, and Malkewitz 2010). Especially, multi-sensory design research has lately focused on the effect of design on perceived attractiveness. Results indicate that a design that appeals to more than one sense and conveys congruent information, is perceived as more attractive by a consumer (Lindstrom 2005; Littel and Orth 2013). Latest research of experience has confirmed also the notion that a more intense experience is source of a higher attractiveness rating (Brakus, Schmitt, and Zarantonello 2009; Pine and Gilmore 1998; Schifferstein and Spence 2008; Schmitt 2010). Based on these insights, this research hypothesizes:

H2: A product high in DX evokes a higher perceived attractiveness than a product low in DX.

Satisfaction

Besides attractiveness also consumer satisfaction is a salient outcome for marketers (Chen and Chuang 2008). As stated in chapter 4.2.3, satisfaction is defined as “an attitude-like judgment following a purchase act or based on a series of consumer-product interactions” (Fournier and Mick 1999, p. 5).

It is further acknowledged that people seek sensory stimulation (McAllister and Pessemier 1982). Apart from fulfilling utilitarian needs, it is widely approved, that experiences offer experiential value and various stimulations (Brakus, Schmitt, and Zhang 2008; Pine and Gilmore 1999). Further, Brakus, Schmitt, and Zarantonello (2009) state that the more

experience dimensions are triggered by a stimulus, the more satisfaction is evoked. Hence, this research proposes the following hypothesis:

H3: A product high in DX evokes a higher satisfaction than a product low in DX.

Attachment

As explained more in detail in chapter 4.2.3, the attachment construct is based on the emotional bond between a consumer and a specific product (Mugge, Schoormans, and Schifferstein 2008). A requirement for this emotional bond between a product and a consumer are recurring interactions and positive emotions such as pleasure (Thomson, MacInnis, and Park 2005). Besides pleasure, also self-expression, group affiliation and memories determine attachment positively.

Findings of product design research and experience suggest that certain design elements (Govers and Mugge 2004; Schifferstein and Zwartkruis-Pelgrim 2008) and intensive experiences (Jung and Soo 2012; Zarantonello and Schmitt 2010) influence the level of attachment positively. Therefore, the present work assumes the following hypothesis:

H4: A product high in DX evokes a higher level of attachment than a product low in DX.

Experiential Value

As illustrated in detail in chapter 4.2.3, Pine and Gilmore (1999) created the idea of experiential value. Experiences provide value and utility similar to utilitarian attributes (Brakus, Schmitt, and Zarantonello 2009). Value – from an experiential perspective – is considered as a key outcome variable in experience research (Babin, Darden, and Griffin 1994; Havlena and Holbrook 1986; Holbrook and Hirschman 1982). Experiential value is related to hedonic responses as well as tangible consequences and is defined as "an interactive relativistic preference experience" (Holbrook and Corfman 1985, p. 40). As DX summarizes sensory, psychological, behavioral, and social reactions evoked by interaction with a design, it is suggested that it influences the experiential value represented by functional, emotional, and social value aspects. Hence, this dissertation proposes the following hypothesis:

H5a-c: A product high in DX creates more emotional (a), functional (b), and social (c) experiential value than a product low in DX.

Purchase Intention

As shown in detail in chapter 4.2.3, purchase intention is a central concern to consumer behavior researchers and industry alike. Purchase intention is defined as an indicator of the

subsequent purchase depending on the psychological reaction to the stimulus (Grewal et al. 1998, p. 339). In the product design context, research investigated for example the effects of product design on purchase behavior in general (Bloch 1995), of package design in particular (Orth and Malkewitz 2008), and of perceived attractiveness and quality based on design (Orth, Campana, and Malkewitz 2010). Taken together, results indicate that design and design elements impact purchase significantly.

Experience research investigated the effect of weak vs. intensive experiences on purchase intentions (Brakus, Schmitt, and Zarantonello 2009; Fiore, Yah, and Yoh 2000; Nambisan and Watt 2011; Pine and Gilmore 1999). Results confirm a positive relationship between experiences and effects on purchase intentions. This leads to the following hypothesis:

> H6: Consumers have a higher purchase intention for a product high in DX than for a product low in DX.

Willingness to Pay a Higher Price

Based on the knowledge that experience leads to pleasurable outcomes, it is expected that consumers want to repeat these experiences (Brakus, Schmitt, and Zarantonello 2009) by e.g., buying a product again (Roster 2001). Therefore, it is more likely that a consumer buys a product with an intense, positive DX again than a product which design does not evoke a DX at all. Consequently, DX not only has an impact on the actual purchase intention, but also may influence repeated or future-purchases. Moreover, based on the same reasons, it is assumed that the consumer is willing to pay a higher price for a product that evokes an intense, positive DX (Orth, Campana, and Malkewitz 2010).

Transferring the above-described knowledge to the DX concept, this dissertation proposes the following hypothesis:

> H7: Consumers are more willing to pay a higher price for a product high in DX than a product low in DX.

Pleasure and Arousal

A further important key finding of previous works, confirmed the proposition that affect (pleasure/arousal) plays a major role in consumer behavior, and consumer and environmental psychology (e.g., Edell and Burke 1987; Holbrook and Batra 1987; Holbrook and Gardner 1993; Laros and Steenkamp 2005; Mehrabian and Russel 1974; Menon and Kahn 2002). It is widely acknowledged that people seek sensory stimulations (McAllister and Pessemier 1982). Furthermore, human beings show negative effects under sensory deprivation (Goldberger

1993). They seek pleasure and want to avoid pain (Freud 1950). Pine and Gilmore (1998, 1999) suggest that the best relationships with customers are affective or emotional in nature. Pullman and Gross (2004) add that, when companies succeed in not only satisfying certain needs but also making the interactions pleasurable, people are more inclined to stay loyal, even when a mistake takes place (Pullman and Gross 2004, p. 558). Tangible attributes of product or service have far less influence on consumer preference than the subconscious sensory and emotional elements derived from the total experience (Zaltman 2003).
In environmental psychology, pleasure and arousal are conceptualized as two orthogonal dimensions of affect (Mehrabian and Russel 1974). While pleasure summarizes the degree to which a person feels happy, joyful, good, or satisfied in a certain situation, arousal refers to the degree to which a person feels active, alert or stimulated. According to Mehrabian and Russell (1974), these two dimensions are said to be independent. That means that one dimension can be high and the other low; e.g., one person may experience a high arousal situation that can be either pleasant or unpleasant. Regarding DX, a product design also can evoke a highly intensive experience (high arousal) that elicits negative emotions (displeasure). Experiential consumer behavior research supports the proposition that emotion is a key link for experience (shopping, brand, etc.) (Brakus, Schmitt, and Zarantonello 2009; Fiore 2008; Holbrook and Hirschman 1982). Hirschman and Holbrook (1982) state that an "interaction with the product, service, and / or shopping environment can be intrinsically satisfying, or satisfying for tis own sake. Searching for sensory or cognitive stimulation and satisfying curiosity are main reasons for shopping" (Fiore 2008, p. 629) (see Figure 22).
Therefore, this dissertation hypothesizes the following:

H8a: A product high in DX has a higher effect on pleasure than a product low in DX.

H8b: A product high in DX has a higher effect on arousal than a product low in DX.

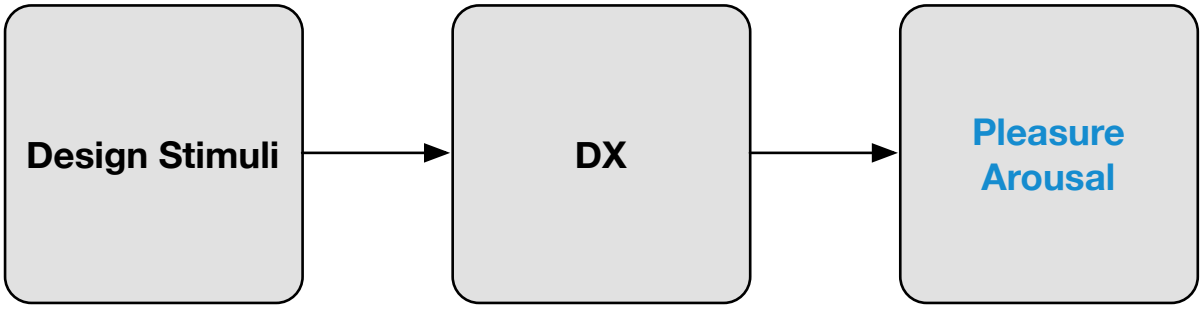


Figure 22: Model of Direct Effects (II)
Source: author's own illustration

5.3.1.2.3 Indirect Effects - Mediation

Besides, the afore-mentioned direct effect of DX on affect, DX is likely to result in further processing and thus affects behavioral outcomes indirectly. As Seva, Duh, and Helander (2007) note, strong affect evoked by e.g., a design influences consumers' purchase intention. According to Baron and Kenny (1986) and Hayes (2009), an indirect effects relation with mediation exist, when the predictor (DX) is statistically related to the mediator (i.e., pleasure, arousal) and the mediator is statistically related to the dependent variable (i.e., purchase intention). Hence, DX is mediated by pleasure and arousal and therefore has an indirect effect on purchase intention mediated by pleasure and arousal. Figure 23 illustrates the relationship. Variable M is considered a mediator if X significantly predicts M, and M significantly predicts Y controlling for X (compare Preacher and Hayes 2004).

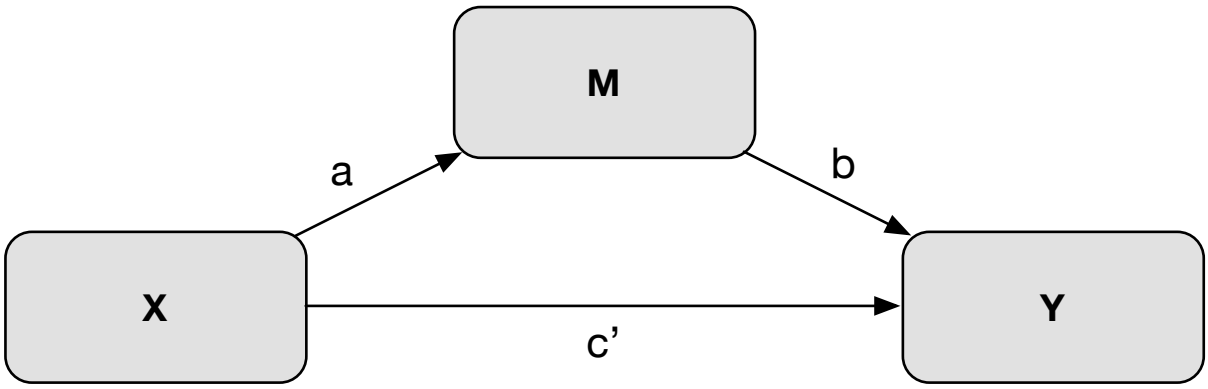


Figure 23: Simple Mediation Model
Source: author's own illustration adapted from Preacher and Hayes 2004, p. 718

The higher the overall score on the DX scale, the more likely the consumer will experience pleasure and / or arousal. Referring to previous research, downstream effects of pleasure on behavioral intention and evaluations are well established (Orth and Wirtz 2014). A possibility to analyze the indirect route is to suppress the affective route by manipulating participants' ability to feel pleasure and arousal by using affect regulation induced by emotional freeze. Manucia, Baumann, and Cialdini (1984) developed the applied emotional freeze method. This method investigates behavioral changes as a function of whether affect regulation is ostensibly possible or impossible. Findings suggest that behaviors that can only be found when affect regulation is possible are motivated by the desire for their affective benefit (Tice, Bratslavsky, and Baumeister 2001) (see Figure 24). Based on these findings, the present work suggests the following hypotheses:

H9: The effect of DX on predictive outcomes will be mediated by pleasure (H9a: liking, H9b: attractiveness, H9c: satisfaction, H9d: attachment, H9e: emotional product value, H9f: functional product value, H9g: social product value, H9h: purchase intention, H9i: willingness to pay a higher price).

H10: The effect of DX on predictive outcomes will be mediated by arousal (H10a: liking, H10b: attractiveness, H10c: satisfaction, H10d: attachment, H10e: emotional product value, H10f: functional product value, H10g: social product value, H10h: purchase intention, H10i: willingness to pay a higher price).

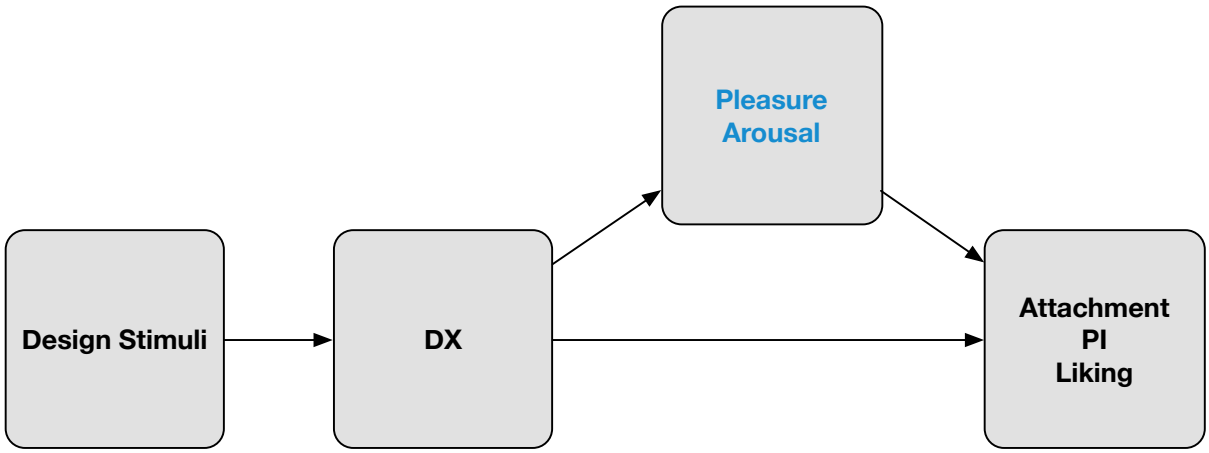


Figure 24: Mediator of Design Experience Effects
Source: author's own illustration

5.3.1.2.4 Interacting Effects - Moderators

Besides the described effects, Study IV investigates possible moderators for the effect of DX on various outcome variables. A moderator is defined as a "variable that affects the direction and /or the strength of the relation between an independent or predictor variable and a dependent variable or criterion variable." (Baron and Kenny 1986, p. 1174) (see Figure 25). As shown in chapter 4.2.4, various person- or context-related moderators could have an influence on the evoked DX and its impact on consumer behavior outcome variables. Due to the complexity and length of Study IV, the present work focuses on the following four possible moderators: involvement, CVPA, absorption, and product category.

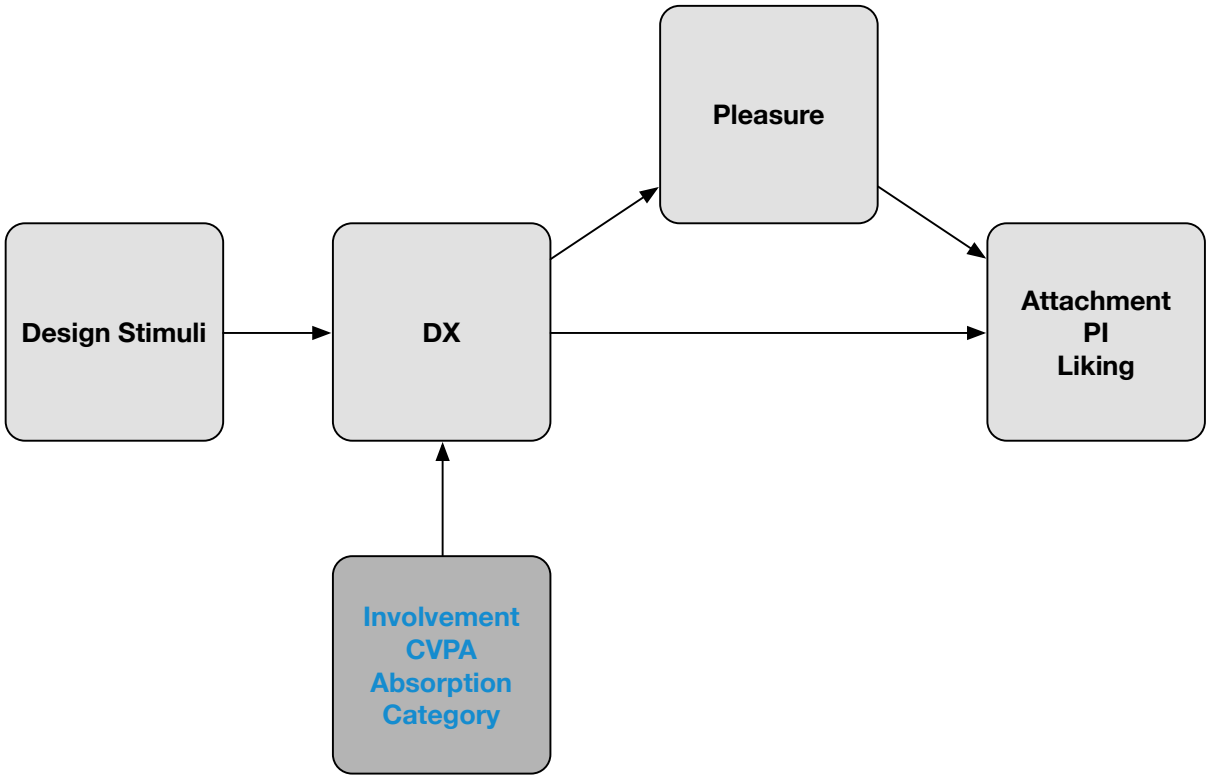


Figure 25: Moderators of Design Experience Effects (Conditional Process Model)
Source: author's own illustration

Involvement

As elaborated in chapter 4.2.4, the concept of involvement describes a person's relevance of an object or product category. This relevance is based on inherent needs, interests, and values (Zaichkowsky 1985). Moreover, the individual level of involvement can be a result of a person-product-interaction (Baumgartner and Steenkamp 2001; Beatty and Talpade 1994; Bloch 1981; Nkwocha et al. 2005). The level of a person's involvement influences significantly the reactions towards brands or products (Dens and Pelsmacker 2010; Goldsmith and Emmert 1991).

Recent studies confirm the notion that product involvement influences product experiences (Zaichkowsky 1985) and also the interaction level with products (Dens and Pelsmacker 2010; Mano and Oliver 1993). Transferring these findings to the car example, this results in a higher level of interaction with the product category cars than a person not involved.

Concluding, a person highly involved is likely to engage in more human-product-interaction and hence, to have a more intense DX than a person who is just mildly involved. Therefore, this dissertation proposes the following hypothesis:

H11: The level of individual involvement moderates the level of evoked DX.

CVPA

As observed in chapter 4.2.4, the importance of product or packaging design for an individual may vary significantly (Bloch, Brunel, and Arnold 2003; Littel and Orth 2013; Lupold 2010; Orth and Malkewitz 2008). Bloch, Brunel, and Arnold (2003) summarized this phenomena as CVPA defining it as "the overall level of significance that visual aesthetics hold for a particular consumer in his/ her relationships with products" (Bloch, Brunel, and Arnold 2003, p. 552). Previous empirical research showed that CVPA is defined by three dimensions: "value", "acumen", and "response" (Bloch, Brunel, and Arnold 2003; Lupold 2010). A high level in CVPA affects consumers' purchasing decisions, their usage of and interaction with products, and also their preferences for brands independent of the product category or setting (Bloch, Brunel, and Arnold 2003).

This research suggests that the personal CVPA score influences the level of evoked sensations, feelings, cognitions, and other relevant reactions by the outer appearance of a product. Hence, it is likely that a person low in CVPA is less stimulated by a design and therefore, interacts not only less but also less intensively with this design. As a result, this person's DX is less intense than a person's DX high in CVPA. This leads to the following hypothesis:

H12: The level of individual CVPA moderates the level of evoked DX.

Absorption

Besides the already mentioned influencing effects involvement and CVPA, this dissertation proposes that absorption characterized as individual difference reflecting consumers' ability to get absorbed by a stimulus, influences the impact DX has on predictor variables. Youn and Faber (2000) suggest that the level of individual response to environmental and sensory cues depends on the individual disposition of being able to get caught up in sensory stimulation. This concept plays an important role regarding individual's responsiveness to sensorial cues. Depending on the degree one is sensitive to sensorial stimuli, the effect of absorption is regulated (Youn and Faber 2000). As not every individual has the ability to get absorbed, some individuals may be excluded from immersive experiences. Hence, it is expected that the effect of DX on predictors to depend on the individual ability to get absorbed by the design of a product. This points to the following hypothesis:

H13: The level of individual absorption moderates the level of evoked DX.

Product Category

Besides involvement, also the product category could influence the impact of DX on consumer behavior. Experience researchers investigated the effects of mundane and extraordinary products on consumer behavior (Richins 1997, 2008). Limon, Orth, and Kahle (2009) differentiated between the effects of hedonic and utilitarian product categories comparing the effect of packaging design on consumer behavior. Also, Orth and Malkewitz (Orth and Malkewitz 2008) showed that consumer responses to packaging design varied dependent on product category analogous to category-specific differences in types of brand personalities (wine and fragrances). Therefore, this research suspects that the product category influences the perception of DX. Hence, this dissertation proposes the following hypothesis:

H14: The type of product category moderates the level of evoked DX.

In summary, a product evokes DX that may be high or low in intensity depending on a certain design. It is expected that the intensity of evoked DX has a main effect on salient consumer behaviors, such as purchase intention. Furthermore, the present work assumes that the intensity of DX has a direct impact on affect (pleasure/arousal) that mediates the relation of DX and outcome variables. Furthermore, it is expected that the effect of DX on predictors to depend on various moderators, such as involvement or the observer's CVPA score.

5.3.1.3 Method

According to established scale development (DeVellis 2003; Netemeyer, Bearden, and Sharma 2003; Nunnally and Bernstein 1994; Thomson, MacInnis, and Park 2005) and design research procedures (Berkowitz 1987; Blijlevens et al. 2012; Bloch, Brunel, and Arnold 2003; Brunel 2006; Desmet, Overbeeke, and Tax 2001; Eckman and Wagner 1994; Mugge, Govers, and Schoormans 2009; Orth and Malkewitz 2008; Veryzer and Hutchinson 1998), Study IV includes the following specific methodological steps:

1. Analysis of reliability, criterion and known-group validity of the DX scale
2. Analysis of factor structure and dimensionality of the DX scale
3. Analysis of discriminant validity
4. Analysis of direct, indirect, interaction and moderating effects

To collect data and evidence that would help to accomplish the various goals of Study IV, students at the University of Kiel were asked to participate in two ostensibly unrelated studies: "Mood Induced Information Processing" and "Perception and Experience of Product

Design". Both surveys took place in the consumer behavior lab of the A&F Marketing department. A total of 79 (M_{age} = 24.63, female = 70.9%) students participated in Study IV for a small compensation (a voucher with a value of EUR 5 for a local coffee chain). Due to mood induction students were asked to come to the A&F Marketing department one at a time. While the participant completed the various questionnaires an investigator was always present to control the mood induction and emotional freeze, as well as to ensure the chronological order of the different questionnaires. The whole study took approximately 30 minutes to complete (see Appendix F for questionnaires). The online questionnaires were programmed in Unipark. The field time was twenty-two days from 5th till the 27th of March 2013.

Study IV had an experimental within-subjects design and consisted of the four following steps (see also Figure 26 and Figure 27):

1) Scenario-based mood induction and short paper pencil questionnaire assessing participants' mood
1) Emotional freeze dependent on condition
2) First online questionnaire assessing DX scale
3) Second online questionnaire assessing participant related characteristics such as absorption

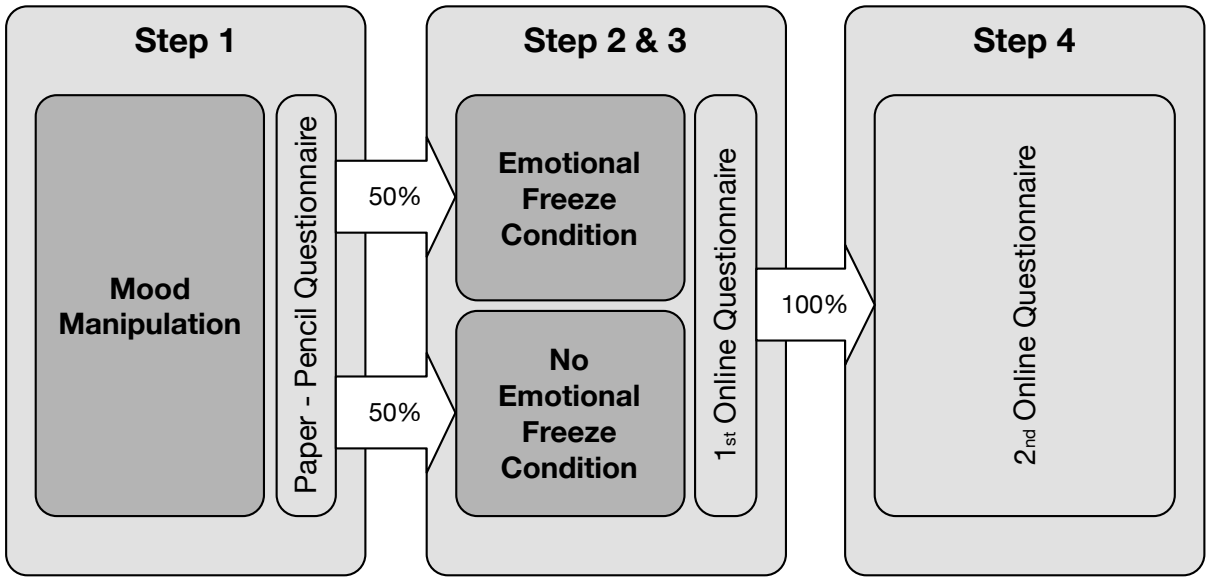


Figure 26: Study IV: Procedure
Source: author's own illustration

To assess the impact of the affective effect, the study was split into two parts: the mood induction part with questions regarding individual characteristics and the experience of

design. For the success of the study, it was essential that participants did not understand the existing connection between the two studies. Therefore, they were invited to the study "Mood Induced Information Processing" and asked to answer a second ostensibly unrelated study while they were waiting to allow the sensory memory of the mood induction scenario to fade. Beside the content-wise split also the layout of both studies differed. The online questionnaire was presented as if it was unrelated to the mood manipulation, but in fact, it was the central part and included all main dependent variables. Participants were randomly assigned to mood-freeze and high / low design experience conditions.

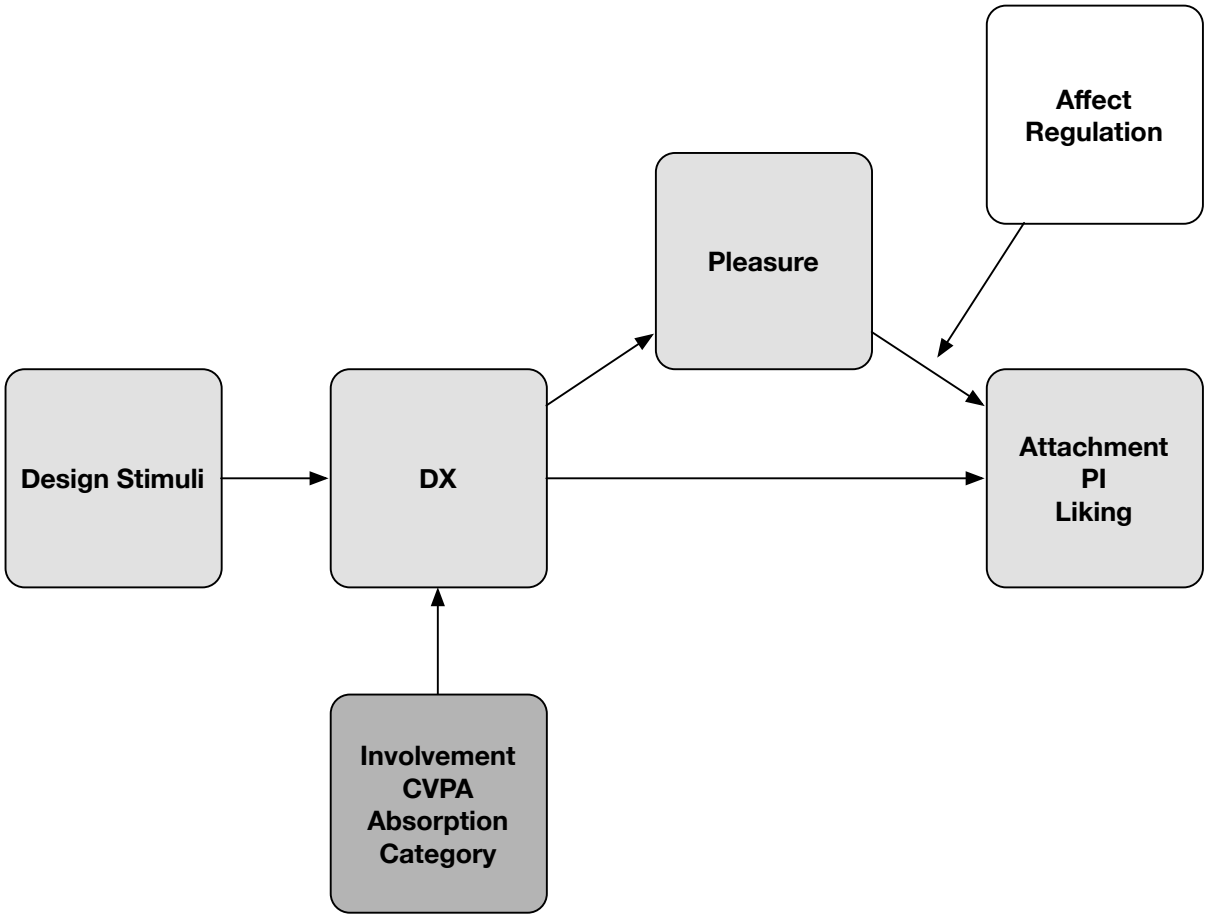


Figure 27: Study IV: Model
Source: author's own illustration

Due to the complex study design, the following part explains each step in detail:

Step 1

Following established procedures (Manucia, Baumann, and Cialdini 1984; Tice, Bratslavsky, and Baumeister 2001; Wenzlaff, Wegner, and Roper 1988) participants' mood was manipulated using a scenario technique (see Appendix F for the scenario) (Wenzlaff, Wegner, and Roper 1988). The instructions for the mood-induction included the attentive reading of a

real-life scenario, the imagining of oneself as main character in the situation, the experiencing and identifying with the emotions evoked by the scenario just read. The participants were then asked to summarize the emotions they felt, to imagine themselves being the main character, and finally, to answer a paper-pencil questionnaire regarding their current mood (see Appendix F for questionnaire). Goal of the mood manipulation was to induce a general sad mood within each participant.

Step 2

The mood-freezing manipulation was introduced just before the experimenter opened the first online survey for the participant. In the mood-freeze condition the investigator asked the participant to read a text about the common believe that product design has a positive effect on one's mood, although scientific evidence points to the contrary (see Appendix F). Representatives of the changeable mood (control condition) received no instruction about the effects of product design on mood (Manucia, Baumann, and Cialdini 1984).

Step 3

Participants were asked to take part in an unrelated study during the waiting period (Tice, Bratslavsky, and Baumeister 2001; Wenzlaff, Wegner, and Roper 1988). According to the experimental within design, they were invited to evaluate the intensity of DX evoked by two product design stimuli of two different categories: water kettle and computer mouse. After reading a short version of the DX definition, each participant first rated a product design stimuli of the category water kettle and then computer mouse. They either saw all main product design stimuli only high in DX or only low in DX. To increase the DX manipulation, a priming effect was used. Each participant first saw four priming pictures and then a picture of the main stimuli. Priming pictures and main stimuli were opposite in DX intensity (Herr 1989; Hoch and Ha 1986; Kreuzbauer and Malter 2005; Veryzer and Hutchinson 1998; Yi 1993). According to design research standards (Blijlevens, Creusen, and Schoormans 2009; Creusen and Schoormans 2005; Fenko et al. 2009) and Study II and III, all logos and brand relevant factors had been removed.

The first online questionnaire contained the following structure (for screenshots of the original survey see Appendix F, for priming and main stimuli see Table 53):

I. Welcome page
II. Short version of DX definition
III. Product category: water kettle
    a. Priming stimuli

b. Main stimuli
c. DX Scale
d. Dependent variables

II. Product category: computer mouse
a. Priming stimuli
b. Main stimuli
c. DX Scale
d. Dependent variables

III. Participant and category related variables (e.g., CVPA, involvement)

Table 53: Study IV: Overview of Priming and Main Stimuli

	Prime 1	Prime 2	Prime 3	Prime 4	Main Stimuli
Low					
High					
Low					
High					

Source: author's own calculation

Step 4

Participants were invited to complete the second, in their opinion actual questionnaire. The last part of the study was designed to assess participant relevant characteristics such as age, sex, and individual ability to absorb (see Appendix F for questionnaire).

5.3.1.3.1 Pretest

Two independent pretests were conducted: one assessing possible stimuli and their DX intensity and the other testing the complex study design of Study IV.

The final stimuli (see Table 54) were the results of an online pretest using Unipark. Participants were invited by e-mail to take part in a short online questionnaire about design perception from the 1st till 13th of February 2013. The test took approximately ten minutes. Each participant (N = 36) had to rate 4 product design stimuli. First, participants were asked to read a short version of the DX definition. Then they were invited to rate the DX of 4 products. Before looking at the main stimuli four priming stimuli of the same category but different in DX intensity were shown; e.g., four times a picture of four different water kettles low in DX and finally one picture of a water kettle high in DX. The order of the main stimuli and categories was fixed: water kettle low, water kettle high, mouse low, mouse high in DX. The pictures used were taken from the picture pool of Study III and if necessary slightly adjusted, e.g., color saturation. To assess the results, two ANOVAs were conducted with DX as dependent variable, once for all product categories together (high /low) and once for each single stimulus as independent variables. The results indicate the success of the DX manipulation across stimuli high/low ($F(1,133) = 88.85$, $p < .001$) with $M_{low} = 1.60$ vs. $M_{high} = 3.19$ (with 1 = "totally disagree" and 7 = "totally agree") and also for single stimuli ($F(3,131) = 29.89$, $p < .001$) with $M_{WK\_low} = 1.63$ vs. $M_{WK\_high} = 3.32$ and M_{M_low} 1.56 vs. $M_{M\_high} = 3.05$.

Table 54: Study IV: Results of Pretest Stimuli Manipulation

	Stimuli	N	Mean	SD	Min	Max	F	p
1		36	1.63*	.71	1.00	4.00	29.89	.000
2		34	3.32*	1.17	1.33	5.33		
3		34	1.56*	.69	1.00	3.25		

	Stimuli	N	Mean	SD	Min	Max	F	p
4		31	3.05*	1.28	1.17	5.83		
DX Low		70	1.56	.69	1.00	4.00	88.85	
DX High		65	3.19	1.22	1.17	5.83		

*The means are significantly different at the 0.05 level.
Source: author's own calculation

To test the full study setup, a second pretest was conducted. Participants (N = 10, M_{age} = 28.10, female = 90%) were asked to take part in a survey at the A&F Marketing department. After the pretest various small modifications were made to optimize the complex procedure.

