

‘Love It or Hate It’? Exploring the Role of Visual Storytelling in Mitigating Design Risk

by

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Abstract

Even though consumers desire new product designs, many are initially hesitant to purchase innovatively designed products due to the lack of understanding the new design's value, resulting in product launch failures. Thus, capitalizing on the magic of visual storytelling can help to mitigate the design risk and enhance the aesthetic experience associated with novel designs. Specifically, this study suggests that visual design stories related to the product's formal and symbolic/expressive qualities can add extra value and product meaning. This study intended to provide a holistic understanding of how visual storytelling (conceptual product cue) can aid in the overall aesthetic experience related to the novelty of product designs (perceptual product cue). As part of this goal, this study investigated the main and interaction effects of design novelty (perceptual product cue) and visual storytelling (conceptual product cue) on objective and subjective cognitive responses, objective aesthetic impression and subjective aesthetic association, respectively. It also examined the effects of both product cues on two affective and cognitive aesthetic output variables, aesthetic emotion and aesthetic judgment, respectively. Further, this study explored the structural relationships between cognitive responses and aesthetic output variables with the purpose of delineating an overarching model that includes perceptual and conceptual product cues and all relevant concepts that make up the overall aesthetic experience. ANCOVA and multiple linear regression were conducted to test the hypotheses. Results revealed that moderate (vs. high) novelty products received more positive judgment, objective and subjective cognitive responses and less negative emotions. Visual

design stories related to both types of product qualities enhanced all dependent variables, whereas only stories related to symbolic/expressive product qualities stimulated positive aesthetic emotions. An interaction between perceptual and conceptual product cues on dependent variables was not found. This study also shows that a visual design story (present vs. absent) enhanced subjective aesthetic association of the product more than its objective aesthetic impression. Lastly, both cognitive responses provoked positive aesthetic emotions, and subjective cognitive responses partially mediated the relationship between objective cognitive responses and aesthetic judgment. The study offers important theoretical and marketing implications with the inclusion of limitations and suggestions for future research.

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CHAPTER 1. INTRODUCTION

Design has become significantly more important in the progressively competitive global market of today because it can make or break a consumer product. Superior design has an impact at the consumer-level as well as at the societal-level because it may lead to better quality of life (Koshy, 2011). Peter Lawrence, Chairman of Corporate Design Foundation, stated that “design is the term we use to describe both the process and the result of giving tangible form to human ideas. Design does not just contribute to the quality of life; design, in many ways, now constitutes the quality of life” (Koshy, 2011, p. 27). Design adds further value to the product which results in increased profit for the manufacturer (Crilly, Moilultrie, & Clarkson, 2004; Noble & Kumar, 2010). The appearance of a product influences its desirability and drives consumer satisfaction (Noble & Kumar, 2010). With many competing products in the marketplace, consumers make their purchase decisions based on the visual appearance and aesthetics of a product (Creusen & Schoormans, 2005). Consumers are also prone to switch more quickly to new and innovative designs, which can in turn lead to shorter product lifecycles. Creating a distinct product design can, hence, give companies a competitive advantage, longer product life cycle, and allow for premium pricing.

Yet, design innovation is not without risks. Even though consumers desire new designs, many are initially hesitant to purchase innovatively designed products, resulting in product launch failures (Mugge & Dahl, 2013). The most important reason for this is that consumers may lack an understanding of the new design’s value (Gourville, 2006). Consumers may often have difficulties to in directly classifying a new product design with respect to existing product

concepts (Wang, Dacko, & Gad, 2008) and thus turn back to products they have previously encountered when evaluating new designs (Berger & Fitzsimons, 2008). Schneider and Hall (2011), market specialists in product launches, point out that “the biggest problem we’ve encountered is lack of preparation: Companies are so focused on designing and manufacturing new products that they postpone the hard work of getting ready to market them until too late in the game” (para. 3). Then, if marketers get the timing right, they often do not know the right marketing strategy to effectively provoke consumers’ demand for unique product designs. NASBP, the National Foundation of Surety Bond Producers, states that 46% of all business failures happen because of the inexperience and lack of understanding when it comes to marketing and managing their products (Steinforth, 2014).

Besides the lack of marketing efforts and knowledge that contributes to consumers’ reluctance in approaching design innovations, new and exciting designs must also be perceived as beautiful or aesthetically pleasing. A large body of research in the field of art and design (e.g. Berlyne, 1971; Cox & Cox, 2002; Creusen, Veryzer, & Schoormans, 2010; Hekkert, Snelders, & van Wieringen, 2003; Noble & Kumar, 2010) has delineated aesthetic principles that provide aesthetic pleasure for consumers and are important in creating visually appealing designs. Novelty is a collative design factor where the term “collative” refers to the comparison of responses formed based on the deviation between current stimuli and stimuli from previous experiences (Berlyne, 1971). Product novelty relates to “the degree to which a product is seen as different from a prototypical object” (Noble & Kumar, 2010, p. 650), and has been found to have a significant impact on perceptions of beauty (e.g., Hekkert, Snelders, & van Wieringen, 2003; Hung & Chen, 2012; Mugge & Dahl, 2013). Design novelty in products affects the first aesthetic impressions of consumers (Noble & Kumar, 2010), but is subject to high risk due to its ability to influence visual perception both positively and negatively. The resulting judgment that

consumers form based on the information perceived by the senses refers to the cognitive response which can be objective or subjective in nature (Crilly et al., 2004). The objective cognitive response, known as objective aesthetic impression in this study, relates to decoding the perceived order, form, and structural composition of the product's design. The subjective cognitive response, known as subjective aesthetic association in this study, refers to decoding the perceived symbolism and sense in the product's design. Backed by supporting studies, this study proposes that consumers' objective and subjective cognition generated by design novelty has an impact on aesthetic output variables, aesthetic emotions and aesthetic judgment. Aesthetic emotion results from pleasure which "depends on the subjective success of the information processing" and can be positive as well as negative (Leder et al., 2004, p. 502). Aesthetic judgment results from deliberate processing and "is closely linked to knowledge about the appropriate criteria for judgment, to ideas about what an artwork is or should be, about art movements, and so on" (Leder & Nadal, p. 447). Consumers' cognitive responses and the aesthetic output variables make up the aesthetic experience, which accounts for consumers' product acceptance.

So, how can product and brand marketers mitigate the design risk and enhance the aesthetic experience associated with highly novel design innovations? The key is to capitalize on the magic of visual storytelling. Exposing consumers to the surrounding environment that contains conceptually related cues has a profound impact in shaping consumers' responses and influences the way a consumer evaluates a product (Berger & Fitzsimons, 2008). Storytelling has always been at the core of marketing since it provides conceptual information linked to product design. It increases a product's accessibility and transforms information into product meaning. Through storytelling, product and brand marketers get to transform the target consumer's thoughts and feelings so that consumers "mentally enter a world that a story evokes" (Van Laer, Ruyter, Visconti, & Wetzels, 2014, p. 797). In particular, much of the connection between the

product and the consumer is through the nonverbal articulation of thoughts and ideas in stories, seen in images and pictures (Megehee & Woodside, 2010). People think in images; a human brain typically processes images 60,000 times faster than text (Walter & Gioglio, 2014). Visual stories in the form of imagery or photographs adjoining a new product design have the ability to quickly capture people's attention and influence the decision making through transporting their mental state (Van Laer et al., 2014). Marketing a new product design through the use of an adjoining visual story can alter consumers' product perception and create memorable experiences. Particularly, this study proposes that visual stories adjoining the product design can significantly influence consumers' objective and subjective cognitive responses (objective aesthetic impression and the subjective aesthetic association) as well as the aesthetic output variables (aesthetic emotions and aesthetic judgment). Not only do consumers better comprehend the design with a meaningful visual image, but marketers can also promote the new product design by taking advantage of the rising popularity of visual networking platforms such as Pinterest, Vines, and Instagram.

Given the importance of visual stories, the next important question to answer is which types of visual stories are more effective when introducing novel product designs? This study proposes that the visual story should allude to the novel product's qualities to spark creative thinking, trigger consumers' fantasy, and remain memorable. Crilly et al. (2004) emphasized that product qualities are experienced by the senses, and thus can greatly influence a consumer's aesthetic experience. A product is perceived as a combination of formal, expressive, and symbolic qualities (Fiore, Kimle, & Moreno, 1996). Formal product qualities refer to the "perceivable (sensory) features of the structural composition of a product" (Fiore, 2010, p. 7). The role of the expressive qualities of a product is to provoke pleasure, arousal, and dominance when using the product (Fiore & Kimle, 1997). Symbolic aspects of a product refer to "the

symbolic nature of the object communicating an interpretation of the outside world through representational aspects of the form” (Fiore et al., 1996, p. 102). Therefore, visual design stories that highlight formal, expressive, and symbolic qualities of the product’s novel design may be most successful in communicating a unique design by bridging the gap between the consumer and the product. The jewelry brand Tiffany can be considered as the master of visual storytelling because it remarkably plays with the formal and symbolic qualities of its jewelry and accessory pieces to communicate meaning and emphasize certain design features. For example, their recent catalog presented a visual design story that communicates the symbolic meaning of a necklace by displaying a colorful fish with the necklace’s pendant in its mouth to mimic and symbolize a water drop. Another example of visually emphasizing the formal product qualities is when Tiffany’s watch with a round-shaped glass is placed next to an image of a curved tunnel that mimics and emphasizes the shape of the watchcase. Tiffany’s dramatic marketing strategy can alter consumers’ visual perception of their jewelry pieces and adds extra perceived value to their product designs.

Taken together, this study proposes that persuasive visual storytelling can stimulate the senses, emotion, and mind when introducing an innovative design by creating a conceptual understanding for a perceptually novel or unfamiliar product. The current research draws on the theory of processing fluency by Reber, Schwarz, and Winkielman (2004) in explaining this phenomenon. Processing fluency is “the speed and ease with which a stimulus is processed (Lanska, Olds, & Westerman, 2014) and can be perceptual or conceptual in nature (Tulving & Schacter, 1990). Thus, fluency can be enhanced through both conceptual and perceptual means. The more fluently a stimulus is processed, the more positive is a consumer’s aesthetic experience. In particular, the ability with which consumers can ascertain the physical attributes of a product and identify it relates to perceptual fluency (Lee & Labroo, 2004). Conceptual fluency reflects a

product's ability to imply to the consumer an interpretation of its meaning and to understand the product's intention (Lee & Labroo, 2004). Therefore, the concept of processing fluency may help to shed light on how conceptual and perceptual product cues, namely visual design stories and design novelty respectively, can reinforce each other to shape consumers' aesthetic experiences.

Besides processing fluency, this study utilizes the information processing model of aesthetic appreciation and aesthetic judgments by Leder, Belk, Oebersta, and Augustin (2004) to understand the distinct cognitive and affective variables involved in the aesthetic experience through an integrative framework. An important facet of this model is that it differentiates between two output variables – aesthetic emotion and aesthetic judgment (defined previously) as independent outcomes of the information processing based aesthetic experience. Furthermore, the current study builds on Crilly, Moultrie, and Clarkson's (2004) conceptual framework of consumer response to the visual domain in product design. The identified categories of cognitive responses to product form, namely aesthetic impression (objective or subjective), and symbolic association, account for consumers' first aesthetic impression and are of particular interest to the current study, as discussed previously.

In summary, this study integrates the following elements of specific theories and frameworks in its conceptualization: a) the role of processing fluency by Reber et al. (2004) for the main and interaction effects of conceptual and perceptual product cues on consumers' cognitive responses, b) the categories of objective and subjective cognitive responses identified by Crilly et al. (2004); and c) the two aesthetic output variables of Leder et al.'s (2004) model – aesthetic emotion and aesthetic judgment.

Problem Statement

Researchers in the field of psychology, art, and design have long studied the phenomenon of visual product aesthetics and its effect on consumer behavior. However, there is still a great need for more empirical research on how novel product designs influence consumer response (Talke, Salomo, Wieringa, & Lutz, 2009). Marketing researchers have begun to realize that product aesthetics is of critical interest to a business because product design can help brands outperform their competition. Even though marketing research has started to grow in this field of interest, it still seems to be a neglected area in comparison to heavily studied topics, such as customer satisfaction and theories related to brand-community or brand- building processes (Bloch, 2011). Clearly, more research is needed to move product aesthetics forward in the field of marketing and gain greater insights into how certain marketing efforts can help mitigate the design risk present in high impact designs and subsequently persuade consumers to adopt it.

Storytelling has become a powerful marketing tool to attract consumers and transform their thoughts and feelings. However, this topic has not received enough attention in past research. Most studies that dealt with narrative storytelling are related to brand and consumer storytelling (e.g., Megehee & Woodside, 2010; van Laer et al., 2014; Woodside, Sood, & Miller, 2008). However, research on visual storytelling related to product design is lacking. Also, no research appears to exist that has examined the effectiveness of different types of visual stories related to product qualities in influencing consumers' cognition, aesthetic emotions, and aesthetic judgments of new product designs. Understanding how consumers resonate with stories related to symbolic, expressive, and formal product qualities of a design can help product and brand marketers fine tune the specific content of visual stories.

Despite the application of the concept of fluency in marketing literature, little empirical research has focused on the effects of conceptual fluency on aesthetic judgment (Lee & Labroo,

2004). Studies have supported that perceptual fluency impacts aesthetic judgments (e.g., Berger & Fitzsimons, 2008; Labroo, Dhar, & Schwarz, 2008; Lee & Labroo, 2004; Winkielman, Schwarz, Fazendeiro, & Reber, 2003); however, the role of conceptual fluency in aesthetics has been largely disregarded. Most importantly, only two studies (Lanska, Olds, & Westerman, 2014; Lee & Labroo, 2004) explored the combinatorial effect of perceptual and conceptual fluency within the same experiment. However, no previous studies have linked these concepts to product aesthetics, a critical linkage given that perceptual and conceptual cues related to an aesthetic stimulus shape the consumer's aesthetic experience. Clearly, more research is needed to fill the gap in this unexamined area of marketing and design literature.

Purpose

This study aims to address the aforementioned gaps in the literature by investigating how visual storytelling (conceptual cue) may interact with product design novelty (perceptual cue) to shape a consumer's aesthetic experience. It further considers the formal, expressive, and symbolic product qualities and examines whether different types of visual design stories related to these qualities differently impact cognitive responses and, in turn, affect aesthetic emotions and aesthetic judgment. Overall, this study develops two models with the following specific objectives:

- 1) To investigate the main and interaction effects of design novelty (perceptual product cue) and the visual design story (conceptual product cue) on consumers' subjective aesthetic association and objective aesthetic impression (cognitive responses) and the two output variables, aesthetic emotions and aesthetic judgment, and to explore the structural relationships between these variables (Model 1; see Figure 3); and 2) To explore the moderating effects of the type of visual design story on the relationship between type of

cognitive response (subjective aesthetic association and objective aesthetic impression) and cognitive response (Model 2; see Figure 4)

Significance of the Study

Stories make life interesting and provide people a way to make connections in their minds. Exposing consumers to visual stories creates an opportunity to entice consumers to adopt and purchase a product. Sharing a product designer's vision and providing product meaning resonates with consumers in an impactful way, causing visual storytelling to become a paramount topic within many companies. The findings from this study can help marketers and designers to guide their marketing strategy when introducing new product designs into the marketplace. Especially in the age of visual social media such as Vines, Pinterest, and Instagram, visual advertising content has become more important than ever before. In addition, it is imperative for product and brand marketers to understand whether visual storytelling related to a product's design can mitigate the design risk inherent in high impact product designs. In addition, knowing what type of visual story leads to a more positive aesthetic experience can be crucial in ensuring a successful product campaign.

This research provides important theoretical implications because no research has investigated the combinatorial effects of conceptual and perceptual product cues on aesthetic experience. In particular, by delineating an overarching model including perceptual and conceptual product cues, pivotal cognitive consumer responses, such as subjective aesthetic association and objective aesthetic impression, and two distinct aesthetic output variables, such as aesthetic emotion and aesthetic judgment, this study hopes to make significant contributions to the literature in the areas of marketing, aesthetics, and consumer behavior.

Conceptual Definition of Constructs

Aesthetic emotion: an output variable of the aesthetic experience (Leder et al., 2004) that results from pleasure which “depends on the subjective success of the information processing” and can be positive as well as negative (Leder et al., 2004, p. 502)

Aesthetic experience: “cognitive and emotional processes evoked by the aesthetic processing of an object” (Leder et al, 2004, p. 505)

Aesthetic impression: a type of cognitive response that refers to the visual perception of objective and subjective attractiveness of a product design (Crilly et al., 2004)

Aesthetic judgment: an output variable of the aesthetic experience that results from deliberate processing, and “is closely linked to knowledge about the appropriate criteria for judgment, to ideas about what an artwork is or should be, about art movements, and so on” (Leder & Nadal, p. 447)

Automatic processing: early processing that is stimulus driven and only regards the visual characteristic of the object (Leder et al., 2004)

Cognitive response: “the judgments that the user or consumer makes about the product based on the information perceived by the senses” (Crilly et al., 2004, p. 552)

Conceptual fluency: the product’s ability to imply to the consumer an interpretation of its meaning and to understand the product’s intention (Lee & Labroo, 2004)

Deliberate processing: “higher order cognitive processing associated with detailed and deliberate stimulus analysis” (Graf & Landwehr, 2015, p. 5)

Design novelty: “the degree to which a product is seen as different from a prototypical object” (Noble & Kumar, 2010, p. 650)

Elaboration: “the cognitive effort a person devotes to processing an argument depends on his or her likelihood of elaboration” (Yang, Hung, Sung, & Farn, 2006, p. 431)

Expressive product qualities: feelings and emotions that are communicated through an object and are “conveyed by the form” of an object (Fiore et al., 1996)

Formal product qualities: “perceivable (sensory) features of the structural composition of a product” (Fiore, 2010, p. 7) and elements (e.g., color, line, shape) and principles of design (repetition, unity, balance) in an object (Fiore & Kimle, 1997)

Objective aesthetic impression: a type of cognitive response that relates to the unbiased experience of visual perception of pleasingness and is influenced by the perceived orderliness and clarity of the design (objective concinnity) and stems from the formal product qualities

Objective concinnity: the perception of order in a design (Coates, 2003)

Perceptual fluency: the ability by which consumers can ascertain the physical attributes of a product and identify it (Lee & Labroo, 2004)

Product design-focused elaboration: an effortful processing thinking style where consumers engage in careful evaluation of information about the design of the product.

Processing fluency: “the speed and ease with which a stimulus is processed” (Lanska, Olds, & Westerman, 2014)

Semantic interpretation: “what a product is seen to say about its function, mode-of-use and qualities” (Crilly et al., 2004, p. 552)

Story-focused elaboration: an effortful processing thinking style where consumers engage in careful evaluation of story-relevant information

Storytelling: conveying a substantial amount of information that is stored, indexed and retrieved from memory in the form of stories which “include inciting incidents, experiences, outcomes/evaluations, and summaries/nuances of person-to-person and persona-and-brand relationships within specific contexts” (Woodside, Sood, & Miller, 2008, p. 99)

Subjective aesthetic association: a type of cognitive response that relates to the biased experience of the visual perception of pleasingness and involves the sense perceived in design (subjective concinnity) and the symbolic product meaning (symbolic product qualities)

Subjective concinnity: “the extent to which the design appears to make sense to the viewer” (Crilly et al., p. 558)

Symbolic association: “the perception of what a product says about its owner or user: the personal and social significance attached to the design” (Crilly et al., 2004, p. 552)

Symbolic product qualities: “the symbolic nature of the object communicating an interpretation of the outside world through representational aspects of the form” (Fiore et al., 1996, p. 102) such as symbols that are agreed upon by members of a group (e.g. piece sign)

Visual communication: the conveyance of information and ideas through visual imagery, such as illustrations, photographs, film, or “other media beyond verbal reporting that creates a picture in the mind” (Megehee & Woodside, 2010, p. 604)

Visual design story: photograph or visual imagery that conveys specific information about the product design, such as the symbolic meaning, product features, or properties

CHAPTER 2. LITERATURE REVIEW

This chapter presents a review of relevant literature and the theoretical foundation for this study. The chapter contains two parts: 1) Overview of background knowledge and 2) Proposed models and hypotheses. Part 1 reviews background literature on product aesthetics, design communication, and aesthetic experience, while detailing three theoretical frameworks: a) the framework for consumer response to the visual domain in product design (Crilly et al., 2004); b) the information processing model of aesthetic appreciation and aesthetic judgments (Leder et al., 2004); and c) the processing fluency theory (Reber et al., 2004). Part 2 discusses the literature on design novelty and storytelling to develop two models with accompanying hypotheses addressing:

- a) the main and interaction effects of design novelty (perceptual product cue) and visual design story (conceptual product cue) on consumers' cognitive responses and aesthetic experience and to explore the structural relationships between these variables (Model 1); and
- b) the moderating role of type of visual design story in consumers' cognitive responses (Model 2).

Overview of Background Knowledge

Product Aesthetics

An aesthetic experience is a process that involves cognitive and emotional responses that are evoked by aesthetic processing of a product's design (Leder et al., 2004). Markovic (2012)

identified three specific aspects that make up aesthetic experiences: 1) the motivational, orientational, or attentive aspect that relates to the fascination with the object, 2) the cognitive aspect that is “semantic, symbolic, and imaginative aspect of aesthetic experience” (p. 3), and 3) the affective aspect, which relates to emotions and feelings toward the object. These aspects align with Fiore’s (2010) conceptualization of positive aesthetic experiences that result from Fiore et al.’s (1996) perception of formal (sensory features of the product’s structure), expressive (feelings and emotions communicated through a product), and symbolic qualities (symbolic nature of the product) of an object as discussed in the following paragraphs.

Formal product qualities refer to the “perceivable (sensory) features of the structural composition of a product” (Fiore, 2010, p. 7) and involve elements of design (e.g., texture, line, shape) and design principles (e.g., unity, symmetry) (De Klerk & Lubbe, 2008; Fiore, 2010). Past research in art and design has identified specific aesthetic principles that provide aesthetic pleasure and are most important in visually evaluating a design (e.g., Berlyne, 1971, 1974). Besides balance and proportion (e.g., Locher, 2003), symmetry (e.g., Berlyne, 1971; Creusen, Veryzer, & Schoormans, 2010), typicality (e.g., Hekkert, Snelders, & van Wieringen, 2003; Martindale & Moore, 1988), complexity (e.g., Cox & Cox, 2002; Creusen et al., 2010), novelty (e.g., Hekkert et al., 2003), and contrast (Noble & Kumar, 2010) are critical contributors to beauty. Formal product qualities stimulate the senses, which can result in either positive or negative sensory enjoyment (De Klerk & Lubbe, 2008) and in pleasure without consideration of the utility of the product (Creusen & Schoorman, 2005).

Emotions play an important role in product evaluation (De Klerk & Lubbe, 2008) because certain design elements can elicit different emotional responses. Expressive product qualities involve feelings and emotions conveyed through an object (Fiore et al., 1996). Expressiveness accounts for the pleasingness of a product and can be either inherent in a form or learned (Fiore

et al., 1996). Berlyne (1971) linked the arousal potential of an object to its expressiveness by pointing out that people vary in their level of arousal depending on the object's properties. Thus, it can heighten or lessen the level of hedonic value and arousal. Coates (2003) found that if the novelty of an object is high, then it is perceived to be more potent and active than a low novelty product.

Symbolic product qualities communicate meanings associated with the product's appearance. In particular, symbolic qualities or referential aspects refer to "the symbolic nature of the object communicating an interpretation of the outside world through representational aspects of the form" (Fiore et al., 1996, p. 102). Fiore et al. (1996) argue that those aspects of art forms can be referential to subject or content. Subject references contain "the range of concepts from the outside world which can be referred to in the work; content includes the actual symbols and elements contained within the subject" (Fiore et al., 1996, p. 102). There are two types of symbols, connotative and denotative, that depend on the level of the intended perceived meaning (Fiore et al., 1996). Connotative symbols "only suggest the implied, underlying and less clearly shared interpretation of a concept. Denotative symbols refer specifically to an idea or object; this symbol is formal, conventionalized, and well-known by a group" (Fiore et al., 1996, p. 102). For example, art objects are geared towards connotations of content rather than denotation of subject (Fiore et al., 1996) because they may often have no physical resemblance to the ideas being expressed (Crilly et al., 2004). Taken together, symbolic product qualities can aid in providing cognitive enjoyment and aesthetic experiences to the consumer by communicating a message of reality or possessing a message of fantasy (Fiore & Kimle, 1997).

The senses, emotions, and mind play crucial roles in consumers' aesthetic experience and product preferences (Fiore, 2010). Thus, reinforcing formal, expressive, and symbolic product qualities through visual communication may help to promote the value of a new product design.

Communicating Design

The design of products requires effective communication with target consumers. Luke Wroblewski, a Product Director at Google, argues that the central tendency of ‘design as communication’ is to articulate three product components to consumers: a) how the product works (its utility), b) how to use it (its usability) and c) why consumers should desire it (Wroblewski, 2006). Developing the aptitude required to empower this type of conversation takes time and effort (Wroblewski, 2006). In the end, it all comes down to making people fall in love with the product. If done right, design communication is a powerful tool that can create deep emotional connections between the consumer and the product.

A designer’s strategy is to incorporate design details into a product that communicate certain things, which in turn, subconsciously connect with people and create excitement and joy (Young, 2013). For example, the design of the grill and headlights of the Mini Cooper intend to mirror a smiling face, whereas that of a BMW intends to convey a fierce look (Young, 2013). The pairing of such design features with appropriate contextual imagery can reinforce these intended associations and create the desired meanings for these cars. Thus, design communication attracts consumers to a novel product by encoding a message within its design. Consumers that resonate with the new design features are able to decipher the hidden product meaning.

Conceptual framework for design as a process of communication. Through integration of in-depth literature, theories, and concepts related to visual product form, Crilly et al. (2004) created a conceptual framework for design as a process of communication (see Fig. 1). This framework outlines four stages: 1) first, the design team conveys a certain message within 2) the product through graphic elements, details, texture etc.; and 3) next, the receiver (consumer) visually perceives the product form and other tangible aspects of the product within a certain

environment; and 4) this perception leads to the consumer’s response system, which differentiates between cognitive, affective, and behavioral responses to design. The authors emphasize that these different types of responses interact with each other, and their strength depends on the context or environment in which the product is perceived. In addition, the authors also propose that a number of moderators, such as personal characteristics, cultural influences, and situational factors, affect the consumer’s response system.

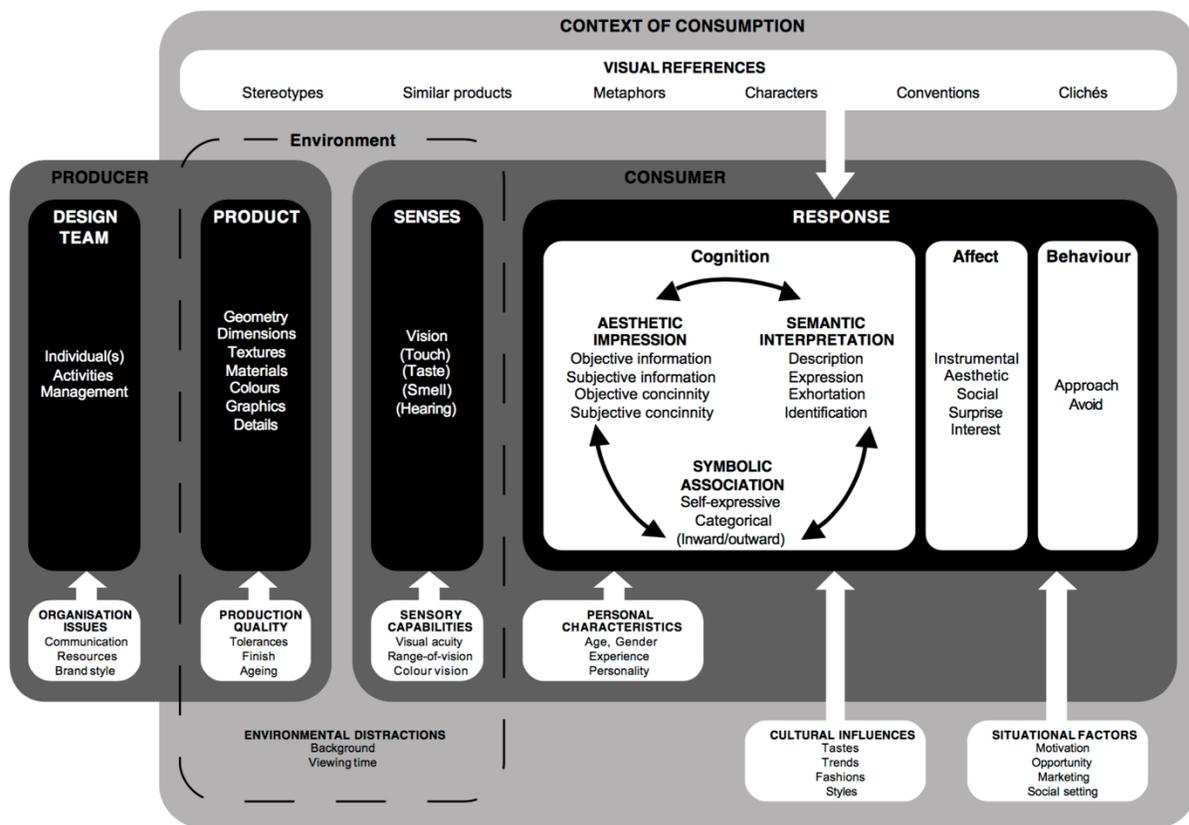


Figure 1. Framework for consumer response to the visual domain in product design. Adapted from “Seeing things: consumer response to the visual domain in product design”, by N. Crilly et al., 2004, Design Studies, 25(6), p. 569.

Consumers respond positively to visually attractive and beautiful designs that are coherent in nature (Crilly et al., 2004). Therefore, understanding cognitive responses is critical from the perspective of avoiding confusion regarding product meaning and negative connotations arising

from a product's design. Crilly et al.'s (2004) model is very relevant to this study because it deepens the knowledge about different aspects of cognitive processing and the important role that cognitions play if a consumer is to approach a novel product design.

Cognitive response to design. The cognitive state of a consumer is “the process of information acquisition and interpretation that forms individuals’ beliefs and knowledge of the environment” (Wang et al., 2013, p. 47). Crilly et al. (2004) categorize cognitive responses to product form into three types: aesthetic impression, semantic interpretation, and symbolic association. Based on the research objectives, this study adapts aesthetic impression and symbolic association to design from Crilly et al.'s (2004) model. Aesthetic impression is defined as “the sensation that results from the perception of attractiveness (or unattractiveness) in products” (Crilly et al., 2004, p. 552). Symbolic association relates to “the perception of what a product says about its owner or user: the personal and social significance attached to the design” (Crilly et al., 2004, p. 552).

Whether consumers find an object visually pleasing, elegant, and beautiful depends on their aesthetic impression, which can be either objective or subjective in nature (Crilly et al. 2004). An objective aesthetic impression stems from the objective (or formal) product qualities. Consumers have inherent responses or innate preferences for certain object forms and properties. For example, people tend to prefer objects with a certain level of order, complexity, novelty, or symmetry as they provide an optimum level of arousal and interest (Berlyne, 1971). In the field of industrial design, Coates (2003) named the perception of order in a design as objective concinnity. Therefore, objective aesthetic impression is influenced by the perceived orderliness and clarity of the design, and is relevant to perceiving the organization of a novel product design, which pertains to objective cognitive responses in this study.

Besides considering the objective component of the perception of pleasingness, the consumer's subjective experience is also a contributing factor to aesthetic impression (Crilly et al., 2004), which is classified as subjective cognitive responses in the current study. The visual appeal is influenced by "the sense perceived in design" that may help a consumer to comprehend and understand it (Crilly et al., 2004, p. 557). This subjective aesthetic impression is akin to Coates's (2003) aesthetic impression factor named subjective concinnity. Subjective concinnity is defined as "the extent to which the design appears to make sense to the viewer" (Crilly et al., 2004, p. 558). Another subjective cognitive dimension is the symbolic associations of a product. The symbolic meaning attached to products is an aspect of "cognition driven by both the perception of tangible stimuli and pre-existing knowledge" (Crilly et al., 2004, p. 553). Even though the symbolic associations are external to a product, they are connected to product appearance in some way and are considered important when judging a product (Crilly et al., 2004). Depending on social norms of the audience, environment, or consumer groups, products can generate different symbolic meanings. For example, a football fan may choose a shirt with colors that signal belongingness to a certain team. Hence, the product's symbolic meaning is subjective rather than objective. Overall, subjective aesthetic impression (or subjective concinnity) as well as the symbolic meaning of a new design refer to subjective cognitive responses, and are hence merged for the purpose of this study. In the following discussion, subjective aesthetic impression and symbolic product meaning are referred to as subjective aesthetic association in response to a novel design.

Crilly et al.'s (2004) interrelated cognitive responses clearly correspond to the formal, expressive, and symbolic qualities of a product that contribute to a consumer's aesthetic experience (Fiore, 2010). Based on the preceding discussion related to objective and subjective cognitive responses to design, it can be inferred that formal product qualities are linked to

objective aesthetic impressions, whereas symbolic and emotional product qualities contribute to subjective aesthetic associations.

Aesthetic Experience

This study draws from two frameworks or theories of aesthetic experience that are rooted in psychological aesthetics: 1) the information-processing model of aesthetic experience (Leder et al., 2004), and 2) the processing fluency theory of aesthetic pleasure (Reber et al., 2004). The following sections discuss both, while identifying specific components of each theory that apply to the current study.

Information-processing model of aesthetic experience. Leder and his colleagues (2004) provide an elaborated approach to aesthetic experience of art objects based on involved psychological processing. Their information-processing stage model of aesthetic experience consists of five stages that deal with the perception of an aesthetic stimulus (see Figure 2). Within this model, aesthetic experience is a continuous process between cognition and emotion. They further differentiate the flow of information into automatic and deliberate processing, which happen consecutively. The first two stages, perceptual analysis and implicit memory integration, are automatic, happening unconsciously during a perceiver's aesthetic experience, and relying heavily on perceptual fluency (Bornstein, 1989). This early processing is stimulus driven and regards only the visual characteristic of the object. Variables such as complexity, contrast, symmetry, order, and grouping are involved in the perceptual analysis stage (Leder et al., 2004). In addition, familiarity, prototypicality, and peak-shift principle are included in the second stage, the implicit memory integration stage. These design features are essential in identifying a new product design because they “optimally exploit (or excite) the usual processes” (Leder et al., 2004, p. 497).

