A DESIGNERLY APPROACH TO THE DEVELOPMENT OF BRAND EXTENSIONS

BRIDGING THE DIVIDE BETWEEN BEHAVIOURAL RESEARCH AND DESIGN SCIENCE

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DISSERTATION

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Voor mama
Summary

Everything around us has been designed. All designs created by human beings consist of ‘explicit cues’ that convey a certain story to help us understand what we experience. Companies use such explicit cues to build strong brands through which they aim to convince consumers by creating a meaningful and recognisable experience. By building on the recognisability of an existing brand, companies try to reduce risk when introducing new products and minimize brand start-up costs. Creating a product under an existing brand is termed a brand extension. However, launching brand extensions still involves great uncertainty and brand extension success cannot be taken for granted. In the existing literature, this challenge of developing brand extensions is studied mainly within individual disciplines, focusing on strategies or processes (innovation management) and consumer behaviour (marketing research). However, hardly any attention has yet been paid to the most important factor in this process: the design of the brand extension itself. This thesis therefore presents a new approach to developing brand extensions, focusing on the design and the designers who are responsible in creating such brand extensions. This thesis combines the knowledge from and approaches of three distinct research domains into a new overarching framework. To help reach this framework, two central research questions were posed and addressed:

1. Which factors, influenced by designers, affect the success of a brand extension?
2. How can designers be supported in influencing these factors to create successful brand extensions?

The first phase of this study examines how the literature within the research disciplines of innovation management and marketing currently influence the design of brand extensions. It also examines how these disciplines relate to the current practice of design. During this research phase, a ‘research-through-design’ methodology was used, leading to new insights into the complex topic of brand extensions. By introducing these new insights into the annual educational cycle, a ‘living lab’ was created that led to the development of a new framework and a supporting teaching program. This led to successful brand extensions from the perspectives of the brand extension designers. The ‘designerly approach’ from the living lab was accompanied by behavioural studies that evaluated potential consumers’ responses to the brand extension designs that had been created.

The response to the first research question revealed three factors that play important roles in designing successful brand extensions. One of these factors is ‘brand fit’. The relevance of brand fit is recognised in the current literature. However, the link of brand fit to the envisaged design is rarely discussed. Scholars mainly consider the type of brand extension that is to be designed, whereas the actual design of the brand extension itself is regarded as a ‘black box’. Several studies explain the importance of the semantic translation of brand values into explicit product characteristics, and highlight both the necessity and the complexity for designers to act upon this.

The following research phase led to an initial response to the second research question. The ‘Brand Translation Prism’ is a newly developed designer-focused model that explicitly connects physical product characteristics, symbolic associations and the overarching core values of the brand. The subdivision of physical product characteristics into three categories (2D, 3D and 2.5D) in the Brand Translation Prism leads to a clear overview of all the recognisable characteristics of a brand, where the newly introduced 2.5D category represents the transition between 2D and 3D elements. The Brand Translation Prism was evaluated by over 900 students at the University of Twente and the University of Antwerp, resulting in recognizable brand extensions with a strong connection to the values of the parent brand. The 2.5D features, also known as graphical elements, seem to be an effective way of conveying the core values of an existing brand to new products.

The two other factors that play a crucial role in designing successful brand extensions are ‘typicality’ and ‘novelty’. Building on the work of Hekkert et al (2003), the hypothesis follows that the joint influence of typicality and novelty should lead to brand extensions that are more successful. However, because various studies show that typicality can refer to both the brand (brand fit) and the extension (product typicality), the interplay of all three factors is complex. Thus, it appears that the influence of brand fit can be used as a suppressor or amplifier in the interplay of typicality and novelty. From the results of a large empirical study, in which a total of 81 snowmobile designs were evaluated as potential brand extensions by 47 professionals, it appeared that respondents used brand-related attributes as antitheses to novelty or as reinforcers of typicality. Therefore, the new concept of ‘brand typicality’ - combining the terms product typicality and brand fit - ultimately proved to be a better predictor of expected market success.

The response to the second research question was twofold. Our research led to the development of an overarching teaching programme which, in addition to the Brand Identity Prism, was extended by the introduction of the ‘Triangular Designer Space’. This is a newly developed model of a design space in which the determinants of typicality, novelty and brand fit jointly influence the success of brand extensions. How designers ‘play’ with these determinants in the design space depends on the brand and the type of brand extension. For a brand that has a more authentic character, the design space is more limited than for a brand focused on expressing innovation. On the other hand, the design space is wider for multitype extensions than for archetype extensions. Therefore, explicitly mapping the three determinants in the triangular space makes it easier for the designer to evaluate feasible design solutions.

The Brand Translation Prism gives future Brand Extension Designers guidance on carefully analysing the relevant factors for the development of a successful brand extension. The Triangular Designer Space thereby gives the designer the creative freedom to develop and balance these factors in an optimum way. Together, the two models make for a well-stocked toolbox for developing successful brand extensions.
Samenvatting

Alles om ons heen is ontworpen. Daarbij bestaan alle ontwerpen die door mensen zijn gemaakt in feite uit ‘expliciete aanwijzingen’ die een verhaal overbrengen om ons als gebruikers te helpen om te begrijpen wat we ervaren. Bedrijven gebruiken zulke expliciete aanwijzingen om een sterk merk te bouwen en ons als consument aan zich te binden met een duidelijk herkenbare ervaring. Door voort te borden op de herkenbaarheid van een bestaand merk proberen bedrijven het risico bij het introduceren van nieuwe producten te verkleinen en hoge merkopstartkosten te voorkomen. Het introduceren van een nieuw product onder de vlag van een bestaand merk heet merkextensie. Het lanceren van merkextensies gaat echter nog steeds gepaard met grote onzekerheden en het is niet vanzelfsprekend dat deze merkextensies ook een succes zullen worden. In de bestaande literatuur wordt dit probleem voornamelijk bestudeerd vanuit individuele disciplines, waarbij de ene kant de strategie of het proces wordt bekeken (innovatiemanagement) en de andere kant het gedrag van de consument (marketingonderzoek). Echter, er wordt nauwelijks aandacht besteed aan het belangrijkste element in dit proces: de merkextensie zelf. Dit proefschrift presenteert daarom een nieuwe benadering voor het ontwikkelen van merkextensies, waarbij het ontwerp en de ontwerper van deze merkextensies centraal staat. Daartoe worden in dit proefschrift de kennis en aanpak van drie afzonderlijke onderzoeksgebieden samengevoegd tot een overkoepelend framework. Om tot dit overkoepelende framework te komen zijn twee centrale onderzoeksvragen beantwoord:

(1) Welke factoren die door de ontwerper kunnen worden beïnvloed leiden tot succesvolle merkextensies?
(2) Op welke manier kan de ontwerper het beste ondersteund worden bij het ontwerpen van succesvolle merkextensies?

In de eerste fase van het onderzoek is gekeken op welke manier de huidige literatuur binnen de twee onderzoeksdisciplines innovatiemanagement en marketing invloed heeft op het ontwerp van merk extensies. Daarnaast is onderzocht hoe deze disciplines zich verhouden. Tijdens deze onderzoeksfase is een ‘research through design’-methodologie gebruikt, die heeft geleid tot nieuwe inzichten in de complexiteit van het thema merkextensies. De reactie van de twee onderzoeksdisciplines op het ontwerp van merkextensies is een van deze inzichten in te brengen in de jaarlijkse onderwijscyclus, ontstond er een ‘living lab’ dat uiteindelijk heeft geleid tot de ontwikkeling van een framework en een ondersteunend lesprogramma die werken als handvatten voor de ontwikkeling van succesvolle merkextensies vanuit het perspectief van de merkextensie ontwerper. De ‘designerly approach’ uit het living lab is steeds afgewisseld met gedragswetenschappelijke studies waarin de reactie van het publiek op de gemaakte ontwerpen van de merkextensies is gerealiseerd.

Het antwoord op de eerste onderzoeksvraag bestaat uit drie factoren die een belangrijke rol spelen in het ontwerpen van succesvolle merkextensies. Een van deze factoren is ‘brand fit’. De relevantie van brand fit in relatie tot merk extensies, wordt in de literatuur erkend, echter de koppeling van brand fit met het te maken ontwerp zelf wordt nauwelijks bediscussieerd. Men beschouwt vooral het type merkextensie dat moet worden ontworpen, waarbij het daadwerkelijke ontwerp van de merkextensie zelf als ‘black box’ wordt gezien. Een aantal studies richt zich op de semantische vertaling van merkwaarden in expliciete productkenmerken en benoemt de noodzakelijkheid, maar ook de complexiteit van dit onderwerp.

Dit deel van het onderzoek heeft geleid tot een eerste antwoord op de tweede onderzoeksvraag. Het ‘Brand Translation Prism’ is een hulpmiddel voor ontwerpers, waarin expliciet een verbinding wordt gemaakt tussen fysieke productkenmerken, symbolische associaties en de overkoepelende kernwaarden van het merk. De in het Brand Translation Prism gemaakte ondervinding van fysieke product kenmerken in drie categorieën (2D, 3D en 2.5D) leidt tot een helder overzicht van alle herkenbare karakteristieken van een merk. De nieuw geïntroduceerde categorie 2.5D vertegenwoordigt daarbij de overgang tussen 2D en 3D elementen. Het Brand Translation Prism is door ruim 500 studenten van de Universiteit Twente en de Universiteit Antwerpen gegerealiseerd, resulterend in herkenbare merkextensies met een sterke verbinding tot de kernwaarden van het moederland. De ook wel grafische elementen genoemde 2.5D-kenmerken blijken een effectieve manier te zijn om de kernwaarden van een merk over te brengen op nieuwe producten.

De twee andere factoren die een bepalende rol spelen in het ontwerpen van succesvolle merkextensies zijn ‘typicality’ en ‘novelty’. Voortbouwend op het werk van Hekkert et al. (2003) volgt de hypothese dat de gezamenlijke invloed van typicality en novelty zou moeten leiden tot meer succesvolle merkextensies. Omdat de verschillende testen blijkt dat herkenbaarheid zowel kan slaan op het merk (brand fit) als op de extensie (product typicality) is het samenspel van de drie factoren echter niet eenduidig. Zo blijkt de invloed van brand fit te kunnen worden gebruikt als onderdrukker of versterker in het samenspel van typicality en novelty. Uit de resultaten van een grote empirische studie, waarbij in totaal 81 ontwerpen van een sneeuwscooter als merkextensie geëvalueerd werden door 47 professionals, volgt dat de respondenten merkgerelateerde kenmerken gebruiken als tegenpoel voor novelty of als versterker voor typicality. De nieuwe term ‘brand typicality’ - waarbij de termen product typicality en brand fit zijn gecombineerd - blijkt daarom uiteindelijk een betere voorspeller te zijn voor verwacht marktsucces.

Het antwoord op de tweede onderzoeksvraag is tweeledig. De thesis heeft geleid tot de ontwikkeling van een eerste antwoord op de tweede onderzoeksvraag. Het ‘Brand Translation Prism’ is een hulpmiddel voor ontwerpers, waarin expliciet een verbinding wordt gemaakt tussen fysieke productkenmerken, symbolische associaties en de overkoepelende kernwaarden van het merk. De in het Brand Translation Prism gemaakte ondervinding van fysieke product kenmerken in drie categorieën (2D, 3D en 2.5D) leidt tot een helder overzicht van alle herkenbare karakteristieken van een merk. De nieuw geïntroduceerde categorie 2.5D vertegenwoordigt daarbij de overgang tussen 2D en 3D elementen. Het Brand Translation Prism is door ruim 500 studenten van de Universiteit Twente en de Universiteit Antwerpen gegerealiseerd, resulterend in herkenbare merkextensies met een sterke verbinding tot de kernwaarden van het moederland. De ook wel grafische elementen genoemde 2.5D-kenmerken blijken een effectieve manier te zijn om de kernwaarden van een merk over te brengen op nieuwe producten.
explicit in kaart brengen van de drie determinanten in de Triangular Designer Space maakt het voor de ontwerper daarbij gemakkelijker om mogelijke ontwerpopplossingen te evalueren. Tegelijkertijd bevordert het de communicatie met designmanagers ten behoeve van een grondiger besluitvorming.

De Brand Translation Prism geeft de toekomstige merkextensieontwerper houvast bij het zorgvuldig analyseren van de relevante factoren voor de ontwikkeling van een sterke merk. De Triangular Designer Space geeft de ontwerper daarbij de creatieve vrijheid om deze factoren afgewogen te ontwikkelen. Samen vormen de twee modellen een goed gevolde gereedschapskist voor het ontwikkelen van succesvolle marktintroducties.

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CHAPTER I  Introduction
CHAPTER 1

Introduction

1.1 The nature of brand extensions

One rainy morning I was blow-drying my hair, when suddenly my hair dryer failed. With reluctance, I went to a local shop looking for a new hair dryer. On entering the shop, I was overwhelmed by the huge number of different hair dryers that were for sale. There was a row of 20 meters with all kinds of models. All hair dryers had more or less the same functional characteristics and also all of the hair dryers had similar appearances: a curved cone connected to a handle. Of course, the styling and the colours hair dryers differed, but the main form of the product was the same. At the far end of the row, a dark grey aluminium hair dryer with purple colour accents caught my attention. That odd-looking product was the Dyson Supersonic hair dryer (Figure 1.1) and had a completely different styling than any of the others. I was surprised to encounter the Dyson brand name, because they are usually associated with vacuum cleaners. However, this quite expensive hair dryer was one of the newest Dyson innovations. The difference in price was enormous (€399 versus other designs varying between €40-80), which gave me the feeling that this must be a very exclusive and innovative hair dryer. Not only the colours but the complete design looked different. The design of this hair dryer consisted of a sleek cone and a handle in a different ratio compared to that of the competitors. Furthermore, it did not reveal any of the technical parts inside of the cone that enables the device to actually blow air: the inner cone was even completely hollow. Initially that gave me the feeling that it might not even work, because the difference with other hair dryers was quite acute. However, the product was displayed as a show model for consumers to try out. While testing the product, I found that the blowing action was actually very powerful. The packaging claimed that Dyson integrates an intelligent sensor that regulates heat and thus protects the hair from damage due to excessive temperatures. When holding the product, I realised Dyson was quite successful in integrating the newest technology in its well-regarded vacuum cleaners, performing their tasks in an excellent way. I also experienced the materials and details of the hair dryer. It really felt like an exclusive product that combined carefully designed buttons and purple colour accents resulting in a sturdy, sophisticated and exclusive design. The aesthetics in combination with the integration of the newest Dyson technology really intrigued me and made me consider actually buying this hair dryer. This more sturdy design might also be indicative of a more durable product.

Using this auto-hermeneutic approach by placing ourselves at the centre of observation as a customer, permits us to immerse ourselves in this experience in its purest form and receive a better understanding of the deeper levels of the customer experience journey (Sahhar, 2021). The descriptive richness of this example enables us to quickly understand the focus of this thesis and easily relate to the bigger picture. This example illustrates the effect of the aesthetics of new innovations on the process of acceptance by potential buyers. By building on brand equity (Aaker, 1991), Dyson may convince consumers to spend about €399 on this brand extension. However, will consumers buy this really expensive brand innovation by Dyson because of the brand name?
In the case of Dyson, this ‘cone-less’ hair dryer follows on from the ‘bag-less’ vacuum cleaner in building on their brand identity in creating their own corresponding design language. Yet it still remains unclear whether the success of this brand extension is based on the identity of the brand and to what extent the design of the hair dryer should build on the design language of previous product categories such as Dyson’s vacuum cleaners (Fedorikhin et al., 2008). The other aspect that has been made clear through this example is the categorisation of objects (Fiske & Pavelchak, 1986; Loken et al., 2008; Meyers-Levy & Tybout, 1989). According to the categorisation theory, consumers first attempt to classify an object within a certain product category in order to evaluate and (possibly) accept a product design. What Muller (2001) refers to as structural design, focuses on the main silhouette of the product. The structural design of the hair dryer in this example enables consumers to categorize this product by recognizing a cone and handle. However, the emptiness of the cone illustrates the difficulty in recognizing all aspects of the product category, leading to uncertainty regarding the likely performance of the product (Meyers-Levy & Tybout, 1986; Veryzer & Hutchinson, 1998). This example illustrates the importance of the visual appearance of products and emphasizes the delicate balance between recognizing the structural design of a specific product category (is it still a hair dryer?) and using the design language of the brand (does this hair dryer reflect Dyson?). The aesthetic appearance of the product influences the acceptance of these products and plays an important role in balancing between these two aspects.

Dyson started developing vacuum cleaners in the 1980s. After a very long process of experimenting with a completely new technology, they finally launched their first ‘bagless’ vacuum cleaner, the DC01, in the 1990s. After the successful introduction of this different-looking vacuum cleaner, they were able to expand their portfolio quickly by developing hand dryers, fans, air purifiers, robot vacuums and hair dryers. Recently, they were even working on developing an electric car. The company used their focus on innovation and their strong visual identity to develop new products (Dyson, 2022b).

Starting with vacuum cleaners, Dyson introduced an alternative technology (bagless vacuum cleaners) with a completely different styling compared to conventional vacuum cleaners of that time (Figure 1.2). The development of Dyson’s cleaners created a significantly stronger brand equity. As defined by Aaker (Aaker, 1991) brand equity can be described as

“A set of assets or liabilities in the form of brand visibility, brand associations and customer loyalty that add or subtract from the value of a current or potential product or service driven by the brand.” (Aaker, p 5)

Brand equity represents the value of a brand, which is affected by five key components: brand awareness, brand loyalty, perceived quality, brand associations and other proprietary assets. These components together represent the value of a company’s brand. So, in other words, the Dyson brand was able to convince customers on all these key components. However, the relation with the customer is crucial in defining brand equity and does not emerge clearly enough from the above definition. Delving deeper into the customer-based brand equity (CBBE) by using Keller’s model (1998) explains that Dyson was able to bridge the gaps between who they are (brand salience), what they are (brand performance and imagery), their relationship with the customer (consumer judgments and feelings), and finally the relation of the customer to the new product (brand resonance). By successfully linking these levels Dyson created their own brand story (Wolstonholme, 2008).

Dyson goes far beyond only developing a new type of vacuum cleaner. With the bagless vacuum cleaner they were able to present a product that not only looked different, but also
felt different and performed differently, offering an aesthetically pleasing lifestyle product that even became a status symbol. In doing so, they automatically connected the levels in Keller’s CBBE model. Everybody was talking about this new vacuum cleaner that performed well and also looked innovative. The success of this vacuum cleaner led to new developments, such as the development of the supersonic hair dryer in our story at the beginning of this chapter. However, will Dyson also succeed in embedding the same powerful story in the hair dryer product category? The risk of launching such a product at an extreme price must be tremendous. To reduce this risk, one can follow the strategy of building on a brand’s identity and developing a brand extension. Even though this sounds pretty simple, actually applying a brand’s identity to concrete physical product characteristics is difficult (Karjalainen, 2004). The underlying difficulty has to do with translating the abstract brand values into concrete physical properties of products: this process of combining all physical properties will lead to the visual appearance of the design that creates a strong connection with the parent brand when applied in the correct way. However, this road towards creating the optimal appearance of product innovations can be achieved in various ways and will be implemented differently by different designers. There are several solutions to this challenge, but the results are not always unambiguous. Some designers create visual appearances that are much more successful than others. Therefore, it would be useful to gain a better understanding of this complex process. What is the role of the aesthetic design in creating successful brand extensions? This question lead to the start of this thesis about designing more successful brand extensions, where the importance of brand extensions needs to be investigated first.

1.2 The importance of brand extension

All evidence so far has indicated that the introduction of new innovations can be more successful when launched under an established brand name, namely brand extension (Aaker, 1990; Hem et al., 2003; Kapferer, 2008). One definition of brand extensions is as follows:

*When a firm uses an established brand name to introduce a new product. An existing brand that gives birth to a brand extension is referred to as the parent brand.* (Keller, 2013, p.577)

In the formentioned example, the parent brand is Dyson and the brand extension is the hair dryer. The hair dryer is an extension of Dyson’s original product range. Brand extensions, such as this example, are frequently used to leverage the parent brand (Tauber, 1998). Several researchers have investigated the advantages and disadvantages of brand extensions (Broniarczyk & Alba, 1994; Park & Srinivasan, 1994; Park et al., 1996). The main reason why ‘stretching the brand’ can be so successful is because of the facilitation of product acceptance. Consumers are more aware of the identity of the brand and the qualities of the associated products and are therefore willing to take some risks in adopting a completely new product innovation from a specific brand.

Using an established brand name on a specific product provides a signal to the consumer about the likely performance of that product and the qualities that are associated with it (Erdem & Swait, 1998). When consumers are uncertain about product attributes, the brand name can give them certainty about the likely performance and behaviour of that product.

There are various types of brand extensions, and these can be classified into four general categories, see Figure 1.3 (Keller & Aaker, 1992; Kotler, 2003). The first is termed a line (or horizontal) extension, which covers products that target a new market segment or a new target group within the same product category. The second is vertical extensions, where a product is introduced in the same category at a different price and/or quality point. The third one is category extension, where a different product category is developed within the parent brand but which is completely new to that brand. The final category is termed co-branding, where two or more brands are combined in one new product offer. Both brands hope to strengthen the combined brand preference and purchase intention, and hope to serve a new audience.

Notwithstanding the advantages of using an established brand name to increase the probability of success, it can also lead to market failures. Brand extensions can be risky, because they can decrease or harm the equity of the core brand (Degraba & Sullivan, 1995; Simon & Sullivan, 1993). A brand extension that evokes negative associations could damage the brand, which can even demolish the overall identity of the brand (Aaker, 1990).
Seventy-eight percent of line extensions introduced in 1998 were based on products that are targeted within the same product category; however, their success rate (28%) was lower than for new products that were not connected to a brand (47%) (Ernst & Young and ACNielsen, 1999). This suggests that launching a new product using an established brand needs to be implemented carefully.

As claimed by Keller (1998) most brand extensions are line or vertical extensions (over 80%). Category extension and co-branding are less common. However, a successful category extension is by far the most profitable and can create a revitalization of a brand when the product is adopted by the market (Meyvis & Janiszewski, 2004). Therefore, developing a successful category extension can be a promising strategy to improve the brand image. However, designing a successful category extension is the most complicated variation. The designer needs to deal with a product category that is not yet associated with the brand. Several category extensions have been introduced to the market that have failed the adoption process, such as the Dyson washing machine or Bic perfumes.

However, successful category extensions include: the Bic razor, G-star furniture, Dyson hair dryers and Dyson fans. Yet what causes the success or failure of these brand extensions, even if they carry the same brand?

The success of brand extensions has been studied by many researchers (Aaker, 1990; Aaker & Keller, 1990; Hem et al., 2003; Martínez Salinas & Pina Pérez, 2009; Sinapuels et al., 2015; Völckner & Sattler, 2006). However, these studies merely focus on general marketing aspects such as the quality of the parent brand and the fit between the parent brand and brand extensions. Our assumption is that the designers of such products have an important role in trying to convince the consumer through the design of a brand extension, such that the values of the brand will have to form a new meaning (Cooper & Press, 2003; Mozota, 2003) in a completely new product category. Despite the abundance of studies, the design of a brand extension itself has been under researched. In fact, it seems that the quality of a brand extension itself is not even considered. How to deal with designing these brand extensions has thus been barely addressed.

This thesis will focus on the affect of design on the success of brand extensions. When developing a new brand extension, it means that the brand will extend out of its own core and will need to redefine its own brand meaning in a completely new category. This means translating from tangible to intangible characteristics and indeed back. Focusing on how to develop such brand extensions will be the central question of this thesis. To design more successful brand extensions, the factors that determine the success of current brand extensions need to be investigated.

1.3 What determines the success of brand extensions?

Innovation can drive profitability and growth and thereby keep companies relevant for consumers (Aaker, 1997). However, brand competition is intense. Companies need to take risks in developing new product innovations, but the likelihood of failure is ever present (Martínez Salinas & Pina Pérez, 2003; Singh et al., 2012).

This sub-section clarifies the meaning of product success. However, a better investigation is needed to understand brand extension failures by giving some examples. Research conducted by Nielsen investigated that, of over 60,000 newly introduced SKU (stock keeping units) in Europe, only 55% were still there in 26 weeks and only 24% made it to the end of the year (Ernst & Young Global Client Consulting & ACNielsen, 1999; Nielsen, 2015). This drastically dropping percentage indicates the crowdedness of the market and the likelihood of only a few innovations enjoying success. Imagine the enormous amount of money that has been spent in the commercialization and introduction of such product innovations. Saving even 10% of the costs that have been spent on that, is clearly desirable.

Research reveals that the Dyson hairdryer, although being the most expensive hair dryer on the market, has proven to be highly successful (Smith, 2017). Some sources compare the success of Dyson with Apple: integrating cutting edge technology in a product with superior quality and a focus on creating the best human interaction (Osterwalder et al., 2020). By following the strategy of implementing cutting edge technology and sleek industrial design they seem to have developed a successful business model of launching brand extensions. However, not all brand extensions developed by Dyson have been successful. In 2000, they launched a washing machine priced at US$ 1672 (Figure 1.4). Despite positive reviews, this innovation failed to succeed commercially and Dyson withdrew it from the market five years after its introduction (Scott, 2017).

Figure 1.4 Dyson Washing machine launched in 2000 but failed to succeed commercially (Dyson, 2002)
This example shows that not all brand extensions with a specific brand name are a success. That raises the question: what is needed to develop such new product innovations within a brand to become a success? To investigate what caused the failure of launching Dyson’s washing machine, we first need to explain the terms product innovation and product success.

The most frequently used definition of product innovation is that of Schumpeter explaining it as ‘the introduction of a new good - that is one with which consumers are not yet familiar - or a new quality of a good’ (Schumpeter, 1934). However, according to many scholars (Danneels & Kleinschmidt, 2001; Garcia & Calantone, 2002; Simonetti et al., 1995) this definition is not clear enough as it can easily be interchanged with process innovation. Furthermore, it can be seen from various perspectives, because a firm might interpret innovation in a different way than an expert in the field or the specific sector in which the product is launched. In this thesis, we will use the ‘firm level approach’ because we want to understand how firms define product innovation. From the perspective of an individual firm, the definition can be formulated as “its new or improved goods which can be sold on the market are product innovations” (Simonetti et al., 1995). In consequence, the new product has to be more novel than previous ones. However, this definition still remains quite fuzzy. How can we include novel aspects into a product? Should the company focus on integrating a new technology, a new appearance, a new way of using a product or all at once? By launching their washing machine, Dyson were already innovating because they were at that time known for their vacuum cleaners. They also incorporated the newest technology in their washing machines, by implementing a contra-rotating drum technology that uses much less energy and water compared to their competitors. However, the appearance of the washing machine seemed quite similar to the designs of existing competitors in the washing machine market. This raises the question of whether Dyson should have exposed their cutting-edge technology in a more extreme way than they did. In the case of the other Dyson products, the appearances of those innovations were distinctive and quite far from the existing product categories (Loken et al., 2008). However, the design of the Dyson washing machine is similar to the current archetype of washing machines, which might not signal the innovativeness of the brand. This aspect plays a central role in this thesis.