5.3.1.3.2 Scales

To test the Study IV model empirically, a number of multi-item scales were employed including the twelve-item DX scale. All additional employed scales were pre-tested and validated in previous research. As in Study II and III, smaller modifications were made such as scale shortening due to the length of the whole study and translation into German. To avoid recency and frequency effects, the order of every multi-item battery used in the online questionnaires was randomized. To form composite measures, items were averaged (Orth, Campana, and Malkewitz 2010). All original measurement models were tested in a CFA using AMOS 21 and SPSS 21.

Mood

To measure participants' mood, two different mood scales were used to avoid repetition. Right after the mood induction, participants were asked to answer the five items of the Mood Short Scale (Orth and Wirtz 2014; Peterson and Sauber 1983), e.g., "*Currently I am in a good mood.*", „*After reading this story I feel depressed and sad*.". The second mood scale assessed the global mood, an adaption of the Mood Short Scale (Swinyard 1993). The multi-item semantic differential measures a state of feeling at a particular point in time on a simple good / bad continuum (Swinyard 1993). Factor loadings for the Mood Short Scale exceeded 0.79.

Items were averaged to form a single measure of Mood ($\alpha = 0.78$, explained variance = 60.18%, GFI = 0.97, CFI = 0.97). Also factor loadings for the global mood scale exceeded 0.77. As before, items are averaged to compute a single measure of global mood ($\alpha = 0.86$, explained variance = 71.49%, GFI = 0.96, CFI = 0.97).

Pleasure and Arousal

As in Study III, the 5-point Likert bipolar rating scale PAD developed by Mehrabian and Russel (1974; 1973; 1977) was employed to measure the affective reactions evoked by the stimuli. Again only the dimensions pleasure and arousal were used, represented by a pair of 3 items each, e.g., *"glücklich - unglücklich", "aufgeregt – ruhig*". Responses to each of these scales were scored from 1 ("maximal pleasure" / "maximal stimulation") to 5 ("maximal displeasure" / "minimal stimulation") . Factor loadings exceeded 0.61, and as before the items were averaged to form two single measures of pleasure ($\alpha = 0.85$, explained variance = 76.92%, GFI = 0.96, CFI = 0.96) and arousal ($\alpha = 0.69$, explained variance = 61.51%).

Attractiveness, Attachment, Purchase Intention, Willingness to Pay a Higher Price. and Liking

To measure product attractiveness, a two item seven-point semantic differential was employed (Hirschman 1986): *"attractive/not attractive", "low /high price level"*. To evaluate product attachment, a version of the Product Attachment Scale (Mugge, Schoormans, and Schifferstein 2008) consisting of three items was included: "*This product is very dear to me.", "I have a bond with this product.", "This product has a special meaning to me."* (1 = "completely disagree" and 7 = "completely agree", $\alpha = 0.87$, explained variance = 84.90%, GFI = 1.00, CFI = 1.00). Consumer purchase intention was measured using a single seven-point Likert item (Baker and Churchill 1977). To assess consumer price expectation, participants were asked to indicate their expected prices for the stimulus displayed in an open-ended question (Jun, MacInnis, and Park 2005; Orth, Campana, and Malkewitz 2010). General evaluation as well as satisfaction was operationalized using one single item on a seven-point Likert scale (1 = "completely disagree" and 7 = "completely agree"). The use of single-item scales appears appropriate in this context given their concrete particular meaning (Bergkvist and Rossiter 2007; Orth, Campana, and Malkewitz 2010).

Emotional, Functional, and Social Product Value

To measure product value, an eight item scale representing the three product value dimensions: "functional value – performance/quality", "emotional value", "social value" was used (Sweeney and Soutar 2001). Answers were measured on a seven-point Likert scale (1 =

"completely disagree" and 7 = "completely agree") (e.g., "*has consistent quality", "would make me feel good", would give its owner social approval*"). Factor loadings exceeded 0.71, and as before the items were averaged to form single measures of product value (α = 0.93, explained variance = 86.09%; GFI = 0.93, CFI = 0.97).

Involvement

Involvement was operationalized by a four item scale based upon Beatty and Talpade's (1994) work and Trommsdorff's (2008) translation. The 7-point Likert scale (1 = "completely disagree" and 7 = "completely agree") scale measures a person's interest in some specific category of products (Baumgartner and Steenkamp 2001; Beatty and Talpade 1994; Bloch 1981). Factor loadings exceeded 0.94, and as before the items were averaged to form a single measure of involvement (α = 0.87, explained variance = 98.01%, GFI = 1.00, CFI = 1.00).

CVPA

Participants were asked to rate their individual aesthetic consciousness on Bloch, Brunel, and Arnold's (2003) CVPA scale. The eleven-item CVPA scale assesses individual differences in importance of product aesthetics to consumers (1 = "completely disagree" and 7 = "completely agree"). Previous empirical research showed that these items have loaded onto three dimensions: "value", "acumen", and "response" (Bloch, Brunel, and Arnold 2003; Lupold 2010). Factor loadings exceeded 0.59, and as before the items were averaged to form a single measure of CVPA (α = 0.91, explained variance = 73.72%, GFI = 0.87, CFI = 0.91).

Absorption

Absorption as an individual disposition was assessed as possible moderating influence. To measure absorption, the ability to get caught up in sensory stimulation, a shortened version of the Tellegen Absorption scale was employed. The scale consists of twelve items representing the three dimensions: "responsiveness to engaging stimuli", "synesthesia", "oblivious / dissociative involvement". Previous research confirmed the relation between the ability to get absorbed, the broader trait openness to experience, and hypnotizability (Glisky et al. 1991; Jamieson 2006; Ritz and Dahme 1995; Tellegen and Atkinson 1974; Youn and Faber 2000). Factor loadings exceeded 0.62, and as before the items were averaged to form a single measure of absorption (α = 0.82, explained variance = 49.97%, GFI = 0.83, CFI = 0.75).

Finally, participants indicated their age and sex.

5.3.1.4 Results

The following chapter is divided into three subchapters: first general results, second DX scale related results, and third, results of direct, mediating and moderating effects.

5.3.1.4.1 General Results

Due to the control field setting just two participants had to be dropped out because of too many missing values.

Reliability

First, to test the quality of the applied measurement, Cronbach's alpha reliability coefficient of all scales was analyzed. Cronbach's alpha is used as a major indicator for a scale's internal consistency reliability (Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005). It represents the homogeneity of the items within a scale. Hence, a high reliability coefficient suggests that all items measure the same construct (DeVellis 2003).
The reliability coefficient Cronbach's alpha of all scales was good, exceeding 0.77, except the following scales: arousal (0.66) and absorption (0.66 - 0.76).
To further test the adequacy of the original measurement models, a CFA using AMOS 21 and SPSS 21 was employed. The GFI is good to great for all scales (0.83 - 0.97 /1.00) and the CFI acceptable to great (0.66 - 0.97 /1.00) (Hair, Babin, and Anderson 2010).

DX Manipulation

A set of manipulation checks was conducted. An analysis of the DX scores indicated that the stimuli were different in perceived DX intensity as intended (M_{low} = 1.99; SD = 0.87; M_{high} = 3.57, SD = 1.26, from 1 = "totally disagree " to 7 = "totally agree"). To determine the success of the DX manipulation, Linear Mixed Models (LMM) instead of ANOVA[22] were employed with the stimuli as factor and the DX score as dependent variable.
Results demonstrate a significant effect with DX low stimuli resulting in a lower DX score than DX high stimuli ($b = -1.63$, $t(153) = -9.54$, $p < 0.001$).
Apart from LMM, various analyses (ANOVA, descriptives) have been conducted to further analyze the stimuli. Resuts of the LMMs can be confirmed ($F(1,153) = 90.96$, $p <= 0.001$, M_{low} = 1.995 vs. M_{high} = 3.567). All results can be found in Table 55.

[22] Due to the study design of Study IV each participant rated the design of two different products. Therefore, this dissertation employed LMM instead of the usual ANOVA.

Table 55: Study IV: Results of Stimuli Manipulation

	Stimulus	Mean	SD	F	p	Min	MAX	N
low		1.99	.89	83.26	.000	1.00	5.17	82
high		3.57	1.3			1.33	6.33	76
low		2.10	.91	68.06	.000	1	4.86	41
high		3.94	1.1			1.29	5.64	38
kettle		2.98	1.4					79
low		2.16	.93	18.66	.000	1	5	41
high		3.27	1.3			1.5	6.21	38
mouse		2.69	1.3					79

Notes: High ratings are associated with higher DX.
Source: author's own calculation

Mood and Emotional Freeze Manipulation

Besides the stimuli, also the participants' mood was manipulated. The general mood after the mood induction was negative (M_{Mood1} = 2.88, from 1 = "totally disagree" to 7 "totally agree"), as intended. In line with literature (Tice, Bratslavsky, and Baumeister 2001; Wenzlaff, Wegner, and Roper 1988), the findings constitute evidence that the mood induction was successful (see Table 56).

Table 56: Study IV: Results of Mood Manipulation

	N	Mean	SD	Min	Max
Mood 1	79	2.88	1.08	1	5.5

Source: author's own calculation

To analyze the success of the emotional freeze manipulation, an ANOVA was employed with the randomly assigned emotional freeze as independent variable and the global mood as dependent variable. The results demonstrate a significant effect of the treatments on mood

($F(1,77) = 4.73$, $p < 0.05$, $M_{EmotionalFreeze} = 3.24$ vs. $M_{No\text{-}EmotionalFreeze} = 3.58$) with lower mood scores for participants in the mood freeze condition ($M_{EmotionalFreeze} = 3.24$) than with participants in the none freeze condition ($M_{No\text{-}EmotionalFreeze} = 3.58$). The results indicate that the emotional freeze was successful (compare Table 57).

Table 57: Study IV: Results of Emotional Freeze Manipulation

EF	N	Mean	SD	Min	Max	F	p
No	40	3.58	.73	2.25	5.00	4.732	.033
Yes	39	3.24	.68	1.50	5.00		

Source: author's own calculation

5.3.1.4.2 Analysis of the DX Scale

To validate the DX scale further, the present work analyzed first its reliability and criterion validity, second its dimensional structure, and third its discriminant validity. The following part introduces the results step by step:

Reliability, Criterion and Known-Group Validity

To retest reliability of the scale, a modified set of product designs, a new displaying method and a new selection of participants was employed in Study IV. As in Study III, this research examined the respondent and stimuli independency of the scale items and hence could confirm the scale's generalizability. Both Cronbach's alphas of the DX scale exceeded 0.9 ($\alpha_{water\ kettle} = 0.90$, $\alpha_{computer\ mouse} = 0.92$). Comparing Cronbach's alpha of Study II, Study III and Study IV, consistently a high reliability of the DX can be demonstrated ($\alpha_{StudyII} = 0.93$, $\alpha_{StudyIII} = 0.97$, $\alpha_{StudyIV} = 0.90$ -0.91).

In order to check criterion validity of the DX scale, the mean value of the DX scale for all four main stimuli (2 water kettles and 2 computer mice) was calculated. Ratings on the stimuli supposed to trigger intense DX were high and consistent ($M_{water\ kettle\_high} = 3.9$, $M_{computer\ mouse\_high} = 3.3$), while ratings for stimuli triggering low DX were low and consistent ($M_{water\ kettle\_low} = 2.1$, $M_{computer\ mouse\_low} = 2.2$) (compare results of Table 55). Results show that product designs high in DX had higher mean scores than product designs low in DX.
To show that participants used the DX scale independently of the product category, this work compared the DX results of water kettle and computer mouse. Results indicate that participants use the DX scale consistently to rate DX independent of the product category.

To analyze known-group validity, two groups of population that are supposed to rate high respective low on the DX scale independent of the DX itself are compared. As presented, depending on one's individual traits people are more interested and sensitive for design than others. Based on the CVPA score of Bloch, Brunel, and Arnold (2003), this research compared the mean value of the DX scale of people low and high in CVPA. Two ANOVAs were employed with the CVPA score as independent variable, and the consumer ratings on DX as dependent variable. The results show a significant effect between the group CVPA low and CVPA high for both product categories: water kettle ($F(1,58) = 9.48$, $p = 0.03$, $M_{CVPALow} = 2.25$, $M_{CVPAHigh} = 3.28$, from 1 = "completely disagree" and 7 = "completely agree") and computer mouse: ($F(1,58) = 8.975$, $p = 0.04$, $M_{CVPALow} = 2.17$, $M_{CVPAHigh} = 3.13$, from 1 = "completely disagree" and 7 = "completely agree").
Results indicate a significant, assumed difference between the two groups low and high in CVPA and therefore, known-group validity can be confirmed.

Dimensional Structure: EFA & CFA

According to established scale development procedures (Bloch, Brunel, and Arnold 2003; Brakus, Schmitt, and Zarantonello 2009; Mugge, Govers, and Schoormans 2009; Netemeyer, Bearden, and Sharma 2003; Thomson, MacInnis, and Park 2005) as well as Study III, various factor analyses were conducted. First an EFA with Promax rotation was conducted resulting in a clear five-factor structure explaining 91.12% of variance (KMO = 0.86, converged in 7 rotations; cutoff criteria > 0.5) (Brakus, Schmitt, and Zarantonello 2009; Thomson, MacInnis, and Park 2005). All factors are easy to interpret, confirm the theoretical assumptions and results of Study I-III. The Factor "behavior" differs slightly from the results of Study III and again is a mixture content-wise of two different groups of items (activation and behavior):

Factor one: "behavior"
Factor two: "social interaction"
Factor three: "cognitive"
Factor four: "affective"
Factor five: "sensory"

Factor loadings (0.73 – 1.04), Cronbach's alpha (0.84 - 0.97), inter-item correlations (0.72 - 0.95) are general high to very high (see table Table 58 and table Table 59). CFA results in acceptable to great model fit indices (GFI = 0.89, CFI = 0.96) (Hair, Babin, and Anderson 2010) (see Figure 28).

Table 58: Study IV: Results of 1st EFA - Dimensions

	1	2	3	4	5
DX Beh 36	**1.01**	-.04	.01	-.00	-.03
DX Beh 52	**.98**	-.02	.04	-.03	.01
DX Beh 33	**.94**	.03	-.01	-.01	.00
DX Beh 50	**.89**	.03	-.03	.05	.02
DX Soc 19	.032	**.96**	-.08	-.02	.02
DX Soc 23	-.01	**.95**	.09	.02	-.04
DX Cog 41	.02	-.12	**.97**	-.00	-.01
DX Cog 5	-.01	.15	**.87**	.01	.03
DX Aff 38	-.08	-.03	.02	**.99**	.05
DX Aff 2	.16	.04	-.02	**.86**	-.06
DX Sen 30	-.04	-.07	.03	-.01	**1.04**
DX Sen 32	.17	.130	-.04	.04	**.73**

Converged after 7 rotations
Source: author's own calculation

Table 59: Study IV: Results of 1st EFA - Cronbach's Alpha

Factor	N	Cronbach's Alpha	Item	Mean	SD	Inter-Item-Correlation
Affective	158	.89	DX Aff 2	2.41	1.51	.81
			DX Aff 38	2.32	1.87	.95-.84[a]
Behavioral	158	.97	DX Beh 33	3.18	2.16	
			DX Beh 36	3.22	2.23	
			DX Beh 50	3.26	2.28	
			DX Beh 52	3.17	2.16	
Cognitive	158	.84	DX Cog 5	2.61	1.83	.72
			DX Cog 41	2.91	1.94	
Social Interaction	158	.91	DX Soc 23	2.37	1.68	.84
			DX Soc 19	2.35	1.77	
Sensory	158	.88	DX Sen 30	2.72	1.82	.79
			DX Sen 32	2.49	1.71	

Source: author's own calculation

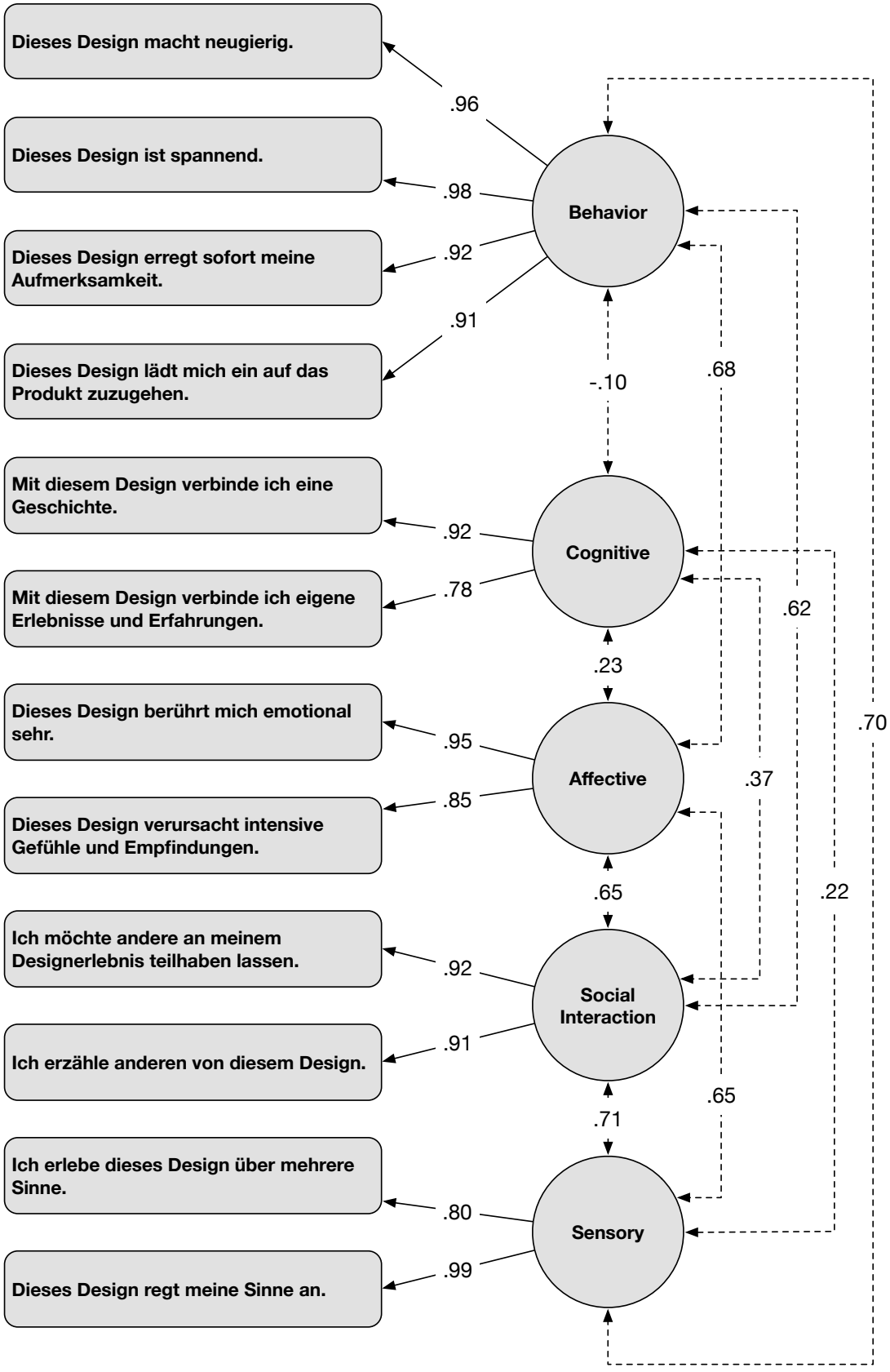


Figure 28: Study IV: Results of the 1st CFA
Source: author's own calculation

Like in Study III, another factor analysis was conducted in order to test whether factor one is a second-order factor. After Promax rotation, results revealed a clear two-factor structure: Factor one ("behavior"), factor two ("activation") explaining 81.38% of the variance (see Table 60).

Table 60: Study IV: Results of Second-Order EFA

Item	1	2
Dieses Design lädt mich ein, auf das Produkt zu zugehen. (52)	**.90**	.53
Dieses Design hat sofort meine Aufmerksamkeit erregt. (50)	**.72**	.52
Dieses Design macht neugierig. (33)	.56	**.73**
Dieses Design ist spannend (36)	.48	**.70**

Source: author's own calculation

A CFA was conducted to test the second-order model. Results show great model fit indices (GFI = 0.93, CFI = 0.98) (see Figure 29).

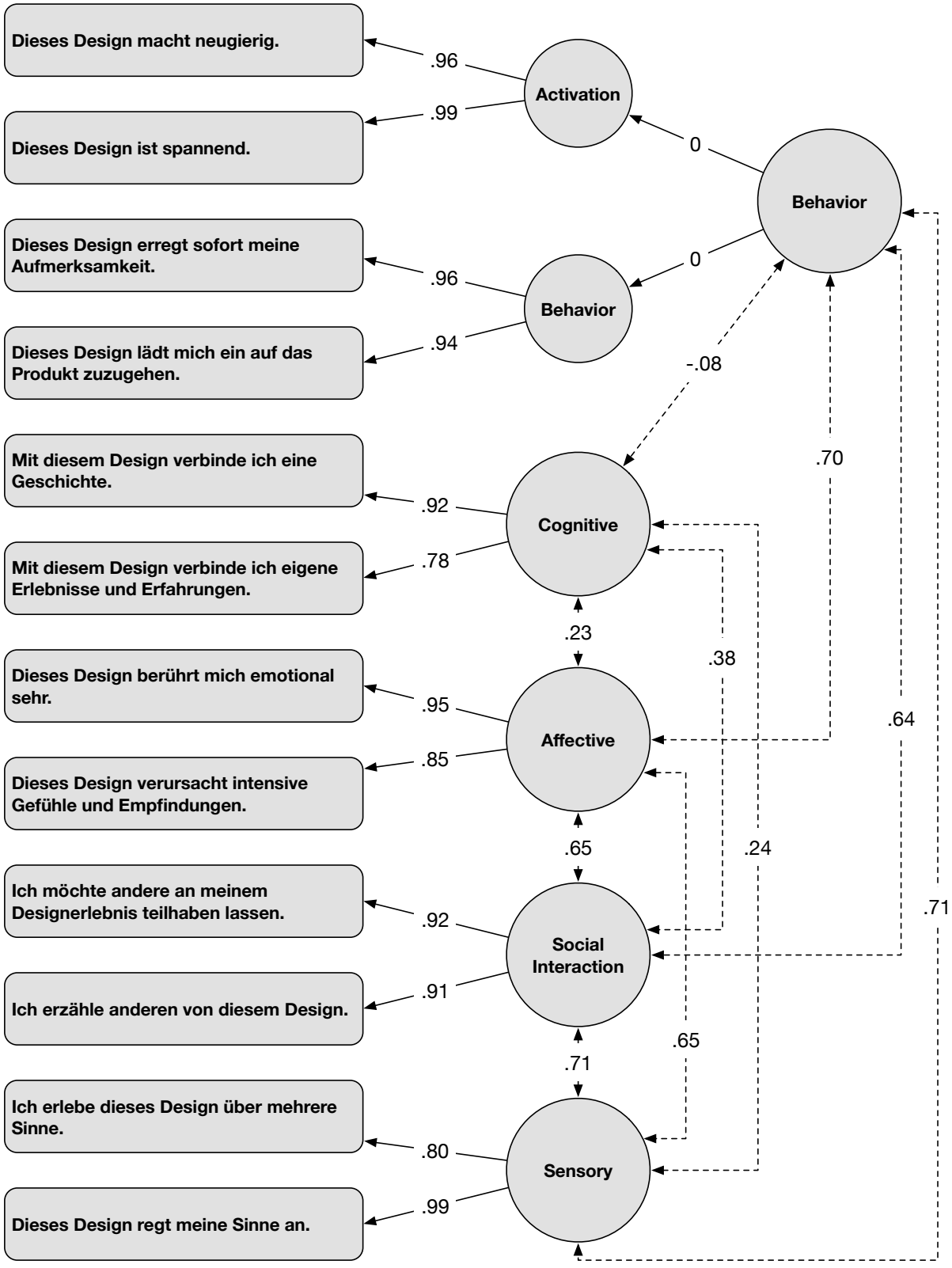


Figure 29: Study IV: Results of the 2nd CFA: First- and Second-Order Factors
Source: author's own calculation

Table 61: Inter-Item Correlation Matrix Dimension Behavior

Behavior	DX Beh 33	DX Beh 36	DX Beh 50	DX Beh 52
33	1.00	.95	.87	.84
36	.95	1.00	.89	.88
50	.87	.89	1.00	.90
52	.84	.88	.90	1.00

Source: author's own calculation

To sum up, the twelve-item DX scale exhibited high consistency and reliability (Cronbach's alpha = 0.91). Results of EFA and CFA are satisfactory to very satisfactory and a five-factorial structure with one second-order factor could again be confirmed. In contrast to Study III, this time the factor is composed of behavioral and activating items. This composition is in line with theory.

Further, all factors have high Cronbach's alphas as well as their items load high. Therefore, it can be concluded that the DX scale is highly consistent and reliable.

Discriminant Validity

To further validate the DX scale, its discriminant validity was assessed by an EFA including DX and concepts such as satisfaction, overall liking, and involvement (Brakus, Schmitt, and Zarantonello 2009). Results of the EFA using an oblique rotation showed satisfactory results (Promax, explained variance = 84.59%, KMO = 0.82). A CFA was not attempted due to the considerable data requirements such an analysis demands. Therefore, neither the number of factors nor which items loaded on which construct were specified a priori. Results of the EFA show a clear four-factor structure: factor one: "satisfaction", "liking"; factor two: "DX" dimensions besides "cognition"; factor three: DX dimension "cognition"; factor four: "involvement". All factor loadings are high on one factor and low on the other factors (compare Table 62 for results).

Summarizing, it can be said that the DX scale is clearly empirically distinguishable from related constructs, such as e.g., satisfaction. Further, four of the five DX dimensions load onto one factor. Only the "cognitive" dimension loads on its own distinct factor. This seems to be counterintuitive and cannot be backed up by literature and therefore, should be investigated separately in a follow up study.

Table 62: Results of Discriminant Validity

Factor	1	2	3	4
Satisfaction	**.92**	.05	-.06	-.04
Likability	**.85**	.12	-.12	-.05
DX Affection	-.15	**.94**	.06	-.01

Factor	1	2	3	4
DX Social Interaction	.00	**.84**	.19	.00
DX Sensory	.07	**.74**	.12	.11
DX Behavior	.30	**.64**	-.31	-.05
DX Cognition	.06	.18	**.98**	-.06
Involvement	.00	.05	-.07	**.99**

Source: author's own calculation

5.3.1.4.3 Predictive Ability: Direct Effects

Direct Effects - Predictive Validity: H1-H7

First Hypothesis H1 – H7 are analyzed. Hypotheses H1 – H7 predict that the degree of DX has significant effects on different outcome variables. To test this proposal various sets of Linear Mixed Models (LMMs) were conducted.

Due to the complex within-subject design and hence the special requirements of the resulting correlated data, this dissertation applies LMMs (compare Landwehr, Herrmann, and Heitmann 2008). Each participant was requested to look at two different stimuli from two product categories, first water kettle and second computer mouse. Each time the participant was asked to rate the DX of each stimulus and subsequently a set of outcome variables. Therefore, ratings are a result of repeated measurement on each subject (DX and outcome variables from two product categories). Ratings from one person are more similar than ratings from different persons and hence, are not independent. Therefore, data is correlated and data analysis requires LMMs instead of regression or ANOVA analysis (Landwehr, Herrmann, and Heitmann 2008).

A mixed-effects model consists of two parts, fixed effects and random effects. Fixed-effects terms are usually the conventional linear regression part, and the random effects are associated with individual experimental units drawn at random from a population. The random effects have prior distributions whereas fixed effects do not. Mixed-effects models can represent the covariance structure related to the grouping of data by associating the common random effects to observations that have the same level of a grouping variable.

The standard form of a linear mixed-effects model is:

$$Y_{ij} = \beta_1 + \beta_2 * t_{ij} + b_{1i} + b_{2i} * t_{ij} + e_{ij}$$

β represents fixed-effects that are all the same for the population. b represents the random effects that vary depending on the subjects. The index i (i = 1, ..., n) represents each single individual. The variable t symbolizes the time of measurement j (j = 1,..., k) for every individual i. The observation error term e_{ij} includes all deviations of the fixed and random effects.

Applying LMMs, results of Study IV confirm the claim that a product design high in DX has a significant effect on all dependent variables tested: liking (H1), attractiveness (H2), satisfaction (H3), attachment (H4), perceived emotional product value (H5a), perceived functional product value (H5b), perceived social product value (H5c), purchase intention (H6), and willingness to pay a higher price (H7).

Looking at the results in detail, DX has a significant effect on liking ($b = 1.02$, $t(152) = 11.52$, $p < 0.001$), attractiveness ($b = 0.97$, $t(156) = 12.84$, $p < 0.001$), satisfaction ($b = 0.52$, $t(155) = 80.21$, $p < 0.001$), and attachment ($b = 0.97$, $t(156) = 12.84$, $p < 0.001$). Results indicate further a significant effect on all product value dimensions: perceived emotional product value ($b = 0.90$, $t(156) = 12.25$, $p < 0.001$), perceived functional product value ($b = 0.40$, $t(156) = 5.72$, $p < 0.001$), and perceived social product value ($b = 1.00$, $t(150) = 11.47$, $p < 0.001$). Also for purchase intention ($b = 0.67$, $t(156) = 7.85$, $p < 0.001$) and on willingness to pay a higher price ($b = 0.27$, $t(153) = 3.45$, $p < 0.01$) a significant effect can be observed (compare Table 63).

To sum up, the DX scale is a valid measurement to predict salient outcome variables such as satisfaction and purchase intention.

Table 63: Results of Hypotheses Direct Effects (H1 - H7)

Hypothesis		b	SE	df	T	F	p
H6	Purchase Intention	.67	.09	156	7.85	61.64	.000
H1	Liking	1.02	.09	152	11.51	132.67	.000
H2	Satisfaction	.97	.09	155	10.60	112.25	.000
H3	Attractiveness	.97	.08	156	12.84	164.84	.000
H4	Attachment	.52	.06	155	8.21	67.37	.000
H5a	Emotional Product Value	.90	.07	156	12.25	150.01	.000
H5b	Functional Product Value	.40	.07	156	5.72	32.71	.000
H5c	Social Product Value	1.00	.09	150	11.47	131.48	.000
H7	Willingness to Pay a Higher Price	.27	.08	153	3.45	11.87	.001

a = z-scores
Source: author's own calculation

Direct Effects: Pleasure (H8a) & Arousal (H8b)

To test the influence of DX on pleasure (H8a) and arousal (H8b) again a set of LMMs was conducted. An overview of these results is presented in Table 64.

Summing up, DX has a significant effect on both affective dimensions, pleasure ($b = 0.43$, $t(156) = 7.01$, $p < 0.001$, with $M_{Pleasure\text{-}DXLow} = 2.93$ vs. $M_{Pleasure\text{-}DXHigh} = 3.40$ with 1 =

"unhappy" and 5 = "happy") and arousal (b = 0.46, t (154) = 6.49, p < 0.001, with $M_{Arousal\text{-}DXLow}$ = 2.51 vs. $M_{Arousal\text{-}DXHigh}$ = 3.08 with 1 = "calm" and 5 = "aroused").

Table 64: Results of Hypotheses Direct Effects (H8a & H8b)

Hypothesis		b	SE	df	T	F	p
H8a	Pleasure	.43	.06	156	7.01	49.88	.000
H8b	Arousal	.46	.07	154	42.15	132.67	.000

a = z-scores
Source: author's own calculation

5.3.1.4.4 Predictive Ability: Indirect Effects

Hypotheses H9a – H9i and H10a – H10i suggest an indirect effects model, whereby the relationship between DX and various salient outcomes is transmitted by pleasure and / or arousal. Recent scientific research in psychology (Preacher and Hayes 2004; Rucker et al. 2011; Shrout and Bolger 2002) recommends that mediation analyses be based on formal significance tests (Sobel) supplemented by bootstrapping (Edwards and Lambert 2007). Through the application of bootstrapped confidence intervals (CIs), it is possible to avoid power problems introduced by asymmetric and other non-normal sampling distributions of an indirect effect (MacKinnon et al. 2002). Taking the special design of Study IV into account, additionally LMMs were conducted.

Indirect Effects - Mediation: Pleasure (H9a –H9i)

First, the next chapter summarizes the results for hypotheses H9a – H9i and introduces more in detail the results of the relation between pleasure and purchase intention exemplarily for all outcome variables (for all results see Table 64 – Table 72):

DX is positively associated with pleasure, as indicated by a significant unstandardized regression coefficient (b = 0.43, p < 0.001). Also, the positive relationship between pleasure and purchase intention, controlling for DX, was supported (b = 0.57, p < 0.001). And finally, DX had an indirect effect on purchase intention, and this indirect effect was positive (0.25), as hypothesized. The formal two-tailed significance test (assuming a normal distribution) demonstrated that the indirect effect was significant (Sobel z = 5.08, p < 0.001). Bootstrap results confirmed the Sobel test (see lower half of Table 65), with a bootstrapped 99% CI around the indirect effect not containing zero (0.15, 0.36). Thus, hypothesis H9h received support.

Table 65: Simple Mediation Effects on Purchase Intention (H9h)

Variable			*B*	*SE*	*t*	*p*
Direct and total effects						
DX -> Purchase intention			.53	.07	7.70	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Purchase intention, controlling for DX			.57	.08	7.34	.0000
DX -> Purchase intention, controlling for Pleasure			.28	.07	4.12	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.25	0.48	.15	.34	5.08	.000
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.2462	.04	.15	.36		

Source: author's own calculation

As summarized in Table 65 and Table 81 - Table 86 in Appendix G, all results for hypothesis H9a-H9f and H9h are positive and significant (Sobel test and bootstrap results). That means that pleasure mediates the effect of DX on liking, satisfaction, attraction, attachment, emotional, and functional product value.

Based on the results of Study IV, the hypothesis H9g and H9i could not be confirmed. Although a low positive relationship between pleasure and social product value (H9g), controlling for DX, could be found (b = 0.06), it was not significant. The same results can be reported for the relationship between pleasure and willingness to pay a higher price (H9i) (b = 0.14) (see Table 87 and Table 88 and in Appendix G)

Indirect Effects - Mediation: Arousal (H10a – H10i)

Second, the following presents the results for hypotheses H10a – H10i. In contrast to pleasure, arousal plays a less important role. DX is also positively associated with arousal, as indicated by a significant unstandardized regression coefficient (b= 0.46, $p < 0.001$). However, there are no significant and positive relationships between arousal and outcome variables. Only for purchase intention (b = -0.18, $p < 0.05$) (10a) and emotional product value (b = -0.15, $p < 0.05$) (10f) a significant, but negative effect can be reported (see Table 66 and Table 93 in Appendix G). DX has a low indirect effect on purchase intention (-0.08) and emotional product value (-0.07). But, these indirect effects are negative. The formal two-tailed significance test (assuming a normal distribution) demonstrated that the indirect effect was significant (Sobel $z_{PI} = -2.19$, $p < 0.05$; Sobel $z_{EPV} = -2.16$, $p < 0.001$). Bootstrap results confirmed the Sobel test, with a bootstrapped 95% CI around the indirect effect not containing zero (-0.16, -0.01; -0.13; -0.01). Thus, hypothesis H10e and H10h received

support. All other hypotheses H10a - H10d, H10f, H10g, and H10i could not be confirmed (compare Table 89 - Table 96 in Appendix G).