The third stage, explicit classification, relates to the content and style of an artwork. Aesthetic processing on this level differs depending on expertise because experts analyze artworks using art-specific classification, while novices describe the object with respect to “what is depicted” (p. 497). Leder and Nadal (2014) updated the model based on new research findings. Following this update, the authors consider the third stage as automatic processing as compared to the initial classification of moderated cognitive processing. In addition, they included the concept of perceptual fluency in the automatic processing stages of perceptual analysis and explicit classification. The concept of perceptual fluency is described in the subsequent section on processing fluency theory. In contrast, stages 4 and 5, named cognitive mastering and evaluation, require deliberate processing, which is also called controlled processing (Graf & Landwehr, 2015). Both stages involve mental processes and “a deeper aesthetic evaluation” (Leder & Nadal, 2014, p. 448) associated with a “detailed and deliberate stimulus analysis” (Graf & Landwehr, 2015, p. 5). Cognitive mastering captures the importance of meaning, interpretation and understanding of an object. It is closely related to the end-stage, evaluation (cognitive state vs. affective state), which results in two independent output variables, aesthetic emotion and aesthetic judgment.

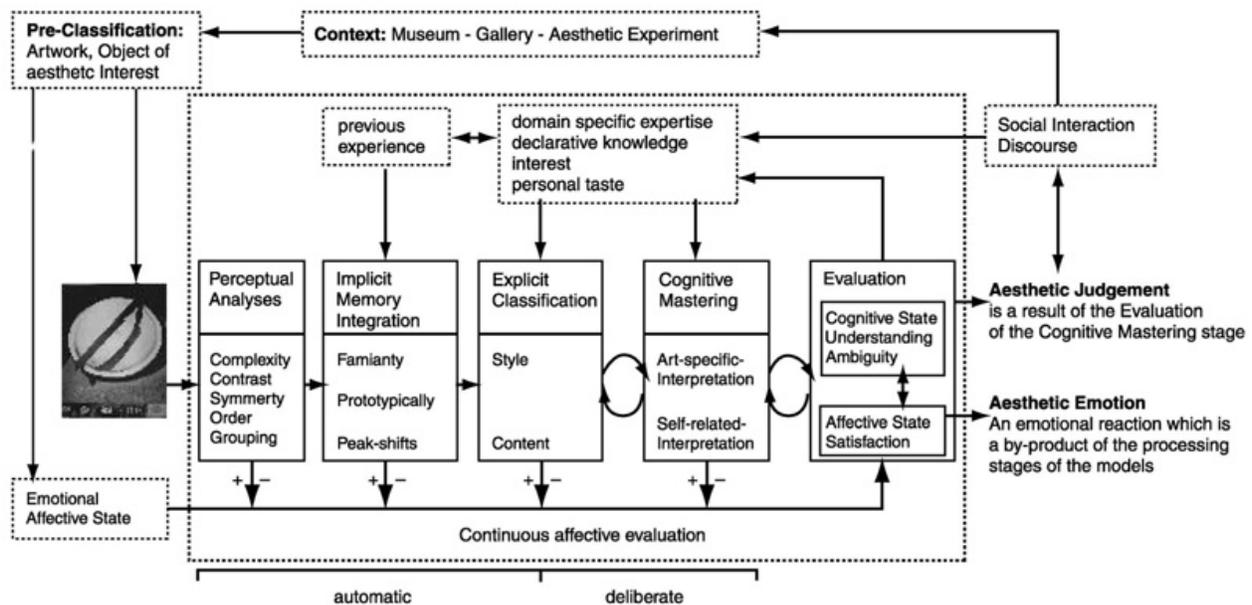


Figure 2. A model of aesthetic experience. Adapted from “A model of aesthetic appreciation and aesthetic judgments”, by H. Leder et al., 2004, British Journal of Psychology, 95, p. 492.

Leder et al.’s (2004) overarching framework is applicable to many objects of aesthetic interest. It further deepens our understanding of the effects of distinct perceptual and conceptual product cues in aesthetic experience, which aligns with the purpose of the current study. Of particular interest for this study is the perceptual analyses stage, which corresponds to the automatic processing of a novel product design (perceptual product cue). In addition, the cognitive mastering stage is relevant to the investigation of contextual information that is linked to a novel design (conceptual product cues) that requires deliberate processing. An important facet of this model is that it differentiates between two independent output variables – aesthetic emotion and aesthetic judgment, which are included in the current study as dependent variables. Both stem from the interaction between cognitive mastering and evaluation. The affective state (satisfaction) of evaluation leads to aesthetic emotion, which can range from “rage and sadness to joy and awe” (Leder & Nadal, 2014, p. 447) and can be negative when the processing is unsatisfactory (Leder et al., 2004, p. 502). On the other hand, the cognitive state of evaluation

leads to aesthetic judgment and entails references to normative criteria. Simply put, aesthetic emotions refer to the “subjective success of the information processing” (Leder et al., 2004, p. 502); whereas aesthetic judgments refer to questions of what should be considered aesthetic from an artistic perspective (Leder et al., 2004).

Processing fluency theory. For a theoretical explanation about the mechanism and interaction of perceptual and conceptual product cues, this study utilizes the processing fluency theory of aesthetic pleasure (Reber et al., 2004). Processing fluency relates to “the speed and ease with which a stimulus is processed” (Lanska, Olds, & Westerman, 2014, pp. 1). In other words, “fluency isn’t the process itself, but, rather, information about how efficient or easy that process feels” (Oppenheimer, 2008, p. 238). Therefore, the feeling of ease associated with a cognitive action is referred to as its fluency, which can be generated by nearly any line of thought (Oppenheimer, 2008). Researchers agree that a variety of variables can influence the ease of processing, which subsequently results in increased liking. As the processing of a stimulus becomes more fluent, the resulting aesthetic response increases (Schwarz, 2008). The fluency of processing can arise from two sources, perceptual and conceptual fluency (Reber et al., 2004), which similarly impact affective judgments (Lee & Labroo, 2004; Winkielman et al., 2003).

Perceptual fluency reflects the ease of identifying “surface” features of the stimulus, or its perceptual form (Winkielman, Schwarz, Fazendeiro, & Reber, 2003) and can be enhanced through variables such as simple repetition, form priming, contrast, and duration (Winkielman et al., 2003), as well as low novelty designs (Reber et al., 2004). The effect of fluency on recognition is traditionally considered a heuristic that stems from previous exposure that induces the ease of processing (Olds & Westerman, 2012). Fluency heuristic is based on an individual’s learning history; thus, repeated exposure of a stimulus leads to familiarity (Olds & Westerman, 2012). Higher levels of fluency are associated with previously experienced stimuli. This feeling

of ease has the potential to persuade a consumer to believe that a novel object is familiar, thus creating a sense of false memory (Olds & Westerman, 2012). Brown and Marsh (2009) call this recognition illusion associated with the generated sense of false familiarity, a déjà-vu effect.

Processing fluency can also arise from conceptual fluency, referring to the ease in processing the meaning of the object through semantic knowledge structures and categorization (Winkielman et al., 2003). Schwarz (2010) pointed out that an individual's cognition is highly context sensitive and that consumers' perception of objects and generation of responses is influenced "by the immediate context in which the respective task is situated" (p. 106). Variables such as semantic predictability, the consistency between the object and its context, and the availability of appropriate mental concepts for object classification can enhance conceptual fluency (Schwarz, 2010; Winkielman et al., 2003). In the context of consumer products, Berger and Fritzsims (2008) explored conceptual priming effects on product evaluation (Puma shoes) by exposing consumers to dog images. Even though the Puma logo most closely resembles a cat, the priming effect of the cat category spreads to other members of that category (in this case dog) and, thus, the dog becomes more accessible. The researchers found that consumers had a more positive response to Puma products when exposed to dog images. This effect was not found for products that were unrelated to Puma. These results highlight that conceptual priming effects happen without forced understanding and a fully aware consciousness (Berger & Frizsimons, 2008). In addition, Kirk, Skov, Hulme, and Christensen (2009) demonstrate that semantic context and framing are crucial components to the aesthetic experience of artwork. Participants were asked to view abstract artworks that were labeled either with "gallery" (signal of an exhibition at a gallery) or "computer" (signal of use of graphic software to create the artwork). Their results revealed that participants liked the artworks that were labeled with gallery more even though all of the stimuli had the same origin.

While the processing fluency theory does not explicitly outline a joint contribution of perceptual and conceptual fluency, Reber et al. (2004) indicate that one fluency type may be a better predictor of liking than the other. This implies that a decrease of one type of fluency “may be outweighed by an increase” of the other type of fluency (Reber et al., 2004, p. 373). For example, a decrease in perceptual fluency may be compensated by processing ease through an increase in conceptual fluency. Yet, the interaction between perceptual and conceptual fluency mechanisms has not been well delineated or studied, which raises the question of whether the two mechanisms can compensate for each other within the overall aesthetic experience.

Taken together, this study incorporates the following specific elements of the above reviewed models and theory in order to conceptualize this study’s research models: a) the various information processing stages of Leder et al.’s (2004) model that discuss the aspects of perceptual and conceptual product cues; b) the role of processing fluency by Reber et al. (2004) for the main and interaction effects between conceptual and perceptual product cues on consumers’ cognitive responses; c) the two types of cognitive responses, objective aesthetic impression and subjective aesthetic association, adapted from Crilly et al. (2004); and d) the two aesthetic output variables of Leder et al.’s (2004) model – aesthetic emotion and aesthetic judgment.

Proposed Models and Hypotheses Development

Model 1: Effects of Perceptual and Conceptual Product Cues on Cognitive Responses and Aesthetic Output Variables

The model below (see Figure 3) shows the effects of perceptual and conceptual cues on objective and subjective cognitive responses and aesthetic output variables with the corresponding hypotheses, discussed in the following sections.

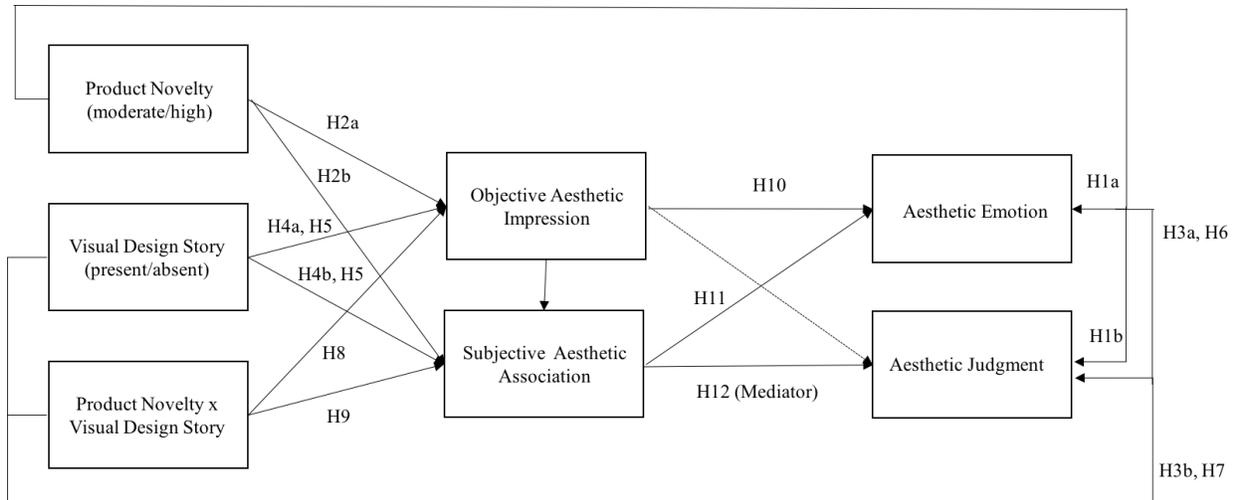


Figure 3. Effects of Perceptual and Conceptual Product Cues on Cognitive Responses and Aesthetic Output Variables

Design Novelty (A Perceptual Product Cue)

Novelty is a perceptual product cue as well as a critical collative design factor that greatly determines consumers’ product acceptance and preferences (Berlyne, 1971). It relates to “the degree to which a product is seen as different from a prototypical object” (Noble & Kumar, 2010, p. 650). Specifically, product novelty is “the deviation in a product design from the current design state of a certain product category” (Mugge & Dahl, 2013, p. 34). Contingent upon the extent of design change in a current product, “an innovation may result in small or large deviation from consumers’ mental schemas” (Mugge & Dahl, 2013, p. 36). Hence, novel objects exhibit more “attentional orienting” and possess less “organized processing dynamics” as compared to objects with which the consumer is already familiar (Reber et al., 2004, p. 371). Products utilizing shapes and lines that are a radical departure from those normally encountered arouse interest due to their novelty (Crilly et al., 2004). However, this aroused interest is not without caveats, as is discussed in the next section.

Main effects of design novelty (perceptual cue) on aesthetic judgment and emotions.

If the product deviates too far from its original form, consumers may not easily be able to categorize it (Bloch, 1995; Mugge & Dahl, 2013). The difficulty of categorization due to the lack of familiarity results in a decrease in perceptual fluency and liking. Consequently, consumers move away from the aesthetic object. Based on Berlyne's (1971) inverted U-relationship of pleasure, the highest level of pleasure results from a moderate level of novelty. Objects with extremely low or high levels of novelty evoke a lower level of pleasure than objects in the moderate range of novelty. Pleasure is generated through the perception and experience of an unfamiliar element to some familiar or recognizable object features (Berlyne, 1971). The preference for familiarity can be explained through the ease of processing because less novel objects facilitate fluent processing (Reber et al., 2004).

Perception of novelty has often been investigated through manipulating inherent properties of a product. For example, Hekkert et al. (2003) studied the joint influence of novelty and typicality on aesthetic preference using utilitarian products (sandwiches, telephones, teakettles and cars). Their findings suggest that a combination of novelty and typicality influences aesthetic preferences; however, one factor inhibits the positive outcome of the other. Yet, novelty and typicality also exert independent, equally strong effects on aesthetic preference. To the researchers' surprise, this effect on preference was highly significant for utilitarian products, where aesthetic appeal is less crucial. Hung and Chen's (2012) study more recently investigated the effect of specific levels of novelty on aesthetic preference, using chairs as the stimuli. Their findings confirm Berlyne's inverted U-curve by demonstrating that chairs with a moderate level of design novelty are the most preferred.

A subsequent study by Mugge and Dahl (2013) explored to what extent the level of design novelty impacts consumers' attitudes towards incremental and radical innovations.

Incremental innovations are products that are improved or modified from existing ones (e.g. small technological changes), whereas radical innovations refer to truly new products (e.g. vast technological developments). Their design stimuli (low vs. high design novelty) were created for three different categories (digital camera, washing machine, and hair dryer) and combined with descriptions for radical and incremental innovations. The results reveal that consumers show more positive responses for low than high product novelty design for radical innovations. This may be due to consumers' difficulties in reconfirming a preexisting product schema through design in order to be able to categorize the radical product innovation (Mugge & Dahl, 2013). On the contrary, the level of design novelty does not matter in consumers' evaluations for incremental innovations because low and high design novelty stimuli are equally preferred. Hence, for incremental innovations, consumers do not encounter the same challenge because they are able to access the relevant schema (Mugge & Dahl, 2013). Based on the above literature, we propose that:

H1: As compared to products with highly novel designs, those with moderately novel designs will create more positive

- a) Aesthetic emotions
- b) Aesthetic judgment

Main effects of design novelty (perceptual cue) on cognitive responses. Within the aesthetic processing model by Leder et al. (2004), familiarity is depicted in the implicit memory integration stage, which occurs in an automatic manner. Therefore, the formation of initial impressions regarding a novel or familiar product happens unconsciously (Leder et al., 2004). Locher (2015) refers to this impression as a “gist response” based on attainable information such as content, structural organization, and style, gained within an instant fixation on the aesthetic

object (p. 77). As discussed previously, a design generates several types of cognitive responses, such as objective aesthetic impression and subjective aesthetic association (Crilly et al. 2004). Crilly et al. (2004) argue that cognitive responses are not influenced in isolation, but in a holistic manner. This implies that if one type of cognitive response is negatively affected, then the negative influence is conveyed to other cognitive responses as well. Hence, both objective and subjective cognitive responses are interrelated and influence each other. In summary, highly novel products may not be perceived as visually attractive due to the difficulty of categorization and schematic processing, which can negatively impact other cognitive responses, such as objective aesthetic impression and subjective aesthetic association. Therefore, we hypothesize:

H2: As compared to products with highly novel designs, those with moderately novel designs will create more positive

- a) objective aesthetic impression of the product
- b) subjective aesthetic association of the product

Visual Storytelling (Conceptual Product Cue)

A designer's worst nightmare comes true when consumers glance at a novel design but move on to another product without appreciating or understanding it. A consumer needs to have the 'cognitive curiosity' to explore the aesthetic stimulus and gain an understanding about its unique features to have a positive aesthetic experience (Locher, 2015). A compelling marketing strategy can help create the 'curiosity' around a new design and pave the way for consumers' product appreciation and enthusiasm. One such strategy is to communicate a new product's design through visual and narrative stories presented in a catalog. Stories are powerful in their ability to persuade as "they are the landscapes of imagination and knowledge" (Bianchi, 2014, p. 15). A visual design story adjoining the product design is a particularly critical tool for design

communication because it can make a novel design sufficiently tangible in order to allow consumers to exercise their imagination (Parrish, 2006).

Transportation, a closely related concept, is defined as "the extent that individuals are absorbed into a story" (Green & Brock, 2000, p. 701). The transportation-imagery model by Green and Brock (2002) depicts that there are three antecedents in transportation, including cognitive attention, mental imagery and emotional involvement. The combined effort of these three antecedents triggers transportation, which results in belief change. Van Laer et al. (2014) advanced and extended the transportation-imagery model by adding storyteller and story receiver antecedents, as well as several output variables that represent consequences of narrative transportation. The consequences include affective responses, cognitive responses (critical and narrative thoughts), beliefs, attitudes, and intention.

Main effects of visual design story on aesthetic judgment and emotions. The act of storytelling can involve a permanent stimulation and generate aesthetic pleasure if internal variety, novelty, and unexpectedness are expressed (Bianchi, 2014). Storytelling has been widely applied in brand communication and provides consumers with an understanding of how brands are built (Collantes & Oliva, 2015). In the context of branding, storytelling can establish brand image, add value, and create an emotional bond with the consumer (Collantes & Oliva, 2015). It also has the potential to negate consumers' rational thought through manipulated logical processing (Vincent, 2002). Such benefits of storytelling in brand communication should reasonably extend to visual design communication. Visual storytelling can help emphasize the product concept and philosophy. Once consumers immerse in a story, their initial attitude about the new product may change due to the persuasion effect and mitigation of critical thoughts (Escalas, 2004). Visual design stories linked to formal, expressive, and symbolic product

qualities can thus attribute additional value and meaning to the new product and create an emotional bond between the consumer and product.

Marketing research points to evidence that storytelling in the form of narrative transportation results in more affective and positive consumer evaluations (Escalas, 2007; Wang & Calder, 2006). It appears that a study by Van de Hende and Schoormans (2012) is the only one that examined storytelling in the context of new product development. The authors examined consumers' evaluations toward a radically new technology (MP3 player). The participants viewed it in one of the following formats: prototype demonstration, narrative text with drawn images, and non-narrative text with drawn images. The results revealed that the technology application presented with narrative text was evaluated more positively on variables, such as evaluation of product, interaction, ease of use, and aesthetics than if it was presented without narrative text. Specifically, participants similarly evaluated the narrative text with drawn images and the prototype demonstration. The authors concluded that narratives are imperative for product evaluations because they provide the consumer with sufficient mental imagery to give a valid evaluation of the new product. In addition, narrative transportation was found to be a mediator. Thus, consumers are transported and gain an understanding about the new product technology when it is presented in narrative form (Van de Hende & Schoormans, 2012).

Aesthetic liking occurs when visual stories adjoining a product design allow for conceptually fluent processing of a product through applied meaning and context congruity (Reber et al., 2004; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). Visual design stories may also contribute to the cognitive mastering stage of Leder et al.'s (2004) model since this stage relates to how content is semantically understood. Leder et al. (2004) highlight the top-down knowledge in relation to aesthetic processing of an artwork. It has been shown that the amount of information about an object can impact aesthetic judgment. In particular, the authors

argue that explicit information about the artist or artwork (e.g. titles included below a painting, background of painter) can enhance the evaluation of an artwork. Therefore, visual design stories can heighten aesthetic judgments because they serve as conceptual product cues and communicate specific information about the product's design.

Based on the preceding discussion, we propose the following hypothesis:

H3: Use of a visual design story (present vs. absent) will enhance

- a) Aesthetic emotion
- b) Aesthetic judgment

Main effects of visual design story on cognitive responses. The aim of a story involves, among others, an educational or informative component that in turn, transforms emotional content to cognition and recognition (Bianchi, 2014). Judgment formation is dependent on the ideas and declarative information influenced by contextual variables (Schwarz, 2010). In particular, “cognition is contextually situated” (Leder & Nadal, 2014, p. 453) because the context itself can lead to different stimulus perceptions and aesthetic experiences (Leder et al., 2004). This implies that context exerts an influence on objective and subjective aesthetic impression. Schwarz (2010) pointed out that our perception of objects and evaluative judgments are guided by the immediate context in which the target is presented. During a conceptual analysis, consumers integrate information from cultural, institutional, and physical context in order to pre-classify an object that warrants aesthetic processing (Leder et al., 2004). Consumers reduce their cognitive effort if they are able to access the relevant product-schema due to an increase in conceptual fluency, which then leads to positive evaluative judgments (Reber et al., 2004).

Based on the above literature, it can be argued that objective aesthetic impression and subjective association of the product will be positively influenced and strengthened through visual design stories. Further, based on Leder et al.'s (2004) model, the flow of information can

be divided into two consecutive processing stages in order to understand an aesthetic experience. Automatic processing occurs under precognitive conditions. During this phase, impression formation occurs after 300ms from the presentation of an object (Jacobsen & Höfel, 2002). This impression formation can be allocated to objective aesthetic impression as it concerns the visual perception of a novel product design. On the other hand, deliberate processing involves higher cognitive processes and begins at approximately 600ms (Jacobsen & Höfel, 2002). Hence, deliberate processing can be linked to subjective aesthetic association, which relates to the comprehension of a stimulus. When exposed to visual design stories, consumers are involved in deliberative thought processes regarding the novel design. This mental involvement is attributed to subjective aesthetic association. Hence, it is proposed that subjective aesthetic association will be more enhanced than objective aesthetic impression after exposure to a product-related story as this type of cognitive response relates directly to associative context of the product. Therefore, we hypothesize that:

H4: Use of a visual design story (present vs. absent) will enhance

- a) objective aesthetic impression of the product.
- b) subjective aesthetic association of the product.

H5: Use of a visual design story (present vs. absent) will enhance subjective aesthetic association of the product more than its objective aesthetic impression.

Interaction effects. Besides determining how easily information can be retrieved from memory or how thoughts can be generated, conceptual cues can also determine how novel material can be processed (Schwarz, 2010). Conceptual knowledge can affect perception “through the association of specific semantic features with objects” (Martin & Caramazza, 2003, p. 509) and thus facilitate processing through the ease of identifying the product’s physical

identity. Consumers can generate a positive aesthetic experience toward high complexity product designs if they are able to interpret the design through “access to the meaning of the stimulus” (Reber et al., 2004, p. 373). This implies that a decrease in perceptual fluency may be compensated by an increase in conceptual fluency through added meaning (Reber et al., 2004). This assumption may apply to the collative factor of design novelty much in the same way as it does to complexity. Thus, regardless of the initial perceptual disfluency, a novel product design can trigger liking if coupled with a visual design story (conceptual product cue) that facilitates conceptual fluency for the novel design.

A study by Labroo, Dhar, and Schwarz (2008) explored whether semantic primes can facilitate fluent perceptual processing. The researchers utilized conceptual cues that either match or mismatch the product category (e.g., experiment 1: frog label on wine bottle; experiment 2: dog picture presented on dog shampoo) and manipulated perceptual fluency through exposure time. Their results revealed that conceptual cues (semantic primes) that match the target object facilitate fluent processing and were judged more positively. However, participants evaluated the product more positively even when the conceptual cue was not meaningfully related to the product category. Blijlevens, Gemser, and Mugge (2012) investigated whether context can influence perceived product typicality (high vs. low) and liking. Their results revealed that consumers perceive a typical product as more typical and evaluate it more positively within an atypical context. No differences in terms of perceived typicality and evaluation were found for atypical products regardless of the level of typicality of the context. Participants had equally positive liking ratings to atypical products. Their liking ratings did not differ between a typical vs. atypical context for an atypical product. Blijlevens et al. (2012) did not specifically link their findings to processing fluency. However, they can be interpreted in such a way that the two

different sources of processing fluency, perceptual and conceptual, interact and jointly influence liking.

Taken together, consumers prefer moderately novel over highly novel designs due to perceptual fluency. However, a highly novel product can generate positive aesthetic responses if low perceptual fluency is compensated by an increase in high conceptual fluency. Conceptual cues influence consumers' cognition and may override the disfluency in the other domain. Thus, a visual design story can provide meaning to a highly novel product design, which in turn can positively influence the aesthetic experience, objective aesthetic impression and subjective aesthetic association. Therefore, we hypothesize that:

H6: Product novelty and visual design stories will have a significant interaction effect on aesthetic emotions such that use of a visual design story (present vs. absent) will enhance aesthetic emotion toward a high novelty product design more than toward a moderate novelty product design.

H7: Product novelty and visual design stories will have a significant interaction effect on aesthetic judgment such that use of a visual design story (present vs. absent) will enhance the aesthetic judgment of a high novelty product design more than that of a moderate novelty product design.

H8: Product novelty and visual design stories will have a significant interaction effect on objective aesthetic impression such that use of a visual design story (present vs. absent) will enhance the objective aesthetic impression of a high novelty product design more than that of a moderate novelty product design.

H9: Product novelty and visual design stories will have a significant interaction effect on subjective aesthetic association such that use of a visual design story (present vs. absent)

will enhance the subjective aesthetic association of a high novelty product design more than that of a moderate novelty product design.

Structural Relationships between Cognitive Responses and Aesthetic Output Variables

Leder et al.'s (2004) model includes two output variables, namely aesthetic emotions and aesthetic judgments, which are independent constructs. As previously discussed, aesthetic emotions result from the affective state (satisfaction) and refer to pleasure, whereas product interpretation and the cognitive state are prerequisites for aesthetic judgments (Leder et al., 2004). Cognitive-based aesthetic judgments arise from the level of understanding, ambiguity, or active thoughts about a product (Leder & Nadal, 2014). Consumers may negatively evaluate an object, if they do not perceive it as meaningful or fail to make insightful associations (Leder et al., 2004). Therefore, consumers can only generate an aesthetic judgment if they allocate enough time for involvement and interaction with the product. Hence, the stimulation of the mind plays an imperative role in forming an aesthetic judgment.

Graf and Landwehr (2015) developed a pleasure-interest model of aesthetic liking which integrates a dual-process perspective of reflection and elaboration. The authors also consider aesthetic processing in their model and argue that feelings are the “by-product” of automatic processing (Graf & Landwehr, 2015, p. 7). Their conceptualization is akin with Leder et al.'s (2004) automatic vs. deliberate aesthetic processing. However, Graf and Landwehr (2015) add the activation of the two processing stages to their discussion. Importantly, they propose that controlled (deliberate) processing, a process that is perceiver driven, only occurs after automatic processing is activated through “sufficient attention by the perceiver” (p. 5). If subsequent controlled processing is not activated, the consumer directly transfers the affective feelings to the

product, which may result in pleasure or displeasure. If controlled processing becomes activated, an aesthetic evaluation takes place (Graf & Landwehr, 2015).

Therefore, it is proposed that both objective aesthetic impression and subjective aesthetic association affect aesthetic emotions in response to the novel product design. However, only subjective aesthetic association leads to aesthetic judgment since this type of cognitive response requires cognitive capacity and reflective interaction with the product. Objective aesthetic impression, on the other hand, refers to automatic processing and is performed without a detailed assessment of the visual product elements (Graf & Landwehr, 2015). Thus, we hypothesize the following:

H10: Objective aesthetic impression will positively influence aesthetic emotions toward product designs.

H11: Subjective aesthetic association will positively influence aesthetic emotions toward product designs.

H12: Subjective aesthetic association of the product will mediate the relationship between objective aesthetic impression and aesthetic judgment such that objective aesthetic impression will positively influence subjective aesthetic association, which in turn will positively influence aesthetic judgment.

Model 2: Moderating Role of Type of Visual Design Story Type on Cognitive Response

The model below (see Figure 4) shows the moderating role of type of visual design story on cognitive responses with the corresponding hypotheses, discussed in the following section.

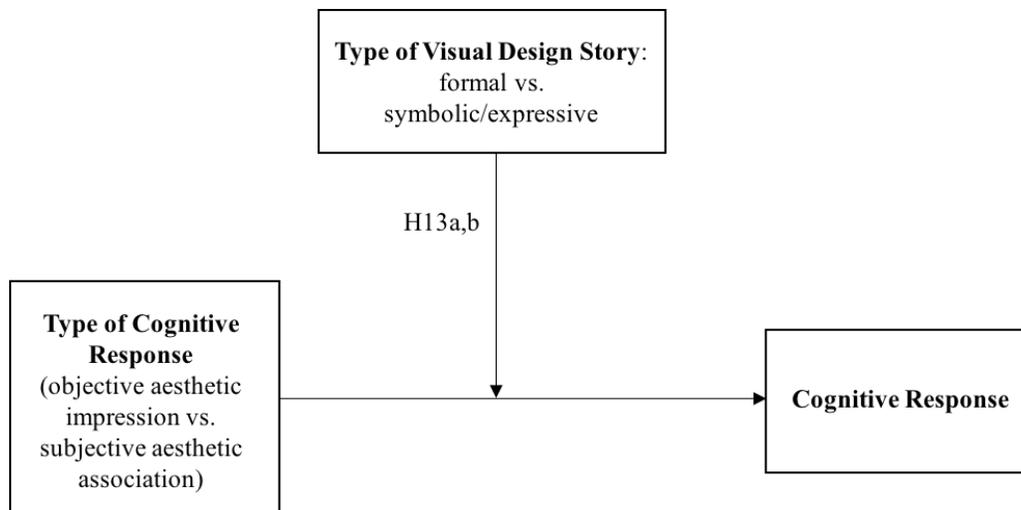


Figure 4. Moderating Role of Type of Product-Related Story on Cognitive Responses

The literature discussed in previous sections indicates that objective aesthetic impression aligns with formal product qualities because both emphasize the visual perception of products by scrutinizing the constitutive elements and principles of design (Crilly et al., 2004; Fiore, 2010). In fact, the concept of objective aesthetic impression closely relates to the concepts of aesthetic formality (Schenkman & Johnson, 2000) or classical aesthetics (Lavie & Tractinsky, 2004) within the web aesthetics literature. Similarly, in the field of industrial design, Coates (2003) named the perception of order in a design as objective concinnity. Thus, objective aesthetic impression in response to product designs may be more influenced by a visual design story that highlights the formal design elements and principles as compared to a visual design story related to emotions or symbols. In contrast, expressive and symbolic product qualities contribute to subjective aesthetic impressions, which refer to sense making and meaning attachment to the product (Crilly et al., 2004). Symbolic product qualities communicate those meanings associated with the product's appearance, which simultaneously express emotions (Fiore, 2010). Hence, expressive and symbolic product qualities are interconnected (Fiore, 2010; Kose, 1984) and merged for the purpose of this study. We can conclude that subjective aesthetic association is further heightened when a visual design story emphasizes the meaning and emotional component

of a product design (as compared to its formal design elements and principles). Hence, it is proposed that objective aesthetic impression in response to a product may benefit from visual design stories that communicate the formal design elements and principles, whereas subjective aesthetic association in response to a product may benefit from visual design stories that communicate the product's expressive associations and symbolic meaning. Therefore, we hypothesize the following:

H13: The type of visual design story will interact with the type of cognitive response to influence consumers' cognitive responses such that:

- a) Consumers' cognitive responses related to objective aesthetic impressions (type of cognitive response to a product's design) will be greater when the visual design story highlights formal product qualities as compared to symbolic/expressive product qualities;
- b) Consumers' cognitive response related to subjective aesthetic associations (type of cognitive response to a product's design) will be greater when the visual design story highlights the expressive/symbolic product qualities as compared to the formal product qualities.

CHAPTER 3. METHOD

This chapter provides an overview of the research design, followed by information about four pretests for stimulus development and the main study. This research employed online experiments to test the proposed research models and hypotheses. The purpose of the pretests was to 1) develop and select images of low and moderate novelty designs for relevant product categories, and 2) develop and select visual design stories (formal vs. symbolic/expressive) that correspond with the product designs (moderate vs. high design novelty). The questionnaires of each pretest can be found in Appendices B-G.

Overview and Experimental Design

The hypotheses were tested through an experimental study conducted online using Qualtrics software. The study employed a 3 (Visual Design Story: Absent, Formal, and Symbolic/Expressive) x 2 (Product Design Novelty: Moderate and High) x 2 (Product Category: Lamp and Chair designs) x 2 (Stimulus number in each product category) mixed-factorial experimental design with the three levels of visual design stories and the two levels of product design novelty as the between-subjects factors, and the two level of product category and number of stimuli as the within-subjects factors.

Lifestyle and home products (lamps and chairs) with moderate versus high design novelty were used as the perceptual product cue in this study. Lifestyle brands offer “a product or service that provides consumers with an emotional attachment to an identifiable lifestyle” (Jung & Merlin, 2002-2003, p. 40). Consumers then communicate “the values and qualities that these brands represent” to the society when consuming the product (Austin & Matos, 2013, p. 653). In

order to enhance the external validity and allow for stimulus sampling (avoiding stimulus-specific effects), this study included two product categories (lamp and chair designs) with two different product designs (number of stimuli) for each moderate versus high novelty condition. The inclusion of the two additional experimental factors, even though they are not variables of interest for the hypothesis testing, resulted in more generalizable effects of visual design story and design novelty on consumers' responses across different types of stimuli. Visual design stories (formal vs. expressive/symbolic) in the form of a color full-catalog page represented the conceptual cues. The visual design story adjoining the product design was displayed in the form of a color catalog page spread. The product design was presented on the left page and the visual design story on the right page. The proposed hypotheses in this study were investigated using quantitative data analysis.

Sample and Data Collection

This study employed female consumers who live in the United States because the catalog pages are more likely to attract a female audience who share similar lifestyle values. To further ensure homogeneity of the sample, female consumers were selected who were between the ages of 25 and 38 and possessed some college education. The chosen age group represents the older segment of the demographic cohort Generation Y, also known as the Millennials. This generation does not have a clearly defined age range but is typically grouped into one large consumer segment born between 1977 and 1995 (Lancaster & Stillman, 2002). Since Generation Y has the widest age range of all cohorts, its division into two distinctive age segments (younger Millennials aged 18-24 and the older Millennials aged 25-38) is inevitable due to major demographic and psychographic differences. Marshal Colen, chief industry analyst of the NPD Group, highlights that older Millennials have a higher level of education, higher income and therefore, higher purchasing power (Cohen, n. d.) and have entered a phase where they have

started a family and/or purchased a house or an apartment. Further, older Millennials devote more of their income toward home-related goods than the younger Millennials (Cohen, n.d.) and are an appropriate consumer group for the needs of this study because they are in the market for purchasing home and lifestyle products to decorate their homes.