The definition of product success also needs to be determined. Traditionally, the literature refers to product success in financial terms, as this is one of the most easily quantifiable parameters measured by “the degree to which the product’s profitability exceeded or fell short of the minimum acceptable profitability level”(Cooper & Kleinschmidt, 1987). However, other aspects such as the impact on the market of introducing a new technology or the opportunity to launch new product categories also seems to be important (Cooper & Kleinschmidt, 1987). Despite the fact that a product’s profitability level and the impact on the market are good ways of reflecting on a product’s success, it is quite impossible to predict these aspects when designing products that do not yet exist. In addition, the information about the revenue of a specific brand extension seems to be less relevant for designers. Designers need to know more about the acceptance of various product concepts instead of knowing the exact revenue yielded by an existing product. Therefore, we need to focus on the preliminary stage of product success, which is product acceptance and this can be measured by the ‘willingness to pay’ and ‘purchase intentions’ (Fedorikhin et al., 2008). In other words, defining the attitude towards brand extensions and the adoption by consumers by looking at the appearance of the product proposals. Bronnenberg et al. (2019) focuses on measuring economic value of a brand by using a characteristic approach building on stated preference data like pack size, packaging format, and flavor. They describe that many studies treat intrinsic brand value or brand equity as a nuisance parameter that controls for all intangible aspects of a product. The economic perspective they take is to analyse the economic value of a brand by taking brand equity as a product characteristic which can be measured by combining objective product attributes such as price, quality by comparing it to the willingness to pay. However, they do not discuss the role of the product itself when discussing brand equity. The physical product itself will be the ‘carrier’ of these intangible aspects. The main questions that remains unanswered is ‘How can we actually design for an increasing brand equity?’. Their study focuses on products that already exist and are based on previous brand experiences, while a more radical product design can also evoke novel experiences which might not be adopted by consumers.

Designers benefit from gaining more knowledge about the factors that actually influence this adoption by consumers instead of only receiving information about the revenue. Looking back at our example of the washing machine: in this case it is less relevant to know the profitability of that product or its impact on the market. By contrast, it is far more relevant for designers to learn which factors led to the failure. In this case, it is, for example, unclear what the influence is of the appearance of the design in influencing the success of this product. This question has not been fully addressed yet, while specifically the appearance in relation to a product’s success has barely been addressed in the literature.

To investigate the influence of the appearance on the success of brand extensions, the definition of aesthetic appearance needs to be defined. Aesthetic appearance refers to “the perceived appearance and beauty of a product” (Bloch, 2011; Desmet & Hekkert, 2007) and has an important role in determining the success of product innovations (Han et al., 2021; Moon et al., 2015). This thesis uses the following definition of aesthetics: “a product has attributes that cause a perception of beauty for the beholder” (Leder et al., 2004). A product’s visual appearance (aesthetic appearance) is the first thing that is noticed by consumers when evaluating a novel design (Goode et al., 2013). However, looking at the appearance of a product will automatically result in a response towards the functional and symbolic meaning of the product and together they will positively influence willingness to pay (Homburg et al., 2015) and ultimately product success. Thus, by measuring the aesthetic appearance of product designs, the success of such product innovations can be indicated.

Summarizing, we could say that it is difficult to predict the success of brand extensions. Especially the influence of appearance has barely been studied in the literature. However, the physical appearance of brand extensions seems to play a central role in synthesizing all relevant information affecting the success of those product innovations. In the next subsection, this gap in the literature will be further addressed and will flow into the research questions of this thesis.
1.4 The gap: research in brand extensions lacks crucial aspects

To obtain an overview of the entire field of the literature around the success of brand extensions, the model of Völckner and Sattler (2006) has been chosen. The key reason for this is that they present a synthesis of multiple models in their work providing an overview of the literature in the brand management field. In their model, four major determinants (inputs) influence the success of brand extensions (outputs) as shown in Figure 1.5. However, they do not discuss the design of the brand extension itself. In fact, they deal with this determinant as a black box (dotted circle in Figure 1.5) that is simply not taken into account. The model implies that the quality of the actual design of the brand extension will not have any effect on the acceptance of brand extensions, while scholars agree that it does have an important impact (Crilly, 2005; Crilly et al., 2008; Goode et al., 2013; Page & Herr, 2002). In the next part, we will discuss the four determinants discussed by Völckner and Sattler but also reflect on the aspects that are not taken into account.

First, ‘parent brand characteristics’ will be discussed; referring to the quality of the parent brand (Smith & Park, 1992), the history of previous brand extensions (Bousch & Loken, 1991; Dacin & Smith, 1994), the conviction projected by the parent brand (Kirmani et al., 1999) and consumers’ experience of the parent brand (Swaminathan et al., 2001). This determinant focuses particularly on those aspects that have already been determined and are beyond the designer’s control.

The quality of the parent brand is already built on past experience and can - at most - determine which innovations were successful in the past. However, it does not guide the development of new brand extensions and how they should be designed. Second, brand extensions marketing context will be discussed, referring to marketing support (Reddy et al., 1994) and retailer acceptance (Nijssen, 1999). Firms’ marketing competence aims to achieve an ability to successfully support a brand through marketing. This determinant might have an important effect in determining the success of brand extensions, yet it does not provide any guidance to designers about how they should design brand extensions. Third, are the brand extensions product category characteristics, referring to perceived risk (Bucklin, 1998) and consumer innovativeness (Klink & Smith, 2001). Völkner and Sattler claim that perceived risk and innovativeness of unknown brands seems to influence the success of brand extensions. However, their work seems to be more related to the quality and prominence of a known versus an unknown brand. They do not discuss the appearance of the brand extension in relation to the drivers of innovativeness and perceived risk. Finally, the link between the parent brand and the brand extension will be discussed, referring to the level of fit (Aaker & Keller, 1990; Broniarczyk & Alba, 1994) and the linkage of the utility of the parent brand to product attributes of the original product category (Rangaswamy et al., 1993). In figure 1.5, this circle is made orange while it does say something about the level of fit between the parent brand and the brand extension. When regarding all these determinants, the fit between the parent brand and the extension category emerges as the most important factor (Aaker & Keller, 1990; Bottomley & Holden, 2001; Völckner & Sattler, 2006). This determinant does give designers important information about the likely success of brand extensions. Zooming in on what these researchers understand by discussing about the fit between the brand extension and parent brand reveals that they do not mean the aesthetic appearance of brand extensions.

The gap in the literature described at the beginning of this section continues to become more apparent. When analysing the literature described above, two conclusions can be drawn. First, the described literature focuses on a different type of research question compared to design based practice. There is a key difference in formulating whether a brand extension should be introduced versus how a brand extension should be designed. The information currently investigated in the field of innovation and design management has a central focus on the consumer instead of looking at the design of the product. All literature cited above referred to whether the given knowledge can be taken along in the process to support brand managers in their decision processes, while the designers want to be supported in designing the physical appearance of the brand extension. This automatically brings us to the second conclusion referring to the type of audience.
Most of the literature focuses on informing brand managers instead of designers. By using their common language, approaches and methods, the brand managers feel more involved and supported in their processes towards creating successful brand extensions compared to designers. The information that has been given by brand and innovation managers is on a different level and will not support the designer in his or her creative process. This difference can be clarified by the fact that designers are able to imagine designs that might exist, instead of dealing with a product that is already on the market. Of course, the literature still describes the relationship between consumer and product design, however, it is discussed from the perspective of consumer behaviour. There is a substantial difference in this point of perspective, regarding the behaviour versus the design. The information needed to be related to the field of product design to be useful for designers in such a way they can use the information to achieve better synthesis in creating the appearance of the brand extension.

Both conclusions reflect that currently the literature on designing brand extensions is rather limited and only addresses a single perspective. However, it still remains unclear what information is relevant from a design perspective. In the next step, we will discuss the literature of brand management from a designers’ perspective and formulate what is needed to support the brand extension (BE) designer. The overview shown in Figure 1.5 as described above explained the importance of the link between the parent brand and brand extension. This link is also described as the level of fit and emerges as the most important factor (Bottomley & Holden, 2001; Völckner & Sattler, 2006). However, it still remains unclear how this level of fit can be achieved by designers. In their discussion, Völckner and Sattler also state that the level of fit is somewhat unclear. Aaker describes fit as: “consumer perceives the new item to be consistent with the parent brand” (Tauber, 1988) and relates to three dimensions of fit (complement, substitute and transfer) (Aaker & Keller, 1990). These levels describe the link between the chosen brand extensions and the parent brand. In fact, there is no universally accepted conceptualization of ‘fit’ and it is therefore quite complex for design and design managers to achieve any particular level of fit. Other studies claim that brand-specific associations can have an important effect, because they can dominate associations of product category similarity (Broniarczyk & Alba, 1994; Park et al., 1991; Spiggle et al., 2012) referring to the level of fit. However, it remains unclear how to deal with the difference in understanding the term ‘fit’. In other words, when the term ‘fit’ means belonging to a specific category it means something completely different when the term ‘fit’ refers to the brand associations of the parent brand.

Gaining a better understanding of the definition of the term “fit” is a logical first step, but understanding why and how this level of fit can be manipulated by designers need to be explained first. This can be illustrated by a fictional example showing the ambiguous understanding of ‘fit’. A company such as Heinz decides to launch a category extension by developing a bottle of fresh tomato juice. We have seen that it is important that consumers perceive a similarity or ‘fit’ between the original and extension category (Aaker & Keller, 1990). As discussed by Aaker & Keller, such a level of fit is related to the connection of the core product (ketchup) to the category innovation (fresh tomato juice). If we only focus on the levels of fit described by Aaker, the fit between the parent brand and the chosen brand extension can be explained as a ‘transfer’, while reflecting the ability of Heinz in operating in the field of fresh tomato juices because of their known expertise in tomatoes. However, the way in which consumers interpret this level of fit could vary widely. It could also be related to the appearance of the product, which is carefully created by designers. The latter could have a large influence on the perception of consumers. However, even once the dimension of fit as described by Aaker & Keller is agreed, it does not give designers any guidance about how to design this level of transfer, whereas the physical appearance of these bottles can vary to a large degree see Figure 1.6. In this picture, we distinguish between two bottles, both introducing freshly produced tomato juice, though the appearance of these bottles is completely different: one evoking a ‘authentic’ character (Figure 1.6B) whereas the other evokes a more ‘clean and modern’ character (Figure 1.6C). Heinz is known as a company with a particularly authentic character focusing on high quality products. When this bottle of Heinz is, for example, designed as too ‘clean and modern’ (Figure 1.6C), it does not fit the core values of the brand and might harm the acceptance of this product innovation by consumers. Design B in Figure 1.6 shows a more authentic bottle using a curved label and a mark suggesting the authenticity, the freshness and quality of the brand. This bottle shows a more congruent design and it is therefore expected that this design will enjoy a higher market success (van Rompay & Pryn, 2011). This example illustrates the importance of the aesthetic appearance of the design. In other words, when a company has already decided what kind of innovation should be launched (fresh tomato juice), how to design this new product innovation becomes the most important influencing factor in determining success or failure.
This results in two research questions that are central in this thesis:

1. Which factors, influenced by designers, affect the success of a brand extension?

2. How can designers be supported in influencing these factors to create successful brand extensions?

These questions will be addressed by discussing two perspectives: (1) the perspective of the consumer (accepting a brand extension) in order to investigate which factors affect the success of brand extensions when regarding the aesthetic appearance of brand extensions; and (2) the perspective of the designer (creating a brand extension) in order to successfully support designers in influencing these factors leading to successful brand extensions. The structure of this thesis will therefore alternate between behavioural-based and design-based research. The contribution of the various research fields will be discussed in the next subsection, focusing on the perspective of the brand extension itself.

1.5 Research fields contributing to our understanding of successful brand extensions

Designing successful brand extensions involves more than one research field. It is clear that knowledge from the brand management research field is needed, in order to help design a brand extension that strongly relates to the brand. However, innovation management is likely to also have an important role in defining how novel brand extensions can be.

As discussed by Brexendorf, Bayus and Keller (2015) the interplay between brand management and innovation management remains under-researched, while both fields are clearly strongly interrelated and come together in the physical appearance of a brand extension. A brand extension can be seen as a new product innovation from inside the brand which could revitalize the brand when accepted by consumers. To achieve that goal, it is important to connect knowledge from various research areas. Designing brand extensions involves the research domain of innovation management (because it is a new product that is going to be launched) and it involves the research domain of brand management (because it should, to some extent, fit to the brand) and it all comes together in the development of a physical product (involving the research domain of product design). These three fields come together in the physical appearance of the brand extension (Figure 1.7).
The ‘black box’, representing the design of the brand extension itself, that has been overlooked by the extant literature will now be positioned at the centre. Relevant literature from the three research fields will be discussed from the perspective of the design of the brand extension. In other words, what can we learn from the three fields to improve the success of brand extensions?

1.5.1 How innovation management contributes to the success of brand extensions

Innovation management involves the successful introduction of something new: it is the embodiment and synthesis of knowledge in original, relevant, valued new products, processes, or services (Luecke & Katz, 2009). This research domain is one those that plays a major role in launching brand extensions, especially regarding the acceptance or adoption of product innovations. In particular, when launching a new product innovation, the consumer’s attitude towards the new product innovation is a crucial factor. Consumers are exposed to something they have not experienced before, so they need to reframe their thoughts and attitudes towards the product and form an opinion.

The type of innovation appears to have an impact on the process or innovation strategy (Veryzer, 1998) and the acceptance of successful brand extensions (Beverland et al., 2010). Innovations can be subdivided into incremental (continuous) or radical (discontinuous) innovations. Incremental innovation means improving a product from the current product portfolio in such a way that it is a logical extension. On the other hand, radical innovations refer to a drastic change regarding the current product portfolio. Designing a category extension can be seen as a more radical innovation, because of the change of product category. Therefore, it is necessary to understand the factors that are important in creating a successful radical innovation. Extant literature focuses merely on the strategies to improve the acceptance of radical innovations (Beverland et al., 2010; Chang et al., 2014; Dewar & Dutton, 1986) or the process of creating a radical innovation (Veryzer, 1998, 2005; Zhang, 2022). However, the physical appearance is not yet considered as a determinant to improve the acceptance of brand extensions.

According to Beverland et al. (2010), there are four innovation strategies for brands to launch new brand extensions: (1) incremental and market-driven (follower brands); (2) radical and market-driven (category leader brands); (3) incremental and driving markets (craft-design-driven brands); and (4) radical and driving markets (product leader brands). In other words, it depends on the type of brand, as to which strategy will be more successful. Category leaders aim to dominate the market with bold product initiatives, whereas craft design driven brands focus on creating a sense of authenticity above bragging about the novelty of their product innovations.

These strategies that are based on the positioning of the brand determine how to deal with launching new product innovations in order to be more successful. However, the brand positioning can also impose a limitation in responding to disruptive technologies that change the market by developing brand extensions. Managers must carefully embed brand positioning when developing innovation strategies and designing brand extensions. Economic theories from industrial organization economics and quantitative marketing modelling (Bronnenberg et al., 2019) claim to be able to measure the value of brands. However, most research that have been done is focused on existing products and does not discuss how to best design the physical manifestations of new product innovations. Only focusing on which strategy will be successful to launch new products or focusing on predicting the economic value might not give an answer to the question of how to design the bold product initiative for category leaders or the more authentic product innovation for craft design driven brands.

The relation between innovation and the aesthetic appearance of products has been barely researched. Only a few scholars consider the relation between design and innovation (Eisenman, 2012; Hernández et al., 2018) by describing the important link between visual attributes on the one hand and functionalities and meanings on the other (Eisenman, 2012) and by describing “how design has become the language of innovation itself” (Hernández et al., 2018). This ‘language’ (e.g. the communication based on design visualisations such as the brand extension itself) actually forms the common ground on which conversations can be built to create more successful brand extensions. Merging the fields of innovation management and brand extensions is important, because the brand positioning helps to foster consumer perceptions about how far a brand can be stretched (Beverland et al., 2010). Looking from a design perspective, it would be even better to know how to implement this connection between innovation management and brand management into the visual appearance of the design.

Besides the type of innovation, the level of innovation also has an impact on the acceptance of brand extensions. Innovation can be launched at various levels, by focusing on technological improvements or on improvements to the appearance and behaviour of the product. Veryzer (1998) developed a descriptive model to represent these various degrees by two dimensions: product capability and technological capability. The technological capability refers to the degree of technological change, while the product capability refers to the benefits of the product as perceived by the customer. Veryzer discusses product benefits, which might include an improvement of a certain function. However, innovations can also be driven by a revolutionary change in the appearance and behaviour of the design of a product, which might have an even greater influencing effect. The latter is also described as ‘design driven innovation’ and explains how we can change the meaning of products instead of only focusing on technological improvements (Verganti, 2009).
As claimed by Verganti, design driven innovations do not come from the market; they create new markets and push new meanings by creating a distinctive experience. As described by Dell’Era et al.:

"the driver of innovation is the ability to understand, anticipate and influence the emergence of new product meanings" (Dell’Era et al., 2010)

Both levels - technological or a radical change in meaning - can have an important influence on the adoption of innovative products by consumers and both are in need of various ways of launch strategies (Frattini et al., 2012). Of course, attention should be paid to how the brand extensions are launched, but this step only follows after the development of the brand extension is completed and is therefore less relevant to designers.

The field of Innovation managements contributes to brand extensions, while changing the meaning of mainstream products is one of the greatest risks and this influences the perceived trustworthiness of the innovation (Yacoub; I, 2015). Changing the type of innovation - from incremental to radical - means accepting a higher level of risk. Moreover, also the level of innovation - from technological, to product capability to design driven - means involving uncertainties in the acceptance of these brand extensions. For this reason, it might be interesting to merge the field of innovation management and brand management, because it could form a crucial link in improving the perceived trustworthiness of the new innovation when the two fields are connected. In that case, the use of a well-known brand name could take care of the perceived trustworthiness of the new innovation, which will probably minimize the risk. To conclude, combining a well-known brand with a technological improvement could lead to a meaningful and successful innovation under the condition that the relevant knowledge from the two fields forms a synthesis in the physical design of the brand extension. In the following chapter, we will discuss the field of brand management.

1.5.2 How brand management contributes to the success of brand extensions

The explanation of the research domain of brand management starts with defining the term ‘brand’.

‘a brand is a set of mental associations, held by the consumer, which add to the perceived value of a product or service’ (Keller, 1998).

These associations should be unique (exclusivity), strong (saliency) and positive (desirable) (Keller, 1998). In other words, it is all about the various feelings of consumers when driving a Volkswagen or an Audi. In practice, the field of brand management is a function of marketing and uses particular techniques to increase the perceived value of a product line or brand over time. The research field of brand management aims to achieve specific scientific and quantifiable results to gain more insights in the factors that create stronger and more salient brands (Kapferer, 2008).

In the brand management literature several studies have been published that investigate drivers for successful brand extensions (Aaker & Keller, 1990; Bottomley & Holden, 2001; Völckner & Sattler, 2006). In these studies, the fit between the parent brand and the extension product can be seen as the most influential factors (Bottomley & Holden, 2001; Völckner & Sattler, 2006). Other key contributors in driving brand extension success are: the marketing support, the parent brand conviction, retailer acceptance and the parent-brand experience (Völckner & Sattler, 2006) as described in sub-section 1.4. It is noteworthy that within this field of research, the influence of product aesthetics and the connection of attributes and associations towards the parent brand is not considered, whereas the product’s visual appearance (aesthetic appearance) is the first thing that is noticed by consumers when evaluating a novel design (Goode et al., 2013).

The literature of brand management regarding the launch of successful brand extensions states that there has to be a perception of fit between the parent brand and the extension product as discussed previously. According to the work of Aaker & Keller (1990), consumer evaluations of brand extensions are determined primarily by the quality of the parent brand and the fit between the original and extension product categories. In other words, the consumer has to believe that the brand and the extension really belong together. However, a perception of fit can be understood in various ways. It is remarkable that within the field of brand management, researchers have focused primarily on the cognitive processes of consumers in making purchase decisions, whereas a perception of fit can also relate to the connection of the aesthetic appearance of a product to the parent brand. In other words, these researchers do not reflect on the connection between the core values and associations of the brand represented in the salient product characteristics of the product innovation. Furthermore, the definition of ‘fit’ is not completely clear. The definition of the ‘level of fit’ needs to be clarified, and more importantly, designers need to know how to incorporate this level of fit in their designs. The latter also requires a different research approach than that currently used in the field of brand management. The studies in this field focus on measuring the effect of existing brand extensions, whereas designers are capable of imagining what might exist by creating a range of proposals. The revenue generated by a successful brand extension in a specific category does not guarantee success in a completely different category. In reality, it is even more sensitive, because designers also tend to have their own signature (author-driven design) in creating products for brands (demand-driven design) (Eggink, 2009). When the design of the same (successful) brand extension is created by another designer, it will be designed in a different way and it might be less or even more successful. Hence, it seems useful to further explore the relationship between the research field of brand management and the role of the aesthetic appearance of the brand extension.
In the field of brand management and innovation management, it is reported on an integrated marketing theoretical framework in relation to product design (Kreuzbauer & Malter, 2005). This study emphasizes the need to combine the insights of marketers and consumer researchers in relation to the actual product design. Researchers claim that, in general, brand management research is based on an information processing approach that focuses on a presumed hierarchical structure of brand knowledge (Keller, 1998). However, a better understanding of how product design is embedded in brand knowledge would better support the designers. Furthermore, a deeper understanding of the process by which product design signals are visually perceived by consumers will support designers in understanding the evaluation of designs (Kreuzbauer & Malter, 2005; Leder et al., 2004). This research connects the most interesting knowledge parts together in such a way that designers can understand the factors that influence the success of product design better. It also explains the relevance of the field of product aesthetics in relation to brand extensions.

The sub-sections above are an overview of the individual fields of innovation management and brand management. However, there is one important field that is not addressed in the studies that were found. All research that has been found in both fields starts from the perspective of the consumer. The consumer is the central point of attention and the main questions that have been addressed are formulated from a consumer perspective: What is the influence of the quality perception of the parent brand? (Völckner & Sattler, 2006) and What is the impact of different strategies in adopting radical innovations by consumers? (Frattniti et al., 2012) These research questions both start with “What is”, instead of “How can”, where the latter could be more relevant for product designers (Henseler & Guerreiro, 2020). Moreover, the aesthetic appearance of a product is actually the most important influencing factor in the consumer appreciation of new product innovation (Creusen & Schoormans, 2005; Goode et al., 2013; Page & Herr, 2002; Radford & Bloch, 2011). The delicate relation between brand and innovation comes together in the physical appearance of the product where the appearance functions to influence consumers and to shape their beliefs about both products and brands (Bloch, 1995; Kreuzbauer & Malter, 2005).

### 1.5.3 How product design contributes to the success of brand extensions

In this thesis, the focus is on a specific field within product design, namely product aesthetics. Aesthetics describes the relationship between the aesthetic characteristics of a product and the positive evaluation of such products by consumers. The evaluation factors that are studied within this field include, for example, emotions (Desmet, 2002; Norman 2004), product meaning (Forty, 1995; Verganti, 2009 (Krippendorff, 2005)), and usability (Jordan, 2002). Although product design and the aesthetics of consumer products have been extensively researched (Berlyne, 1974; Crilly, 2005; Crilly et al., 2004; Desmet, 2002) the link with the fields of brand and innovation management should be further strengthened. Yet the physical appearance of a new product innovation is an important medium between consumers and designers to convey the message of a brand (Bloch, 1995; Crilly, 2005) and to improve acceptance. To gain a better understanding of the creation of successful brand extensions, it is important to discuss the process of how product design is perceived (Kreuzbauer & Malter, 2005; Leder et al., 2004) and evaluated by consumers (Blijlevens et al., 2009; Creusen & Schoormans, 2005).

The aforementioned studies are focused on a deeper understanding of how consumers currently evaluate designs. These studies focus primarily on the what question rather than the how question, whereas, in fact, designers could benefit from more applicable knowledge on how to apply these general theories in practice. However, from the current field of product aesthetics there are two important theories of design that could be beneficial for designing successful brand extensions, which will be briefly discussed here: (1) the semantic transformation (Karjalainen, 2004); and (2) the MAYA (Most advanced, Yet acceptable) principle (Loewy, 1951).

The semantic transformation (Karjalainen, 2004) of brand values into concrete product characteristics is a way to translate the core values or ‘character’ of a brand (Govers & Mugge, 2004; Mugge, 2007) into a new product design. Consumers are able to recognize specific attributes in the physical appearance of a product innovation (Crilly, 2005) and are able to connect a specific meaning to such artefacts (Krippendorff, 2005; Krippendorff & Butter, 2007). However, the process of translating a meaning into the physical appearance of a product innovation is a complex task for designers (Daalhuizen, 2014; Dorst, 2008). Another study also reveals the difficulty of semantic transformation (Karjalainen, 2004; Karjalainen & Snelders, 2010), where the core values (linguistic attributions) of a brand are embodied by translating them into specific product characteristics (at the physical level) of the new product innovation. In other words, consumers perceive all the specific characteristics of a product (form, lines, colours, materials etc) and will infer a more implicit message resulting in the symbolic meaning of a product. For example, the Hummer as visualized in Figure 1.8 shows that the combination of explicit cues (as in volumes and lines) is comparable: both designs consist of huge square volumes and straight lines. However, the materials and refinement of the designs are different, leading to a complete different second-order meaning (Krippendorff, 2005). The hummer on the left emphasizes functionality, robustness and physical power, while the design at the right focuses more on expressing wealth, sportiness and social power (status). The difference in symbolic meaning between those two cars is large, whether the structural design (Muller, 2001) is similar. The differences in the aesthetic appearance of both cars can be found in the medium and detailing phase by adding materials such as the shiny surface of the right car and the use of chrome details. The semantic translation theory (Karjalainen, 2004) is relevant to designing successful brand extensions, while it enables designers to ‘tell the story’ of the brand. The design of the product itself can be seen as the mediator between the consumer and the designer, making it vital that designers are able to convey the intended message through this product. Embedding a clear
and congruent story in the appearance of product innovations is a complex process for novice designers. As a matter of fact, there are multiple ways to evoke the desired meaning in a product. How we can support designers in this task will be further elaborated in Chapter 2, in which the role of the designer will be discussed.

Figure 1.8 Two designs of a Hummer conveying different messages
Note: A. Hummer Humvee first launched in 1985 (Dizono, 2015); B. Hummer HX designed in 2008 (Autoreview, 2009)

Another important theory that plays a major role in this thesis is the MAYA principle (Loewy, 1951). A design must be innovative, yet on the other hand still be acceptable to the majority of consumers for it to be successful. This theory could support designers in finding the earlier mentioned ‘balance’ between ‘typicality’ and ‘novelty’ in order to create more successful brand extensions. This theory will also be explained in depth in Chapter 3.

1.6 Introducing the brand extension designer

The research in all three fields has collectively given us valuable knowledge about the creation of successful brand extensions. However, most of the literature does not focus on the design of the brand extension itself. Moreover, it is remarkable to see that the designer who could really create successful brand extensions is neglected in the extant literature. By placing the brand extension designer (BE designer) at the ‘sweet spot’ of merging the three research fields, we postulate that this could make a worthwhile difference in creating more successful brand extensions (Figure 1.9).

In reality, the three fields in Figure 1.9 have a close interaction with each other and cannot be regarded solely as individual research fields. Brand- and innovation management are clearly strongly interrelated (Brexendorf et al., 2015; Page & Herr, 2002), but have not yet been merged. The field of product design has a different approach but is also strongly related. Brand, product innovation and product design all play important roles in generating favourable consumer responses (Broniarczyk & Alba, 1994). This thesis aims to gain more knowledge at the intersection of these related research fields, with a focus on the aspects that designers can influence during the development process. In the section below, the choice to focus on designers will be further explained.

Figure 1.9 The BE designer is put into ‘the sweet spot’

The approach of the fields of behavioural research and the field of design practice is different in nature (Cross, 1982; Nelson & Stolterman, 2012). In the brand management literature, much research has been focused on the successful effect of existing product-brand combinations (Aaker & Keller, 1990; Bottomley & Doyle, 1996; Bottomley & Holden, 2001; Völckner & Sattler, 2006). However, they only focus on studying the behaviour of consumers towards current brand extensions. These studies focus on what kind of aspects are relevant but do not give any guidance on how to design product developments that do not yet exist. There is a lack of clarity for designers when only focusing on the currently investigated aspects. We have to look at the contribution of these research fields from a designer’s point of view (inner circle) in Figure 1.9 instead of only focusing on the behavioural-based knowledge (the outer circle).
The three fields of innovation management, brand management and product design, which were discussed in the above sub section, are merely focused on answering the ‘what’ question instead of the ‘how to’ question. They all describe research on the interaction between existing products and the consumer, so the relation between innovation and consumers, branding and consumers, and product aesthetics and consumers respectively. The knowledge generated in each of these three research fields helps us to understand the relationship between products and consumers, and therefore contributes to the field of behavioural research.