Table 66: Simple Mediation Effects on Purchase Intention (10h)

Variable			*B*	*SE*	*t*	*p*
Direct and total effects						
DX -> Purchase intention			.52	.07	7.70	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Purchase intention, controlling for DX			-.18	.08	-2.35	.0199
DX -> Purchase intention, controlling for Arousal			.61	.08	8.01	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.08	.04	-.16	-.01	-2.19	.0286
Bootstrap results for indirect effect						
	M	SE	LL 95 % CI	UL 95 % CI		
Effect	-.08	.04	-.16	-.01		

Source: author's own calculation

To further test the role of pleasure as an indirect route, participants' affect was regulated during the data collection. This dissertation proposed that participants whose affect regulation was manipulated using emotional freeze experienced less affect: pleasure and / or arousal. Although the manipulation was successful, and affect regulation had a significant effect on the experienced DX of stimuli high in DX [($b = 0.75$, $t(69) = 3.86$, $p < 0.001$) vs. DX of stimuli low in DX ($b = 0.21$, $t(80) = 1.46$, p = n.s.)] and arousal [($b = 0.72$, $t(74) = 3.45$, $p < 0.01$) vs. DX of stimuli low in DX ($b = 0.05$, $t(80) = 0.26$, p = n.s.)], results could not support the claim of the effect on pleasure [($b = 0.14$, $t(71) = 0.71$, p = n.s.) vs. DX of stimuli low in DX ($b = 0.074$, $t(76) = 0.41$, p = n.s)]. Additionally, no further effects could be found. Therefore, the present work does not report further about affect regulation but focuses on the results of established mediation analysis.

5.3.1.4.5 Analysis of Moderators: H11 – H14

Hypotheses H11-H14 claim that individual differences in involvement (H11), CVPA (H12) and absorption (H13) as well as different product categories (H14) moderate the effect of DX on the predictor mentioned.

Therefore, another set of stepwise LMMs were performed following the procedure suggested by (Frazier, Tix, and Barron 2004; Landwehr, Herrmann, and Heitmann 2008). First, the predictor and moderator variables were assessed. Second, all moderator effects were entered based on the first step.

Results indicate that the influence of the interaction of stimuli with each single moderator variable on DX is significant. Results are described in detail in the following section.

Results reveal a significant interaction effect between stimuli and absorption on DX ($b = -0.25$, $t(148) = -2.41$, $p < 0.05$), as well as between stimuli and involvement on DX ($b = 0.15$, $t(139) = -2.38$, $p < .001$). Further, the effect of the interaction between stimuli and CVPA on DX ($b = 0.13$, $t(148) = 1.55$, $p < 0.05$), and between stimuli and product category on DX ($b = 1.58$, $t(148) = 1.60$, $p < 0.05$) are also significant.
Results of step 3 indicate interactive effects between certain moderator variables: between absorption and involvement ($b = -0.15$, $t(148) = -2.45$, $p < 0.05$) and between involvement and product category ($b = 0.98$, $t(148) = 3.04$, $p < 0.001$). Table 67 presents the results of the three-step LMM.

Together, these findings indicate that an interaction effect influences the relationship between perceived stimuli and experienced DX depending on certain individual dispositions. That means that a higher level of importance of visual design (CVPA) and a higher level of category involvement intensifies the experience of design. In contrast a higher ability to absorb has a negative effect on DX. Accordingly, a person who can easily feel and experience synesthesia, has a higher responsiveness to engaging stimuli and can dissociate from his surroundings, thus experiencing less DX. This seems counterintuitive and cannot be confirmed in literature. Besides the individual characteristics, also the product category in close relation with involvement plays an important role in moderating the effect on DX.

Table 67: Moderating Effects on DXs (H11 - H14)

Step and Variable		B	SE	df	T	F	p
Step 1							
	Stimuli	-1.45	.16	150.40	-9.09	82.62	.000
	Absorption	-.14	.09	150.77	-1.60	2.57	.111
	Involvement	.20	.05	139.49	4.40	19.37	.000
	CVPA	.19	.07	151.63	2.75	7.58	.007
	Product Category	.05	.16	151.66	.31	.10	.756
Step2							
	Stimuli[a] * Absorption	-.25	.10	147.86	-2.41	3.16	.045
	Stimuli[a] * Involvement	.15	.06	138.71	2.38	13.00	.000
	Stimuli[a] * CVPA	.13	.08	147.80	1.55	4.27	.016
	Stimuli[a] * Product Category[b]	1.58	.99	147.99	1.60	2.74	.045
Step 3							
	Absorption * Involvement	-.15	.06	147.98	-2.45	5.99	.016

Step and Variable		B	SE	df	T	F	p
	Absorption * CVPA	-.10	.07	140.17	-1.42	2.03	.157
	Absorption * Product Category[b]	.69	.39	135.99	2.09	1.56	.214
	Involvement * CVPA	-.01	.04	147.93	-.30	.09	.765
	Involvement * Product Category[b]	.98	.32	147.99	3.04	8.50	.000
	CVPA * Product Category[b]	.93	.43	144.70	2.17	2.38	.097

a. DX = 1
b Product Category = 1
Source: author's own calculation

5.3.1.5 Discussion

Study IV sets out to test direct, indirect, and interacting effects of DX on various outcome variables as well as to complete the validation of the DX construct and scale. Therefore, a complex experimental study design was applied including stimuli and mood manipulation. In contrast to the previous Study III, this time findings suggest a successful stimuli and mood manipulation. The emotional freeze also worked out as intended.

The findings of Study IV suggest that the DX scale is a valid measurement to predict salient outcome variables for the marketing and consumer behavior context. Results of Study IV support the hypothesized prediction that a high level of a positive DX enhances liking, perceived attractiveness, satisfaction, attachment, product value, purchase intention, and willingness to pay a higher price. These results confirm the assumptions of the conceptualization of DX further as well as agree with previous studies on experience (Babin, Darden, and Griffin 1994; Brakus, Schmitt, and Zarantonello 2009; Fornerino, Helme-Guizon, and Gotteland 2008; Zarantonello and Schmitt 2010) and product design (Crilly, Moultrie, and Clarkson 2004; Mugge, Schoormans, and Schifferstein 2008; Orth and Malkewitz 2008; Van Rompay and Pruyn 2011; Westerman et al. 2012). Although results indicate a strong predictive power of DX, one has to note that the assessed level of DX refers always to a positive DX – either low or high in intensity. This research suggests comparing results of stimuli triggering an intense, positive DX with ones that trigger an intense, negative DX in a follow-up study to consolidate results.

Further, results support the hypothesized assumption that a high level of DX has a significant, positive effect on affect: pleasure and arousal. The results are in line with previous research on the relation of affect and experience (Brakus, Schmitt, and Zarantonello 2009; Fiore 2008; Holbrook and Hirschman 1982).

Additionally, results of Study IV support the hypothesized mediating effect of pleasure, as they indicate that a high level of pleasure influences the relationship between DX and e.g., purchase intention or attraction. However, results indicate that there is no positive significant relationship between social product value or willingness to pay a higher price and pleasure. Moreover, findings of Study IV do not support hypothesized mediating effects of arousal, as they do not indicate any significant relationship between DX, arousal, and outcome variables.

Further, findings of Study IV support the hypothesized interaction effects depending on participants' individual traits and product category of the stimuli. Results indicate that the

effect on DX depends on individual dispositions, such as involvement and CVPA, as well as the product category of the stimulus. However, findings of Study IV do not support the hypothesized effect of absorption on DX. Based on the results of Study IV a high degree of absorption even has a negative effect on DX. This is counterintuitive and does not conform with literature. One potential explanation might be the poor reliability results of absorption. To verify the results, this research suggests replicating Study IV regarding absorption.

Further, results of Study IV also indicate a clear, easy to interpret five-dimensional structure that mostly is in line with the theoretical propositions, past research and the previous results. All factors have high factor loadings and high Cronbach's alphas, an important criterion for a scale's reliability. Comparable to the results of Study III one of the five factors (factor "behavior") is a second-order factor composed of two first-order factors. However, results of Study III and Study IV suggest two different second-order factors. The other factors correspond to the conceptualization and support previous findings and research (Brakus, Schmitt, and Zarantonello 2009; Schmitt 1999a). The reasons for this remain unclear and need to be clarified in another experiment using the DX scale.

Results of Study IV indicate that DX is statistically clearly distinguishable from related constructs confirming its proposed discriminant validity. More specifically, no DX factor loaded on the same factor representing related constructs (e.g., satisfaction or involvement). Hence, there are no mixed factors containing DX items and items from other constructs. These results do not only confirm the theoretical framework of DX but are also in line with previous research on experience and their distinction form related concepts (Brakus, Schmitt, and Zarantonello 2009). However, not all DX items load on the same factor. The factor "cognition" loads separately on its own factor and not on the same factor as the other dimensions of DX. This seems counterintuitive and cannot be confirmed in literature. Therefore, it is recommended investigating the structure, hierarchy and role of the single dimension in another experiment.

Summing up, findings of Study IV further support the validation of the DX scale, agree with and confirm earlier results from Study I, II, and III and the theoretical conceptualization of DX.

5.3.2 Fourth Expert Evaluation: Content and Face Validation

A final expert evaluation tests the applicability of the DX scale. Three independent design strategists rated the items regarding face validity and sorted the items into content related groups. According to the editorial expert evaluation in Study III, experts were asked to cluster the final set of twelve items into groups and name the groups. Neither the number of groups nor sorting criteria were given. The task resulted in five groups. All three judges clustered the same items into the same five clusters according to the five DX dimensions. Table 68 presents the results. Additionally, one expert named the clusters after the chronological occurrence. Concluding, the results of the final expert evaluation indicate a high face and content validity and confirm prior results of empirical studies and evaluations of the present work. Moreover, the chronological clustering of the items is on the one hand in line with the data-based dimensions found in this dissertation and on the other hand with Crilly, Moultrie, and Clarkson (2004) conceptualization of the interaction with design as communication process.

Table 68: Results of 4th Expert Evaluation

Group	Item	Item Number	Chronological Occurrence
Behavior / Activation	Dieses Design macht neugierig.	DX 33	1st contact / interest
	Dieses Design ist spannend.	DX 36	
	Dieses Design hat sofort meine Aufmerksamkeit erregt.	DX 50	
	Dieses Design lädt mich ein, auf das Produkt zu zugehen.	DX 52	
Senses	Ich erlebe dieses Design über mehrere Sinne.	DX 30	Actual outer experience
	Dieses Design regt meine Sinne an.	DX 32	
Heart (Affect)	Dieses Design hat mich emotional sehr berührt.	DX 2	Actual inner experience
	Dieses Design verursacht intensive Gefühle und Empfindungen.	DX 38	
Head (Cognition)	Mit diesem Design verbinde ich eine Geschichte.	DX 5	Reflection of DX
	Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.	DX 41	
Social Interaction	Ich erzähle anderen von diesem Design.	DX 19	Aftermath of DX
	Ich möchte andere an meinem Designerlebnis teilhaben lassen.	DX 23	

Source: author's own composition

5.4 General Discussion

5.4.1 Advancement of Theory

Summarizing, this dissertation contributes to consumer behavior, marketing, and design research by adding a new focus on human-design-interaction and hence, offering a new approach to explain this interaction and its consequences for consumer behavior and relevant outcome variables such as purchase intention. In detail, the present work conceptualizes design experience by applying the experience construct (Brakus, Schmitt, and Zarantonello 2009) to the design context and developing a new conceptual framework: the design experience concept. Further, this research develops a scale to reliably measure the newly developed design experience concept and validates the concept itself and its scale in four empirical studies and four expert evaluations. Finally, this dissertation provides empirical evidence for direct, indirect, and interaction effects of design experience and affect on relevant consumer behavior variables such as liking or purchase intention among others.

While existing studies on design concentrate on uni- or bi-modal perception, either cognitive or affective reactions, or certain design features, the present work with its four empirical studies combines these aspects and develops a holistic, multi-modal, and multi-dimensional approach to design research. In particular, the present work applies an experiential approach to product design and develops the new concept of design experience. Hence, the present work further contributes to experience research by adding a new experience concept. Additionally, the present work offers a valid, reliable, and objective measuring scale to assess design experience. In four empirical studies and four expert evaluations the concept and scale are validated, and effects and moderators are empirically analyzed. The contributions of the present work are presented in detail in the following.

First, adding a new holistic approach (Brakus, Schmitt, and Zarantonello 2009; Hekkert and Schifferstein 2008) to understand consumer interaction with and perception of design and its effects on consumer behavior extends research on design (e.g., Blijlevens, Creusen, and Schoormans 2009; Bloch 1995; Crilly, Moultrie, and Clarkson 2004; Veryzer 1999). Although research agrees on the fact that design is perceived in a multi-modal way and evokes multi-dimensional responses, no concept exists so far that respects these established aspects holistically. Specifically, the conceptualization of design experience (chapter 4.2) does not only close that gap but also offers a broad and thoroughly investigated multi-modal,

holistic, and multi-dimensional theory to design. Further, Study I, a series of qualitative expert interviews, confirms the lack of and need for a new approach to design.

Second, this dissertation broadens research on experience (e.g., Brakus, Schmitt, and Zarantonello 2009; Fornerino, Helme-Guizon, and Gotteland 2008; Holbrook and Hirschman 1982; Pine and Gilmore 1999; Pullman and Gross 2004; Schmitt 1999b; Verhoef et al. 2009; Zomerdijk and Voss 2011) by adding a new concept and scale to experience research. By summarizing and comparing existing experience research, the present work points out a lack of theoretically well-developed and empirically tested experience concepts and in particular, measurements fulfilling consumer behavior scaling requirements. Up to now the focus has been on managerial guidelines and less on experience model development and testing.
The literature based conceptualization of design experience advances experience and design research by holistically combining and transferring two research areas with each other. The conceptualization of design experience offers a profound theoretical concept by describing its content, antecedents, effects, and internal structure, as well as how it differs from related concepts, and is influenced by boundary conditions. All four studies contribute further to validate the design experience concept. Hence, the present work broadens experience research by adding a new experience concept and offering a new approach to consumer behavior research.

Third, this dissertation contributes to consumer behavior and marketing research (e.g., Brakus, Schmitt, and Zarantonello 2009; Chang and Chieng 2006; Fornerino, Helme-Guizon, and Gotteland 2008; Nambisan and Watt 2011; Pullman and Gross 2004; Schouten, McAlexander, and Koenig 2007) by adding a new valid, reliable, and objective psychometric measurement scale to assess effects of product design from a consumer behavior perspective. Current literature provides measurement scales to assess the quality of design or other experience types, but to the best of the author's knowledge, no holistic, multi-modal, multi-dimensional measurement scale exists that assesses design experience.
In a step-wise approach based on four empirical studies and four expert evaluations, this research developed a measurement scale to rate the level of evoked design experience. All four empirical studies are designed to validate the design experience scale, to prove its reliability and objectivity. The developed scale is short and easy to administer, and consisting of only twelve items. The scale is internally consistent and consistent across samples, stimuli, and studies (qualitative and quantitative). Further, the design experience scale displays

discriminant validity from related measures and scales, including evaluations, involvement, and satisfaction.

Fourth, this dissertation extends research on behavioral impact of experience and design, in particular design experience (e.g., Brakus, Schmitt, and Zarantonello 2009; Carù and Cova 2003; Hekkert and Schifferstein 2008; Orth, Campana, and Malkewitz 2010; Schifferstein and Zwartkruis-Pelgrim 2008). Findings of Study IV confirm the assumption that design experience affects consumer behavior like attractiveness, liking, attachment, satisfaction, and purchase intention of a product significantly (compare chapter 5.3.1). Further, results of Study IV amplify research by developing and testing an indirect effects model assuming that outcome variables such as purchase intention and satisfaction are indirectly affected through pleasure. Findings of mediation analysis indicate that design experience affects various outcome variables such as attraction, purchase intention indirectly through pleasure (see chapter 5.3.1).

5.4.2 Managerial Implications

The present research, its concept, scale, and empirical findings emphasize the importance of creating experiences for business success. It illustrates the consumer-stimuli-interaction, its antecedents, advantages, limitations, and consequences for consumer behavior from various perspectives. Additionally, it offers valuable assistance and insights to marketers to understand consumer behavior, to improve their customer experiences, and to deliver ideas on how to approach ones' target group from different angels (multi-sensory and multi-dimensional) more effectively.

Moreover, by adding a new experience concept, this research enables practitioners to analyze their customer experience from a meta-level. Hence, combine theoretical knowledge and empirical findings of brand, customer, shopping, and design experience and create an overall total experience for their customers that involve them totally on all possible levels and stages of shopping, consumption, and interaction. That enables them to gain competitive advantage, engage their target group fully and establish customer loyalty.

Further, the present research reinforces the importance of a multi-sensory, multi-dimensional and holistic approach to product design to maximize consumer experience, product value, and increase sales. The findings confirm latest design research results stating that the more senses, emotions, cognitions, as well as more behavioral and social reactions are triggered, the greater the effect on consumer behavior. The developed concept design experience encompasses this

phenomenon theoretically and makes it more transparent for designers and managers. In combination with existing research on design (e.g., prototypicality, the effect of color) and tools (e.g., design styles, key design elements, design attributes) managers and designers can improve the perception and interaction with their products and hence, consumer reactions and as a consequence sales.

Additionally, the design experience concept offers a meta-level perspective and analysis to consumer-design-interaction. In contrast to existing product and design concepts, the design experience concept enables marketers and designers to holistically analyze product design and its impact without limiting their research to particular aspects such as sensory perception. Hence, the results illustrate consumer interaction and its impact on consumer behavior much more realistically as many existing tools focusing on single aspects, such as product personality. As a result, applying the design experience concept and scale helps markets to avoid potential sources of error by applying a holistic perspective instead of focusing too early on special, singular aspects due to missing understanding, knowledge, or measuring tools.
The design experience concept and scale offers a meta-level perspective that first allows a holistic view including all dimensions and then, based on the results, a more specific analysis of single dimensions by additionally applying existing tools such as product personality. By applying this procedure, marketers can ensure they are taking all relevant aspects into account and avoid limiting themselves and excluding factors that also influence the design too early in the research process. For example, focusing only on the sensory perception of the applied material and color instead of also taking its impact on cognition, affection, and behavioral responses into account. As a result, the present dissertation offers a concept and scale which facilitate the design creation, product development and implementation process, and hence a more effective and rewarding approach to consumer-design-interaction, increase attachment to the product and purchase intention.

Moreover, the design experience scale offers marketers a more effective measuring tool. The developed 12-item design experience scale is short and easy to use. It can be applied to different product categories, and study contexts such as interviews or questionnaires (online, offline, face-to-face, or telephone). As the usage of the scale is universal and easy, it can be applied multiple times during a product design and development process and hence, help to improve the design and success of the product. With the design experience scale marketers

can assess, plan and track the effect of design on consumer behavior more reliably, precisely, and faster. Overall, they save time and money, improve the design of their product and increase its monetary success.

5.4.3 Limitations and Avenues for Future Research

Findings of this dissertation offer several valuable insights to the interaction of consumers with design, in particular design experience and its impact on consumer behavior that provide highly relevant implications for researchers and practitioners, however, limitations of the concept and studies should also be mentioned.

First, it should be noted that the design experience concept as developed in the present work might not be exhaustive. The current design experience concept is conceptualized and operationalized for product design. Especially for marketing purposes the packaging of a product is highly relevant for purchase decisions (Orth, Campana, and Malkewitz 2010). Hence, it is advisable to extend the current results of experience and design research by conceptualizing design experience evoked by packaging. Especially practitioners could benefit from an extension of the current concept and measurement scale by including packaging as stimulus.

Second, academic research should further investigate antecedents and long-term consequences of design experience. Regarding antecedents, future research might focus on the question of how exactly design experience dimensions are evoked by a design. While the present work shows how design experience directly and indirectly impacts short-term consumer behavior, research on design experience could be extended by analyzing whether DX affects long-term consumer behavior, such as product lifetime values and equity (Rust, Zeithaml, and Lemon 2000; Vogel, Evanschitzky, and Ramaseshan 2008).

Third, the author further encourages research on the experience concept in general and in particular on the relation and effects between different experience concepts. As experience concepts are sometimes intertwined (e.g., the design of a branded product: design and brand experience or a product in a shopping context: design and shopping experience), the author suggests analyzing the relationship of various experience concepts; for example, design experience as an antecedent of brand experience. By investigating the role of design experience for brand experience, researchers could bundle brand-related stimuli and could investigate the role of single brand-related stimuli for brand experience more in detail.

Fourth, the author encourages further research on the design experience scale. The internal structure of the design experience scale was analyzed in Study II, III, and IV of the present work. Unfortunately, although always a five-dimensional structure could be confirmed, the content and composition of two dimensions varied slightly (see chapter 5.2.1.3, 5.2.3.3, and 5.3.1.4). Hence, analyzing the dimensional structure of the design experience scale further is advisable. In order to expand findings and consolidate results, future research should use a new set of stimuli from different product categories and different samples.

Fifth, the current scale does not assess the valence of a design experience. Is to say, whether an experience is positive or negative. Having a design experience can create value and result in a positive outcome. Future research should investigate, tough, how positive and negative experiences affect consumer behavior by exploring positively and negatively worded versions of the scale. Brakus, Schmitt, and Zarantonello (2009) suggest two ways to develop a valenced version of an experience scale: rewording it or adding a bipolar response scale after each scale item. For consistency reasons, it is advisable to include the words “positive” and “negative” and hence, just a slightly reword the scale; for example, “This design induces positive / negative emotions”. Before using the reworded scale, the new scale’s reliability and validity should be tested in a further study.

And finally, design experience was only tested by a national sample. All participants of the four empirical studies as well all four evaluations were Germans, is to say Westerners. Hence, the present work cannot give any evidence, whether the concept design experience and its scale are applicable in a cross-cultural context. The existence and impact on consumer behavior of cross-cultural differences in general and in particular in the context of product design (e.g., color, holistic vs. atomistic perception, etc.) are an established fact (Limon, Orth, and Kahle 2009; Masuda and Nisbett 2001; Nisbett and Masuda 2003; Nisbett and Miyamoto 2005). Hence, the author strongly recommends examining whether the scale can be applied in a cross-cultural context at all, how the concept and operationalization have to be adapted, and how the cultural background of a person affects the evoked design experience and its direct and indirect effects on consumer behavior.

6 Summary

The design of a product conveys associations and meaning, evokes sensations, feelings, and certain sensory perceptions as well as animates people to have a closer look, to touch it and at best persuades them to buy it. The powerful influence of product design for the success of a product and its sales is widely acknowledged by consumer related industries. Even in the B2B sector product design has gained importance as competitive advantage, e.g., almost 130 products from the industry sector won a Red Dot Product Design Price in 2015, like the Tapcon® voltage regulation systems from Maschinenfabrik Reinhausen or the Landa S10 a digital printing press from Landa Digital Printing (Red Dot GmbH & Co. KG 2016). Hence, expanding knowledge about human-product- and in particular human-design-interaction as well as closing existing research gaps in design research contributes to use the opportunities product design offers to companies, consumers, and users even more successfully and sustainably.

Applying the promising experience concept to the design context, this dissertation sets out to close existing knowledge gaps in design and experience research. (1.) Specifically the dissertation offers an approach to explain and understand human-design-interaction and its effects on consumer behavior by adding a new conceptual framework to product design research. (2.) Further, it contributes to research on experience by applying the experience concept to the product design context. (3.) This work expands research by evolving and validating a theoretical framework for design experience. (4.) The dissertation extends consumer behavior research, in particular experience and design research by developing a new valid, reliable, and objective 12-item measurement scale according to established scaling procedures. (5.) Moreover, this dissertation investigates and provides empirical evidence on direct, indirect, and interaction effects of design experience and consumer behavior outcome variables, specially the importance of affect as mediator variable. A summary of the conceptualization and operationalization including the three-step approach with all four empirical studies is given as follows.

Conceptualization

The proposed design experience concept combines theoretically well-established knowledge of design with the experience construct. Based on an extensive, multi-disciplinary literature

review this dissertation conceptualizes design experience as individual sensations, feelings, cognitions, and behavioral responses evoked by design cues. Like other experience concepts, design experience is a holistic perspective, which explicitly acknowledges sensory input from multiple modes (e.g., vision and haptics). This results in various reactions such as affects (e.g., emotions, sensations), cognitions (e.g., associations, thoughts, metaphors, memories) as well as behavior (e.g., moving towards the object, touching it, talking to friends about it). Design experience is proposed as a multi-dimensional concept consisting of five dimensions: "sensory", "affective", "cognitive", "behavioral", and "social interaction". The new experience construct affects a variety of outcomes relevant to marketers including for example, attraction, satisfaction, purchase intention, and attachment to the product. The impact on consumer behavior is moderated by person- and context-dependent influencing factors such as individual traits and preferences or the surroundings. Further, the design experience concept is related but distinct from other experience and design constructs such as product experience or personality, involvement, or evaluative judgment. The 12-item design experience measurement scale assesses the intensity of an experience evoked by a design on a 7-point Likert scale (with 1 = "totally disagree", 7 = "totally agree") (compare Table 69).

Table 69: The Final Design Experience Scale

Items	Subdimensions	
Ich erlebe dieses Design über mehrere Sinne.	Sensory	
Dieses Design regt meine Sinne an.		
Dieses Design hat mich emotional sehr berührt.	Affective	
Dieses Design verursacht intensive Gefühle und Empfindungen.		
Mit diesem Design verbinde ich eine Geschichte.	Cognitive	
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.		
Dieses Design macht neugierig.	Behavioral	Activation
Dieses Design ist spannend.		
Dieses Design hat sofort meine Aufmerksamkeit erregt.		Behavioral
Dieses Design lädt mich ein, auf das Produkt zu zugehen.		
Ich erzähle anderen von diesem Design.	Social interaction	
Ich möchte andere an meinem Designerlebnis teilhaben lassen.		

Source: author's own composition

Operationalization

The step-wise approach including four empirical studies and four expert evaluations aimed at developing a measurement scale and at validating the scale and construct following established methods previously used and employed in marketing research.

Step 1 aimed at the qualitative exploration of the design experience concept and the generation of an item pool including Study I, a literature research, and the first expert evaluation.

In line with well-established scale development procedures, in **Study I** twelve semi-structured expert interviews are conducted to explore understandings, perceptions, associations, dimensions, and limitations connected to experience in general and design experience in particular. High attention was paid to the selection of interviewees. By choosing design experts (e.g., design strategists, industrial designers, color & material designers) with at least five years of professional experience the present work assured the necessary knowledge and experience about consumer responses evoked by design cues and the interaction with design and product design in particular. All interviews were audiotaped, transcribed, and coded. The coding procedure followed the established and previously used method of qualitative content analysis and aimed at building inductive categories while coding. The results of the expert interviews confirmed the idea of design experience and findings indicated that design experience is a result of design–consumer–interaction. The intensity of an experience was directly influenced by the intensity of interaction and hence involved dimensions. Besides the confirmation of the theoretical construct the semi-structured expert interviews generated an initial item pool consisting of 141 items. Study I was also used to collect samples of weak and intense design experiences.

The **literature review** revealed 82 items from existing scales measuring related but distinct constructs. After combining the two item sources, deleting duplicates, redundant and misleading items, the item pool consisted of 102 items.

The **first evaluation** aimed at judging the initial item pool for content and face validity, as well as reducing the number of items. Following established scaling procedures, a pool of design and marketing professionals as well as population judges (N=21) rated the items regarding their representativeness in an online study. The survey, a combination of qualitative and quantitative research elements, included a 3-point categorization task (1 = “does not describe at all”) and a request to comment on content, representativeness, wording, and clarity. To minimize recency and frequency effects, three different versions regarding the displaying order of the 102 items were created. All participants understood the proposed design experience concept and the requested tasks. To analyze the suitability of each item to measure design experience, this work applied two cut-off-criteria resulting in 62 dropped items (mean score below midpoint, $M_{Rep} = 2.0$ or more than five times a rating with 1 = “does

not describe at all"*)*. Qualitative analysis delivered seven more dropouts (redundancy and clarity).
After Step 1 the preliminary item pool counts 55 items.

Step 2 followed successfully employed methods applied in research on construct and scale development by aiming at validating the construct and scale, analyzing the internal structure of the construct, and refining the initial item pool. Specifically, core items are identified, inadequate items are systematically eliminated, and the scale's factors are analyzed. Step 2 consisted of two empirical studies, Study II and Study III, as well as of two expert evaluations, the second and third expert evaluation. Contrary to the expert in-depth interviews in Study I, surveys were conducted in Study II and Study III.
Study II was designed to test the design experience construct and identify those items that form an internally consistent scale. Further, its reliability and its dimensionality were analyzed. Central to Study II are validation, dimensionality testing, purification, and reduction of the item pool. Students (N=309) at a German university were asked to name two examples of an intense design experience, one positive and one negative and to indicate the extent to which the 55 items described their personal positive, intense design experience on a seven-point Likert scale (with 1 = "not at all descriptive", 7 = "extremely descriptive"). Findings suggested that participants share the conception of design experience and can name examples of positive and negative design experiences. To refine the item pool, an analysis was carried out at the item level. Results of mean rating, wording, content, and corrected-item-total correlation analysis caused the dropping of 13 items in total. To confirm the reliability of the scale, the Cronbach's alpha of the 42 remaining items was analyzed in two steps. First, the overall Cronbach's alpha ($\alpha_{all} = 0.93$) was calculated and second, group-dependent Cronbach's alphas were calculated and compared ($\alpha_1 = 0.93$, $\alpha_2 = 0.92$, $\alpha_3 = 0.95$). All results indicate a high reliability. To test the internal structure of the construct and scale, three EFAs with Varimax rotation were performed. Findings of the EFAs indicated that five dimensions appeared to best describe the data: an "affective" (8 items), a "behavioral" (6 items), a "social" (4 items), a "cognitive" (3 items), and a "sensory" (2 items) dimension. Yet, developing accurate explanations for two of the factors ("affective" and "behavioral") was challenging due to terminology and content associations.
To confirm content validity further, a **second expert evaluation** was conducted. Three independent judges, all with a professional editorial background and no relationship or involvement in the research project, were asked to sort all items into groups. This task

resulted in five groups: “affective”, “cognitive”, “social”, “behavioral”, and “sensory” experience. Apart from factor two and three, the clusters were similar to the statistical results based on the EFA of Study II.

Because the construct and the scale needed additional validation, the **third expert evaluation** aimed at strengthening comprehensibility and content of the design experience scale. The third evaluation conducted by two academics suggested dropping out nine items because of misleading wording, content, and similarity. As a result, the design experience scale consisted of fifteen items after the third evaluation.

Study III builds on the results obtained from the previous studies and evaluations. Study III was designed to further validate the design experience construct and scale. Hence, central to Study III were strengthening the scale’s wording, testing of reliability, confirmation of dimensions, scale validation, and analysis of effects on consumer behavior. In contrast to Study II, Study III was designed as an experimental between-subjects design. To test the stability of the scale, a real-life setting with a non-student population and a new set of stimuli were employed. The stimuli selection followed established methods previously used and employed in consumer behavior and design research. By integrating inputs from professionals (designers and researchers) (N = 8) stimuli reduced in design complexity, and without any obvious branding or typical brand design key elements from three common product categories (electric kettle, computer mouse, wall clock) were chosen. High attention was paid to the images that required uniform backgrounds, same product size and camera angle. In an online survey consumers (N = 208) listed at a German online research consumer panel recruited by a professional recruiting agency were asked to evaluate the intensity of the design experience evoked by one manipulated product design stimulus either high or low in design experience using a 7-point Likert scale. Further, participants had to complete questions on approach-avoidance-tendencies, purchase intentions, and general product evaluation among others.

An analysis was carried out at the stimulus level. To show that design stimuli are associated with design experiences, an ANOVA was performed. Results indicated strong reliability criteria. Unfortunately the design experience manipulation was not successful, yet results indicated the desired tendencies of the manipulated stimuli for the rather small cells (N_{mean} = 32) and a successful manipulation for greater populations.

Again, to test the internal structure, four EFAs were conducted confirming a five-factor solution with four first-order factors (“cognitive”, “behavioral”, “social”, “affective”) and two first-order factors nested within a second-order factor (“sensory” – “approach” dimension).

In line with established construct and scaling procedures, Study III provided the desired empirical support for convergent validity. Results showed high to medium correlations of related consumer behavior constructs indicating convergence between certain design experience dimensions and related consumer behavior constructs. Furthermore, findings supported suggested effects of design experience on consumer behavior such as product evaluation and purchase intention.
The final design experience scale contained 12 items.

Step 3 was composed of an empirical study, Study IV, and the last expert evaluation. Apart from the recurring main goal to further validate the design experience construct and scale, Study IV was designed to analyze direct, indirect, and interaction effects on predictor variables, hence, determine mediators and moderators that influence the effect of design experience on outcome dimensions.
In contrast to the prior empirical studies, **Study IV** was designed as experimental within-subject design. To collect data and evidence that would help accomplish the various goals of Study IV, students (N = 79) were invited to the consumer behavior lab of the A&F Marketing department at the university of Kiel one at a time and asked to complete two for them unrelated surveys. To test whether affect indirectly influenced the design experience route, Study IV applied a mood induction combined with emotional freeze setting suppressing the affective route. The mood manipulation and suppression followed established methods previously used and employed in marketing research. A trained investigator supervised and controlled mood induction and emotional freeze as well as the overall survey setting. Participants were randomly assigned to mood-freeze (yes / no) and design experience (high / low) conditions. Stimuli selection and manipulation followed the same method as in Study II and III. However, to increase the design experience manipulation, a priming effect opposite was used. Participants had to complete questions on design experience intensity, attraction, attachment, purchase intention, experiential product value, and satisfaction among others. Furthermore, important variables such as involvement and CVPA were included as alternative explanation that was suggested to moderate the proposed relationship. To confirm the success of the manipulation and to analyze the collected data further, Linear Mixed Models were performed to analyze the correlated data.
Findings constituted evidence that the mood induction, emotional freeze and stimuli manipulation were successful. Overall, the results of Study IV provided empirical support to validate the design experience construct and measurement scale further. Specifically, findings

indicated that design experience was statistically clearly distinguishable from theoretically related consumer behavior constructs by demonstrating its statistical difference to satisfaction, liking, and involvement. Moreover, results suggested a clear, easy to interpret, statistically satisfying, five-dimensional structure that was in line with the author's theoretical propositions and past research. One of the five factors (factor "behavior") was a second-order factor composed of two first-order factors.

Findings from Study IV clearly provided evidence for the hypothesized prediction that a high level of design experience enhanced consumer behavior such as liking, attraction, purchase behavior among others. Findings from Study IV also supported the hypothesized indirect affect effects model partly. In detail, results suggested that pleasure mediates the relationship between design experience and a number of different outcome variables such as purchase intention or attraction. Yet, no relation between the dimension arousal and design experience could be confirmed. Finally, findings supported interaction effects depending on participants' individual traits and the product category of the stimulus. In particular, Study IV confirmed the notion that the design experience intensity and its effect was moderated by individual dispositions, such as involvement and CVPA and depend on the category of the product.