Participants were recruited from a consumer research company named CINT that maintains an online insights exchange platform representing the U.S. population. The same platform for recruiting the sample was used for all of the four pretests and the main survey, although the participants for each of the pretests and main study were distinct. Participants received a monetary incentive in exchange for completing the internet-based questionnaire. The following sampling requirements were established to control for sample variations: 1) sampling was spread out throughout the day for all surveys, so that an even number of participants took the survey in the morning, noon, afternoon, and evening; 2) once participants took one survey, they were then excluded and unable to participate in the following studies; and 3) all surveys used the same, consistent target group supply sources (consumer panels), which were initially identified based on the study's purpose, and stimuli selection (consumer products).

Data for the main study were collected through an Internet-based, structured questionnaire including demographic questions and the visual stimuli. Each participant was exposed and randomly assigned to one of the six conditions: they were assigned to one of the two product design novelty condition in combination with one of the three visual design story conditions (formal or symbolic/expressive or absent story). Since there were two within-subjects factors with two levels, product category (chairs and lamps) and stimulus number (1 and 2), each participant saw 4 catalog page spreads in total. Thus, each participant viewed either moderate or high novelty product designs (chairs and lamps) without (absent condition) or with visual design stories related to formal or symbolic/expressive product qualities. The order of the four catalog

page spreads was randomized in the experiment to control for order effects. Each catalog page spread was followed by scale measures of objective aesthetic impression (DV), subjective aesthetic associations (DV), aesthetic emotions (DV), aesthetic judgment (DV), product design novelty (manipulation check), product design complexity (potential control variable), product involvement (potential control variable), visual communication of symbolic/expressive or formal product qualities (manipulation check), visual image/product design congruency (manipulation check), attitude toward the ad (potential control variable), and attractiveness of the ad (potential control variable). The Institutional Review Board at the University approved the protocol for this study (Protocol #16-348 EX 1610, see Appendix A).

Stimuli and Pretests

The stimuli were catalog page spreads, which included both the perceptual and conceptual product cues to manipulate the design novelty and visual design story factors, respectively. Prior to the main experiment, a series of four pretests were conducted with the purpose of identifying stimuli representative of moderate versus high design novelty (Pretests 1 and 2) and visual design stories linked to formal and expressive/symbolic product qualities (Pretests 3 and 4).

Stimulus Development

Manipulation of design novelty. The perceptual product cue was presented through color photographs of two designer chairs and lamps and placed on the left page of the catalog spread. Designer chairs and lamps were selected for several reasons: 1) they are consumed conspicuously and used as a means to represent a consumer's lifestyle and personality; 2) they differ widely in the level of design novelty; 3) consumer responses to home and lifestyle products are less influenced by factors such as body image, which has a critical impact on apparel products; 4) chair and lamps possess both formal and expressive/symbolic qualities that are easily identifiable and recognizable by a majority of consumers; and 5) visual design stories are very

relevant and applicable to designer chairs and lamps as they are perceived to be more hedonic than functional.

The chair and lamp designs were sourced from various home furnishing and designer websites, design awards and competition websites, exhibitions, and design and interiors magazines. In choosing moderate and novel chair designs, the type “lounge chairs” were chosen (see Appendix Q for image credits). The type “suspension lamps” were selected for moderate and novel lamp designs. The design novelty of the chair and lamp designs varied based on the newness or originality of the product design (Fiore & Kimle, 1997). Previous studies manipulated the level of novelty based on the object’s shape (Hekkert et al., 2003; Hung & Chen, 2012). Hence, design novelty was represented through different shapes/forms and unique or unconventional details. To convey high novelty, chair and lamp designs were selected such that the design deviated in shape from a prototypical object of its product category (Mugge & Dahl, 2013; Noble & Kumar, 2010). Prevalent or typical (most common) styles represented low novelty product designs (Hung & Chen, 2012).

Moderately novel chair and lamp designs showcased contemporary designs whereas highly novel designs were very unique in a sense that they could be perceived as a piece of art (e.g. sculptures). To ensure consistency using Adobe Photoshop, all product designs were presented on a consistent grey background and were consistent in color (white or grey), size and resolution (300 pixels/inch). Additionally, all lamp designs were shown illuminated with the help of various Photoshop tools (see Figures 5 and 6 for the final set of stimuli).

Manipulation of visual design story. The conceptual product cue was presented through color photographs of the visual design story adjoining the chair and lamp design and was included on the right page of the catalog spread. The visual design story mimicked the formal and symbolic qualities of the product designs (see Figures 5 and 6); see Appendix Q for image

credits. To communicate a visual design story linked to formal product qualities, a color catalog page was developed that visually portrayed and emphasized the structural composition based on conceptual definitions (Fiore, 2010). Particularly, the shape of the product design was a key determinant factor in creating visual stories related to a product's formal qualities. Thus, the formal visual design stories mimicked and emphasized the shape or contour of the chair and lamp designs through imagery of architectural elements, such as buildings, windows, ceilings and so on.

To convey symbolic/expressive qualities of chair and lamp designs within a visual design story, the meaning associated with representational aspects of the product's appearance was visually emphasized in the catalog page (Fiore et al., 1996). These symbolic/expressive visual stories were color images of 'associations' that came to most people's minds when looking at the chairs and lamps, such as elements from nature, animals, or space. Dr. Stephen Kellert, known as the "Godfather of Biophilia" argues that all humans should be connected to nature ("Remembering Stephen Kellert," 2017) . The profound influence of implementing nature in design related to human beings has been greatly studied in the context of built environments and public spaces. The incorporation of nature into design is called biophily and is said to advance consumers' wellbeing (Kellert & Calbrese, 2015). Specifically, Kellert and Calbrese (2015) argue that biophilic design triggers an emotional attachment with the built environment. One way to experience nature is through the use of a design strategy related to indirect experience of nature. Some attributes that fall into this strategy are the inclusion of images of nature, natural colors, and naturalistic shapes and forms (Kellert & Calbrese, 2015). Therefore, biophilic-inspired visual design stories related to product design could also have a powerful impact on consumers by reinforcing natural components attributed to different chair and lamp designs.

In addition, a control condition (absent visual design story condition) was included in which the chair and lamp designs (moderate vs. high novelty) were presented without an adjoining visual design story. In contrast, an unrelated advertising image was presented on the right catalog page in lieu of the adjoining visual story. The unrelated image was minimalistic and advertised Wifi for a Café. This simple black and white advertising page was chosen in order to draw participants' full attention to the product design (see Figures 5 and 6). Adding a control condition was imperative for this study to verify that the performance of the control group was significantly different from the other manipulated conditions in order to test research model 1 and increase internal validity.

Prior to the experiment, a series of pretests (discussed below) were conducted to ensure that design novelty and visual design story manipulations were successful with respect to a final set of 24 stimuli (four in each condition: two chairs and two lamps; see Figures 5 and 6). An overview of the pretest procedure is shown in Figure 7.



Figure 5. An overview of the chair designs used in the main study



Figure 6. An overview of the lamp designs used in the main study

Pretest 1 - Expert Panel

Purpose. The purpose of the first pretest was to get a sense of which pre-selected chair and lamp designs possessed a high and medium level of design novelty through the help of an expert panel. The second purpose was to obtain the experts' perception of symbolic or expressive associations related to the shape of each design using an open-ended question.

Method. An expert panel of four interior design professors and one apparel design professor evaluated design novelty for 27 different pre-selected lamp and chair designs (chairs: seven moderately novel designs, six high novel designs; lamps: seven moderately novel designs, seven high novel designs). Perceived novelty was measured on one 7-point semantic differential scale anchored by *familiar-novel* adapted from Cox and Cox (2002). The Cronbach's alpha coefficient for this scale reported by Cox and Cox (2002) (with three semantic differential scales) was .89. The expert panel was also asked to list some symbolic or expressive associations related to the shape of the design in an open-ended question (see Table 3.1 for measures). Overall, the expert panel's evaluation helped to get a sense of which chair and lamp designs possessed a high and medium level of design novelty. Getting the perspective of experts on design novelty was meaningful due to their daily exposure to various lamp and chair designs.

Data analysis and results. The mean was calculated based on the mean novelty ratings for each stimulus design. After a careful review of means, five moderate and five high novelty chair designs were selected from the initial set of 13 chair designs (no statistical tests were conducted due to the small sample size). Similarly, from the initial selection of 14 lamp designs, three moderate and four high novelty designs were chosen for further pretesting. These designs were evaluated as either low-medium design novelty with means ranging from 1.80 to 3.2 or high design novelty with means ranging from 5.6 to 7.0. These chosen design were pretested with a non-expert sample in Pretest 2 because their means indication of novelty could be higher than the expert sample identified.

Table 3.1

Measures for Pretest 1

Variable	Measures	α
Novelty	7 point semantic differential scale adapted from Cox and Cox (2002) I perceive this lamp as: familiar – novel	.89
Symbolic/expressive product associations (used to create visual design story related to symbolic/expressive product qualities)	One open-ended question with the following instruction: Please list some symbolic or expressive associations (if any) related to the shape of this design.	

Pretest 2 – Novelty verification and identification of symbolic and expressive associations

Purpose. The purpose of the second Pretest was to validate the moderate vs. high novel lamp and chair designs in two separate surveys with nationwide female consumer samples. Two separate surveys were employed to avoid participants' fatigue due to the high number of the designs in each product category. Similar to Pretest 1, another objective was to obtain their perception of symbolic or expressive associations related to the shape of each design in an open-ended question.

Method. Based on ratings from the expert panel, additional chair and lamp designs were included in Pretest 2. A total of 22 lamp designs (11 for each moderate vs. high novelty condition) were validated in Pretest 2a with 43 female consumers and 23 chair designs (9 high novel and 10 moderate novel designs) in Pretest 2b with 45 female consumers. The perceived novelty was measured on three 7-point semantic differential scales anchored by *familiar-novel*, *unoriginal-original*, and *atypical-typical*. The Cronbach's alpha coefficient for this scale was .89 (Cox & Cox, 2002). Before the novelty ratings, all of the designs were randomly shown one at a time in four second-intervals so that participants could familiarize themselves with the range of stimuli for a holistic comparison. This was important because consumers rate design novelty

based on stimulus comparison. For example, one design could be perceived as highly novel when shown alone. However, if presented with different designs, this initial novelty perception could change based on the comparison with one another. This procedure of presenting all the stimuli before novelty evaluations is common in design novelty studies as seen in Cox and Cox (2002), Hung and Chen (2012), and Thurgood, Hekkert, and Blijlevens (2014). Further, the order of stimuli presentation was randomized across participants.

Similar to the first pretest with an expert panel, participants were also asked to list symbolic or expressive associations related to the shape of each design (1-3 key words). An example was given for clarification: A particular shape of a lamp may represent or symbolize a seagull, a desert and so on (see Table 3.2 for all measures). Gathering information about symbolic and expressive associations for each design, which are subjective in nature, was important for the creation of visual design stories related to symbolic/expressive product qualities. On the other hand, formal product qualities concerning the shape and contour are easily recognizable, objective in nature and do not need much imagination to be identified. Thus, open-ended questions related to formal qualities were not included.

Data analysis of design novelty. The novelty items were combined to create a composite scale and one-sample *t*-tests with a test value of 3.5 were conducted. Based on a comparison of mean novelty ratings, 11 lamp designs (five moderate novelty, six high novelty designs) out of 22 lamp designs and nine chair designs (four moderate novelty, five high novelty designs) out of 23 chair design were selected (see Tables 3.3 and 3.4). In order to choose appropriate designs that fell into the moderate vs. high novelty category, the mean of the moderate design novelty stimulus had to be close to the moderate value of 3.5 on a 7-point scale to be considered and that of high novelty designs close to the maximum value of 7.0.

Results of design novelty. The means of the chosen moderate novelty chairs ranged from 2.71 to 3.71 and those of the chosen moderate novelty lamps ranged from 4.23 to 4.44. The means of the chosen high novelty chairs ranged from 6.33 to 6.53 and those of the chosen high novelty lamps ranged from 5.88 to 6.10 (see Table 3.3 and 3.4 for novelty mean ratings of chosen stimuli). Based on the one sample *t*-test results, the means of the moderate novel chair designs were in the 4.0 range and hence, were significant with a test value of 3.5; however, achieved non-significance with a test value of 4.0 which is still considered moderate novelty. The means of the novel lamp designs fell in the 6.0 range and all of the lamps achieved non-significance with a test value of 6.0 (see Table 3.3 for results of chosen lamp designs). Thus, the lamp designs were in the anticipated ranges of novelty and were again validated in Pretest 4. With respect to the chair designs, the means of three moderate novel chairs fell in the moderate range and achieved non-significance with a test value of 3.5 (the other two lamp designs had means close to 3.0 and therefore, were significant). The means of all of the novel chair designs fell in the 6.5 range and achieved non-significance with a test value of 6 (see Table 3.4 for results of chosen chair designs). Thus, the chair designs were in the anticipated ranges of novelty and were again validated in Pretest 4.

Data analysis and results of qualitative data. Next, qualitative data were content analyzed for the selected 11 lamp and nine chair designs in order to identify what the majority of participants and expert panel (from Pretest 1) indicated when asked about the symbolic and expressive associations related to these designs. Based on repeated themes in the responses, visual design stories related to the product's symbolic/expressive association were created (see Table 3.6 and 3.7 for themes of all stimuli). For example, flowing water, space, swan, shark head, and snowflake came to most participants' minds when looking at the various chair designs. For the lamp designs, participants mentioned most often Tetris, icicle, fighting birds, and water drops.

Table 3.1

Measures of Pretest 2

Variable	Measures	α
Novelty	3 item, 7-point semantic differential scale adapted from Cox and Cox (2002) I perceive this lamp as: 1) unoriginal - original 2) typical – atypical 3) familiar - novel	.89
Symbolic/expressive product associations (used to create visual design story related to symbolic/expressive product qualities)	One open-ended question with the following instruction: Please list some symbolic or expressive associations (if any) related to the shape of this lamp (1-3 key words). For example, a particular shape of a lamp may represent or symbolize a seagull, a flower, a desert etc.	

Table 3.2

Novelty mean results for moderate and high novelty lamps of Pretest 2

Moderate novelty lamps	
 <p>Lamp C780 NOVALCOM</p>	4.40
 <p>Lamp C780 NOVALCOM</p>	4.23*
 <p>Lamp C780 NOVALCOM</p>	4.28*
 <p>Lamp C780 NOVALCOM</p>	4.33*
 <p>Lamp C780 NOVALCOM</p>	4.34*

High novelty lamps

			
32 NOVALCOM 5.94*	32 NOVALCOM 5.88*	32 NOVALCOM 5.99*	32 NOVALCOM 5.98*
			
32 NOVALCOM 6.10*	32 NOVALCOM 5.95*		

Note: one-sample *t*-test results with a test value of 4.0: **p*>.05 for moderate novelty lamps
 one-sample *t*-test results with a test value of 6.0: **p*>.05 for high novelty lamps

Table 3.3

Novelty mean results for moderate and high novelty chairs of Pretest 2

Moderate novelty chairs

			
32 NOVALCOM 3.03	32 NOVALCOM 3.71*	32 NOVALCOM 3.77*	32 NOVALCOM 2.71

High novelty chairs

Chair A204



NOVALCOM
6.43*

Chair A204



NOVALCOM
6.39*

Chair A204



NOVALCOM
6.33*

Chair A204



NOVALCOM
6.34*

Chair A204



NOVALCOM
6.53*

Note: one-sample *t*-test results with a test value of 3.5: $*p > .05$ for moderate novelty chairs
one-sample *t*-test results with a test value of 6.5: $*p > .05$ for high novelty chairs

Pretest 3 – Verification of visual design stories and validation of self-developed scales

Purpose. The purpose of Pretest 3 was to verify the visual design stories related to symbolic/expressive product qualities which were created based on the identified repeated themes from Pretest 1 and 2 (see Tables 3.8 and 3.9). A secondary purpose of Pretest 3 was to ensure reliability and validity of the self-developed scales of objective aesthetic impression and subjective aesthetic association before the inclusion in the main survey.

Method. Based on participants' open-ended responses concerning the associations of the designs from Pretest 2, 11 visual design stories (formal vs. expressive/symbolic) for lamps and nine visual design stories (formal vs. expressive/symbolic) for chairs were created to be viewed in a catalog page spread (visual story on the left and the product design on the right page). The visual stories (formal vs. expressive/symbolic) of each lamp and chair along with the consumers'

symbolic/expressive associations (some related to the formal product qualities) are included in Tables 3.8 and 3.9. These visual design stories linked to symbolic/expressive and formal product qualities were validated in two separate surveys with a nationwide female consumer sample in order to avoid participants' fatigue due to the high number of images. Therefore, 57 participants viewed one questionnaire (3a) including a total of 20 visual stories related to symbolic/expressive qualities of the chair (9 visual stories) and lamp designs (11 visual stories). Further, 60 participants viewed another questionnaire (3b) including a total of 20 visual stories related to formal qualities of the chair (9 visual stories) and lamp designs (11 visual stories). After each stimulus, the following scales were included in order to establish the successful manipulation of the independent variable, visual design story: scales of visual communication of symbolic/expressive product qualities or visual communication of formal product qualities (depending on the type of visual design story) and visual imagery/product's design congruency (control variable). The inclusion of both scales after each stimulus was crucial to test whether the manipulated visual design stories corresponded to the specific product qualities and whether the visual design stories were congruent with the product design.

Visual communication of product qualities and visual design story/product design congruency scale measures. Visual design stories related to symbolic/expressive and formal product qualities (see Table 3.8 and 3.9) were rated on researcher-developed measures for visual communication with items that are in congruence with Fiore et al.'s (1996) conceptual definition of symbolic and formal product qualities (see Table 3.5 for all measures used in Pretest 3). The visual communication of expressive/symbolic product qualities was measured using four items. For example, statements that captured the visual communication of expressive/symbolic product qualities through the visual design story of the catalog page spread were *"This visual image conveys the symbolism of the lamp (chair) design,"* or *"The meaning of the lamp (chair) design is*

portrayed through this visual image.” The visual communication of formal product qualities was measured using three items. For example, statements that captured the visual communication of formal product qualities through the visual design story of the catalog page spread were “*This visual image resembles the form and shape of the lamp (chair) design,*” or “*The form and shape of the lamp design is portrayed through this visual image.*” Each item was rated on a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

In addition, how congruent the visual design story was to the chair and lamp designs was measured with the global congruence scale including three items developed by Fleck, Korchia, and Le Roy (2012). This scale originated from the advertising/celebrity context and was modified to fit this study’s context. Examples of statements were “*This visual image and the lamp (chair) design go well together,*” or “*This visual image is well matched with the lamp (chair) design.*” The coefficient alphas for this scale is .97 (Fleck et al., 2012).

Objective aesthetic impression and subjective aesthetic association measures. A secondary purpose of Pretest 3 was to ensure reliability and validity of the self-developed scales of objective aesthetic impression and subjective aesthetic association before the inclusion in the main survey (see Tables 3.5). This way, any reliability and validity issues could be detected early on and scale items refined prior to hypothesis testing. Therefore, an additional catalog page spread with a visual design story adjoining a lamp design was created and included at the end of the survey. This additional image was not considered for the main study and was included solely for reliability and validity purposes of the cognitive response measures. After viewing this stimulus, participants evaluated their objective aesthetic impression and subjective aesthetic association.

On the basis of previous findings on the dimension of aesthetics, objective cognitive responses, namely objective aesthetic impression, was measured by integrating five items from

classical aesthetic dimension scales (Cai & Xu, 2011; Lavie & Tractinsky, 2004) and an aesthetic formality scale (Schenkman & Jonsson, 2000) that both relate to the order and clarity of a design. One of the classical aesthetic scales was developed by Lavie and Tractinsky (2004) with five items on a 7-point scale and a Cronbach's alpha of .85. Typical items are: aesthetic design, pleasant design, clear design, clean design, and symmetric design. In agreement with a study by Cai and Xu (2011), two of Lavie and Tractinsky's (2004) items were excluded: 1) the *aesthetic* item because it already refers to an overall evaluation and 2) the *pleasant* item due to its linkage to affect and emotion. Also, the *symmetric design* item was dropped because it does not apply to product design. The *harmonious* item was adapted from Cai and Xu's (2004) partially self-developed classical aesthetic scale related to web aesthetic. In addition, the *order* item was included from Schenkman and Jonsson's (2000) aesthetic formality dimension scale and is in line with classical experimental literature of aesthetics (see Berlyne, 1971). Thus, objective aesthetic impression was measured with five items (*harmonious, order, clean, clear, and organized*) and each item was accompanied by a 7-point Likert response scale ranging from strongly agree (= 7) to strongly disagree (= 1). Two example statements are "*I perceive this lamp (chair) design to be harmonious,*" and "*I perceive a sense of order in this lamp (chair) design.*"

With respect to subjective cognitive responses, five self-developed items were used to measure subjective aesthetic association. For example, statements such as "*This lamp (chair) design is meaningful;*" "*Through my personal, cultural or visual experience, I am able to understand this lamp (chair) design;*" and "*This lamp (chair) design appears to make sense to me.*" The item development followed Crilly's et al. (2004) conceptualization of subjective concinnity to capture the extent to which consumers understand and comprehend the product's design. In addition, one item of Mugge, Brunel, and Schoormans's (2012) brand symbolism scale (three item scale with Cronbach's alpha of .96) was used to measure subjective aesthetic

association. The item was revised to fit the context of product design. The statement was “*This lamp (chair) design has symbolic qualities*” and represents the symbolic value of the product’s design. All of the six items were measured using a 7-point Likert response scale ranging from strongly agree (=7) to strongly disagree (=1).

Table 3.4

Measures of Pretest 3

Variable	Measures	α
Visual communication of symbolic/expressive product qualities	Four self-developed items measured on a 7-point Likert scale. We are interested in your evaluation of the visual image of the catalog adjoining the chair design. Please indicate the number that best reflects your opinion 1) This visual image conveys the symbolism of the chair design. 2) The meaning of the chair design is portrayed through this visual image. 3) This visual image contributes to the symbolic nature of the chair design. 4) This visual image communicates feelings and emotions associated with the chair design.	
Visual communication of formal product qualities	Three self-developed items measured on a 7-point Likert scale. 1) This visual image resembles the form and shape of the chair design. 2) The form and shape of the chair design is portrayed through this visual image. 3) This visual image places emphasis on the form and shape of the chair design	
Product design/Visual design story congruency	Global congruence scale with three items adapted from Fleck et al. (2012) 1) This visual image and the chair design go well together. 2) This visual image is well matched with the chair design. 3) In my opinion, this visual image is very appropriate for advertisement of the chair design.	.97
Objective aesthetic impression	Five self-developed items measured on a 7-point Likert scale. 1) I perceive this lamp design to be harmonious. 2) I perceive a sense of order in this lamp design. 3) I perceive this lamp design to be clean. 4) I perceive this lamp design to be clear.	

	5) I perceive this lamp design to be organized.
Subjective aesthetic association	Six self-developed items measured on a 7-point Likert scale. 1) This lamp design has symbolic qualities. 2) This lamp design is meaningful. 3) This lamp design embodies symbolic associations. 4) This lamp design appears to make sense to me. 5) Through my personal, cultural or visual experience, I am able to understand this lamp design. 6) This lamp design is easy to comprehend.

Data analysis and results. First, exploratory factor analysis was conducted to define the dimensions underlying existing measurement instruments to verify unidimensionality before creating composite scales for all the variables. All factors that had an eigenvalue greater than 1 were retained (see Table 3.6). The results of the principal components analysis with varimax rotation indicated that each variable was comprised of only one factor. With respect to the self-developed measures, the results further indicated that the cognitive responses successfully loaded on two factors, objective aesthetic impression and subjective aesthetic association. One item of subjective aesthetic association was deleted due to insufficient factor loadings ($> .70$) on either factor (see Table 3.7).

The internal consistency reliabilities of visual communication of formal qualities related to the lamp designs ranged from .93 to .96 and those of chair designs from .85 to .96. The reliabilities of visual communication of symbolic/expressive qualities related to the lamp designs ranged from .91 to .97 and those of the chair designs from .95 to .98. Hence, the visual communication of product qualities self-developed scale established adequate reliabilities. The reliabilities of the product design congruency related to visual design stories linked to formal qualities of the lamp designs ranged from .94 to .98 and those of the chair designs from .95 to .98. The reliabilities of the product design congruency related to visual design stories linked to

symbolic/expressive qualities of the lamp designs ranged from .94 to .97 and those of the chair designs from .94 to .99. Both scales also revealed adequate reliability.

The Cronbach's alpha coefficient for the objective aesthetic impression scale was .94 in the survey involving symbolic/expressive product qualities (Pretest 3a) and .90 in the survey involving formal product qualities (Pretest 3b). The Cronbach's alpha coefficient for the subjective aesthetic association scale was .96 in the survey involving symbolic/expressive product qualities (Pretest 3a) and .90 in the survey involving formal product qualities (3b).

Test of visual design stories. To test whether the formal and symbolic/expressive visual design stories were created successfully, a one-sample *t*-test with a test value of 3.5 was conducted. The test value of 3.5 could reveal whether the mean scores of visual communication of formal and symbolic qualities were significantly greater than the median value of the 7.0 rating scale ($p < .05$). Based on the *t*-test results, all mean scores of visual communication of formal product qualities were significantly greater than the test value (see significances of each stimulus in Tables 3.10-3.13), which indicated that the visual design story visually related to the chair and lamp designs' formal qualities, with the exception of one stimulus (stimulus #7 in Table 3.13). The mean score of visual communication of formal qualities related to one chair design (within the high novelty category) did not significantly differ from the test value.

The same analysis was conducted for the control variable, product design/visual design story congruency in order to examine whether the visual design story was well matched with the product designs. Based on the results, the aforementioned chair design (stimulus #7 in Table 3.13) and one lamp design (stimulus #6 in Table 3.11) were rated as incongruent with the visual design story related to formal qualities ($p > .05$). Hence, both stimuli were deemed unsuccessful and excluded for further consideration.

One sample *t*-test results related to the visual design story associated with symbolic/expressive product qualities revealed that all mean scores of visual communication of symbolic/expressive product qualities were significantly greater than the test value of 3.5. Therefore, each visual design story successfully represented the chair and lamp designs' symbolic/expressive qualities. Also, results of the *t*-test of the control variable product design/visual design story congruency revealed that all designs were congruent with the visual design story related to symbolic/expressive product qualities, except for one chair design (within the moderate novelty design condition, see stimulus #4 in Table 3.12), which was also not considered for inclusion in the main study (results for each stimulus were indicated in Tables 3.10-3.13).

Table 3.5

Factors Loadings for Unidimensionality of Measures used in Pretest 3

Scale	Factor loadings
<i>Product Design/Visual Design Story Product congruency</i>	
This visual image and the chair design go well together.	.95
This visual image is well matched with the chair design.	.98
In my opinion, this visual image is very appropriate for advertisement of the chair design	.92
Eigenvalue	2.81
Variance Explained	93.50%

<i>Visual Communication of Symbolic/Expressive Product Qualities</i>	.89
This visual image conveys the symbolism of the chair design.	.97
The meaning of the chair design is portrayed through this visual image.	.89
This visual image contributes to the symbolic nature of the chair design.	.87
This visual image communicates feelings and emotions associated with the chair design.	3.47
Eigenvalue	86.68%
Variance Explained	
<i>Visual Communication of Formal Product Qualities</i>	.96
This visual image resembles the form and shape of the chair design.	.91
The form and shape of the chair design is portrayed through this visual image.	.93
This visual image places emphasis on the form and shape of the chair design	2.74
Eigenvalue	91.48%
Variance Explained	

Table 3.6

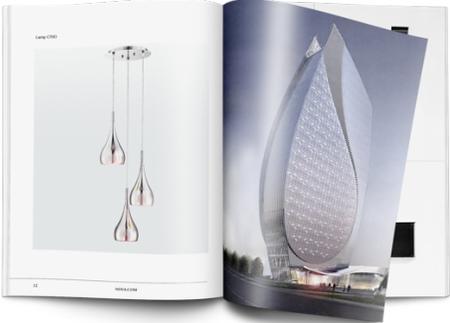
Factors Loadings of the Two Types of Cognitive Responses (objective and subjective) used in Pretest 3

	Factor loadings	
	Component 1 Objective	Component 2 Subjective
<i>Cognitive responses</i>		
I perceive this lamp design to be harmonious.	.74	
I perceive a sense of order in this lamp design.	.73	
I perceive this lamp design to be clean.	.84	
I perceive this lamp design to be clear.	.86	
I perceive this lamp design to be organized	.85	
This lamp design has symbolic qualities.		.88
This lamp design is meaningful.		.92
This lamp design embodies symbolic associations.		.96
This lamp design appears to make sense to me.		.72
Through my personal, cultural or visual experience, I am able to understand this lamp design.		.73
This lamp design is easy to comprehend*	.31*	.50*
Eigenvalue	6.81	2.2
Variance Explained	62.83	22.27

Note: *item deleted

Table 3.7

Visual design stories related to formal and symbolic lamp qualities created for Pretest 3 based on identified formal and symbolic/expressive associations in Pretest 2

Lamp	Visual stories – formal qualities	Visual stories – expressive/symbolic qualities
1		
	Shape: architectural, triangle, diamond-shaped, sharp edges	Expressiveness/Symbolism: diamond, gemstone, dark
2		
	Shape: droplet-shaped,	Expressiveness/Symbolism: rain drops, calm
3		
	Shape: long, sleek, needle, thin	Expressiveness/Symbolism: comet, telescope

4



Shape: tent-shaped



Expressiveness/Symbolism: darkness, witch hat, halloween, pottery

5



Shape: sphere



Expressiveness/Symbolism: pearls

6



Shape: waved, hard



Expressiveness/Symbolism: manta ray

7



Shape: soft wave

Expressiveness/Symbolism: feather (with pearl)

8



Shape: fan, round, intertwined

Expressiveness/Symbolism: (flying) birds, birds tangled up in flight

9



Shape: block, cubicles

Expressiveness/Symbolism: Tetris

10



Shape: zig-zag

Expressiveness/Symbolism: lightning

11



Shape: sharp, sleek spear

Expressiveness/Symbolism: icicles, crystal

Table 3.8

Visual design stories related to formal and symbolic chair qualities created for Pretest 3 based on identified formal and symbolic/expressive associations in Pretest 2

Chair	Visual stories – formal qualities	Visual stories – expressive/symbolic qualities
-------	-----------------------------------	--

1



Shape: egg-shaped

Expressiveness/Symbolism: flower

2



Shape: half-sphere, round

Expressiveness/Symbolism: outer space

3



Shape: sleek, round, opening, pointy



Expressiveness/Symbolism: shark head, modern

4



Shape: rounded edges



Expressiveness/Symbolism: Tulip, sophistication

5

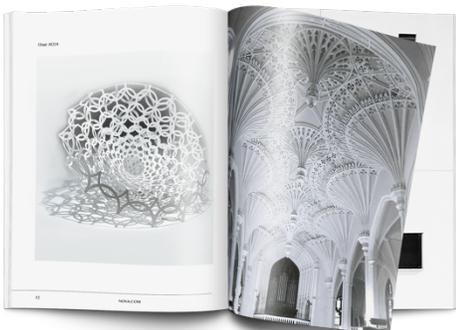


Shape: hand fan-shaped, accordion-shaped



Expressiveness/Symbolism: (humming) bird

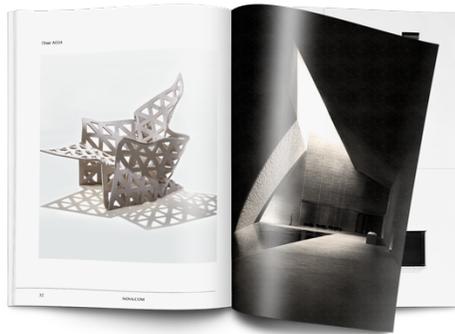
6



Shape: lace, round, geometric

Expressiveness/Symbolism: snowflake

7



Shape: origami, pointy, sharp edges, straight lines

Expressiveness/Symbolism: handkerchief, folded fabric

8



Shape: spoon-like shape

Expressiveness/Symbolism: swan

9



Shape: soft zig-zag lines

Expressiveness/Symbolism: flowing water, stream, shiny

Pretest 4 – Validation of Design Novelty

Purpose. The purpose of Pretest 4 was to validate design novelty of the 20 designs from Pretest 2 (see Table 3.3 and 3.4). The same novelty measures were used as in Pretest 2. Novelty is a collative design factor which is perceived as highly subjective and varies greatly due to the

broad range of consumers' previous experiences (Berlyne, 1971). Therefore, it was crucial to test these 20 designs with a new consumer sample for novelty confirmation.

Method. In order to arrive at the final stimuli of four for each condition (two chair and two lamp designs), Pretest 4 with a nationwide female sample of 45 was used to validate the novelty level of nine chair and 11 lamp designs from Pretest 2. Similar to Pretest 2, the 11 lamps were first presented in randomized order for familiarization before participants rated the design novelty of these lamps. Following the lamp ratings, the nine chair designs were shown in a randomized order before participants rated the novelty of these chair designs.

Data analysis and results. By holistically comparing results of Pretest 3 and Pretest 4, the goal was to select a set of four stimuli with two levels of design novelty (N) and adjoining visual design stories related to symbolic/expressive and formal qualities to create a 2 (Novelty: high vs. low) x 3 (Story: absent vs. formal vs. symbolic/expressive) factorial stimulus design: High N + Absence of product story, Low N + Absence of product story, High N + Story related to formal product qualities, Low N + Story related to formal product qualities, High N + Story related to symbolic/expressive product qualities, and Low N + Story related to symbolic/expressive product qualities (see Figures 5 and 6 for the final set of stimuli).

The stimuli were narrowed based on the following requirements: 1) the mean of high novel designs needed to be close to the maximum value of 7.0 and that of moderate novel designs close to 4.0; 2) the mean of visual design story/product design congruency needed to be close to the maximum value of 7.0; and 3) the means of visual communication of symbolic/expressive and formal product qualities needed to be close to the maximum value of 7.0.

According to the above description, the following stimuli met the requirements: 1) moderate novel chairs: image # 2 and image #3; 2) high novel chairs: image #5 and image #9; 3)

moderate novel lamps: image #1 and image #3; and 4) high novel lamps: image #8 and image #11 (chosen stimuli are highlighted in Tables 3.10-3.13).