However, this knowledge is different in nature to the type of knowledge that is needed by designers who have to design these products. This ‘behaviour-oriented research’ is based on the underlying assumption that designers can directly use those outcomes in creating new designs. However, the practice of designing is a complex task (Lawson & Dorst, 2009) in which designers need to incorporate relevant knowledge from various disciplines in the development of a new product design that will be accepted by consumers. In other words, relevant research needs to be translated from the consumer perspective to a product-oriented perspective to support designers in their design process. To explain this need for a ‘designerly way of knowing’ (Cross, 1982), the difference in approach between the practice of design versus the practice of behavioural research will be discussed.

1.7 The difference in the approach of designers versus behavioural researchers

To achieve a better understanding of the practice of design, we need to start with the definition of the term ‘design’. The term design is a confusing term that is widely used and misused and therefore needs to be clarified. One of the difficulties in understanding design is its multifaceted nature as both a verb and a noun (Lawson & Dorst, 2009). To deal with the multifaceted nature of design the definition coined by Herbert Simon is useful: “to design is to devise courses of action aimed at changing existing situations into preferred ones” (Simon, 1988). Through this definition, Simon focuses on a rational approach of solving well-formed problems by decomposing the complex problem into sub-problems. Solving and combining the sub-solutions should lead to the optimal solution to the problem. Simon mentions that design is an objective process of searching for the optimal solution where the processes and results of human perceptions are not considered. In contrast to the work of Simon, Schon (1983) claims that designers frequently start with complex and ill-defined problems that need to be reflected on. He describes design as a ‘reflection in action’ in which changing a given situation takes precedence over the interests of understanding it. Therefore, the most important task of a designer is determining how to approach this task, and this is followed by intuitive and subjective processes rather than rational approaches. This way of looking at design is also adopted by other researchers (Cross, 1982; Dorst, 2007; Lawson, 2005; Lawson & Dorst, 2009; Nelson & Stolterman, 2012) According to Cross (1982), design can be seen as a process to achieve synthesis by combining both insights. He claims that designers are specifically trained to design the human-made world and designers know how to use their knowledge and skills to create new artifacts that embody new messages. In his opinion, design can be seen as a third discipline alongside science and the humanities. This view is shared by Nelson & Stolterman (2012), who claim design is a tertium quid – a third way which integrates thought (science) and action (art), rather than splitting these two fields. In fact, they even speak of design having its own tradition, dating back to the Stone Age:

“People didn’t discover fire - they designed it” (Nelson & Stolterman, 2012, p. 11).

Over the years, the design tradition has been lost, overgeneralized by our Western preference for observation over imagination (Nelson & Stolterman, 2001; Schon, 1983). This is based on the rise of science and technology during the nineteenth century, believing that human progress would be achieved by integrating technology and by making scientific rational knowledge more dominant.

As a result, our current educational systems are mainly dominated by a knowledge-based approach. Even though the importance of imagination is recognised by many, it is still hardly implemented (Takaya, 2004). Research reveals that both disciplines need to be implemented to be able to address our challenges, where approach of designers can be an important connection (Cross, 1982; Dorst, 2008; Nelson & Stolterman, 2012). According to Nelson & Stolterman (2012), we need to bring back and cherish the unique way of thinking and acting again by using design as a frame of reference grounded in its own tradition. Because the designer is able to tackle design problems by using their own approaches and processes by integrating knowledge from the disciplines science and humanities.

Coming back to the research fields described in sub-section 1.6, the same difference in approach can be discerned. The description of the three research fields clearly described the difference in approach of behavioural versus design research. The studies in the field of innovation management focus on finding the quantitative answer in creating successful innovations, while the field of brand management focuses on studying the behaviour of the consumer towards the acceptance of such innovations. The field of product design studies the product itself by exploring and creating multiple variations. The physical product creates a link to the human-made world, by combining the fields of innovation management and brand management. In this thesis, I will build on the definition of Cross (1982) by explaining design in my own words:

“Design can be seen as a synthesizing holistic activity that balances rational and subjective considerations from various disciplines which results in creating a meaningful artifact, whether product or service”.

In my own definition, the integrative aspect can also be found by alternating rational and subjective considerations from various disciplines, resulting in an increasingly holistic
approach. This holistic approach enables designers to zoom in and out regarding their design task to be able to make well-founded design choices considering relevant knowledge from various disciplines, ultimately leading to an integrated design. In the next part, a better understanding about the way of working of designers is presented together with a consideration of the types of knowledge that they use.

The process of designing can be regarded as a sequence of activities. Most design practices tackle a design problem following certain stages: starting with a design brief in which the initial problem is stated, followed by an analysis to research the problem and the formulation of specifications (list of requirements). Subsequently, the problem-solving part begins where iterations are started, finally resulting in ideas and concepts. Such concepts need to be developed and finally tested, implemented and evaluated (Lawson, 2005). Although the stages of a design process are typically well defined, the actual design process is merely based on an iterative process and can be chaotic.

“As a designer you gradually gather knowledge about the nature of the design problem and the best routes to take towards a design solution. You do this by trying out different ways of looking at the problem and experimenting with various solution directions. You propose, experiment and learn from the results, until you arrive at satisfactory result. Design can be described as a process of going through many of these learning cycles (propose, experiment, learn) until you have created a solution to the design problem”. (Lawson & Dorst, p. 34)

During a design process, the use of knowledge is necessary to design the best solution for the initial problem. This knowledge can be of differing natures during the subsequent phases. For example: when designing a chair – during the ideation phase more general information is needed about the preferred height to sit on a chair, while in the conceptualization phase more specific information such as the strength of the materials to be used is helpful. A designer needs to know general information that will give him or her some boundaries in the ideation phase; however, the creativity of the designer could also lead to new designs that do not incorporate the height of a more mainstream chair. It could, for example, also be possible to design a hanging chair, where the height of the legs is not relevant. In a later phase the designer needs more specific information to determine the details of his or her design. In this example, the specific height of where to hang the chair to use it in a convenient way became relevant. Furthermore, the form of this knowledge differs from highly specific and more rational-oriented knowledge (specific height of a chair) to more abstract and subjective information (such as the preferred styling of a certain target group). The latter knowledge will probably lead to a completely different way of designing (using intuition instead of rational requirements) during the ideation phase in which the preferred height of the chair is no longer relevant.

Working with various types of knowledge can be difficult. During the design process, designers make use of several techniques that structure ways of coming up with new solutions (design methods, guidelines, mechanisms, heuristics) (Daalhuizen & Cash, 2021). However, most important is the way designers communicate with the world around them. Designers learn to think in a sketch-like form, in which abstract requirements become more realistic by materializing the idea on paper. This way of working guides them to reflect by themselves but also with other stakeholders about the optimal solution and finally translate insights into an artifact that embodies the optimal experience. This part of the process is iterative and designers continually alternate between rational and intuitive-based knowledge (Corremans & Mulder-Nijkamp, 2016). In this way, design is used as a synthesis tool, to help find the best solution to the problem. This is in contrast with, for example, the field of science in which scientist are trained to find the best solution by recognising a pattern. This different way of approaching a problem is further explained in the following section.

By claiming to put the BE designer at the center, the first steps are taken towards creating more successful brand extensions. However, the difference in the approach of both groups can cause problems. The different way of working of designers to that of behavioural researchers is evident. The designer’s approach is focused more on a ‘designerly’ form of activity that separates it from typical scientific and scholarly activities (Cross, 1982). This holistic approach has an influence on how designers currently use more rational or ‘scientific oriented’ information in the fields of brand and innovation management. The studies report that scientists are trained to analyse a problem, whereas designers are trained to find a certain solution through experimentation (Lawson, 2005). This is based on the fact that science research studies the natural world and research in humanities studies the human experience, whereas research in design studies the human-made world (Cross, 1982). However, both disciplines could strengthen each other.

As described by Henseler:

“Marketing and design are different yet complementary. The strength of one discipline is the weakness of the other, and vice versa” (Henseler, 2015, p. 26)

By combining the strengths of both disciplines, more rigorous and meaningful artefacts can be created emphasizing that ‘the whole is more than the sum of its parts (Henseler, 2015)’.

In fact, design is all about the synthesis of all various kinds of knowledge, in which designers can be designated as system thinkers to create a more holistic approach instead of combining the individual parts together to find the best solution. This approach can be explained by alternating between a principally analytic view on incorporating rational knowledge; however, also keeping a holistic view when designing the artefact. Having said that, one could imagine the complexity of designing brand extensions when the designer can only use the more scientific data that is currently available.
The designer constantly needs to adapt during the process, adopting a more analytical attitude in processing rational data, but also turning back into a creative mode where the analyses are translated into a new artifact. However, support for translating the analytical data into a more holistic brand approach is currently missing. By merging the various research fields and approaching this process from a design perspective, we claim to be able to create brand extensions that are more successful.

1.8 Research approach and thesis outline

By placing the BE designer at the centre, this thesis aims to bridge the gap between information that just shows that a certain effect might have an impact, to information that shows how designers can actually make use of such an impact. Relevant knowledge from the three related research fields will be addressed from a BE designers’ perspective, thereby creating the appearance of the product (Figure 1.10). After all, the appearance of a new product innovation determines to a high degree the response of consumers, because it is the first thing that consumers perceive. This approach - placing the designer as ‘foundation’ - enables us to research an area that has not previously been investigated. It would be beneficial to not only use the knowledge from these research fields, but also their differences in approaching these topics could support designers in bridging the gap. The aim is therefore to gain a better understanding of the contribution of the three research fields, and translate this into a useful support to help design brand extensions that are more successful. Therefore, this thesis will address the two central research questions described in sub-section 1.4 by investigating two fields: the behavioural line and the design-based line (Figure 1.11).

First, we will aim to understand the consumer and his or her behaviour towards brand innovations. In this thesis, the literature that will have an influence on designing brand extensions will be discussed in depth and will be termed behavioural-based research (blue). These parts will address the question of which factors can be influenced by designers to design brand extensions that are more successful and leads to the conceptual model.

Second, we want to gain knowledge about how to support designers to design successful brand extensions. The ‘Behavioural research line’ (blue) will be alternated with knowledge about how designers can use these insights; this will be termed the ‘Design based support’ line (purple). The purple line describes the design-based support leading to the creation of a tool to support designers. This part will provide support for designers to influence the above-mentioned factors to create successful brand extensions. In-between, the experiments (orange) that lead to new behavioural insights will be discussed, to support the design-based line. The aim of this thesis is to bridge the gap between these areas. A visual representation of the structure of this thesis can be found in Figure 1.11.
The approach of this thesis is to focus on exchanging insights between behavioural research and design-based practice. A research-through-design approach (Findeli, 2010) was chosen, by developing, testing and adapting a framework in an educational context. By making use of novice designers within two Universities, we had the perfect ‘playing area’ to apply this approach in a highly realistic situation. This set-up provided us with the perfect target group, because these young designers know how to follow a basic design process and they are also keen to learn new knowledge and methodologies. The insights into the field of brand extensions are fed into an educational context and applied by bachelor and master’s students industrial design engineering each subsequent year. The result is a model that leads to (1) insights about designing for brand extensions focused on marketers and design managers; and (2) an educational framework that can be used for designers to design successful brand extensions that enjoy greater success.

The design research methodology (DRM) (Blessing & Chakrabarti, 2009) was used as a guiding principle and woven into Figure 1.11 to help address the research questions and build on existing research knowledge. In Chapter 1, the focus has been on research clarification. In this chapter, the research motive became clear - resulting in the research questions and the approach to be taken.

In Chapter 2, the role of the designer in creating successful brand extensions will be further discussed. First of all, an overview is given to explain the importance of the aesthetic appearance in determining product success and understand the processes followed by designers. Subsequently, the relevant literature is discussed from a designer’s perspective to clarify the main topics and factors that need to be taken into account when designing the aesthetic appearance of brand extensions. As a result, the Brand Translation Framework was developed to support designers in creating a stronger connection between the brand and the brand extension by linking the explicit design features to the overarching core values of the brand. The outcomes of the model from two Universities in the Netherlands and Belgium are evaluated as the first stage of a two-step evaluation. This framework was used by approximately 500 students and showed that most students were capable of designing a successful brand extension using brand specific associations. However, not all of the designs were successful.

Chapter 3 aims at investigating less successful results of Chapter 2. The MAYA principle seems to influence the aesthetic preference of brand extensions in balancing the factors of typicality and novelty. A conceptual model is created that shows the effects of typicality and novelty on the success of brand extensions. In this descriptive stage, two empirical studies were executed focusing on the impact of these factors to create successful brand extensions, to gain a better understanding of how designers can use the aforementioned factors. The sub questions that will be addressed are: 3.1 Will the joint influence of typicality and novelty lead to a greater market success? and research sub question 3.2 What is the influence of the environment on the perception of novelty?
In Chapter 4, the results of the two empirical studies are used to form the basis for the prescriptive stage. In this part, the model was improved and tested in an empirical experiment with an increased sample size of 81 stimuli and evaluated by professional designers from 47 design agencies. The research sub question that will be addressed is 4.1 What is the effect of the interplay between brand fit, typicality and novelty on the success of brand extensions? Beyond the quantitative study focusing on the successful interaction, this chapter also discusses a qualitative study in which all protocols of professional designers are transcribed in order to provide an answer to research sub question 4.2 How do professional designers reflect on the interplay between typicality, novelty and brand fit?

In Chapter 5, the development of Teaching Framework to support designers to develop more successful brand extensions will be discussed using a research-through-design approach. The goal of this chapter is to validate if design support leads to more successful brand extensions answering the main research question: How can designers be supported in creating successful brand extensions. The second step in the two-step evaluation will be executed by performing an dedicated experiment to validate the Teaching Framework. The descriptive stage 2 will underpin the instrumentation that has been described in the previous chapters by splitting a student cohort into two groups. One of the groups received design support regarding the factors that had been found in the previous studies, whereas the other group received general “design support”.

Chapter 6 further discusses the interplay between the factors typicality, novelty and brand fit by investigating the boundaries of the model by again focusing on a prescriptive study. In two empirical experiments, the robustness and the applicability of the model is tested, by focusing on different types of product types (archetype versus multitype products). The first study discusses research sub question 6.1 How novel can a new brand extension be, compared to previous product-variants in order to accomplish the desired recognition? In this first study the focus is on investigating the role of the factor brand fit in relation to the factors typicality and novelty. In a second empirical study, research sub question 6.2 is addressed: what is the effect of novelty – for brand extensions – in archetype versus multitype products.

In Chapter 7, the synthesis of all studies will be discussed by leading to an answer to the main two research questions taking into account the research landscape as discussed in Chapter 1. As well as the discussion and presenting conclusions, this chapter will specifically describe how to use the knowledge developed in this research to improve practice in brand extension.
CHAPTER 2

The role of the designer in developing the visual appearance of brand extensions

Parts of this chapter were published earlier in three conference papers published in the proceedings of the International conference on Engineering and Product Design Education (E&PDE) in London, the proceedings of the Global brand Conference (GBC) in Porto and the International associations of Societies of Design Research conference (IASDR) in Tokyo.


“In the case of all things which have several parts and in which the totality is not, as it were, a mere heap, but the whole is something besides the parts” Aristotle (350 BC) translated by W.D. Ross (1908)
CHAPTER 2  The role of the designer

This chapter will focus on the factors that influence the aesthetic appearance of brand extensions, with specific attention paid to the role of the designer. The role of the designer will be central in the discussion about how to create the aesthetic appearance of product innovations by alternating the factors that improve the success of brand extensions. By focusing on the literature about the overlap between brand management literature and design literature, the role of the designer can be investigated more precisely.

2.1 Introduction

One of the important aspects that influences the how-to-design question is the aesthetic appearance of brand extensions. As claimed by Page and Herr (2002), in the literature little attention has yet been paid to the importance of aesthetics relative to brand strength. In fact, the current literature barely considers the aesthetic appearance of a product as a driver to determine brand extension success (Brexendorf et al., 2015), even though this driver seems to have an impact on the successful acceptance of such brand extensions (Homburg et al., 2015). Although it might have a considerable influence on the perception of consumers, understanding the effect of the aesthetic appearance of a design is difficult to grasp. We need to carefully investigate this effect, since small adjustments in shape and colour can make a difference in accepting or not accepting product innovations (Blijlevens et al., 2012). This fragile window of success in launching brand extensions might lead to an enormous financial losses (Ernst & Young Global Client Consulting & ACNielsen, 1999) and it is therefore fruitful to better understand the complexity of this driver. Consequently, this underlines the significant role of designers in creating successful brand extensions. The aesthetic appearance of new product innovations, such as the Dyson supersonic hair dryer discussed in the Introduction, is determined by designers. It is their job to merge all relevant knowledge and translate the intended message into the visual appearance of a product innovation that will be accepted by consumers. This challenging task is complex, the results are hard to predict, and companies have to cope with much uncertainty about whether these designs will be accepted or not. Therefore, it might be useful to achieve a better understanding of the approach of designers and how they deal with the complexity in embedding brands’ DNA (e.g., applying a distinctive shape or recognizable colour combination) into a new product. Moreover, it is important that designers become aware of the impact that visual design can have in communicating product novelty (Radford & Bloch, 2011) and their impact in creating successful designs (Homburg et al., 2015). In fact, designers need to know what determinants are considered to lead to more successful brand extensions. How many typical characteristics are necessary to design a brand extension that will be recognized and (possibly) accepted by consumers? Moreover, how novel can brand extensions be? A more in-depth study is necessary to better understand the role of designers in creating the aesthetic appearance of brand extensions and what factors might impact the success of these designs.
2.2 The role of aesthetic appearance in communicating brand identity

In our current ‘experience society’ it is increasingly important to develop products with a strong, precisely targeted and distinctive character (Bloch, 1995; Cooper & Press, 2003). In the auto-hermeneutic example in the Introduction to this thesis it was already made clear that consumers are exposed to a multitude of ‘experiences’ such as the overwhelming choice of product alternatives when walking into a shop or the merchandising of those products in the shop. The focus of this thesis is on the product design itself as an important carrier in communicating the message of a company (Crilly et al., 2008). Because the range of in-store alternatives is often so great, it is usually necessary for companies to differentiate themselves from their competitors. When the functional characteristics of products and their prices are the same, the aesthetic expression of a product is a useful way to differentiate it from its competitors (Cooper & Press, 2003; Kotler, 2000). One of the most commonly used methods to increase the aesthetic expression and to create recognisability among consumers (Kapferer, 2008) is branding. According to Zajonc (1968) and Bornstein (1989), the positive effect of branding also increases with repeated, unreinforced exposure and thus the familiarity of a stimulus. In other words, when consumers are more familiar with a certain brand and its visual expression, it is more likely that such consumers remain faithful to the brand. Therefore, it is vital to distinguish a brand from the competitors through a strong and recognizable brand identity (Kapferer, 2008).

Many companies describe their vision and mission on their website and some even use brand models to enlarge the brand experience enjoyed by consumers. This outward expression of a company or a brand, including its name, trademark, communications, and visual appearance is termed the corporate identity and reflects how the company wants consumers to perceive the brand (Hesket, 2002). If consumers have already been exposed to a product through other communication channels (for example viewing the website or an advertisement for the brand), they will be more confident of buying a product because they are more familiar with the brand (Kapferer, 2008; Kotler, 2000, 2003). Through the design consistency of a corporate identity, a brand can develop a solid base on which to create new recognizable products (Karjalainen, 2007; Karjalainen et al., 2010). Nevertheless, the most direct part of contact between a brand and consumers is the product itself (Crilly, 2005) which - to a large extent - influences consumers’ preferences (Bloch, 1995).

The design of a product acts as a carrier of various symbolic meanings (Krippendorff & Butter, 2007). These meanings are a result of perceiving all the specific design attributes together in the visual appearance of a product and will influence the consumers’ product choice in several ways. In the literature, six roles for product appearance for consumers are identified (Creusen & Schoormans, 2005): (i) communication of aesthetic - ; (ii) symbolic - ; (iii) functional - ; (iv) and ergonomic information; (v) attention drawing; and (vi) categorization. These six roles are merged in the visual appearance of a product and can hardly be judged in isolation. However, consumers mention the aesthetic and symbolic role as being most important in determining product choice (Blijlevens et al., 2009; Creusen & Schoormans, 2005). Although consumers might not relate to all the aspects above, it should be noted that valuing one aspect does not automatically mean that the other aspects do not have important roles. Consumers might not be conscious of their own process of selection, because these aspects are closely related to each other. In fact, the visual appearance of a design acts as the medium of communication between the user and the designer and plays a key role in conveying the intended message in terms of functionality, usability, symbols and so on.

Even for products in an environment that is less prone to judging a product on its aesthetic quality, the ‘design language’ is still important. Imagine a farmer having to make a choice between the two industrial chopping balers shown in Figure 2.1. If the functional aspects and the price of these machines are comparable, it is assumed that a majority of farmers will choose the left design over the right design. Their choice will probably be based on a better expected functionality and usability, while the aesthetic appearance of the right machine shows a more compact, dynamic and moveable design. In this case, the styling of the machine plays a key role, not only in communicating the core values of the brand, but also in conveying direct information about the functionality and usability of this device. To better understand the choices made by such farmers, we must first delve into the process of embedding specific characteristics into the appearance of a product. The powerful and dynamic design of this chopping baler refers to the ‘character’ of a brand (Govers, 2004; Govers & Mugge, 2004; Govers & Schoormans, 2005). The designers aimed to translate specific human traits into the aesthetic design of a product to create a certain recognizable ‘personality,’ which reflects to the ‘character’ of the brand. The recognizability of this character plays a significant role in consumers’ estimation of the performance and overall quality of the product. Therefore, it is important to carefully investigate how designers can communicate this ‘character’ and create products that act as a carrier of meaning to convey the intended message.

Figure 2.1  Two chopping balers with the same functionality but different visual appearances.
Note: A. Welger RPC 445 Tornado, designed by Flex | Innovation for Lely Industries (Flex | The Innovation Lab, 2010); B. Krone Round Pack 1250 MC, designed in 2013 (Krone, 2013).
When designing brand extensions it is important to create designs that not only appear attractive but also carry distinctive references to the ‘character’ of the brand (Govers & Schoormans, 2005; Karjalainen, 2007). The appearance of the product must be designed in such a way that consumers will immediately recognize the character of the brand or the company, even without seeing a logo. One way to achieve this is to design the complete product, from the three-dimensional form to the details of the product, in such a way that it fits the DNA of the brand which is based on the corporate identity. This can be achieved by embedding separate design attributes in the design of a product to communicate the ‘character’ of the brand, such that a product may look ‘sturdy’, ‘innovative’, or ‘dynamic’. Such distinctive references are based on specific associations (Krippendorff, 2005). Some of the associations are explicit, such as ‘the angularity’ or ‘curviness’ of a product, and some are more implicit, such as a ‘sophisticated’ or ‘nostalgic’ design (Crilly, 2005; Karjalainen & Snelders, 2010). Explicit visual cues can be immediately recognized and pointed out in the design as, for example, the highly recognizable grille of a BMW car. Repeating explicit cues in several product lines of the brand will lead to a more congruent, consistent and recognizable design language (van Rompay et al., 2009). On the other hand, implicit cues are not immediately distinguished. However, when using such cues in the visual appearance of a product they ‘make sense.’ The implicit cues often refer to the brand values of a company and the translation of these values is crucial to help a company develop a strong brand. One of the most important values promoted by Volvo is ‘safety.’ In Figure 2.2 we can see two drilling machines for the Skil brand in which two car brands, Volvo and Citroën, were used as inspiration. In the design based on Volvo, robust volumes and horizontal and parallel lines are incorporated to emphasize sturdiness and reliability, referring to the core value of safety. However, the design based on Citroën uses more explicit skewed and curved lines with tension to refer to the dynamic and speed values. In other words, the visual appearance of a product communicates the brand values and leads indirectly to the core values of the brand (Keller, 1998). The designers of Lely clearly paid more attention to the appearance of the baler compared to their competitor. They created a more fluent form-language and emphasized the ‘compacting’ functionality of the baler with a funnel shape in the silhouette, highlighted by the grey panels. The appearance of this product evokes a more active association and looks more well thought out than the rather sturdy look of the competitor. This will contribute to the vision of the company, which is as “farming innovators” (Lely, 2022), and its associated core values of: innovative power, reliability, passion, and ambition.
Therefore, through design consistency, a brand can develop a solid base on which to create new products for improving brand identity (Karjalainen, 2007; Karjalainen et al., 2010). However, such products still need to be recognized by consumers. To create more recognizable product innovations, it is important to understand the cognitive processes of perceiving such innovations, which will be discussed in the next sub-section.

2.3 Understanding the cognitive process of evaluating product innovations

When perceiving a product innovation, the consumer will process information based on the design of a product, which will influence the emotional response of the consumer (Crilly, 2005; Crilly et al., 2008; Leder et al., 2004). Such cognitive processes are important to understand, especially in terms of our human sensory system ‘picking up’ certain design elements. According to Leder et al. (2004), aesthetic experiences involve five stages: perception, implicit classification, explicit classification, cognitive mastering, and evaluation (Figure 2.4).

That model explains the stages of processing information, in which the first three stages are automatically and unconsciously generated by consumers, and the last two stages are more deliberate and conscious. The model also differentiates between aesthetic judgement and aesthetic emotions, where an aesthetic emotion is a result of the cognitive processing of the stimuli and an aesthetic judgement is a result of the evaluation.

This model is created based on analyzing artwork from a museum; however, the research indicates that this framework can also be applied in other fields in which aesthetic appearance is important, such as product design. This framework explains the importance of perceptual analysis, during which consumers order and group stimuli as belonging to a certain category (Loken et al., 2008). Consumers will search for recognizable ‘categories’ when evaluating designs (Meyers-Levy & Tybout, 1989). Adding a specific brand to this process will result in a different type of categorization, namely brand categorization (Kreuzbauer & Malter, 2007) in which consumers are able to identify a new product as a member of a particular brand category. So, for example, consumers will not only recognize a product as belonging to the category ‘automobiles’, but they will also connect a specific brand to this categorization, so ‘a BMW automobile’. When designing a product based on a specific brand, the recognition of new products is influenced by brand-typical design attributes (such as the typical grill of a BMW car or the typical round headlight, the wasp waist and the front panel of a Piaggio Vespa motor scooter see Figure 2.5) (Leder et al., 2007). When these brand typical attributes are well incorporated in the design of an object, it will lead to a positive brand evaluation.
However, this is exactly where it can go wrong. Recognition of the brand typical design attributes by consumers is not difficult. Yet incorporating such design attributes by designers into the design of a completely new product is not an easy task. The example of Figure 2.5B shows an effective example of incorporating existing design attributes into a new product design, where the designers were able to translate the character of the brand (elegance, stylish) into the new product design. However, it can also easily go wrong. Figure 2.5C also shows an ineffective example where the designers were not able to incorporate the character of the brand resulting in a more clunky design of a food mixer.

Little attention has been paid to the role of design in product perception (Kreuzbauer & Malter, 2007; Veryzer & Hutchinson, 1998). Keller talks about the importance of recognizable associations and evoking the required brand knowledge structure (Keller, 2013) when designing product innovations, but he does not clarify how these associations and brand knowledge structures can be embedded in specific visual design attributes. Which types of visual design attribute enable brand recognition and will create such a powerful brand knowledge structure? A subtle change in lines or colours could already have a large impact on consumer evaluation (Leder & Carbon, 2005), and therefore in misunderstanding the intended character of the product or even worse: misinterpreting the functionality of a product. Consumers might be confused if they do not know how to use the product or if they do not recognize specific brand characteristics referring to the mother brand. The designer, who is responsible for translating the desired message, needs to be aware of the importance of his or her task.