The **fourth expert evaluation** indicated a high face and content validity and confirmed prior results of the empirical studies and evaluations of the present work. Moreover, the chronological clustering of the items is on the one hand in line with the data-based dimensions found in this dissertation and on the other hand with (Crilly, Moultrie, and Clarkson (2004) conceptualization of the interaction with design as communication process.

Concluding, the present work offers a new approach to analyze product design and its effects on consumer behavior by combining design research knowledge with an experience approach. In particular, this dissertation conceptualizes design experience based on a profound theoretical framework and operationalizes it in a three-step approach including four empirical studies resulting in an empirically validated concept and a 12-item measuring scale.

7 German Summary

Das Design eines Produktes vermittelt dem Betrachter Assoziationen und Bedeutungen, weckt Empfindungen, Gefühle und Sinneswahrnehmungen und animiert dadurch den Betrachter sich das Produkt genauer anzusehen, es anzufassen und überzeugt ihn bestenfalls es zu kaufen. Die Konsumgüterindustrie hat den bedeutenden und bedeutenden Einfluss von Produktdesign für den seinen Verkaufserfolg erkannt. Sogar im Industriegütersektor wird Produktdesign inzwischen als wettbewerbsvorteilverschaffender Faktor geschätzt. Alleine im Jahr 2015 haben 130 Produkte aus dem Industriegütersektor einen der renommierten Red Dot Designpreise gewonnen. Dazu gehören zum Beispiel der Spannungsregler Tapcon® von der Maschinenfabrik Reinhausen oder die digitale Druckmaschine Landa S10 der Firma Landa Digital Printing (Red Dot GmbH & Co. KG 2016). Aus diesem Grund trägt die Erweiterung des Wissens über Mensch-Produkt- und im speziellen über Mensch-Design-Interkation, sowie die Analyse offener Fragestellungen im Beriech Designforschung dazu bei, dass die Chancen und Vorteile, die Produktdesign Firmen, Konsumenten und Usern bietet, noch besser und nachhaltiger nutzen zu können.

Die vorliegende Arbeit wendet den vielversprechenden Ansatz „Experience“ auf den Produktdesignkontext an, um Forschungslücken der „Experience“- und Designforschung zu schließen. Konkret entwickelt die Arbeit (1.) ein neues Erklärungsmodell für die Mensch-Design-Interaktion und die daraus resultierenden Effekte auf das Konsumentenverhalten und erweitert (2.) die Erkenntnisse der „Experience“ Forschung im Zusammenhang mit Produktdesign. (3.) Ein theoretisches Konzept „Design Experience“ wird erarbeitet und validiert sowie (4.) eine valide, zuverlässige und objektive 12-Item Messskala nach etablierten Skalenentwicklungskriterien entwickelt. (5.) Die Arbeit liefert ferner empirische Erkenntnisse inwieweit sich „Design Experience“ direkt, indirekt oder mittels Interaktionseffekten auf das Konsumentenverhalten auswirkt. Dem Aspekt Affekt als Mediator wird hierbei spezielle Aufmerksamkeit geschenkt.
Im Folgenden wird die Konzeptualisierung und die dreistufige Operationalisierung bestehend aus vier empirischen Studien und vier Evaluierungsrunden zusammengefasst.

Konzeptualisierung

Das vorgeschlagene Konzept „Design Experience“ kombiniert fundiertes Wissen über Design mit Ergebnissen aus der „Experience“-Forschung. Basierend auf einer umfassenden und interdisziplinären Aufarbeitung des Forschungsstandes konzeptualisiert die vorliegende Dissertation „Design Experience“ als individuelle Empfindungen, Gefühle, Kognitionen, und Verhaltensreaktionen, die von einem Produktdesign hervorgerufen werden. Ebenso wie andere „Experience“ Ansätze zeichnet sich auch „Design Experience“ durch eine holistische Perspektive aus , die explizit Sinneserfahrungen verschiedener Sinnesorgane anerkennt (z.B.: visuell und haptisch). Dies löst beim Betrachter verschiedene Reaktionen aus, wie Affekt (z.B.: Empfindungen und Emotionen), Kognitionen (z.B.: Assoziationen, Gedanken, Metaphern und Erinnerungen) und Verhalten (z.B.: Zubewegen auf ein Objekt, Berühren, mit Freunden darüber sprechen). „Design Experience“ definiert sich somit als ein multi-dimensionales Konzept, welches aus fünf Dimensionen besteht: „Sinne“, „Affekt“, „Kognition“, „Verhalten“ und „soziale Interaktion“. „Design Experience“ beeinflusst eine Reihe von Verhaltensvariablen, die für das Marketing von Bedeutung sind wie zum Beispiel Kaufintention und Bindung zum Produkt. Gleichzeitig wird der Einfluss von „Design Experience“ auf das Konsumentenverhalten von personen- und kontextabhängigen Einflussfaktoren sowie vorangegangene Erfahrungen moderiert. „Design Experience“ weist zudem Ähnlichkeiten, aber auch Unterschiede zu bestehenden Konzepten aus der „Experience“ und Designforschung auf, wie zum Beispiel „Product Experience“, Produktpersönlichkeit oder Produktbewertung. Die entwickelte Messskala „Design Experience“ erfasst die Intensität einer „Design Experience“ auf einer 7-Punkt Likert Skala (mit 1= „stimme überhaupt nicht zu“, 7 = „stimme voll und ganz zu“) (vergleiche Table 70).

Table 70: Finale Skala „Design Experience“

Item	Dimension	
Ich erlebe dieses Design über mehrere Sinne.	Sinne	
Dieses Design regt meine Sinne an.		
Dieses Design hat mich emotional sehr berührt.	Affekt	
Dieses Design verursacht intensive Gefühle und Empfindungen.		
Mit diesem Design verbinde ich eine Geschichte.	Kognition	
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.		
Dieses Design macht neugierig.	Verhalten	Aktivierung
Dieses Design ist spannend.		
Dieses Design hat sofort meine Aufmerksamkeit erregt.		Verhalten
Dieses Design lädt mich ein, auf das Produkt zu zugehen.		

Item	Dimension	
Ich erzähle anderen von diesem Design.	Soziale Interaktion	
Ich möchte andere an meinem Designerlebnis teilhaben lassen.		

Quelle: Autor

Operationalisierung

Die aus vier empirischen Studien und vier Expertenevaluierungsrunden bestehende stufenweise Operationalisierung zielt darauf ab, eine Messskala nach etablierten Methoden zu entwickeln, sowie diese und das Konzept „Design Experience“ zu validieren.

Stufe Eins hatte zum Ziel das Konzept „Design Experience“ qualitativ zu erforschen und einen umfassenden Itempool zu generieren. Stufe Eins beinhaltet Studie I, eine Analyse bestehender Arbeiten aus dem Forschungsgebiet „Experience“ und eine erste Expertenevaluierung des Itempools.
Nach bewährten Vorgehensweisen der Skalenentwicklung wurden in **Studie I** zwölf semi-strukturierte Experteninterviews durchgeführt um das Verständnis über „Experience“ im Allgemeinen und „Design Experience“ im Speziellen sowie damit verbundene Wahrnehmungen, Assoziationen, Dimensionen und Limitationen zu erkunden. Durch eine sorgfältige Auswahl der Teilnehmer - professionelle Designer (z.B.: Design Strategen, Industriedesigner, Color & Material Designer) mit mindestens 5-jähriger Berufserfahrung - konnte sichergestellt werden, dass alle Interviewteilnehmer über ein fundiertes Wissen und die nötige Erfahrung mit Konsumentenreaktionen in der Interaktion mit Design verfügten. Alle Interviews wurden aufgenommen, transkribiert und kodiert. Der Kodierungsprozess erfolgte gemäß etablierter und bereits erfolgreich angewendeter Standards der qualitativen Inhaltsanalyse und zielte darauf ab induktive Kategorien im Lauf des Kodierungsprozesses zu bilden. Die Ergebnisse der Experteninterviews bestätigten die Grundannahmen über „Design Experience“ und deuteten darauf hin, dass „Design Experience“ ein Ergebnis der Mensch-Design-Interaktion ist. Die Intensität einer „Design Experience“ steht - so die Erkenntnis der Interviews - im direkten Zusammenhang zu der Intensität der Interaktion und den relevanten Dimensionen. Neben der Bestätigung der Existenz des Konzepts „Design Experience“, generierten die Interviews einen ersten Itempool bestehend aus 141 Items. Zudem konnten Beispiele für Designs, die eine schwache oder eine intensive „Design Experience“ auslösen, gesammelt werden.

Die **Literaturrecherche** ergab 82 Items aus bestehenden Skalen, die verwandte aber dennoch unterschiedliche Konzepte messen. Nachdem die Items aus beiden Quellen kombiniert,

Duplikate gelöscht, redundante und irreführende Items aussortiert wurden, bestand der Itempool aus 102 Items.

Die **erste Evaluierungsrunde** der Items hatte zum einen die Inhaltsvalidierung und einen Plausibilitätscheck, zum anderen eine weitere Reduzierung der Items zum Ziel. In einer auf etablierten Skalenentwicklungsprozessen fußenden Onlineumfrage beurteilte eine Gruppe (N=21) aus Marketing- und Designexperten und Laien die Items bezüglich ihrer repräsentativen Qualität. Die Studie, die qualitative und quantitative Elemente aufweist, bestand aus einer Kategorisierungsaufgabe und der Aufforderung, Inhalt, Repräsentativität, Ausdruck und Sprache zu bewerten und zu kommentieren. Alle Teilnehmer verstanden das Konzept „Design Experience“ und die Aufgaben. Es wurden zwei Cut-off Kriterien angewendet um zu beurteilen, inwieweit sich ein Item dazu eignet „Design Experience“ zu messen (Mittelwert kleiner 2,0 und fünf Mal eine Bewertung 1 = „beschreibt überhaupt nicht“). Dieses Vorgehen hatte die Löschung von 62 Items zur Folge. Die qualitative Analyse lieferte zudem sieben weitere Items, die wegen Redundanz und fehlender Klarheit gelöscht wurden.
Nach Stufe Eins zählte somit der vorläufige Itempool 55 Items.

Gemäß etablierter Forschungsmethoden der Konzept- und Skalenentwicklung hat **Stufe Zwei** die Konstrukt- und Skalenvalidierung, sowie die Analyse der internen Struktur und die Verfeinerung des Itempools zum Ziel. Die Identifizierung von Schlüsselitems, die systematische Eliminierung von unpassenden Items und die Analyse der Faktoren der Skala waren Hauptbestandteile. Stufe Zwei bestand aus zwei empirischen Studien, Studie II und Studie III sowie zwei Expertenevaluierungen. Im Gegensatz zu den Expertentiefeninterviews in Studie I handelt es sich bei Studie II und Studie III um Umfragen.
Studie II wurde mit dem Ziel durchgeführt das Konzept „Design Experience“zu testen und die Items mit einer hohen internen Konsistenz zu identifizieren. Hauptanforderungen der Studie II waren somit die Validierung, die Analyse der internen Struktur und die Bereinigung und Reduktion des Itempools. Studenten (N = 309) einer deutschen Universität wurden dazu eingeladen zwei Beispiele für eine eigene, intensive „Design Experience“ zu nennen, eine positive sowie eine negative „Design Experience“. Weiterhin wurden sie gebeten anzugeben, inwieweit jedes der 55 Items ihre persönliche, positive „Design Experience“ auf einer 7-Punkt Likert Skala beschreibt (1 = „beschreibt überhaupt nicht“, 7 = „beschreibt sehr“). Die Ergebnisse ließen vermuten, dass die Teilnehmer das vorgestellte Konzept „Design

Experience“ teilten. Zudem konnten sie Beispiele für eine positive und negative „Design Experience“ nennen. Um den Itempool zu kürzen und zu verfeinern wurden Analysen auf Itemebene durchgeführt. Die Ergebnisse der Mittelwert- und Korrelationsanalyse sowie der Beurteilung von Ausdruck und Inhalt führte zu einer Eliminierung von 13 Items. Die Reliabilität der verbleibenden 42 Items wurde in zwei Stufen anhand des Cronbachs Alpha Wertes ermittelt. Zuerst wurde das gesamte Cronbachs Alpha errechnet ($\alpha_{all} = 0.93$) und anschließend wurden drei gruppenabhängige Cronbachs Alphas berechnet und verglichen ($\alpha_1 = 0.93$, $\alpha_2 = 0.92$, $\alpha_3 = 0.95$). Alle Ergebnisse deuten auf eine hohe Reliabilität der vorläufigen Skala hin. Die interne Struktur des Konzepts wurde in einem nächsten Schritte mittels explorativer Faktorenanalyse mit Varimax Rotation analysiert. Ergebnisse der Faktorenanalyse deuten darauf hin, dass fünf Dimensionen die Daten am besten beschreiben: „Affekt” (8 Items), „Verhalten” (6 Items), „Sozial” (4 Items), „Kognition” (3 Items), und „Sinne” (2 Items). Jedoch sind zwei Dimensionen aufgrund ihrer Zusammensetzung nicht einfach zu erklären. Zudem sind die statistischen Ergebnisse nur für die ersten vier Faktoren zufriedenstellend.

In einer **zweiten Evaluierungsrunde** wurde die Skala erneut einer Inhaltsvalidierung unterzogen. Drei unabhängige professionelle Editoren mit keinerlei Verbindung zum Forschungsprojekt wurden gebeten alle Items in für sie sinnvolle Gruppen zu sortieren. Diese Aufgabe führte zur Bildung von fünf Itemgruppen. „Affekt“, „Kognition“, „Sozial“, „Verhalten“ und „Sinneserfahrungen“. Die gebildeten Gruppen entsprachen weitestgehend den Ergebnissen der vorangegangenen explorativen Faktorenanalyse in Studie II.

Um das Konstrukt und die Skala weiter zu validieren, wurde eine **dritte Evaluierungsrunde** durchgeführt, in der die Verständlichkeit und der Inhalt der einzelnen Items der Skala analysiert wurden. Diese dritte Expertenrunde, bestehend aus zwei Akademikern, führte zur Eliminierung von neun Items aufgrund irreführender oder zu ähnlicher Formulierung oder Inhalt. Nach der dritten Evaluierungsrunde bestand die Skala „Design Experience“ aus 15 Items.

Aufbauend auf den Ergebnissen der vorausgegangenen Studien und Evaluierungsrunden bildete **Studie III** einen weiteren Baustein der Konzept- und Skalenvalidierung. Sie hatte folgende Schwerpunkte: Verbesserung der Itemformulierung, Prüfung der Reliabilität, Bestätigung der Dimensionen, erneute Skalenvalidierung und eine erste Analyse potentieller

Effekte von „Design Experience“ auf das Konsumentenverhalten. Im Gegensatz zu Studie II wurde Studie III als experimentelles Between-Subject-Design aufgesetzt. Um die Stabilität der Skala zu testen wurden für Studie III ein Konsumentensample und neue Stimuli gewählt. Die Auswahl der Stimuli erfolgte nach erprobten Methoden der Konsumenten- und Designforschung und wurde von acht professionellen Designern und Marketingfachleuten unterstützt. Alle drei ausgewählten Produktkategorien zeichneten sich durch eine reduzierte Designkomplexität und ihre Alltäglichkeit (Wasserkocher, Computermaus, Wanduhr) aus. Zudem wurde darauf geachtet, dass alle ausgewählten Stimuli keine offensichtlichen oder markentypischen Designmerkmale ausweisen. Alle Produkte waren ähnlich groß abgebildet, wurden mit dem gleichen Kamerawinkel aufgenommen und hatten einen ähnlichen Hintergrund. In einer Onlinebefragung bewerteten Konsument gelistet bei einem Panel einer deutschen Marktforschungsagentur die Intensität ihrer „Design Experience“ auf einer 7-Punkt Likert Skala ausgelöst von einem vorher gezeigten Produktdesign. Zudem beantworteten die Probanden unter anderem Fragen zu ihrem Apporach-Avoidance-Verhalten, ihrer Kaufintention sowie einer allgemeinen Produktbewertung. Anschließend wurden Analysen auf Stimuluslevel durchgeführt. Um zu zeigen, dass die gewählten Stimuli mit der gemessenen „Design Experience“ korrelieren wurde eine Varianzanalyse durchgeführt. Die Ergebnisse wiesen auf eine starke Reliabilität hin.

Wie bereits in Studie II wurde die interne Struktur mittels explorativer und konfirmatorischer Faktorenanalysen getestet. Die vier Faktorenanalysen betätigten eine fünfdimensionale Struktur. Die Ergebnisse der Studie III weisen zudem auf eine hierarchische Struktur bestehend aus vier Faktoren erster Ordnung („Kognitiv”, „Verhalten”, „Sozial”, „Affekt“) und zwei Faktoren erster Ordnung eingebettet in einem Faktor zweiter Ordnung („Sinne“ und „Annäherung“) hin.

Studie III lieferte empirische Belege für die Konvergenzvalidität des Konstrukts und seiner Skala. Die Ergebnisse zeigten eine hohe bis mittlere Korrelation zwischen verwandter Konstrukte aus der Konsumentenverhaltensforschung und bestimmter Dimensionen des Konstrukts „Design Experience“. Dies bestätigt die Konvergenzvalidität von „Design Experience“. Zudem deuten die Ergebnisse auf einen positiven Effekt von „Design Experience“ auf bestimmte Konsumentenverhaltensvariablen, wie zum Beispiel Kaufverhalten und Produktbewertung hin.

Die „Design Experience“ Messskala besteht nach Abschluss der Stufe Zwei aus 12 Items.

Stufe Drei setzte sich aus der empirischen Studie IV und der letzten Expertenevaluierung zusammen. Neben dem Ziel der weiteren Validierung von Konzept und Skala wurde Studie IV dafür entwickelt um direkte, indirekte und Interaktionseffekte zu analysieren und Mediatoren und Moderatoren zu bestimmen.

Im Gegensatz zu den vorherigen Studien weist **Studie IV** ein experimentelles Within-Subjects-Design auf. Im Rahmen der Studie wurden Studenten (N= 79) in das Konsumentenverhaltensforschungslabor des A&F Marketing Lehrstuhles der Universität zu Kiel eingeladen um dort einzeln an zwei für sie voneinander unabhängigen Studien teilzunehmen. Um testen zu können, ob eine affektive Route „Design Experience“ indirekt beeinflusst, wurde eine Stimmungsinduzierung in Kombination mit einem sogenannten „Emotional Freeze“ angewendet. Ein geschulter Mitarbeiter kontrollierte laufend die Stimmungsmanipulation, die „Emotional Freeze“-Prozedur und überwachte die Versuchsanordnung. Die Probanden wurden zufällig den Gruppen „Emotional Freeze“ und „Design Experience“ intensiv oder schwach zu gewiesen. Die Auswahl der Stimuli und deren Manipulation erfolgte nach denselben Kriterien wie in Studie II und Studie III. Um die Manipulation der „Design Experience“ noch zu erhöhen, nutze Studie IV zusätzlich einen Primingeffekt. Die Teilnehmer wurden aufgefordert, Fragen zur „Design Experience“, zur Attraktivität, Bindung, Kaufintension und Zufriedenheit des gezeigten Stimulus zu beantworten. Des Weiteren enthielt der Fragebogen Variablen zu CVPA und Miteinbezogenheit („involvement“) um mögliche alternative moderierende Effekte testen zu können. Die korrelierten Daten wurden mit Hilfe Linearer Gemischter Modelle analysiert.
Die Ergebnisse deuten darauf hin, dass alle Manipulationen erfolgreich waren. Zudem unterstützen die Ergebnisse die empirische Validierung des Konzeptes und seiner Skala. Die Ergebnisse deuten zudem darauf hin, dass das Konzept „Design Experience“ sich statistisch klar von bestehenden Konzepten (z.B.: Zufriedenheit, Miteinbezogenheit („involvement“)) differenzieren lässt und bestätigen somit die Diskriminanzvalidität. Die Ergebnisse mehrerer explorativer und konfirmatorischer Faktorenanalysen bestätigen weiterhin eine klare, einfach zu interpretierende aus fünf Dimensionen bestehende innere Struktur, die sowohl der theoretischen Konzeptualisierung dieser Arbeit als auch vorangegangener Arbeiten entspricht und zudem durch statistisch zufriedenstellende Ergebnisse untermauert wird. Einer der fünf Faktoren besteht aus zwei Faktoren zweiter Ordnung.
Die Ergebnisse der Studie liefern zudem klare Beweise dafür, dass eine positive, intensive „Design Experience“ das Konsumentenverhalten beeinflusst (z.B.: Attraktivität,

Kaufintension). Des Weiteren wird das angenommene indirekte Affektmodel zum Teil bestätigt. Im Detail zeigen die Ergebnisse, dass der Aspekt Freude („pleasure“) als Mediatorvariable das Verhältnis zwischen „Design Experience“ und einer Reihe verschiedener Konsumentenverhaltensvariablen, wie zum Beispiel Kaufintension oder Attraktivität beeinflusst. Es konnte jedoch kein Zusammenhang zwischen „Design Experience“ und dem Aspekt Erregung („arousal“) nachgewiesen werden. Die Ergebnisse unterstützen zudem die Annahme, dass Interaktionseffekte abhängig von persönlichen Charakteristika und der Produktkategorie des Stimulus existieren. Konkret bestätigte Studie IV die Annahme, dass die Intensität einer „Design Experience“ von individuellen Veranlagungen wie CVPA und Miteinbezogenheit („involvement“) moderiert werden und darüber hinaus auch von der jeweiligen Produktkategorie abhängen.
Die **letzte Expertenevaluierung** attestierte der Skala „Design Experience“ abschließend ein hohes Maß an Plausibilität und Inhaltsvalidität.

Zusammenfassend bietet die vorliegende Dissertation eine neue Herangehensweise um Produktdesign und seine Effekte auf das Konsumentenverhalten zu analysieren, indem es Erkenntnisse aus dem Bereich Designforschung mit dem Ansatz „Experience“ kombiniert. Hierfür wird basierend auf einer ausführlichen Literaturrecherche von Forschungsansätzen und Ergebnissen aus den Bereichen Design und „Experience“ das Konzept „Design Experience“ entwickelt und anschließend in einem dreistufigen Prozess operationalisiert. Die Operationalisierung beinhaltet vier empirische Studien sowie vier Expertenbewertungen um die Skala nach gängigen Methoden zu entwickeln und zusammen mit dem Konzept zu validieren. Diese Arbeit erweitert die „Experience“- und Designforschung um das neue theoretisch fundierte und empirisch validierte Konzept „Design Experience“ und eine valide, objektive und zuverlässige Messskala bestehend aus 12-Items.

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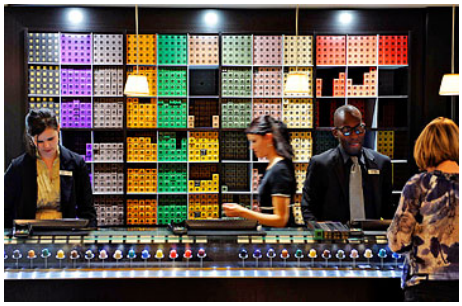
Appendix A: The Experience Concept

Table 71: Collection of Experience Examples

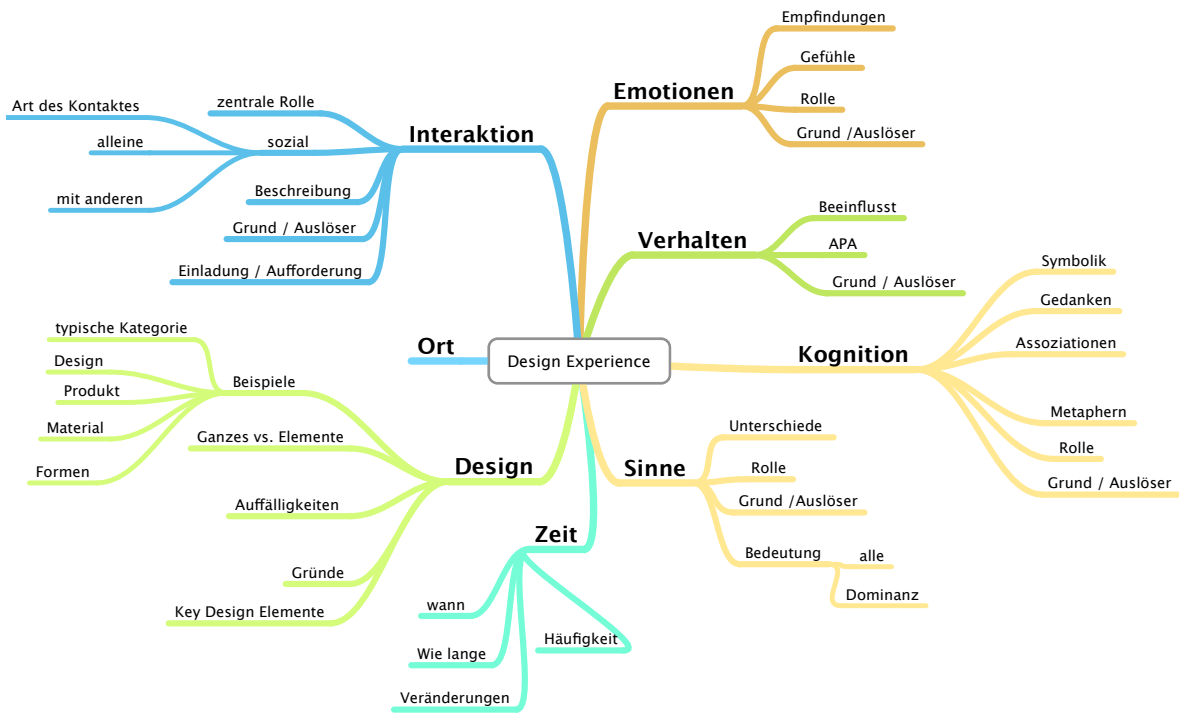
Brand / Product	Example	Example
BMW Driving Experience	 TechDrive 2015	"The ultimate Driving Experience" TechDrive 2015
Nespresso Coffee Experience	NESPRESSO. Gourmet Experience TheFWA 2015	 TheFWA 2015
	 Bloor-Yorkville BIA 2015	 Bloor-Yorkville BIA 2015
SANIFAIR Toilet Experience	 SANIFAIR GmbH 2015	"Bei SANIFAIR kommen auch die Kleinsten nicht zu kurz! Damit der Toiletten-Halt zum echten Erlebnis wird, bietet SANIFAIR für Familien mit Kindern besondere Vorteile" SANIFAIR GmbH 2015

Source: author's own collection

Appendix B: Study I: Interview Guideline and Examples

Interview Guideline

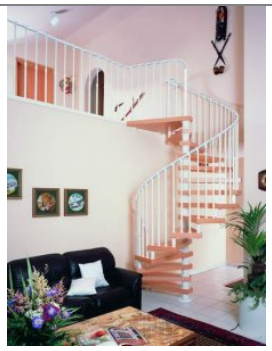
1. Introduction: Project, agenda and rules of interview
2. Role of experts for operationalization
3. Icebreaker: Professional background, current projects
4. Design Experience:
    a. Experience in general and design experience in particular
    b. Examples of strong and weak design experiences
    c. Design as a whole or special features of a design
    d. Interaction with design
    e. Moment of encounter
    f. Sensory perception and their importance
    g. Reactions in general and in particular affective, cognitive, behavioral, and social reactions
5. Further comments to and questions of the participant about the project

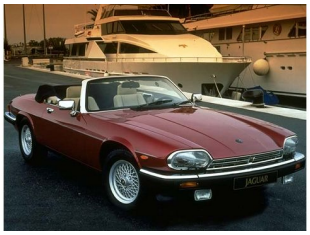


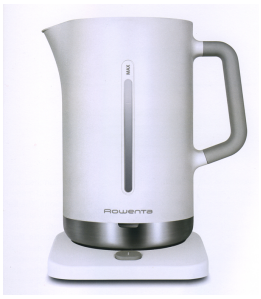
Study I: Mind Map
Source: author's own illustration

Table 72: Examples Expert Interviews

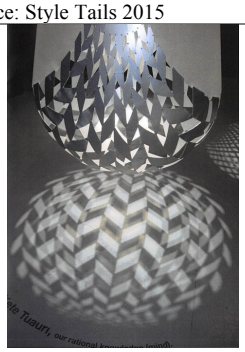
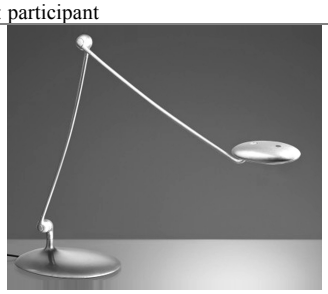
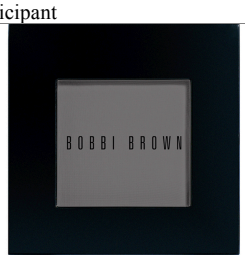
Participant	Product Category	Positive	Negative
Iris	Lamp	 Unknown Source: participant	 Unknown Source: participant
	Chair	 Dedon, "Nest" Source: Style Tails 2015)	 Unknown Source: participant
Stefanie	Storage container	 Rosti Mepal, "Volumina" Source: artvoll 2015	 Unknown Source: participant
	Pen	 Porsche Design, "Shake Pen" Source: Stolz-Schimpf and Stolz 2015	 Unknown Source: participant
	Cosmetics eyecare	 GoodSkin, "Tri Aktiline" Source: Parfümerie Douglas GmbH 2015	 Korres, "Eye Mata" Source: participant

Participant	Product Category	Positive	Negative
Sonja	Food processor	 KitchenAid, "Artisan" Source: Callwey GmbH & Co. KG 2015	 Kenwood ,"kMix" Source: nettoShop.ch 2015
	Ventilator	 Dyson, „Air Multiplier Ventilator" Source: Red Dot GmbH & Co. KG 2015	 Unknown Source: participant
David	Chair	 Thonet "Freischwinger S43" by Mart Stam Source: adero Design 2015	 Plank, „Myto" by Konstantin Grcic Source: participant
Klaus	Staircase	 LaRoche "Fuel oil tank III" by Hoffmann, Nutley, New Jersey Source: participant	 Kengott "Spindeltreppe" Source: participant
		 La Roche AG, Bau 15 by Dr. Roland Rohn, Prof. Otto R. Salvisberg Source: participant	 La Muralla Roja by Ricardo Bofil Source: participant

Participant	Product Category	Positive	Negative
Christoph	Sneakers	 Nike Source: participant	 Asics Source: participant
	Automobile	 Jaguar Source: participant	 Hyundai Source: participant
Stephan	Chair	 Magis “Chair One Concrete Base” by Konstantin Grcic Source: Nest.co.uk Ltd 2016	 Vitra “Waver” by Konstantin Grcic Source: Vitra AG, a Swiss corporation 2015
	Clothes rack	 Nils Holger Moormann. “Pin Coat” by Oliver Bahr Source: participant	 Keilbach, “Naomi” by Peter Keilbach Source: participant
Christian	Chair	 Vitra “Achille Castiglioni” Source: Connox GmbH 2015	 Plank, „Myto“ by Konstantin Grcic Source: participant

Participant	Product Category	Positive	Negative
	Electric water kettle	 Rowenta by Jasper Morrison Source: Howard 2015	 Unknown Source: participant
	Push-along cars for children	 La femme et la maison, “Konstantin B” by Nika Zupanc Source: Truffledigger GmbH 2015	 BMW “Baby Racer” Source: Sesselmann 2015
	Tights	 LaPerla Source: participant	 Elbeo Source: participant
	Vases	 Alessi by Alessandro Mendini Source: Questo Design 2015	 Vase iittala by Alva Aalto Source: Stylepark AG 2015
	Pot	 iittala, Dahlström Source: Illums Bolighus 2015	 Unknown Source: participant

Participant	Product Category	Positive	Negative
	Smart phone	 Aesir, „Æ+Y phone“ Yves by Behar Source: Superyachts.com 2015	 Apple, „iPhone 4s“ by Jonanthan Ive Source: ConCord Remarketing GmbH 2015
Michael	Automobile	 Porsche “911 Carrera” Source: participant	 Weber Sportscar “Faster One” Source: participant
	Laptop	 Apple “Macbbok Pro” Source: participant	 Samsung Notebook “R580” Source: participant
Gottfried	Lamp	 Unknown Source: participant	 Unknown Source: participant
	Chair	 Unknown Source: participant	 Unknown Source: participant

Participant	Product Category	Positive	Negative
Jürgen	Chair	 Dedon "Nest" Source: Style Tails 2015	 Unknown Source: participant
	Lamp	 Unknown Source: participant	 Unknown Source: participant
	Wall decoration	 Unknown Source: participant	 Unknown Source: participant
Nina	Desk lamp	 Benjamin Hubert, "heavy desk light Source: participant	 Artemide Ross, "Grifo" by Lovegrove Source: participant
	Cosmetics	 Nars, "Exotica" Source: participant)	 Bobbi Brown, "Mono-Eyeshadow-Series" Source: participant

Participant	Product Category	Positive	Negative
	Table wear	 Villeroy & Boch, “Acapulco“ Source: participant	 Villeroy & Boch, “Acapulco New Wave“ Source: participant
	Sofa	 Matthew Hilton, “Hepburn“ Source: participant	 Verzelloni, “Hampton Memory” Source: participant

Source: author’s own compilation

Appendix C: Item Pools

Table 73: Items from Expert Interviews

Category	Item
Gedanken	Ich mache mir Gedanken über das Design.
	Ich denke darüber nach.
	Aufgrund des Designs muss man nicht darüber nachdenken wie das Produkt funktioniert.
Assoziationen	Das Design vermittelt etwas.
	Das Design ruft Assoziationen hervor.
	Das Design löst innere Bilder aus.
Identifikation mit dem Design	Ich identifiziere mich mit dem Design.
Definition über das Design	Ich definiere mich über das Design.
Interessant finden	Ich finde dieses Design sehr interessant.
Erwartungen	Das Design erfüllt genau meine Erwartungen.
Ideen	Das Design bringt mich auf Ideen.
Erfahrungen	Mit dem Design verbinde ich positive Erfahrungen.
Kenntnis	Ich habe viel Kenntnis über das Design.
Erinnerungen	Das Design erinnert mich an etwas.
	Das Design erinnert mich an meine Kindheit.
	An das Design kann ich mich gar nicht mehr erinnern.
	Ich erinnere mich daran als ich das Design zum ersten Mal gesehen habe.
Geschichte	Das Design hat eine Geschichte.
Verwunderung	Das Design erzeugt Stirnrunzeln bei mir.
	Das Design verwundert mich.
Rätselhaft	Das Design ist für mich ein Rätsel.
sich fragen	Ich frage mich wie haben sie das Design gemacht.
	Ich weiß nicht was die Designer sich bei dem Design gedacht haben.
	Ich frage mich wie das Design funktioniert.
	Ich frage mich wie man auf so eine Designidee kommen kann.
	Ich frage mich wer das gestaltet hat?
	Ich frage mich was für eine Idee / Intension hinter dem Design stecken soll.
Poesie	Das Design hat etwas Poetisches.
Träumen	Das Design regt zum träumen an.
Phantasie	Das Design regt die Phantasie an.
Erzählung	Das Design erzählt mit etwas.
Ironie	Das Design wirkt ironisch.
Wiedererkennen	Ich erkenne das Design wieder.
Vision, Zukunft	Das Design hat Vision und Zukunft.
verstehen	Ich verstehe das Design.
Freude	Ich freue mich sehr über das Design.
Begeisterung	Ich bin von dem Design begeistert.
	Ich bin von der Designidee begeistert.
	Das Design löst ein Bedürfnis in mir aus.
WOW-Effekt	Das Design löst einen WOW-Effekt aus.
	Das Design löst einen AHA-Effekt in mir aus.
Überraschung	Das Design überrascht mich

Category	Item
	Ich bin positiv überrascht von dem Design.
	Das Design ist erstaunlich.
	Das Design hat einen Überraschungseffekt.
Vertrauen	Das Design weckt Vertrauen in mir.
Enttäuschung	Ich bin enttäuscht von dem Design.
Beziehung	Zu dem Design habe ich eine persönliche Beziehung.
sich ärgern	Ich ärgere mich über das Design.
	Das Design, die Art der Gestaltung regt mich auf.
jemanden berühren	Das Design hat mich berührt.
Faszination	Das Design hat mich fasziniert.
Spürbar	Ich kann das Design spüren und fühlen.
abstoßen	Das Design stößt mich ab.
Bewunderung	Ich bewundere das Design.
	Ich bewundere die Arbeit der Designer des Produktes.
	Ich bewundere die Verarbeitung des Designs.
	Das Design imponiert mir.
Liebe des Designers	Man spürt die Liebe des Designers zum Produkt.
	Man erkennt am Design des Produktes das Können des Gestalters.
Spannung	Das Design ist spannend. .
Neugierde	Das Design macht neugierig.
	Das Design macht neugierig es genauer anzusehen.
	Das Design macht neugierig es anzufassen.
	Das Design macht neugierig es auszuprobieren.
Spaß	Das Design macht Spaß.
betrogen fühlen	Ich fühle mich von dem Design betrogen.
	Das Design wirkt falsch.
	Ich fühle mich von dem Design manipuliert.
schönes gefühl	Das Design gibt mir als Nutzer ein schönes Gefühl.
Emotionen	Das Design weckt in mir Emotionen.
	Das Design weckt Gefühle.
Langeweilie	Das Design ist langweilig.
Stolz	Ich bin stolz auf das Design.
Irritation	Das Design irritiert mich.
Herzeigen	Ich möchte das Design herzeigen.
Teilhaben lassen	Ich möchte andere an meinem Design teilhaben lassen.
Erzählen	Ich erzähle anderen von dem Design.
	Ich rede mit anderen über das Design.
	Ich diskutiere mit anderen über das Design.
Interaktion	Ich interagiere mit dem Design.
Angesprochen	Das Design spricht mich an.
Aufmerksamkeit	Das Design hat meine Aufmerksamkeit erregt.
entdecken	Ich möchte das Design entdecken.
	Das Design möchte ich erforschen.
Wunsch, Berührung	Ich möchte das Design anfassen.
	Das Design regt dazu an, es anzusehen.
Wunsch Benutzung	Ich möchte es gerne benutzen.