The design novelty composites were created for each of the 20 stimuli (see means of novelty in Tables 3.10-3.13). Multiple comparisons of means through paired samples *t*-test were conducted for final design novelty verification in order to assure that the stimuli means of the high novelty condition were significantly greater than those of the moderate novelty condition. The paired samples *t*-test results revealed that the stimuli in both conditions were significantly different from each other with respect to design novelty (see Table 3.14). In addition, results from Pretest 3 revealed that the creation of the visual stories related to formal and symbolic qualities for these four chair and four lamp designs were successful, and, hence, were included in the main survey.

Table 3.14

Paired Samples t-Test Results for the Design Novelty Factor

Stimulus Pair	Mean Difference	SD	St. Error Mean	<i>t</i>	<i>df</i>	<i>p</i>
Pair 1 Lamp 1 (moderate N) - Lamp 1 (high N)	-2.341	1.588	0.237	-9.866	44	< .001
Pair 2 Lamp 1 (moderate N) - Lamp 2 (high N)	-2.385	1.455	0.217	-11.000	44	< .001
Pair 3 Lamp 2 (moderate N) - Lamp 1 (high N)	-2.148	1.678	0.250	-8.587	44	< .001
Pair 4 Lamp 2 (moderate N) - Lamp 2 (high N)	-2.193	1.540	0.230	-9.552	44	< .001
Pair 5 Chair 1 (moderate N) - Chair 1 (high N)	-2.585	1.721	0.256	-10.079	44	< .001
Pair 6 Chair 1 (moderate N) - Chair 2 (high N)	-2.488	1.635	0.249	-9.979	42	< .001
Pair 7 Chair 2 (moderate N) - Chair 1 (high N)	-2.326	1.577	0.235	-9.893	44	< .001
Pair 8 Chair 2 (moderate N) - Chair 2 (high N)	-2.240	1.509	0.230	-9.736	42	< .001

Table 3.10

Visual communication of lamp qualities and congruency means (Pretest 3) with Novelty means (Pretest 4) – Identified as moderate novel lamps (Pretest 2)

Lamp design with Visual Design Story Formal vs. Symbolic/expressive	Novelty	Visual comm. of formal qualities	Congruency formal qualities	Visual comm. of symbolic/ expressive qualities	Congruency symbolic/ expressive qualities
	<i>Pretest 4</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>
1 	3.79	5.63**	5.63**	5.23**	5.24**
2 	3.81	4.58**	4.63**	6.25**	6.30**
3 	3.96	5.11**	5.13**	5.75**	5.80**

4		3.71	5.58**	5.71**	4.48**	4.46**
						
5		4.07	4.02*	4.10*	5.63**	5.41**
						

Note: * $p < .05$, ** $p < .01$

Table 3.11
Visual communication of lamp qualities and congruency means (Pretest 3) with novelty means (Pretest 4) – Identified as high novel lamps (Pretest 2)

	Lamp design with Visual Design Story Formal vs. Symbolic/expressive	Novelty	Visual comm. of formal qualities	Congruency formal qualities	Visual comm. of symbolic/ expressive qualities	Congruency symbolic/ expressive qualities
		<i>Pretest 4</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>
6		6.26	4.05*	3.91	5.77**	5.74**
						

7		6.51	4.94**	4.95**	5.83**	6.00**
						
8		6.16	5.66**	5.60**	5.50**	5.25**
						
9		5.96	5.96**	6.23**	5.79**	5.76**
						
10		6.01	4.25*	4.26*	4.71**	4.61**
						

1		6.20	5.15**	5.22**	5.46**	5.36**
1						

Note: * $p < .05$, ** $p < .01$

Table 3.12
Visual communication of chair qualities and congruency means (Pretest 3) with novelty means (Pretest 4) – Identified as moderate novel chairs (Pretest 2)

	Chair design with Visual Design Story Formal vs. Symbolic/expressive	Novelty	Visual comm. of formal qualities	Congruency formal qualities	Visual comm. of symbolic/ expressive qualities	Congruency symbolic/ expressive qualities
		<i>Pretest 4</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>
1		3.02	4.43**	4.38**	5.01**	5.02**
						
2		3.97	6.21**	6.14**	5.16**	5.23**
						

3		3.71	6.01**	6.11**	5.68**	5.78**
						

4		3.02	4.21*	4.40**	4.12*	3.81
						

Note: * $p < .05$, ** $p < .01$

Table 3.13
Visual communication of chair qualities and congruency means (Pretest 3) with novelty means (Pretest 4) – Identified as high novel chairs (Pretest 2)

	Chair design with Visual Design Story Formal vs. Symbolic/expressive	Novelty	Visual comm. of formal qualities	Congruency formal qualities	Visual comm. of symbolic/ expressive qualities	Congruency symbolic/ expressive qualities
		<i>Pretest 4</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>	<i>Pretest 3</i>
5		6.31	5.68**	5.84**	5.50**	5.39**
						

6		6.20	5.60**	5.83**	5.75**	5.78**
						
7		6.19	3.57	3.63	4.79**	4.77**
						
8		6.07	6.05**	6.08**	5.83**	5.84**
						
9		6.31	5.49**	5.59**	5.24**	5.25**
						

Note: * $p < .05$, ** $p < .01$

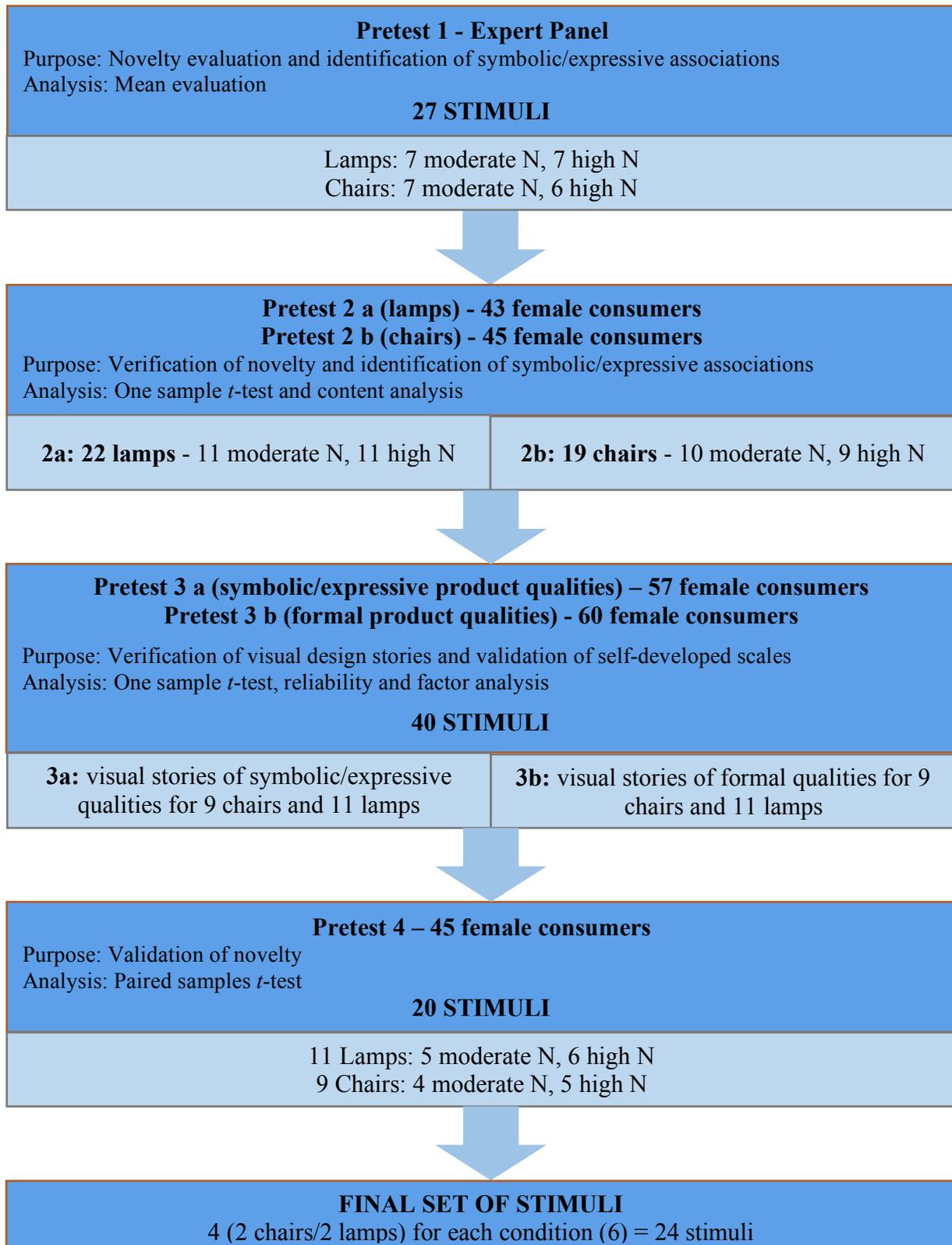


Figure 7. Overview of pretests

Main Study Questionnaire

The self-administered, internet-based questionnaire used in this study included a mixed factorial experimental design with a set of two catalog page spreads that showcased the moderate versus high novel product designs (two lamps and two chairs) with adjoining visual design stories (see Figure 5 and 6 for the final set of stimuli). Each participant was randomly assigned to one of the six conditions: they were assigned to one of the two product design novelty condition in combination with one of the three visual design story conditions (formal or symbolic/expressive or absent story). Because there were two within-subjects factors with two levels, product category (chairs and lamps) and stimulus number (1 and 2), each participant saw four catalog pages with products in total. The order of the four catalog pages was randomized in the experiment to control for order effects. Measures of objective aesthetic impression, subjective aesthetic associations, aesthetic emotion, aesthetic judgments, design complexity, product involvement, visual communication of either formal or symbolic/expressive product qualities, attractiveness of the ad, and attitude toward the ad appeared after each of the four catalog pages.

The questionnaire started with demographic information, including respondents' gender, age, education, ethnicity, and annual household income. Following the presentation of the stimuli and measures, the questionnaire continued with novelty evaluations of all of the four lamp and four chair designs (manipulation check for novelty). First, participants viewed the four lamp designs in 4 second intervals so that they could get familiar with the designs before they were asked to evaluate the novelty of each of the lamps. Similarly, participants then viewed the four chair designs before the novelty measures of the chairs appeared. This procedure was identical to Pretest 2 and Pretest 4. Most of the instruments (see Table 3.15) that were used in this study are well established and reliable scales, so that measurement error for this study could be reduced which enhances the internal validity.

Mediators and Dependent Variable Measures

Objective aesthetic impression. The same five items of objective aesthetic impression (*harmonious, order, clean, clear, and organized*) as in Pretest 3 were measured on a 7-point Likert response scale ranging from strongly agree (= 7) to strongly disagree (= 1).

Subjective aesthetic associations. The same five items of subjective aesthetic associations as in Pretest 3 (one item was deleted based on factor analysis results) were measured on a 7-point Likert response scale ranging from strongly agree (=7) to strongly disagree (=1).

Aesthetic emotion. Aesthetic emotions of each product design were measured using the feelings toward ads scale which was developed by Edell and Burke (1987). These feelings can be either negative or positive, and positive feelings are differentiated between “warm” and “upbeat” feelings. This scale consists of a total of 65 items with 32 items related to upbeat feelings, 13 items related to warm feelings, and 20 items related to negative feelings. Edell and Burke (1987) reported coefficient alpha estimates of 0.95, 0.89, and 0.88 for the upbeat, warm, and negative scale dimensions, respectively.

For this study, four upbeat feelings such as *excited, interested, joyful, and inspired* as well as four negative feelings such as *disgusted, irritated, skeptical, and bored*, were selected as relevant for consumer products. Participants were asked to indicate how much they felt each of the feelings while looking at the product design, similar to Edell and Burke’s (1987) study and Lennon’s (2013) approach to measure positive and negative emotions after visiting an online retailer. Each of the eight feelings was measured using a 7-point Likert scale (1 = not at all, 7 = very strongly) as seen in Edell and Burke’s (1987) study.

Aesthetic judgment. Aesthetic judgment of each product design was measured using the aesthetic judgment scale developed by Jacobsen, Buchta, Köhler, and Schröger (2004) with a reported reliability of 0.82 to 0.96. Based on this measure, aesthetic judgment was measured

through three 7-point semantic differential scales anchored by *ugly - beautiful*, *not elegant - elegant*, and *not attractive - attractive* (7 = positive, 1 = negative). One adjective pair of this scale referring to harmony was deleted since it referred to a product's composition (design principle) which was already included in the objective aesthetic impression scale.

Manipulation Checks

Manipulation of design novelty. Perceived novelty was measured on the same Cox and Cox (2002) rating scale as used in the Pretests 2 and 4.

Manipulation of visual communication of design stories. In order to test whether the visual imagery had been successfully manipulated based on the specific product qualities (formal and symbolic/expressive), the same self-developed items were used as in Pretest 3.

Potential Control Variables

Product involvement. It is very likely that consumers' involvement with the product may influence their cognitive responses as well as their aesthetic emotions and aesthetic judgments. To exclude the possibility that changes in consumer preferences were caused due to their involvement with the stimulus, product involvement was added as a potential control variable. By statistically controlling for any confounding variables, the internal validity can be increased. Product involvement was measured by using Cho, Lee, and Tharp's (2001) 7-point Likert scale (1 = disagree, 7 = totally agree) with two items and a coefficient alpha of .85. Example statements are "*Generally, I am very interested in this product*", or "*This product is important to me*".

Design complexity. It has been found that design complexity is correlated with design novelty (Seifert & Chattaraman, 2017). In order to eliminate any effects on the cognitive responses caused by this design principle, design complexity was added as a control variable. Perceived complexity was measured on two 7-point semantic differential scale items developed

by Cox and Cox (2002) anchored by *simple–complicated* and *not complex–complex* (1 = simple, 7 = complex). The Cronbach’s alpha reliability for this scale was 0.85 (Cox & Cox, 2002).

Attractiveness and attitude of the catalog page spread. Besides controlling for aspects of the product’s design, controlling for any aspects of the catalog page spread was also imperative to eliminate any confounding alternate explanations. Hence, the attractiveness of the catalog page spread as well as the attitude of the catalog page spread, could be added as control variables in the two way repeated measures ANCOVA for hypotheses testing. Attractiveness of the catalog page spread was measured on a two 7-point semantic scale anchored by *attractive–unattractive* and *very likeable–very unlikeable*. The Cronbach’s alpha reliability for this scale was .96 (Oh & Jasper, 2006). Attitude of the catalog page spread was measured on a three 7-point semantic scale anchored by *bad–good*, *dislike very much–like very much*, and *unfavorable–favorable*. The Cronbach’s alpha reliability for this scale was .91 (Oh & Jasper, 2006).

Table 3.15

Measurement scale items used in main study

Variable	Measures	<i>α</i>
Objective aesthetic impression	Five self-developed items measured on a 7-point Likert scale. 1) I perceive this lamp (chair) design to be harmonious. 2) I perceive a sense of order in this lamp (chair) design. 3) I perceive this lamp (chair) design to be clean. 4) I perceive this lamp (chair) design to be clear. 5) I perceive this lamp (chair) design to be organized.	
Subjective aesthetic association	Five self-developed items measured on a 7-point Likert scale. 1) This lamp (chair) design has symbolic qualities. 2) This lamp (chair) design is meaningful. 3) This lamp (chair) design embodies symbolic associations. 4) This lamp (chair) design appears to make sense to me. 5) Through my personal, cultural or visual experience, I am able to understand this lamp (chair) design	

Aesthetic emotions	<p>Eight items adopted from Edell and Burke (1987) and measured on a 7-point Likert scale</p> <p>We are interested in the extent to which you felt a certain way about the lamp (chair) design. Please indicate on the scale below how much you felt each of the feelings while looking at the lamp (chair) design.</p> <p><i>Upbeat emotions</i></p> <ol style="list-style-type: none"> 1) Inspired 2) Joyful 3) Interested 4) Excited <p><i>Negative emotions</i></p> <ol style="list-style-type: none"> 1) Irritated 2) Sceptical 3) Disgusted 4) Bored 	.95/ .88
Aesthetic judgment	<p>Three items adapted from Jacobsen et al. (2004) and measured on a 7-point semantic differential scale</p> <p>This lamp (chair) design is</p> <ol style="list-style-type: none"> 1) Ugly - beautiful 2) Not elegant – elegant 3) Not attractive - attractive 	.82- .96
Design Complexity	<p>Two items adapted from Cox and Cox (2002) and measured on a 7-point Likert scale</p> <ol style="list-style-type: none"> 1) Simple – complicated 2) Not complex - complex 	.85
Product involvement	<p>Two items adapted from Cho et al. (2001) and measured on a 7-point Likert scale</p> <ol style="list-style-type: none"> 1) Generally, I am very interested in this product. 2) This product is important to me. 	.85
Visual communication of symbolic/expressive product qualities	<p>Four self-developed items measured on a 7-point Likert scale.</p> <p>We are interested in your evaluation of the visual image of the catalog adjoining the chair (lamp) design. Please indicate the number that best reflects your opinion</p> <ol style="list-style-type: none"> 1) This visual image conveys the symbolism of the lamp (chair) design. 2) The meaning of the lamp (chair) design is portrayed through this visual image. 3) This visual image contributes to the symbolic nature of the lamp (chair) design. 4) This visual image communicates feelings and emotions associated with the lamp (chair) design. 	
Visual communication of formal product qualities	<p>Three self-developed items measured on a 7-point Likert scale.</p> <ol style="list-style-type: none"> 1) This visual image resembles the form and shape of the lamp (chair) design. 	

	<ul style="list-style-type: none"> 2) The form and shape of the lamp (chair) design is portrayed through this visual image. 3) This visual image places emphasis on the form and shape of the lamp (chair) design 	
Attractiveness of the catalog page spread	<p>Two items adapted from Oh and Jasper (2006) and measured on a 7-point Likert scale</p> <p>The catalog page spread is</p> <ul style="list-style-type: none"> 1) Unattractive – attractive 2) Very unlikeable – very likeable 	.96
Attitude of the catalog page spread	<p>Three items adapted from Oh and Jasper (2006) and measured on a 7-point Likert scale</p> <p>My attitude toward the catalog spread is:</p> <ul style="list-style-type: none"> 1) bad – good 2) dislike very much – like very much 3) unfavorable - favorable 	.91

CHAPTER 4. RESULTS

This chapter discusses the results of the main study. Before hypotheses were tested, initial preliminary analysis was conducted. As part of the preliminary analysis, descriptive statistics were run on demographic information contained in the main study data. Next, a factor analysis for each scale was conducted and their reliabilities were tested. Then, manipulation checks were performed to identify whether the visual design stories (symbolic/expressive vs. formal) and design novelty (moderate vs. high) manipulations were successful. Once the preliminary analysis was completed, the proposed hypotheses were tested using two-way repeated measures ANCOVA (H1 – H9), three-way repeated measures (H5 and H13), and simple and multiple linear regression (H10-H12). The questionnaire for the main study can be found in Appendices H and I.

Preliminary Analysis

Data Cleaning

Because this study was interested in female consumers ranging between 25 and 37 years of age with some college education, the online panel company distributed the survey to this target population only and therefore, no data entries of male consumers or other undesirable data had to be eliminated. Further, three participants who did not complete the survey by leaving more than 20% of items unanswered were eliminated. Two questionnaires with obvious response sets, which means that participants were just “clicking through” the survey without actually reading the questions and answer choices, were not included for further analysis. All of these data

cleaning steps were important to enhance internal validity. Of the 402 questionnaires returned, 397 that were completely filled in and valid were used for data analysis.

Demographics

The research participant ages ranged between 25 and 37 (mean age: 30.6) with a median of 30. A majority of research participants possessed an undergraduate degree (43.8%), followed by a graduate degree (22.4%), some college (20.2%), and an associate degree (13.6%). In terms of ethnicity, a majority of respondents were Caucasian/White (68.8%). Of the remaining, 12.8% were Asian/Pacific Islander, 8.8% African American/Black, 8.1% Latino/Hispanic, .8% Native American or Aleut and .8% chose other ethnic background. Further details of sample characteristics are provided in Table 4.1.

Table 4.1

Sample Characteristics and Frequency Distributions

Demographic characteristic	<i>f</i>	%	<i>SD</i>
Age (<i>N</i> =397)			
25	31	7.8	
26	25	6.3	
27	35	8.8	
28	37	9.3	
29	33	8.3	
30	42	10.6	
31	31	7.8	
32	24	6.0	
33	42	10.6	
34	25	6.3	
35	39	9.8	
37	25	6.3	
38	8	2.0	
Education (<i>N</i> =397)			1.034
Some College	80	20.2	
Associate Degree	54	13.6	
Undergraduate Degree	174	43.8	
Graduate Degree	89	22.4	

Demographic characteristic	<i>f</i>	%	<i>SD</i>
Ethnicity (<i>N</i> =397)			0.792
African American/Black	35	8.8	
Asian/Pacific Islander	51	12.8	
Caucasian/White	273	68.8	
Latino/Hispanic	32	8.1	
Native American or Aleut	3	.8	
Other ethnic background	3	.8	
Total family household income (<i>N</i> =397)			1.669
Less than \$14.999	23	5.8	
\$15.000 to \$24.999	22	5.5	
\$25.000 to \$34.999	43	10.8	
\$35.000 to \$49.999	73	18.4	
\$50.000 to \$74.999	115	29.0	
\$75.000 to \$99.999	60	15.1	
\$100.000 or more	55	13.9	
Prefer not to say	6	1.5	

Factor Analysis.

For a thorough assessment, reliability analyses were conducted separately on scale items for each of the six conditions. Reliability analysis using the Cronbach's α revealed adequate reliability for each scale (in each condition) because α was greater than .7 (Nunnally & Bernstein, 1994) as follows: objective aesthetic impression, $\alpha = .933-.948$; subjective aesthetic association, $\alpha = .938-.946$; upbeat aesthetic emotions (factor 1 of aesthetic emotion), $\alpha = .935-.948$; negative aesthetic emotions (factor 2 of aesthetic emotion), $\alpha = .837-.874$; aesthetic judgment, $\alpha = .950 - .959$; design complexity, $\alpha = .838-.892$; product involvement, $\alpha = .899-.925$; visual communication of symbolic/expressive product qualities, $\alpha = .920-.966$; visual communication of formal product qualities, $\alpha = .920-.965$; attractiveness of the ad, $\alpha = .931-.950$; attitude toward the ad, $\alpha = .966-.975$; and design novelty, $\alpha = .782 - .869$.

Table 4.2

Eigenvalues of each scale after factor analysis

Scale	Initial Total Eigenvalues		
	Component1	Component 2	Component 3
Objective aesthetic impression (5 items)	4.035	0.356	0.246
Subjective aesthetic association (5 items)	4.123	0.419	0.195
Aesthetic emotion (8 items)	3.782	2.519	0.541
Aesthetic judgment (3 items)	2.775	0.144	0.080
Design complexity (2 items)	1.805	0.195	
Product involvement (2 items)	1.833	0.167	
Visual communication of symbolic/expressive product qualities (4 items)	3.638	0.174	0.109
Visual communication of formal product qualities (3 items)	2.769	0.138	0.093
Ad attractiveness (2 items)	1.888	0.112	
Ad attitude (3 items)	2.858	0.071	0.071
Design novelty (3 items)	2.268	0.415	0.317

Reliabilities

Reliability analyses were conducted on scale items for each of the six conditions separately for a thorough assessment. Reliability analysis using the Cronbach's α revealed adequate reliability for each scale (in each condition) since α was greater than .7 (Nunnally & Bernstein, 1994): objective aesthetic impression, $\alpha = .933-.948$; subjective aesthetic association, $\alpha = .938-.946$; upbeat aesthetic emotions (factor 1 of aesthetic emotion), $\alpha = .935-.948$; negative aesthetic emotions (factor 2 of aesthetic emotion), $\alpha = .837-.874$; aesthetic judgment, $\alpha = .950-.959$; design complexity, $\alpha = .838-.892$; product involvement, $\alpha = .899-.925$; visual communication of symbolic/expressive product qualities, $\alpha = .920-.966$; visual communication of formal product qualities, $\alpha = .920-.965$; attractiveness of the ad, $\alpha = .931-.950$; attitude toward the ad, $\alpha = .966-.975$; and design novelty, $\alpha = .782-.869$.

Manipulation Check

First, the manipulation check for the design novelty factor was performed followed by the manipulation check for the visual design story factor using a series of *t*-tests (see Table 4.5 for an overview of novelty and visual design story means for each stimulus). Means of the high novelty condition were predicted to be greater than those of the moderate novelty condition for the manipulation to be successful. Multiple comparisons of means through paired samples *t*-test revealed that the manipulations of the novelty design conditions (moderate vs. high) of chair and lamp designs were successful (see Table 4.3). The means of the high design novelty condition were significantly ($p < .05$) greater than the means of the moderate design novelty condition for the lamp and chair designs (see Table 4.3).

With respect to the manipulation check for the formal vs. symbolic/expressive visual design story of each stimulus, a one-sample *t*-test with a test value of 3.5 revealed that the mean score of visual communication of product qualities was significantly greater from the medium scale value of the 7.0 rating scale (see Table 4.4). Ratings (mean) of the visual communication of symbolic/expressive product qualities clearly indicated that the visual design story visually represented the symbolic/expressive qualities of the chair and lamp designs. In addition, ratings (mean) of the visual communication of formal product qualities clearly indicated that the visual design story visually represented the formal product qualities of the chair and lamp designs (see Table 4.5 for an overview of the stimuli with means for novelty and visual communication of product qualities).

Table 4.3

Paired Samples t-Test Results for the Design Novelty Factor

Stimulus Pair	Mean Difference	SD	St. Error Mean	<i>t</i>	<i>df</i>	<i>p</i>
Pair 1 Lamp 1 (moderate N) – Lamp 1 (high N)	-1.824	1.789	0.093	-19.710	373	< .001
Pair 2 Lamp 1 (moderate N) – Lamp 2 (high N)	-1.860	1.812	0.094	-19.853	373	< .001
Pair 3 Lamp 2 (moderate N) – Lamp 1 (high N)	-2.190	1.803	0.093	-23.485	373	< .001
Pair 4 Lamp 2 (moderate N) – Lamp 2 (high N)	-2.228	1.863	0.096	-23.126	373	< .001
Pair 5 Chair 1 (moderate N) – Chair 1 (high N)	-2.320	1.975	0.103	-22.599	369	< .001
Pair 6 Chair 1 (moderate N) – Chair 2 (high N)	-2.184	1.915	0.098	-22.181	377	< .001
Pair 7 Chair 2 (moderate N) – Chair 1 (high N)	-2.376	1.943	0.101	-23.519	369	< .001
Pair 8 Chair 2 (moderate N) – Chair 2 (high N)	-2.243	1.966	0.101	-22.187	377	< .001

Table 4.4

One Sample t-Test Results for the Visual Design Factor with a test value of 3.5

Stimulus	<i>t</i>	<i>df</i>	<i>p</i>	Mean Difference
Visual Communication of Formal Product Qualities				
Lamp 1 (moderate N)	10.213	65	< .001	1.894
Lamp 2 (moderate N)	8.793	65	< .001	1.768
Chair 1 (moderate N)	8.601	65	< .001	1.737
Chair 2 (moderate N)	20.661	65	< .001	2.611
Lamp 1 (high N)	12.540	68	< .001	2.027
Lamp 2 (high N)	6.804	67	< .001	1.314
Chair 1 (high N)	9.443	67	< .001	1.819
Chair 2 (high N)	9.556	67	< .001	1.977
Visual Communication of Symbolic/Expressive Product Qualities				
Lamp 1 (moderate N)	12.649	70	< .001	1.930
Lamp 2 (moderate N)	12.928	70	< .001	2.060
Chair 1 (moderate N)	8.691	70	< .001	1.521
Chair 2 (moderate N)	11.028	70	< .001	1.911
Lamp 1 (high N)	9.637	64	< .001	1.869
Lamp 2 (high N)	9.002	63	< .001	1.664
Chair 1 (high N)	8.473	63	< .001	1.711
Chair 2 (high N)	8.291	63	< .001	1.750

Table 4.5

Overview of stimuli with means of novelty and visual communication of product qualities

Product category (novelty condition)	Stimulus		Design novelty	Visual comm. Of formal qualities	Visual comm. Of symbolic/ expressive qualities
Lamp 1 (mod. N)			4.26	5.39	5.43
Lamp 2 (mod. N)			3.92	5.27	5.56
Lamp 1 (high N)			6.10	5.53	5.37
Lamp 2 (high N)			6.13	4.81	5.16
Chair 1 (mod. N)			3.80	5.24	5.02
Chair 2 (mod. N)			3.74	6.11	5.42
Chair 1 (high N)			6.15	5.32	5.21
Chair 2 (high N)			6.00	4.84	5.25

Test of Hypotheses

Model 1 (H1-H4, and H6-H9) was first tested by using a 3 x 2 x 2 x 2 ANCOVA with visual design story (absent vs. formal vs. symbolic/expressive) and design novelty (moderate vs. high) as the between-subjects factors; product category (lamp and chair design) and stimulus number (1 and 2 in each condition) as the within-subjects factors; objective aesthetic impression, subjective aesthetic association, upbeat aesthetic emotion, negative aesthetic emotion, and aesthetic judgment as the dependent variables and age as the covariate. Age served as a covariate because product design novelty can be perceived differently depending on consumers' age. Consumers who are older in age have more exposure and experience with a variety of home and lifestyle products and, thus, are more familiar with a broad range of product designs as compared to consumers who recently graduated and/or moved into their first new home. To control for the possibility that an age-related increase in expertise with a variety of product designs influenced participants' design novelty perceptions and preferences, the demographic variable age was included as a covariate.

Prior to conducting a two-way ANCOVA, the homogeneity-of-slope assumption was empirically evaluated. The null hypothesis is conceptualized as the population effect of the interaction between age and the visual design story factor (three levels: absent vs. formal vs. symbolic/expressive) and the interaction between age and the design novelty factor (two levels: moderate vs high) in predicting the dependent variables (aesthetic judgment, aesthetic emotions, objective aesthetic impression, and subjective aesthetic association) are zero. A significant interaction effect between age and visual story and between age and design novelty implies that differences on the dependent variables among groups vary as a function of age and therefore, ANCOVA should not be conducted.

Based on the test of homogeneity of slopes, the interaction between age and design novelty on all dependent variables was insignificant ($p > .05$). Similarly, the interaction between age and visual design story on all dependent variables was insignificant ($p > .05$). In addition, the results of the partial η^2 ranged between .00% and 1.0% which is of very small size. These overall results suggest that the null hypothesis could be rejected and ANCOVA could be conducted (see Appendix J for the results of homogeneity of slopes test).

Model 1 examines the effects of design novelty and visual design story on cognitive responses and aesthetic output variables. The first four hypotheses predicted the main effects of two experimental factors (design novelty and visual design story) on objective aesthetic impression, subjective aesthetic association, aesthetic emotion, and aesthetic judgment. Specifically, it is proposed that as compared to products with highly novel designs, those with moderately novel designs will create more positive aesthetic emotions (H1a), aesthetic judgment (H1b), objective aesthetic impression (H2a), and subjective aesthetic association (H2b). Further, it was expected that the use of a visual design story (present vs. absent) will enhance aesthetic emotion (H3a), aesthetic judgment (H3b), objective aesthetic impression (H4a), and subjective aesthetic association (H4b).

Model 1 - Main effects on aesthetic emotions

Aesthetic emotions consist of two dimensions, upbeat aesthetic emotion and negative aesthetic emotion. Therefore, two-way repeated measures ANCOVA was conducted separately for each dimension. The results of the upbeat aesthetic emotion are as follows: The between-subject effects (see Table 4.6) revealed a non-significant main effect for design novelty [$F(1/387) = 1.802, p = 0.180, \eta^2 = .5\%$] on upbeat aesthetic emotion. A significant main effect for visual design story [$F(2/387) = 3.200, p = .042, \eta^2 = 1.6\%$] on upbeat aesthetic emotion was found. Specifically, consumers had higher upbeat aesthetic emotions to visual design stories (VSD)

related to symbolic/expressive product qualities than when the visual design story was absent [$M_{VSDsymbolic/expressive} = 3.153$, $M_{VSDabsent} = 2.821$, $SE = .131$, Mean Difference = .332, $p = .012$]. No differences in upbeat aesthetic emotions were observed for visual design stories related to formal product qualities vs. absent visual design stories [$M_{VSDformal} = 2.988$, $M_{VSDabsent} = 2.821$, $SE = 0.131$, Mean Difference = .167, $p = .204$].

Table 4.6

Between-Subjects Effects of the Repeated Measures ANCOVA Results for Upbeat Aesthetic Emotions

Source	Type III Sum of Squares	df	Mean Square	F	p	Partial η^2 (%)
Intercept	3347.222	1	3347.222	750.999	< .001	66.0
Age	12.678	1	12.678	2.845	.092	0.7
Visual Design Story	28.522	2	14.261	3.200*	.042	1.6
Novelty	8.033	1	8.033	1.802	.180	0.5
Visual Design Story x Novelty	2.690	2	1.345	.302	.740	0.2
Error	1724.869	387	4.457			

Note: * Significant at the .05 alpha level

With respect to the second dimension of aesthetic emotion, results revealed a significant main effect for design novelty [$F(1/384) = 7.658$, $p = .006$, $\eta^2 = 2.0\%$] on negative aesthetic emotions (see Table 4.7). Specifically, consumers had lower negative aesthetic emotions to moderate novelty (N) than high novelty products [$M_{Nmod.} = 1.713$, $M_{Nhigh} = 1.931$, $SE = .079$, Mean Difference = -.218, $p = .006$]. There was no main effect of visual design story [$F(2/384) = 1.766$, $p = .172$, $\eta^2 = .9\%$] on negative emotion.

Table 4.7

Between-Subjects Effects of the Repeated Measures ANCOVA Results for Negative Aesthetic Emotions

Source	Type III Sum of Squares	df	Mean Square	F	p	Partial η^2 (%)
Intercept	1235.833	1	1235.833	511.500	< .001	57.1
Age	4.648	1	4.648	1.924	.166	0.5
Visual Design Story	8.536	2	4.268	1.766	.172	0.9
Novelty	18.502	1	18.502	7.658*	.006	2.0
Visual Design Story x Novelty	.895	2	.448	.185	.831	0.1

Note: * Significant at the .05 alpha level

In summary, a significant main effect was found for design novelty on negative aesthetic emotions but not on upbeat aesthetic emotions (positive emotions). Moderately novel designs as compared to highly novel designs did not create more positive aesthetic emotions; however, created less negative aesthetic emotions. Hence, hypothesis 1a was partially supported. With respect to the visual design story, the use of a visual design story related to symbolic/expressive product qualities as compared to an absent story enhanced consumers' positive aesthetic emotions. This effect was not supported for a visual design story related to formal product qualities. There was no significant main effect of visual design story on negative emotions. Therefore, hypothesis 3a was partially supported.