The aesthetic appearance of products is essential in processing information which is crucial in determining the level of fit between the brand extension and the mother brand (Kreuzbauer & Malter, 2003; Kreuzbauer & Malter, 2007). A better understanding of conceptual knowledge and how consumers categorize the aesthetic appearance of product innovations is necessary to understand how product design information is processed by the human sensory system. The four stages of Palmer (Palmer, 1999) in Figure 2.6 show a clear overview of the steps that are followed, starting with the retinal image which is the moment we actually see the product innovation for the first time. In its image-based processing, the brain starts processing information by recognizing simple features such as edges and colours. After that, the surface-based processing (estimating the main volumes, materials, textures) will take place followed by final object-based processing, in which the various parts are connected to recognizable objects. In the final stage, the categorization of objects (Loken et al., 2008; Meyers-Levy & Tybout, 1989) takes place and consumers are able to determine to which category a product design stimuli belongs (Figure 2.6). This stage can be enriched when evaluating a product from a specific brand, because consumers will be able to recognize the brand while categorizing the object, and this is termed brand categorization (Kreuzbauer & Malter, 2005; Kreuzbauer & Malter, 2007). In the work of Kreuzbauer and Malter, four bases of brand categorization are proposed: (1) the perception of product affordances; (2) brand-product categorization; (3) brand-sign categorization; and (4) brand-style categorization. Especially brand-product categorization and brand-sign categorization play significant roles in recognizing a brand and will be explained further.

![Figure 2.6 Palme's stages of product design perception (1999) in which brand categorization is added as last stage by Kreuzbauer et al. (2007)](image)

Brand product categorization represents the general product category in combination with the brand-specific knowledge. During the object-based-processing stage, consumers are able to connect the volumes of previous stages within certain product frames or schemes (Meyers-Levy & Tybout, 1989) by recognizing certain perceptual symbols (Barsalou, 1999). For example, consumers can recognize a motorbike by its structure, through pointing out the distinct parts. A motorbike exists of an engine, wheels, steer, tank, saddle etc. which cognitively forms the specific frame of a motorbike. It is important to realise that consumers are usually not able to remember the motorbike as a holistic whole, but one recognizes the components or combinations of components (Barsalou, 1999), which are referred to as geometric icons or ‘geon’ structures (Biederman, 1987; Kreuzbauer & Malter, 2005). More specifically, it refers to spatial arrangements of the primary volumetric components of a product design based on recognition through components (Biederman, 1987). Consumers will first recognize the silhouette of an object (Figure 2.7A) and subsequently categorize the separate components into clusters that will categorize this object as belonging to a specific
type of product (Figure 2.7B). In brand product categorization, consumers can combine their knowledge of a certain product category (geon-structure of a motorbike) with the brand-specific knowledge (brand specific orientation of such components). So, for example Harley Davidson has a completely different center of gravity compared to Ducati because the front fork is positioned in a more diagonal position, resulting in a recognizable geon-structure. Different combinations of these so-called geons will lead to new product types within the main category.

Figure 2.7 Recognizing the surface and object-based structure of a motorbike

Brand-sign categorization conveys information that is characteristic of a specific brand, such as the double-kidney BMW grill or the iconic bottle shape of Coca Cola. These specific characteristics evoke a certain message and can become quite powerful in recognizing a brand. Additionally, research has revealed that the recognition of these characteristic elements takes places mainly during surface-based processing (Kreuzbauer & Malter, 2007). This means that such iconic signs seem to play a crucial role in determining a powerful and recognizable geon-structure. Even before consumers are categorizing what they see, they are aware of such iconic characteristics. In Figure 2.8 an example is visualized of recognizing a motorbike from Ducati (Motofichas, 2021) from surface-based to object-based to category-based, where the iconic signs of the triangular framework might already be noticed during the first stages of categorizing (red circle). We argue that designers could benefit from knowing when and how to apply these iconic elements in new product innovations in order to promote recognition. However, not all explicit cues used in product design become iconic in determining the categorization of products. It is therefore interesting to know more about this process. This can make the difference in success or failure when launching new brand extensions. The role of designers is decisive in this process of translating the identity of a brand into recognizable geon-structures. However, this so-called semantic translation process (Krippendorff, 2005; Krippendorff & Butter, 2007) is difficult for designers to incorporate in creating new products.

One of the methods that could support this process is the semantic transformation method (Karjalainen, 2004; Karjalainen & Snelders, 2010) which will be discussed in the next chapter.

2.4 The influence of the designer in developing the visual appearance of brand extensions

Many studies have argued that brand extensions should have a strong relation with the parent brand in order to become successful (Aaker & Keller, 1990; Deng & Messinger, 2021; Völckner & Sattler, 2006). Aaker and Keller proposed that the fit can be defined as similarity between the parent brand and the extension product (Aaker & Keller, 1990). However, the exact definition of how to guarantee the relationship between parent brand and brand extensions remains unclear. In the literature, the link with the visual appearance of the brand extension is barely taken into account, while the importance of the aesthetic appearance of products does seem to have an important role. The connection between brand strength and the aesthetic appearance seems to influence consumers’ product liking (Page & Herr, 2002), where brand-specific associations (Broniarczyk & Alba, 1994; Martínez Salinas & Pina Pérez, 2009) between the parent brand and the brand extension are considered to form an important connection. However, incorporating these brand-specific associations into the creation of brand extensions is not an easy task for designers. Just telling designers that brand-specific associations matter will not automatically lead to more successful designs. To understand the complexity of designing in a better way, the approach taken by designers will be explained.
Designers have a completely different approach from scientists in solving problems (Cross, 1982). First of all, designers deal with a different kind of problem, the so called ‘wicked’ problem (Rittel & Webber, 1973), that involve multiple disciplines and fields which all have an influence on each other. This could vary from more abstract societal issues such dealing with climate change by designing more sustainable packaging or more concrete product design cases as in the example of Dyson's hair dryer. In the latter case, the designers need to develop a physical product within technical limitations (will it provide the required functionality?), psychological constraints (will consumers use this device in the correct way?), marketing (will consumers buy this device and is it commercially viable?). All these fields have to be merged in order to lead to the optimal design of the product. In addressing these complex problems, designers use their common approach of analysing, ideating, conceptualization and evaluating. Designers are trained to find solutions for these ‘wicked problems’ by experimenting (Lawson & Dorst, 2009) rather than coming quickly to one ultimate solution. An important characteristic of this designerly approach is that there is not one linear path to the solution; there is no true or false answer but rather a good or a poor solution. Different designers can come up with completely different results, where both solutions can be successful. Furthermore, their ways of working can be quite chaotic and based on an intuitive approach that builds on their levels of expertise. More experienced designers are more capable of translating a design brief into a realistic solution. However, novice designers still need to be trained and gain more experience in exploring various solutions and selecting the optimal match. Currently, designers are taught to follow specific methodologies, such as the stage gate model (Cooper, 1990) or the double diamond model (Design Council, 2005) to help create new product (services) (Dorst, 2015). These methods are crucial to guide them during the process and can even become a mental support for them in training them as more professional designers (Daalhuizen, 2014).

Especially for novice designers, these theories are helpful to guide them throughout this chaotic process. However, even for experienced designers these methods might also be useful to substantiate their decisions leading to an optimal design. How can we support designers in the actual transformation of values to characteristics and how can we embed such values into new product innovations, i.e., brand extensions? To address this question, it is needed to elaborate more on the actual process of communication between designers and users. The communication between designers and users takes place via the designed product itself (Figure 2.9), while both are not in the same location. Therefore, the role of the designed object is important, because it needs to communicate the functionality, the usability of the product, and the symbolic meaning of the product referring to the three levels proposed by Norman: visceral, behavioural, reflective (Norman, 2004).

Crilly et al. (2004) explains the process of the incorporation of a specific meaning into a design by using a basic communication model (Figure 2.10) in which on the one side the design team (source) is responsible for the design of the product. This product can be seen as the transmitter of the message (transmitter). On the other side, the consumer (receiver) perceives the product through sensory perception accompanied by both affective and behavioural responses (destination). The actual communication process takes place in a certain environment (dotted line in Figure 2.10) such as in a shop, so that means the designer and user are not in the same place at the same time. Thus, the product itself should convey the intended message without interference by the designer.

The process of perceiving objects seems quite straightforward, but in reality, is a complex and non-linear process influenced by many more factors than the simple schematic overview in Figure 2.10.
Figure 2.11 shows a more elaborate overview of the most important aspects that influence the consumer’s perception. It makes clear that opting for a specific product is not straightforward, but also depends on several factors that might not always be clear to designers, such as the personal characteristics, situational factors or cultural influences (Bloch, 1995). However, there are also factors that can be considered by designers. We have already discussed the cognitive processes of consumers in the previous sub-section. In this sub-section, the focus will be on the factors that designers can influence. The model of Crilly shows a clear overview of both designer and consumer in which the product can be seen as the mediator. In the overview shown in Figure 2.11, we again highlight the importance of the aesthetic appearance in starting the sequence towards finally accepting a brand extension. Consumers will (sub)consciously perceive objects by observing and processing information about the object, followed by an aesthetic impression, a semantic interpretation and a symbolic association (Crilly et al., 2004). Finally, this results in an affective response (emotional response to the stimuli) and a behavioural response (approach or avoid). Crilly focuses more on the variants of responses of the consumer in perceiving the product; meanwhile the other side of the scheme is rather underexposed and would be quite interesting to investigate. What about the communication between the company and the designer and how will the intended message of the company be translated into the design of a new product by the designer?

The designer is dedicated to translating the corporate identity of the brand into a design language that will communicate ‘the right message’ to the consumer. The main task of designers is thus to identify and develop design features that evoke the desired associations by consumers when they perceive the new product. However, it is a difficult job to manipulate the possible design features all at once to elicit the ‘correct’ associations. In the literature, there are many models that describe brands and their brand values, such as the Brand Identity Prism by Kapferer (2008) and the Brand Key model (Roscam Abbing, 2010). However, there are few models that focus on the process of translating those values into new products (Karjalainen, 2007). In practice, translating the core values of the brand into new products tends to be based merely on the experience and intuition of the designer (Dorst, 2007). The semantic translations method (Karjalainen, 2004; Karjalainen & Snelders, 2010) distinguishes the use of explicit and implicit cues to design more recognizable products and discusses the field of semiotics. In the following sub-section, we will therefore elaborate on the meaning of products by delving into the field of semiotics and its relationship to specific design cues.

2.5 Understanding the meaning of a stimulus using semiotics

When observing a stimulus, the physical design features together evoke certain associations, which refer to the symbolic meaning of a product (Krippendorff & Butter, 2007; Muller, 2001). The (subjective) meaning of objects can be explained by using linguistic attributions to explain what can be seen - for example, a powerful bike. The word "powerful" describes the perception of all physical design features (form, proportions, colours, materials, etc) into words. These words help to clarify, distinguish and qualify a product and are used to reflect the perceptual and emotional effects of a product. Describing the meaning of products in words is closely related to the field of semiotics, which actually means “the life of signs within society” as defined by the Swiss linguist Ferdinand de Saussure (Britannica, 2022). Peirce defined a sign as follows:

“a sign is something, A, which brings something, B, its interpretant sign determined or created by it, into the same sort of correspondence with something, C, its object, as that in which itself stands to C.” (Peirce, 1955)

So there are three basic semiotic elements: a sign (R or representamen) which is a perceptible object, the object (O) which is the reference, and an interpretant (I) which is the effect of the sign (Peirce, 1955). The triadic relationship between these aspects results in the explanation of a specific meaning. This can also be translated to the field of design (Karjalainen & Snelders, 2010; Steffen et al., 2000; Vihma, 1995) by connection of the brand values to specific design features.
In Figure 2.12, the letter ‘R’ stands for a specific design feature (such as a specific recognizable feature – for example, the recognizable shoulder line of Volvo cars). The red line in Figure 2.12 shows a strong curve which can be seen as the representation of a shoulder. This shoulder can be observed all over the side and even rises at the rear, which emphasizes the protective nature of the car. This shoulder line is connected to the ‘O’ (object of reference) which refers to the brand value of ‘Safety’. The ‘I’ refers to the interpretation of the feature, which in this case refers to “interpreted as powerful and protective.” On their website, Volvo explains this feature as:

“The wide shoulder line stretches back from the headlamp with a sharp line to echo the rising beltline. As it reaches the end of the rear door it sweeps up into an integrated “hook”, inherited from the legendary P1800. The highlight continues rearward into a very full powerful section that revolves into the tail lamps.” (Global Newsroom Volvo, 2012)

By repeating certain design features in the product family, the link between these three elements will become stronger. Creating a strong triadic relationship between one design feature and its related value seems to be achievable. However, incorporating several specific design features in a new product design is difficult and requires an accurate translation of the separate features into an integral product design. Simply combining all separate design features into a new product does not lead to the ultimate solution, simply because the sum of all parts does not automatically lead to the best design as already pointed out by Aristotle (Ross, 1908). It is vital to create synergy between the parts so as to lead to a more meaningful final product. However, creating synergy between all the separate parts is a challenging task.

Merely a subtle change in the proportions of a specific form or curve can by itself lead to a completely different interpretation of the meaning of an object. In Figure 2.13, the redesign of the Fiat Multipla (Santos, 2020) can be seen. The basic silhouette of both designs remains similar. However, by only changing subtle lines and curves on the side and front of the car, the overall meaning of the car is less ‘clumsy’ and more powerful. The subtle indentation on the side gives the car a sleeker look. The kink at the rear of the car gives it a faster appearance.

Using the same kink line in the opposite direction at the front of the car emphasizes its fast appearance, resulting in a completely different meaning (Krippendorff & Butter, 2007). Designers therefore need to be supported to be able to translate the more abstract semantic meaning into specific physical design features. In the next sub-section, the link between semiotics and such specific design features will be discussed.

2.6 Explicit and implicit design cues to transfer meaning

The design of a product combines both tangible and intangible characteristics, referred to as explicit design cues and implicit design cues (Karjalainen, 2004; Warell, 2001). The explicit design cues are the characteristics of a product that can be pointed out, such as the angularity of a product or a specific curve. Consumers easily recognize such explicit characteristics. The implicit design cues are the combined characteristics that will lead to a specific association. These characteristics cannot be directly pointed out in the product but are perceived by the consumer when experiencing the complete product. The implicit associations often refer to the brand values of a company and the translation of these values into the product is crucial for a company to build a corporate reputation and is necessary to the development of a strong brand. The separate explicit design characteristics in products will build up to a total image, which in the most ideal situation will evoke certain associations that correspond with the implicit design associations (Karjalainen, 2007). That is because such associations are a result of experiencing all the specific design characteristics together in the complete product.
By consistently using recognizable explicit cues and implicit cues, a design that evokes the desired associations will be created. However, as designers it is difficult to understand what the most recognizable explicit cues are and which of these explicit cues are needed to evoke the desired associations. The design format analysis (DFA) model (Warell, 2001) supports designers in more objectively determining the most important recognizable explicit cues of the brand. In that model, the designer analyses the design format across various generations of products that can provide valuable information regarding the use of styling features. The designer starts by analyzing the history of the brand (Figure 2.14), followed by an analysis of significant form elements, compositional principles, colours and materials throughout the complete portfolio (Figure 2.15). Subsequently, the embedding of these cues in the complete product portfolio will be reported by presenting them in a table. By assigning a value (0, 1 or 2) to indicate the degree of similarity with styling features of the other products, it is possible to assess whether a new product will conform to the common design format of the product family (Figure 2.16). Finally, the most and least typical products can be identified and the most and least typical form features.

This method supports designers in gaining a better understanding of the explicit design cues of a brand when designing a new product that belongs to the same product family. In the design format analysis shown in Figure 2.16, one can clearly see how specific design features are connected to a specific product category. Only a few of the explicit cues of the vacuum cleaners are repeated in the other product categories, such as the air fan. Therefore, this method lacks clarity about how to apply the current visual form language in new product categories. When a completely new product design (in a new category) needs to be developed, the designer must first explore the visual language of this new-to-design product in order to become familiar with its recognizable features. After that, the visual language of the brand can be applied to the design.

Figure 2.14 Historical overview of different Dyson product lines from 1993 until 2014
Note: Graphic representation made by students (Anonymous, 2015b) where the bottom line shows the development of the first Dyson product line: steel vacuum cleaners, followed by normal vacuum cleaners and handheld devices, the development of the washing machine, the air blade and air fan.
Figure 2.15 Overview of reoccurring explicit design features from Dysons’ portfolio. Note: the repeated explicit design features are numbered in the top from 0-12; in the column below the explicit features are visualized in various Dyson products using red lines (Anonymous, 2015b).

Figure 2.16 Design format analysis (Warell, 2001) showing the most recognizable features and products of the Dyson brand (Anonymous, 2015b). Note: On the horizontal axis we see the Dyson product lines; on the vertical axis we see the explicit cues from Figure 2.15. The highest number on the bottom row in black represents the most recognizable Dyson product (DC47, DC49 and DC66), whereas the yellow bar (at the right) shows the most remarkable design features (symmetrical shape and metal appearance).
For brand extensions, this semantic process is more complex. The design language of a brand cannot be literally translated for a brand extension because the products that are to extend the brand are mostly from a completely different category, with specific, commonly used design features for that category. Therefore, the extension must be a good representation of the brand and at the same time has to retain recognition in the product category. For example, the new Dyson hairdryer must be recognized as a hairdryer, but also has to share a certain amount of its design language with existing Dyson products.

To summarize, several scholars appoint that the role of the aesthetic appearance of a product is an important medium in conveying a particular (symbolic) meaning (Cooper & Press, 2003; Crilly, 2005; Krippendorff & Butter, 2007; Steffen et al., 2000; Vihma, 1995). However, only few of them actually support designers in the process of conveying an intended meaning by incorporating explicit design features (Karjalainen, 2004; Warell, 2001). These analytical methods provide a better understanding of the salient explicit features of a brand. However, how to translate those explicit cues to evoke the intended meaning in new product innovations, remains unclear. This complex process is, therefore, still a matter of exploring and trying to find the optimum match.

The methods discussed above, describe the importance of the connection between the implicit associations and explicit design features, however, how to incorporate the connection in a design process needs more attention. In fact, the actual semantic transformation of the intended ‘character’ of the brand (DNA) to the correct ‘design language’ is still based on the designer’s intuitive approach. Furthermore, merely combining all explicit cues will not automatically lead to a meaningful design. Our previous research showed that when the translation of the design language is limited to only the explicit cues, the resulting designs are less valued (Mulder-Nijkamp & Eggink, 2012). It would be helpful to create a methodology that also contributes to a better recognition and translation of the implicit associations of brands and their brand values. The first steps towards a model that aims to better connect the explicit cues to the implicit values of a brand will be presented in the sub-section.

### 2.7 Initial model to support in designing successful brand extensions

The literature and tools discussed above have led to the development of a model that supports the designer in taking the optimum decisions when translating a corporate identity into a design language. This model is called the ‘Brand Translation Prism’ (Mulder-Nijkamp & Eggink, 2011, 2013a; Mulder-Nijkamp & Eggink, 2013b) and helps the designer to deconstruct the identity of the brand into specific design features. By analysing the history and current product portfolio of the brand, designers become aware of the design language of the brand. By explicitly connecting such design features to the most important implicit associations and core values of the brand, consumers will be able to recognize the brand more easily. The prism starts by analysing in which way the specific design cues of the brand refer to the core values of the brand. The translation of the more tangible features towards the more abstract values can then be achieved by referring to first and second order associations (Krippendorff, 2005). When analysing the brand by ordering such associations, designers will become more aware of the most important values of the brand. An important note must be made that visualising the important ‘ingredients’ for designers might help to gain a better understanding of the brand. However, it does not automatically guarantee the synthesis of these ‘ingredients’ into a more successful meaningful product. We do believe that by using this prism and practising its application this in real life cases, it will become more than just an instrument. In other words, when designers are more trained in incorporating the intended implicit associations into the visual appearance of products, the process of designing becomes more intuitive. It can be compared to the example of playing golf. Having all the ingredients at your disposal does not automatically lead to a good golf swing. However, for some golfers it becomes a habit as if it were second nature.

The initial Brand Translation Prism can be seen in Figure 2.17 and is divided into three levels: (1) physical design features; they refer to the explicit cues of the products and are subdivided into graphical aspects (2D), form features (3D) and everything in-between (2.5D); (2) associations; these refer to the implicit associations which are evoked by the design features; and (3) overarching values; this layer defines the ideology of the brand by presenting the three overarching core values. Each level is discussed below.

![Initial Brand Translation Prism visualizing three layers representing the physical design features, associations, and values.](image-url)
1 Physical design features

Based on the cognitive processing of information as presented in sub-section 2.2, consumers experience various stages when perceiving stimuli. These stages build towards a categorization of an object (Palmer, 1999) and could also be enriched by a brand (Leder et al., 2007). Currently, designers more or less intuitively merge these separate stages or categories while creating product innovations by creating a silhouette (surface-based) and integrating brand specific features (category-based). However, it could be useful to visualize these categories individually, so designers know which ‘ingredients’ can be used to design a new product. Furthermore, we also consider the relevance of the iconic cues of a brand (for example, the triangular framework of Ducati or the air intake of a Ferrari Testa Rossa) explained in the brand-sign-categorization (Kreuzbauer, 2002; Kreuzbauer & Malter, 2005) referring to the ‘graphical elements,’ which can be encountered in an early stage and seems to form a crucial role in distinguishing and recognizing a specific brand.

Therefore, a prism was proposed (Figure 2.17), where the bottom of the prism distinguishes three dimensions in recognition; namely 3D, 2D and 2.5D. By dividing the design features into these categories, designers are able to gain more understanding of the design language of a brand. Consumers can recognize the three-dimensional shape of a product to be typical for a specific brand, such as the comparable silhouette (3D). This dimension refers to the surface-based processing level, at which general surface and spatial information is processed, and consumers can distinguish the silhouette of a design. Yet this will still be perceived at an abstract level without processing three-dimensional information. Besides the three-dimensional form, a product can also be recognized as belonging to a specific brand by using a specific colour, logo or a text (2D). This dimension is concerned with the graphic representation of the brand and refers to the object-based stage, in which consumers are already capable of processing more detailed information about the design. It reveals a more detailed relation of all separate parts of the design.

Between those two dimensions, we have identified a new area which we term the graphical elements of a brand (2.5D). At this level, the two-dimensional and three-dimensional worlds meet each other in-between, and it refers to the iconic explicit cues of a brand. Such cues refer to recognizable features that can be seen as ‘3D logos’ embedded in the form language of a brand. Examples of such graphical elements are the recognizable grill of BMW, or the protruding letters on a Grolsch beer bottle (Figure 2.18). These elements are more than a 2D logo and refer to the recognition of a brand by connecting the values of the brand in 2D and 3D form language.

First, the kidney-shaped grill of BMW, which can be considered as one of the most recognizable features of the brand used throughout BMW’s complete portfolio. This feature is incorporated in its complete portfolio and it becomes more or less a three-dimensional logo of the brand. The other example is based on the design of the Grolsch beer bottle. The protruding letters on the design of the green beer bottle can be seen as more than just ‘placing’ a logo. The designers carefully embedded the 2D design features with the 3D language and connected the core values of authenticity, tradition and craftsmanship by translating them into a sensory experience. The designers embedded the curly font in the structural design of the bottle, so consumers will actually feel the craftsmanship by holding the bottle and touching the letters. The designers claimed to make an iconic brand tangible by creating a sensory experience:

“The new design for the swing top bottle is an amalgamation of the opening ritual, the unique sound when popped combined with the embossed grip detail and the green glass of the returnable bottle” (Verbrugge, 2012 from Flex/Design the design agency)

By designing the bottle using the 2.5D element, Grolsch won the prestigious ID award and was identified as the best Dutch packaging design by creative directors. To emphasize the use of the graphical element of the logo, it was also incorporated into other objects that were designed for Grolsch (e.g. glasses, a beer tap etc) creating a recognizable product family.

The graphical elements (2.5D elements) can play an important role in improving and increasing the recognizability of a brand, because they are identified during an early stage of the recognition process (surface-based processing). If we persuade designers to actually consider this new level of creating brand recognition, it might lead to brand extensions that are more recognizable.
2 Associations

Physical design features lead to specific associations, which can be described in terms of linguistic attributions. As already described in sub-section 2.5 about semiotics, such linguistic attributions help to clarify and distinguish a product, resulting in a specific meaning. It starts by observing the stimulus (R). Subsequently, consumers interpret the stimulus (I) and it finally leads to attaching a specific brand value or meaning to a stimulus (O). This process of interpreting a stimulus and attaching a particular meaning is complex and can be interpreted differently by different people. Consumers often describe how they perceive an object in words. However, such words can be divided into two categories: first and second order associations (Krippendorff, 2005). First order associations are more objective and can be seen by everybody without particular capacity of understanding. They refer to aspects that we can point out in the design (such as a specific angular line, symmetry or a curved form). These words describe the form language of the visual stimuli by using specific words to clarify what consumers literally see. Most of such words refer to the Gestalt theory (Barsalou, 1999; Wertheimer, 2005). Second order associations are subjective and can differ among consumers, since they treat humans as knowledgeable agents (Krippendorff, 2005). By dividing the associations into two categories, designers can create an improved understanding of the semantic translation process.

These two levels of associations are important for connecting the explicit cues of the brand to the core values of the brand in order to evoke a more congruent meaning (van Rompay & Pruyn, 2011).

3 Core values

Ultimately, the analysis of all second order associations leads to the important core values that can be connected to the brand. Such core values can be a multidimensional construct of the functional and emotional values of the company focusing on the performance and psychosocial needs of consumers (Chernatony & Riley, 1998). All second order associations will be grouped together to refer to the most remarkable overarching brand values. In most cases, the essence of the brand will be expressed by using three to five core values (Chernatony & Riley, 1998; Li & Sun, 2015) representing a recognizable and strong identity of the brand. These values represent the visual portfolio of the brand and can be used by designers to underpin specific design choices. By presenting these values, designers will be made more aware of the translation process and the use of specific explicit and implicit cues. By decomposing the visual design language of the brand into this prism, we believe that designers will be supported in their process of semantic translation. When designing a brand extension in a completely new product category, it could help them to recompose the brand again. They would have to start with the core values and work towards a new form language (explicit cues) that will connect the brand extension to the current portfolio.

The final version of the Brand Translation Prism is shown in Figure 2.19. During the analysis of a brand, the most remarkable levels of recognition are visualized in the prism to achieve a better understanding of the brand and its product, and can be used as an inspiration tool in the design process. The bottom of the prism presents the three main components that can be used in the design process: (1) 3D design features (main level); (2) the 2.5D graphical elements, which shows iconic elements between 2D and 3D (medium level – see also Figure 2.8); and (3) 2D graphic features (detail level). A better investigation of these components will lead to a better understanding of the brand language. However, using only these components to create a brand extension will not lead to a better design. The consistent use of all the levels in the Brand Translation Prism will lead to a design that will better reflect the ideology of the brand. By combining all these design features in a product, the intended message of the designer will be evoked, thereby resulting in specific associations.
is a 6-week project worth 3 ECTS and is also aimed at defining brand identity and translating the identity into new products. The goal of using the Brand Translation Prism was to see if students succeeded in designing brand extensions that enjoy greater success by decomposing the current ‘design language’ of the brand and recomposing this ‘design language’ in the development of a new brand extension. In Figure 2.20 a result of the course is shown, namely a filled-in Brand Translation Prism by a student pair from the University of Twente, analysing the brand Lamborghini. The students made an analysis of the brand according to the three levels of the prism, starting by defining the physical features of the brand at the top level (level 1).

Figure 2.20  Defining the core values for Lamborghini by using the Brand Translation Prism.