Category	Item
	Ich möchte es gerne immer wieder benutzen.
Ausprobieren	Ich möchte das Design gerne ausprobieren.
Erleichterung	Das Design bietet mir eine Erleichterung.
Körperreaktion	Das Design erzeugt eine Gänsehaut.
	Das Design geht mir unter die Haut.
Ausprobieren	Ich möchte das Design gerne ausprobieren.
	Das Design lädt dazu ein es auszuprobieren.
fordert zur Interaktion	Das Design fordert von mir eine Reaktion.
	Das Design fordert körperliche Bewegung / Reaktion um es erleben zu können.
Einladung es zu erleben	Das Design lädt mich dazu ein es zu erleben.
	Das Design lädt mich ein es auszuprobieren.
	Das Design lädt mich ein auf es zu zugehen.
	Das Design lädt mich ein mit anderen zu interagieren.
Grund für eine Aktion	Das Design ist der Grund für mein Verhalten.
	Das Design ist der Grund für eine Aktion.
	Das Design ist der Auslöser für ein Verhalten.
Vorstellung	Dank dem Design kann ich mir vorstellen wie es ist, es zu benutzen.
darauf zu gehen	Wenn ich das Design sehe, gehe ich weiter.
	Ich gehe auf das Design zu, um es mir genau anzusehen.
Schlange stehen	Für das Design stehe ich an und warte.
	Ich warte um es benutzen zu können.
Besitzen wollen	Ich möchte dieses Design unbedingt haben.
nachgebaut, nachgemalt	Dieses Design habe ich selber nachgemalt.
genießen wollen	Ich will dieses Design genießen.
mehr darüber wissen wollen	Ich will mehr über dieses Design wissen.
	Ich investiere Zeit um mehr über das Produkt zu erfahren.
Erleben	Ich möchte es erleben.
zeigt mir was zu tun ist	Das Design zeigt mir wie ich es benutzen muss.
Nachteile	Das Design gefällt mir so gut, dass ich über kleine funktionale Nachteile im Vergleich zu anderen Produkten hinweg sehe.
Haptik	Es ist angenehm anzufassen.
	Ich möchte das Design anfassen.
	Das Design hat ein eigenständiges Tasterlebnis.
verschiedene Sinne	Ich erlebe das Design über mehrere Sinne.
	Ich erlebe das Design über alle Sinne.
	Um so mehr Sinne das Design anspricht um so intensiver erlebe ich es.
Sinne anregen	Das Design regt meine Sinne an.
sinnlich	Das Design hat etwas Sinnliches.
Entdecken	Ich möchte das Design sinnlich erfahren.
Geruch	Ich möchte dieses Design riechen.
	Mit dem Design verbinde ich einen bestimmten Geruch.
Visuell	Das Design spricht mich optisch sehr an.
	Ich sehe mir das Design gerne an.
Perfektion	Das Design ist perfekt gemacht.
Funktionalität	Das Design funktioniert.
	Das Design ist praktisch.
	Es ist kein Design sondern rein funktional.

Category	Item
	Es beschränkt sich rein auf die Funktion ohne ästhetische Ansprüche.
	Es ist eine gute Symbiose aus Funktionalität, Gestaltung und Performance.
	Solang mir das Design gefällt, kann ich auch funktionale Abstriche in Kauf nehmen.
	Das Design muss funktionieren.
Kauf	Das Design regt zum Kauf an.
Begierde	Ich möchte dieses Design unbedingt haben.
Bindung	Ich habe eine starke Bindung zu diesem Design.

Source: author's own compilation

Table 74: Items After Step 1

Category	Item Positive	Item Negative
Gedanken	Ich mache mir Gedanken über das Design.	
	Ich denke sehr viel nach, wenn ich dieses Design sehe. (Brakus, Schmitt, and Zarantonello 2009)	
		Das Design regt mich nicht zum nachdenken an.(Brakus, Schmitt, and Zarantonello 2009)
Assoziationen	Das Design vermittelt mir etwas.	
	Das Design ruft Assoziationen hervor.	
		Das Design vermittelt Nichts.
	Das Design löst Bilder aus.	
Interesse	Ich finde dieses Design sehr interessant.	
Erfahrungen	Mit dem Design verbinde ich Erfahrungen.	
Erinnerungen	Das Design hat viele Erinnerungen wach gerufen. (Schifferstein and Desmet 2007)	
	Das Design erinnert mich an Früher.	
	Das Design erinnert mich an Erlebtes.	
		An das Design kann ich mich gar nicht mehr erinnern.
	Ich erinnere mich daran als ich das Design zum ersten Mal gesehen habe.	
Geschichte	Das Design hat eine Geschichte.	
Verwunderung	Das Design hat für mich etwas Rätselhaftes.	
Sich fragen	Ich frage mich wie das Design funktioniert.	
	Ich frage mich welche Intension hinter diesem Design steckt.	
Phantasie	Das Design regt die Phantasie an.	
Erzählung	Das Design erzählt mir etwas.	
		Das Design ist nichtssagend.
Wiedererkennen	Ich erkenne das Design wieder.	
	Das Design hat einen sehr hohen Wiedererkennungswert.	
Vision, Zukunft	Das Designverkörpert eine Vision.	

Category	Item Positive	Item Negative
Verstehen	Ich verstehe das Design.	
		Ich verstehe das Design nicht.
Bedürfnis	Das Design löst ein Bedürfnis in mir aus.	
Effekt	Das Design hat einen starken Effekt auf mich.	
Überraschung	Das Design überrascht mich.	
Beziehung	Zu dem Design habe ich eine persönliche Beziehung.	
Persönlich berührt	Das Design hat mich berührt.	
		Das Design hat mich kalt gelassen.
Faszination	Das Design hat mich fasziniert.	
Spürbar	Ich kann das Design spüren.	
Beziehung Designer Produkt	Man spürt die Liebe des Designers zum Produkt.	
	Man erkennt am Design des Produktes das Können des Gestalters .	
Spannung	Das Design ist spannend.	
Emotionen	Das Design ruft starke Emotionen hervor. (Fornerino, Helme-Guizon, and Gotteland 2008)	
	Das Design hat eine Reihe verschiedener Emotionen hervorgerufen. (Fornerino, Helme-Guizon, and Gotteland 2008)	
	Dank dem Design habe ich Momente intensiver Aufregung gespürt. (Fornerino, Helme-Guizon, and Gotteland 2008)	
	Das Design verursacht Gefühle und Empfindungen. (Brakus, Schmitt, and Zarantonello 2009)	
		Ich habe keine starken Gefühle für das Design. (Brakus, Schmitt, and Zarantonello 2009)
	Das Erlebnis war emotional sehr intensiv. (Schouten, McAlexander, and Koenig 2007)	
	Ich kann mich noch an die Gefühle während des Erlebnisses erinnern. (Schouten, McAlexander, and Koenig 2007)	
	Es war sehr emotional an das Design zu denken. (Schifferstein and Desmet 2007)	
		Das Design weckt gar keine Emotionen.
Herzeigen	Ich möchte das Design herzeigen.	
Überzeugen	Ich möchte andere von dem Design überzeugen.	
Teilhaben lassen	Ich möchte andere an meinem Designerlebnis teilhaben lassen.	
Verbundenheit mit Anderen	Ich hatte den Eindruck mit den anderen verbunden zu sein, auch wenn ich sie nicht kannte. (Fornerino, Helme-Guizon, and Gotteland 2008)	
Erzählen	Ich erzähle anderen von dem Design.	

Category	Item Positive	Item Negative
	Ich diskutiere mit anderen über das Design.	
soziale Interaktion	Das macht soziale Interaktion leichter. (Jordan 2000)	
	Das Design lädt mich ein mit anderen zu interagieren.	
	Manchmal interagiere ich mit Leuten, die um mich herum sind. (Fornerino, Helme-Guizon, and Gotteland 2008)	
Interaktion	Ich interagiere mit dem Design.	
Angesprochen	Das Design spricht mich an.	
Aufmerksamkeit	Das Design hat meine Aufmerksamkeit erregt.	
	Meine ganze Aufmerksamkeit war auf das Design gerichtet. (Schouten, McAlexander, and Koenig 2007)	
Entdecken	Ich möchte das Design entdecken.	
Wunsch, Berührung	Das Design regt dazu an, es anzusehen.	
Ausprobieren	Ich möchte das Design gerne ausprobieren.	
Körperreaktion	Das Design erzeugt eine Gänsehaut.	
	Dieses Design ruft eine Körperreaktionen bei mir hervor. (Brakus, Schmitt, and Zarantonello 2009)	
	Das Design geht mir unter die Haut.	
Aufforderung zur Interaktion	Das Design fordert von mir eine Reaktion.	
Einladung es zu erleben	Das Design lädt mich dazu ein es zu erleben.	
	Das Design lädt mich ein es auszuprobieren.	
	Das Design lädt mich ein auf es zu zugehen.	
	Das Design lädt ein es zu erforschen.	
Grund für eine Aktion	Das Design ist der Grund für mein Verhalten.	
Vorstellung	Dank dem Design kann ich mir vorstellen wie es ist das Produkt zu benutzen.	
Darauf zu gehen/ Genauer ansehen		Wenn ich das Design sehe, gehe ich weiter.
	Ich gehe auf das Design zu, um es mir genau anzusehen.	
mehr darüber wissen wollen	Ich will mehr über dieses Design wissen.	
	Ich investiere Zeit um mehr über das Produkt zu erfahren.	
Neugierde	Das Design macht neugierig.	
	Das Design macht neugierig es genauer anzusehen.	
	Das Design macht neugierig es anzufassen.	

Category	Item Positive	Item Negative
	Das Design macht neugierig es auszuprobieren.	
Erleben	Ich möchte es erleben.	
Zeigt mir was zu tun ist	Das Design zeigt mir wie ich es benutzen muss.	
	Das Produktdesign erklärt die Funktionalität des Produktes.	
	Das Design ist selbsterklärend.	
	Ich möchte es haptisch erleben.	
	Das Design hat ein eigenständiges Tasterlebnis.	
	Ich frage mich wie sich das Design anfasst.	
Verschiedene Sinne	Ich erlebe das Design über mehrere Sinne.	
	Ich finde das Design interessant wegen seiner Sinneseindrücke. (Brakus, Schmitt, and Zarantonello 2009)	
	Ich erlebe das Design mit allen Sinnen.	
Sinne anregen	Das Design regt meine Sinne an.	
		Das Design spricht meine Sinne nicht an. (Brakus, Schmitt, and Zarantonello 2009)
Sinnlich	Das Design hat etwas Sinnliches.	
Entdecken	Ich möchte das Design sinnlich erfahren.	
Geruch	Ich möchte dieses Design riechen.	
	Ich frage mich wie das Design riecht.	
	Mit dem Design verbinde ich einen bestimmten Geruch.	
Visuell	Das Design ist ein visuelles Erlebnis.	
	Dieses Design hinterlässt einen bleibenden bildlichen Eindruck. (Brakus, Schmitt, and Zarantonello 2009)	
	Das Design lädt ein es genauer anzusehen	
Akustik	Die Akustik unterstützt das Designerlebnis.	
klare Vorstellung	Ich habe keine Probleme mir das Design mit geschlossenen Augen vorzustellen. (Landwehr and Orth 2009)	
	Ich habe keine Probleme das Design zu einem späteren Zeitpunkt zu beschreiben. (Landwehr and Orth 2009)	
	Ich sehe dieses Design klar und deutlich vor meinem inneren Auge. (Schifferstein and Desmet 2007)	

Source: author's own compilation

Appendix D: Study II: Questionnaire

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Befragung *Designerlebnis*

Im Rahmen meiner Promotion entwickele ich eine Skala, um das individuelle Erleben von Design („*Designerlebnis*“) messen zu können.

Hierfür benötige ich Ihre Hilfe.

- Bitte lesen Sie sich zunächst die Definition von *Designerlebnis* auf Seite 2 zweimal durch.
- Bitte füllen Sie anschließend den Fragebogen ab Seite 3 aus.

Bitte bewerten Sie jede Aussage im Fragebogen dahingehend, wie gut diese das Konzept *Designerlebnis* Ihrer Meinung nach beschreibt und repräsentiert.
Die Bewertung geht jeweils von 1 = beschreibt überhaupt nicht bis 7 = beschreibt sehr gut.

Bitte beantworten Sie alle Fragen so gut Sie können. Es gibt keine richtigen oder falschen Antworten. Wir sind an Ihrer Meinung interessiert.

Herzlichen Dank für Ihre Teilnahme.

Selbstverständlich werden Ihre Aussagen vertraulich behandelt und nur in aggregierter Form im Rahmen meiner Dissertation verwendet.

Bei Fragen erreichen Sie mich unter kscheub@ae.uni-kiel.de oder 0431- 880 1169.

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Definition *Designerlebnis*

Designerlebnis ist ein ganzheitlicher Ansatz, der das individuelle Phänomen des Er-Lebens von Design konzeptionalisiert. Design wird mit allen Sinnen wahrgenommen und auf der emotionalen und kognitiven Ebene verarbeitet. Weiter zählen dazu die vielfältigen Reaktionen wie Gefühle, Gedanken, Assoziationen und Verhalten, die Design auslösen kann. *Designerlebnis* ist damit ein multidimensionales Konzept, das sich aus affektiven, kognitiven, verhaltensrelevanten und sinnesbezogenen Dimensionen zusammensetzt.

Die **Intensität** eines *Designerlebnisses* ist abhängig von der Interaktion zwischen der Person und dem Design; umso intensiver, vielfältiger und aktiver die Interaktion zwischen den beiden ist, umso intensiver ist das Erlebnis. Ein intensives *Designerlebnis* kann sowohl positiv als auch negativ sein; kann zum Beispiel absolute Begeisterung oder aber Abscheu auslösen.

Design bedeutet in diesem Zusammenhang die äußere Gestaltung eines Produktes, also seine Form, seine Materialität und Farbigkeit. Ergonomie und die Gestaltung von Bedienoberflächen gehören in diesem Fall nicht dazu. Das multisensorische Erleben von Design beinhaltet visuelle, haptische (Tastsinn), akustische (Gehörsinn) und olfaktorische (Geruchssinn) Sinneseindrücke.

2

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TEIL I: Allgemeine Fragen zu *Designerlebnis*

1. Bitte nennen Sie ein Produkt, dessen Design bei Ihnen ein **positives**, intensives *Designerlebnis* auslöst (Definition siehe S.2):

_____

2. Bitte nennen Sie ein Produkt, dessen Design bei Ihnen ein **negatives,** intensives *Designerlebnis* auslöst:

_____

3. Für mich ist das **intensivere** *Designerlebnis* ...	
das Positive	O
das Negative	O

TEIL II: Bewertung der Aussagen, die *Designerlebnis* beschreiben

1. Bitte bewerten Sie die folgenden Aussagen dahingehend, wie gut sie das Konzept *Designerlebnis* Ihrer Meinung nach beschreiben und repräsentieren.
Bitte bewerten Sie jede Aussage einzeln und denken Sie stets an das **für Sie intensive, positive** *Designerlebnis*.

Diese Aussage beschreibt mein *Designerlebnis*...		**beschreibt überhaupt nicht**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**beschreibt sehr gut**
1	Mit diesem Design verbinde ich einen bestimmten Geruch.		0	0	0	0	0	0	0	
2	Dieses Design hat mich emotional sehr berührt.		0	0	0	0	0	0	0	
3	Dieses Design ist der Grund für mein Verhalten.		0	0	0	0	0	0	0	
4	Dieses Design erzeugt eine Gänsehaut.		0	0	0	0	0	0	0	
5	Mit diesem Design verbinde ich eine Geschichte.		0	0	0	0	0	0	0	

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	Diese Aussage beschreibt mein *Designerlebnis*...	**beschreibt überhaupt nicht**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**beschreibt sehr gut**
6	Dieses Design ist ein visuelles Erlebnis.		0	0	0	0	0	0	0	
7	Ich möchte dieses Design mit meinen Händen erleben.		0	0	0	0	0	0	0	
8	Es ist sehr emotional, an dieses Design zu denken.		0	0	0	0	0	0	0	
9	Dieses Design ist nichtssagend.		0	0	0	0	0	0	0	
10	Ich diskutiere mit anderen sehr gerne über dieses Design.		0	0	0	0	0	0	0	
11	Dieses Design hat mich fasziniert.		0	0	0	0	0	0	0	
12	Ich gehe auf dieses Produkt zu, um mir sein Design genauer anzusehen.		0	0	0	0	0	0	0	
13	Mit diesem Design verbinde ich einen bestimmten Sound.		0	0	0	0	0	0	0	
14	Dieses Design hat mich emotional nicht berührt		0	0	0	0	0	0	0	
15	Das Design hat ein eigenständiges Tasterlebnis.		0	0	0	0	0	0	0	
16	Dieses Design löst ein Bedürfnis in mir aus.		0	0	0	0	0	0	0	
17	Dieses Design hat ein eigenständiges Geruchserlebnis.		0	0	0	0	0	0	0	
18	Ich möchte dieses Design herzeigen.		0	0	0	0	0	0	0	
19	Ich erzähle anderen von diesem Design		0	0	0	0	0	0	0	
20	Ich interagiere mit diesem Design.		0	0	0	0	0	0	0	
21	An dieses Design kann ich mich nicht mehr erinnern.		0	0	0	0	0	0	0	
22	Dieses Design hinterlässt einen bleibenden bildlichen Eindruck.		0	0	0	0	0	0	0	
23	Ich möchte andere an meinem Designerlebnis teilhaben lassen.		0	0	0	0	0	0	0	
24	Das Design dieses Produktes lädt mich ein, dieses Produkt auszuprobieren.		0	0	0	0	0	0	0	
25	Man spürt die Liebe des Designers zum Produkt.		0	0	0	0	0	0	0	

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	Diese Aussage beschreibt mein *Designerlebnis*...	**beschreibt überhaupt nicht**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**beschreibt sehr gut**
26	Dieses Design ruft eine Reaktion in meinem Körper hervor.		0	0	0	0	0	0	0	
27	Dieses Design hat viele Erinnerungen wach gerufen.		0	0	0	0	0	0	0	
28	Dieses Design hat eine Reihe verschiedener Emotionen hervorgerufen.		0	0	0	0	0	0	0	
29	Dieses Design ruft Assoziationen hervor.		0	0	0	0	0	0	0	
30	Ich erlebe dieses Design über mehrere Sinne.		0	0	0	0	0	0	0	
31	Dieses Design löst keinerlei Emotionen in mir aus.		0	0	0	0	0	0	0	
32	Dieses Design regt meine Sinne an.		0	0	0	0	0	0	0	
33	Dieses Design macht neugierig.		0	0	0	0	0	0	0	
34	Ich habe kein Problem, mir dieses Design mit geschlossenen Augen vorzustellen.		0	0	0	0	0	0	0	
35	Ich kann dieses Design spüren.		0	0	0	0	0	0	0	
36	Dieses Design ist spannend.		0	0	0	0	0	0	0	
37	Wegen der vielen Sinneseindrücke finde ich dieses Design interessant.		0	0	0	0	0	0	0	
38	Dieses Design verursacht intensive Gefühle und Empfindungen.		0	0	0	0	0	0	0	
39	Ich investiere Zeit, um mehr über dieses Design und dieses Produkt zu erfahren.		0	0	0	0	0	0	0	
40	Ich mache mir Gedanken über dieses Design.		0	0	0	0	0	0	0	
41	Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.		0	0	0	0	0	0	0	
42	Ich frage mich, wie sich dieses Design anfühlt.		0	0	0	0	0	0	0	
43	Dieses Design regt meine Phantasie an.		0	0	0	0	0	0	0	
44	Dieses Design fordert von mir eine Reaktion.		0	0	0	0	0	0	0	
45	Ich finde dieses Design sehr interessant.		0	0	0	0	0	0	0	

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	Diese Aussage beschreibt mein *Designerlebnis*...	**beschreibt überhaupt nicht**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**beschreibt sehr gut**
46	Dieses Design geht mir unter die Haut.		0	0	0	0	0	0	0	
47	Dieses Design hat einen starken emotionalen Effekt auf mich.		0	0	0	0	0	0	0	
48	Dieses Design spricht meine Sinne nicht an.		0	0	0	0	0	0	0	
49	Dieses Design überrascht mich.		0	0	0	0	0	0	0	
50	Dieses Design hat sofort meine Aufmerksamkeit erregt.		0	0	0	0	0	0	0	
51	Dieses Design löst innere Bilder bei mir aus.		0	0	0	0	0	0	0	
52	Dieses Design lädt mich ein, auf das Produkt zuzugehen.		0	0	0	0	0	0	0	
53	Ich erinnere mich daran, als ich dieses Design zum ersten Mal gesehen habe.		0	0	0	0	0	0	0	
54	Dank dieses Designs kann ich mir vorstellen, wie es ist das Produkt zu benutzen.		0	0	0	0	0	0	0	
55	Dieses Design regt mich dazu an, mir das Produkt anzusehen.		0	0	0	0	0	0	0	

TEIL III: Fragen zu Ihrer eigenen Person

Bitte geben Sie abschließend noch Ihr Alter und Ihr Geschlecht an: Ich bin ..... Jahre alt und
O weiblich O männlich

Vielen Dank für Ihre Teilnahme!

Appendix E: Study III: Stimuli, Questionnaires

Stimuli Pre-Selection Computer Mouse and Water Kettle

Table 75: Stimuli Pre-Selection Computer Mouse

		
		
		
		
		

Source: author's own compilation

Table 76: Stimuli Pre-Selection Water Kettle

Source: author's own compilation

Definition Design Experience

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Definition *Designerlebnis*

Designerlebnis ist ein ganzheitlicher Ansatz, der das individuelle Phänomen des Er-Lebens von Design konzeptionalisiert. Design wird mit allen Sinnen wahrgenommen und auf der emotionalen und rationalen Ebene verarbeitet. Weiter zählen dazu die vielfältigen Reaktionen wie Gefühle, Gedanken, Assoziationen und Verhalten, die Design auslösen kann. *Designerlebnis* ist damit ein multidimensionales Konzept, das sich aus affektiven, kognitiven, verhaltensrelevanten und sinnesbezogenen Dimensionen zusammensetzt.

Die **Intensität** eines *Designerlebnisses* ist abhängig von der Interaktion zwischen der Person und dem Design; umso intensiver, vielfältiger und aktiver die Interaktion zwischen den beiden ist, umso intensiver ist das Erlebnis. Ein intensives *Designerlebnis* kann sowohl positiv als auch negativ sein; kann zum Beispiel absolute Begeisterung oder aber Abscheu auslösen.

Design bedeutet in diesem Zusammenhang die äußere Gestaltung eines Produktes, also seine Form, seine Materialität und Farbigkeit. Ergonomie und die Gestaltung von Bedienoberflächen gehören in diesem Fall nicht dazu. Das multisensorische Erleben von Design beinhaltet visuelle, haptische (Tastsinn), akustische (Gehörsinn) und olfaktorische (Geruchssinn) Sinneseindrücke.

1

Pretest Questionnaire: Computer Mouse

Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

1

Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

2

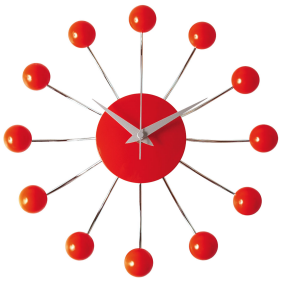
Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

3

Pretest Questionnaire: Wall Clock

Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

1

Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

2

Pretest Questionnaire: Water Kettle

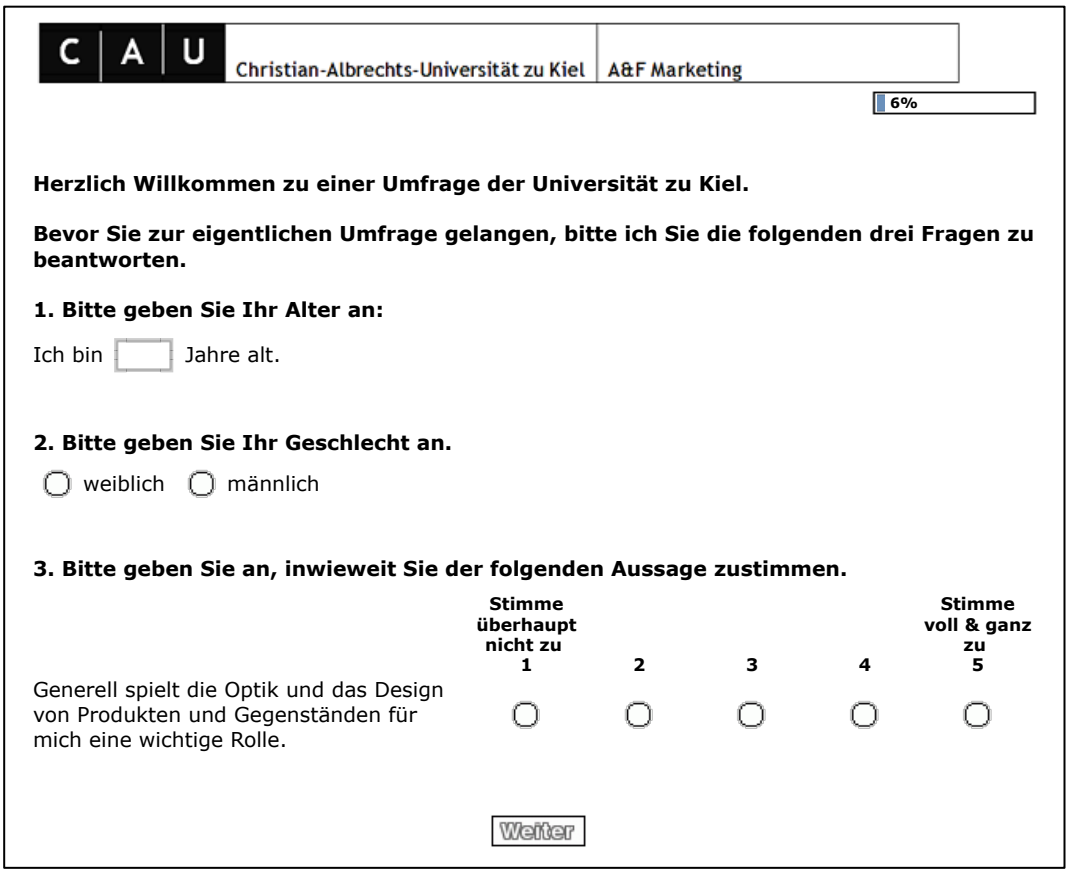
Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

1

Das Design des Produktes löst bei mir ein sehr intensives Designerlebnis aus.	**stimme überhaupt nicht zu**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**stimme voll und ganz zu**
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	

2

Study III: Main Study: Screenshots Unipark Survey

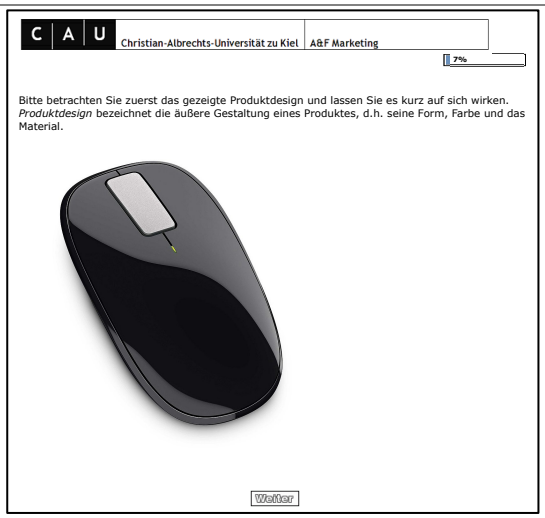
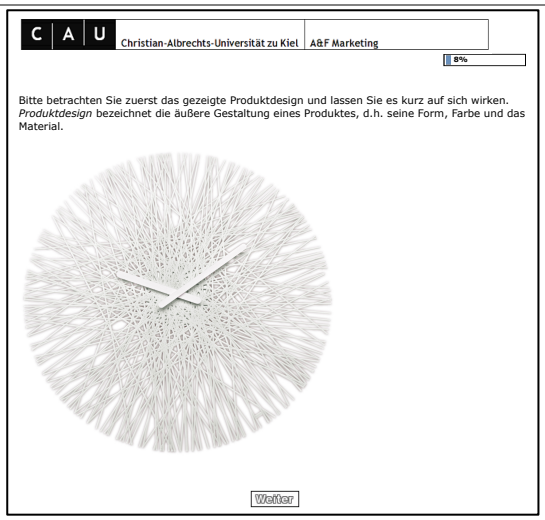
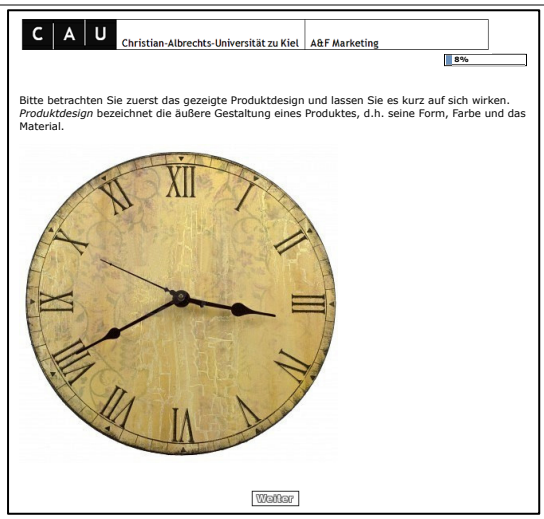


Study III: Welcome Page & Quotation Features

Study III: Full Quota

Study III: Welcome & Procedure

Table 77: Overview Stimuli

Stimuli High	Stimuli Low
	
	
	

Source: author's own compilation

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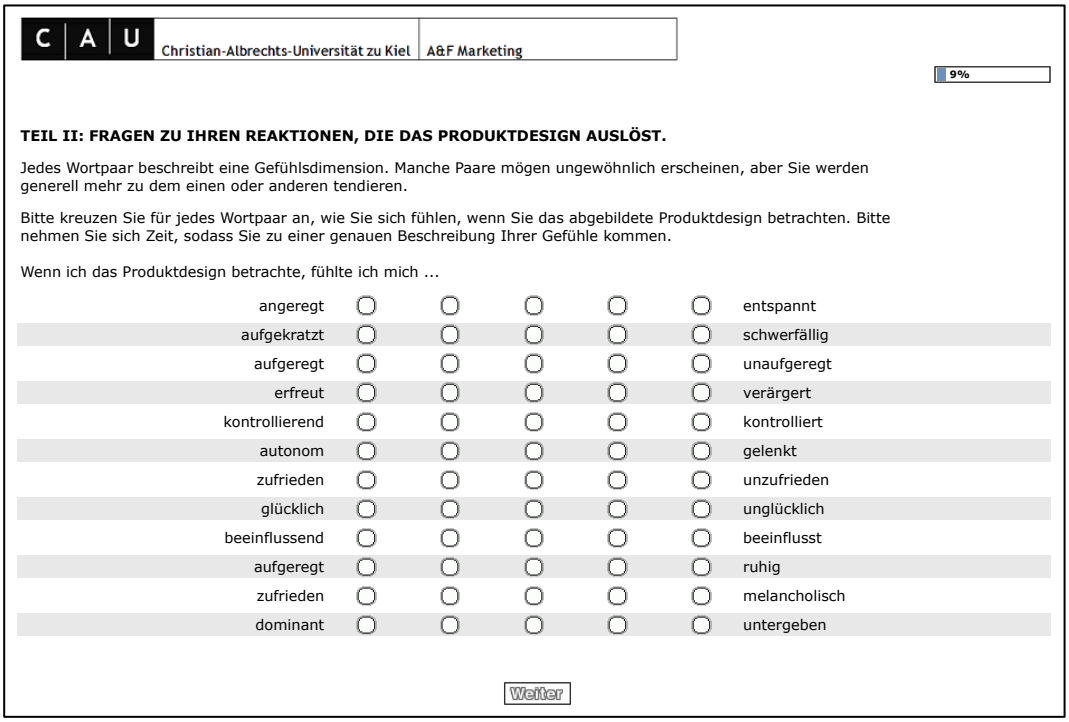
TEIL I: FRAGEN ZU IHRER PRODUKTDESIGNWAHRNEHMUNG

Bitte geben Sie nun an, inwieweit Sie den folgenden Aussagen zustimmen. Alle Aussagen beziehen sich auf das abgebildete Produktdesign.