The table of multivariate tests on the specified models are provided in Appendices K and L. No other interaction effects between the within-subjects factor and between-subjects factor were significant in the overall ANCOVA, except for the interaction effect of product category, design novelty and visual design story [Wilk's $\lambda = .977$, $F(2/387) = 4.570$, $p = .011$, $\eta^2 = 2.3\%$] on upbeat aesthetic emotions. It appears that the slopes of the formal and expressive visual design stories for lamps versus chair designs are different. For the lamp design, a story related to its symbolic/expressive qualities benefitted the moderate novelty lamp designs as compared to a story related to its formal qualities or an absent story. On the other hand, for the chair design, a visual design story related to its symbolic/expressive qualities benefitted the high novelty chairs as compared to a story related to formal qualities or an absent story (see Figure 8).

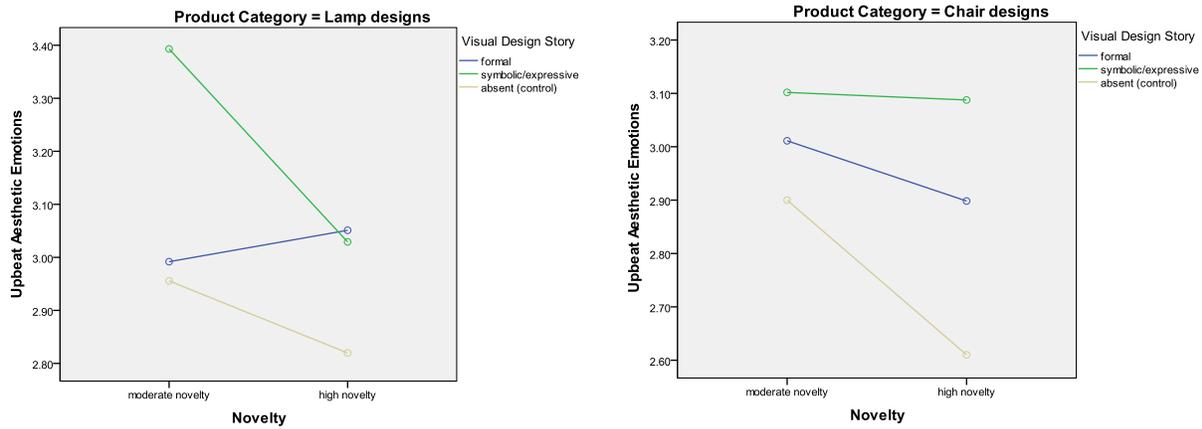


Figure 8. Interaction effect of Design Novelty x Visual Design Story x Product Category on Upbeat Aesthetic Emotions

Model 1 - Main effects on aesthetic judgment

The result of the between-subject effects revealed a significant main effect for design novelty [$F(1/387) = 10.652, p = .001, \eta^2 = 2.7\%$] on aesthetic judgment (see Table 4.8).

Specifically, consumers had higher aesthetic judgments to moderate novelty (N) than high novelty products [$M_{Nmod.} = 4.809, M_{Nhigh} = 4.316, SE = .151, \text{Mean Difference} = .493, p = .001$]. Hence, Hypothesis 1b was supported.

The result of the between-subject effects also revealed a significant main effect for visual design story [$F(2/387) = 7.150, p = .001, \eta^2 = 3.6\%$] on aesthetic judgment (see Table 4.8).

Consumers had higher aesthetic judgments to visual design stories (VSD) related to symbolic/expressive product qualities than to an absent visual design story [$M_{VSDsymbolic/expressive} = 4.922, M_{VSDabsent} = 4.221, SE = .186, \text{Mean Difference} = .702, p < .001$]. Also there was a marginally significant main effect of visual design stories related to formal vs. absent product qualities on aesthetic judgment. Consumers had a higher aesthetic judgment to visual design stories (VSD) related to formal product qualities than to an absent visual design story [$M_{VSDformal}$

= 4.545, $M_{VSD_{absent}} = 4.221$, $SE = .186$, Mean Difference = .324, $p = .082$]. The significance for the formal story was marginal, therefore, Hypothesis 3b was partially supported.

Table 4.8

Between-Subjects Effects of the Repeated Measures ANCOVA Results for Aesthetic Judgment

Source	Type III Sum of Squares	df	Mean Square	F	p	Partial η^2 (%)
Intercept	7363.843	1	7363.843	821.005	< .001	68.0
Age	6.608	1	6.608	.737	.391	.2
Visual Design Story	128.253	2	64.127	7.150*	.001	3.6
Novelty	95.544	1	95.544	10.652*	.001	2.7
Visual Design Story x Novelty	13.716	2	6.858	.765	.466	.4
Error	3471.121	384	8.969			

Note: * Significant at the .05 alpha level

The table of multivariate tests on the specified model is provided in Appendix M. In addition to the hypothesized effects above, there was an interaction effect of product category x stimulus number x design novelty on aesthetic judgment [Wilk's $\lambda = .976$, $F(1/387) = 9.498$, $p = .002$, $\eta^2 = 2.4\%$]. With respect to the product category lamps, aesthetic judgment ratings were higher for the second stimulus when design novelty was moderate. However, aesthetic judgment ratings were higher for the first stimulus when design novelty was high. With respect to the product category chairs, aesthetic judgment ratings were higher for the second stimulus regardless of the level of novelty (see Figure 9). There was also an interaction effect between design novelty and stimulus number on aesthetic judgment [Wilk's $\lambda = .976$, $F(1/387) = 9.535$, $p = .002$, $\eta^2 = 2.4\%$]. It appears that aesthetic judgment ratings were higher for the second stimulus when design novelty was moderate, whereas aesthetic judgment ratings were higher for the first stimulus when design novelty was high. (see Figure 10).

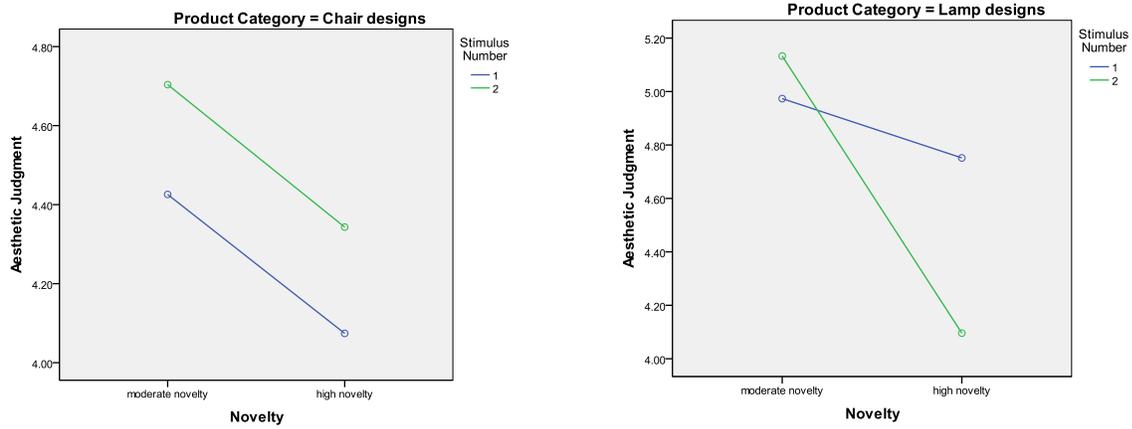


Figure 9. Interaction effect of Design Novelty x Visual Design Story x Product Category on Aesthetic Judgment

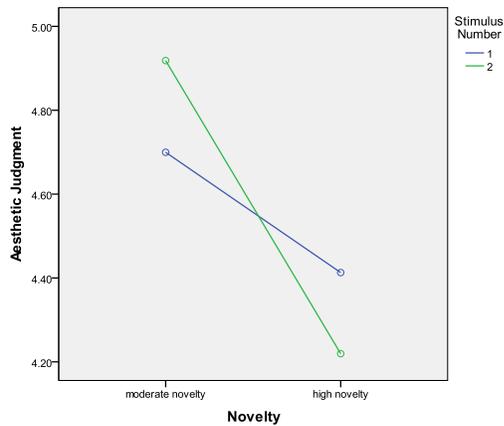


Figure 10. Interaction effect of Design Novelty x Stimulus Number on Aesthetic Judgment

Model 1 - Main effects on objective aesthetic impression

The result of the between-subject effects (see Table 4.9) revealed a significant main effect for design novelty [$F(1/387) = 67.108, p < .001, \eta^2 = 14.8\%$] on objective aesthetic impression. Specifically, consumers had a higher objective aesthetic impression to moderate novelty (N) than high novelty products [$M_{Nmod.} = 5.184, M_{Nhigh} = 4.160, SE = .125, \text{Mean Difference} = 1.025, p < .001$]. Hence, Hypothesis 2a was supported.

The results of the between-subject effects (see Table 4.9) also revealed a significant main effect for visual design story [$F(2/387) = 4.205, p = .016, \eta^2 = 2.1\%$] on objective aesthetic impression. Specifically, consumers had a higher objective aesthetic impression to visual design stories (VSD) related to symbolic/expressive product qualities than to an absent visual design story [$M_{VSDsymbolic/expressive} = 4.870, M_{VSDabsent} = 4.429, SE = .154, \text{Mean Difference} = .441, p = .004$]. Also, there was a marginally significant main effect of visual design stories related to formal vs. absent product qualities. Consumers had a higher objective aesthetic impression to visual design stories (VSD) related to formal product qualities than to an absent visual design story [$M_{VSDformal} = 4.716, M_{VSDabsent} = 4.429, SE = 0.154, \text{Mean Difference} = .287, p = .063$]. Hence, Hypothesis 4a was partially supported.

Table 4.9

Between-Subjects Effects of the Repeated Measures ANCOVA Results for Objective Aesthetic Impression

Source	Type III Sum of Squares	df	Mean Square	F	p	Partial η^2 (%)
Intercept	7779.323	1	7779.323	1264.401	< .001	76.6
Age	9.047	1	9.047	1.470	.226	.4
Visual Design Story	51.742	2	25.871	4.205*	.016	2.1
Novelty	412.888	1	412.888	67.108*	< .001	14.8
Visual Design Story x Novelty	12.355	2	6.178	1.004	.367	.5
Error	2381.047	387	6.153			

Note: * Significant at the .05 alpha level

The table of multivariate tests on the specified model is provided in Appendix N. No other interaction effects between the within-subjects factor and between-subjects factor were significant in the overall ANCOVA, except for the interaction effect of design novelty and stimulus number on objective aesthetic impression [Wilk's $\lambda = .990, F(1/387) = 4.031, p = .045, \eta^2 = 1.0\%$] as well as the interaction between product category x stimulus number and design novelty on objective aesthetic impression [Wilk's $\lambda = .962, F(1/387) = 15.404, p = < .001, \eta^2 =$

3.8%]. Similarly to the interaction effect of design novelty x stimulus number on aesthetic judgment (see Figure 10), objective aesthetic impression ratings were also higher for the second stimulus when design novelty was moderate, whereas objective aesthetic impression ratings were higher for the first stimulus when design novelty was high. The results of the product category x stimulus number x design novelty interaction effect on objective aesthetic impression is similar to the interaction effect concerning aesthetic judgment: With respect to the product category lamps, objective aesthetic impression ratings were higher for the second stimulus when design novelty was moderate. However, objective aesthetic impression ratings were higher for the first lamp stimulus when design novelty was high. With respect to the product category chairs, objective aesthetic impression ratings were higher for the first chair stimulus regardless of the level of novelty (see Figure 11).

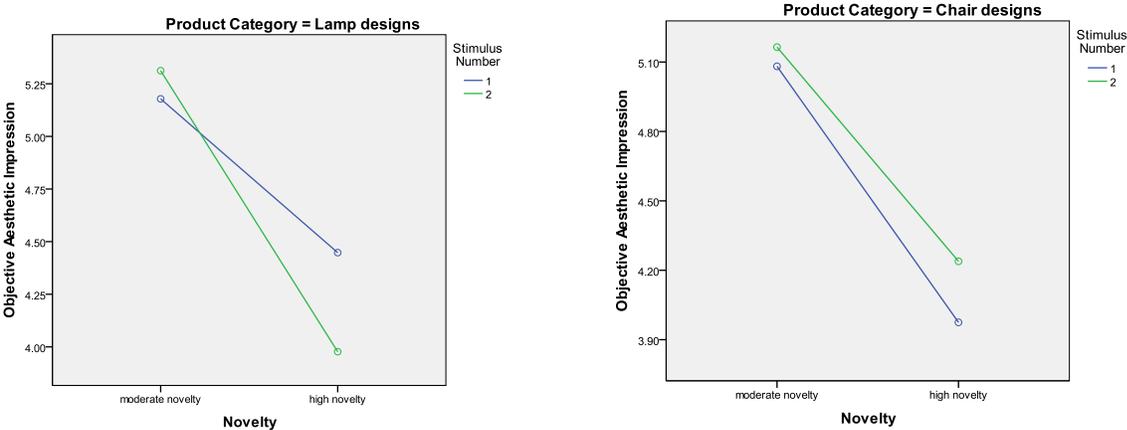


Figure 11. Interaction effect of Design Novelty x Stimulus Number x Product Category on Objective Aesthetic Impression

Model 1 - Main effects on subjective aesthetic association

The result of the between-subject effects revealed a significant main effect for design novelty [$F(1/387) = 11.523, p = .001, \eta^2 = 2.9\%$] on subjective aesthetic association (see Table

4.10). Specifically, consumers had a higher subjective aesthetic impression to moderate novelty (N) than high novelty products [$M_{Nmod.} = 4.729$, $M_{Nhigh} = 4.266$, $SE = .136$, Mean Difference = .462, $p = .001$]. Hence, Hypothesis 2b was supported.

The result of the between-subject effects revealed a significant main effect for visual design story [$F(2/387) = 10.154$, $p = < .001$, $\eta^2 = 5.0\%$]. Specifically, consumers had a higher subjective aesthetic association to visual design stories (VSD) related to symbolic/expressive product qualities than to an absent visual design story [$M_{VSDsymbolic/expressive} = 4.887$, $M_{VSDabsent} = 4.134$, $SE = .168$, Mean Difference = .753, $p = < .001$]. Also, consumers had a higher subjective aesthetic association to visual design stories (VSD) related to formal product qualities than to an absent visual design story [$M_{VSDformal} = 4.471$, $M_{VSDabsent} = 4.134$, $SE = .168$, Mean Difference = .337, $p = .045$]. Hence, Hypothesis 4b was supported.

Table 4.10

Repeated Measures ANCOVA Results for Subjective Aesthetic Association

Source	Type III Sum of Squares	df	Mean Square	F	p	Partial η^2 (%)
Intercept	7050.669	1	7050.669	966.969	< .001	71.4
Age	3.374	1	3.374	.463	.497	.1
Visual Design Story	148.077	2	74.039	10.154*	< .001	5.0
Novelty	84.017	1	84.017	11.523*	.001	2.9
Visual Design Story x Novelty	4.742	2	2.371	.325	.723	.2
Error	2821.817	387	7.292			

Note: * Significant at the .05 alpha level

The table of multivariate tests on the specified model is provided in Appendix O. No other interaction effects between the within-subjects factor and between-subjects factor were significant in the overall ANCOVA.

Model 1 - Interaction effects of visual design story x design novelty on aesthetic output variables and cognitive responses

The next four hypotheses predicted that product novelty and visual design stories will have a significant interaction effect on aesthetic emotion (H6), aesthetic judgment (H7), objective aesthetic impression (H8), subjective aesthetic association H(9) such that: Use of visual design story (present vs. absent) will enhance aesthetic emotion, aesthetic judgment, objective aesthetic impression, subjective aesthetic association of a high novelty product design more than a moderate novelty product design. The results of the two-way repeated measures ANCOVA revealed that there was no interaction effect between visual design story x design novelty on any of the dependent variables ($p > .05$) (see insignificant interaction effects in Tables 4.6-4.10). Hence, H6-H9 were not supported.

Model 1 –Objective vs. subjective cognitive responses

H5 of model 1 expected that the use of a visual design story (present vs. absent) will enhance subjective aesthetic association of the product more than its objective aesthetic impression. To test this hypothesis, the type of cognitive response was included as an additional within-subjects factor in the repeated measures ANCOVA in order to observe any differences between the two types of responses. Therefore, a 2 (visual design story: formal vs. symbolic/expressive) x 2 (design novelty: moderate vs. high) x 2 (product category: lamp vs. chair designs) x 2 (stimulus number: 1 vs. 2 in each condition) x 2 (cognitive response: subjective aesthetic association vs. objective aesthetic impression) ANCOVA with visual design story and design novelty as the between-subjects factors; product category, stimulus number and cognitive response as the within-subjects factors; objective aesthetic impression and subjective aesthetic association as the dependent variables and age as the covariate. The results of the two-way repeated measures ANCOVA revealed a significant interaction effect between visual design story and type of cognitive response [Wilk's $\lambda = .957$, $F(2/387) = 8.727$, $p < .001$, $\eta^2 = 4.3\%$], see

Figure 12. Syntax to test the significant interaction effect for visual design story by type of cognitive response was typed in SPSS.

Based on pairwise comparison results (see Table 4.11 and Figure 12), objective aesthetic impression to a product design was significantly enhanced by the use of a visual design story (VDS) related to symbolic/expressive product qualities vs. when the visual design story was absent [$M_{VDS_{\text{symbolic/expressive}}} = 4.870$, $M_{VDS_{\text{absent}}} = 4.429$, $SE = .154$, Mean Difference = .441, $p = .004$]. This effect reached marginal significance for visual design stories related to formal product qualities and an absent story. Objective aesthetic impression to a product design was marginally enhanced by the use of a visual design story related to formal product qualities versus when then the visual design story was absent [$M_{VDS_{\text{formal}}} = 4.716$, $M_{VDS_{\text{absent}}} = 4.429$, $SE = .154$, Mean Difference = .287, $p = .063$]. Hence, the presence (vs. absence) of a visual design story either marginally (formal story) or significantly (expressive/symbolic story) enhanced objective aesthetic impressions of a product design.

Subjective aesthetic association to a product design was significantly enhanced by the presence (vs. absence) of both: a) visual design story related to symbolic/expressive product qualities [$M_{VDS_{\text{symbolic/expressive}}} = 4.887$, $M_{VDS_{\text{absent}}} = 4.134$, $SE = .168$, Mean Difference = .753, $p < .001$] and b) formal product qualities [$M_{VDS_{\text{formal}}} = 4.471$, $M_{VDS_{\text{absent}}} = 4.134$, $SE = .168$, Mean Difference = .337, $p = .045$]. Since the presence (vs. absence) of both visual design stories related to formal and symbolic/expressive qualities significantly enhanced subjective aesthetic association, we can state that the use of a visual design story (present vs. absent) enhances subjective aesthetic association of the product more than its objective aesthetic impression, which was enhanced significantly only by symbolic/expressive stories. Hence, H5 was supported. Results are shown in Table 4.11.

Table 4.11

Results of Pairwise Comparisons of Type of Cognitive Response and Visual Design Story

Cognitive Response	Visual Story	Visual Story	Mean Difference	SE	p
Objective	formal	Symbolic/expressive	-.154	.152	.312
		absent	-.287	.154	.063
	Symbolic/expressive	Formal	.154	.152	.312
		absent	.441*	.154	.004
	absent	formal	-.287	.154	.063
		Symbolic/expressive	-.441*	.154	.004
Subjective	formal	Symbolic/expressive	-.416*	.165	.012
		absent	.337*	.168	.045
	Symbolic/expressive	Formal	.416*	.165	.012
		absent	.753*	.168	< .001
	absent	formal	-.337*	.168	.045
		Symbolic/expressive	-.753*	.168	< .001

Note: * Significant at the .05 alpha level

Model 2 – Moderating effects of type of visual design story on cognitive responses

Model 2 examined whether subjective vs. cognitive responses will be enhanced more greatly after exposure to a certain type of visual design story. Hypothesis 13 predicted a moderating effect for type of visual design story and the effect of type of cognitive response on cognitive response. Specifically, cognitive response related to objective aesthetic impression in response to a product design will be greater when the visual design story highlights the formal product qualities as compared to the symbolic/expressive product qualities (H13a); and cognitive response related to subjective aesthetic association in response to a product design will be greater when the visual design story highlights the expressive/symbolic product qualities as compared to the formal product qualities (H13b). This hypothesis was tested with the same analysis as conducted for H5.

Based on the specific pairwise comparisons (see Table 4.11), there were no significant mean differences between visual design stories (VDS) related to formal vs. symbolic/expressive

product qualities on objective aesthetic impression [$M_{VDS_{formal.}} = 4.716$, $M_{VDS_{symbolic/expressive}} = 4.870$, $SE = .152$, Mean Difference = $-.154$, $p = .312$] (see Table 4.11). Objective aesthetic impression to a product design was not enhanced more greatly by the use of a visual design story related to formal product qualities as compared to a story related to expressive/symbolic product qualities. Hence, H13a was not supported.

However, the results revealed a significant mean difference between visual design stories related to symbolic/expressive and formal product qualities for subjective aesthetic association (see Table 4.12). Subjective aesthetic association to a product design was enhanced more greatly by the use of a visual design story (VDS) related to symbolic/expressive product qualities as compared to a story related to formal product qualities [$M_{VDS_{symbolic/expressive.}} = 4.887$, $M_{VDS_{formal}} = 4.471$, $SE = .165$, Mean Difference = $.416$, $p = .012$]; hence, hypothesis 13b was supported. Taken together, hypothesis 13 was partially supported. Results are shown in Table 4.11 and Figure 12.

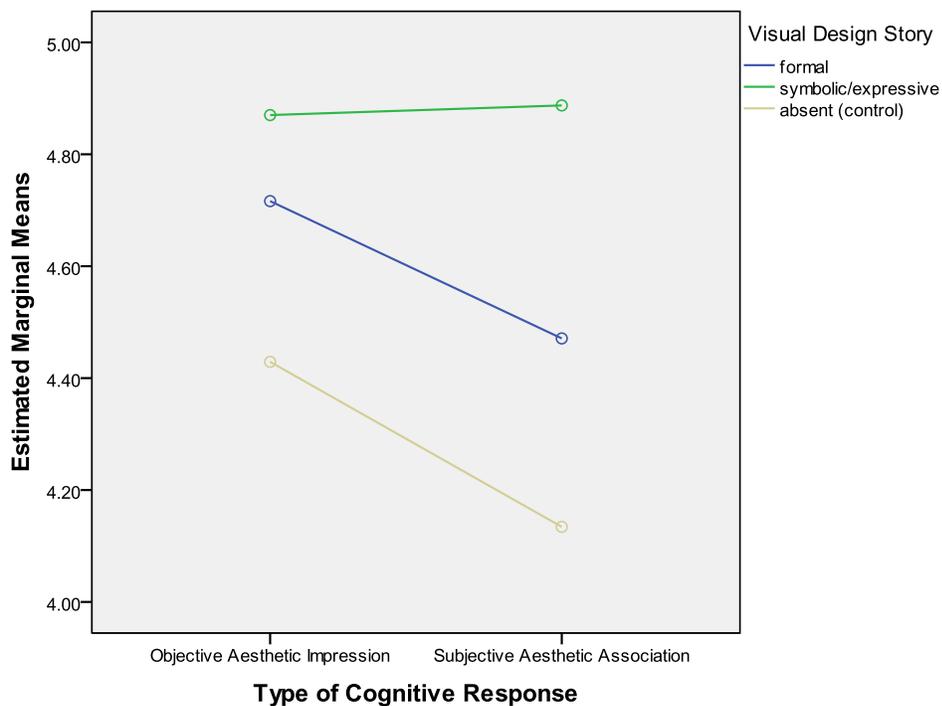


Figure 12. Type of Visual Design Story and Type of Cognitive Response

Model 1 – Structural Relationships between Cognitive Responses and Aesthetic Output Variables

In order to test the structural relationships between cognitive responses and aesthetic output variables, hypotheses 10 to 12 were tested using regression analysis. Hypothesis 10 proposed a positive influence of objective aesthetic impression on aesthetic emotion, and hypothesis 11 proposed a positive influence of subjective aesthetic association on aesthetic emotion. The hypotheses were tested through multiple linear regressions with mean values of objective aesthetic impression and the positive aesthetic dimension such as upbeat aesthetic emotion for each set of stimuli. A multiple linear regression was conducted to predict upbeat aesthetic emotions from objective aesthetic impression and subjective aesthetic association. The multiple regression model with the two predictors explained a significant amount of the variance

in upbeat aesthetic emotion for each set of stimuli: $F(2/394) = 287.650, p = <.001, R^2 = .594$; for set 2 of lamps $F(2/392) = 313.045, p = <.001, R^2 = .615$; for set 1 of chairs $F(2/392) = 309.892, p = .000, R^2 = .613$; and for set 2 of chairs $F(2/394) = 319.894, p = <.001, R^2 = .619$. The results of the data analysis revealed that both cognitive responses positively influenced positive aesthetic emotions (see Table 4.12), hence, supporting H10 and H11. Also, 59.4% - 61.9% of the variance in upbeat aesthetic emotion was explained by objective aesthetic impression and subjective aesthetic association. Overall, if consumers form higher objective aesthetic impression and subjective aesthetic association in response to a product's design, upbeat aesthetic emotions also increase.

Table 4.12

Regressing objective aesthetic impression and subjective aesthetic association on upbeat aesthetic emotions for each set of stimuli

Measure	Beta	Std. Error	t	p
<i>Lamp set 1</i>				
Objective Aesthetic Impression	.182	.042	4.282*	< .001
Subjective Aesthetic Association	.414	.041	10.114*	< .001
<i>Lamp set 2</i>				
Objective Aesthetic Impression	.181	.036	5.082*	< .001
Subjective Aesthetic Association	.434	.037	11.779*	< .001
<i>Chair set 1</i>				
Objective Aesthetic Impression	.104	.042	2.445*	.015
Subjective Aesthetic Association	.504	.043	11.710*	< .001
<i>Chair set 2</i>				
Objective Aesthetic Impression	.181	.044	4.084*	< .001
Subjective Aesthetic Association	.440	.042	10.386*	< .001

Note: * Significant at the .05 alpha level

Also, the multiple regression model with the two predictors explained a significant amount of the variance in negative aesthetic emotion for each set of stimuli: $F(2/391) = 39.891, p = <.001, R^2 = .169$; for set 2 of lamps $F(2/392) = 22.577, p = <.001, R^2 = .103$; for set 1 of chairs $F(2/392) = 35.922, p = <.001, R^2 = .155$; and for set 2 of chairs $F(2/394) = 29.404, p = <.001, R^2 = .130$. The analysis showed that objective aesthetic impression, but not subjective aesthetic

association negatively influence negative aesthetic emotion (see Table 4.13). Hence, when consumers have lower objective aesthetic impressions in response to a product design, they are more likely to develop more negative aesthetic emotions. In turn, when consumers form more positive objective aesthetic impression in response to a product design, negative aesthetic responses are likely to be lower. However, negative aesthetic emotions are not impacted by subjective aesthetic associations.

Table 4.13

Regressing objective aesthetic impression and subjective aesthetic association on negative aesthetic emotions for each set of stimuli

Measure	Beta	Std. Error	t	p
<i>Lamp set 1</i>				
Objective Aesthetic Impression	-.235	.047	-5.042*	< .001
Subjective Aesthetic Association	-.009	.045	-.201	.841
<i>Lamp set 2</i>				
Objective Aesthetic Impression	-.192	.046	-4.223*	< .001
Subjective Aesthetic Association	-.005	.047	-.101	.919
<i>Chair set 1</i>				
Objective Aesthetic Impression	-.167	.048	-3.514*	< .001
Subjective Aesthetic Association	-.065	.048	-1.355	.176
<i>Chair set 2</i>				
Objective Aesthetic Impression	-.119	.054	-2.207*	< .001
Subjective Aesthetic Association	-.114	.051	-2.217*	.027

Note: * Significant at the .05 alpha level

Hypothesis 12 proposed that subjective aesthetic association of the product will mediate the relationship between objective aesthetic impression and aesthetic judgment (see Figure 13).

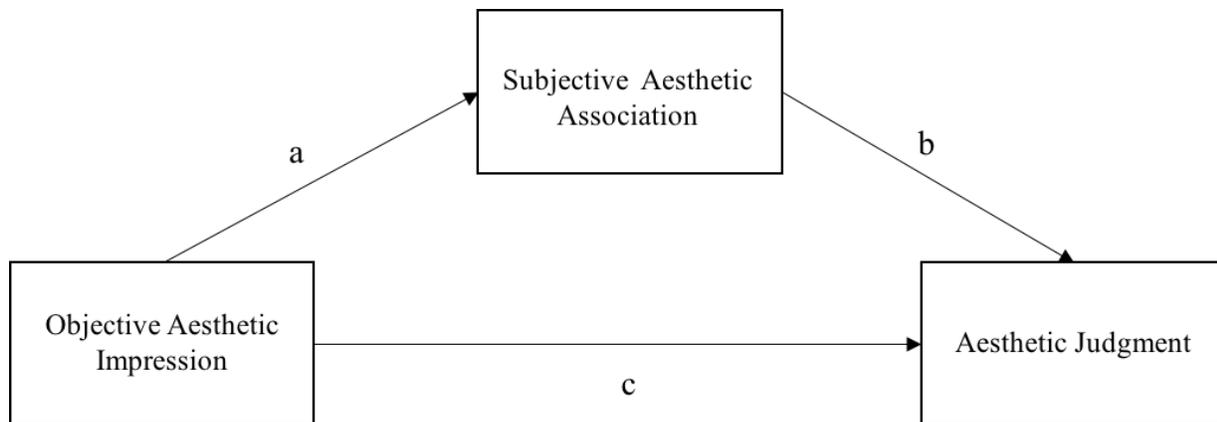


Figure 13. Mediation model

The first requirement is that objective aesthetic impression is correlated with aesthetic judgment by adding a direct path (std. $\beta > 0$, $p < .05$) between causal and outcome variable (path c). Based on the results, objective aesthetic impression of all four stimulus sets positively influenced aesthetic judgment ($p < 0.5$) (see Table 4.15). Next, there needs to be a positive significant path (std. $\beta > 0$, $p < .05$) between objective aesthetic impression and subjective aesthetic associations, the mediator variable (path a). The results revealed that objective aesthetic impression of all four stimulus sets positively influenced subjective aesthetic association (see Table 4.15). Additionally, subjective aesthetic association needs to positively affect aesthetic judgments (path b) through a positive and significant effect (std. $\beta > 0$, $p < .05$) which is also confirmed by the results (see Table 4.16 for the influence of subjective aesthetic association on aesthetic judgment for all four sets of stimuli). Lastly, a complete mediation occurs if the influence of objective aesthetic impression on aesthetic judgment becomes non-significant, after subjective aesthetic associations, the mediator, is added as an IV in the model. The results (see Table 4.17) revealed that the influence of objective aesthetic impression on aesthetic judgment remained significant. Hence, a full mediation did not occur.

A partial mediation occurs when the path c is reduced in absolute size when subjective

aesthetic association is added. Based on the regression results, the influence of objective aesthetic impression on aesthetic judgment has become smaller in size after adding subjective aesthetic association as an IV in the model. Solbel's test was then performed to determine if this influence of objective aesthetic impression was significantly reduced after including subjective aesthetic association. Based on the results of Sobel test, partial mediation effects were found in the model because the z-values of the stimuli were significant (Lamp Set 1, $z = 4.88, p = < .001$; Lamp Set 2, $z = 5.38, p = < .001$; Chair Set 1, $z = 8.56, p = < .001$; Chair Set 2, $z = 4.75, p = < .001$). Hence, H12 was partially supported. These findings suggest that the influence of objective aesthetic impressions of a product's design on aesthetic judgments is partially mediated by subjective aesthetic association. Table 4.18 presents an overview of the hypotheses testing results.

Table 4.14

Regressing objective aesthetic impression on aesthetic judgment for each set of stimuli

Measure	Beta	R^2	F	p
Lamp set 1	.743	.553	487.794*	< .001
Lamp set 2	.711	.506	402.161*	< .001
Chair set 1	.687	.471	349.432*	< .001
Chair set 2	.702	.493	383.692*	< .001

Note: * Significant at the .05 alpha level

Table 4.15

Regressing objective aesthetic impression on subjective aesthetic association for each set of stimuli

Measure	Beta	R^2	F	p
Lamp set 1	.817	.667	792.404*	< .001
Lamp set 2	.768	.590	566.054*	< .001
Chair set 1	.832	.692	883.983*	< .001
Chair set 2	.872	.695	899.627*	< .001

Note: * Significant at the .05 alpha level

Table 4.16

Regressing subjective aesthetic association on aesthetic judgment for each set of stimuli

Measure	Beta	R ²	F	p
Lamp set 1	.701	.492	381.942*	< .001
Lamp set 2	.667	.445	315.638*	< .001
Chair set 1	.736	.542	464.611*	< .001
Chair set 2	.678	.460	336.109*	< .001

Note: * Significant at the .05 alpha level

Table 4.17

Regressing objective aesthetic impression with aesthetic association on aesthetic judgment for each stimulus – Results of objective aesthetic impression after adding aesthetic association

Measure	Beta	R ²	F	p
Lamp set 1	.513	.579	271.000*	< .001
Lamp set 2	.484	.736	231.489*	< .001
Chair set 1	.240	.560	248.889*	< .001
Chair set 2	.448	.722	214.285*	< .001

Note: * Significant at the .05 alpha level

Table 4.18

Hypotheses Testing Results

	Hypotheses	Result
H1:	As compared to products with highly novel designs, those with moderately novel designs will create more positive a) Aesthetic emotions b) Aesthetics judgment	P/S ^b
H2:	As compared to products with highly novel designs, those with moderately novel designs will create more positive a) objective aesthetic impression of the product b) subjective aesthetic association of the product	S ^a
H3:	Use of a visual design story (present vs. absent) will enhance a) Aesthetic emotion b) Aesthetic judgment	P/S
H4:	Use of a visual design story (present vs. absent) will enhance a) objective aesthetic impression of the product. b) subjective aesthetic association of the product.	P/S
H5:	Use of a visual design story (present vs. absent) will enhance subjective aesthetic association of the product more than its objective aesthetic impression	S
H6:	Product novelty and visual design stories will have a significant interaction effect on aesthetic emotions such that use of a visual design story (present vs. absent) will enhance aesthetic emotion toward a high novelty product design	N/S ^c

	more than toward a moderate novelty product design	
H7:	Product novelty and visual design stories will have a significant interaction effect on aesthetic judgment such that use of a visual design story (present vs. absent) will enhance the aesthetic judgment of a high novelty product design more than that of a moderate novelty product design.	N/S
H8:	Product novelty and visual design stories will have a significant interaction effect on objective aesthetic impression such that use of a visual design story (present vs. absent) will enhance the objective aesthetic impression of a high novelty product design more than that of a moderate novelty product design.	N/S
H9:	Product novelty and visual design stories will have a significant interaction effect on subjective aesthetic association such that use of a visual design story (present vs. absent) will enhance the subjective aesthetic association of a high novelty product design more than that of a moderate novelty product design.	N/S
H10:	Objective aesthetic impression will positively influence aesthetic emotions toward product designs.	S
H11:	Subjective aesthetic association will positively influence aesthetic emotions toward product designs.	S
H12:	Subjective aesthetic association of the product will mediate the relationship between objective aesthetic impression and aesthetic judgment such that objective aesthetic impression will positively influence subjective aesthetic association, which in turn will positively influence aesthetic judgment.	P/S
H13:	The type of visual design story will interact with the type of cognitive response to influence consumers' cognitive responses such that: <ul style="list-style-type: none"> a) Consumers' cognitive responses related to objective aesthetic impressions (type of cognitive response to a product's design) will be greater when the visual design story highlights formal product qualities as compared to symbolic/expressive product qualities; b) Consumers' cognitive response related to subjective aesthetic associations (type of cognitive response to a product's design) will be greater when the visual design story highlights the expressive/symbolic product qualities as compared to the formal product qualities. 	P/S

Note: a. S – Supported; b. P/S – Partially Supported; c. N/S – Not Supported

CHAPTER 5. DISCUSSION

This study intended to provide a holistic understanding of how visual storytelling (conceptual product cue) can aid in the overall aesthetic experience related to the novelty of product designs (perceptual product cue). As part of this goal, this study first investigated the main and interaction effects of design novelty (perceptual product cue) and visual storytelling (conceptual product cue) on objective and subjective aesthetic cognitive responses, namely objective aesthetic impression and subjective aesthetic association, respectively. It also examined the effects of design novelty and visual storytelling on affective and cognitive aesthetic output variables, namely aesthetic emotion and aesthetic judgment, respectively. Further, this study investigated whether objective aesthetic impression and subjective aesthetic association to product design predict aesthetic emotions and whether subjective association mediates the relationship between objective aesthetic impression and aesthetic judgment. Visual storytelling in form of visual design stories were examined using two different types of visual design stories related to formal and symbolic/expressive product qualities. In the experimental study, participants were exposed to either moderate or high novelty product designs (chairs and lamps) without or with visual stories related to either formal or symbolic/expressive product qualities. The results of the experimental studies are discussed in the subsequent sections.