Note: BTP developed by students (2013a)

Subsequently, the students derived first and second order associations (level 2) from the visuals of the brand and finally they combined the wordings of the second order associations into groups that together form a certain keyword that refers to the core values of the brand (level 3). It should be noted that the students are free to decide how to visually present the link between the levels, it does not necessarily have to follow the same visual presentation as presented in Figure 2.19. The students of this example presented the prism showing all design features on top, followed by the associations and finally the overarching core values (bottom). Furthermore, it is important to know that the students are challenged to make their own observations from the product portfolio of the brand and to define the three core values that best suit the brand in their vision. In fact, this could be different compared to the values of the brand itself as presented on websites or communicated in some other way.

Over the years, the Brand Translation Prism has been used by approximately 500 students from two Universities in The Netherlands and Belgium and resulted in a high number of brand extensions. During the analysis of the results, it was found that almost all groups succeeded in presenting an overview of the link between the levels. Some of these brand extensions showed a clear link with the parent brand, while others were less capable in incorporating the intended design language. We specifically analysed those results where students were able to analyse the design language of the brand by using the Brand Translation Prism, but failed to design successful brand extensions. From these results, it seems that applying the prism to design a completely new brand extension is difficult. Reconstructing all design features in such a way that the brand extensions conveys the intended meaning is a challenging process. Furthermore, designers also need to incorporate the design language in a completely new product category. However, incorporating the recognizable explicit cues and embedding the values into designing a product for another product category seemed to be quite hard. Simply incorporating all explicit design features into a new design does not of itself lead to a successful design and might also result in ‘copying’ incorrect features. This is shown in Figure 2.21 by two bicycle designs for the Ferrari brand. It is clear that the concepts both make use of characteristic explicit cues of the brand. However, the designs are completely different.

Figure 2.21  Two different bikes for the Ferrari brand, in which design A is expected to better fit the parent brand compared to B.

Note: A. photo of a Ferrari Testarossa launched in 1984 (Vivian, 2020) & design of a Ferrari bike designed by students (Anonymous, 2011c); B. photo of a Ferrari F458 launched in 2009 (Almagan Collection, 2022), (right bottom) design of a Ferrari bike designed by students (Anonymous, 2011a)
The design of the group at the right (Figure 2.21B) has focused more on incorporating the specific design features of the shape of the Ferrari F438 into the design of the bike by copying the lines of the car quite literally. The design of the group at the left (Figure 2.21A) focuses more on the associations with the brand (power, Italian tradition, and 'a purebred racing pedigree'). To retain the Ferrari-feeling, they translated the remarkable air intake into the bike concept, as well as the rims of the car. This iconic design attribute can be seen as a representation of a 2.5D level-attribut. By referring to the well-known air intake, consumers might relate more easily to the brand when seeing the Ferrari bike. To summarize, the students who designed the left bike are using all levels of the Brand Translation Prism (including iconic design features), unlike the one at the right which only uses the physical characteristics of the brand. The pitfall of design B is that the designers became lost in copying the features of the car into the bike. These students forgot to take a step back and gain an overview of the complete product and therefore failed to integrate Ferrari's core values. The other important aspect of their design is that the bike is not particularly recognizable as a archetypical bike. In fact, the bike in the right picture does not convey the values of powerful and aggressive, but rather suggests to a velocipede, known as one of the first bikes in history (Figure 2.22). The connection to that old bike does not add to the current values of the brand. From this example, it can be concluded that there is a difference in analysing the design language of a brand by using the Brand Translation Prism and applying this design language to the design of a new product. The example of Figure 2.21 clearly shows that these students were capable of analysing the portfolio of the Ferrari brand, but the model did not support them during the actual process of designing the new brand extension. This example also shows there are more factors that need to be considered when designing a brand extension. To successful apply the design language into a new product category, it is also necessary to understand the categorization process (Loken et al., 2008) of the new product category.

When designing a brand extension in a completely new product category, it is important to investigate the known archetype of that product category. Consumers need to recognize the new product category to be able to categorize the product by using cognitive processes. After that, they need to recognize the identity of the brand.

To conclude, the consumers need to be able to recognize this brand extension as belonging to the product category of 'bikes'. Moreover, they also need to recognize the bike as designed for Ferrari by incorporating the correct design features leading to the Ferrari values such as powerful and fast.

The other aspect that was encountered when analysing the results of the brand extensions that failed was based on the novelty of the designs. It was found that some of the designs were evaluated as being too novel compared to the archetypical designs of that product category. Balancing between on the one hand a recognizable design using the 'correct' design features, and on the other hand recognizing the design as a member of the family seems to be crucial for the design of successful brand extensions. This balance shows similarities to the much-investigated MAYA principle (Loewy, 1951), stating that consumers prefer objects that incorporate the philosophy of 'Most Advanced; Yet Acceptable'. From the example of bike B in Figure 2.21 it was noted that the category of the bike was not correctly applied and resulted in a less successful design. Furthermore, the use of explicit design features was followed too literally, by just copying the features from the category 'cars' to the category 'bikes'. The example in Figure 2.21A showed a balance in designing a bike which will not be perceived as too novel, but still incorporating the optimum number of design features to allow the brand identity to be recognized. Exactly this makes it quite difficult. When designing a brand extension, it is unclear how the MAYA principle can be applied. Will the brand take care of the recognition by adding to the 'Yet Acceptable' part and will the design of a bike be the novel aspect in creating a Ferrari bike? Or will it be the other way around? In that case, consumers will easily recognize the bike as a recognizable example of the product category 'mountain bikes' and the surprising effect will be the fact that Ferrari has designed a mountain bike. In Chapter 3, the MAYA principle and its role in relation to brand extensions will be investigated in depth.

2.9 Conclusion

In this Chapter the role of the designer has been explored in creating more successful brand extensions. It specifically aimed at factors that can be used by designers to improve the aesthetic appearance of brand extensions. From the literature, it became clear that the importance of aesthetic appearance plays a key role in the cognitive processes of consumers when perceiving objects. Consumers interact with brand extensions through the physical product itself and in this way experience the meaning of the artefact. Therefore, it is important to create a strong link between the values and associations to convey the intended meaning of the brand by translating the core values into physical design features. However, this process of semantic transformation (Karjalainen, 2004) is difficult to apply. A Brand Translation Prism (BTP) was used to support students in creating a better and stronger link between the core values and the actual design language of the brand. By making use of the Brand Translation Prism, students are encouraged to deconstruct a brand into three levels: the physical level.
(explicit design features divided in three dimensions), the symbolic level (first and second order association) and the ideology level (overarching values). By dividing the current design language of the brand into 3D, 2.5D and 2D features, designers are forced to deconstruct and recognize specific design features and salient cues of a brand in order to create a more recognizable design. By linking the physical level to the symbolic level in connecting first and second order associations, designers will gain a better understanding of the ideology of the brand when referring to the overarching values of the brand. The Brand Translation Prism (Figure 2.23) was used by approximately 500 students at two Universities, resulting in various brand extensions. In general, we can say that the use of the prism led to more successful designs. However, there were also students who were unable to create a successful design by using the Brand Translation Prism. Some did not use the Brand Translation Prism in the correct way, resulting in a less successful brand extension, as expected. However, there was also a group of students who used the prism in a correct way, but still were not capable of designing successful brand extensions. By analysing the results of the group of students who successfully used the prism but failed to design a successful brand extensions, we formulated three conclusions.

The first aims at the difference in analysing the brand and adapting this analysis into designing new brand extensions. Although the Brand Translation Prism supported students in their understanding of the identity of the brand and the specific design language, it did not support them in the actual process of translating those values into new designs. As explained previously, the process of designing is complex. It is not a simple step-by-step process of just reconstructing the explicit design features into a new brand extension. The combination of all explicit features must result in a holistic design, needing for better-skilled designers. Furthermore, translating the explicit design features into the new category seems to be especially difficult for designers. More information was needed about the categorisation of objects and especially how to incorporate the explicit design features into the new product category in such a way that the brand was not ‘copied’ too literally. This conclusion runs smoothly into the second conclusion about categorization.

The second conclusion is based on comparing the literature on the categorisation of objects by focusing on the overlap between the behavioural literature and the design literature. It was found that designing objects could be compared with both the categorization stages (Palmer, 1999) and the brand categorization process (Kreuzbauer & Malter, 2005) during the cognitive processes of consumers when perceiving objects. Both start at a silhouette stage, followed by a medium stage and finally a detailed stage. Currently, designers more or less intuitively merge these separate stages while creating product innovations. However, by using the information about design features in a more conscious way, the prism might support them in creating more recognizable designs. By dividing the current design language into three blocks (see the bottom of Figure 2.23): design features 3D (surface-based design), followed by graphical elements 2.5D (object-based design) and, finally resulting in a graphic features 2D (category-based design), it will result in a better overview of the design language of the brand. Please note that this does not necessarily mean that one can combine all these separate features into a holistic design. The results do show that skilled designers, are able to create more detailed successful brand extensions by carefully considering all dimensions individually. The relevance of the graphical elements or 2.5D elements (for example, the triangular framework of Ducati or the air intake of a Ferrari Testa Rossa) seems to play a key role in distinguishing and recognizing a specific brand, because these graphical elements mostly refer to the iconic cues of a brand. It is assumed that these salient cues will be encountered during an early stage of the recognition process. Furthermore, they can be easily transformed in various product categories. Figure 2.23 shows the deconstruction of a Ducati motorcycle from surfaced-based to category-based, where the iconic triangular frame of Ducati seems to form a salient cue. In some of the successful designs from students, we encountered the implementation of these graphical elements (e.g. the incorporation of the air intake of the Ferrari Testarossa into the bike design) that suggest a powerful effect in creating a stronger brand identity. However, more investigation is needed to define the real effects of these graphical elements.

Thirdly, it was found that some of the brand extensions that failed were considered to be too novel compared to the archetypal designs of that product category. This effect might be caused by the much debated Maya principle (Loewy, 1951), which holds that consumers prefer objects referring to the aesthetic appearance through two opposing factors: attraction to the new and resistance to the unfamiliar. Consumers are constantly searching for novel experiences. However, when a design is too novel it creates too much uncertainty resulting in a negative consumer response. The MAYA principle can be seen as theory that could also explain the success of some brand extensions. Balancing the effect of designing a new brand extension in a new product category (which involves a novel experience) and creating recognition by users to connect to the identity of the brand (which refers to recognition) seems to play a key role. Balancing the factors of typicality and novelty in the design of brand extensions could lead to more successful brand extensions and therefore will be further investigated in the next chapter.

Figure 2.23 Detailed Brand Translation Prism combined with categorization stages of Palmer (1999) and brand categorization by Kreuzbauer and Malter (2005), proposing that brand recognition will take place at an early stage.
Critical reflection on practice is a requirement of the relationship between theory and practice. Otherwise theory becomes simply “blah, blah, blah,” and practice, pure activism” (Freire, 2000)

CHAPTER 3

Evaluation of a theoretical model to design successful brand extensions.

Parts of this chapter were published earlier in two conference papers published in the proceedings of the International Design Management Research conference (DMI) in London and the proceedings of the International conference on Engineering and Product Design Education (E&PDE) in Denmark.


CHAPTER 3

Evaluation of a theoretical model to design successful brand extensions

In Chapter 2, the influence of the aesthetic appearance of brand extensions and the role of the designer to design such brand extensions was discussed. The literature gave insight into the relevance of incorporating brand fit into the aesthetic appearance of brand extensions to increase consumers’ liking (Page & Herr, 2002) and showed the importance of brand-specific associations (Broniarczyk & Alba, 1994; Martínez Salinas & Pina Pérez, 2009). As a result, the Brand Translation Framework was developed to support designers in creating a stronger connection between the brand and the brand extension by linking the explicit design features to the overarching core values of the brand. This framework was used by approximately 500 students and showed that most students were capable of designing a successful brand extension using brand specific associations. However, not all of the designs were successful. The analysis of the less successful designs revealed important aspects that needed further investigation. The focus of this chapter will be on the evaluation of the designed brand extensions, in order to measure their levels of success. The results will be used to gain a better understanding of the various factors that designers can use in designing brand extensions that are more successful.

3.1 Introduction

The analysis of the less successful brand extensions revealed that during the design process other factors also come into play that determine the success of brand extensions. From the results, many brand extensions were considered to be too novel and could not be recognized as belonging to a specific product category. This illustrates that, besides brand specific associations, the categorization of objects (Fiske & Pavelchak, 1986; Kreuzbauer & Malter, 2007; Loken et al., 2008; Meyers-Levy & Tybout, 1989) also seems to impact the evaluation of consumers. Consumers will follow three stages of recognition when perceiving the aesthetic appearance of products: surface-based, object-based and category-based in order to categorize an object. Recognizing which kind of category the stimuli belongs to is an important first step to create acceptance. At a certain moment in the cognitive processing of perceiving a brand extension, the recognition of the brand comes into play. However, it remains unclear at what stage the brand will be recognized. As discussed by Kreuzbauer & Malter (2007), the brand categorization process relates to the connection with the brand and will follow immediately after the categorization. However, we claim that salient cues might be picked up during an earlier stage. To be more specific, an example of these salient cues are the kidney shaped grill of a BMW which is described as ‘brand iconic categorization’ by Kreuzbauer (2007). These elements become embedded in the design language of a brand, ensuring immediate recognition of the product (Karjalainen & Snelders, 2010). The cognitive processing of brand extensions can be explained even better using the example of the Ferrari bikes from Chapter 2. When looking at these designs, consumers first attempt to recognize a specific product category (this is a mountain bike). Moreover, the brand extension also needs to have a connection with the parent brand (this is a mountain bike designed for Ferrari). We argue that respondents will first notice the iconic graphical elements (such as the transformation of the iconic air intake of the Ferrari Testarossa on the bike), which can be termed as brand iconic features. After that, consumers will experience the complete design of the bike, which is conveying the values of speed and power by using straight angular lines and designing a bike that leans forward evoking ‘speed’. Brand iconic categorization (Kreuzbauer & Malter, 2007) is based on graphical elements (2.5D) such as the transformation of iconic features. Consumers might notice the striped air intake of the Ferrari Testarossa as a salient cue during the object stage and refer to the brand during an early stage. By repeating this cue in multiple products, it becomes embedded as a recognizable feature of Ferrari that ensures immediate recognition. This means that using these graphical elements in a more conscious way might support designers in their processes of creating recognizable brand extensions.

Looking at the design of the more successful Ferrari bike in Chapter 2, we noticed that the students designed a bike that will be recognized as a mountain bike, while still ensuring the link to the parent brand. In fact, these designers were balancing between designing a recognizable product (resulting in a typical design of a bike) and incorporating the optimum number of design features that refer to the design language of Ferrari (creating a novel experience). This balance relates to the much investigated MAYA principle (Most Advanced;
Yet Acceptable) (Loewy, 1951), which might come into play when designing brand extensions. The MAYA principle seems to influence the aesthetic preference of brand extensions in balancing the factors of typicality and novelty. The method explains that designs should strive for creating novel experiences; however, the designs should still be recognized by consumers in order to be accepted. In this balance between typicality and novelty, the exact role of the brand in relation to the MAYA principle is ambiguous. In the explanation above, the brand takes care of the novel experience. However, the brand could also take care of the recognizability, and the design of the bike could evoke a novel experience. Moreover, if consumers experience these brand extensions in a certain environment (such as a bike shop or a car showroom) this might also influence the balance between the two factors of typicality and novelty. In this chapter, we will explore whether designers can influence the factors of typicality and novelty to improve the success of brand extensions. A conceptual model is created that shows the effects of typicality and novelty on the success of brand extensions. To gain a better understanding of how designers can use the aforementioned factors, two case studies were set up to test the relevance of the factors and measure the success of brand extensions. Two sub-questions have emerged that will be addressed: (1) “Will the joint influence of typicality and novelty lead to a higher aesthetic preference?” to test whether using this balance might be fruitful; and (2) “What is the effect of the environment on the perception of novelty?” This second question focuses on the role of the context in perceiving the factor of novelty in the MAYA principle. Several brand extensions were carefully selected to test the effect of the categorization and the MAYA principle, based on the conclusions of Chapter 2.

### 3.2 Investigating the MAYA principle for brand extensions

When creating brand extensions, designers need to carefully balance the aesthetic appearance in order to be more successful. They need to design a product that consumers are able to categorize as belonging to the designed extensions and they also need to translate the recognizable features of the brand. As stated by Gombrich (1984) “delight lies somewhere between boredom and confusion” which means that in order to be accepted by consumers they need to understand what they are seeing, but they also need to be stimulated to arouse their curiosity. The same ‘mechanism’ is explained by the reinterpretation of the Wundt curve (Berlyne, 1971) where on the X-axis the arousal potential is visualized and on the Y-axis the hedonic response (Figure 3.1). This graph shows that the hedonic response to products will peak when there is an optimal level of psychological arousal. A suitable level of arousal potential maximizes positive hedonic response, whereas extreme arousal potential induces a negative response (Yanagisawa, 2021).

Another theory that explains the same effect is the MAYA principle (Most Advanced; Yet acceptable). The MAYA principle as stated by Loewy (1951) has a major impact on the appreciation and acceptance of the design of new products. When a product shows novelty, people are attracted to it (Bianchi, 1998; Loken & Ward, 1990). On the other hand consumers also need to be familiar with the product category to accept the new product as being credible (Loken & Ward, 1990; Veryzer & Hutchinson, 1998). Therefore, the product design must have certain levels of novelty and typicality to attract consumers (Blijlevens et al., 2012). To conclude, consumers prefer an optimum between innovation and categorization (Crilly et al., 2004) as explained in the MAYA principle (Loewy, 1951). However, these two opposites do not seem to be linearly related to each other. Hekkert et al (2003) demonstrated that both features together have a positive effect on aesthetic preferences. In other words, the aesthetic preference will be determined by the joint influence of typicality and novelty.

“Typicality and novelty are not to be conceived as opposite poles of one and the same continuum, although a high (negative) correlation will often be found” (Hekkert et al., 2003, p. 112).

When the design of a product seems to be novel, consumers tend to become insecure about the performances. Therefore, designers must create a certain level of recognition in the product to counteract that effect. However, when the design has a strong resemblance to the same category of the core product, the reaction of the consumer can be to be disappointed. At the same time, the visual similarity of products determines the categorization of the concept. If the design differs a lot from the stereotypical product, the consumer will no longer recognize the function of the product and cannot categorize it. It seems, at first glance that those two principles are linearly related to each other. If a product is more typical, it is less...
novel and vice versa. This seems to be a logical explanation but, on the contrary, there are also products that demonstrate a combination of those two characteristics. For example, Figure 3.2 shows a novel interpretation of a classic baroque lamp designed by Ferruccio Laviani in 2004 for the company Kartell.

![The well-known Kartell lamp expressing 'typicality' and 'novelty' simultaneously](image)

Note: The Bourgie table lamp from Kartell (Fonq, 2022) designed by Ferruccio Laviani in 2004

The form of the lamp refers to baroque style characteristics that are familiar to consumers, while the use of transparent shiny polycarbonate evokes the novel experience of the lamp. The same holds for the construction of the foot, which incorporates baroque elements. However, the foot exists of three plains which together creates a three-dimensional form. Therefore, the novel experience of this lamp is created using a new material for the design of a recognizable lamp with specific design cues that refer to classic baroque. The same holds for the construction of the foot, which incorporates baroque elements. However, the foot exists of three plains which together creates a three-dimensional form. Therefore, the novel experience of this lamp is created using a new material for the design of a recognizable lamp with specific design cues that refer to classic baroque. The same holds for the construction of the foot, which incorporates baroque elements. However, the foot exists of three plains which together creates a three-dimensional form. Therefore, the novel experience of this lamp is created using a new material for the design of a recognizable lamp with specific design cues that refer to classic baroque.

On the other hand, the consumer might be more familiar with the archetypical forms of a product category compared to the brand. In other words, the product is categorized and recognized as a certain archetypical form (typicality). Meanwhile, the consumer considers the extension of the brand as a novel experience with respect to the product category. In our example, people know bikes, what is new is that it is a bike from Ferrari.

The theory of Hekkert et al. (2003) is used to disentangle the design of successful brand extensions. Based on the above considerations, Hekkert’s hypothesis implies that the joint influence of typicality and novelty is also positively related to aesthetic preference when designing brand extensions. To test this hypothesis, a case study with two different sets of brand extension designs was executed. First, the set-up of the conceptual model will be explained, followed by a description of the set-up of two case studies.

### 3.3 A conceptual model

In the previous sub-section we explained the MAYA principle and discussed how that principle might have an important role in designing successful brand extensions. The factors of typicality and novelty can be influenced by designers when creating brand extensions and therefore we need to investigate the role of these factors in the process of creating brand extensions. In this sub-section a method will be described to test whether the MAYA principle could also influence the success of brand extensions.

A first set-up of the conceptual model to develop more successful brand extensions is visualised in Figure 3.3 where the factors of typicality and novelty in relation to aesthetic preference will be tested. At first, it will be tested if the theory of Hekkert et al. is also applicable to brand extensions (case study 1). In this study, several designs will be ranked by respondents where the hypothesis is that the joint influence of typicality and novelty will lead to a higher aesthetic preference. In a second case study, the effect of the two mechanisms as described above is tested by placing the designs in a specific environment. The hypothesis is that the type of environment has an impact on the evaluation of the factor of novelty. In other words, placing a novel design in a novel environment leads to a higher ranking of novelty compared to placing a novel design in a typical environment.
In this study, the design of a bike for Lamborghini is placed in two different environments: a bike shop and a car shop. When placing the Lamborghini bike in a bike shop, the novel aspect will be the fact that there is a bike with a Lamborghini design in the assortment. When we place the same bicycle in a Lamborghini showroom, the novel aspect will be that Lamborghini mainly designs cars, but in this example also designs for another product category.

3.4 Case Study 1: investigating the joint influence of typicality and novelty related on aesthetic preference

In study 1, the joint influence of typicality and novelty on aesthetic preference for brand extensions will be tested. The general hypothesis that will be tested is: A high level of novelty combined with a high level of typicality will lead to a higher aesthetic preference. The relation between novelty and typicality on the one hand and aesthetic preference on the other hand was investigated in a case study with two brand extensions: bicycle and helmet designs. Conform the joint influence of typicality and novelty, we expect that the more aesthetically preferred designs are above the typical negative correlation line (distributed around the red line) (Figure 3.4) and the less aesthetically preferred products are on or beneath the line (blue area). The optimum of both mechanisms, more to the centre of the graph where the distance between the blue and the red line will be larger, is expected to lead to more aesthetically preferred products.

3.4.1 Selection of stimuli

The stimuli used for this study were several concepts of the students of the Master's course in the Graphic language of products at the University of Twente. We selected six designs of bicycles and six designs of helmets designed for four different brands (Figure 3.5). These categories were selected on the basis of their difference in the visual appearance of the designs. Helmets are products which strongly relate to the archetypical form, so the visual designs of such products primarily focus on graphics. Conversely, the designs of bicycles do have much more 'flesh' to design when focusing on the various parts of the frame. Based on the fact that a helmet is intended to be placed on your head, it is expected that the evaluation of the helmets are more sensitive to extreme designs. This is in contrast to the designs of the bikes, in which designers have more 'freedom' in creating a different design of the frame. It would be interesting to test whether this effect can also be confirmed in this study. The brands chosen are existing, well-known brands, so the probability these brands are familiar to respondents is high. Furthermore, these brands possess a large portfolio with a strong and recognizable design language that uses clear explicit design features.

To test the balance between typicality and novelty in designing successful brand extensions, the stimuli were selected in a careful way. We chose common, typical designs (bike C and F), novel designs (bike A and E) and designs in between (B and D). For the helmets, we also selected typical designs (A and D), and novel designs (C and E) and designs in between (B and F). It is expected that the designs using both typicality and novelty in their design will be evaluated with a higher aesthetic preference. According to the categorization of objects, bike C is expected to score low in aesthetic preference, while this design does not relate to the archetypical category of bikes.
Furthermore, we also selected designs using iconic brand features or ‘graphical elements (2.5D) as explained in Chapter 2. The designers of bike A replicated the iconic air intake of the Ferrari Testarossa in the design of the frame. The designers of helmets B and F incorporated the logo of the brand in a three-dimensional way. In the design of helmet B, the designers used an abstract embossed image of a bull at the back of the design. The design of helmet F integrated the recognizable striped logo of the Mini brand at the side of the helmet.

3.4.2 Method

The two product categories were rated by twenty-one respondents in a live setting in which the stimuli were presented on a large screen and on a digital screen in front. They all had to evaluate six bicycle designs and six helmet designs (Figure 3.5). The respondents were asked to order the designs according to aesthetic preference, typicality and novelty, by placing them on a line with, on the one hand, the term “not typical” or “does not look like an archetypical bike” and, on the other hand, “typical” or “looks like an archetypical bike”. The respondents were asked to ‘think out loud’ during the process. The selected designs cover a wide range of typicality and novelty. On a big screen, life-size pictures of the six designs were shown (Figure 3.6). The respondents needed to rank all designs separately, while in the beginning all the designs were covered over each other. The set-up was prepared in this way, so respondents were forced to score each design individually so that an accidental ranking was avoided. The designs automatically received a score of between 0 to 1000 which was based on the position of the middle of the picture with respect to the complete field.

3.4.3 Results

As expected, the ratings for typicality and novelty showed a high negative correlation for both the bicycles and the helmets. The Pearson correlations were -0.96 (p<.01) and -0.90 (p<0.05) respectively. Both the correlation between the mean typicality and mean preference score (.30) and the mean novelty and mean preference score (-.023) did not reach statistical significance (p>0.5) which was comparable to the findings of Hekkert et al (2003).

As stated by Hekkert et al., looking at the high negative correlations between typicality and novelty, either of these variables may have functioned as a suppressor variable with respect to the relation between the opposite factor and aesthetic preference. When we performed a correlation analysis for the bicycles, where the effect of novelty was partialed out, this is true. The suppressor effect was even larger than that found by Hekkert et al. The correlation of typicality with the preference of the products was 0.94 (with significance p<0.05) when we controlled for the influence of novelty. The mean originality scores correlated with the mean preference controlling for typicality with r = 0.935 and a significance of p<0.05. However, the same tests
applied to the helmets showed a different result. There was no significance between the mean typicality and main preference when partialing out for novelty and vice versa. The partial typicality/mean preference correlation was 0.836 and for novelty/mean preference it was 0.872. For both, p≥0.05. Finally, a regression analysis was performed to determine how much variance in the ratings of the dependent variable “aesthetic preference” can be explained by typicality and novelty. It seems that for the bicycles, the influence of the predictors of typicality and novelty showed a significance compared to aesthetic preference (p<0.05). For the helmets, there was no significance for this relation (p>0.05). The analysis revealed that both typicality and novelty explained 89% of the variance in the aesthetic preference ratings of the bicycle. Although some of the outcomes showed a significant result, the statistical power of the tests should be noted. Because this experiment is based on an average of only 6 bikes and 6 helmets, we cannot conclusively establish that there is an effect, the numbers are unfortunately too low for that. However, we can substantiate that the results give an indication of the occurring effect. In the discussion, we will elaborate further on the rationale for building on this outcome.