	Stimme überhaupt nicht zu 1	**2**	**3**	**4**	**5**	**6**	**Stimme voll & ganz zu 7**
Dieses Design hat viele Erinnerungen wach gerufen.	○	○	○	○	○	○	○
Dieses Design hat mich emotional sehr berührt.	○	○	○	○	○	○	○
Dieses Design hat einen starken emotionalen Effekt (positiv oder negativ) auf mich.	○	○	○	○	○	○	○
Ich möchte dieses Produkt mit meinen Händen erleben.	○	○	○	○	○	○	○
Dieses Design ist spannend.	○	○	○	○	○	○	○
Dieses Design verursacht intensive Gefühle und Empfindungen.	○	○	○	○	○	○	○
Ich erzähle anderen von diesem Design.	○	○	○	○	○	○	○
Dieses Design hat sofort meine volle Aufmerksamkeit erregt.	○	○	○	○	○	○	○
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.	○	○	○	○	○	○	○
Ich erlebe dieses Design über mehrere Sinne.	○	○	○	○	○	○	○
Dieses Design regt meine Phantasie an.	○	○	○	○	○	○	○
Dieses Design geht mir unter die Haut.	○	○	○	○	○	○	○
Dieses Design regt meine Sinne an.	○	○	○	○	○	○	○
Ich möchte andere an den Empfindungen, Gedanken und Reaktionen, die dieses Produktdesign bei mir auslöst, teilhaben lassen.	○	○	○	○	○	○	○
Dieses Design lädt mich ein, auf das Produkt zu zugehen.	○	○	○	○	○	○	○
Mit diesem Design verbinde ich eine Geschichte.	○	○	○	○	○	○	○
Dieses Design hat mich fasziniert.	○	○	○	○	○	○	○
Dieses Design ist ein visuelles Erlebnis.	○	○	○	○	○	○	○
Ich diskutiere mit anderen sehr gerne über das Design des Produktes.	○	○	○	○	○	○	○
Ich möchte dieses Design herzeigen.	○	○	○	○	○	○	○
Dieses Design macht neugierig.	○	○	○	○	○	○	○
Dieses Design hat eine Reihe verschiedener Emotionen hervorgerufen.	○	○	○	○	○	○	○
Ich finde dieses Design sehr interessant.	○	○	○	○	○	○	○
Dieses Design löst innere Bilder in mir aus.	○	○	○	○	○	○	○

Weiter

Study III: Design Experience Scale



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TEIL II: FRAGEN ZU IHREN REAKTIONEN, DIE DAS PRODUKTDESIGN AUSLÖST.

Jedes Wortpaar beschreibt eine Gefühlsdimension. Manche Paare mögen ungewöhnlich erscheinen, aber Sie werden generell mehr zu dem einen oder anderen tendieren.

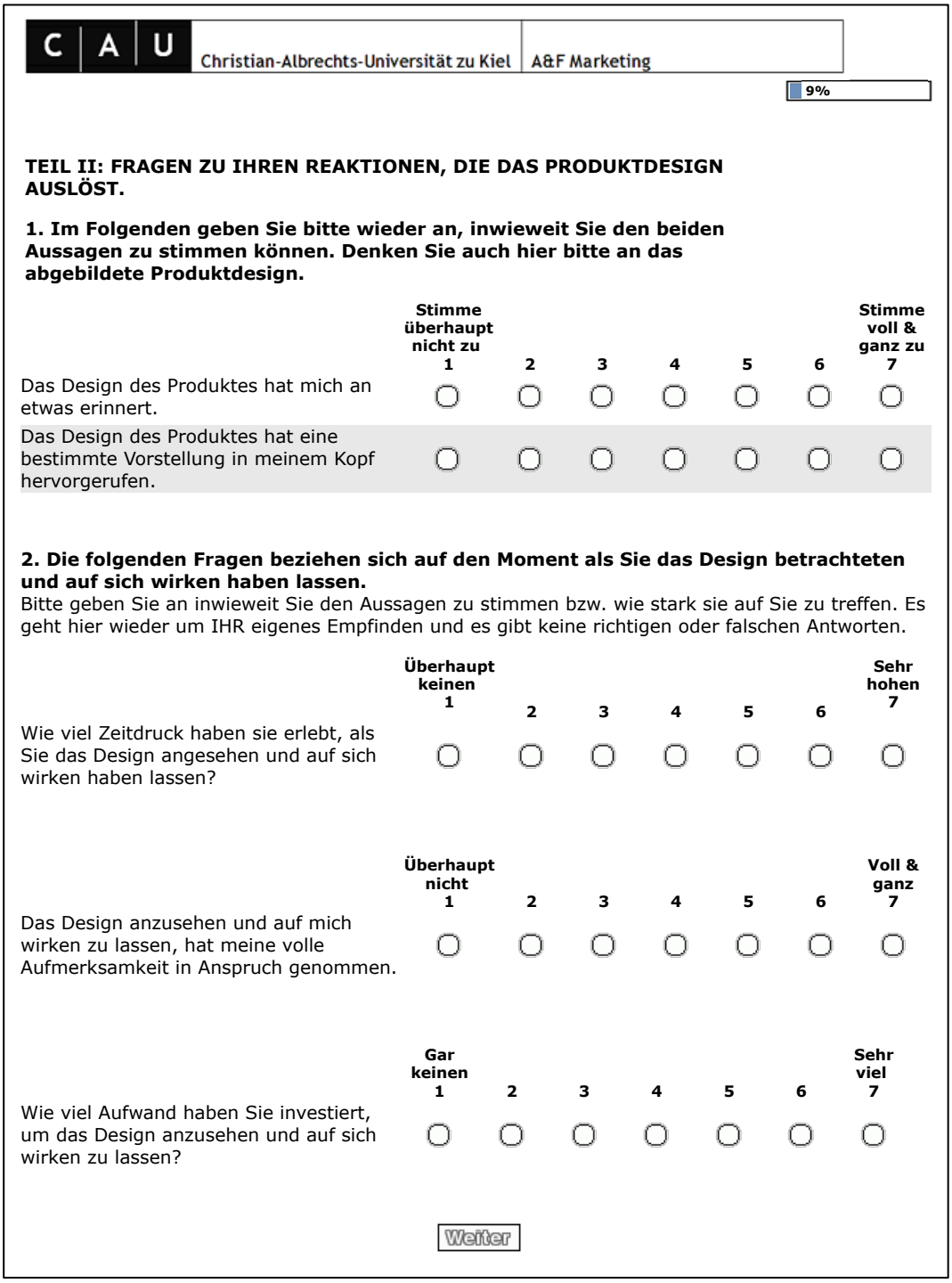
Bitte kreuzen Sie für jedes Wortpaar an, wie Sie sich fühlen, wenn Sie das abgebildete Produktdesign betrachten. Bitte nehmen Sie sich Zeit, sodass Sie zu einer genauen Beschreibung Ihrer Gefühle kommen.

Wenn ich das Produktdesign betrachte, fühlte ich mich ...

angeregt	○	○	○	○	○	entspannt
aufgekratzt	○	○	○	○	○	schwerfällig
aufgeregt	○	○	○	○	○	unaufgeregt
erfreut	○	○	○	○	○	verärgert
kontrollierend	○	○	○	○	○	kontrolliert
autonom	○	○	○	○	○	gelenkt
zufrieden	○	○	○	○	○	unzufrieden
glücklich	○	○	○	○	○	unglücklich
beeinflussend	○	○	○	○	○	beeinflusst
aufgeregt	○	○	○	○	○	ruhig
zufrieden	○	○	○	○	○	melancholisch
dominant	○	○	○	○	○	untergeben

Weiter

Study III: Emotional Responses



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TEIL II: FRAGEN ZU IHREN REAKTIONEN, DIE DAS PRODUKTDESIGN AUSLÖST.

1. Im Folgenden geben Sie bitte wieder an, inwieweit Sie den beiden Aussagen zu stimmen können. Denken Sie auch hier bitte an das abgebildete Produktdesign.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Das Design des Produktes hat mich an etwas erinnert.	○	○	○	○	○	○	○
Das Design des Produktes hat eine bestimmte Vorstellung in meinem Kopf hervorgerufen.	○	○	○	○	○	○	○

2. Die folgenden Fragen beziehen sich auf den Moment als Sie das Design betrachteten und auf sich wirken haben lassen.
Bitte geben Sie an inwieweit Sie den Aussagen zu stimmen bzw. wie stark sie auf Sie zu treffen. Es geht hier wieder um IHR eigenes Empfinden und es gibt keine richtigen oder falschen Antworten.

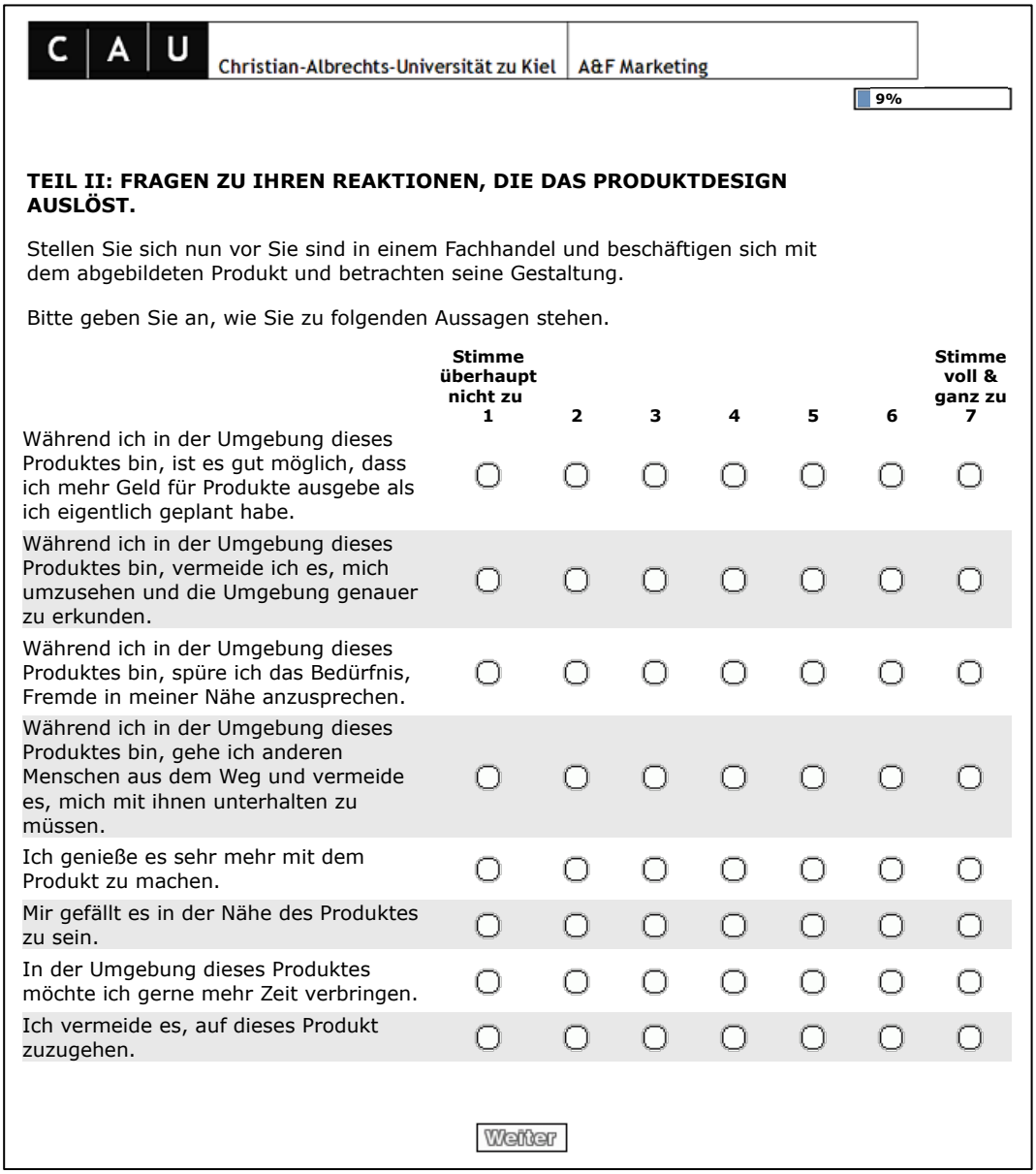
	Überhaupt keinen 1	2	3	4	5	6	Sehr hohen 7
Wie viel Zeitdruck haben sie erlebt, als Sie das Design angesehen und auf sich wirken haben lassen?	○	○	○	○	○	○	○

	Überhaupt nicht 1	2	3	4	5	6	Voll & ganz 7
Das Design anzusehen und auf mich wirken zu lassen, hat meine volle Aufmerksamkeit in Anspruch genommen.	○	○	○	○	○	○	○

	Gar keinen 1	2	3	4	5	6	Sehr viel 7
Wie viel Aufwand haben Sie investiert, um das Design anzusehen und auf sich wirken zu lassen?	○	○	○	○	○	○	○

Weiter

Study III: Cognitive Responses



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TEIL II: FRAGEN ZU IHREN REAKTIONEN, DIE DAS PRODUKTDESIGN AUSLÖST.

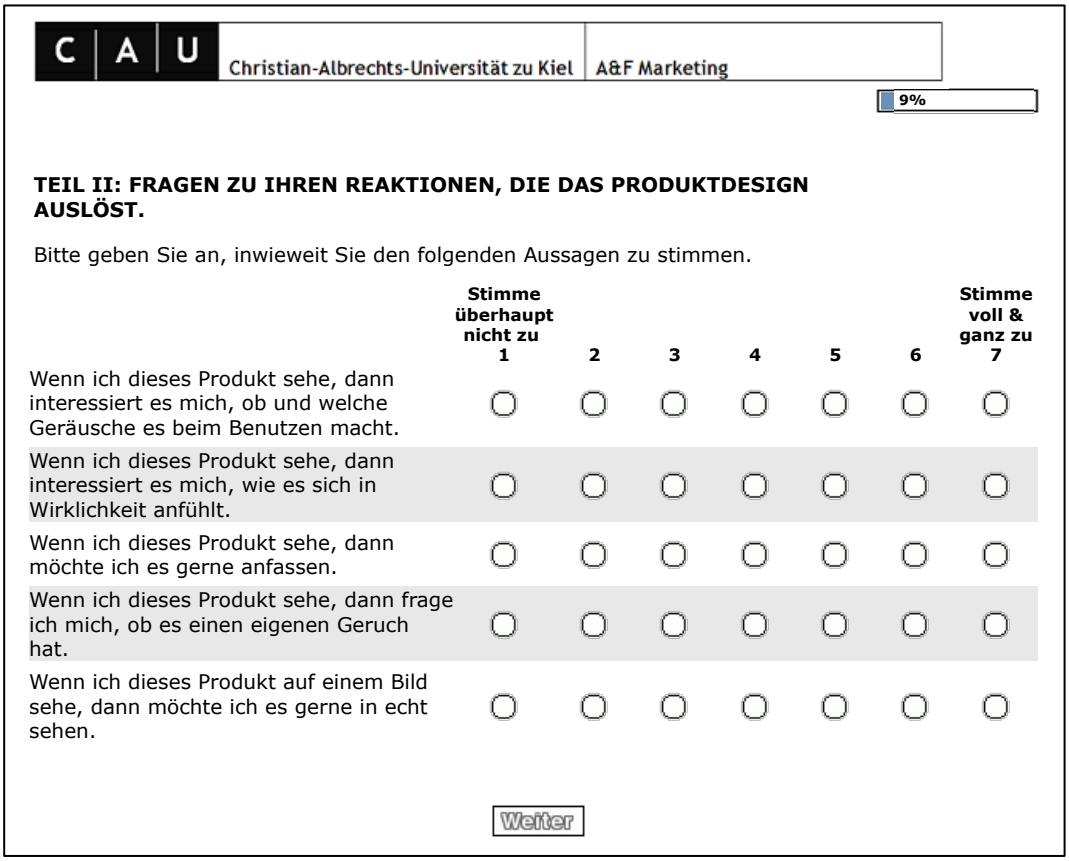
Stellen Sie sich nun vor Sie sind in einem Fachhandel und beschäftigen sich mit dem abgebildeten Produkt und betrachten seine Gestaltung.

Bitte geben Sie an, wie Sie zu folgenden Aussagen stehen.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Während ich in der Umgebung dieses Produktes bin, ist es gut möglich, dass ich mehr Geld für Produkte ausgebe als ich eigentlich geplant habe.	○	○	○	○	○	○	○
Während ich in der Umgebung dieses Produktes bin, vermeide ich es, mich umzusehen und die Umgebung genauer zu erkunden.	○	○	○	○	○	○	○
Während ich in der Umgebung dieses Produktes bin, spüre ich das Bedürfnis, Fremde in meiner Nähe anzusprechen.	○	○	○	○	○	○	○
Während ich in der Umgebung dieses Produktes bin, gehe ich anderen Menschen aus dem Weg und vermeide es, mich mit ihnen unterhalten zu müssen.	○	○	○	○	○	○	○
Ich genieße es sehr mehr mit dem Produkt zu machen.	○	○	○	○	○	○	○
Mir gefällt es in der Nähe des Produktes zu sein.	○	○	○	○	○	○	○
In der Umgebung dieses Produktes möchte ich gerne mehr Zeit verbringen.	○	○	○	○	○	○	○
Ich vermeide es, auf dieses Produkt zuzugehen.	○	○	○	○	○	○	○

Weiter

Study III: Behavioral Responses



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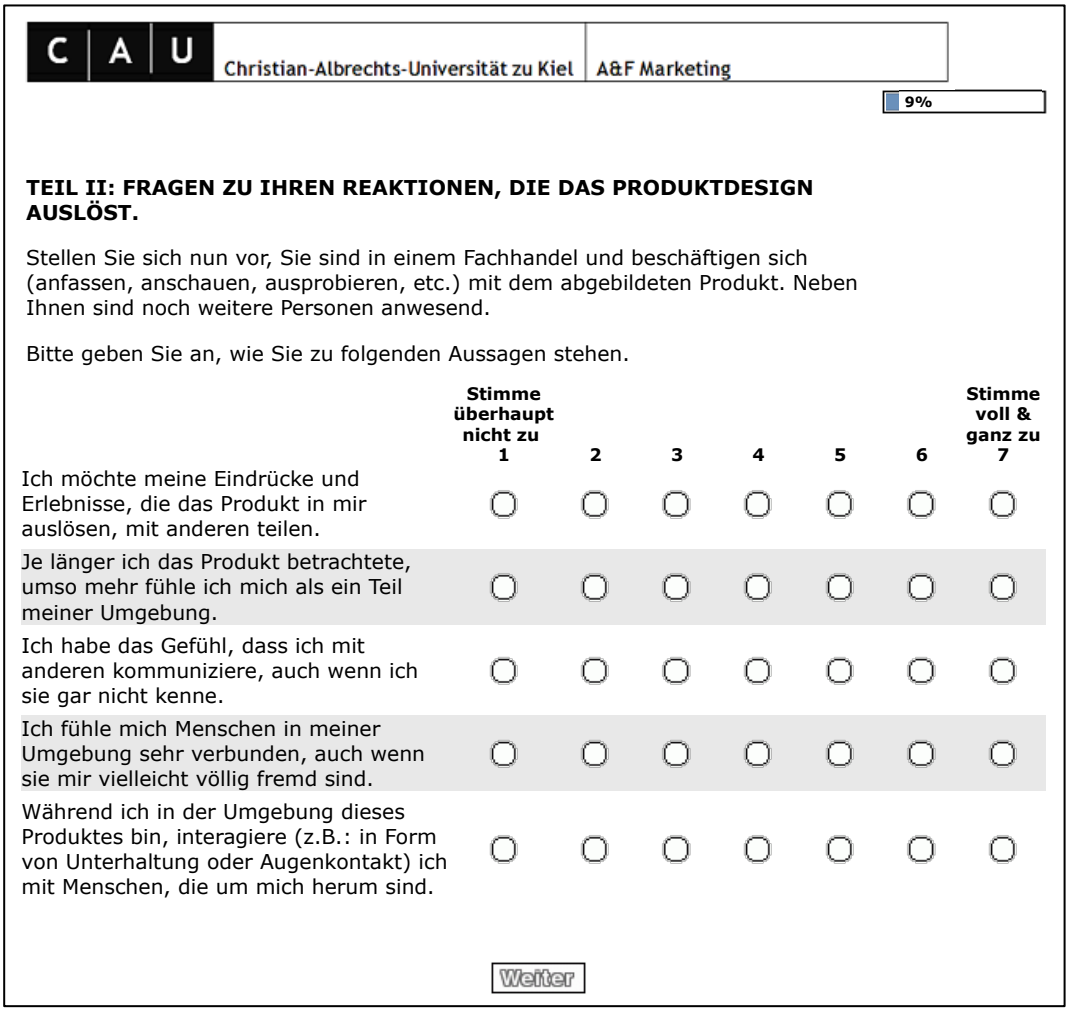
TEIL II: FRAGEN ZU IHREN REAKTIONEN, DIE DAS PRODUKTDESIGN AUSLÖST.

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zu stimmen.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Wenn ich dieses Produkt sehe, dann interessiert es mich, ob und welche Geräusche es beim Benutzen macht.	○	○	○	○	○	○	○
Wenn ich dieses Produkt sehe, dann interessiert es mich, wie es sich in Wirklichkeit anfühlt.	○	○	○	○	○	○	○
Wenn ich dieses Produkt sehe, dann möchte ich es gerne anfassen.	○	○	○	○	○	○	○
Wenn ich dieses Produkt sehe, dann frage ich mich, ob es einen eigenen Geruch hat.	○	○	○	○	○	○	○
Wenn ich dieses Produkt auf einem Bild sehe, dann möchte ich es gerne in echt sehen.	○	○	○	○	○	○	○

Weiter

Study III: Sensory Perception



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TEIL II: FRAGEN ZU IHREN REAKTIONEN, DIE DAS PRODUKTDESIGN AUSLÖST.

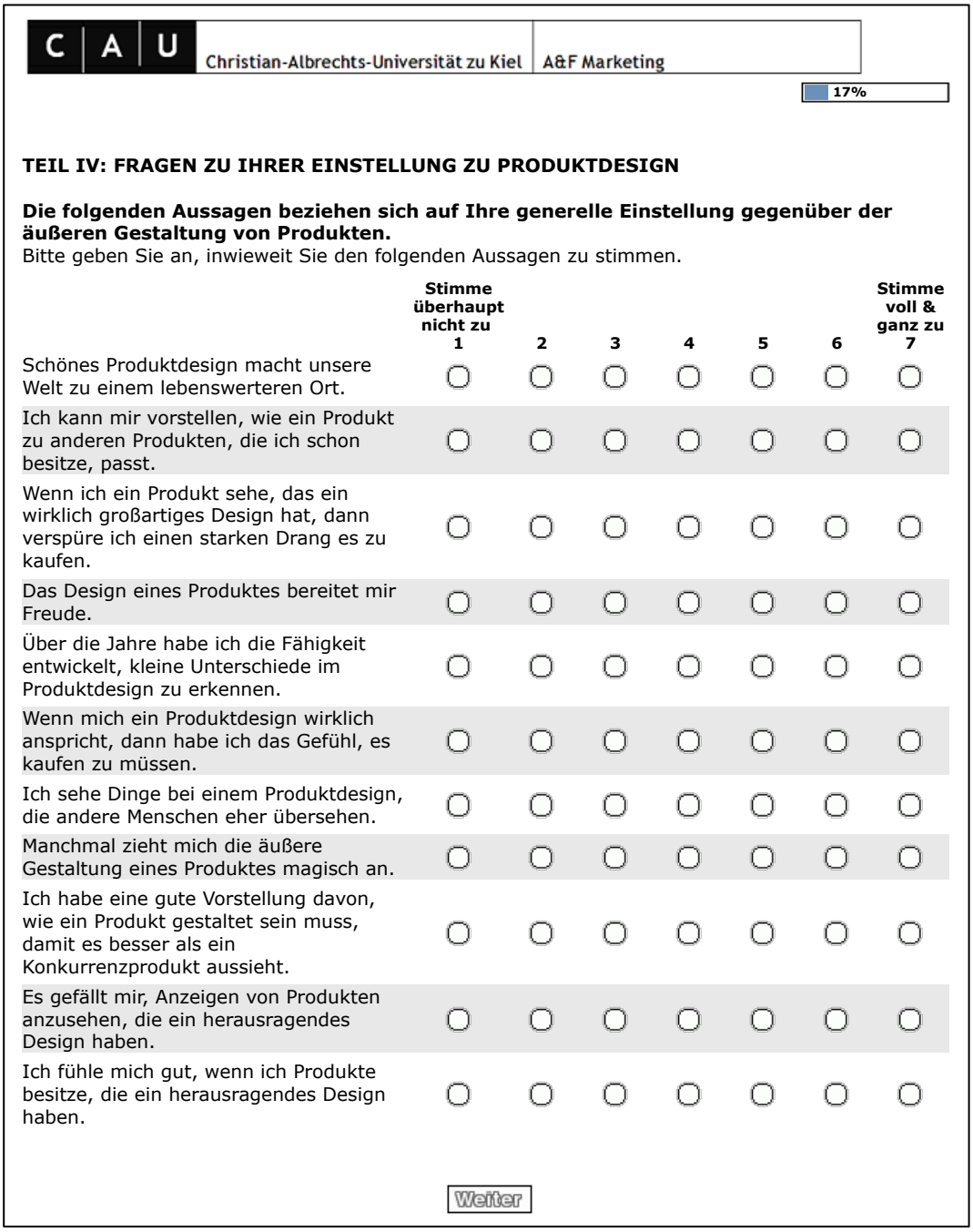
Stellen Sie sich nun vor, Sie sind in einem Fachhandel und beschäftigen sich (anfassen, anschauen, ausprobieren, etc.) mit dem abgebildeten Produkt. Neben Ihnen sind noch weitere Personen anwesend.

Bitte geben Sie an, wie Sie zu folgenden Aussagen stehen.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Ich möchte meine Eindrücke und Erlebnisse, die das Produkt in mir auslösen, mit anderen teilen.	○	○	○	○	○	○	○
Je länger ich das Produkt betrachtete, umso mehr fühle ich mich als ein Teil meiner Umgebung.	○	○	○	○	○	○	○
Ich habe das Gefühl, dass ich mit anderen kommuniziere, auch wenn ich sie gar nicht kenne.	○	○	○	○	○	○	○
Ich fühle mich Menschen in meiner Umgebung sehr verbunden, auch wenn sie mir vielleicht völlig fremd sind.	○	○	○	○	○	○	○
Während ich in der Umgebung dieses Produktes bin, interagiere (z.B.: in Form von Unterhaltung oder Augenkontakt) ich mit Menschen, die um mich herum sind.	○	○	○	○	○	○	○

Weiter

Study III: Social Behavioral Responses



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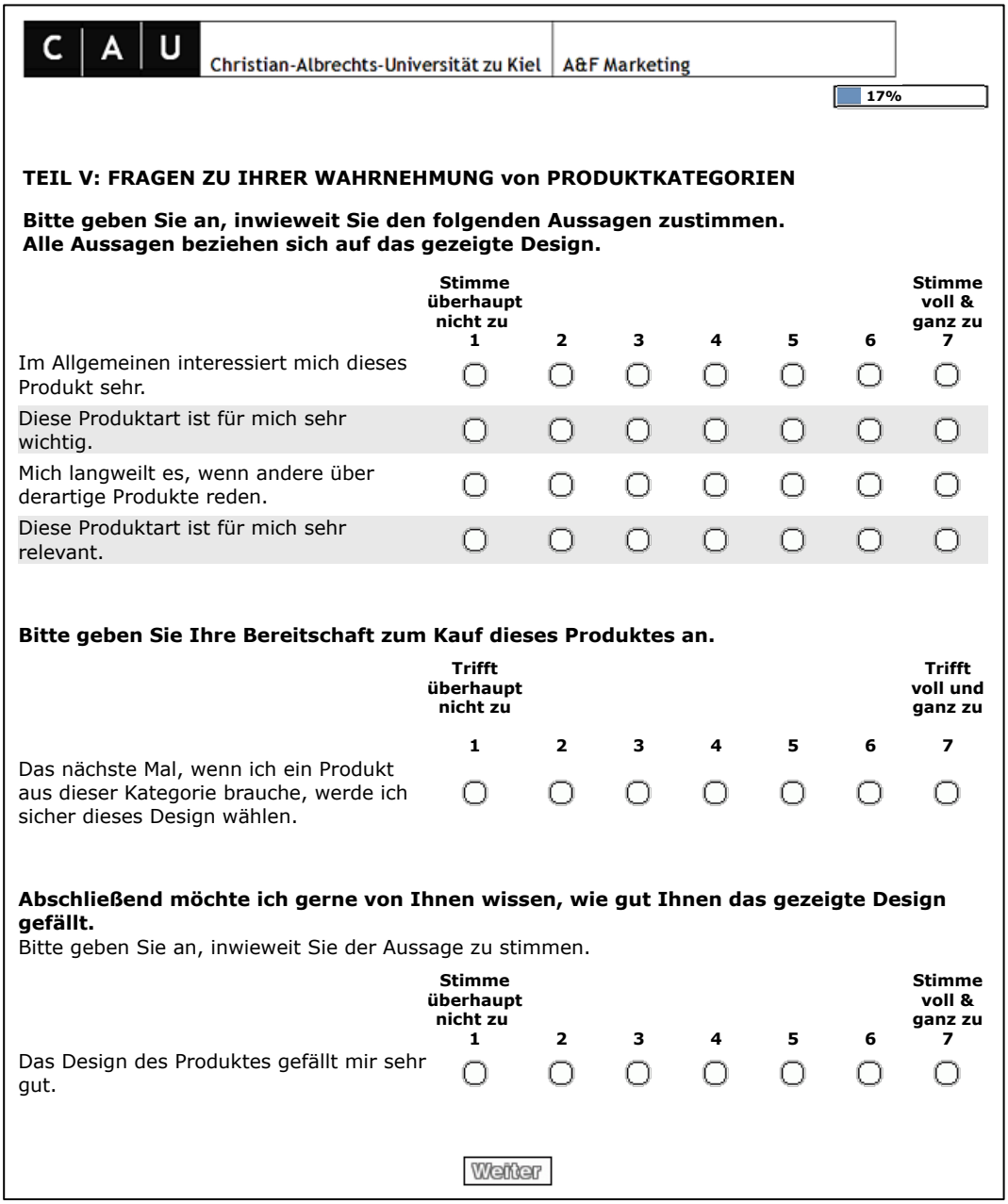
TEIL IV: FRAGEN ZU IHRER EINSTELLUNG ZU PRODUKTDESIGN

Die folgenden Aussagen beziehen sich auf Ihre generelle Einstellung gegenüber der äußeren Gestaltung von Produkten.
Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zu stimmen.

	Stimme überhaupt nicht zu 1	**2**	**3**	**4**	**5**	**6**	**Stimme voll & ganz zu 7**
Schönes Produktdesign macht unsere Welt zu einem lebenswerteren Ort.	○	○	○	○	○	○	○
Ich kann mir vorstellen, wie ein Produkt zu anderen Produkten, die ich schon besitze, passt.	○	○	○	○	○	○	○
Wenn ich ein Produkt sehe, das ein wirklich großartiges Design hat, dann verspüre ich einen starken Drang es zu kaufen.	○	○	○	○	○	○	○
Das Design eines Produktes bereitet mir Freude.	○	○	○	○	○	○	○
Über die Jahre habe ich die Fähigkeit entwickelt, kleine Unterschiede im Produktdesign zu erkennen.	○	○	○	○	○	○	○
Wenn mich ein Produktdesign wirklich anspricht, dann habe ich das Gefühl, es kaufen zu müssen.	○	○	○	○	○	○	○
Ich sehe Dinge bei einem Produktdesign, die andere Menschen eher übersehen.	○	○	○	○	○	○	○
Manchmal zieht mich die äußere Gestaltung eines Produktes magisch an.	○	○	○	○	○	○	○
Ich habe eine gute Vorstellung davon, wie ein Produkt gestaltet sein muss, damit es besser als ein Konkurrenzprodukt aussieht.	○	○	○	○	○	○	○
Es gefällt mir, Anzeigen von Produkten anzusehen, die ein herausragendes Design haben.	○	○	○	○	○	○	○
Ich fühle mich gut, wenn ich Produkte besitze, die ein herausragendes Design haben.	○	○	○	○	○	○	○

Weiter

Study III: CVPA



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TEIL V: FRAGEN ZU IHRER WAHRNEHMUNG von PRODUKTKATEGORIEN

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen.
Alle Aussagen beziehen sich auf das gezeigte Design.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Im Allgemeinen interessiert mich dieses Produkt sehr.	○	○	○	○	○	○	○
Diese Produktart ist für mich sehr wichtig.	○	○	○	○	○	○	○
Mich langweilt es, wenn andere über derartige Produkte reden.	○	○	○	○	○	○	○
Diese Produktart ist für mich sehr relevant.	○	○	○	○	○	○	○

Bitte geben Sie Ihre Bereitschaft zum Kauf dieses Produktes an.

	Trifft überhaupt nicht zu 1	2	3	4	5	6	Trifft voll und ganz zu 7
Das nächste Mal, wenn ich ein Produkt aus dieser Kategorie brauche, werde ich sicher dieses Design wählen.	○	○	○	○	○	○	○

Abschließend möchte ich gerne von Ihnen wissen, wie gut Ihnen das gezeigte Design gefällt.
Bitte geben Sie an, inwieweit Sie der Aussage zu stimmen.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Das Design des Produktes gefällt mir sehr gut.	○	○	○	○	○	○	○

Weiter

Study III: Involvement, Purchase Intention, and Evaluation

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Herzlichen Dank für Ihre Teilnahme!

Study III: Last Page

Appendix F: Study IV: Questionnaires

Scenario-Based Mood Induction and Short Paper Pencil Questionnaire Assessing Participants' Mood

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Herzlich Willkommen

Willkommen zu einer wissenschaftlichen Studie der Universität Kiel zum Thema stimmungsabhängige Informationsverarbeitung.

Die Studie besteht aus mehreren Einzelteilen. Der Versuchsleiter wird Sie dabei durch die Studie führen und Ihnen die nötigen Anweisungen geben.

Bestandteile der Studie sind:

1. Das Lesen und kurze Zusammenfassen eines Textes
2. Nach einer kurzen Pause das Beantworten eines Fragebogens

Die Studie wird ca. 25 Minuten Zeit in Anspruch nehmen.

Selbstverständlich werden Ihre Aussagen vertraulich behandelt und nur für wissenschaftliche Zwecke verwendet.

Bitte blättern Sie nun um und lesen sich die weiteren Anweisungen in Ruhe durch.

1

TEIL 1A): TEXT LESEN

Bitte lesen Sie nun den folgenden Text. Für den Erfolg der Studie ist es wichtig, dass Sie den Text langsam und gewissenhaft lesen. Nehmen Sie sich die Zeit, die Sie benötigen und blättern dann um.

Sie haben ein sehr wichtiges Vorstellungsgespräch. Der Job, für den Sie eingeladen worden sind, scheint ideal für Sie zu sein. Wenn es Ihnen möglich ist, diesen Job zu bekommen, dann erhalten Sie ein hervorragendes Gehalt. Zudem können Sie die Arbeit machen, die Ihnen am meisten Freude bereitet. Verständlicherweise sind Sie aufgeregt und in der Nacht vor dem Interview fällt es Ihnen schwer einzuschlafen. Das Interview findet bereits um 9.00 Uhr morgens statt. Endlich können Sie um 3.00 Uhr morgens einschlafen.