Main Effects of Design Novelty (Perceptual Cue) on Aesthetic Output Variables and Cognitive Responses

The first hypothesis in this study predicted main effects for design novelty on aesthetic emotions and aesthetic judgment. As hypothesized, there was a significant main effect for design

novelty on aesthetic judgment (H1a). Consumers' aesthetic judgments were more positive toward products with moderate than high design novelty, which is in line with Hung and Chen's (2012) study using chairs as the stimuli. The results are consistent with Berlyne's (1971) inverted U-curve of pleasure where the highest level of pleasure results from a moderate level of novelty. If products possess an extremely low level of novelty, consumers become bored since they desire higher arousal and stimulation of their senses and, thus, evaluate the product as less beautiful, elegant, and attractive. Contrary to this, if design novelty is extremely high, consumers are mentally challenged since they are unable to categorize the product (Bloch, 1995; Mugge & Dahl, 2013). A theoretical explanation for the lower preference for high design novelty is provided by the processing fluency theory of aesthetic pleasure by Reber et al. (2004). This theory suggests that the more fluently consumers can process a product, the more positive is their judgment (Reber et al., 2004). This feel of unease to categorize high novelty designs negatively influences perceptual fluency (Reber et al., 2004). As the processing of design novelty becomes disfluent, the resulting aesthetic judgment decreases. Thus, the farther the product deviates from its familiar form, the less perceptually fluent is the processing and therefore, the lower is the consumers' aesthetic judgment toward the novel design. This study's finding together with Hung and Chen's (2012) results clearly demonstrate the pivotal importance of moderate design novelty on aesthetic preference for lifestyle and home products which is a function of perceptual fluency.

This main effect of design novelty was significant for negative aesthetic emotions; but not for positive aesthetic emotions. Moderately novel designs as compared to highly novel designs did not create more positive aesthetic emotions; however, triggered less negative aesthetic emotions. This means that the absence of ease of categorizing the novel product design influences consumers' negative aesthetic emotions. Consumers had more negative aesthetic emotions such as disgust, skepticism, and irritation toward a high than moderate novel product design which

confirms Leder's et al.'s (2004) argument that negative emotions are provoked by unsatisfactory processing. Positive feelings such as excitement, joy, inspiration, and interest were not impacted by the level of design novelty. This implies that consumers quickly experience negative aesthetic emotions when they encounter a visually unfamiliar design. Yet, their positive emotions toward a moderate vs. high novel product design did not change significantly – regardless of the level of design novelty. The discrepancy between positive and negative aesthetic emotions can be explained by the way the human brain handles information.

According to Clifford Nass, a professor of psychology, negative emotions usually require a higher degree of cognitive capacity than positive emotions and incoming information is processed more thoroughly (Tugend, 2012). He further points out that people have a tendency to think more about undesirable or bad events and describe them by using stronger words as compared to pleasant events (Tugend, 2012). This argument may apply to consumer products in the same way - people use stronger words to describe aesthetically unpleasing products than pleasing ones. This claim is observable in the aesthetic emotion scale by Edell and Burke (1987), which was used in this study. Items such as disgust, skepticism and irritation are strong negative emotions and are placed on the very negative end of the spectrum. On the other hand, items that describe positive emotions such as interest, joy, and excitement are not as impactful. Silvia (2012) argues that disgust is one of the three hostile emotions (besides anger and contempt), which are evoked by artists and designer who intentionally want to provoke. In Silvia and Brown's (2007) study, results revealed that participants, who viewed a variety of photographs and paintings, experienced disgust when the stimulus conflicted with their values and was perceived as inherently unpleasant (Silvia & Brown, 2007). Overall, the non-significant main effect of design novelty on positive aesthetic emotions may be explained such that consumers' negative aesthetic emotions toward high novel designs overrode their positive ones. The results

of hypotheses one and two further confirm Leder et al.'s (2004) conceptualization of the independence of aesthetic output variables – aesthetic emotions and aesthetic judgment. Consumers' positive emotions do not differ between a moderate and high novel product design, however their aesthetic judgment is significantly different when it comes to the level of product design novelty, as moderate novelty designs are rated more positively than high novelty designs.

The third hypothesis in this study proposed a significant main effect of design novelty on objective aesthetic impression and subjective aesthetic association. As hypothesized, there was a significant main effect for design novelty on the two types of cognitive responses, objective aesthetic impression and subjective aesthetic association. The results delineated that consumers had a higher objective aesthetic impression and subjective aesthetic association to moderate novelty than high novelty products. The means of both cognitive responses greatly differed between moderate and high product design novelty. These findings are consistent with the claims of previous literature (Crilly et al., 2004) that have argued that a product cue generates subjective and objective cognitive responses which are influenced in a holistic manner rather than in isolation. Specifically, the results revealed that the processes of decoding the perceived symbolism and sense in the product's design (subjective aesthetic association) as well as decoding the perceived order and structural composition of the product's design (objective aesthetic impression) are similarly affected by novelty levels. Thus, products with moderate design novelty lead to greater objective and subjective cognitive responses than products with high design novelty. The results demonstrate the importance of both processes as they influence the consumer's holistic impression which is the initial aesthetic reaction toward a product's design, also known as "gist response" (Locher, 2015, p. 77).

Importantly, objective aesthetic impression showed the highest R^2 of all dependent variables, with 14.8% of the variance in objective aesthetic impression being explained by design

novelty. This result demonstrates the significance of design novelty on consumers' perception of order and clarity regarding the product's design.

Main Effects of Visual Design Story (Conceptual Cue) on Aesthetic Output Variables and Cognitive Responses

In order to examine the overall aesthetic experience, conceptual product cues need to be taken into consideration as consumers do not perceive a product in isolation but within its context. Thus, to provide insights into the relationship between a conceptual product cue and the aesthetic output variables, this study examined the main effect for a visual design story adjoining the product's design on aesthetic emotion and aesthetic judgment. Specifically, this study examined whether a visual design story related to formal product qualities vs. an absent story and a visual design story related to symbolic product qualities vs. an absent story enhance both of the aesthetic output variables (Hypothesis 3). The results demonstrate overall significant main effects for visual design story on positive aesthetic emotion and aesthetic judgment.

As hypothesized, consumers had more positive aesthetic emotions and higher aesthetic judgments to visual design stories related to symbolic/expressive product qualities than to an absent visual design story. These findings support the notion that a visual design story related to symbolic/expressive product qualities is a critical tool for design communication. They further support Leder et al.'s (2004) argument that the amount of information about a product influences aesthetic judgment, which is the result of an increase in conceptual fluency (Reber et al., 2004). Similar to the inclusion of titles below a painting or background information of a painter, explicit information about the product, in this case the visual image that emphasizes the symbolism and emotion of the product, can heighten consumers' positive emotions and aesthetic judgment of the product (Leder et al., 2004). If the visual design story is successful in communicating emotions, meaning and symbolism of the stimuli, consumers develop heightened aesthetic emotions and

aesthetic judgments toward the product. It appears that marketing research only investigated the effect of narrative storytelling on positive consumer evaluations (Escalas, 2007; Wang & Calder, 2006) but the effect of visual storytelling has been unexplored. By demonstrating that a visual design story related to symbolic/expressive product qualities aided in influencing the aesthetic output variables, these findings fill an important knowledge gap in the marketing and advertising literature.

With respect to the second type of visual design story, the effect of visual design stories related to formal product qualities reached marginal significance for aesthetic judgment.

Nevertheless, the means were in the anticipated directions as consumers had higher aesthetic judgment to visual design stories related to formal product qualities than to an absent visual design story. This finding also supports Leder et al.'s (2004) premise that if content is semantically understood through visual communication related to a product's formal qualities, the consumer evaluates the product as more beautiful, attractive, and elegant. Explicit information about the product, in this case the visual design story that emphasizes the product's form and shape, can enhance consumers' aesthetic judgment of the product (Leder et al., 2004).

This study could not find support for the main effect of visual design story related to formal qualities on the other aesthetic output variable – positive aesthetic emotion. Consumers' positive aesthetic emotions to a product did not significantly change after exposure to a visual design story related to its formal qualities as compared to an absent story. Thus, the results suggest that visual design stories related to formal product qualities have a greater impact on aesthetic judgment than positive aesthetic emotions, which further supports Leder et al.'s (2004) conceptualization of the two independent output variables of aesthetic emotions and aesthetic judgments. There was no main effect of visual design story on negative emotions, which suggests

that a visual design story does not play a role in reducing negative emotions, only increasing positive emotions when using stories related to symbolic/expressive qualities.

The findings related to the two hypotheses suggest that conceptual and perceptual product cues are similarly important for shaping consumers' aesthetic judgments. This indicates that marketers can greatly benefit by creating compelling visual design stories that feature the design in order to alter consumers' aesthetic judgments. Importantly, a visual design story related to symbolic/expressive product qualities connects with consumers on an emotional level (this effect was non-significant for stories related to formal qualities), which was not a surprising result since symbolic/expressive product qualities are greatly linked to emotions (Fiore et al., 1996).

Considering both types of stories, the use of a visual design story had a more prominent effect on consumers' aesthetic judgments than on their positive aesthetic emotions. This finding is somewhat inconsistent with Leder et al.'s (2004) statement that "more naive perceivers presumably show a stronger interdependence of both outputs" (p. 502). Based on the results of this study, we believe that it may be more challenging for non-experts to analyze their aesthetic emotions and feelings without any art training and expertise. It is believed that art experts can identify and depict their aesthetic emotions toward an artwork in a more precise way. On the other hand, non-experts feel challenged to indicate their feelings toward a product on predetermined items. A study by Silvia (2006) supports this assumption by demonstrating differences in the magnitude of aesthetic emotions between art experts and novices. Specifically, experts with art training demonstrated more positive aesthetic emotions (interest) to artworks due to a higher level of appraised comprehension as compared to non-experts. This finding may explain why participants' aesthetic emotions in response to a product were in the medium range after exposure to all of the visual design stories.

The fourth hypothesis in this study predicted a main effect of visual design story on the cognitive responses. The results delineated significant main effects for visual design story on objective aesthetic impression and subjective aesthetic association. As hypothesized, consumers showed higher objective aesthetic impression and subjective aesthetic association to visual design stories related to symbolic/expressive product qualities than to an absent visual design story. The findings further illustrate that consumers had higher subjective aesthetic association to visual design stories related to formal product qualities than to an absent visual design story. This effect achieved marginal significance for objective aesthetic impression as well. These results support Leder and Nadal's (2014) statement that "cognition is contextually situated" (p. 453) as a specific context or concept can lead to different product perceptions. Consistent with Schwarz (2010), consumers' subjective and objective perceptions of the product is impacted by the surrounding environment due to an increase in conceptual fluency. In line with Reber et al. (2004), visual design stories related to formal and symbolic/expressive product qualities can reduce consumers' cognitive effort to fluently process the product, which then leads to more positive objective and subjective cognitive responses.

Summarizing the key findings of hypothesis 3 and 4, the use of a visual design story related to symbolic/expressive product qualities (vs. an absent story) enhanced all dependent variables such as positive aesthetic emotions, aesthetic judgment, objective aesthetic impression and subjective aesthetic association. The use of a visual design story related to formal product qualities heightened subjective aesthetic association, objective aesthetic impression (marginal significance), and aesthetic judgment (marginal significance). These results strongly support the role of a visual design story related to product qualities, particularly to symbolic/expressive qualities, in enhancing cognitive responses, positive emotions, and aesthetic judgment to a product's design.

The fifth hypothesis predicted that the use of visual design story (present vs. absent) will enhance subjective aesthetic association of the product more than its objective aesthetic impression. Results confirmed this hypothesis. It is suggested that a visual design story contributes to Leder et al.'s (2004) cognitive mastering stage within the information processing model because this stage related to how product content is semantically understood. Therefore, a visual design story captures the importance of meaning, interpretation, and understanding of a product's design as a source of conceptual fluency. The mental involvement and the successful processing of a visual design story leads to greater engagement during decoding the perceived symbolism and sense in the product's design as compared to decoding the product's form and structural composition. A visual design story, thus, helps to comprehend a novel design and promotes consumers' subjective cognitive responses.

Overall, these results only considered the present vs. absent visual design story condition. However, the results clearly show the type of visual design story matters in the context of visual perception. This specific interaction was hypothesized later in context to H13 and H14 (model 2) that examined how the type of visual design story interacted with the type of cognitive response (discussed subsequently).

Interaction Effects of Design Novelty (Perceptual Cue) and Visual Design Story (Conceptual Cue) on Aesthetic Output Variables and Cognitive Responses

The hypotheses six to nine predicted an interaction effect between design novelty and visual design stories on aesthetic emotions, aesthetic judgment, objective aesthetic impression, and subjective aesthetic association. Specifically, it was expected that the use of a visual design story (present vs. absent) will enhance all of the aforementioned dependent variables more greatly for a high novelty product design more than a low novelty product design. These specific hypotheses required a significant interaction effect between design novelty and visual design

story on the dependent variables, which was not found. Our findings are consistent with other studies' (Lee & Labroo, 2004; Lee, Yoon, & Mitchell, 2005) results, which revealed a non-significant interaction effect between perceptual and conceptual cues, suggesting that they are operate differently and exert independent effects, rather than combinatorial effects. The failure to find a significant interaction effect implies that the story impacted perceptions, emotions, and judgments of both moderate and high novelty designs in a similar way. Hence, contrary to our expectations that high novelty designs will experience a greater benefit through visual design stories than moderate novelty designs, our findings suggest only a main effect for the benefits of visual stories, which occurs across both levels of novelty.

Structural Relationships between Cognitive Responses and Aesthetic Output Variables

The next three hypotheses (H10-H12) considered the structural relationships between cognitive responses and aesthetic output variables. Using multiple regression analysis, this study demonstrates the importance of objective aesthetic impression and subjective aesthetic association toward two product categories on consumers' upbeat aesthetic emotions since 77% - 79% of the variance in positive aesthetic emotions was explained by objective aesthetic impression and subjective aesthetic association (Hypotheses 10 and 11). Based on the beta weights, the influence was slightly stronger for subjective aesthetic association on upbeat aesthetic emotions which is not surprising since subjective aesthetic associations are affiliated with positive aesthetic emotions (Fiore et al., 1996; Leder et al., 2004). This result shows that the perception of product symbolism and understanding is greatly important for provoking consumers' positive aesthetic emotions.

The overall results imply that objective aesthetic impression and subjective aesthetic association enhance positive aesthetic emotions toward a variety of product designs (moderate and high design novelty) across different home and lifestyle product categories. These findings

illustrate the significance of cognitive responses to different product designs on consumers' positive aesthetic emotions to those designs, supporting the information processing based model of aesthetic experience proposed by Leder et al. (2004). If consumers generate higher objective aesthetic impression and subjective aesthetic association in response to a product's design, the influence on upbeat aesthetic emotions also increases. Visual design stories that support the cognitive decoding of symbolism and sense (subjective) as well as order and structural composition (objective) of the product's design influence how consumers feel about the product – whether they experience excitement, inspiration, joy, or interest when looking at the design. Thus, the more consumers can comprehend the design and find order in it, the more positive are their aesthetic emotions toward the design – regardless of the design style and product category.

Analysis also revealed that objective aesthetic impression plays a significant role in influencing negative aesthetic emotions. If consumers form lower objective aesthetic impression in response to a product's design, negative aesthetic emotions increase. Surprisingly, this significant influence on negative aesthetic emotions (except for one set of chairs) was not found for subjective aesthetic associations. Consumers' inability to decode the symbolic nature of the product did not influence negative aesthetic emotions towards the product. Hence, product symbolism has a greater impact on positive than negative emotions, an important finding for marketers.

Hypothesis 12 proposed that subjective aesthetic association of the product will mediate the relationship between objective aesthetic impression and aesthetic judgment. This hypothesis was partially supported. Through testing the mediation effect, it was found that objective aesthetic impression influenced aesthetic judgment and subjective aesthetic association. A partially mediation occurred as the influence of objective aesthetic impression on aesthetic judgment became statistically smaller in size when subjective aesthetic association was added as

a second independent variable. Therefore, consumers' objective aesthetic impression of a product's design partially impacted aesthetic judgments through their subjective aesthetic association. These results are somewhat consistent with Graf and Landwehr's (2015) proposition that an aesthetic evaluation takes place only when deliberate processing is activated. Specifically, Graf and Landwehr (2015) propose that consumers first need to be mentally involved with the product before they can form an accurate aesthetic evaluation since product interpretation and cognitive state are prerequisites for this type of output variable (Leder et al., 2004). Hence, this study hypothesized that objective aesthetic impression first influences subjective aesthetic association before an aesthetic judgment can be formed. However, the results delineated a positive influence of objective aesthetic impression on aesthetic judgment and this effect was still significant when subjective aesthetic association was added. Yet, the influence of objective aesthetic impression on aesthetic judgment was significantly reduced after including subjective aesthetic association. This implies that not only subjective aesthetic association but also objective aesthetic association lead to aesthetic judgment.

Processes that involve decoding the perceived symbolism and meaning (subjective) as well as the perceived order and structural composition (objective) of the product's design influence how attractive, elegant or beautiful the product's design is perceived by the consumer. Thus, the more consumers can comprehend the design and find order in it, the more positive are their aesthetic judgments toward the design – regardless of the design style and product category. However, the process of subjective aesthetic association partially explains the influence of objective aesthetic impression on aesthetic judgment. When forming an aesthetic judgment, decoding the perceived sense and meaning of the product is an intervening process after analyzing the structural composition and order of the design.

Moderating Effects of Type of Visual Design Story on Objective Aesthetic Impression and Subjective Aesthetic Association

Lastly, hypothesis 13 considered whether one type of cognitive response will be greater than the other after exposure to a certain type of visual design story. It was expected that cognitive response related to objective aesthetic impression in response to a product design will be greater when the visual design story highlights the formal product qualities as compared to the symbolic/expressive product qualities (H13a). On the other hand, it was proposed that cognitive response related to subjective aesthetic association in response to a product design will be greater when the visual design story highlights the expressive/symbolic product qualities as compared to the formal product qualities (H13b). The results indicated that objective aesthetic impression was similarly enhanced by both types of visual design stories. The results suggest that the ease of decoding the product's form and structure was increased after exposure to a visual design story, regardless of its linkage to the product's symbolic/expressive or formal qualities.

Further, as hypothesized, consumers' had higher subjective aesthetic association to a visual design story related to symbolic/expressive product qualities than to a story related to formal product qualities. Thus, consumers' subjective aesthetic association ratings are more impacted by the type of visual design story. The results delineate that a visual design story highlighting the symbolic and expressive associations of a product is most important in influencing the subjective cognitive response. Consumers gained a better understanding of the product's meaning if the visual design story relates to its symbolic and expressive qualities than if it relates to its formal qualities. This result is consistent with the assumption that symbolic and expressive product qualities are allocated to subjective cognitive responses as they relate to sense making and product meaning. Viewed holistically, the subjective and objective cognitive

responses are most enhanced by a visual design story related to symbolic/expressive qualities as compared to formal qualities which leads to important implications for marketers.

CHAPTER 6. IMPLICATIONS AND CONCLUSIONS

Much can be learned from the application of the findings of this study and this chapter will explore these implications. Because this study was based on three theoretical frameworks: a) the framework for consumer response to the visual domain in product design (Crilly et al., 2004); b) the information processing model of aesthetic appreciation and aesthetic judgments (Leder et al., 2004); and c) the processing fluency theory (Reber et al., 2004), important theoretical and practical implications can be drawn from the research. This chapter also includes suggestions for future research as well as limitations of the study.

Theoretical Implications and Future Research Suggestions

For greatest insight into consumers' perceptions and responses to a product's design, both perceptual and conceptual product cues must be considered. Researchers have argued that a product is not perceived in isolation but together with conceptually-related environmental cues (e.g. Berger & Fritzsims, 2008; Schwarz, 2010). The prevalence of conceptual product cues can influence consumers' responses and judgment as much as perceptual product cues. Few studies, however, have empirically investigated this statement. In addition, the role of conceptual fluency in aesthetics has been largely disregarded. The current research contributes to filling a much needed gap in the literature by exploring how the use of a visual design story (conceptual product cue) enhanced a variety of consumer responses and emotions to a product's design as a function of conceptual processing fluency. The findings open up a new perspective in the aesthetic and marketing literature as it was evident that product aesthetics as well as the context

that surrounds the product need to be considered for a holistic interpretation of consumers' responses toward product design. Theoretically, this study helps to support the importance of the conceptual fluency in consumers' responses and emotions to a variety of different product designs and categories (Reber et al., 2004). In addition, the findings that products with moderate novel designs (perceptual product cue) created more positive aesthetic emotions, aesthetic judgment, subjective and objective cognitive responses than highly novel designs contribute to the recent research on perceptual fluency (Reber et al., 2004). An interaction effect between conceptual and perceptual product cues was not found. Further research is warranted to identify whether perceptual and conceptual cues indeed exert any interaction effects by operating jointly. One potentially important topic for further research concerns the degree to which the significant main effect for design novelty on consumer responses is applicable to other products, such as functional products. For this product category, consumers are much more pragmatic and may desire minimalistic designs that do not take away from the functional component (e.g. easy handling).

This study suggests that visual storytelling is a crucial conceptual product cue and a powerful marketing and communication tool to persuade consumers and alter their perception, emotion, and judgment toward a new product design. The research taps into an unexplored area by illustrating that the exposure of a visual design story related to the product's qualities can help emphasize the product concept, which in turn influences consumers' cognitive responses and aesthetic output variables. This study examined two types of visual design stories – a visual design story related to formal product qualities and a visual design story related to symbolic/expressive product qualities on consumers' subjective and objective cognitive responses, aesthetic emotions, and aesthetic judgment. By illustrating that both types of visual design stories, particularly a visual design story related to symbolic product qualities,

significantly heighten consumers' responses, this study provides a powerful demonstration of the impact of adjoining visual design stories on consumer behavior. The use of a visual design story has the power to mitigate the risk when introducing a new design in the market as the visual design stories contribute to consumers' understanding and attach meaning and symbolic value. These results can benefit a variety of research streams and provide avenues for further inquiry.

Future research is needed to identify the degree to which the significant main effect for visual design story on consumer responses is applicable to other hedonic products, such as apparel or footwear. Unlike home and lifestyle products, visual design stories related to formal product qualities may be more effective for these product categories. Future research could also examine the effect of a visual design story including narrative on objective and subjective cognitive responses and whether the combination of a visual story and narrative is more effective in provoking consumer responses, especially to a highly novel product. It can be argued that a visual design story with the inclusion of narrative adjoining a highly novel design leads to greater transportation (as compared without narrative) (see narrative transportation studies by Megehee & Woodside, 2010; van Laer et al., 2014; Woodside et al., 2008) and in turn, influences cognitive responses more favorably.

Researchers have argued that besides objective aesthetic impression, consumers' subjective aesthetic impression also play a pivotal role in forming aesthetic preferences (Crilly et al., 2004). However, it appears that the exploration of the two different types of cognitive responses to a product's design is still a neglected area of research. This study successfully created two scales for measuring consumers' two distinct cognitive responses - objective aesthetic impression and subjective aesthetic association to a perceptual and conceptual product cue. This examination opens up a new perspective on cognition with respect to how consumers perceive product and contextual information by their senses and how objective and subjective

cognition differently influence aesthetic emotion and aesthetic judgment. This research refines and extends knowledge (Graf & Landwehr, 2015; Leder et al., 2004) by illustrating that consumers' aesthetic judgment can be influenced through both types of cognitive responses even though subjective aesthetic association partially mediates the relationship between objective aesthetic impression and aesthetic judgment. The study further found that the two aesthetic output variables, aesthetic emotion and aesthetic judgment, are influenced differently by conceptual and perceptual product cues, confirming Leder et al.'s (2004) information processing model of aesthetic appreciation and aesthetic judgment in which they are recognized as independent constructs.

This research delineated an overarching model that includes perceptual and conceptual product cues, subjective and objective cognitive responses and two distinct aesthetic output variables, aesthetic emotion and aesthetic judgment. By creating a model that involves all relevant concepts that make up the overall aesthetic experience, this study makes significant contributions to the literature in the area of marketing, aesthetics, and consumer behavior. Another potentially important topic for further research is to test this research model through the inclusion of other relevant perceptual (e.g. complexity, harmony) and conceptual product cues (e.g. brand story, trend story) to examine whether the objective and subjective cognitive responses and aesthetic output variables are affected in the same way. Future research could also explore moderating variables that impact the relationship between the variables outlined in the model. For example, individual difference variables such as CVPA (centrality of visual product aesthetics) developed by Bloch, Brunel, and Arnold (2003) or demographic variables such as gender could possibly influence the relationship between a perceptual product cue and dependent variables. The level of consumers' need for cognition (Cacioppo, Petty, & Chuan, 1982) could

also change how consumers subjectively perceive the product after exposure to a conceptual product cue.

Managerial Implications

This study provides important practical implications for marketers and brand managers to bring new products closer to the consumer and bridge the gap between consumers' uncertainty about the product and their decision making. Findings from this study help marketers and designers to guide their visual advertising content which has become today's number one marketing strategy through the rise of visual social media such as Vines, Pinterest and Instagram.

This study suggests that visual design stories as compared to narrative stories have the power to quickly catch people's attention and provide a filter for the audience to identify which content is worth spending time on and engage with. This is imperative because we live in a consumer world where we are inundated with advertising and marketing information. Visual design stories not only help to make the marketing message memorable, but also provide meaning and attach extra value to the product. In order to mitigate the risk that is present in introducing a new product, marketers should identify and communicate its product qualities through conveyance and communication of visual design stories. In particular, marketers will be more successful if the visual design story adjoining the new product relates to its formal or symbolic/expressive qualities. Based on this study's results, both types of visual design stories are highly effective in altering consumers' perception and stimulating favorable judgments. Therefore, this study suggests that marketers need to be aware that introducing a product coupled with a visual design story related to the product qualities is imperative for communicating its design and influencing consumer responses.

A visual design story related to symbolic/expressive qualities even has the potential to emotionally connect with consumers since the results revealed that this type of visual design story triggers positive aesthetic emotions. The visual design story related to symbolic/expressive product qualities heightens objective aesthetic impression and also subjective aesthetic association. Given that both types of cognitive responses greatly benefit from this type of story, a win-win-strategy for marketers is guaranteed. It is recommended that a new marketing strategy should revolve around the emotion and symbolism of lifestyle and home products. By emphasizing symbolic/expressive qualities, consumers are able to successfully decode the symbolism and meaning of the product and interpret the product's design in a way that they have previously not considered. Symbolic visual images help uncover new facets of a product's design that conveys a message that a product is something "special". Thus, it is worth the effort to first conduct marketing research prior to creating visual images that relates to symbolic/expressive qualities. Identifying symbolic and expressive associations that the majority of the audience perceive when looking at the product and then translating them into visual imagery can lead to an impactful marketing strategy. Marketers, however, need to recognize that the meaning consumers attach to the product can be different based on specific geographic regions, subcultures, age cohorts, and gender. Thus, knowing the target market of a new product is critical for creating effective visual design stories promoting the symbolic and expressive product value.

This study further suggests that design novelty is an important determinant of consumer responses, with moderate novelty products resulting in more positive emotions and responses than high novelty products. Thus, designers need to be aware that particularly the shape of a product can produce both positive and negative feelings and judgments. Designers should create a moderate novel product with a shape that is not too unfamiliar or novel but also not too boring. The shape of the design should to some extent deviate from a prototypical product within its

product category to enhance arousal and interest - not too far, but far enough that the design is considered moderate novel so that the ease of processing is still guaranteed. Especially when product managers provide a similar product in their product line each year, it is suggested that incorporating unique elements into an otherwise familiar design (shape) can set the product apart from the mass and increase sell-through. Further, brands that mainly carry basic or traditional product styles should provide a sufficient assortment in product design novelty in order to achieve the right amount of interest and arousal.

Based on the results of this study, the author concludes that design novelty is most related to objective aesthetic impression considering all other dependent variables. Fifteen percent of the variance of objective aesthetic impression index is associated with design novelty. This finding underpins the importance of perceiving order, harmony, and clarity within a product's design. Thus, designers need to keep this in mind when creating a new product design and should provide easy visual processing of information for the consumer. For example, in order to amplify consumers' objective aesthetic impression, the designer is advised to stay true to the brand aesthetic by keeping iconic assets of the product or brand with which consumers are familiar. Once recognition and categorization take place, consumers' eyes can take in changes of the visual product form or structure through exaggerated or modified lines and contours.

Limitations

Although this study provides important insights into consumers' responses to perceptual and conceptual product cues, several limitations should also be noted. A limitation of this research is that it focuses on designer lifestyle and home products (chairs and lamps). However, the results of this study can be adapted to other home products, such as tables and sofas as well as other hedonic products such as apparel, jewelry, or cars. Another limitation, following from the

manipulation check of the visual design story factor is that not all subjects responded to all visual communication scale items for formal and symbolic/expressive qualities. Thus, the author was unable to compare all of subjects' responses on the same scales. However, due to the series of pretests that had previously measured both visual communication and product design/visual design story congruency, it is certain that the visual design story corresponded to the product's formal and symbolic/expressive qualities. Further, the study limited the sample to females, aged 25-37 with some college degree, which is important to ensure internal validity. A more diverse sample with respect to age and gender would have enhanced the external validity of the results. Also, this study did not collect participants' geographical locations in the U.S., which could have been a possible blocking variable since different location may impact consumers' design novelty perception of home and lifestyle products.

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APPENDIX A. INFORMATION LETTER

INFORMATION LETTER
for a Research Study entitled
“Exploring consumer responses to product design”

You are invited to participate in a research study to investigate consumers’ responses to product design and its environment. The study is being conducted by Christin Seifert, a doctoral student, under the direction of Dr. Veena Chattaraman in the Auburn University Department of Consumer and Design Sciences. You are invited to participate because you are female and are of legal age in the state where you live

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this research study, you will be asked to complete an online questionnaire. Your total time commitment will be approximately 15 minutes.

Are there any risks or discomforts? We assure that the participation in this study would put you in no physical or psychological risks other than the minimal inconvenience of completing the questionnaire.

Are there any benefits to yourself or others? The general population may benefit from this study as product designers and marketers may sell and advertise products that better resonates with their target market.

Will you receive compensation for participating? To thank you for your time you will be offered a monetary value provided by the online panel company.

If you change your mind about participating, you can withdraw at any time by closing your browser window. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Once you’ve submitted anonymous data, it cannot be withdrawn since it will be unidentifiable. Your decision about whether or not to participate or to stop participating will not jeopardize your future relations with Auburn University, the Department of Consumer and Design Sciences.

Any data obtained in connection with this study will remain anonymous. We will protect your privacy and the data you provide by not collecting IP addresses from research participants. Information collected through your participation may be published in a professional journal, and/or presented at a professional meeting.

If you have any questions about this study, please contact Christin Seifert at czs0009@auburn.edu or Dr. Veena Chattaraman at vzc0001@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334) 844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION ABOVE, YOU MUST DECIDE IF YOU WANT TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, PLEASE CLICK ON THE LINK BELOW. YOU MAY PRINT A COPY OF THIS LETTER TO KEEP.

Christin Seifert 09/29/2016

Investigator Date

Dr. Veena Chattaraman 09/29/2016

Co-Investigator Date

The Auburn University Institutional Review Board has approved this document for use from October 05, 2016 to October 04, 2019. Protocol #16-348 EX 1610.

PLEASE CLICK THE BUTTON BELOW.

APPENDIX B. EXPERT PANEL PRETEST QUESTIONNAIRE
(NOVELTY EVALUATION)

Welcome!

In this study, I am interested in your evaluation of **design novelty**. The following pages show 25 photographs of various **lamp and chair designs**. When judging design novelty, please **DISREGARD color and material** of the product.