The graph in Figure 3.7 shows the ratings of the bicycle designs with ‘typicality’ on the horizontal axis and ‘novelty’ on the vertical axis. According to our hypothesis, the bike designs that are located above the line should be evaluated to have a higher aesthetic preference than the bikes closer or below the straight blue line. When we compare those results with the aesthetic preference rates (Figure 3.8), it is clear that the designs B, D and A were considered to be the most preferred designs. Bike C scored the lowest, followed by bike F. Bike C even scored below the line. Respondents experienced difficulties in judging the bike, probably because the design of the bike is unfamiliar. Furthermore, we noticed the high score of aesthetic preference for Bike A. If we compare this to the graph on which typicality and novelty were plotted, it shows the best balance of all designs. Despite the fact this bike is quite novel, it seems that respondents appreciated this design the most. The standard deviations of the ratings for bike E are very high. Some of the respondents judged the bike as too extreme in appearance, while others really liked the novel aspect. This also indicate that the responses to more novel stimuli are more uncertain, because consumers react more sensitively to the factor novelty and tend to show a stronger affective reaction (Radford & Bloch, 2011). In Figure 3.9, the results of the helmet designs are plotted with ‘typicality’ on the horizontal axis and ‘novelty’ on the vertical axis. The graph shows all results plotted above the blue line. According to the hypothesis, the helmets B, C and F should rate highest according to aesthetic preference because of the combined influence of the two mechanisms of typicality and novelty. When we compare the results with the aesthetic preference ratings (Figure 3.10), it shows that helmet B is rated as the far most preferred helmet and conforms to our hypothesis. The results also show that helmet C is not rated extremely highly, against expectations. A closer look at the standard deviation showed that there is lot of disagreement about this helmet. Helmet E also scored rather poorly (with the highest standard deviation of all helmets). Helmet A is rated to have the lowest aesthetic preference, with an exceedingly small standard deviation. It is also remarkable to see that the helmets are mainly positioned on the right side of the graph, while the bicycles were more spread out. Compared to the graph of the bikes in Figure 3.7, the graph for the helmets does not highlight any design that is rated as rather novel.
3.4.4 Discussion of case study 1

The results show that the hypothesis that is visualized in Figure 3.4 is valid for the product category of the bicycles, but not for the helmets. Whether or not the hypothesis is valid, seems to depend on the type of products to be designed. As we compare the results of the helmets against those for the bicycles, the helmets are rated as more typical and less novel. This could be explained by the difference in the dominance of the archetypical shape of bicycles versus helmets. After the test, the respondents were asked for which product category it was easier to judge the designs. Seventeen of the twenty-one respondents indicated the bicycles as easier to judge, because the designs varied more, and it was easier to determine the extremes. Comparing these results with the stimuli of Hekkert et al. (tea-kettles, cars and telephones) it shows that those three product categories are less stereotypical compared to the helmet. This can be explained because a helmet is a product that must fit around the head and therefore is automatically likely to be less novel. The shape of a water kettle is determined by its main function of holding water and is less fixed compared to the shape of a helmet, which must fit around the head. The same results can be found in the follow-up study in which we investigated the appearance of a skating shoe of a famous Dutch skating brand (Viking) by asking design students and professional skaters to rank the results. The results showed that professional skaters (especially experienced skaters who are used to the design and the performance of a specific skating shoe) are really sensitive to changes in the aesthetic appearance of new skates, while design students are more open to a novel design (Offringa & Mulder-Nijkamp, 2016). The combination of the archetypical product category of a skate and a more traditional and conventional brand such as Viking explains the sensitivity of the consumers. However, when we take a closer look at the results of the aesthetic preference ratings of the helmets this case seems more complex. The different interpretation of novelty of helmet E (Figure 3.11A) varied a lot between the respondents, as it has the highest standard deviation. Some of the respondents described the helmet as old fashioned and discussed its resemblance to a retro motorcycle helmet (called ‘pothelm’ in Dutch) as shown in Figure 3.11B.

![Figure 3.9](image1)  
Typicality (looks like an archetypical helmet) versus novelty (looks like a novel design of a helmet) plot for the six helmet designs.

![Figure 3.10](image2)  
Mean values for aesthetic preference of the helmet designs.

![Figure 3.11](image3)  
Similarity between the design of the helmet for the Mini brand and a vintage ‘pothelm’

Note: A. the design of helmet for the Mini brand created by students (Anonymous, 2013b);  
B. a vintage motor helm called ‘pothelm’ in Dutch (Pothelm, n.d.)
As discussed previously, the same ‘problem’ occurred when respondents were rating the bicycles. Bicycle C was perhaps judged as a bike that looks like an old-fashioned bike from the nineteenth century in contrast to others who judged the bike as really innovative. This is also explained by the findings of Blijlevens et al. that consumers easily compare products with other products they already know and quickly connect and judge the expected behaviour of these new designs (Blijlevens et al., 2012). The evaluation of bike A also needs a better clarification. Despite the fact we assumed this bike to be quite novel, respondents really appreciated the design. In fact, evaluating the graph of typicality versus novelty, it shows the best balance between the two factors. Despite the fact this design is quite novel, the designers were able to use the optimum number of recognizable features from the design language of the brand in order to create the best balance in applying the MAYA principle. The use of graphical elements such as the air intake, could have an influence on that effect. This suggest that the factor of brand fit also seems to influence the relation between typicality and novelty. However, further investigation is needed to confirm that assumption.

Despite the fact that the statistical power is limited within this experiment, as only a low number of respondents were used, the results do give an indication of the effect. In addition to the quantitative data, the experiment also included respondents’ qualitative comments in evaluating the outcomes. Previous studies indicate that similar usability experiments at a number of five respondents are already conclusive about the results (Nielsen & Landauer, 1993; Virzi, 1992). These studies show that 80% of the usability problems are detected with four or five subjects and additional subjects are less and less likely to reveal new information. The sample size is also a function of how small a difference will be detected when comparing two groups with each other. In this study, a total of 21 respondents evaluated all products within subjects, leading to an approximate difference of 40% (Sauro, 2015) using 90% confidence and 80% power. By setting up this first experiment in this way, an identification of what the results could be is determined.

In addition, the study also uses a limited amount of stimuli. Only six bicycles and six helmets were tested in this experiment, which limits the statistic power of the analysis. However, two caveats should be made here. First, this is a study on products that do not yet exist. Generating many examples to increase the statistical power is therefore limited. Developing serious product proposals takes time and should be done by qualified designers, which are not easy to find. Second, careful consideration was given to whether the dispersion between the chosen designs was sufficiently different. In this way, it can be determined with more certainty that an effect is found. However, the sensitivity of the measurement instrument can be improved by increasing the amount of stimuli.

3.4.5 Conclusions from case study 1

We intended this case study to answer the following question: “Will the joint influence of typicality and novelty lead to a higher aesthetic preference?” The results show that the hypothesis is valid for the bicycle designs, but not for the helmet designs. Therefore, we could say that the aesthetic preference based on the joint influence of typicality and novelty is true for this product category in the case of brand extensions. However, for helmets the hypothesis is not significant, which seems to be due to the more archetypical product category. This emphasizes the fact that the balance between the factors of typicality and novelty is closely related to the product category. To be able to say more about this effect, further research is needed, involving more product categories in a larger study. However, the results did show that there is an optimum area between the red dotted lines as visualized in Figure 3.4. The designs that have a higher score on aesthetic preference will be positioned in that area. Building on the research of Hekkert et al. (2003) we can say that to create a successful brand extension, it is important to create a product that must look like other products in its category (typicality) and on the other hand has to maximize the novelty aspect. In this balance between typicality and novelty, the brand also seems to have an influence. Further research is needed to confirm the validity of this assumption. The results also showed that the judgment of novelty in the case of brand extensions is not without difficulty. The novel designs (e.g. bike E) scored quite highly, however, the standard deviation scores were extreme. Further research is needed to investigate the factor of novelty in relation to the MAYA principle.

As discussed in sub-section 3.2 two approaches can be considered in explaining the role of novelty in the MAYA principle. On the one hand, the new product category can be seen as a novel experience, and the characteristics of the brand take care of the factor of typicality. On the other hand the consumer might be more familiar to the type of product category and could be less familiar to the brand language. A second case study was set-up in which the influence of the context was measured to evoke either a recognizable experience or a novel experience. By placing the same bike in a different environment we aim to investigate if the difference in context influences the effect of novelty in the rankings.

3.5 Case study 2: investigating the effect of novelty when creating brand extensions

From the results of case study 1 it emerged that the rankings of the factor of novelty were ambiguous. Indeed, we argue that it is easier to judge designs by typicality than by novelty. When ranking designs on the factor of typicality, designs will be compared to the prototypical design of an object that represents this category (Hekkert et al., 2003; Loken & Ward, 1990; Veryzer & Hutchinson, 1998). However, when ranking the factor of novelty, designs cannot be easily compared to novel ‘examples’ in their category. The evaluations of the novel designs
might be completely different among different respondents and might also be different in nature (such as for the example of the innovative material of the lamp in Figure 3.2). Evaluating the factor of novelty in relation to the aesthetic appearance leads to uncertainty (Yanagisawa, 2021) and can be considered at various levels (Bianchi, 1998; Hung & Chen, 2012) relating to the functionality, the behaviour, the material, the context etc. When designing brand extensions, the relation between typicality and novelty becomes even more complex.

The results of case study 1 suggest that balancing the factors of typicality and novelty seems to improve the aesthetic preference of brand extensions. In other words, a brand extension must look like the product of its category (typicality) and on the other hand has to maximize the novelty aspect. However, the role of the brand itself has not yet been considered in this balance. There are two mechanisms that can operate when experiencing a brand extension in a specific context. On the one hand, the new product category with respect to the brand can be seen as the experience of the novelty of the product. The familiarity with the brand characteristics of the brand (typicality) must compensate for the effects of the novel experience. On the other hand, the consumer can be familiar with the archetypical forms of a product category (typicality) but also consider the extension of the brand as a novel experience with respect to the product category. Take, for example, the brand extension of a Lamborghini bike. When placing the Lamborghini bike in a bike shop, the novel aspect will be the fact that there is also a bike with a Lamborghini design in the assortment. When we place the same bicycle in a Lamborghini car showroom, the novel aspect will be the fact that Lamborghini also designs for another product category. The aim of this second case study is to test the effects of the environment on the perception of novelty.

### 3.5.1 Selection of stimuli

To test the effect of the environment on judging the factor of novelty, four stimuli of two bikes in two different environments (Figure 3.12) were created. The typical design will be placed in two different environments, and the novel design will be placed in two different environments. The two hypotheses that will be tested are:

1. **A typical design in a novel context (1)** will lead to a higher overall novelty score compared to a typical design in a typical context (4)

2. **A novel design in a novel context (3)** will lead to a higher overall novelty score compared to a novel design in a typical context (2)

* The numbers refer to the stimuli shown in figure 3.12 and Table 3.1

When the outcomes of the novelty ratings for the same designs in a different context are the same, there is no difference in judging the objects even by placing them in a specific context. However, we assumed that the more typical bike of Lamborghini in the more typical context (bike shop) will be rated as less novel. All the other bikes will be rated as (more) novel. If the Lamborghini bike in the bike shop is rated as more novel compared to the same bike in the Lamborghini showroom, then we could say that the influence of context will reinforce the effect of the recognition of brand characteristics with placement in a specific context leading to the product being perceived as novel. To be more specific, we assume that picture 4 (the bike in a bike shop) will be rated as more novel than picture 1 (the bike in the Lamborghini showroom). Figure 3.12, because the novelty in picture 1 is provided by the environment, in contrast to the typical bike shop in picture 4. The second assumption is that the bike in picture 3 will be rated as more novel than the bike in picture 2, because the physical brand characteristics (forms/lines, colours etc.) of the product show more contrast in the design when related to the context. As a result of the integration of the product with the context we assume that the bike in picture 4 is more integrated with the context than the bike in picture 1 and the bike of picture 2 is more integrated than the bike of picture 3.
3.5.2 Method

The stimuli were presented to a group of fifty-nine first-year students on the Industrial Design Engineering program at the University of Twente. These students were asked to judge two different bike designs in specific contexts, presented in an online survey. In the survey, the respondents were asked to rate a brand extension (a product for a specific brand), but the exact product and the context were not explained to the respondents. We conducted four different surveys in which the respondents were asked to rate only two different bike designs (1&3, 2&4, 1&2 or 3&4). This was done to make sure that these students were only judging the designs once, instead of giving multiple scores for one design. The students were asked to rate the factor of novelty on a Likert scale from 1 to 7. We also asked the respondents to rate to what extent they thought the bike was integrated into the context (from 1 to 7). The latter was based on the fact that the contrast between the stimuli and the environment could also play a role in judging the designs. When consumers perceive stimuli which are of a strikingly different colour to the environment, it could lead to a higher ranking of the factor of novelty. This is based on the application of the Gestalt rules (Wertheimer, 1938) which suggest that respondents will perceive more unity when the level of contrast is kept constant (Crilly et al., 2004).

3.5.3 Results

Table 3.1 shows an overview how the stimuli are connected to the type of context and type of bike and can be used as a legenda for Table 3.2. The results showed that the respondents did not discriminate much between stimuli 1 & 4. The bike in stimulus 1 was rated just slightly higher (M1=2.0) compared to the bike in stimulus 4 (M4=1.96). However, the standard deviation of the bike in stimulus 4 was lower (SD1=1.13; SD4=0.73) (Table 3.2). In contrast, the bike in stimulus 3 is scored as more novel (M3=5.3; SD3=1.06) compared to the bike in stimulus 2 (M2=4.6; SD2=1.32) (Table 3.2). So, we could say that for typical products, the environment does not have an effect on the ranking the factor of novelty. This means we must reject the first hypothesis. The second hypothesis is confirmed, by showing a higher score of novelty when placing the same novel bike in a different environment. So, we could say that when the product is not aligned with the context (stimulus 3), this has a bigger effect on novelty than placing a more novel product in a context in which the product and the context are more aligned (stimulus 2).

Table 3.1 Stimuli connected to type of context and type of bike

<table>
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<tr>
<th>Context</th>
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<td>typical</td>
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<td>stimulus 4</td>
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<td>stimulus 1</td>
<td>stimulus 2</td>
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The outcomes of the second question about integration of the product with the context (consensus) reveals that the bike in stimulus 2 (M=4.6; SD=1.55) is more merged with its environment compared to the bike in stimulus 3 (M=2.6; SD=1.54). The bike in stimulus 4 (M=5.8; SD=1.33) is more integrated with the context compared to the bike in stimulus 1 (M=3.0; SD=1.64). This might also explain the difference in ranking the factor novelty, while a higher level of contrast (such as colours, forms etc) results in a more novel experience.

The outcomes of the second question about integration of the product with the context (consensus) reveals that the bike in stimulus 2 (M=4.6; SD=1.55) is more merged with its environment compared to the bike in stimulus 3 (M=2.6; SD=1.54). The bike in stimulus 4 (M=5.8; SD=1.33) is more integrated with the context compared to the bike in stimulus 1 (M=3.0; SD=1.64). This might also explain the difference in ranking the factor novelty, while a higher level of contrast (such as colours, forms etc) results in a more novel experience.

3.5.4 Discussion of case study 2

The outcomes of the integration of the bikes with the context showed that the bike in stimulus 2 is considered to be merged more with its environment compared to the bike in stimulus 3. Therefore, the effect that respondents experience the Lamborghini brand as the provider of the novelty aspect with the bike in the bike shop as provider for the typicality aspect seems stronger than vice versa (the bike in the Lamborghini showroom as the provider of novelty, with the Lamborghini brand as the provider of typicality). The outcomes for novelty reveal the same effect: the “Lamborghini-bike” in stimulus 3 is rated as more novel than the “bike-Lamborghini” in stimulus 2. However, the results of stimuli 1 and 4 did not match our hypothesis, as the bike in stimulus 1 was not rated as more novel than the bike in stimulus 4. The effect of the typical bike seems to overshadow the novelty aspect. We assume that this was because the bike design is close to the product archetype.

There were some other limitations to this case study. The outcomes of the mean scores of novelty and consensus can also depend on the sequence of showing the stimuli. The respondents in survey 1 first rated the more typical bike as less novel in stimulus 1, and after that stimulus 3 was rated as even more novel, in comparison with the respondents of survey 4, who started with stimulus 3. This means that we also must test for the inverse of all the combinations. The other restriction is that the results of this case study need to be considered carefully, because it is only evaluated with one product category and only two designs within that category. Furthermore, the stimuli were evaluated only by first year industrial design students, who may be atypical. Although the respondents could be characterized as reasonably experienced in adequately judging the designs of products, it should be noted that these students are still learning to become experienced designers.

3.5.5 Conclusions from case study 2

We conducted this second case study to investigate the effects of the environment on the perception of novelty. The first hypothesis was rejected, but the second hypothesis was confirmed. The results show that the difference in context is negligible for typical designs; however, for novel designs we clearly see a difference, where the more novel design in the typical environment was rated as being the most novel. The integration of the novel design with the context seems to play a key role in the ranking of novelty. When a design is more integrated with its context, consumers rank such designs as less novel compared to designs which stand out more. With this second case study, we also tried to explore the role of the brand in the MAYA principle. Respondents saw the brand as typical and experienced the Lamborghini bike as the novel aspect. However, it could also be the other way around. We cannot yet conclude with certainty what ‘mechanism’ is operating when evaluating a brand extension in a specific context.
3.6 General conclusions

The starting point for the research described in this chapter was our previous findings, that to create an optimal brand extension, designs need to use all levels of the brand translation framework (Mulder-Nijkamp & Eggink, 2013a; Mulder-Nijkamp & Eggink, 2013b). We hypothesized that beyond this, a successful brand extension depends on the joint influence of typicality and novelty as also claimed by Hekkert et al. (Hekkert et al., 2003) The first case study confirmed that to create a successful brand extension, it is important to create a product that looks like the archetypical product of its own category (typicality), and on the other hand maximizes the novelty aspect. The results of the case study were partially successful in indicating that the joint influence of typicality and novelty lead to a higher aesthetic preference when evaluating the bicycle product category. However, for helmets the hypothesis was rejected, which means the validity of the hypothesis depends on the category. More research needs to be done with various product categories and larger sample sizes to justify a clear conclusion.

Furthermore, we experienced that the role of iconic graphical elements (2.5D) could support designers in creating immediate recognition during an early stage of the design process. The results from the first case study showed that the designs using such iconic graphical elements were ranked relatively highly in comparison to those of the other designs (Bike A and Helmets B and F). However, it is not certain that the higher rankings are caused by the use of such iconic graphical elements. Further research is needed to confirm or reject this impression. The second case study investigated the effect on the perception of novelty when a product was placed in a different context. The results indicate that the environment does not have an influence on typical designs; however, novel designs tend to be scored as more novel when placed in a context with a high level of contrast. It was partially successful in determining which of the proposed ‘mechanisms’ defined the appreciation of novelty among the respondents. The “Lamborghini-bike” was rated more novel than the “bike-Lamborghini”; however, the reciprocity of the two mechanisms was not confirmed. The outcomes did show that the appreciation of novelty for less typical designs is reinforced by the context they are presented in. The appreciation of novelty by the respondents seems to be strengthened by an environment that uses a high level of contrast in comparison with the stimuli.

3.7 General discussion

In the first case study, we could partially confirm the hypothesis that the joint influence of typicality and novelty is essential to design successful brand extensions. However, we have seen that much variation occurred among respondents while ranking the aspect ‘novelty.’ The rankings of novelty showed a higher standard deviation and during the session the participants did not respond uniformly to the perception of novelty when evaluating the same stimuli. In addition, the second study revealed that the context also has an influence on the appreciation of novelty. The results showed that the Lamborghini bike is ranked as more novel than the ‘bike-Lamborghini’. However, it is not clear what exact mechanism was operating in these examples. In other words, what is the exact role of the brand when ranking these brand extensions? Will the branding context build on the recognizability and act as the suppressor of novelty or, on the contrary, does it ensure the strengthening of a novel experience? As a follow-up to this study, we would like to further investigate the aspect of novelty and the role of brand fit in relation to brand extensions. Therefore, a new qualitative and quantitative study will be set up, focusing on one brand extension. By investigating the effect in a larger study, many stimuli can be evaluated, resulting in a more robust conclusion.

Another aspect that needs to be addressed is the evaluation of the designs. The respondents who evaluated the stimuli from the case studies in this chapter were not yet professional designers. A next step in the development of the framework for application in design practice could therefore be to assess the results when using experienced designers as respondents, to see whether the hypotheses can be confirmed. Furthermore, such experienced designers will be more capable of judging conceptual designs and are therefore better able to give their opinions on the various meanings of the aspect of novelty. Using professionals to evaluate designs is expected to lead to different results, as confirmed in a follow-up study investigating the MAYA principle on designing skating shoes (Offringa & Mulder-Nijkamp, 2016). In that study, we showed that professional skaters rank stimuli in a more conservative way compared to students.

We investigated the visual appearance of a new skating shoe for Viking, which is one of the most famous skating brands in the Netherlands, by presenting eight distinctive designs of increasing novelty (Figure 3.14).

Figure 3.14 Redesigning the Viking Gold design based on the MAYA principle
Note: A: Viking gold design (2015), B: All designs made by a student (Anonymous, 2016); Professional skaters tend to respond more conservatively to the new proposals (preference for C and D) in comparison to students (preference for E and F).
The visual appearance of a skating shoe will focus merely on the graphic representation of the medium and detailed design instead of creating a completely new structural design of the shoe, while the main form of the shoe is already given. In other words, the foot of the skater determines, to a large extent, the necessary shape of the skating shoe. However, as presented in this chapter, the results of the helmet study also indicated the difficulty of finding the ‘right balance’ in designing products that have a archetypical nature. In general, this study also confirmed the designs in the MAYA stage were considered as most successful by all respondents. However, professional skaters respond slightly more conservatively to the proposed designs compared to design students, as can be seen in Figure 3.15. The professional skaters preferred skating shoes C and D, while the novice designers preferred skating shoes E and F. The results of this study confirmed the importance of a professional target group ranking the designs instead of using only design students in confirming the hypothesis.

Figure 3.15 Difference in rankings of aesthetic preference by forty-four professional skaters (black) versus thirty-three design students (green).

Note: The numbers on top of the graphs represent the order of ranking, so the column with 1 was preferred most, the column with 8 was preferred least. In this graph, the skaters like concept C best, whereas the designers prefer concept E. Both groups dislike concept G.

In the next chapter, the research will be elaborated by focusing on creating a new brand extension for one brand only aiming for more stimuli. We will use the Brand Translation Prism in a Bachelor’s course in which a large group of students will be asked to design a snow mobile for the Lamborghini brand. This will give an increased sample size and yield more rigorous results. However, since it is difficult to find professional snow mobile users to evaluate the results of the students, we decided to ask professional designers from various design agencies to rank the various stimuli. These experts are capable of judging conceptual designs and also we will learn a lot from their expertise in evaluating the stimuli. In a quantitative and qualitative study, we will further investigate the effect of the factors that can be influenced by designers. Hence, the results of the rankings will be analysed, resulting in a more rigorous study in the role of the factors of typicality, novelty and brand fit, and the experts will also be asked to think-out-loud about their various responses towards novelty.
CHAPTER 4

Searching for the optimum strategy for brands and new product innovations

This chapter is based on a journal paper published in 2020 in the journal of Creativity and Innovation Management published by John Wiley & Sons Ltd. The first draft is published and presented on the 11th Global Brand Conference in Bradford in 2016.

Mulder-Nijkamp, M. (2020). Bridging the gap between design and behavioral research: (Re)searching the optimum design strategy for brands and new product innovations. Creativity and Innovation Management, 29(S1), 11-26.

CHAPTER 4

Searching the optimum strategy for brands and new product innovations

In Chapter 2, the influence of designers in creating brand extensions was analysed. The much-investigated MAYA theory has been tested and the results indicated the joint effect of typicality and novelty in consumer perception of new brand extensions. However, the sample size was quite small and the respondents who ranked the design were not professionally trained in evaluating design concepts. Furthermore, we did not test the relation of the brand to the expected market success as an determinant, even though this relation might have an important role in acting as a suppressor of the factors in the MAYA principle. Therefore, this chapter will focus on analysing the interaction between brand fit, typicality and novelty on the success of brand extensions. In this chapter, two sub questions will be addressed.

1. What is the effect of the interplay between brand fit, typicality and novelty on the success of brand extensions?

2. How do professional designers reflect on the interplay between typicality, novelty and brand fit?

By addressing these questions, we can provide designers with a better understanding of the interplay of the drivers that determine success. The first question will be investigated via a quantitative study by ranking 81 designs by 47 professional designers. The results will give an overview of the most important drivers and their interplay. To address the second question, a qualitative study is executed. In that, we aim to gain more knowledge of why professional designers rank the designs in specific ways. By asking them to ‘think out loud’, we hope to gain a clearer idea what terminology they use when ranking the designs with respect to the three determinants under consideration. This will eventually give us a better understanding of the importance of the individual drivers and their interaction.

4.1 Introduction

Introducing a new product innovation using an established brand name – termed a brand extension – allows for reduction of risks of new product market failure and avoids costs of developing a new brand (Keller, 2013; Shuling & Colin, 2014). This strategy is widely followed and can increase the chances of corporate success. It can create a positive spillover effect, depending on the realized quality level of the parent brand (Degraha & Sullivan, 1995). This ‘innovation from inside the brand’ provides for a trustworthy way of introducing new product innovations. In short, a trusted brand will help consumers evaluate product performance (Maheswaran et al., 1992) and the familiarity with the brand, and its performance will give consumers confidence (Sinapuelas et al., 2015). Notwithstanding the advantages of using an established brand to increase the chances of success, it could also lead to failures as described in Chapters 1 and 2.

It is necessary to carefully investigate all aspects that influence the acceptance of new product innovations. The two research areas of brand management and innovation management that are described in the introductory chapter are clearly strongly related, However, we have also seen that their interplay remains underexposed (Brexendorf et al., 2015). Both fields have gathered much knowledge about creating successful product innovations. However, our designers and design managers face a serious challenge: how can all relevant knowledge be merged into the actual creation of this new brand extension: the visual appearance? In fact, as we argued in Chapter 2, there is a third research field that is clearly involved in the process of creating new product innovations: product design. The aesthetic appearance of an object (which is part of the field product design) is an important determinant of success (Crilly, 2005). However, creating the appearance of new product innovations involves a completely different approach compared to the current research field of brand extensions, in which a more behavioural oriented approach is more common.

4.2 Approach of designers

As explained in Chapter 2, designers make use of a different approach to arrive to the best solution compared to those applied in the fields of science and the humanities. Several studies about the working of designers support the view that there is a designerly form of activity that distinguishes it from typical scientific and scholarly activities (Cross, 1982). That view indicates that scientists are more trained to analyse a problem, whereas designers are more trained to find a certain solution through experimentation (Lawson, 2005). This is based on the fact that research in science studies the natural world, research in humanities studies the human experience, whereas research in design studies the man-made world (Cross, 1982). In fact, design is about the synthesis of all kinds of knowledge. Designers can be designated as system thinkers to create a more holistic approach instead of combining the
individual 'parts' together to find the best solution. Design can be seen as a culture, in which designers create changes by looking at the human condition in a particular way, making use of their own materials, tools, methods, traditions and languages (Nelson & Stolterman, 2012). Using imagination rather than observation explains the gap between the other two disciplines (Dorst, 2017; Nelson & Stolterman, 2012). This difference in background will have an influence on how designers use the currently more rational or 'scientifically oriented' information in the fields of brand and innovation management.

Focusing on the initial question – why isn't the knowledge of the other fields working for designers? Once all relevant information that will influence the success of a brand extension is known, such as the quality of the parent brand, the history of the parent brand, and the 'fit' known as the relationship between the parent brand and the brand extension (Völkner & Sattler, 2006), it is still difficult for designers to translate the product characteristics and the values of a specific brand into a successful product innovation. How are we going to implement this general implicit rule that some level of 'fit' is important? Such a level of fit can be implemented in many ways.

Currently, investigations in the fields of innovation and design management focus on the consumer rather than on the design of the product. Of course, these studies still describe the relation between the consumer and a product's design, but they seem to focus on the behaviour of the consumer. There is a substantial difference in this perspective regarding the behaviour of the consumer versus the design. The required knowledge to design successful brand extensions needs to be related to the field of product design to be useful for designers in a way in which they can use the information in order to achieve better synthesis. In other words, it is good to know what needs to be changed (rational consideration), but it is even more important that we know how something needs to be changed (synthesis). To support designers in this process, we need to zoom in on the interplay between the three areas.