Als Sie das nächste Mal die Augen öffnen, drehen Sie sich langsam in Ihrem Bett und erhaschen einen Blick auf die Uhr. Es ist 8.30 Uhr! Sie haben vergessen den Wecker zu stellen und jetzt beginnt das Vorstellungsgespräch bereits in 30 Minuten! Nachdem Sie sich hektisch angezogen und fertig gemacht haben, rennen Sie zu Ihrem Auto und rasen davon zu Ihrem Termin. Während Sie fahren, sind Sie sich bewusst, dass Sie rasen, entscheiden aber, dass es die einzige Möglichkeit ist, zu dem Termin rechtzeitig zu kommen. Sie schauen zur nächsten Kreuzung und sehen, dass die Ampel auf gelb schaltet. Obwohl Sie noch ein gutes Stück von der Kreuzung entfernt sind, beschleunigen Sie. Als Sie sich der Kreuzung nähern schaltet die Ampel auf Rot und Sie sehen wie ein Auto die Kreuzung quert. Sie treten in die Bremsen, aber es ist zu spät. Sie rasen in die Seite des anderen Fahrzeuges. Sie hören das Quietschen der Bremsen, von zerberstendem Glas und von Metall auf Metall. Das nächste, was Sie mitbekommen, ist die Gruppe von Menschen, die über Sie gebeugt steht. Einer sagt Ihnen, dass Sie sich nicht bewegen sollen und dass Hilfe bereits auf dem Weg zu Ihnen sei. Als Sie Ihren Blick abwenden, sehen Sie die Fahrerin des anderen Wagens mit einem kleinen Kind in ihren Armen. Sie hören, wie sie verzweifelt aufschreit: „Sie ist tot! Sie ist tot! Mein Baby ist tot!“

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TEIL 1B): TEXT ZUSAMMENFASSEN

Bitte denken Sie noch einmal über die eben gelesene Geschichte nach und versetzen Sie sich in die Lage und Gefühle des Autofahrers.
Bitte fassen Sie jetzt kurz in 3-5 Sätzen zusammen, wie Sie sich fühlen, wenn Sie sich in die Rolle des Autofahrers hineinversetzen. Denken Sie dabei vor allen Dingen an den Moment als er bemerkt, was passiert ist und ihm die Auswirkungen seines schnellen Fahrens bewusst werden.

Meine Zusammenfassung:

Nachdem Sie Ihre Zusammenfassung geschrieben haben, blättern Sie bitte um.

3

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TEIL 1C: FRAGEN ZU IHRER DERZEITIGEN STIMMUNG

Bitte geben Sie zum Abschluss des ersten Teils noch an , inwieweit Sie den folgenden Aussagen zustimmen können.
(1= stimme überhaupt nicht zu, 7= stimme voll und ganz zu).

	Stimme überhaupt nicht zu	1	2	3	4	5	6	7	Stimme voll und ganz zu
Gerade habe ich gute Laune		O	O	O	O	O	O	O	
Nachdem ich diese Geschichte gelesen habe, bin ich sehr bedrückt und traurig.		O	O	O	O	O	O	O	
Aus irgendeinem Grund fühle ich mich gerade nicht sehr wohl.		O	O	O	O	O	O	O	
Nachdem ich diese Geschichte gelesen habe, fühle ich mich fröhlich.		O	O	O	O	O	O	O	
In diesem Moment fühle ich mich nervös und gereizt.		O	O	O	O	O	O	O	

Sie haben den ersten Teil der Studie geschafft.

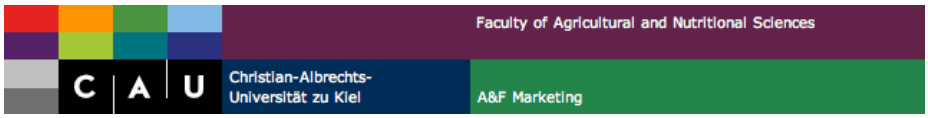
Bitte folgen Sie nun den weiteren Anweisungen des Versuchsleiters.

Vielen Dank.

P-Nr.: _____

4

Emotional freeze dependent on condition

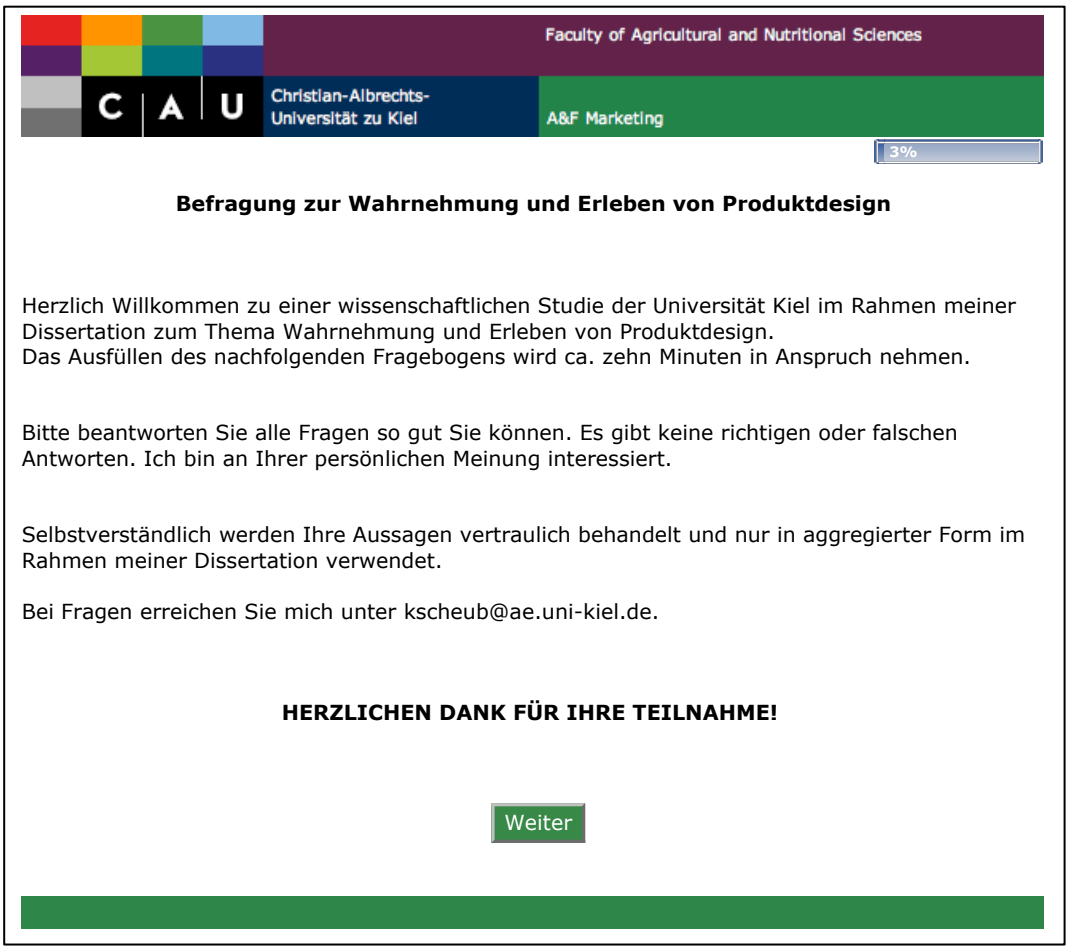


Bitte lesen Sie sich vor dem Beginn der Studie folgenden Text durch:

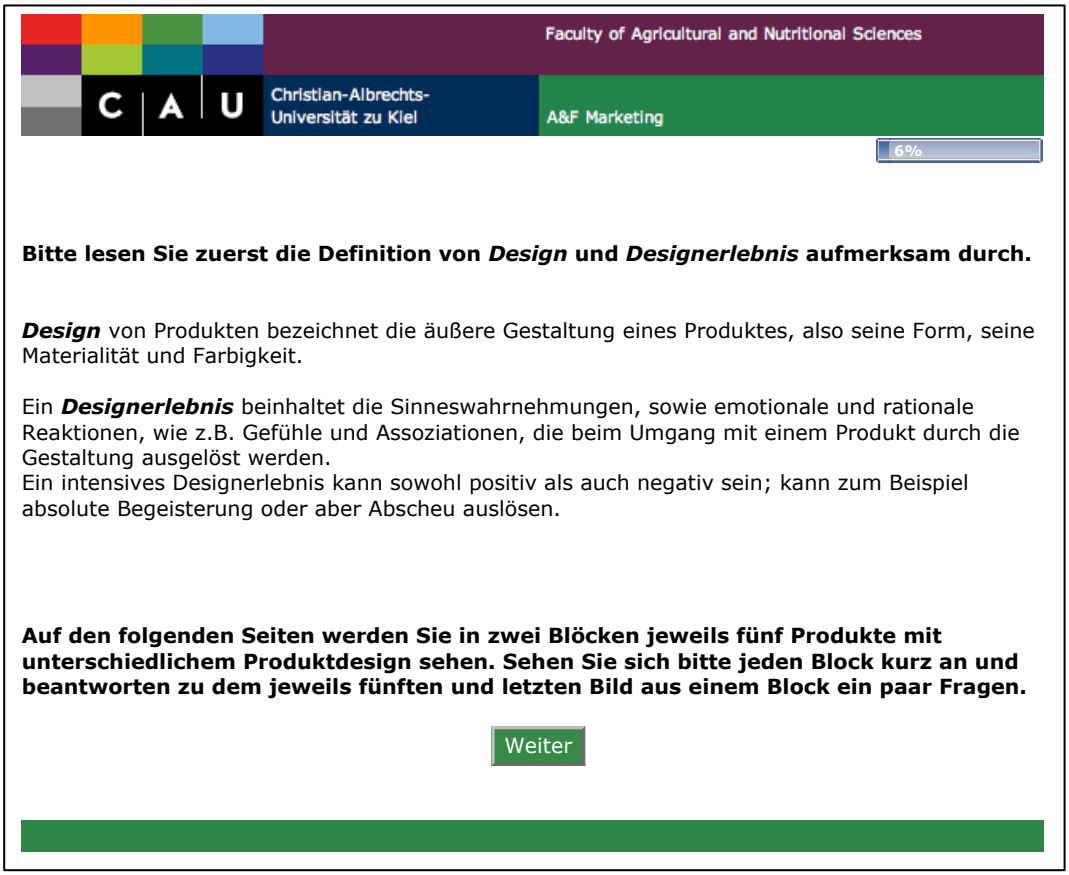
Obwohl allgemein angenommen wird, dass Produkte mit einem herausragenden Produktdesign dazu beitragen, dass man sich besser fühlt, gibt es wissenschaftliche Erkenntnisse, dass das Gegenteil der Fall ist.

Wenn überhaupt, dann verlängern Produkte, deren Design als herausragend und gut bezeichnet werden kann, nur die Stimmungslage, in der sich der Betrachter gerade befindet. In welcher Stimmung Sie sich gerade auch immer befinden mögen, es ist sehr wahrscheinlich, dass Sie auch während und nach dem Experiment noch in der gleichen Stimmung sein werden.

Study IV: 1st t Online Questionnaire Assessing DX Scale Version High

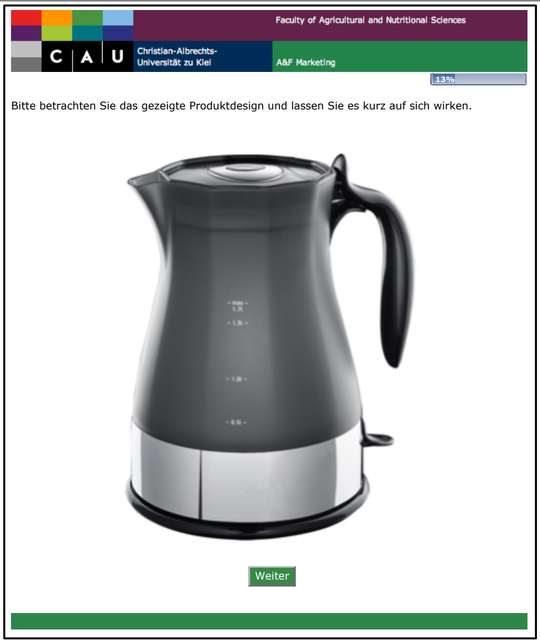


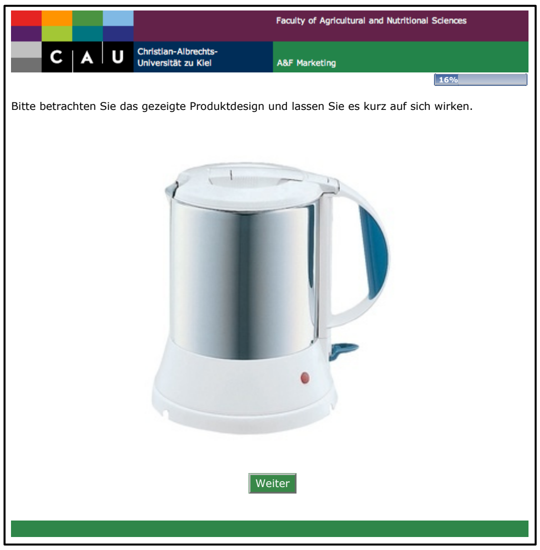
Study IV: 1st Online Questionnaire: Welcome Page



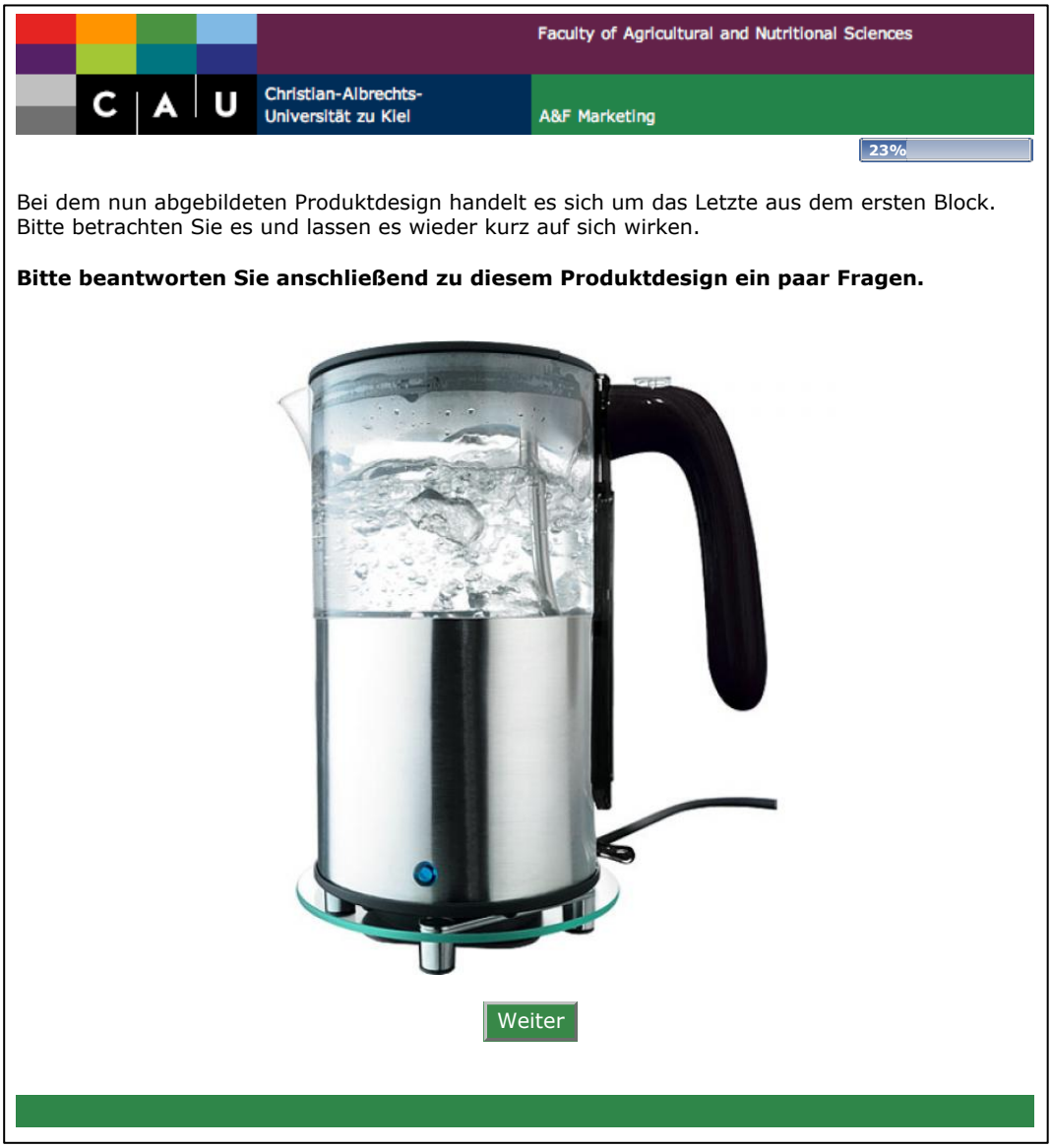
Study IV: 1st Online Questionnaire: Definition Design Experience

Table 78: Study IV: 1st Online Questionnaire: Priming Stimuli Water Kettle





Source: author's own compilation



Study IV: 1st Online Questionnaire: Main Stimuli Water Kettle High

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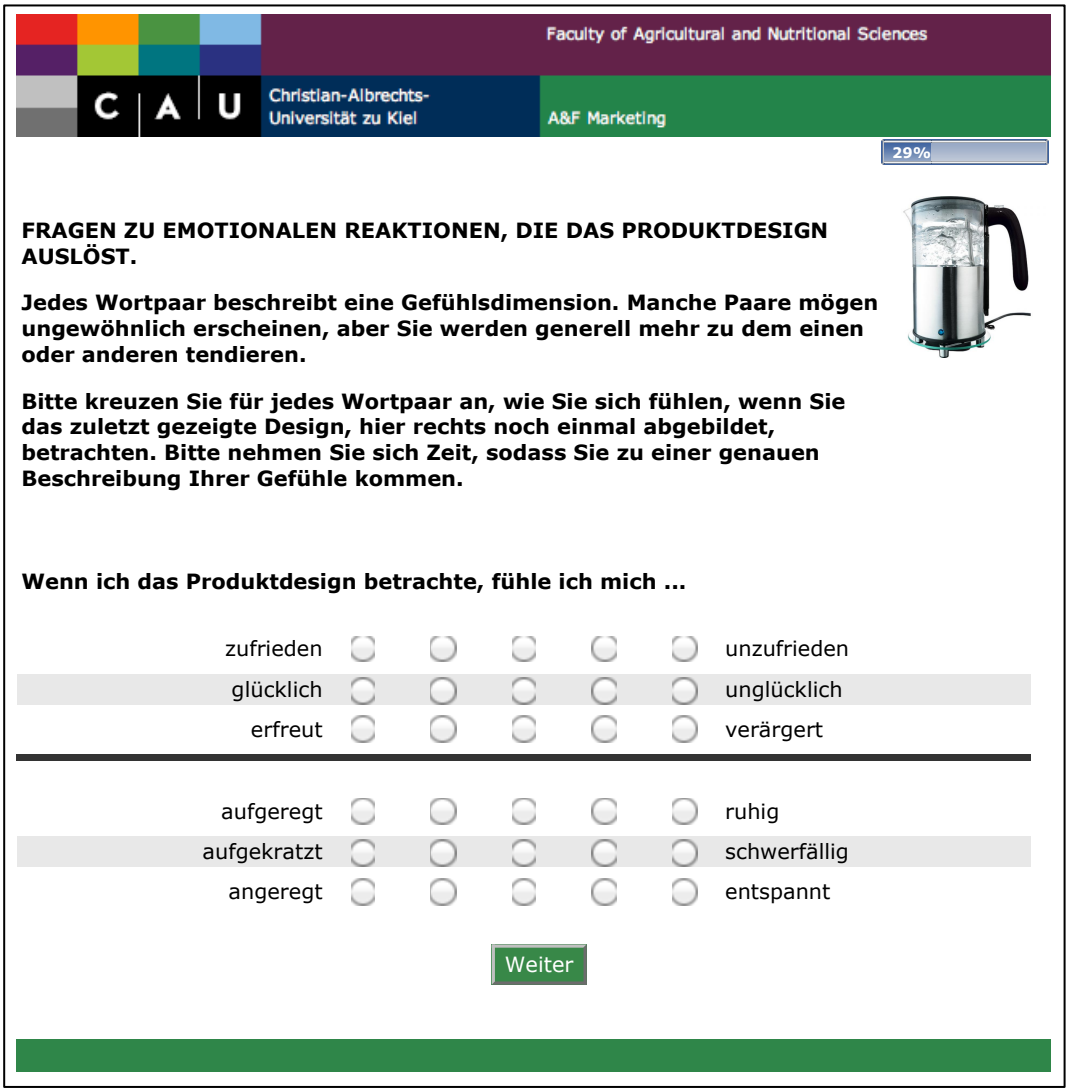
FRAGEN ZU IHREM DESIGNERLEBNIS

Bitte geben Sie nun an, inwieweit Sie den folgenden Aussagen zustimmen. Bitte beziehen Sie sich dabei auf das letzte gezeigte Design, hier rechts noch einmal abgebildet.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Emotionales Erleben							
Dieses Design berührt mich emotional.	○	○	○	○	○	○	○
Dieses Design verursacht intensive Gefühle und Empfindungen.	○	○	○	○	○	○	○
Aktivierendes Erleben							
Dieses Design macht neugierig.	○	○	○	○	○	○	○
Dieses Design ist spannend.	○	○	○	○	○	○	○
Dieses Design hat sofort meine Aufmerksamkeit erregt.	○	○	○	○	○	○	○
Dieses Design lädt mich ein, auf das Produkt zu zugehen.	○	○	○	○	○	○	○
Rationales Erleben							
Dieses Design ruft Assoziationen und Gedanken hervor.	○	○	○	○	○	○	○
Mit diesem Design verbinde ich eine Geschichte.	○	○	○	○	○	○	○
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.	○	○	○	○	○	○	○
Dieses Design animiert mich mir Gedanken zu machen.	○	○	○	○	○	○	○
Interaktives Erleben							
Ich möchte andere an meinem Designerlebnis teilhaben lassen.	○	○	○	○	○	○	○
Ich erzähle anderen von diesem Design.	○	○	○	○	○	○	○
Erleben über die Sinne							
Ich erlebe dieses Design über mehrere Sinne.	○	○	○	○	○	○	○
Dieses Design regt meine Sinne an.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Design Experience



Study IV: 1st Online Questionnaire: PAD

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FRAGEN ZUR ATTRAKTIVITÄT DES PRODUKTES

1. Die folgenden Fragen beziehen sich auf die Attraktivität des zuletzt gezeigten Produktes.
Bitte kreuzen Sie für sich zutreffendes an.
(1= unattraktiv bzw.niedrig; 7 =attraktiv bzw. hoch)

	unattraktiv / niedrig 1	2	3	4	5	6	attraktiv / hoch 7
Ich finde das Produkt ist ...	○	○	○	○	○	○	○
Das Preisniveau des Produktes ist ...	○	○	○	○	○	○	○

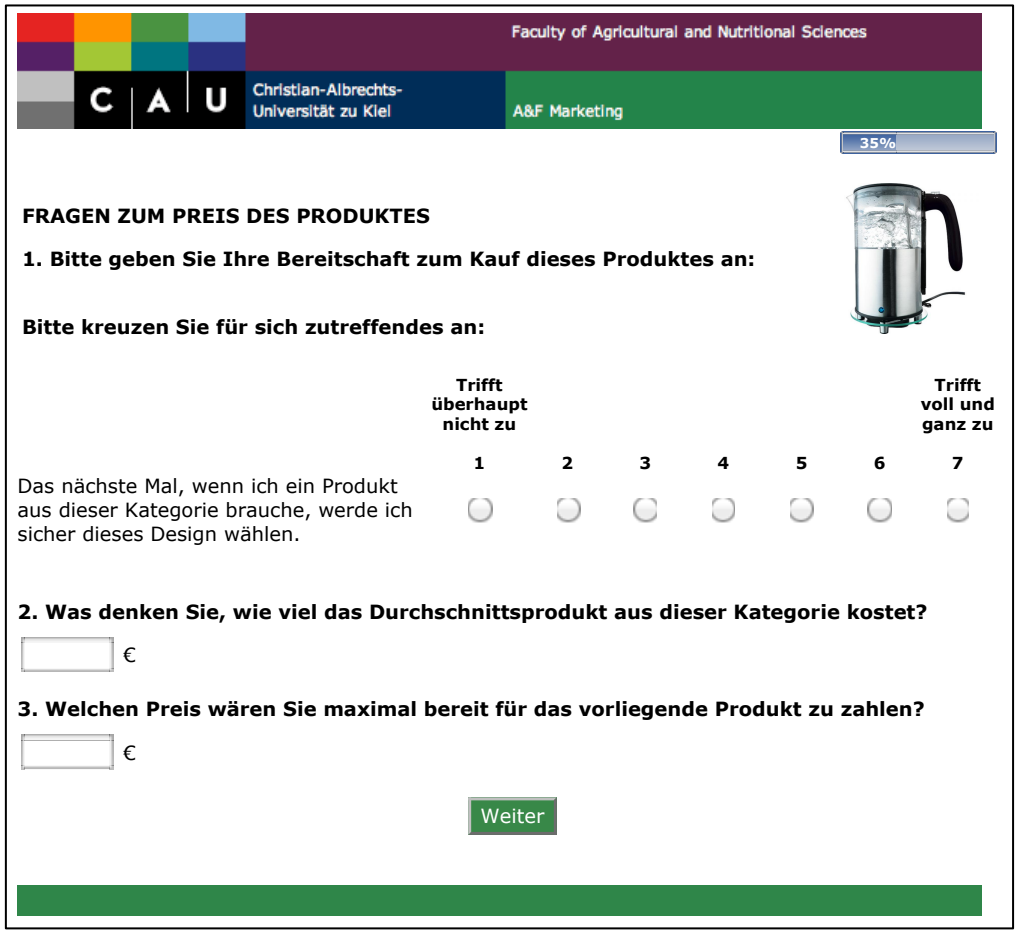
2. Bitte geben Sie nun an, wie Ihnen die äußere Produktgestaltung (Formensprache, Farbigkeit, etc.) gefällt und wie zufrieden Sie mit ihr sind.

Bitte geben Sie wieder an, inwieweit Sie der Aussage zustimmen.
(1= stimme überhaupt nicht zu, 7= stimme voll & ganz zu)

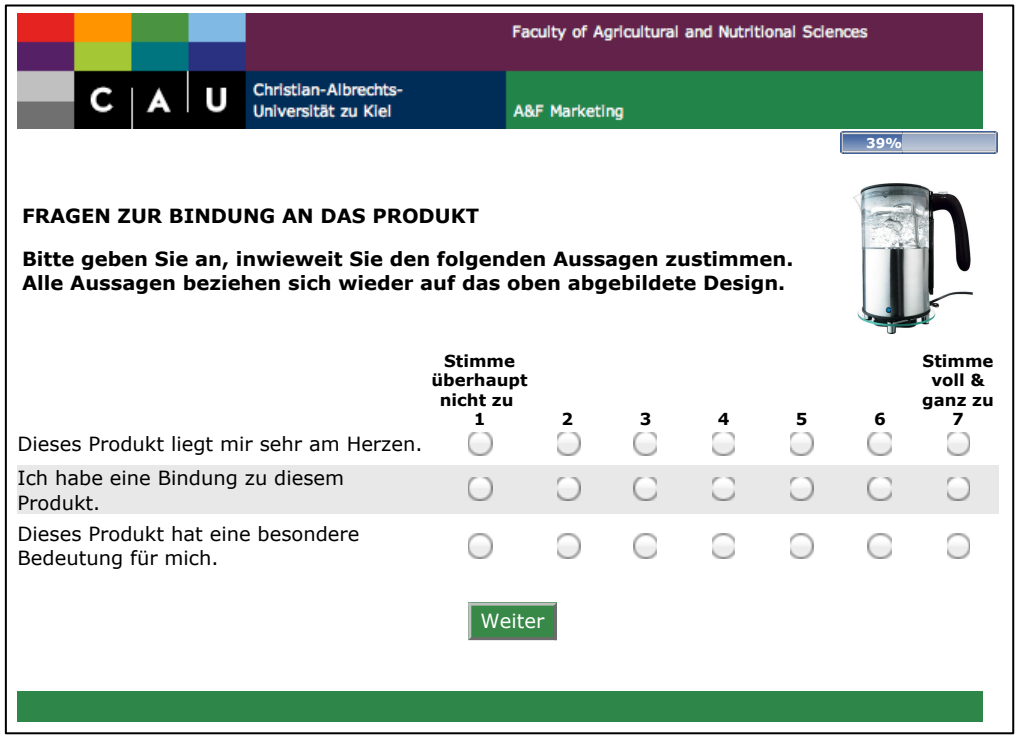
	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Die Gestaltung des Produktes gefällt mir gut.	○	○	○	○	○	○	○
Mit der Gestaltung bin ich zufrieden.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Liking



Study IV: 1st Online Questionnaire: Purchase Intention



Study IV: 1st Online Questionnaire: Involvement

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FRAGEN ZUM WERT DES PRODUKTES

Die folgenden Aussagen beziehen sich auf den allgemeinen Wert, den Sie dem abgebildeten Produkt geben.

Bitte geben Sie an, inwieweit Sie den einzelnen Aussagen zustimmen. (1= stimme überhaupt nicht zu, 7= stimme voll und ganz zu)

Dieses Produkt ...	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Qualität							
... hat eine gleichbleibende Qualität.	○	○	○	○	○	○	○
... hat einen hohen Verarbeitungsgrad.	○	○	○	○	○	○	○
... wirkt zuverlässig.	○	○	○	○	○	○	○
Joy of Use							
... ist eines, das ich gerne verwenden möchte.	○	○	○	○	○	○	○
... ist eines, das das mir allgemein ein gutes Gefühl geben würde.	○	○	○	○	○	○	○
... würde mir Freude bereiten.	○	○	○	○	○	○	○
Außenwirkung							
... macht einen guten Eindruck auf andere Menschen.	○	○	○	○	○	○	○
... bringt seinem Besitzer soziale Anerkennung.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Product Value

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FRAGEN ZUR PRODUKTPERSÖNLICHKEIT

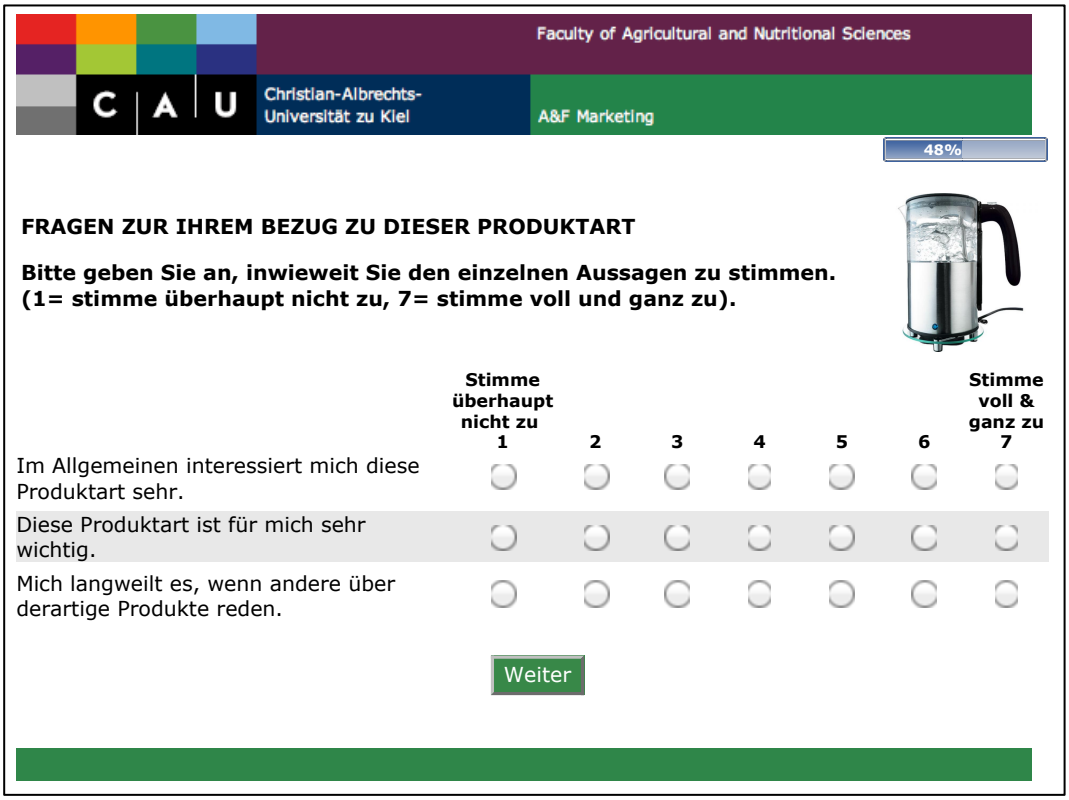
Wenn das gezeigte Produkt eine Person mit einer eigenen Persönlichkeit wäre, wie wäre diese?

Bitte geben Sie an, inwieweit für Sie die einzelnen Charaktereigenschaften für das gezeigte Produktdesign zu treffen. (1= trifft überhaupt nicht zu, 7= trifft voll & ganz zu).