The novelty rating is followed by one open-ended question regarding **symbolic/expressive product qualities = ONLY KEY WORDS (1 or 2 are enough)**

'**Symbolic/expressive product qualities** refer to the symbolic or expressive associations related to the product's design (e.g. the shape of the product symbolizes a desert or flower)'



Stimuli used in this survey:

Moderately novel chairs



High novel chairs

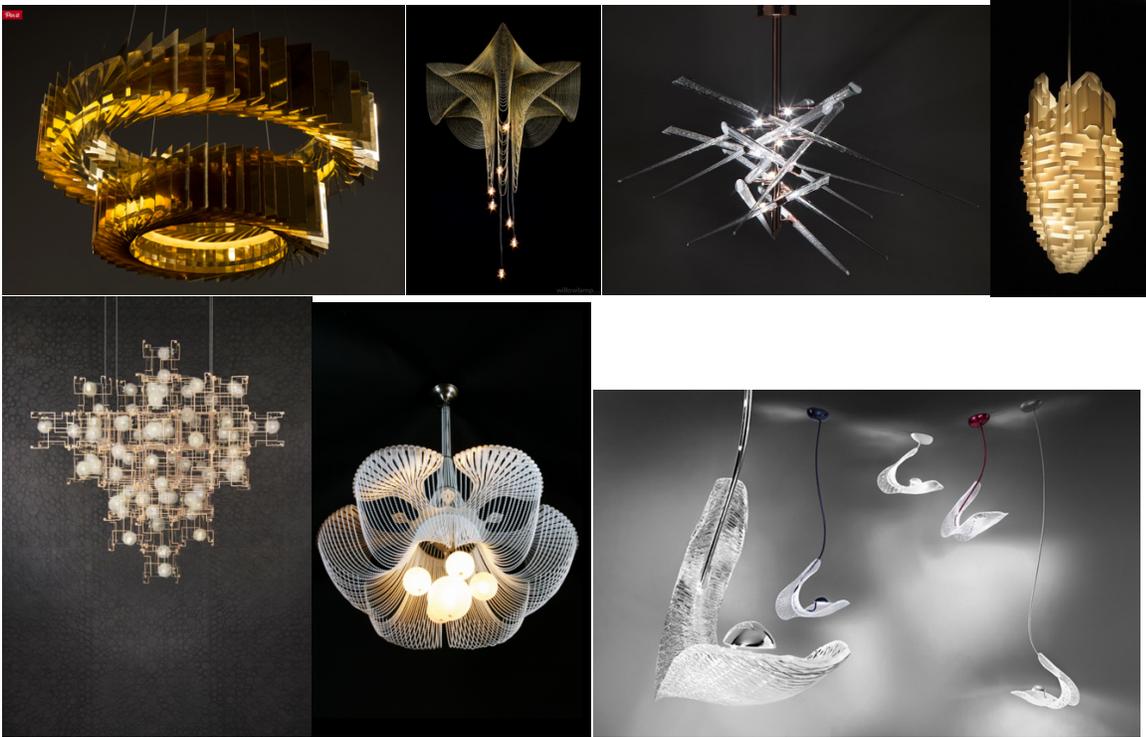




Moderately novel lamps



High novel lamps



This design is _____.

1 2 3 4 5 6 7

Familiar Novel

Please list some symbolic or expressive associations (if any) related to the shape of this design.



APPENDIX C. NATIONWIDE SAMPLE PRETEST 2A QUESTIONNAIRE
(NOVELTY VERIFICATION OF LAMP DESIGNS)

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

No High School Diploma

High School Diploma

Some College

Associate Degree

Undergraduate Degree (BA, BS)

Graduate Degree



What is your ethnicity?

African American/Black

Asian/Pacific Islander

Caucasian/White

Latino/Hispanic

Native American or Aleut

Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

- less than \$15,000
- \$15,000 - \$24,999
- \$25,000 - \$34,999
- \$35,000 - \$49,999
- \$50,000 - \$74,999
- \$75,000 - \$99,999
- \$100,000 or more
- Prefer not to say



Our study concerns thoughts and perceptions that people have about different **lamp designs**.

In a moment, you will be given **4 seconds** to view **22 lamp designs**. They will be shown one at a time. After 4 seconds, the next design will be automatically presented. You are not required to click anything.

When this task is completed, we will ask you some questions.







1. You will now be presented with the same 22 lamp designs. This time you will be asked to rate the **visual appearance of the lamps**. Please indicate your evaluation on the scales below each of the lamp.

2. You will also be asked what **symbolic/expressive product qualities** come to your mind when looking at each lamp design.

'**Symbolic/expressive product qualities** refer to the symbolic or expressive associations related to the product design. For example, a particular shape of a lamp may **represent or symbolize** a seagull, a flower, a desert etc. **Give your imagination free rein!**

>>

-Stimulus presentation-

For each stimulus, the same set of questions was asked:

DIRECTION: We are interested in your evaluation of **design novelty**. When judging the novelty of this lamp, please **DISREGARD color and material**.

I perceive this lamp design as _____.

	1	2	3	4	5	6	7	
Familiar	<input type="radio"/>	Novel						
unoriginal	<input type="radio"/>	original						
typical	<input type="radio"/>	atypical						

DIRECTION: **Please list some symbolic or expressive associations (if any) related to the shape of this lamp (1-3 key words)**. For example, a particular shape of a lamp may represent or symbolize a seagull, a flower, a desert etc.



APPENDIX D. NATIONWIDE SAMPLE PRETEST 2B QUESTIONNAIRE
(NOVELTY VERIFICATION OF CHAIR DESIGNS)

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

- No High School Diploma
- High School Diploma
- Some College
- Associate Degree
- Undergraduate Degree (BA, BS)
- Graduate Degree



What is your ethnicity?

- African American/Black
- Asian/Pacific Islander
- Caucasian/White
- Latino/Hispanic
- Native American or Aleut
- Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

less than \$15,000

\$15,000 - \$24,999

\$25,000 - \$34,999

\$35,000 - \$49,999

\$50,000 - \$74,999

\$75,000 - \$99,999

\$100,000 or more

Prefer not to say

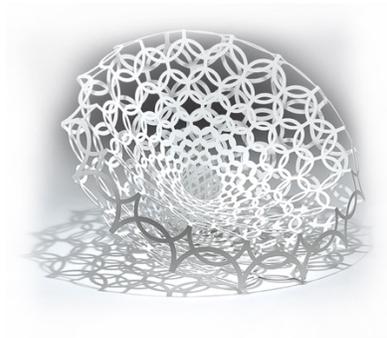


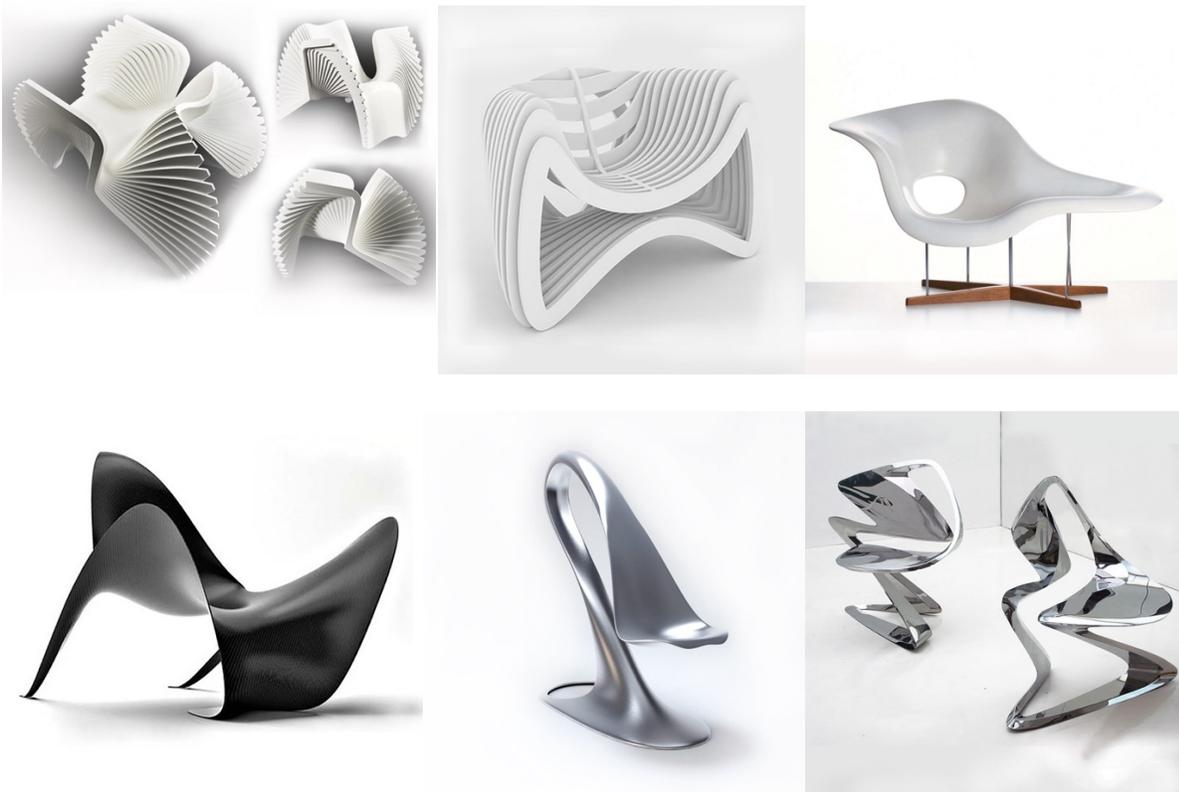
Our study concerns thoughts and perceptions that people have about different **chair designs**.

In a moment, you will be given **4 seconds** to view **19 chair designs**. They will be shown one at a time. After 4 seconds, the next design will be automatically presented. You are not required to click anything.

When this task is completed, we will ask you some questions.







1. You will now be presented with the same 19 chair designs. This time you will be asked to rate the **visual appearance of the chairs**. Please indicate your evaluation on the scales below each of the chair.

2. You will also be asked what **symbolic/expressive product qualities come to your mind when looking at each chair design**.

'Symbolic/expressive product qualities refer to the symbolic or expressive associations related to the product design. For example, a particular shape of a chair may **represent or symbolize a seagull, a flower, a desert** etc. **Give your imagination free rein!**



-Stimulus presentation-

For each stimulus, the same set of questions was asked:

DIRECTION: We are interested in your evaluation of **design novelty**. When judging the novelty of this chair, please **DISREGARD color and material**.

I perceive this chair design as _____.

	1	2	3	4	5	6	7	
Familiar	<input type="radio"/>	Novel						
unoriginal	<input type="radio"/>	original						
typical	<input type="radio"/>	atypical						

DIRECTION: **Please list some symbolic or expressive associations (if any) related to the shape of this chair (1-3 key words).** For example, a particular shape of a chair may represent or symbolize a seagull, a flower, a desert etc.



APPENDIX E. NATIONWIDE SAMPLE PRETEST 3A QUESTIONNAIRE
(VERIFICATION OF VISUAL DESIGN STORIES RELATED TO SYMBOLIC/EXPRESSIVE
PRODUCT QUALITIES AND SCALE VALIDATION)

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

- No High School Diploma
- High School Diploma
- Some College
- Associate Degree
- Undergraduate Degree (BA, BS)
- Graduate Degree



What is your ethnicity?

- African American/Black
- Asian/Pacific Islander
- Caucasian/White
- Latino/Hispanic
- Native American or Aleut
- Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

less than \$15,000

\$15,000 - \$24,999

\$25,000 - \$34,999

\$35,000 - \$49,999

\$50,000 - \$74,999

\$75,000 - \$99,999

\$100,000 or more

Prefer not to say



Our study is interested in **your thoughts and perceptions about how chair and lamp designs are advertised in catalogs.**

In the next few pages, you will see a catalog with 20 chair and lamp designs accompanied by visual advertising images. Each catalog page will be followed by questions that relate to the visual image adjoining the product. Please indicate your evaluation on the scales below each image.

An example of the catalog page is below:



-Stimulus presentation-

For each stimulus, the same set of questions was asked:







DIRECTION: We are interested in your evaluation of **the visual image of the catalog adjoining the lamp design**. Please indicate the number that best reflects your opinion.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
This visual image conveys the symbolism of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The meaning of the lamp design is portrayed through this visual image.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image contributes to the symbolic nature of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image communicates feelings and emotions associated with the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
This visual image and the lamp design go well together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image is well matched with the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my opinion, this visual image is very appropriate for advertisement of the lamp design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



We are now interested in **your evaluation of the product design**. In the next page, you will be presented with one lamp design accompanied by a visual advertising image. **Please indicate your perception of the lamp design on the scales below the image.**





DIRECTION: We are interested in your evaluation of **the visual appearance of this lamp design**. Please indicate the number that best reflects your opinion.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
I perceive this lamp design to be harmonious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive a sense of order in this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see this visual image, I can understand the lamp design better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With this visual image, I discover a new aspect of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
I perceive this lamp design to be harmonious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive a sense of order in this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see this visual image, I can understand the lamp design better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With this visual image, I discover a new aspect of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX F. NATIONWIDE SAMPLE PRETEST 3B QUESTIONNAIRE
(VERIFICATION OF VISUAL DESIGN STORIES RELATED TO FORMAL PRODUCT
QUALITIES AND SCALE VALIDATION)

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

No High School Diploma

High School Diploma

Some College

Associate Degree

Undergraduate Degree (BA, BS)

Graduate Degree



What is your ethnicity?

African American/Black

Asian/Pacific Islander

Caucasian/White

Latino/Hispanic

Native American or Aleut

Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

- less than \$15,000
- \$15,000 - \$24,999
- \$25,000 - \$34,999
- \$35,000 - \$49,999
- \$50,000 - \$74,999
- \$75,000 - \$99,999
- \$100,000 or more
- Prefer not to say



Our study is interested in **your thoughts and perceptions about how chair and lamp designs are advertised in catalogs.**

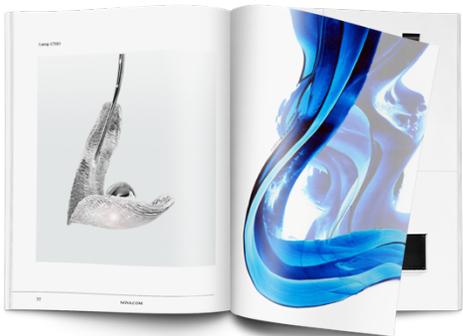
In the next few pages, you will see a catalog with 20 chair and lamp designs accompanied by visual advertising images. Each catalog page will be followed by questions that relate to the visual image adjoining the product. Please indicate your evaluation on the scales below each image.

An example of the catalog page is below:

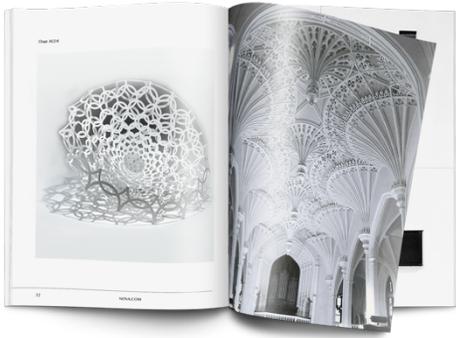


-Stimulus presentation-

For each stimulus, the same set of questions was asked:







DIRECTION: We are interested in your evaluation of **the visual image of the catalog adjoining the lamp design**. Please indicate the extent to which you agree or disagree with each of the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
This visual image resembles the form and shape of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The form and shape of the lamp design is portrayed through this visual image.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image places emphasis on the form and shape of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
This visual image and the lamp design go well together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image is well matched with the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my opinion, this visual image is very appropriate for advertisement of the lamp design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



We are now interested in **your evaluation of the product design**. In the next page, you will be presented with one lamp design accompanied by a visual advertising image. **Please indicate your perception of the lamp design on the scales below the image.**





DIRECTION: We are interested in your evaluation of **the visual appearance of this lamp design**. Please indicate the number that best reflects your opinion.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
I perceive this lamp design to be harmonious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive a sense of order in this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see this visual image, I can understand the lamp design better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With this visual image, I discover a new aspect of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
I perceive this lamp design to be harmonious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive a sense of order in this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see this visual image, I can understand the lamp design better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With this visual image, I discover a new aspect of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX G. NATIONWIDE SAMPLE PRETEST 4 QUESTIONNAIRE
(NOVELTY VERIFICATION)

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

- No High School Diploma
- High School Diploma
- Some College
- Associate Degree
- Undergraduate Degree (BA, BS)
- Graduate Degree



What is your ethnicity?

- African American/Black
- Asian/Pacific Islander
- Caucasian/White
- Latino/Hispanic
- Native American or Aleut
- Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

less than \$15,000

\$15,000 - \$24,999

\$25,000 - \$34,999

\$35,000 - \$49,999

\$50,000 - \$74,999

\$75,000 - \$99,999

\$100,000 or more

Prefer not to say

>>

Our study is interested in your thoughts and perceptions about different **chair and lamp designs**.

PART 1:

In a moment, you will be given **2 seconds** to view **9 catalog pages that showcase different chair designs**. They will be shown one at a time. After 2 seconds, the next design will be automatically presented. You are not required to click anything.

When this task is completed, we will ask you a question related to the chair designs.

>>

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

Chair A004



32

NOVA.COM

-Stimulus presentation-

For each stimulus, the same set of questions was asked:

DIRECTION: We are interested in your evaluation of **the visual appearance of this chair**. When judging the design, please **DISREGARD color and material**.

I perceive this chair design as _____.

	1	2	3	4	5	6	7	
Familiar	<input type="radio"/>	Novel						
Unoriginal	<input type="radio"/>	Original						
Typical	<input type="radio"/>	Atypical						



PART 2:

In a moment, you will be given **2 seconds** to view 11 **catalog pages that showcase different lamp designs**. They will be shown one at a time. After 2 seconds, the next design will be automatically presented. You are not required to click anything.

When this task is completed, we will ask you a question related to the lamp designs.



Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

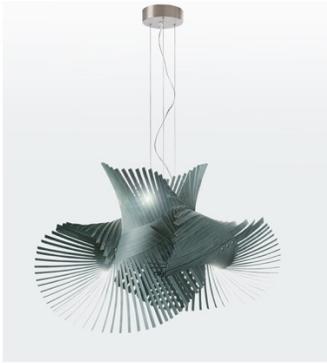
Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

Lamp CT60



32

NOVA.COM

You will now be presented with the same 11 catalog pages. This time you will be asked to rate the **visual appearance of the lamps**. Please indicate your evaluation on the scales below each of the image.



-Stimulus presentation-

For each stimulus, the same set of questions was asked:

DIRECTION: We are interested in your evaluation of **the visual appearance of this lamp**. When judging the design, please **DISREGARD color and material**.

I perceive this lamp design as _____.

	1	2	3	4	5	6	7	
Familiar	<input type="radio"/>	Novel						
Unoriginal	<input type="radio"/>	Original						
Typical	<input type="radio"/>	Atypical						



APPENDIX H. NATIONWIDE SAMPLE MAIN STUDY

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

- No High School Diploma
- High School Diploma
- Some College
- Associate Degree
- Undergraduate Degree (BA, BS)
- Graduate Degree



What is your ethnicity?

- African American/Black
- Asian/Pacific Islander
- Caucasian/White
- Latino/Hispanic
- Native American or Aleut
- Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

<input type="radio"/>	less than \$15,000
<input type="radio"/>	\$15,000 - \$24,999
<input type="radio"/>	\$25,000 - \$34,999
<input type="radio"/>	\$35,000 - \$49,999
<input type="radio"/>	\$50,000 - \$74,999
<input type="radio"/>	\$75,000 - \$99,999
<input type="radio"/>	\$100,000 or more
<input type="radio"/>	Prefer not to say



Our study is interested in **your thoughts and perceptions about various chair and lamp designs and how these designs are advertised in catalogs.**

In the next few pages, you will see a catalog spread with 4 chair and lamp designs accompanied by visual advertising images. Each catalog spread will be followed by questions that relate to the **product design and the visual image** adjoining the product. Please indicate your evaluation on the scales below each image.

An example of the **catalog spread** is below:



>>

PART 1:

First, we are interested in **your evaluation of the lamp design.** Please indicate your perception of the lamp design on the scales below the image.

>>

-Stimulus presentation of visual design stories related to either formal or symbolic/expressive product qualities-

- Participants viewed either moderate or high novel stimuli
- For each stimulus, the same set of questions was asked (except for one question; highlighted in the subsequent section):
-

Moderate novel products with adjoining visual design story related to formal product qualities:



Or High novel products with adjoining visual design story related to formal product qualities



Or Moderate novel products with adjoining visual design story related to symbolic/expressive product qualities



Or High novel products with adjoining visual design story related to symbolic/expressive product qualities



DIRECTION: We are interested in your evaluation of **the visual appearance of this lamp design**. Please indicate the number that best reflects your opinion.

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
I perceive this lamp design to be harmonious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive a sense of order in this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
This lamp design has symbolic qualities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This lamp design is meaningful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This lamp design embodies symbolic associations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This lamp design appears to make sense to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Through my personal, cultural or visual experience, I am able to understand this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

We are interested in the extent to which you **felt** a certain way about the **lamp design**. Please indicate on the scale below **how much you felt each of the feelings while looking at the lamp design**.

	not at all	not very strongly	somewhat strongly	strongly	very strongly
inspired	<input type="radio"/>				
joyful	<input type="radio"/>				
interested	<input type="radio"/>				
excited	<input type="radio"/>				
irritated	<input type="radio"/>				
skeptical	<input type="radio"/>				
disgusted	<input type="radio"/>				
bored	<input type="radio"/>				

DIRECTION: We are interested in your evaluation of **the visual appearance of this lamp**. When judging the design, please **DISREGARD color and material**.

This lamp design is _____.

	1	2	3	4	5	6	7	
ugly	<input type="radio"/>	beautiful						
not elegant	<input type="radio"/>	elegant						
not attractive	<input type="radio"/>	attractive						

This lamp design is _____.

	1	2	3	4	5	6	7	
simple	<input type="radio"/>	complicated						
not complex	<input type="radio"/>	complex						

DIRECTION: Please indicate the extent to which you agree or disagree with each of the following statements.

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
Generally, I am very interested in this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This product is important to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PART 2:

We are now interested in your evaluation of **a) the visual image adjoining the lamp design** and **b) the catalog spread itself**. Please indicate the extent to which you agree or disagree with each of the following statements.

An example of the **catalog spread** is below:



DIRECTION: Please indicate **your perception of the visual image adjoining this lamp design** on the scales below.

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
This visual image conveys the symbolism of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The meaning of the lamp design is portrayed through this visual image.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image contributes to the symbolic nature of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image communicates feelings and emotions associated with the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Or (depending on type of visual design story)

DIRECTION: Please indicate **your perception of the visual image adjoining the lamp design** on the scales below.

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
This visual image resembles the form and shape of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The form and shape of the lamp design is portrayed through this visual image.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This visual image places emphasis on the form and shape of the lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The catalog spread is:

	1	2	3	4	5	6	7	
unattractive	<input type="radio"/>	attractive						
very unlikeable	<input type="radio"/>	very likeable						

My attitude toward the catalog spread is:

	1	2	3	4	5	6	7	
bad	<input type="radio"/>	good						
dislike very much	<input type="radio"/>	like very much						
unfavorable	<input type="radio"/>	favorable						

APPENDIX I. NATIONWIDE SAMPLE MAIN STUDY
(CONTROL CONDITION)

Welcome!

Before we start with the survey, we would like know more about you. Below are a few questions regarding demographic information.

What is your gender?

Female

Male



What is your age?



What is your highest level of education?

No High School Diploma

High School Diploma

Some College

Associate Degree

Undergraduate Degree (BA, BS)

Graduate Degree



What is your ethnicity?

African American/Black

Asian/Pacific Islander

Caucasian/White

Latino/Hispanic

Native American or Aleut

Other ethnic background



Which of the following categories best represents your total annual household income before taxes?

less than \$15,000
\$15,000 - \$24,999
\$25,000 - \$34,999
\$35,000 - \$49,999
\$50,000 - \$74,999
\$75,000 - \$99,999
\$100,000 or more
Prefer not to say



Our study is interested in **your thoughts and perceptions about various chair and lamp designs and how these designs are presented in catalogs.**

In the next few pages, you will see a catalog spread with 4 chair and lamp designs on the left and an unrelated advertising image on the right. Each catalog spread will be followed by questions that relate to the **product design and the catalog spread itself.** Please indicate your evaluation on the scales below each image.



PART 1:

First, we are interested in **your evaluation of the lamp design.** Please indicate your perception of the lamp design on the scales below the image.

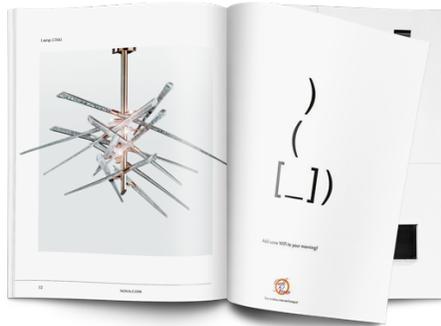


Stimulus presentation of either moderate or high novel stimuli
For each stimulus, the same set of questions was asked

Moderate novel products (absent story):



Or High novel products (absent story):



DIRECTION: We are interested in your evaluation of **the visual appearance of this lamp design**. Please indicate the number that best reflects your opinion.

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
I perceive this lamp design to be harmonious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive a sense of order in this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I perceive this lamp design to be organized.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
This lamp design has symbolic qualities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This lamp design is meaningful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This lamp design embodies symbolic associations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This lamp design appears to make sense to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Through my personal, cultural or visual experience, I am able to understand this lamp design.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

We are interested in the extent to which you **felt** a certain way about the **lamp design**. Please indicate on the scale below **how much you felt each of the feelings while looking at the lamp design**.

	not at all	not very strongly	somewhat strongly	strongly	very strongly
inspired	<input type="radio"/>				
joyful	<input type="radio"/>				
interested	<input type="radio"/>				
excited	<input type="radio"/>				
irritated	<input type="radio"/>				
skeptical	<input type="radio"/>				
disgusted	<input type="radio"/>				
bored	<input type="radio"/>				

DIRECTION: We are interested in your evaluation of **the visual appearance of this chair**. When judging the design, please **DISREGARD color and material**.

This chair design is _____.

	1	2	3	4	5	6	7	
ugly	<input type="radio"/>	beautiful						
not elegant	<input type="radio"/>	elegant						
not attractive	<input type="radio"/>	attractive						

This chair design is _____.

	1	2	3	4	5	6	7	
simple	<input type="radio"/>	complicated						
not complex	<input type="radio"/>	complex						

DIRECTION: Please indicate the extent to which you agree or disagree with each of the following statements.

	strongly disagree	disagree	somewhat disagree	neither agree nor disagree	somewhat agree	agree	strongly agree
Generally, I am very interested in this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This product is important to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PART 2:

We are now interested in your evaluation of **the catalog spread**. Please indicate the extent to which you agree or disagree with each of the following statements.



The catalog spread is:

	1	2	3	4	5	6	7	
unattractive	<input type="radio"/>	attractive						
very unlikeable	<input type="radio"/>	very likeable						

My attitude toward the catalog spread is:

	1	2	3	4	5	6	7	
bad	<input type="radio"/>	good						
dislike very much	<input type="radio"/>	like very much						
unfavorable	<input type="radio"/>	favorable						

APPENDIX J. HOMOGENEITY OF SLOPES TEST

Tests of Between Subjects Effects to Observe the Homogeneity of Slopes

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Novelty * Age	Objective impression Set 1 of Lamps	.539	1	.539	.227	.634
	Objective impression Set 2 of Lamps	1.918	1	1.918	.804	.371
	Objective impression Set 1 of Chairs	1.388	1	1.388	.536	.465
	Objective impression Set 2 of Chairs	.443	1	.443	.198	.657
	Objective impression Set 1 of Lamps	.180	2	.090	.038	.963
Story * Age	Objective impression Set 2 of Lamps	2.768	2	1.384	.580	.560
	Objective impression Set 1 of Chairs	1.678	2	.839	.324	.724
	Objective impression Set 2 of Chairs	2.302	2	1.151	.513	.599
	Subjective association Set 1 of Lamps	1.421	1	1.421	.539	.463
	Subjective association Set 2 of Lamps	.103	1	.103	.041	.840
Novelty * Age	Subjective association Set 1 of Chairs	.011	1	.011	.004	.948
	Subjective association Set 2 of Chairs	.198	1	.198	.077	.781
	Subjective association Set 1 of Lamps	.363	2	.182	.069	.933
	Subjective association Set 2 of Lamps	1.584	2	.792	.313	.732
	Subjective association Set 1 of Chairs	10.212	2	5.106	1.889	.153
Story * Age	Subjective association Set 2 of Chairs	1.277	2	.638	.248	.780
	Aesthetic judgment Set 1 of Lamps	1.057	1	1.057	.293	.588
	Aesthetic judgment Set 2 of Lamps	13.822	1	13.822	4.076	.044
	Aesthetic judgment Set 1 of Chairs	1.893	1	1.893	.473	.492
	Aesthetic judgment Set 2 of Chairs	.330	1	.330	.090	.764

Story * Age	Aesthetic judgment Set 1 of Lamps	.528	2	.264	.073	.929
	Aesthetic judgment Set 2 of Lamps	3.747	2	1.874	.552	.576
	Aesthetic judgment Set 1 of Chairs	3.618	2	1.809	.452	.637
	Aesthetic judgment Set 2 of Chairs	8.973	2	4.486	1.227	.294
Novelty * Age	Upbeat emotions Set 1 of Lamps	1.223	1	1.223	.838	.361
	Upbeat emotions Set 2 of Lamps	.610	1	.610	.417	.519
	Upbeat emotions Set 1 of Chairs	.269	1	.269	.165	.685
	Upbeat emotions Set 2 of Chairs	.803	1	.803	.521	.471
Story * Age	Upbeat emotions Set 1 of Lamps	.501	2	.251	.172	.842
	Upbeat emotions Set 2 of Lamps	2.599	2	1.299	.888	.412
	Upbeat emotions Set 1 of Chairs	.219	2	.109	.067	.935
	Upbeat emotions Set 2 of Chairs	.217	2	.109	.070	.932
Novelty * Age	Negative emotions Set 1 of Lamps	.064	1	.064	.074	.785
	Negative emotions Set 2 of Lamps	1.275	1	1.275	1.292	.256
	Negative emotions Set 1 of Chairs	1.439	1	1.439	1.609	.205
	Negative emotions Set 2 of Chairs	.357	1	.357	.388	.534
Story * Age	Negative emotions Set 1 of Lamps	3.292	2	1.646	1.925	.147
	Negative emotions Set 2 of Lamps	3.086	2	1.543	1.564	.211
	Negative emotions Set 1 of Chairs	1.440	2	.720	.805	.448
	Negative emotions Set 2 of Chairs	1.291	2	.646	.702	.496

APPENDIX K. TABLE OF MULTIVARIATE RESULTS OF ANCOVA FOR POSITIVE
AESTHETIC EMOTIONS

Effect		Value	F	Hypothesis		
				df	Error df	Sig.
Product Category	Pillai's Trace	.004	1.538 ^a	1.000	387.000	.216
	Wilks' Lambda	.996	1.538 ^a	1.000	387.000	.216
	Hotelling's Trace	.004	1.538 ^a	1.000	387.000	.216
	Roy's Largest Root	.004	1.538 ^a	1.000	387.000	.216
Product Category * Age	Pillai's Trace	.000	.001 ^a	1.000	387.000	.971
	Wilks' Lambda	1.000	.001 ^a	1.000	387.000	.971
	Hotelling's Trace	.000	.001 ^a	1.000	387.000	.971
	Roy's Largest Root	.000	.001 ^a	1.000	387.000	.971
Product Category * Story	Pillai's Trace	.001	.243 ^a	2.000	387.000	.785
	Wilks' Lambda	.999	.243 ^a	2.000	387.000	.785
	Hotelling's Trace	.001	.243 ^a	2.000	387.000	.785
	Roy's Largest Root	.001	.243 ^a	2.000	387.000	.785
Product Category * Novelty	Pillai's Trace	.000	.010 ^a	1.000	387.000	.921
	Wilks' Lambda	1.000	.010 ^a	1.000	387.000	.921
	Hotelling's Trace	.000	.010 ^a	1.000	387.000	.921
	Roy's Largest Root	.000	.010 ^a	1.000	387.000	.921
Product Category * Story * Novelty	Pillai's Trace	.023	4.570 ^a	2.000	387.000	.011
	Wilks' Lambda	.977	4.570 ^a	2.000	387.000	.011
	Hotelling's Trace	.024	4.570 ^a	2.000	387.000	.011
	Roy's Largest Root	.024	4.570 ^a	2.000	387.000	.011
Stimulus Number	Pillai's Trace	.000	.161 ^a	1.000	387.000	.688
	Wilks' Lambda	1.000	.161 ^a	1.000	387.000	.688
	Hotelling's Trace	.000	.161 ^a	1.000	387.000	.688
	Roy's Largest Root	.000	.161 ^a	1.000	387.000	.688
Stimulus Number * Age	Pillai's Trace	.001	.476 ^a	1.000	387.000	.491
	Wilks' Lambda	.999	.476 ^a	1.000	387.000	.491
	Hotelling's Trace	.001	.476 ^a	1.000	387.000	.491
	Roy's Largest Root	.001	.476 ^a	1.000	387.000	.491
Stimulus Number * Story	Pillai's Trace	.001	.117 ^a	2.000	387.000	.890
	Wilks' Lambda	.999	.117 ^a	2.000	387.000	.890
	Hotelling's Trace	.001	.117 ^a	2.000	387.000	.890
	Roy's Largest Root	.001	.117 ^a	2.000	387.000	.890

Stimulus Number * Novelty	Pillai's Trace	.007	2.540 ^a	1.000	387.000	.112
	Wilks' Lambda	.993	2.540 ^a	1.000	387.000	.112
	Hotelling's Trace	.007	2.540 ^a	1.000	387.000	.112
	Roy's Largest Root	.007	2.540 ^a	1.000	387.000	.112
Stimulus Number * Story * Novelty	Pillai's Trace	.009	1.738 ^a	2.000	387.000	.177
	Wilks' Lambda	.991	1.738 ^a	2.000	387.000	.177
	Hotelling's Trace	.009	1.738 ^a	2.000	387.000	.177
	Roy's Largest Root	.009	1.738 ^a	2.000	387.000	.177
Product Category * Stimulus Number	Pillai's Trace	.005	1.804 ^a	1.000	387.000	.180
	Wilks' Lambda	.995	1.804 ^a	1.000	387.000	.180
	Hotelling's Trace	.005	1.804 ^a	1.000	387.000	.180
	Roy's Largest Root	.005	1.804 ^a	1.000	387.000	.180
Product Category * Stimulus Number * Age	Pillai's Trace	.001	.318 ^a	1.000	387.000	.573
	Wilks' Lambda	.999	.318 ^a	1.000	387.000	.573
	Hotelling's Trace	.001	.318 ^a	1.000	387.000	.573
	Roy's Largest Root	.001	.318 ^a	1.000	387.000	.573
Product Category * Stimulus Number * Story	Pillai's Trace	.007	1.459 ^a	2.000	387.000	.234
	Wilks' Lambda	.993	1.459 ^a	2.000	387.000	.234
	Hotelling's Trace	.008	1.459 ^a	2.000	387.000	.234
	Roy's Largest Root	.008	1.459 ^a	2.000	387.000	.234
Product Category * Stimulus Number * Novelty	Pillai's Trace	.015	5.709 ^a	1.000	387.000	.017
	Wilks' Lambda	.985	5.709 ^a	1.000	387.000	.017
	Hotelling's Trace	.015	5.709 ^a	1.000	387.000	.017
	Roy's Largest Root	.015	5.709 ^a	1.000	387.000	.017
Product Category * Stimulus Number * Story * Novelty	Pillai's Trace	.002	.295 ^a	2.000	387.000	.745
	Wilks' Lambda	.998	.295 ^a	2.000	387.000	.745
	Hotelling's Trace	.002	.295 ^a	2.000	387.000	.745
	Roy's Largest Root	.002	.295 ^a	2.000	387.000	.745