4.3 Brand extensions and the interplay between three research areas

As explained in the introduction to this chapter, a brand extension is a secure way of introducing a new product innovation by using an established brand (Kapferer, 2008). In other words, designing a brand extension can bridge the gap between the areas of brand management (an existing brand taking care of established knowledge) and innovation management (launching a new product in a new category) converging in the physical 'form' of new product (product aesthetics). The current literature is quite clear that brand extensions provide for greater certainty and can even cause a spillover effect (Degraba & Sullivan, 1995), but also come with risks of failure in the market success (Boon et al., 2016; Loken & John, 1993). However, as mentioned by Brexendorf et al. (2015), the interplay between these areas is complex and there is still too little knowledge on how to effectively combine all research areas in the most effective way. Therefore, in the following sections, we briefly discuss these shortcomings in relation to designing successful brand extensions.

As explained in the brand management literature, much research has been conducted on the successful effects of existing product-brand combinations (Aaker & Keller, 1990; Bottomley & Doyle, 1996; Bottomley & Holden, 2001; Völkner & Sattler, 2006). However, that does not give any guidance about new product development and product management and on how a brand extension should be designed. How can we implement this general implicit rule that some level of fit is important? In the innovation management literature, the focus is mainly on various levels of innovation (Versey, 1998). Besides technological innovations, innovation can also be driven by a revolutionary change in the appearance and behaviour of the design of a product, which might even have a greater influence (Verganti, 2009). The interplay within the field of brand management is interesting, but the link between the disciplines has not yet been established (Brexendorf et al., 2015). What role could brands fulfil in the adoption process of new product innovations? In the product aesthetics literature, the interplay between branding and innovation has been barely addressed. Although product design and the aesthetics of consumer products have been extensively researched (Berlyne, 1974; Crilly, 2005; Crilly et al., 2004; Desmet, 2002), research on branding and innovation remains a slightly unexplored area. However, the aesthetic appearance of a product functions as a vital medium to influence consumers and shape their beliefs about products and brands (Bloch, 1995; Kreuzbauer & Malter, 2005). The process of translating abstract implicit core values into explicit characteristics is described by the semantic transformation method (Karjalainen, 2004; Karjalainen & Snelders, 2010) as described in Chapter 2. However, the semantic transformation of brand values into concrete product characteristics is a complex task for designers (Mulder-Nijkamp & Eggink, 2014). Between the product aesthetic literature and the innovation management literature, we find several studies (Hekkert et al., 2003; Simonson & Nowlis, 2000; Whitfield, 1983) investigating the level of success in using the Maya principle (Loewy, 1993). That method can predict the success of new designs; while a design must be innovative on the one hand and the other hand, it must still be acceptable for the majority of consumers in order to be successful. Combining these insights with the other research areas could lead to the more holistic approach that we are searching for.

We will extend the more general knowledge of all areas with insights that combine the three areas with a specific focus on how to design a successful brand extension instead of only focusing on what to design. Design managers and designers will benefit from the knowledge that will give them guidance on how to implement brand extensions that have certain brand characteristics to foster brand recognition and still create arousal among consumers. This chapter leads to more informed decisions by designers and design managers on how to design new brand extensions when all other conditions are already defined (the brand, the product to design, etc.). The central question is: What is the effect of the interplay between brand fit, typicality and novelty on the success of brand extensions?
4.4 Theoretical background

To gain better insights on the important factors of the three research areas that can be influenced by designers, we first need to focus on the process of designing. Designers focus on the creation of artefacts in which they need to translate (contradictory) requirements in several fields into one design, trying to find the optimum design solution. The more experienced designer possesses the ability to synthesize all knowledge into an artefact at a more intuitive level, based on his or her experience (Dorst, 2007; Lawson & Dorst, 2009). However, designers can benefit from knowledge that helps them in this intuitive process. As discussed earlier, the way of presenting knowledge in the fields of brand management and innovation management is focused particularly on the consumer. Hence, in this part, we will focus on the actual physical representation of the product and the kind of knowledge designers use. During their process, designers use methods and tools to structure the process (Daalhuizen, 2014), but, in general, they start experimenting during an early stage with all the ingredients of the design brief.

While designing a brand extension, several factors influence the adoption process, such as the quality of the parent brand and the actual fit of the product with the parent brand. (Aaker & Keller, 1990; Völckner & Sattler, 2006). However, from a designer’s point of view, there are only two ‘ingredients’ that are relevant: (1) the fit with the parent brand (referred to brand fit; linking of the utility of the PB to product attributes of the original product category); and (2) the extension: the creation of the physical appearance of the new product. The physical appearance is the most important transmitter of the initial message of the brand, and plays a relevant role in the decision-making process (Crilly, 2005; Crilly et al., 2004).

We will discuss the relevant literature regarding brand extensions from the designer’s point of view, focusing on the aesthetical evaluation of the design. In this paper, we aim to achieve a more structured and guided overview of their solution space, which can help designers during their process. First, we will discuss brand fit and the way in which the designer can benefit from that (subsection 4.4.1). Second, we will discuss the creation of the new product where the MAYA method (Most advanced, yet acceptable) (Hekkert et al., 2003; Loewy, 1993) plays an important role by describing the factors’ typicality (sub section 4.4.2), novelty (sub section 4.4.3), and the interaction between typicality and novelty (sub section 4.4.4).

4.4.1 Brand fit

The aesthetic appearance of a product is the main ingredient that fosters a strong visual identity for a brand (Stompff, 2003) and builds meanings by creating brand values (Borja de Mozota, 2004). Design has a major impact on consumers’ purchase decisions, and influences the perceived meaning of the brand (Karjalainen & Snelders, 2010). As also stated by Hornburg et al., (2015) brand attitude fully mediates the effect of aesthetics in product design in purchase intention, willingness to pay, and word of mouth as dependent variables. Clearly, there must be some sort of connection with the parent brand, i.e., the product needs to be recognized by the consumer using both concrete and abstract design attributes that communicate the core values of the brand. The brand fit we describe here is different compared to that described in the literature of brand management. In the brand management literature, authors refer to fit, which is the similarity between the two related product classes (Aaker & Keller, 1990; Bottomley & Doyle, 1996; Völckner & Sattler, 2006). There are only a few scholars who refer to the influence of brand specific associations (Broniarczyk & Alba, 1994; Park et al., 1991), which can be defined as an attribute or benefit that differentiates a brand from competitors’ brands. The study of Park et al. (1991) finds that an evaluation of an extension is improved when the brand and the extension category share the same association which they term brand concept consistency. They claim that fit is a function of two factors: product feature similarity and brand concept consistency. Broniarczyk and Alba (1994) even found that the brand specific associations dominate the effect of product category similarity. In an extension to the work of Broniarczyk and Alba, we will use the term brand fit to explain the brand concept consistency, which means the extent to which both concrete and abstract design attributes communicate the core values of the brand.

We argue that a strong relationship between brand fit and a new product innovation will support the adoption process, when the perceived meaning of the innovation is aligned with the perceived promise of the brand. To achieve that, it is important that brand characteristics are consistently reflected in the design of the products and the product line to improve the recognisability (Kreuzbauer & Malter, 2005). For brand extensions, the use of these recognizable attributes is even more important. A brand design requires a combination of existing brand-typical elements with design elements from the new product category (Leder et al., 2007). Introducing a product in a completely different product category will evoke a novel experience for consumers, at the same time, to assure the acceptance of the brand it is important to connect to the identity of the brand and its core values to the product. The connection between the brand-typical elements - and the brand values in particular - has to be taken into account (Mulder-Nijkamp & Eggink, 2013a). To illustrate this requirement, Figures 4.1 and 4.2 show two designs made for the Bang & Olufsen brand, namely a computer mouse and an electric scooter. The design in Figure 1 uses explicit cues (Karjalainen & Snelders, 2010) of the brand (tapered design, integrated forms) which are more or less copied into the design of the electric scooter, resulting in a scooter that does not immediately evoke the brand values of B&O. The designers did not analyse the current product category ‘electric scooters’ by connecting the brand values of B&O with this new product category. They presented their step via the brand translation prism, but did not actually create a connection between the levels. The tapered curve shape is innovative within the product category of speakers; however, not distinctive in the product category of scooters.
The design of the mouse also uses explicit design cues such as rounded forms, detailed patterns and hexagon parts (Figure 4.2). More importantly, these designers also tried to incorporate the core values of Bang & Olufsen (craftsmanship, excellence, imagination and simplicity), which leads to an innovative design in the product category of computer mice (round forms with a cut off) that evokes craftsmanship by adding the wooden detailing and the dots on the side. The imaginativeness is evoked by the intuitive interaction of the computer mouse by touching the round circle in the middle. When we let these designs be judged by consumers, they will probably immediately recognize that the design of the electric scooter consists of uncommon characteristics, looks a bit weird and is unrealistic. Conversely, although the design of the mouse seems quite novel, it also is a promising concept that fits well with the brand’s identity. This example shows the importance of integrating brand-specific associations into the physical appearance of a product. The judgment about these designs are most likely based on subtle details with respect to the recognition of certain product categories (categorisation – does it fit into the current field of electric scooters or computer mice?) and the connection to the design language of the brand.

The literature reveals that the brand attitude, expressed in consumers’ perceptions toward a brand, is a strong mediator in explaining the purchase intention and willingness to pay (Homburg et al., 2015). In particular, brand-specific associations are important in explaining the fit to the core values of the parent brand (brand fit), as the intention to purchase brand extensions (Broniarczyk & Alba, 1994; Fedorikhin et al., 2008; Pourazad et al., 2019). We expect that the incorporation of brand fit (which means the extent to which both concrete and abstract design attributes communicate the core values of the brand) will lead to a higher expected market success. We therefore hypothesize:

$$H_1\quad \text{The higher a design’s brand fit, the greater its market success will be.}$$

4.4.2 Typicality

An important factor that determines the success of a brand extension is the impact of the categorization principle, which has also been adopted by several other researchers (Loken & Ward, 1990; Meyers-Levy & Tybout, 1989). Is a product perceived as a typical design with regard to the main product category? The categorization principle means that a new product is classified as a member of a previously defined category representation (Barsalou, 1985; Loken & Ward, 1990; Veryzer & Hutchinson, 1998). The category representation of objects is processed in our cognitive system to classify, interpret and understand new information. In other words, the bike designs for Ferrari in Chapter 2 have to be recognized as a bike to be classified in the right category. Moreover, for brand extensions, this means that the bike should be recognized as a bike, but should also have a fit with the categorization of the mother brand. Consumers use their categorical knowledge of brands and products to simplify structure and interpret a new meaning (Meyers-Levy & Tybout, 1989). In the example of the electric scooter in Figure 4.1, we can say that the category representation of this product is that of an electric scooter, but probably not classified as an electric scooter that is perceived to convey the same values of ‘excellent performance’ compared to the other products in the brand’s portfolio. The brand product category as discussed by Kreuzbauer (2007) is not recognized by consumers in the design of this electric scooter, because B&O would never introduce an electric scooter with four wheels. As also discussed in Chapter 2, consumers first evaluate the affordances and the main category of a product, followed by the connection with specific brand sign categorization in combination with the main brand characteristics (Kreuzbauer & Malter, 2007; Leder et al., 2007) We argue that a recognizable brand product categorization, in combination with brand sign categorization, will lead to a successful brand extension. Therefore, we hypothesize:

$$H_{2a}\quad \text{A high level of typicality together with a given level of brand fit will lead to a greater expected market success.}$$
4.4.3 Novelty

Novelty is strongly related to typicality and is classified by Berlyne (1971) in two categories: absolute novelty – which refers to an object that is never been experienced previously, but in most cases represents relative novelty – which refers to a new combination of previously experienced design elements. When a design is perceived as relatively novel, it means that the combination of those design elements create arousal among consumers (Desmet, 2002), resulting in an effect in which consumers are more interested in the design and probably are tempted to choose the brand extension. Several researchers have investigated the effect of novelty in consumer decision making (Bianchi, 1998; Blijlevens et al., 2012; Simonson & Nowlis, 2000) and have discovered that novelty leads to greater success in the aesthetic appraisal of product design. In one of those studies, it was found that products with high levels of product novelty elicited greater affective reactions (Radford & Bloch, 2011). This suggests that novelty is also an important predictor in the explanation of successful brand extensions.

As discussed by Kreuzbauer (2007), it is important to study the interaction between design innovativeness and the brand categorization processes. New product innovation balances between increasing the brand familiarity by implementing recognizable design attributes and creating arousal through the introduction of highly novel design attributes that risk being unrecognizable as members of the brand category. We argue that the appealing brand extension design in Figure 4.2 uses the optimal balance in brand fit (the designers use a combination of concrete and abstract characteristics), proto typicality (it looks like a racing bike), and novelty (there is some novelty in the design with regard to the frame of the bike).

In this study, we aim to provide evidence that besides brand fit and typicality, novelty is also an important variable to predict the market success of a brand extension (Mulder-Nijkamp & Eggink, 2016). Therefore, we hypothesize,

\[ H_{2b} \quad \text{A high level of novelty, together with a given level of brand fit, will lead to a greater expected market success.} \]

4.4.4 Interaction between typicality and novelty

The majority of consumers have a preference for ‘typicality’ in new product innovations (Veryzer & Hutchinson, 1998; Whitfield, 1983), while it is more adaptive for consumers to prevent risks and uncertainties. However, in some cases, the opposite effect is shown, and the designs with a more novel, distinctive appearance seem to be more successful (Bianchi, 1998; Simonson & Nowlis, 2000). This suggests that a simple linear gradient from novel to typical does not suffice to explain these effects. There are also studies that showed evidence for a moderate level of novelty that is preferred over both extremely typical and extremely novel products (Berlyne, 1974; Hekkert et al., 2003; Hung & Chen, 2012). The balance between both aspects seems to be the most optimal strategy to design for new product innovation.

This is known from the MAYA theory of Loewy (1951), which holds that a successful design must be as innovative as possible, but not so much as to be considered unacceptable. This finding has shown up repeatedly in many studies (Blijlevens et al., 2012; Hekkert et al., 2003; Whitfield, 1983). Hekkert et al. (2003) achieved a major breakthrough when they researched consumer preference resulting from of novelty (as in ‘as innovative as possible’) and typicality (as in ‘goodness of example’) as two separate indicators of two opposite poles. They found that there is a preference for the combination of both a high level of typicality and a high level of novelty, which will lead to higher aesthetic preference among consumers. Following this principle, a strategy to design for both novelty and typicality can be applied by using the design of various product attributes for either characteristic as proposed by Eggink (2010, 2012). For instance, a basic shape can be used to signal typicality, while at the same time, an unfamiliar choice of material can signal novelty in the same product. When designing brand extensions, one can optimize novelty and typicality in a similar manner by thoughtfully using aspects of brand characteristics and product or brand categorization. As also predicted by Berlyne (1974), the interaction of typicality and novelty as two linear functions may result in an inverted U quadratic function to predict the aesthetic preference. Indeed, this effect was reported by Hung and Chen (2012). Their study shows an inverted U curve between novelty and aesthetic preference for the product category of chairs, where a moderate level of novelty is perceived as most beautiful. However, a limitation of that research was that the author’s used a bipolar scale for typicality and novelty.

In our study, we used brand fit, typicality, and novelty as independent scales to predict the success of brand extensions. Our study re-investigates the research of Hekkert et al (2003) and provides empirical evidence for the relationship between the interaction of typicality and novelty as the independent variables and expected market success as the dependent variable. The final hypothesis we would like to test is:

\[ H_{3} \quad \text{The higher the level of novelty of a design with a given brand fit, the higher the effect of the design’s level of typicality on its market success.} \]
We divided that hypothesis into three parts. First, we want to provide empirical evidence that brand fit (the aesthetic fit with the parent brand) is an important predictor of the expected market success. Second, we add the independent predictors of typicality and novelty and finally, we add the interaction of typicality and novelty (Figure 4.3).

\[
\begin{align*}
(1) \quad \text{Expected market success} &= \beta_0 + \beta_1 \text{fit} \\
(2) \quad \text{Expected market success} &= \beta_0 + \beta_1 \text{fit} + \beta_2 \text{typ} + \beta_3 \text{nov} \\
(3) \quad \text{Expected market success} &= \beta_0 + \beta_1 \text{fit} + \beta_2 \text{nov} + \beta_3 \text{typ} + \beta_4 \text{typ} \times \text{nov}
\end{align*}
\]

Next, we want to gain insight into the ratio between typicality and novelty so as to be able to predict the success of brand extensions in more detail. By achieving more insight into the acceptance of brand extensions and especially the ratio between typicality and novelty, we expect to provide information for designers that can be used to achieve an optimal combination in new product innovations.

In Figure 4.3, the overview of the complete model is visualised. In Chapter 2, we showed that the interaction of the drivers of typicality and novelty lead to a higher aesthetic preference. In this chapter, we want to show that the interaction of typicality and novelty will lead to a higher aesthetic preference and a higher expected market success, while the individual drivers will not lead to a higher expected market success. The driver of brand fit will also lead to a higher aesthetic preference and a higher expected market success.

\[\text{Figure 4.3} \quad \text{Model describing the three hypotheses}\]

4.5 Research methodology

In this sub-section the research methodology - to investigate the interplay between brand fit, typicality and novelty - will be explained by describing the development of stimuli, the data collection method and presenting the findings.

4.5.1 Development of stimuli

To investigate the factors that influence the success of brand extensions, we needed many different designs from one specific brand and one specific product category. For the decision of the brand, we used the experience we had built over the years by giving a Master's course about creating brand extensions based on an extensive brand analysis. Evaluating the results of the chosen brands, we indicated more implicitly oriented brands (Google, Diesel, Aston Martin, etc.) and more explicitly oriented brands (Ferrari, Siemens Porsche line known from their small kitchen appliances such as a toaster, coffeemaker and a blender using the same characteristics, etc.) and we saw brands using both strong explicit and implicit cues (Lamborghini, Dyson, etc). Explicit cues are visual references in the design that can be pointed out such as the hexagon shapes of Lamborghini (Karjalainen & Snelders, 2010). These explicit references are embedded in design features that designers implement the intending them to be recognized. On the other hand, implicit cues are visual references that are not immediately recognized. When such implicit cues are embedded in the design they
‘make sense’, such as the rebellious character of Diesel. Consumers will inherently perceive and recognize these cues but in a mainly subconscious way (Karjalainen & Snelders, 2010). Using both explicit and implicit visual references in a design results in a more recognizable brand (Crilly, 2005; Karjalainen & Snelders, 2010). For novice designers, it is also easier to embed explicit visual cues (such as the hexagon shapes), resulting in a strong implicit character (aggressive, fast cars). Therefore we decided to use a brand (Lamborghini) that has strong explicit and implicit design cues (Crilly, 2005; Karjalainen, 2004) in their product portfolio and one specific brand extension to generate many different designs from one brand and one product category. Within one brand, all brand-related effects (brand loyalty, brand recognition etc) remain the same.

To select an effective brand extension, we evaluated the dimensions of fit of Aaker and Keller (1990) and decided to design a snow mobile for Lamborghini with a focus on transfer. Transfer reflects the perceived ability of any firm operating in the first product class to make a product in the second product class. We decided to use the dimension of transfer, since as a predictor this dimension is more important than the dimensions of substitute and complement, and has a direct impact on the brand evaluations as discussed by Aaker and Keller (1990).

As a starting point, we made an fictitious design brief to design a snow mobile for the Lamborghini brand. The assignment was given to 81 second year students of Industrial Design Engineering. They all designed the snow mobile in four weeks, during a concept sketching course during which they learned to use a digital drawing tablet. The result was 81 different concept sketches of snow mobiles which varied from really novel concepts to concepts that are quite typical (Figure 4.5). The results also varied in the quality of the drawings. There were results that were not completely finished, which were really unrealistic, but also designs that were completely finished with a high level of realism (Figure 4.6).

All designs were presented in a portfolio with an environment-like background as shown in Figure 4.6. This environment, or the background in which the design is presented, can influence the perception of the consumer. Hence, first of all, we removed the background, so that the evaluator will focus purely on the design. We selected the best 3D image of each concept in each portfolio and placed the design on a white surface in a picture of 7 x 7 cm.

The aim to investigate the relation with the expected market success is influenced by the fact that the aesthetic preference is largely determined by one’s own personal preferences of beauty and aesthetics (Bloch, 1995; Hekkert & Leder, 2008; Radford & Bloch, 2011). Ranking the most successful designs requires respondents to think about the likely acceptance by a large group of consumers. Therefore, we used design professionals to evaluate the designs. These professionals are trained to make decisions between several product alternatives and select the designs, likely to be most successful in their markets.

### 4.5.2 Data collection

The presented results were clearly not yet ready for the market. Therefore, we also decided to evaluate the design concepts by using design experts, instead of regular consumers, because the former are familiar with ‘evaluating’ concept drawings and are also more capable of understanding the designer’s intent. It seems that professionals are better capable of processing new information because they apply a more fine-grained conceptual structure. While judging new designs they are able to classify new information better than non-professionals (Alba & Hutchinson, 1987). Due to their level of experience, they are the most capable target group for rating the expected level of market success of designs for the consumer market.

We asked 47 design experts from several Dutch design agencies to cooperate in the experiment. Since there are 81 designs, this lead to some organizational problems, because one designer...
cannot rate 81 designs at once. To prevent the respondent being overwhelmed by the number of designs, we decided to form sets of twelve designs each. The optimal number of images to be compared is seven (Dirken, 1997). However, in this experiment, we used twelve images, which were revealed one by one to improve the overview of the respondents. To avoid biased results using the same sets of twelve designs, we also decided to reorganize the sets of designs, so in total there were 21 sets of images ranked by 47 design experts. Every expert ranked twelve designs in about thirty minutes. During the experiment, the design experts were also asked to think out loud, so that we could use this qualitative data to underpin the quantitative results. Every session was audio-recorded and was used to investigate the most important categories people mention when they rank the items. In the end, all pictures were ranked at least six times by different experts. The ranking tool can be seen in Figure 4.7 and the setup of the interviews can be seen in Figure 4.8. Every single design expert ranked twelve different designs on a large screen. On the screen, there are two lines; the line at the right end with a plus symbol is the maximum result and the left line with the minus symbol is the minimum result (Figure 4.7). They were asked to position the designs together on five dimensions on a scale from 0 (not at all successful) to 1000 (really successful) regarding likely market success, typicality (not at all typical to really typical), novelty (not at all novel to really novel), brand fit (does not fit the parent brand to does fit the parent brand), and aesthetic preference (I do not like the design to I like the design). The grey arrow above the picture is the point of measurement, so when two designs are placed above each other they are ranked similarly. The vertical axis in the representation does not particularly refer to anything but it helps respondents gain a better overview of all designs. We emphasized that the respondents could use the complete scale from 0 to 1000, but they were also allowed to use only a part of the scale if they thought that was better. We decided to use this absolute way of measuring the data to obtain more refined judgments (Oppenheim, 1992).

The procedure can be described as follows: We welcomed the respondents and asked them if they had any objections to being audio-recorded. A short explanation of the procedure followed and respondents were asked to rank twelve different designs based on several dimensions (i.e. likely market success, fit, novelty, and typicality). They also received the twelve designs on paper in case they wanted to take a closer look or rank all the designs by hand beforehand. To be familiar with the ranking tool, the respondents were first asked to rank the designs on the quality of the drawing. This step was also important to control for the drawing capabilities of the students. Eventually, we could thus consider if the reliability of the design influences the outcomes. To test the inter-rater reliability between the different raters, we calculated Cronbach’s alpha. Since we had decided to use design experts instead of consumers, it was only possible to compare the outcomes of 47 design experts. This is because it is difficult to find experts in the field of design, who are able to find time in their busy schedules and willing to join our experiment. Considering their level of expertise and years of experience in the field of design, we appreciate their findings as more reliable than those of consumers. However, it also lead to difficulties in testing the reliability of the different raters. The more formal method of using ICC to test the inter-rater reliability was not possible in this specific case, because the respondents did not rank the exact same combination of images. The respondents were deliberately asked to rank different sets of images to prevent the influence of certain combinations of images. In total, we obtained 21 combinations of images and every combination was tested by at least two respondents. To underpin the reliability of the experiment, Cronbach’s alpha was calculated by measuring the means of the correlation between all respondents using the formula in Figure 4.9 (Cronbach, 1951).
In this formula, N refers to the number of indicators (47 in total) and \( r \) refers to the average indicator correlation. A Cronbach’s alpha of 0.73 indicates a reliable measurement (Nunnally, 1978). We know that many other design researchers cope with the same difficulties of a limited set of respondents and many stimuli, so hopefully we can contribute to this problem by measuring the reliability in this way.

\[
\alpha = \frac{N \cdot \bar{r}}{1 + (N - 1) \cdot \bar{r}}
\]

Figure 4.9  Cronbach’s alpha formula of measuring inter-rater reliability

4.5.3 Findings

First of all, we investigated the Pearson correlation between typicality and novelty researched in the work of Hekkert et al. (2003). In that study, it was shown that typicality and novelty are jointly equally effective in explaining the aesthetic preference for consumer products, but they suppress each other’s effect. Products with an optimal balance between the two aspects were aesthetically preferred.

In our study, as expected, the measurements showed a negative correlation of -17 (p<0.01). The correlation between both items were not as high as those reported by Hekkert et al. In the latter study, only the main ratings for all designs were calculated. When we calculate the means of every rating and also control the quality of sketching (selecting the designs that have a rating higher than 500 for the quality of drawing), we also measure a higher negative correlation between typicality and novelty of -55 (p<0.01). In the next step, we investigated if there is a significant relationship between the designs that use typicality and novelty in the optimum way (i.e., maximizing both typicality and novelty) and the level of market success. The hypothesis states there is a linear relation between the interaction of typicality and novelty compared to expected market success.

A multiple linear regression analysis was performed using the SPSS software package to discover if brand fit, typicality, novelty, and the interaction of typicality and novelty has an impact on the expected market success (TABLE 4.1). The analyses demonstrated a significantly positive effect of brand fit on the expected market success (β = 0.571, p<0.01). However, typicality and novelty did not significantly impact the expected market success (p = 0.396 and p = 0.159 respectively). Nevertheless, the analysis showed a significantly positive effect of the interaction of typicality and novelty on the expected market success (β = 0.114, p<0.05). While the independent outcomes of typicality and novelty did not reach a significant level, it is striking that the results of the interaction between typicality and novelty showed a significantly linear relationship (R² = 0.615, F = 177, p<0.05).

In Figure 4.10, the market success is plotted against the interaction between typicality and novelty; on the x-axis, the product of typicality and novelty (0-1000 x 1000), on the Y-axis the expected market success are plotted (0-1000). To plot this figure, we used the average measurements from all respondents. As explained in the development of the stimuli, the designs varied in the quality of the drawings. There were results that were not completely finished, which seem to be unrealistic and designs that were completely finished with a high level of realism. Therefore, we decided to rank all designs based on the ‘quality of their drawings’. We decided to divide the designs into three groups: low level of quality of drawing (average score between 0–333), medium level of quality of drawing (average score between 333–666), and high level of quality of drawing (average score between 666–1000). To prevent miscommunication caused by a low quality of drawing, we only used designs with a medium or high level of quality of drawing (average score>333). Hence, only 59 designs were plotted. The resulting graph in Figure 4.10 shows that more successful products indeed use a combination of higher rates of both typicality and novelty, compared to these of the less successful products.

There is a positive relation between the interaction of typicality and novelty and expected market success. It is possible that a specific design has a very high level of typicality and a lower level of novelty or vice versa. Therefore, we need to determine whether both typicality and novelty have to be optimized to create successful designs. In the second step, we will visualize the ratio between the level of typicality and novelty (horizontal axis) and market success (vertical axis) in more detail. As previously, we only plotted the results that had a medium or high level of quality of drawing (average score>333), and filtered out the designs of poor quality (Figure 4.11).