	Trifft überhaupt nicht zu 1	2	3	4	5	6	Trifft voll & ganz zu 7
Fröhlich	○	○	○	○	○	○	○
Offen	○	○	○	○	○	○	○
Entspannt	○	○	○	○	○	○	○
Hübsch	○	○	○	○	○	○	○
Unbeschwert	○	○	○	○	○	○	○
Süß	○	○	○	○	○	○	○
Dominant	○	○	○	○	○	○	○
Aufdringlich	○	○	○	○	○	○	○
Dumm	○	○	○	○	○	○	○
Kindisch	○	○	○	○	○	○	○
Unordentlich	○	○	○	○	○	○	○
Eigen	○	○	○	○	○	○	○
Interessant	○	○	○	○	○	○	○
Lebhaft	○	○	○	○	○	○	○
Provokativ	○	○	○	○	○	○	○
Bescheiden	○	○	○	○	○	○	○
Ehrlich	○	○	○	○	○	○	○
Ernst	○	○	○	○	○	○	○
Distanziert	○	○	○	○	○	○	○
Langweilig	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Product Personality



Study IV: 1st Online Questionnaire: Product Category Involvement

Study IV: 1st Online Questionnaire: Introduction to 2nd Part

Table 79: Study IV 1st Online Questionnaire: 4th Priming Stimuli Computer Mouse High

Source: author's own compilation

Study IV 1st Online Questionnaire: Stimuli Computer Mouse High

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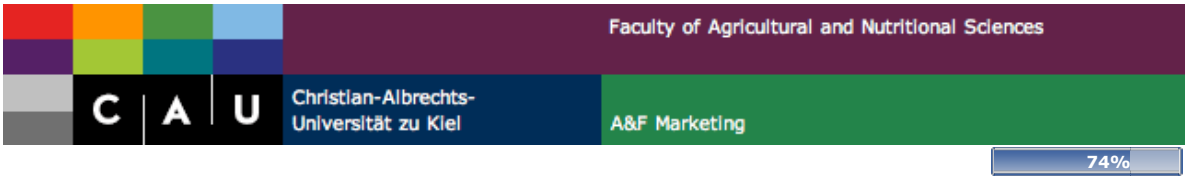
FRAGEN ZU IHREM DESIGNERLEBNIS

Bitte geben Sie nun an, inwieweit Sie den folgenden Aussagen zustimmen. Bitte beziehen Sie sich dabei auf das letzte gezeigte Design, hier rechts noch einmal abgebildet.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Emotionales Erleben							
Dieses Design berührt mich emotional.	○	○	○	○	○	○	○
Dieses Design verursacht intensive Gefühle und Empfindungen.	○	○	○	○	○	○	○
Aktivierendes Erleben							
Dieses Design macht neugierig.	○	○	○	○	○	○	○
Dieses Design ist spannend.	○	○	○	○	○	○	○
Dieses Design hat sofort meine Aufmerksamkeit erregt.	○	○	○	○	○	○	○
Dieses Design lädt mich ein, auf das Produkt zu zugehen.	○	○	○	○	○	○	○
Rationales Erleben							
Dieses Design ruft Assoziationen und Gedanken hervor.	○	○	○	○	○	○	○
Mit diesem Design verbinde ich eine Geschichte.	○	○	○	○	○	○	○
Mit diesem Design verbinde ich eigene Erlebnisse und Erfahrungen.	○	○	○	○	○	○	○
Dieses Design animiert mich mir Gedanken zu machen.	○	○	○	○	○	○	○
Interaktives Erleben							
Ich möchte andere an meinem Designerlebnis teilhaben lassen.	○	○	○	○	○	○	○
Ich erzähle anderen von diesem Design.	○	○	○	○	○	○	○
Erleben über die Sinne							
Ich erlebe dieses Design über mehrere Sinne.	○	○	○	○	○	○	○
Dieses Design regt meine Sinne an.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Design Experience



FRAGEN ZU EMOTIONALEN REAKTIONEN, DIE DAS PRODUKTDESIGN AUSLÖST.

Jedes Wortpaar beschreibt eine Gefühlsdimension. Manche Paare mögen ungewöhnlich erscheinen, aber Sie werden generell mehr zu dem einen oder anderen tendieren.

Bitte kreuzen Sie für jedes Wortpaar an, wie Sie sich fühlen, wenn Sie das abgebildete Produktdesign betrachten. Bitte nehmen Sie sich Zeit, sodass Sie zu einer genauen Beschreibung Ihrer Gefühle kommen.

Wenn ich das Produktdesign betrachte, fühle ich mich ...

zufrieden	○	○	○	○	○	unzufrieden
erfreut	○	○	○	○	○	verärgert
glücklich	○	○	○	○	○	unglücklich
aufgeregt	○	○	○	○	○	ruhig
aufgekratzt	○	○	○	○	○	schwerfällig
angeregt	○	○	○	○	○	entspannt

Weiter

Study IV: 1st Online Questionnaire: PAD

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FRAGEN ZUR ATTRAKTIVITÄT DES PRODUKTES

1. Die folgenden Fragen beziehen sich auf die Attraktivität des gezeigten Produktes.
Bitte kreuzen Sie für sich zutreffendes an.
(1= unattraktiv bzw.niedrig; 7 =attraktiv bzw. hoch)

	unattraktiv / niedrig						attraktiv / hoch
	1	2	3	4	5	6	7
Ich finde das Produkt ist ...	○	○	○	○	○	○	○
Das Preisniveau des Produktes ist ...	○	○	○	○	○	○	○

2. Bitte geben Sie nun an, wie Ihnen die äußere Produktgestaltung (Formensprache, Farbigkeit, etc.) gefällt und wie zufrieden Sie mit ihr sind.

Bitte geben Sie wieder an, inwieweit Sie der Aussage zustimmen.
(1= stimme überhaupt nicht zu, 7= stimme voll & ganz zu)

	Stimme überhaupt nicht zu						Stimme voll & ganz zu
	1	2	3	4	5	6	7
Die Gestaltung des Produktes gefällt mir gut.	○	○	○	○	○	○	○
Mit der Gestaltung bin ich zufrieden.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Liking

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FRAGEN ZUM PREIS DES PRODUKTES

1. Bitte geben Sie Ihre Bereitschaft zum Kauf dieses Produktes an:

Bitte kreuzen Sie für sich zutreffendes an:

	Trifft überhaupt nicht zu						Trifft voll und ganz zu
	1	2	3	4	5	6	7
Das nächste Mal, wenn ich ein Produkt aus dieser Kategorie brauche, werde ich sicher dieses Design wählen.	○	○	○	○	○	○	○

2. Was denken Sie, wie viel das Durchschnittsprodukt aus dieser Kategorie kostet?

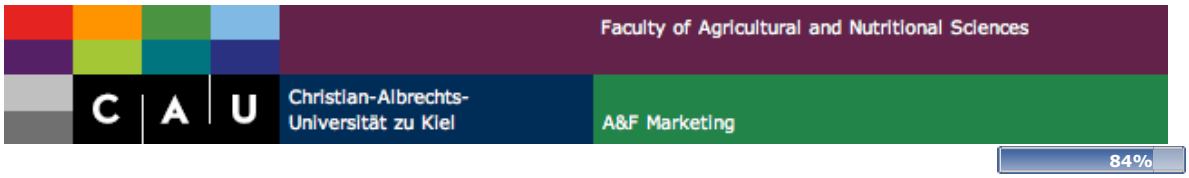
[ ] €

3. Welchen Preis wären Sie maximal bereit für das vorliegende Produkt zu zahlen?

[ ] €

Weiter

Study IV: 1st Online Questionnaire: Purchase Intention



FRAGEN ZUR BINDUNG AN DAS PRODUKT

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen. Alle Aussagen beziehen sich wieder auf das oben abgebildete Design.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Dieses Produkt liegt mir sehr am Herzen.	○	○	○	○	○	○	○
Ich habe eine Bindung zu diesem Produkt.	○	○	○	○	○	○	○
Dieses Produkt hat eine besondere Bedeutung für mich.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Involvement

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FRAGEN ZUM WERT DES PRODUKTES

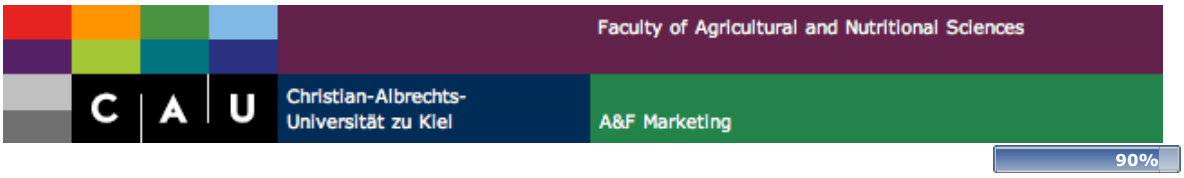
Die folgenden Aussagen beziehen sich auf den allgemeinen Wert, den Sie dem abgebildeten Produkt geben.

Bitte geben Sie an, inwieweit Sie den einzelnen Aussagen zustimmen. (1= stimme überhaupt nicht zu, 7= stimme voll und ganz zu)

Dieses Produkt ...	**Stimme überhaupt nicht zu 1**	**2**	**3**	**4**	**5**	**6**	**Stimme voll & ganz zu 7**
Qualität							
... hat eine gleichbleibende Qualität.	○	○	○	○	○	○	○
... hat einen hohen Verarbeitungsgrad.	○	○	○	○	○	○	○
... wirkt zuverlässig.	○	○	○	○	○	○	○
Joy of Use							
... ist eines, das ich gerne verwenden möchte.	○	○	○	○	○	○	○
... ist eines, das das mir allgemein ein gutes Gefühl geben würde.	○	○	○	○	○	○	○
... würde mir Freude bereiten.	○	○	○	○	○	○	○
Außenwirkung							
... macht einen guten Eindruck auf andere Menschen.	○	○	○	○	○	○	○
... bringt seinem Besitzer soziale Anerkennung.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Product Value



FRAGEN ZUR PRODUKTPERSÖNLICHKEIT

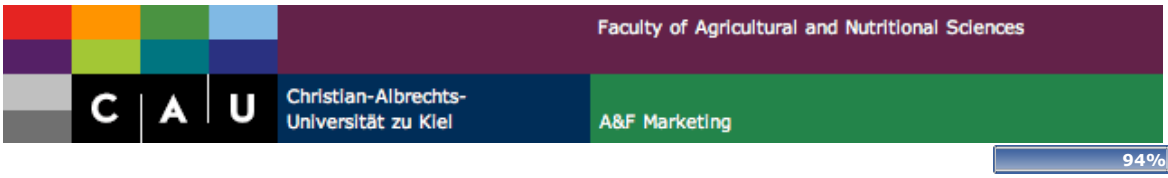
Wenn das gezeigte Produkt eine Person mit einer eigenen Persönlichkeit wäre, wie wäre diese?

Bitte geben Sie an, inwieweit für Sie die einzelnen Charaktereigenschaften für das gezeigte Produktdesign zu treffen. (1= trifft überhaupt nicht zu, 7= trifft voll & ganz zu).

	Trifft überhaupt nicht zu 1	2	3	4	5	6	**Trifft voll & ganz zu** 7
Bescheiden	○	○	○	○	○	○	○
Ehrlich	○	○	○	○	○	○	○
Dumm	○	○	○	○	○	○	○
Fröhlich	○	○	○	○	○	○	○
Entspannt	○	○	○	○	○	○	○
Offen	○	○	○	○	○	○	○
Langweilig	○	○	○	○	○	○	○
Lebhaft	○	○	○	○	○	○	○
Dominant	○	○	○	○	○	○	○
Unbeschwert	○	○	○	○	○	○	○
Aufdringlich	○	○	○	○	○	○	○
Interessant	○	○	○	○	○	○	○
Unordentlich	○	○	○	○	○	○	○
Hübsch	○	○	○	○	○	○	○
Kindisch	○	○	○	○	○	○	○
Eigen	○	○	○	○	○	○	○
Süß	○	○	○	○	○	○	○
Provokativ	○	○	○	○	○	○	○
Distanziert	○	○	○	○	○	○	○
Ernst	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Product Personality



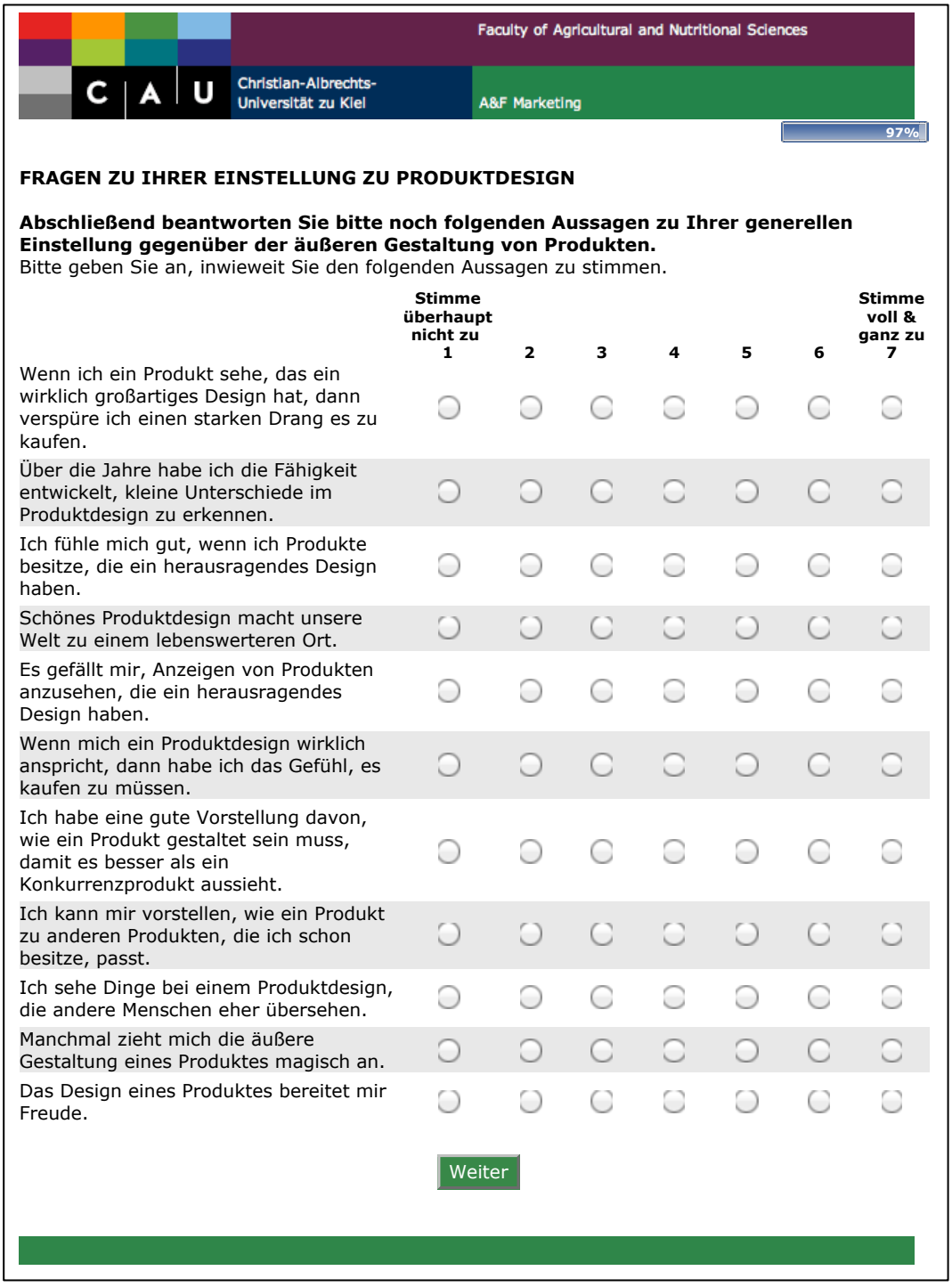
FRAGEN ZUR IHREM BEZUG ZU DIESER PRODUKTART

Bitte geben Sie an, inwieweit Sie den einzelnen Aussagen zu stimmen. (1= stimme überhaupt nicht zu, 7= stimme voll und ganz zu).

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Im Allgemeinen interessiert mich diese Produktart sehr.	○	○	○	○	○	○	○
Diese Produktart ist für mich sehr wichtig.	○	○	○	○	○	○	○
Mich langweilt es, wenn andere über derartige Produkte reden.	○	○	○	○	○	○	○

Weiter

Study IV: 1st Online Questionnaire: Product Category Involvement



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FRAGEN ZU IHRER EINSTELLUNG ZU PRODUKTDESIGN

Abschließend beantworten Sie bitte noch folgenden Aussagen zu Ihrer generellen Einstellung gegenüber der äußeren Gestaltung von Produkten.
Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zu stimmen.

	Stimme überhaupt nicht zu 1	2	3	4	5	6	Stimme voll & ganz zu 7
Wenn ich ein Produkt sehe, das ein wirklich großartiges Design hat, dann verspüre ich einen starken Drang es zu kaufen.							
Über die Jahre habe ich die Fähigkeit entwickelt, kleine Unterschiede im Produktdesign zu erkennen.							
Ich fühle mich gut, wenn ich Produkte besitze, die ein herausragendes Design haben.							
Schönes Produktdesign macht unsere Welt zu einem lebenswerteren Ort.							
Es gefällt mir, Anzeigen von Produkten anzusehen, die ein herausragendes Design haben.							
Wenn mich ein Produktdesign wirklich anspricht, dann habe ich das Gefühl, es kaufen zu müssen.							
Ich habe eine gute Vorstellung davon, wie ein Produkt gestaltet sein muss, damit es besser als ein Konkurrenzprodukt aussieht.							
Ich kann mir vorstellen, wie ein Produkt zu anderen Produkten, die ich schon besitze, passt.							
Ich sehe Dinge bei einem Produktdesign, die andere Menschen eher übersehen.							
Manchmal zieht mich die äußere Gestaltung eines Produktes magisch an.							
Das Design eines Produktes bereitet mir Freude.							

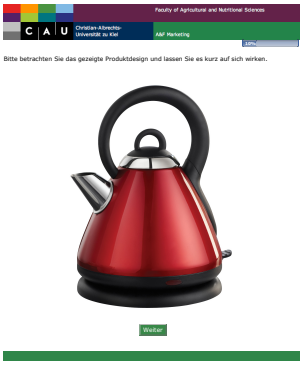
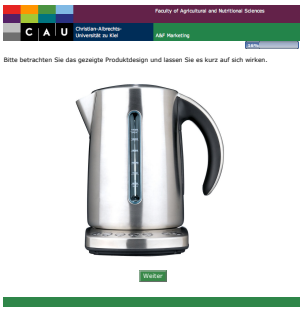
Weiter

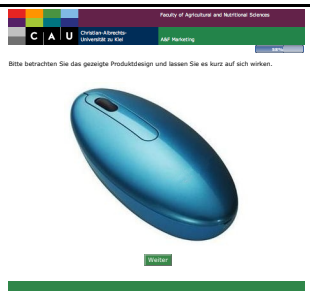
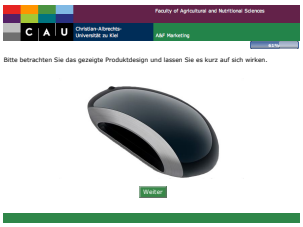
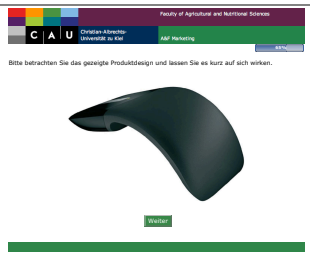
Study IV: 1st Online Questionnaire: CVPA

Study IV: 1st Online Questionnaire: Last Page

Study IV: 1st Online Questionnaire: Priming and Main Stimuli Version Low

Table 80: Study IV: 1st Online Questionnaire: Priming and Main Stimuli (Low)

Priming / Main Stimuli	Stimuli	
Priming stimuli water kettle		
		
Main stimulus water kettle (low)		

Priming / Main Stimuli	Stimuli	
Priming stimuli mouse		
		
Main stimulus mouse (low)		

Source: author's own compilation

Second Online Questionnaire Assessing Participant Related Characteristics Such as Absorption

Befragung zur stimmungsabhängigen Informationsverarbeitung

Willkommen zum zweiten und letzten Teil unserer Studie zum Thema stimmungsabhängige Informationsverarbeitung.

Das Ausfüllen des nachfolgenden Fragebogens wird ca. fünf Minuten in Anspruch nehmen.

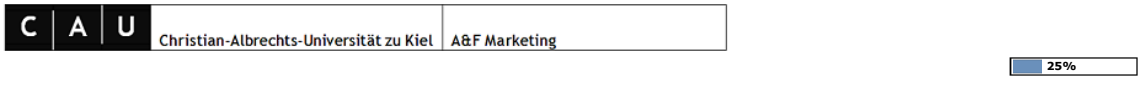
Bitte beantworten Sie alle Fragen so gut Sie können. Es gibt keine richtigen oder falschen Antworten. Es geht hier um Ihre persönliche Einschätzung. Bitte beantworten Sie alle Fragen so ehrlich wie möglich.

Selbstverständlich werden alle Ihre Aussagen streng vertraulich behandelt und nur für wissenschaftliche Zwecke verwendet.

HERZLICHEN DANK FÜR IHRE TEILNAHME!

Weiter

Study IV: 2nd Online Questionnaire: Welcome Page



I. STIMMUNG

Bitte geben Sie an, wie sie sich fühlen.

Ich bin gerade...

traurig	○	○	○	○	○	glücklich
schlechter Laune	○	○	○	○	○	guter Laune
irritiert	○	○	○	○	○	zufrieden
niedergeschlagen	○	○	○	○	○	fröhlich

Weiter

Study IV: 2nd Online Questionnaire: Mood

II. ABSORPTION

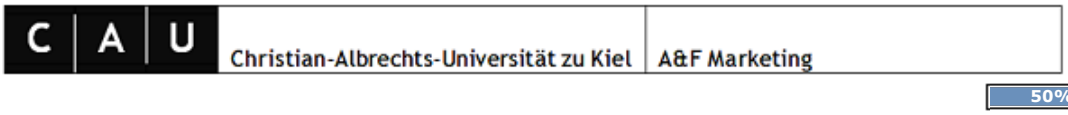
Bitte geben Sie an, inwieweit die folgenden Aussagen für Sie zu reffen.
Manche der Aussagen mögen im ersten Moment ungewöhnlich erscheinen. Geben Sie an, wie häufig die Aussagen auf Sie zutreffen.
Es ist sehr wichtig, dass Sie die Fragen so ehrlich wie möglich beantworten.

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen: (1=stimme überhaupt nicht zu; 7=stimme voll & ganz zu)

	Stimme überhaupt nicht zu 1	**2**	**3**	**4**	**5**	**6**	**Stimme voll & ganz zu 7**
Reaktionsfähigkeit							
Eine poetische Ausdrucksweise kann mich sehr bewegen.	○	○	○	○	○	○	○
Ich mag es mir Wolken und ihre Formen im Himmel anzusehen.	○	○	○	○	○	○	○
Das Betrachten eines offenen Kamins regt meine Phantasie an.	○	○	○	○	○	○	○
Ich bin tief bewegt von einem Sonnenuntergang.	○	○	○	○	○	○	○
Synästhesie							
Materialien, wie Wolle oder Holz, erinnern mich manchmal an Farben oder Musik.	○	○	○	○	○	○	○
Verschiedene Farben haben eine bestimmte Bedeutung für mich.	○	○	○	○	○	○	○
Einige meiner lebhaftesten Erinnerungen werden von Gerüchen und Düften hervorgerufen.	○	○	○	○	○	○	○
Bestimmte Musikstücke erinnern mich an Bilder oder Farben.	○	○	○	○	○	○	○

Weiter

Study IV: 2nd Online Questionnaire: Absorption I & II



III. Absorption

Bitte geben Sie an, inwieweit die folgenden Aussagen für Sie zutreffen.
Manche der Aussagen mögen im ersten Moment ungewöhnlich erscheinen. Geben Sie an, wie häufig die Aussagen auf Sie zutreffen.
Es ist sehr wichtig, dass Sie die Fragen so ehrlich wie möglich beantworten.

Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen: (1=stimme überhaupt nicht zu; 7=stimme voll & ganz zu)

	Stimme überhaupt nicht zu 1	**2**	**3**	**4**	**5**	**6**	**Stimme voll & ganz zu 7**
Dissoziative Bindung							
Im Kino oder im Theater kann es passieren, dass ich so in das Geschehen eintauche, dass ich die Welt um mich herum vergesse.	○	○	○	○	○	○	○
Ich kann mir Dinge so lebhaft vorstellen, dass sie meine Aufmerksamkeit wie ein guter Film in Anspruch nehmen.	○	○	○	○	○	○	○
Wenn ich Musik höre, dann kann ich alles um mich herum vergessen.	○	○	○	○	○	○	○
Mir ist es möglich meine Gedanken während einer Routinearbeit wandern zu lassen und die Arbeit dabei völlig zu vergessen.	○	○	○	○	○	○	○

Weiter

Study IV: 2nd Online Questionnaire: Absorption III

IV. KRITERIEN DER PRODUKTAUSWAHL

Die folgenden Aussagen beziehen sich darauf nach welchen Kriterien Sie Produkte auswählen.
Bitte geben Sie an, inwieweit Sie den folgenden Aussagen zustimmen:
(1=stimme überhaupt nicht zu; 7=stimme voll & ganz zu)

	Stimme überhaupt nicht zu 1	**2**	**3**	**4**	**5**	**6**	**Stimme voll & ganz zu 7**
Häufig kombiniere ich Dinge so, dass sie einen persönlichen, eigenständigen Stil kreieren, der nicht kopiert werden kann.	○	○	○	○	○	○	○
Ich versuche häufig auch bei Alltagsgegenständen etwas Besonderes zu kaufen.	○	○	○	○	○	○	○
Ich versuche aktiv meine persönliche Einzigartigkeit mit besonderen Produkten und Marken zu unterstreichen.	○	○	○	○	○	○	○
Produkte, die ich kaufe und die Art und Weise, wie ich sie verwende, entspricht nicht immer den Erwartungen meines sozialen Umfeldes.	○	○	○	○	○	○	○
Mir gefällt es, Menschen mit den Produkten, die ich kaufe, herauszufordern.	○	○	○	○	○	○	○
Ich mag aus Prinzip keine Produkte oder Marken, die von Jedermann gekauft werden.	○	○	○	○	○	○	○

Weiter

Study IV: 2nd Online Questionnaire: Uniqueness

V. INFORMATIONSVERARBEITUNGSSTIL

Die folgenden Aussagen beziehen sich darauf, wie Sie mentale Aufgaben lösen. Ihre Antworten sollten die Art und Weise widerspiegeln, wie Sie sich normalerweise in einer derartigen Situation verhalten.
Auch hier gibt es wieder keine richtigen oder falschen Antworten. Wir bitten Sie ehrliche und akkurate Antworten auf die Fragen zu geben.
(1=trifft überhaupt nicht zu; 7=trifft voll und ganz zu)

	Trifft überhaupt nicht zu 1	**2**	**3**	**4**	**5**	**6**	**Trifft voll & ganz zu 7**
Ich lese viel.	○	○	○	○	○	○	○
Ich mache mir gerne schriftliche Notizen.	○	○	○	○	○	○	○
Ich denke oft in Bildern.	○	○	○	○	○	○	○
Ich lese lieber Gebrauchsanweisungen als mir von jemanden zeigen zu lassen, wie es funktioniert.	○	○	○	○	○	○	○
Ich arbeite gerne mit Worten.	○	○	○	○	○	○	○
Ich finde häufig nicht die richtigen Worte.	○	○	○	○	○	○	○
Ich stelle mir gerne vor, wie ich meine Wohnung einrichten könnte, wenn ich keine finanziellen Einschränkungen hätte.	○	○	○	○	○	○	○
Ich tagträume gerne.	○	○	○	○	○	○	○
Ich ziehe ein Schaubild einer geschrieben Anleitung vor.	○	○	○	○	○	○	○
Ich male gerne nebenbei kleine Bildchen (z.B.: Strichmännchen, Muster, Blumen, etc.), wenn ich zuhöre oder telefoniere.	○	○	○	○	○	○	○

Weiter

Study IV: 2nd Online Questionnaire: Style of Information Processing

VI. ALTER UND GESCHLECHT

Bitte geben Sie abschließend noch Ihr Alter und Geschlecht an:

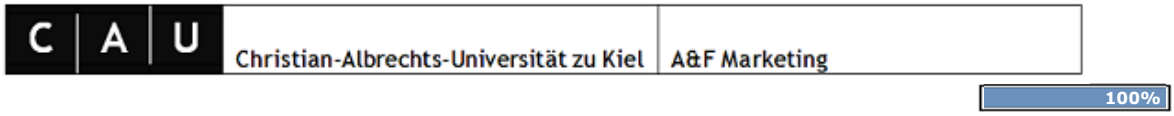
Ich bin ____ Jahre alt.

Ich bin...

⊗ weiblich ○ männlich

Weiter

Study IV: 2nd Online Questionnaire: Age & Sex



Herzlichen Dank für Ihre Teilnahme!!!

Bitte fragen Sie den Versuchsleiter nach Ihrem Gutschein als Dankeschön für die Teilnahme und nennen Sie ihm Ihre Teilnehmernummer.

Ihre Teilnehmernummer lautet: **32**

Study IV: 2nd Online Questionnaire: Last Page

Appendix G: Study IV: Results Simple Mediation Effects

Indirect Effects - Mediation: Pleasure (H9a –H9i)

Table 81: Simple Mediation Effects on Liking (H9a)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Liking			.67	.06	11.40	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Liking, controlling for DX			.46	.07	6.65	.0000
DX -> Liking, controlling for Pleasure			.48	.06	7.92	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.20	.04	.12	.28	4.83	.000
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.20	.04	.11	.30		

Source: author's own calculation

Table 82: Simple Mediation Effects on Attraction (H9b)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Attraction			.72	.06	13.03	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Attraction, controlling for DX			.27	.07	3.90	.0001
DX -> Attraction, controlling for Pleasure			.60	.06	9.90	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.12	.03	.05	.19	3.39	.0007
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.12	.03	.03	.21		

Source: author's own calculation

Table 83: Simple Mediation Effects on Satisfaction (H9c)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Satisfaction			.65	.06	10.60	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Satisfaction, controlling for DX			.49	.07	6.94	.0000
DX -> Satisfaction, controlling for Pleasure			.44	.06	7.09	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.21	.04	.13	.29	4.94	.000
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.21	.04	.12	.31		

Source: author's own calculation

Table 84: Simple Mediation Effects on Attachment (H9d)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Attachment			.54	.07	7.97	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Attachment, controlling for DX			.22	.09	2.55	.0116
DX -> Attachment, controlling for Pleasure			.44	.08	5.80	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.10	.04	.02	.18	2.38	.0172
Bootstrap results for indirect effect						
	M	SE	LL 95 % CI	UL 95 % CI		
Effect	.10	.04	.02	.18		

Source: author's own calculation

Table 85: Simple Mediation Effects on Emotional Product Value (H9e)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Emotional product value			.70	.06	12.28	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Emotional product value, controlling for DX			.54	.06	8.76	.0116
DX -> Emotional product value, controlling for Pleasure			.47	.05	8.68	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.23	.04	.15	.32	5.50	.0000
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.23	.04	.14	.34		

Source: author's own calculation

Table 86: Simple Mediation Effects on Functional Product Value (H9f)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Functional product value			.43	.07	5.91	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Functional product value, controlling for DX			.25	.09	2.67	.0085
DX -> Functional product value, controlling for Pleasure			.32	.08	3.92	.0001
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.11	.04	.02	.19	2.47	.0134
Bootstrap results for indirect effect						
	M	SE	LL 95 % CI	UL 95 % CI		
Effect	.11	.05	.01	.22		

Source: author's own calculation

Table 87: Simple Mediation Effects on Social Product Value (H9g)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Social product value			.67	.06	11.29	.0000
DX -> Pleasure			.43	.06	7.10	.0000
Pleasure -> Social product value, controlling for DX			.06	.08	.77	.4410
DX -> Social product value, controlling for Pleasure			.64	.07	9.42	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.03	.03	-.04	.09	.76	.4469
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.03	.04	-.06	.13		

Source: author's own calculation

Table 88: Simple Mediation Effects on Willingness to Pay a Higher Price (H9i)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Delta - Willingness to pay			.27	.08	3.44	.0007
DX -> Pleasure			.43	.06	6.99	.0000
Pleasure -> Delta - Willingness to pay, controlling for DX			.14	.10	1.40	.1655
DX -> Delta - Willingness to pay, controlling for Pleasure			.21	.09	2.32	.0213
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.06	.05	-.03	.15	1.35	.1760
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.06	.04	-.03	.16		

Source: author's own calculation

Indirect Effects - Mediation: Arousal (H10a – H10i)

Table 89: Simple Mediation Effects on Liking (10a)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Liking			.67	.06	11.41	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Liking, controlling for DX			-.05	.07	-.76	.4487
DX -> Liking, controlling for Arousal			.70	.07	10.46	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.02	.03	-.08	.04	-.75	.4558
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	-.02	.03	-.11	.07		

Source: author's own calculation

Table 90: Simple Mediation Effects on Attraction (H10b)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Attraction			.72	.06	13.03	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Attraction, controlling for DX			.09	.06	1.51	.1330
DX -> Attraction, controlling for Arousal			.68	.06	10.91	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.04	.03	-.02	.10	1.45	.1458
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.04	.04	-.05	.16		

Source: author's own calculation

Table 91: Simple Mediation Effects on Satisfaction (H10c)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Satisfaction			.65	.06	10.60	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Satisfaction, controlling for DX			-.09	.07	-1.26	.2082
DX -> Satisfaction, controlling for Arousal			.69	.07	10.01	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.04	.03	-.10	.02	-1.23	.2199
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	-.04	.03	-.12	.05		

Source: author's own calculation

Table 92: Simple Mediation Effects on Attachment (H10d)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Attachment			.54	.07	7.98	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Attachment, controlling for DX			-.03	.08	-.40	.6876
DX -> Attachment, controlling for Arousal			.55	.08	7.24	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.01	.04	-.08	.06	-.40	.6911
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	-.02	.04	-.14	.08		

Source: author's own calculation

Table 93: Simple Mediation Effects on Emotional Product Value (H10e)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Emotional product value			.70	.06	12.28	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Emotional product value, controlling for DX			-.15	.06	-2.32	.0217
DX -> Emotional product value, controlling for Arousal			.77	.06	12.12	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.07	.03	-.13	-.01	-2.16	0.000
Bootstrap results for indirect effect						
	M	SE	LL 95 % CI	UL 95 % CI		
Effect	-.07	.03	-.13	-.01		

Source: author's own calculation

Table 94: Simple Mediation Effects on Functional Product Value (H10f)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> functional product value			.43	.07	5.91	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> functional product value, controlling for DX			-.10	.08	-1.21	.2289
DX -> functional product value, controlling for Arousal			.47	.08	5.80	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.05	.04	-.12	.03	-1.17	.2403
Bootstrap results for indirect effect						
	M	SE	LL 95 % CI	UL 95 % CI		
Effect	-.05	.05	-.19	.07		

Source: author's own calculation

Table 95: Simple Mediation Effects on Social Product Value (H10g)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> social product value			.67	.06	11.29	.0000
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> social product value, controlling for DX			.07	.07	1.06	.2901
DX -> social product value, controlling for Arousal			.64	.07	9.53	.0000
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	.03	.03	-.03	.09	1.04	.3003
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	.04	.04	-.04	.14		

Source: author's own calculation

Table 96: Simple Mediation Effects on Willingness to Pay a Higher Price (H10i)

Variable			***B***	***SE***	***t***	***p***
Direct and total effects						
DX -> Delta - Willingness to pay			.27	.08	3.45	.0007
DX -> Arousal			.46	.07	6.50	.0000
Arousal -> Delta - Willingness to pay, controlling for DX			-.03	.09	-.30	.7635
DX -> Delta - Willingness to pay, controlling for Arousal			.28	.09	3.19	.0017
	Value	*SE*	LL 95% CI	UL 95% CI	*z*	*p*
Indirect effect and significance using normal distribution						
Sobel	-.01	.04	-.09	.07	-.30	.7661
Bootstrap results for indirect effect						
	M	SE	LL 99 % CI	UL 99 % CI		
Effect	-.01	.04	-.13	.11		

Source: author's own calculation

Curriculum Vitae

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Arbeitserfahrung

2012 - heute	**Senior Consultant Brand & Design Strategy / Research** designaffairs GmbH, München
2010 - 2011	**Wissenschaftliche Mitarbeiterin** A&F Marketing, Christian-Albrechts-Universität zu Kiel
2007 - 2009	**Consultant Brand & Design Strategy** designaffairs GmbH, München

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2010 – 2017	**Doktorandin - Ernährungsökonomie** A&F Marketing - Prof. Dr. Ulrich Orth Christian-Albrechts-Universität zu Kiel
2001 – 2007	**Sprachen-, Wirtschafts- und Kulturraumstudien** Universität Passau
1991 – 2000	**Willstätter-Gymnasium, Nürnberg**