APPENDIX L. TABLE OF MULTIVARIATE RESULTS OF ANCOVA FOR NEGATIVE
AESTHETIC EMOTIONS

Effect		Value	F	Hypothesis		
				df	Error df	Sig.
Product Category	Pillai's Trace	.023	9.154 ^a	1.000	384.000	.003
	Wilks' Lambda	.977	9.154 ^a	1.000	384.000	.003
	Hotelling's Trace	.024	9.154 ^a	1.000	384.000	.003
	Roy's Largest Root	.024	9.154 ^a	1.000	384.000	.003
Product Category * Age	Pillai's Trace	.015	5.671 ^a	1.000	384.000	.018
	Wilks' Lambda	.985	5.671 ^a	1.000	384.000	.018
	Hotelling's Trace	.015	5.671 ^a	1.000	384.000	.018
	Roy's Largest Root	.015	5.671 ^a	1.000	384.000	.018
Product Category * Story	Pillai's Trace	.001	.235 ^a	2.000	384.000	.790
	Wilks' Lambda	.999	.235 ^a	2.000	384.000	.790
	Hotelling's Trace	.001	.235 ^a	2.000	384.000	.790
	Roy's Largest Root	.001	.235 ^a	2.000	384.000	.790
Product Category * Novelty	Pillai's Trace	.000	.008 ^a	1.000	384.000	.928
	Wilks' Lambda	1.000	.008 ^a	1.000	384.000	.928
	Hotelling's Trace	.000	.008 ^a	1.000	384.000	.928
	Roy's Largest Root	.000	.008 ^a	1.000	384.000	.928
Product Category * Story * Novelty	Pillai's Trace	.005	1.043 ^a	2.000	384.000	.353
	Wilks' Lambda	.995	1.043 ^a	2.000	384.000	.353
	Hotelling's Trace	.005	1.043 ^a	2.000	384.000	.353
	Roy's Largest Root	.005	1.043 ^a	2.000	384.000	.353
Stimulus Number	Pillai's Trace	.002	.828 ^a	1.000	384.000	.363
	Wilks' Lambda	.998	.828 ^a	1.000	384.000	.363
	Hotelling's Trace	.002	.828 ^a	1.000	384.000	.363
	Roy's Largest Root	.002	.828 ^a	1.000	384.000	.363
Stimulus Number * Age	Pillai's Trace	.003	.975 ^a	1.000	384.000	.324
	Wilks' Lambda	.997	.975 ^a	1.000	384.000	.324
	Hotelling's Trace	.003	.975 ^a	1.000	384.000	.324
	Roy's Largest Root	.003	.975 ^a	1.000	384.000	.324
Stimulus Number * Story	Pillai's Trace	.003	.585 ^a	2.000	384.000	.558
	Wilks' Lambda	.997	.585 ^a	2.000	384.000	.558
	Hotelling's Trace	.003	.585 ^a	2.000	384.000	.558
	Roy's Largest Root	.003	.585 ^a	2.000	384.000	.558

Stimulus Number * Novelty	Pillai's Trace	.005	1.883 ^a	1.000	384.000	.171
	Wilks' Lambda	.995	1.883 ^a	1.000	384.000	.171
	Hotelling's Trace	.005	1.883 ^a	1.000	384.000	.171
	Roy's Largest Root	.005	1.883 ^a	1.000	384.000	.171
Stimulus Number * Story * Novelty	Pillai's Trace	.002	.325 ^a	2.000	384.000	.723
	Wilks' Lambda	.998	.325 ^a	2.000	384.000	.723
	Hotelling's Trace	.002	.325 ^a	2.000	384.000	.723
	Roy's Largest Root	.002	.325 ^a	2.000	384.000	.723
Product Category * Stimulus Number	Pillai's Trace	.001	.233 ^a	1.000	384.000	.630
	Wilks' Lambda	.999	.233 ^a	1.000	384.000	.630
	Hotelling's Trace	.001	.233 ^a	1.000	384.000	.630
	Roy's Largest Root	.001	.233 ^a	1.000	384.000	.630
Product Category * Stimulus Number * Age	Pillai's Trace	.006	2.134 ^a	1.000	384.000	.145
	Wilks' Lambda	.994	2.134 ^a	1.000	384.000	.145
	Hotelling's Trace	.006	2.134 ^a	1.000	384.000	.145
	Roy's Largest Root	.006	2.134 ^a	1.000	384.000	.145
Product Category * Stimulus Number * Story	Pillai's Trace	.000	.060 ^a	2.000	384.000	.941
	Wilks' Lambda	1.000	.060 ^a	2.000	384.000	.941
	Hotelling's Trace	.000	.060 ^a	2.000	384.000	.941
	Roy's Largest Root	.000	.060 ^a	2.000	384.000	.941
Product Category * Stimulus Number * Novelty	Pillai's Trace	.001	.571 ^a	1.000	384.000	.450
	Wilks' Lambda	.999	.571 ^a	1.000	384.000	.450
	Hotelling's Trace	.001	.571 ^a	1.000	384.000	.450
	Roy's Largest Root	.001	.571 ^a	1.000	384.000	.450
Product Category * Stimulus Number * Story * Novelty	Pillai's Trace	.005	.973 ^a	2.000	384.000	.379
	Wilks' Lambda	.995	.973 ^a	2.000	384.000	.379
	Hotelling's Trace	.005	.973 ^a	2.000	384.000	.379
	Roy's Largest Root	.005	.973 ^a	2.000	384.000	.379

APPENDIX M. TABLE OF MULTIVARIATE RESULTS OF ANCOVA FOR AESTHETIC
JUDGMENT

Effect		Value	F	Hypothesis		
				df	Error df	Sig.
Product Category	Pillai's Trace	.031	12.273 ^a	1.000	387.000	.001
	Wilks' Lambda	.969	12.273 ^a	1.000	387.000	.001
	Hotelling's Trace	.032	12.273 ^a	1.000	387.000	.001
	Roy's Largest Root	.032	12.273 ^a	1.000	387.000	.001
Product Category * Age	Pillai's Trace	.006	2.309 ^a	1.000	387.000	.129
	Wilks' Lambda	.994	2.309 ^a	1.000	387.000	.129
	Hotelling's Trace	.006	2.309 ^a	1.000	387.000	.129
	Roy's Largest Root	.006	2.309 ^a	1.000	387.000	.129
Product Category * Story	Pillai's Trace	.005	.976 ^a	2.000	387.000	.378
	Wilks' Lambda	.995	.976 ^a	2.000	387.000	.378
	Hotelling's Trace	.005	.976 ^a	2.000	387.000	.378
	Roy's Largest Root	.005	.976 ^a	2.000	387.000	.378
Product Category * Novelty	Pillai's Trace	.008	3.288 ^a	1.000	387.000	.071
	Wilks' Lambda	.992	3.288 ^a	1.000	387.000	.071
	Hotelling's Trace	.008	3.288 ^a	1.000	387.000	.071
	Roy's Largest Root	.008	3.288 ^a	1.000	387.000	.071
Product Category * Story * Novelty	Pillai's Trace	.005	.974 ^a	2.000	387.000	.378
	Wilks' Lambda	.995	.974 ^a	2.000	387.000	.378
	Hotelling's Trace	.005	.974 ^a	2.000	387.000	.378
	Roy's Largest Root	.005	.974 ^a	2.000	387.000	.378
Stimulus Number	Pillai's Trace	.003	1.136 ^a	1.000	387.000	.287
	Wilks' Lambda	.997	1.136 ^a	1.000	387.000	.287
	Hotelling's Trace	.003	1.136 ^a	1.000	387.000	.287
	Roy's Largest Root	.003	1.136 ^a	1.000	387.000	.287
Stimulus Number * Age	Pillai's Trace	.004	1.686 ^a	1.000	387.000	.195
	Wilks' Lambda	.996	1.686 ^a	1.000	387.000	.195
	Hotelling's Trace	.004	1.686 ^a	1.000	387.000	.195
	Roy's Largest Root	.004	1.686 ^a	1.000	387.000	.195
Stimulus Number * Story	Pillai's Trace	.000	.074 ^a	2.000	387.000	.928
	Wilks' Lambda	1.000	.074 ^a	2.000	387.000	.928
	Hotelling's Trace	.000	.074 ^a	2.000	387.000	.928
	Roy's Largest Root	.000	.074 ^a	2.000	387.000	.928

Table continued

Stimulus Number * Novelty	Pillai's Trace	.024	9.535 ^a	1.000	387.000	.002
	Wilks' Lambda	.976	9.535 ^a	1.000	387.000	.002
	Hotelling's Trace	.025	9.535 ^a	1.000	387.000	.002
	Roy's Largest Root	.025	9.535 ^a	1.000	387.000	.002
Stimulus Number * Story * Novelty	Pillai's Trace	.004	.793 ^a	2.000	387.000	.453
	Wilks' Lambda	.996	.793 ^a	2.000	387.000	.453
	Hotelling's Trace	.004	.793 ^a	2.000	387.000	.453
	Roy's Largest Root	.004	.793 ^a	2.000	387.000	.453
Product Category * Stimulus Number	Pillai's Trace	.002	.617 ^a	1.000	387.000	.433
	Wilks' Lambda	.998	.617 ^a	1.000	387.000	.433
	Hotelling's Trace	.002	.617 ^a	1.000	387.000	.433
	Roy's Largest Root	.002	.617 ^a	1.000	387.000	.433
Product Category * Stimulus Number * Age	Pillai's Trace	.004	1.411 ^a	1.000	387.000	.236
	Wilks' Lambda	.996	1.411 ^a	1.000	387.000	.236
	Hotelling's Trace	.004	1.411 ^a	1.000	387.000	.236
	Roy's Largest Root	.004	1.411 ^a	1.000	387.000	.236
Product Category * Stimulus Number * Story	Pillai's Trace	.013	2.565 ^a	2.000	387.000	.078
	Wilks' Lambda	.987	2.565 ^a	2.000	387.000	.078
	Hotelling's Trace	.013	2.565 ^a	2.000	387.000	.078
	Roy's Largest Root	.013	2.565 ^a	2.000	387.000	.078
Product Category * Stimulus Number * Novelty	Pillai's Trace	.024	9.498 ^a	1.000	387.000	.002
	Wilks' Lambda	.976	9.498 ^a	1.000	387.000	.002
	Hotelling's Trace	.025	9.498 ^a	1.000	387.000	.002
	Roy's Largest Root	.025	9.498 ^a	1.000	387.000	.002
Product Category * Stimulus Number * Story * Novelty	Pillai's Trace	.004	.681 ^a	2.000	387.000	.507
	Wilks' Lambda	.996	.681 ^a	2.000	387.000	.507
	Hotelling's Trace	.004	.681 ^a	2.000	387.000	.507
	Roy's Largest Root	.004	.681 ^a	2.000	387.000	.507

APPENDIX N. TABLE OF MULTIVARIATE RESULTS OF ANCOVA FOR OBJECTIVE
AESTHETIC IMPRESSION

Effect		Value	F	Hypothesis		
				df	Error df	Sig.
Product Category	Pillai's Trace	.016	6.389 ^a	1.000	387.000	.012
	Wilks' Lambda	.984	6.389 ^a	1.000	387.000	.012
	Hotelling's Trace	.017	6.389 ^a	1.000	387.000	.012
	Roy's Largest Root	.017	6.389 ^a	1.000	387.000	.012
Product Category * Age	Pillai's Trace	.008	3.317 ^a	1.000	387.000	.069
	Wilks' Lambda	.992	3.317 ^a	1.000	387.000	.069
	Hotelling's Trace	.009	3.317 ^a	1.000	387.000	.069
	Roy's Largest Root	.009	3.317 ^a	1.000	387.000	.069
Product Category * Story	Pillai's Trace	.011	2.097 ^a	2.000	387.000	.124
	Wilks' Lambda	.989	2.097 ^a	2.000	387.000	.124
	Hotelling's Trace	.011	2.097 ^a	2.000	387.000	.124
	Roy's Largest Root	.011	2.097 ^a	2.000	387.000	.124
Product Category * Novelty	Pillai's Trace	.000	.021 ^a	1.000	387.000	.885
	Wilks' Lambda	1.000	.021 ^a	1.000	387.000	.885
	Hotelling's Trace	.000	.021 ^a	1.000	387.000	.885
	Roy's Largest Root	.000	.021 ^a	1.000	387.000	.885
Product Category * Story * Novelty	Pillai's Trace	.011	2.216 ^a	2.000	387.000	.110
	Wilks' Lambda	.989	2.216 ^a	2.000	387.000	.110
	Hotelling's Trace	.011	2.216 ^a	2.000	387.000	.110
	Roy's Largest Root	.011	2.216 ^a	2.000	387.000	.110
Stimulus Number	Pillai's Trace	.004	1.733 ^a	1.000	387.000	.189
	Wilks' Lambda	.996	1.733 ^a	1.000	387.000	.189
	Hotelling's Trace	.004	1.733 ^a	1.000	387.000	.189
	Roy's Largest Root	.004	1.733 ^a	1.000	387.000	.189
Stimulus Number * Age	Pillai's Trace	.006	2.270 ^a	1.000	387.000	.133
	Wilks' Lambda	.994	2.270 ^a	1.000	387.000	.133
	Hotelling's Trace	.006	2.270 ^a	1.000	387.000	.133
	Roy's Largest Root	.006	2.270 ^a	1.000	387.000	.133
Stimulus Number * Story	Pillai's Trace	.002	.451 ^a	2.000	387.000	.637
	Wilks' Lambda	.998	.451 ^a	2.000	387.000	.637
	Hotelling's Trace	.002	.451 ^a	2.000	387.000	.637
	Roy's Largest Root	.002	.451 ^a	2.000	387.000	.637

Stimulus Number * Novelty	Pillai's Trace	.010	4.031 ^a	1.000	387.000	.045
	Wilks' Lambda	.990	4.031 ^a	1.000	387.000	.045
	Hotelling's Trace	.010	4.031 ^a	1.000	387.000	.045
	Roy's Largest Root	.010	4.031 ^a	1.000	387.000	.045
Stimulus Number * Story * Novelty	Pillai's Trace	.002	.473 ^a	2.000	387.000	.624
	Wilks' Lambda	.998	.473 ^a	2.000	387.000	.624
	Hotelling's Trace	.002	.473 ^a	2.000	387.000	.624
	Roy's Largest Root	.002	.473 ^a	2.000	387.000	.624
Product Category * Stimulus Number	Pillai's Trace	.001	.281 ^a	1.000	387.000	.596
	Wilks' Lambda	.999	.281 ^a	1.000	387.000	.596
	Hotelling's Trace	.001	.281 ^a	1.000	387.000	.596
	Roy's Largest Root	.001	.281 ^a	1.000	387.000	.596
Product Category * Stimulus Number * Age	Pillai's Trace	.004	1.388 ^a	1.000	387.000	.239
	Wilks' Lambda	.996	1.388 ^a	1.000	387.000	.239
	Hotelling's Trace	.004	1.388 ^a	1.000	387.000	.239
	Roy's Largest Root	.004	1.388 ^a	1.000	387.000	.239
Product Category * Stimulus Number * Story	Pillai's Trace	.002	.348 ^a	2.000	387.000	.706
	Wilks' Lambda	.998	.348 ^a	2.000	387.000	.706
	Hotelling's Trace	.002	.348 ^a	2.000	387.000	.706
	Roy's Largest Root	.002	.348 ^a	2.000	387.000	.706
Product Category * Stimulus Number * Novelty	Pillai's Trace	.038	15.404 ^a	1.000	387.000	.000
	Wilks' Lambda	.962	15.404 ^a	1.000	387.000	.000
	Hotelling's Trace	.040	15.404 ^a	1.000	387.000	.000
	Roy's Largest Root	.040	15.404 ^a	1.000	387.000	.000
Product Category * Stimulus Number * Story * Novelty	Pillai's Trace	.004	.698 ^a	2.000	387.000	.498
	Wilks' Lambda	.996	.698 ^a	2.000	387.000	.498
	Hotelling's Trace	.004	.698 ^a	2.000	387.000	.498
	Roy's Largest Root	.004	.698 ^a	2.000	387.000	.498

APPENDIX O. TABLE OF MULTIVARIATE RESULTS OF ANCOVA FOR SUBJECTIVE
AESTHETIC ASSOCIATION

Effect		Value	F	Hypothesis		
				df	Error df	Sig.
Product Category	Pillai's Trace	.015	5.869 ^a	1.000	387.000	.016
	Wilks' Lambda	.985	5.869 ^a	1.000	387.000	.016
	Hotelling's Trace	.015	5.869 ^a	1.000	387.000	.016
	Roy's Largest Root	.015	5.869 ^a	1.000	387.000	.016
Product Category * Age	Pillai's Trace	.002	.945 ^a	1.000	387.000	.331
	Wilks' Lambda	.998	.945 ^a	1.000	387.000	.331
	Hotelling's Trace	.002	.945 ^a	1.000	387.000	.331
	Roy's Largest Root	.002	.945 ^a	1.000	387.000	.331
Product Category * Story	Pillai's Trace	.004	.724 ^a	2.000	387.000	.485
	Wilks' Lambda	.996	.724 ^a	2.000	387.000	.485
	Hotelling's Trace	.004	.724 ^a	2.000	387.000	.485
	Roy's Largest Root	.004	.724 ^a	2.000	387.000	.485
Product Category * Novelty	Pillai's Trace	.009	3.465 ^a	1.000	387.000	.063
	Wilks' Lambda	.991	3.465 ^a	1.000	387.000	.063
	Hotelling's Trace	.009	3.465 ^a	1.000	387.000	.063
	Roy's Largest Root	.009	3.465 ^a	1.000	387.000	.063
Product Category * Story * Novelty	Pillai's Trace	.010	1.888 ^a	2.000	387.000	.153
	Wilks' Lambda	.990	1.888 ^a	2.000	387.000	.153
	Hotelling's Trace	.010	1.888 ^a	2.000	387.000	.153
	Roy's Largest Root	.010	1.888 ^a	2.000	387.000	.153
Stimulus Number	Pillai's Trace	.005	1.966 ^a	1.000	387.000	.162
	Wilks' Lambda	.995	1.966 ^a	1.000	387.000	.162
	Hotelling's Trace	.005	1.966 ^a	1.000	387.000	.162
	Roy's Largest Root	.005	1.966 ^a	1.000	387.000	.162
Stimulus Number * Age	Pillai's Trace	.009	3.460 ^a	1.000	387.000	.064
	Wilks' Lambda	.991	3.460 ^a	1.000	387.000	.064
	Hotelling's Trace	.009	3.460 ^a	1.000	387.000	.064
	Roy's Largest Root	.009	3.460 ^a	1.000	387.000	.064
Stimulus Number * Story	Pillai's Trace	.006	1.081 ^a	2.000	387.000	.340
	Wilks' Lambda	.994	1.081 ^a	2.000	387.000	.340
	Hotelling's Trace	.006	1.081 ^a	2.000	387.000	.340
	Roy's Largest Root	.006	1.081 ^a	2.000	387.000	.340

Stimulus Number * Novelty	Pillai's Trace	.009	3.465 ^a	1.000	387.000	.063
	Wilks' Lambda	.991	3.465 ^a	1.000	387.000	.063
	Hotelling's Trace	.009	3.465 ^a	1.000	387.000	.063
	Roy's Largest Root	.009	3.465 ^a	1.000	387.000	.063
Stimulus Number * Story * Novelty	Pillai's Trace	.012	2.445 ^a	2.000	387.000	.088
	Wilks' Lambda	.988	2.445 ^a	2.000	387.000	.088
	Hotelling's Trace	.013	2.445 ^a	2.000	387.000	.088
	Roy's Largest Root	.013	2.445 ^a	2.000	387.000	.088
Product Category * Stimulus Number	Pillai's Trace	.002	.598 ^a	1.000	387.000	.440
	Wilks' Lambda	.998	.598 ^a	1.000	387.000	.440
	Hotelling's Trace	.002	.598 ^a	1.000	387.000	.440
	Roy's Largest Root	.002	.598 ^a	1.000	387.000	.440
Product Category * Stimulus Number * Age	Pillai's Trace	.002	.589 ^a	1.000	387.000	.443
	Wilks' Lambda	.998	.589 ^a	1.000	387.000	.443
	Hotelling's Trace	.002	.589 ^a	1.000	387.000	.443
	Roy's Largest Root	.002	.589 ^a	1.000	387.000	.443
Product Category * Stimulus Number * Story	Pillai's Trace	.001	.142 ^a	2.000	387.000	.868
	Wilks' Lambda	.999	.142 ^a	2.000	387.000	.868
	Hotelling's Trace	.001	.142 ^a	2.000	387.000	.868
	Roy's Largest Root	.001	.142 ^a	2.000	387.000	.868
Product Category * Stimulus Number * Novelty	Pillai's Trace	.003	1.211 ^a	1.000	387.000	.272
	Wilks' Lambda	.997	1.211 ^a	1.000	387.000	.272
	Hotelling's Trace	.003	1.211 ^a	1.000	387.000	.272
	Roy's Largest Root	.003	1.211 ^a	1.000	387.000	.272
Product Category * Stimulus Number * Story * Novelty	Pillai's Trace	.002	.468 ^a	2.000	387.000	.627
	Wilks' Lambda	.998	.468 ^a	2.000	387.000	.627
	Hotelling's Trace	.002	.468 ^a	2.000	387.000	.627
	Roy's Largest Root	.002	.468 ^a	2.000	387.000	.627

(Continued)

APPENDIX P. TABLE OF MULTIVARIATE RESULTS OF ANCOVA WITH TYPE OF
COGNITIVE RESPONSE AS AN ADDITIONAL WITHIN-SUBJECTS FACTOR

Effect		Value	F	Hypothesis		
				df	Error df	Sig.
Product Category	Pillai's Trace	.018	6.991 ^a	1.000	387.000	.009
	Wilks' Lambda	.982	6.991 ^a	1.000	387.000	.009
	Hotelling's Trace	.018	6.991 ^a	1.000	387.000	.009
	Roy's Largest Root	.018	6.991 ^a	1.000	387.000	.009
Product Category * Age	Pillai's Trace	.006	2.253 ^a	1.000	387.000	.134
	Wilks' Lambda	.994	2.253 ^a	1.000	387.000	.134
	Hotelling's Trace	.006	2.253 ^a	1.000	387.000	.134
	Roy's Largest Root	.006	2.253 ^a	1.000	387.000	.134
Product Category * Story	Pillai's Trace	.008	1.511 ^a	2.000	387.000	.222
	Wilks' Lambda	.992	1.511 ^a	2.000	387.000	.222
	Hotelling's Trace	.008	1.511 ^a	2.000	387.000	.222
	Roy's Largest Root	.008	1.511 ^a	2.000	387.000	.222
Product Category * Novelty	Pillai's Trace	.002	.798 ^a	1.000	387.000	.372
	Wilks' Lambda	.998	.798 ^a	1.000	387.000	.372
	Hotelling's Trace	.002	.798 ^a	1.000	387.000	.372
	Roy's Largest Root	.002	.798 ^a	1.000	387.000	.372
Product Category * Story * Novelty	Pillai's Trace	.012	2.273 ^a	2.000	387.000	.104
	Wilks' Lambda	.988	2.273 ^a	2.000	387.000	.104
	Hotelling's Trace	.012	2.273 ^a	2.000	387.000	.104
	Roy's Largest Root	.012	2.273 ^a	2.000	387.000	.104
Stimulus Number	Pillai's Trace	.006	2.185 ^a	1.000	387.000	.140
	Wilks' Lambda	.994	2.185 ^a	1.000	387.000	.140
	Hotelling's Trace	.006	2.185 ^a	1.000	387.000	.140
	Roy's Largest Root	.006	2.185 ^a	1.000	387.000	.140
Stimulus Number * Age	Pillai's Trace	.009	3.344 ^a	1.000	387.000	.068
	Wilks' Lambda	.991	3.344 ^a	1.000	387.000	.068
	Hotelling's Trace	.009	3.344 ^a	1.000	387.000	.068
	Roy's Largest Root	.009	3.344 ^a	1.000	387.000	.068
Stimulus Number * Story	Pillai's Trace	.002	.397 ^a	2.000	387.000	.673
	Wilks' Lambda	.998	.397 ^a	2.000	387.000	.673
	Hotelling's Trace	.002	.397 ^a	2.000	387.000	.673
	Roy's Largest Root	.002	.397 ^a	2.000	387.000	.673

Stimulus Number * Novelty	Pillai's Trace	.011	4.437 ^a	1.000	387.000	.036
	Wilks' Lambda	.989	4.437 ^a	1.000	387.000	.036
	Hotelling's Trace	.011	4.437 ^a	1.000	387.000	.036
	Roy's Largest Root	.011	4.437 ^a	1.000	387.000	.036
Stimulus Number * Story * Novelty	Pillai's Trace	.007	1.451 ^a	2.000	387.000	.236
	Wilks' Lambda	.993	1.451 ^a	2.000	387.000	.236
	Hotelling's Trace	.007	1.451 ^a	2.000	387.000	.236
	Roy's Largest Root	.007	1.451 ^a	2.000	387.000	.236
Cognitive Response	Pillai's Trace	.027	10.555 ^a	1.000	387.000	.001
	Wilks' Lambda	.973	10.555 ^a	1.000	387.000	.001
	Hotelling's Trace	.027	10.555 ^a	1.000	387.000	.001
	Roy's Largest Root	.027	10.555 ^a	1.000	387.000	.001
Cognitive Response * Age	Pillai's Trace	.002	.808 ^a	1.000	387.000	.369
	Wilks' Lambda	.998	.808 ^a	1.000	387.000	.369
	Hotelling's Trace	.002	.808 ^a	1.000	387.000	.369
	Roy's Largest Root	.002	.808 ^a	1.000	387.000	.369
Cognitive Response * Story	Pillai's Trace	.043	8.727 ^a	2.000	387.000	.000
	Wilks' Lambda	.957	8.727 ^a	2.000	387.000	.000
	Hotelling's Trace	.045	8.727 ^a	2.000	387.000	.000
	Roy's Largest Root	.045	8.727 ^a	2.000	387.000	.000
Cognitive Response * Novelty	Pillai's Trace	.159	73.306 ^a	1.000	387.000	.000
	Wilks' Lambda	.841	73.306 ^a	1.000	387.000	.000
	Hotelling's Trace	.189	73.306 ^a	1.000	387.000	.000
	Roy's Largest Root	.189	73.306 ^a	1.000	387.000	.000
Cognitive Response * Story * Novelty	Pillai's Trace	.003	.587 ^a	2.000	387.000	.557
	Wilks' Lambda	.997	.587 ^a	2.000	387.000	.557
	Hotelling's Trace	.003	.587 ^a	2.000	387.000	.557
	Roy's Largest Root	.003	.587 ^a	2.000	387.000	.557
Product Category * Stimulus Number	Pillai's Trace	.001	.512 ^a	1.000	387.000	.475
	Wilks' Lambda	.999	.512 ^a	1.000	387.000	.475
	Hotelling's Trace	.001	.512 ^a	1.000	387.000	.475
	Roy's Largest Root	.001	.512 ^a	1.000	387.000	.475

Product Category *	Pillai's Trace	.003	1.164 ^a	1.000	387.000	.281
Stimulus Number *	Wilks' Lambda	.997	1.164 ^a	1.000	387.000	.281
Age	Hotelling's Trace	.003	1.164 ^a	1.000	387.000	.281
	Roy's Largest Root	.003	1.164 ^a	1.000	387.000	.281
Product Category *	Pillai's Trace	.001	.225 ^a	2.000	387.000	.798
Stimulus Number *	Wilks' Lambda	.999	.225 ^a	2.000	387.000	.798
Story	Hotelling's Trace	.001	.225 ^a	2.000	387.000	.798
	Roy's Largest Root	.001	.225 ^a	2.000	387.000	.798
Product Category *	Pillai's Trace	.020	7.895 ^a	1.000	387.000	.005
Stimulus Number *	Wilks' Lambda	.980	7.895 ^a	1.000	387.000	.005
Novelty	Hotelling's Trace	.020	7.895 ^a	1.000	387.000	.005
	Roy's Largest Root	.020	7.895 ^a	1.000	387.000	.005
Product Category *	Pillai's Trace	.001	.171 ^a	2.000	387.000	.843
Stimulus Number *	Wilks' Lambda	.999	.171 ^a	2.000	387.000	.843
Story * Novelty	Hotelling's Trace	.001	.171 ^a	2.000	387.000	.843
	Roy's Largest Root	.001	.171 ^a	2.000	387.000	.843
Product Category *	Pillai's Trace	.000	.090 ^a	1.000	387.000	.765
Cognitive Response	Wilks' Lambda	1.000	.090 ^a	1.000	387.000	.765
	Hotelling's Trace	.000	.090 ^a	1.000	387.000	.765
	Roy's Largest Root	.000	.090 ^a	1.000	387.000	.765
Product Category *	Pillai's Trace	.004	1.671 ^a	1.000	387.000	.197
Cognitive Response *	Wilks' Lambda	.996	1.671 ^a	1.000	387.000	.197
Age	Hotelling's Trace	.004	1.671 ^a	1.000	387.000	.197
	Roy's Largest Root	.004	1.671 ^a	1.000	387.000	.197
Product Category *	Pillai's Trace	.005	.933 ^a	2.000	387.000	.394
Cognitive Response *	Wilks' Lambda	.995	.933 ^a	2.000	387.000	.394
Story	Hotelling's Trace	.005	.933 ^a	2.000	387.000	.394
	Roy's Largest Root	.005	.933 ^a	2.000	387.000	.394
Product Category *	Pillai's Trace	.020	7.864 ^a	1.000	387.000	.005
Cognitive Response *	Wilks' Lambda	.980	7.864 ^a	1.000	387.000	.005
Novelty	Hotelling's Trace	.020	7.864 ^a	1.000	387.000	.005
	Roy's Largest Root	.020	7.864 ^a	1.000	387.000	.005

Product Category *	Pillai's Trace	.003	.536 ^a	2.000	387.000	.586
Cognitive Response *	Wilks' Lambda	.997	.536 ^a	2.000	387.000	.586
Story * Novelty	Hotelling's Trace	.003	.536 ^a	2.000	387.000	.586
	Roy's Largest	.003	.536 ^a	2.000	387.000	.586
	Root					
Stimulus Number *	Pillai's Trace	.000	.003 ^a	1.000	387.000	.958
Cognitive Response	Wilks' Lambda	1.000	.003 ^a	1.000	387.000	.958
	Hotelling's Trace	.000	.003 ^a	1.000	387.000	.958
	Roy's Largest	.000	.003 ^a	1.000	387.000	.958
	Root					
Stimulus Number *	Pillai's Trace	.000	.143 ^a	1.000	387.000	.705
Cognitive Response *	Wilks' Lambda	1.000	.143 ^a	1.000	387.000	.705
Age	Hotelling's Trace	.000	.143 ^a	1.000	387.000	.705
	Roy's Largest	.000	.143 ^a	1.000	387.000	.705
	Root					
Stimulus Number *	Pillai's Trace	.014	2.705 ^a	2.000	387.000	.068
Cognitive Response *	Wilks' Lambda	.986	2.705 ^a	2.000	387.000	.068
Story	Hotelling's Trace	.014	2.705 ^a	2.000	387.000	.068
	Roy's Largest	.014	2.705 ^a	2.000	387.000	.068
	Root					
Stimulus Number *	Pillai's Trace	.000	.070 ^a	1.000	387.000	.792
Cognitive Response *	Wilks' Lambda	1.000	.070 ^a	1.000	387.000	.792
Novelty	Hotelling's Trace	.000	.070 ^a	1.000	387.000	.792
	Roy's Largest	.000	.070 ^a	1.000	387.000	.792
	Root					
Stimulus Number *	Pillai's Trace	.007	1.297 ^a	2.000	387.000	.275
Cognitive Response *	Wilks' Lambda	.993	1.297 ^a	2.000	387.000	.275
Story * Novelty	Hotelling's Trace	.007	1.297 ^a	2.000	387.000	.275
	Roy's Largest	.007	1.297 ^a	2.000	387.000	.275
	Root					
Product Category *	Pillai's Trace	.000	.063 ^a	1.000	387.000	.803
Stimulus Number *	Wilks' Lambda	1.000	.063 ^a	1.000	387.000	.803
Cognitive Response	Hotelling's Trace	.000	.063 ^a	1.000	387.000	.803
	Roy's Largest	.000	.063 ^a	1.000	387.000	.803
	Root					
Product Category *	Pillai's Trace	.001	.293 ^a	1.000	387.000	.588
Stimulus Number *	Wilks' Lambda	.999	.293 ^a	1.000	387.000	.588
Cognitive Response *	Hotelling's Trace	.001	.293 ^a	1.000	387.000	.588
Age	Roy's Largest	.001	.293 ^a	1.000	387.000	.588
	Root					

Product Category *	Pillai's Trace	.002	.364 ^a	2.000	387.000	.695
Stimulus Number *	Wilks' Lambda	.998	.364 ^a	2.000	387.000	.695
Cognitive Response *	Hotelling's Trace	.002	.364 ^a	2.000	387.000	.695
Story	Roy's Largest	.002	.364 ^a	2.000	387.000	.695
	Root					
Product Category *	Pillai's Trace	.150	2.815 ^a	1.000	387.000	.075
Stimulus Number *	Wilks' Lambda	.990	2.815 ^a	1.000	387.000	.075
Cognitive Response *	Hotelling's Trace	.150	2.815 ^a	1.000	387.000	.075
Novelty	Roy's Largest	.150	2.815 ^a	1.000	387.000	.075
	Root					
Product Category *	Pillai's Trace	.013	2.503 ^a	2.000	387.000	.083
Stimulus Number *	Wilks' Lambda	.987	2.503 ^a	2.000	387.000	.083
Cognitive Response *	Hotelling's Trace	.013	2.503 ^a	2.000	387.000	.083
Story * Novelty	Roy's Largest	.013	2.503 ^a	2.000	387.000	.083
	Root					

APPENDIX Q. IMAGE CREDITS

Symbolic/Expressive Stories:

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