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>8.589</td>
<td>28.129</td>
<td>.305</td>
<td>.760</td>
<td></td>
</tr>
<tr>
<td>typicality</td>
<td>.008</td>
<td>.044</td>
<td>.039</td>
<td>.850</td>
<td>.396</td>
</tr>
<tr>
<td>novelty</td>
<td>.071</td>
<td>.050</td>
<td>.071</td>
<td>1.411</td>
<td>.159</td>
</tr>
<tr>
<td>brand fit</td>
<td>.566</td>
<td>.032</td>
<td>.571</td>
<td>17.823</td>
<td>.000</td>
</tr>
<tr>
<td>typicality x novelty</td>
<td>.000</td>
<td>.000</td>
<td>.114</td>
<td>2.014</td>
<td>.045</td>
</tr>
<tr>
<td>quality of drawing</td>
<td>.185</td>
<td>.032</td>
<td>.177</td>
<td>5.728</td>
<td>.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficients a</th>
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<tr>
<td>Unstandardized Coefficients</td>
</tr>
<tr>
<td>Model</td>
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<tr>
<td>-------</td>
</tr>
<tr>
<td>1 (Constant)</td>
</tr>
<tr>
<td>typicality</td>
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<tr>
<td>novelty</td>
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<tr>
<td>brand fit</td>
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<tr>
<td>typicality x novelty</td>
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<tr>
<td>quality of drawing</td>
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</tbody>
</table>

a  Dependent Variable: Expected market success
The levels of typicality and novelty are divided into eight divisions. The left part of the graph shows the more incremental designs with high typicality and low novelty (ratio of -1 to 0), the right part shows the more radical designs, plotted with high novelty and low typicality (ratio of 0 to 1). In between are the combinations with a high level of both typicality and novelty.

The plot shows an inverted U curve on which the more successful designs are at the top or above the red line. When we take a closer look at the middle part of the graph, we can locate the designs that have high levels of both typicality and novelty. The best designs use an almost uniform ratio of typicality and novelty, with the qualification that both levels of typicality and novelty have to be high. Design A39 uses an optimal balance between typicality and novelty, but both levels are relatively low (T = 247, N = 235) compared to B36 (T = 706, N = 637).

The graph also shows that more designs are plotted in the high typicality and low novelty part, which suggests that designers are more used to designing typical innovation instead of novel innovations. All the designs that use a high level of novelty and a high level of typicality do not seem to be successful. Designs A18, A39, B7, B31, A2, and A19 have a high level of novelty and typicality but are perceived as likely to be less successful products. A plausible explanation may be that these designs have more extreme styling and therefore are judged with a higher level of uncertainty regarding the performance of the product. In other words, they have recognizable characteristics of the product category of snow mobiles, but they also have relatively extreme features that could have dominated the overall decision.

Finally, we need to investigate if the designs that are at the top of the quadratic curve (all designs in the purple oval in Figure 4.11) are also the designs with the highest brand fit. The designs B36, B10, B6, B15, A2, and A3 all have a level of brand fit of 650 or higher. This corresponds with the outcomes of the correlation between expected market success and brand fit (0.74, p<0.01).

On the right side of the graph, we see the designs with a high level of novelty and a low level of typicality. Can it also be true that the successful designs have a high novelty and a low typicality, but scored a higher level of brand fit? Hence the balance between typicality and novelty is still there, but now with a focus on brand typicality and novelty. Indeed, the designs above the red line (B33, A35, A3, A38, A8, A2, A40) have a level of brand fit higher than 550 and the designs under the line (B14, A20, B19, A17, B31 A19 and B7) have a low level of brand fit and are therefore less successful. In other words, this suggests that when we optimize the balance between brand typicality and novelty, designs are also perceived as likely to be more successful.
In a 3D visual representation, we plotted the expected market success (z-axis) against the interaction between typicality and novelty (x and y-axes) (Figures 4.12 a&b). The data for the expected market success is calculated from a regression analysis with the expected market success as the dependent factor and the interaction between typicality and novelty as the independent factor. In the analysis, we also calculated the unstandardized measurements. We exported this dataset to Excel and made a three-dimensional presentation of the results. In this visualization, we can see that the interaction of typicality and novelty leads to a higher expected market success. First of all, it is notable that the designs on the vertical line, which designates the negative correlation between typicality and novelty, all have comparable outcomes for the expected market success (z-axis). The really extreme typical or novel designs have slightly lower levels of expected market success. When we maximize both typicality and novelty, the graph shows a quadratic function. All those designs above the negative correlation line of typicality versus novelty have a higher expected market success.

Note: X-axis represents typicality, Y-axis the novelty, and Z-axis the expected market success.
The results of the quantitative study showed that the interaction of typicality and novelty seems to be relevant in developing a successful brand extensions. Furthermore, we also see a positive correlation between brand fit and expected market success. Although the three factors all seem to affect the expected market success, they could also play an important role in the MAYA principle, which was discussed in Chapter 3. The factor brand fit might be the suppressor for novelty together with the factor typicality. However, the exact relation of the brand fit according to the MAYA principle stays unclear, and needs further investigation.

Zooming in on the results of the quantitative study revealed that, in particular, the ranking of the factor of novelty was ambiguous. The results show a high standard deviation and respondents were finding difficulties in understanding the term of novelty. In this study, we also decided to perform a qualitative content analysis in order to investigate how respondents evaluate the factor of novelty. During the process of ranking, respondents were asked to think aloud and describe how they are ranking the designs. Based on the outcomes, we will gain a better understanding of the reasoning behind the ranking of the factor of novelty and what kinds of features might lead to particular decisions.

4.6 Qualitative content analysis

As previously mentioned, the respondents were asked to think aloud during the process of evaluating the designs. We prepared a transcript of all the protocols and coded it using the ATLAS-TI program (Muhr, 1991) and performed a qualitative content analysis (Mayring, 2014). The inductive category formation technique gave us an overview of the categories that were most relevant and made us rethink about the level of abstraction regarding the chosen categories. We examined how they interacted with and related to each other.

In this sub-section, we discuss our findings for the interpretation of the term of novelty, as the definition of this term remains fuzzy (Hsiao & Chen, 2006; Hung & Chen, 2012). Novelty can be seen "as the result of an overall appraisal of visual characteristics of a stimulus, including appraisals of how trendy, how curved and how complex it is" (Hung & Chen, 2012). Hsiao & Chen (2006) describe four important determinants of aesthetic appraisals: trendiness, complexity, emotion, and potency. The result of this appraisal leads to the evaluation of novelty: how different the stimulus is compared to a typical object of its category. The perception of product appearance is strongly related to categorizing the design into a specific group of products (Blijlevens et al., 2009; Bloch, 1995; Crilly et al., 2004; Loken et al., 2008; Loken & Ward, 1990).

4.6.1 Results

The results of this study clearly show that - to a large extent - the respondents based their judgements on the categorization of the object (Kreuzbauer & Malter, 2005; Loken et al., 2008). Most of the respondents indicated that they compared the design to the prototype of a snow mobile looking for (the existence or absence of) common attributes such as two skis at the front and a caterpillar at the back. They also compared it with other product categories such as cars and motors ("These are a kind of motor-like-models and that is of course quite innovative"). They also refer to novelty as being contemporary, and hence compare the design with the current state of the art ("there are a number of them that have a bit of an old-fashioned character by choosing the wrong curve, that is just not contemporary and certainly not innovative"). This quote fits into the category of trendiness in forming a judgement (Hsiao & Chen, 2006). Another aspect is the level of complexity, which was also mentioned in their work. When a design is too complex, it is regarded as too novel. In our study the complexity of the design also relates to the quality of the drawing. The quality of drawing also influences the judgement. If a drawing is not detailed enough, it correlates negatively with novelty ("What a weird drawing, not so nicely drawn, a little shaky...").
We also found two categories that were not described as important factors in determining novelty (Hsiao & Chen, 2006; Hung & Chen, 2012). Respondents relate to novelty with respect to the ‘character’ of the design. They refer to the brand identity of the Lamborghini as being outspoken (“This one’s very conservative for Lamborghini, this one’s a little more outspoken. I’m going to look purely at the styling in terms of innovative”). If respondents refer to the brand identity when interpreting novelty, it may imply that the identity of the brand is seen as the suppressor value for novelty (typicality). Hence this might indicate that we can replace typicality with brand fit as argued earlier.

Furthermore, we also found that respondents relate to functional aspects (“I find this design to be innovative, because the motor is located at the front” or “A very high one is quite new, but I still have questions about how that could work”) and usability aspects (“You can lie on this one, I can’t imagine that that’s already happening, but maybe I don’t know them well enough for that.”). So even without physically interacting with the design, they form judgements about the way it works. One of the most remarkable aspects of the results were the various ways respondents refer to the brand identity when evaluating novelty. We saw some respondents that refer to brand as the counterpart of novelty (“Yes, that’s innovative, but I can also see that it fits the Lamborghini brand”), referring to Figure 4.13 (left). Others refer to embedding of the brand characteristics as the novel aspect in relation to the more archetypical designs (“Well, I’m just looking at what aspects such a design has, that isn’t really relevant to a snowmobile, so with this design I like the fact that they actually translated a part of the grill of the car that is very specific to Lamborghini into such a snowmobile”), referring to Figure 4.13 (right). In this final quote we noticed that the respondent described an explicit feature of Lamborghini as the novel aspect in the otherwise quite standard-looking snow mobile.

From these qualitative statements, it is clear that designers need to take into account several aspects when they want to design a more novel product with a higher level of acceptance shown in Figure 4.14: the categorization of the object (the main form of the design should be recognizable), the trendiness (specific colours, forms and details on a medium or detail level that refer to the current trends are all important), the level of complexity of the design which in our case refers to the quality of the drawing (the design should be neither too complex nor too simple), the performance/functionality of the design (the functionality and usability of a design should be clear) and the character of the design (referring to the level of novelty with regard to the brand).

The final factor ‘character of the design’ explains the connection of explicit design features and implicit associations to describe the definition of novelty. Respondents used the brand or brand-specific values to relate to novelty in varying ways. In this relation, we noticed the brand acts as a suppressor for novelty explaining the factor of novelty. In view of this observation, there are broadly two strategies to implement novelty in a design. The first one is to design a radical snow mobile, embedding more recognizable brand characteristics (such as the grill) that can act as a salient cue to improve the familiarity (Figure 4.13 left). The second strategy is to design a snow mobile that is based on a regular snow mobile, but in which the more salient features of the brand guarantee the novelty in the design (Figure 4.13 right).
In conclusion, we state that the term ‘novelty’ remains complex and this might have influenced the results in the quantitative study. The results of the qualitative analysis revealed that the respondents referred to various themes when evaluating ‘novelty’, showing the ambiguity of the definition. Respondents related in most cases to the categorization of objects (comparing the design with the current categorical representation of snow mobiles). However, respondents also consider other aspects such as the functionality/performance of the product, the trendiness and the ‘character’ of the design. Building on incorporating novelty in the character of the design, there are broadly two strategies to follow. A more safe solution in building on the current archetype of a snow mobile, using more salient explicit cues to elicit a more novel experience; or a more drastic solution by choosing a radical design in which recognizable explicit design features of the brand can be used to evoke familiarity.

In conclusion, using the factor novelty in the design of brand extensions is complicated. Therefore, we decided to further investigate this phenomenon in order to formulate a clearer understanding of the term novelty. This will be discussed in Chapter 6.

**4.7 Discussion & conclusions**

In this paper, we have tried to bridge the gap between three research areas by integrating the three important determinants of brand extensions: brand fit, typicality, novelty in order to improve market success. Undoubtedly, there is awareness that a brand extension must fit the mother brand, but it is still poorly understood how the interconnection of the brand and the innovations can be integrated in a design. To support designers in creating more successful brand extensions, we tested the integration of branding and innovation based on an evaluation of 81 snow mobile design concepts by using 47 design experts to evaluate the designs.

1. **Theoretical implications**

   This paper will contribute to the field of knowledge in brand extensions emphasizing on the aesthetic appearance of new designs. The current literature in brand extensions focuses solely on addressing the following question: what leads to a successful product-brand combination? However, it does not include any guidance about how to design such brand extensions. Combining the literature from three research areas – innovation management, brand management and product aesthetics – has led to three important determinants relevant to designers in creating more successful brand extensions. One of the most important determinants that designers can use to improve consumers’ preference is the Maya principle (Loewy, 1951), which was further developed by Hekkert et al. (2003) by claiming that “typicality and novelty are jointly and equally effective in explaining the aesthetic preference”.

In this research, we build on that study specifically for brand extensions and extend the work by additionally considering products’ expected market success as the dependent variable. The results show the significantly positive effect of brand fit on the expected market success and a linear relationship between the interaction of typicality and novelty, and market success. Although the independent outcomes of typicality and novelty do not significantly impact the expected market success, the interactions between typicality and novelty do impact it. As an explanation for the non-significant relationship of the independent outcomes of typicality and novelty, we assume that one value might have functioned as a suppressor variable in relation to the other value. The interaction does show a significant relationship between both determinants, and the interaction will make the effect stronger. This expected market success seems to be the greatest when the interaction (combination) of typicality and novelty is at its highest and the ratio of both aspects is almost equal (B36 and A2).

2. **Managerial implications**

   The results of this study can be important for designer-managers as well as designers in understanding the several priorities in creating new successful brand extensions. For product designers, a clearer definition of novelty related to the product appearance will provide useful information. This study provides them with visual examples that can function as a reference for their own search for novelty in design. Especially in the case of brand extensions, designers should be aware of the effect of novelty on the aesthetic appearance, because creating a product in another category might of itself be perceived as novel.

For managers, it is expected to take better strategic design decisions. Overall, managers should strive to maximize the interaction of typicality and novelty in their designs. However, there are still two possible strategies to follow to reach that goal: (i) they can start with a more ‘incremental’ innovation as the main form; subsequently, they need to improve the level of novelty by adding novel elements at a medium or fine detail level (for example, the steering wheel or the interface); or (2) they can design a more radical innovation as a main form and try to improve the typicality by adding recognizable brand characteristics at the medium and fine detail levels.

3. **Limitations of the research**

   The limitations of this research are fourfold: (1) the generalizability of the results; (2) the applicability for companies; (3) the complexity of the term of novelty; and (4) our choice of professionals as respondents.

   (1) This study has focused on the relation between brands and innovations from a design perspective, in order to support designers in designing successful brand extensions. However, we only investigated one brand and one product category. We
need to further investigate the generalizability of the outcomes for other categories and brands in order to better support designers. Furthermore, we used many examples that sometimes had a low level of quality of drawing, and that may have influenced the results.

(2) In this study, we have tried to gain insight into using various levels of typicality and novelty to help design a successful brand extension. In general, such ‘rules’ will help designers make deliberate decisions about the level of innovation in new products. Nevertheless, we also must admit that the notion of novelty is relative - a discontinuous innovation for one organization might be an incremental one for another. To make the optimum decision for brand extensions and brand companies, a proper understanding of the type of brand/organizations is needed in each individual case.

(3) The complex meaning of the term of novelty might have influenced the results. Although we found a linear relationship between expected market success and the interaction of typicality and novelty, some of the design experts we used experienced difficulties in ranking the level of novelty. In fact, the definition of novelty is somewhat unclear and can be divided into several aspects ranging from the affective response to product appearance. In a qualitative study, we noticed five categories when ranking the designs on novelty (categorization, trendiness, level of quality of the design, brand identity or character, functionality/interaction). Some respondents indicated that they compared the design to the archetype of a snow mobile looking for (the existence or absence of) common attributes such as two skis at the front and a caterpillar at the end, in contrast to other respondents, who mentioned technical innovation as an important aspect of novelty or the way of considering the snow mobile. This ambiguity could mean that there were differences between the rankings of novelty by consumers and needs further investigation.

(4) Another limitation of this research is regarding the evaluation of the designs using design experts rather than real consumers. Despite the fact that experts are trained to design products for consumers, there is a possibility that these designers focused on the potentials of an idea rather than on the design concept itself. In the next chapter, we will investigate the approach of professional designers by performing a qualitative study.

Furthermore, the interpretation of the objects due to their person taste and preferences could create a bias. To obtain the most meaningful results, we decided to use an absolute scale to rank all the items. In the ranking sessions, we explicitly emphasized the use of the entire scale. However, this method of ranking could be biased, as some respondents would be more conservative than others. Nevertheless, the IRR showed that the measurements were reliable.

4. Future research

Further research needs to address the limitations that are mentioned above. The generalizability of the results needs to be improved by adding new product categories and other brands. Furthermore, we strive to make the study more robust by asking more experts to test fewer designs and also by performing the same experiments with consumers. The selection of those designs will be by a pre-test in order to eliminate less suitable designs or designs with lower drawing quality.

Moreover, we need additional studies to investigate the interpretation of the term of novelty. In the qualitative content analysis, our results show a variety of ways of interpreting novelty. As also stated by other researchers, the term is multi-interpretable and therefore should be regarded as multi-item dimension. ‘What are the different aspects that may affect the evaluation of novelty? What is the relation of brand fit and novelty? How can we support designers with a better definition? In further studies we will investigate these questions and prepare specific stimuli to measure the responses to novel designs.

Future research will focus on elaborating the strategies that were identified managerial implications. We will aim to gain a better understanding of the role of brand fit in the interaction between typicality and novelty. The factor of brand fit seems to act as the suppressor for novelty and may be termed as brand typicality. Further studies therefore will investigate the role of brand typicality as the interaction of typicality and brand fit.
CHAPTER 5

Development of a teaching framework for designing successful brand extensions

Parts of this chapter were published earlier in a conference paper included in the proceedings of the International conference on Engineering and Product Design Education (E&PDE) in Aalborg, Denmark in 2016.

CHAPTER 5

Development of a teaching framework for designing successful brand extensions

The previous chapter bridged the gap between three research areas by integrating the important determinants relevant for brand extensions (brand fit, typicality, novelty). The results showed that the interaction between typicality and novelty seems to be relevant in developing a successful brand extension. In this stage of the research phase, it becomes clear which factors need to be used by designers to create successful brand extension. However, the question on how to support these designers in creating a successful brand extensions still needs to be addressed. In this chapter, the set-up of a Teaching Framework will be discussed by applying a research-through-design approach. Applying this research-through-design method in an educational context, enabled us to learn about the complexity of the brand extensions, and to apply and validate new insights immediately by continuously adapting the teaching framework. Furthermore, it resulted in many design stimuli that could be used to test whether or not the teaching framework is successful. In the final part of the chapter, the results of students are validated by means of an experiment. In that experiment, two groups were defined: one group of students who followed the teaching framework for creating successful brand extensions, and the other group which was offered an alternative topic on inspiration techniques. The results from these groups were evaluated by design professionals. Furthermore, the experience of the students - and whether they actually gained knowledge - will also be discussed. Central to this chapter is the main research question 2: “How can designers be supported to create successful brand extensions”

5.1 Introduction

Product design research communities have produced a plethora of methods because they build on a tradition of method development (Blessing & Chakrabarti, 2009). Methods are means to support designers to achieve desired change as efficiently and effectively as possible (Simon, 1970). In various fields of expertise, designers use their own common methodologies and approaches to solve (design) problems, where using a methodology can guide them in the complex process of creating a new artifact (Simon, 1988). This thesis has also provided a framework to increase the success of brand extensions. However, the question of whether the proposed method will actually lead to more successful brand extensions still remained unanswered. Furthermore, it is also important to know whether the designers feel effectively supported. To address these questions, it is useful to consider the diverse nature of methods. Scientific methods are intended to support scientists in constructing theories of the world, while artistic methods exist to support artists in creating expressive art (Daalhuizen, 2014). However, the overarching goal these design methods all strive towards is to transform thinking into action and actually creating artefacts to enlighten, bring order and give greater meaning to our lives (Nelson & Stolterman, 2012).

“Design is a third culture with its own founding postulates and axioms, with its own approach to learning and inquiry” (Nelson & Stolterman, 2012, p. 12)

As explained by Nelson & Stolterman, design can be seen as having its own tradition, with its own approaches and habits. Compared to the other two cultures of “Science” and “Humanities” (Cross, 1982), described in Chapter 1, the approaches and habits of design are different. Moreover, every designer has his or her own approach to applying knowledge and skills concerning materials, tools, methods, languages, traditions, styles etc. However, all strive to integrate the core elements in a (concrete) artifact that brings a new purposeful addition to the real world.

In this thesis, the aim is to bridge the gap between the three research fields, resulting in the brand translation prism discussed in chapter 2. However, as discussed in Chapter 3, our analysis showed that not all factors were taken into account. It can be concluded that this model focuses solely on the analytical approach of designers in deconstructing the recognizable design features of a brand, but lacks important aspects (e.g. categorization of objects) in creating successful brand extensions. The analysis in Chapter 3 and 4 clarified this by explaining that designers were not taught how to actually include these factors in the design of a coherent product. The actual translation of knowledge into a holistic design of a new brand extension demands a more ‘designerly approach (Cross, 1982), which is different in nature to the analytical approach that was proposed in Chapter 2. Therefore, it was decided to expand the brand translation prism into a teaching framework that teaches designers to design more successful brand extensions.
In this teaching framework, we carefully combined the more analytical perspective (explaining about the brand translation framework and the process of categorization) with the designerly perspective on how to translate this knowledge into successful brand extensions.

In this chapter, the development of a teaching framework is explained, incorporating the Brand Translation Prism and focusing on the other factors that could be influenced by designers in balancing the typicality, novelty and brand fit of brand extensions. The main question posed this chapter is "How can designers be supported in influencing these factors to create successful brand extensions". To address the research question, the research-through-design method (Frayling, 1993/4) is used in an educational setting, which will be discussed in sub-section 5.3. The evaluation of the proposed teaching framework is the second step in the 2-step evaluation method as described in Chapter 3, by means of a dedicated experiment to evaluate the successfulness of designers in following the teaching framework.

To validate the newly developed teaching framework, we set up an experiment in which we divided the student population into two. One group received knowledge sessions regarding the three determinants that influence the success of brand extensions whereas the other group received comparable knowledge sessions but on a different topic: using three approaches of inspiration techniques (Corremans & Mulder-Nijkamp, 2016). We carefully developed the experiment, to ensure that both groups received knowledge at comparable levels. The unique set-up of this experiment, in which second-year Industrial design students followed the adapted version of the framework, led to a lot of ‘realistic’ design stimuli based on one design brief. The resulting stimuli were evaluated by professional designers, which followed the adapted version of the framework, led to a lot of ‘realistic’ design stimuli based on one design brief. The resulting stimuli were evaluated by professional designers, which helped us to address the research question. The effect of the teaching framework was also evaluated among students by means of a two-part survey. The students filled in a survey to check whether or not they actually gained knowledge in the knowledge sessions and were asked to evaluate their own experience of using this knowledge to design more successful brand extensions.

5.2 Teaching and design expertise

By using suitable methods and tools, designers are able to better translate the initial problem into concrete artefacts. However, before the actual design process can take place it is necessary to discuss the expertise of designers, which clearly can vary substantially. Inexperienced designers, for instance, need more structure than more advanced designers (Dorst & Reymen 2004). Designing artefacts is a complex and sophisticated skill that must be both learnt and practised. As a consequence, there is a huge difference between the expertise of novice and expert designers. There are levels in expertise ranging from novice, advanced beginner to competent proficient and expert (Dorst & Reymen, 2004; Lawson & Dorst, 2009). Experience determines how designers will approach and tackle design problems.

Expert designers are able to make rapid and effective decisions in which intuition plays a critical role (Salas et al., 2010), whereas novice and beginning designers need more guidance and tend to follow strict ways of addressing a problem.

“It is in the very nature of highly developed skills that we can perform them unconsciously. The expert golfer is not thinking about the golf swing but about the golf course, the weather and the opponents” (Lawson, 2005, p. 15)

Actually, one is considered an expert designer when certain processes take place unconsciously, without thinking about them (Lawson & Dorst, 2009). The skill of an expert designer can be explained by his or her way of communicating and envisioning the future: in for example drawing. The pen can be seen as a tool for communicating their ideas and quickly gives an overview of the thoughts of designers (Waanders et al., 2011). During the design process, the expert designer is not thinking about performing the actual skill of drawing (creating lines, forms etc). The expert designer works unconsciously at an intuitive level and during the iteration process new ideas keep evolving. However, the beginning designer hesitates to put a pen to paper while creating his or her first designs. They still need to think about how to construct lines and ellipses to create a new design (van Passel & Eggink, 2013). Therefore, the design process will be less intuitive. Of course, beginning designers need practice and guidance about the steps to take (the same is true for the beginning golfer). However, the more experienced designer performs design tasks at a more intuitive level and tries to achieve synergy in finding the optimum design solution. Experienced designers are able to use several insights, at once embedding the relevant insights into a new proposal. However, when introduced to a new specific topic or design problem such as brand extensions, even experienced designers need guidance in their processes. To achieve the same level of intuitiveness again, the more skilled designer also need to learn and practice the new method (Daalhuizen, 2014). Due to their general level of experience, however, the format of guidance could be different to that for beginning designers. The expert designer is capable of quickly adapting and applying new methods and theories by building on his or her previous experience.

In this study, it was decided to focus on the novice designer, who does not yet have much experience. However, design students do know the sequences of a design process by following certain steps. The framework that will be developed will build on the basic skills of designers and will add specific theories and activities related to designing successful brand extensions.
5.3 Development of an effective teaching framework

Our proposed teaching framework is developed based on the insights of the previous chapters by using a research-through-design approach (Findeli, 2010). As discussed by Read (1943) and later adapted by Frayling (1993/4), we can divide design research into three types: research into design, research through design, and research for design. From those three, the 'Research through design' approach has been developing and gaining increasing importance since the 1990s. Ann Brown (1992) was one of the first pioneers to execute ‘design experiments’ to understand more about a certain phenomenon in the real world instead of executing experiments in a laboratory. Later, the term of design experiments was better labelled as ‘research through design’, in which the actual designing itself is an important factor in the process which teaches us more about the research question. Findeli (2010) claims that creativity is a fundamental element in design research, where he describes design research as

"a systematic search for and acquisition of knowledge related to general human ecology, considered from a ‘designerly way of thinking (i.e. project-oriented) perspective” (Findeli, 2010); see Figure 5.1.

The development of our proposed teaching framework was based on this designerly way of thinking. In our case, the central part of research-through-design is the design project which can be reframed into a broader research question: How can we support designers in creating more successful brand extensions? The design question in this case relates to format of the support, which refers to the design of the framework and will result in various design answers, which are the various designs of the teaching framework. Such artefacts can be used to communicate with the students and will finally provide a better understanding of the main research question (Figure 5.1).

Using this research-through-design method in an educational context, enabled us to learn about the complexity of the topic and apply and validate new insights immediately. It also resulted in many design stimuli that could be used to test the newly developed knowledge. In addition, the iterative process contributed to the development of the teaching framework by refining the insights in every educational cycle. Based on the results of this ‘living lab’, we constantly improved the educational framework. From the results presented in Chapter 2, it was discovered that brand fit is not the only aspect that influences the success of brand extensions. After this first version of the design support (using the Brand Translation Prism) many followed and finally led to the teaching framework presented in sub-section 5.4. Performing research through design in education, seems to be promising for our situation, because in this case we are constantly balancing two worlds. Students can learn from the developments in research and can also take part in those. On the other hand, we can use the results of students to test certain principles such as a newly developed design method, which can in turn improve the learning experience of the students.

For the development of the Teaching Framework, it is important to know how the acquisition of knowledge can be designed optimally. Creating learning experiences starts by formulating the learning objectives, in turn by defining what students need to learn. The taxonomy of Bloom is a model that is well-known for the development of learning objectives in which different levels of knowledge acquisition can be integrated (remembering, understanding, applying, analysing, evaluating, creating) (Bloom, 1956). These levels represent an increasing cognitive complexity. However, the levels described by Bloom focus on cognitive learning skills rather than using psychomotor skills (e.g. learning how to draw) or affective skills (e.g. empathy towards your target group) (Adams, 2015). The taxonomy model of Fink (2003) in contrast, identifies six core elements of developing an educational process that leads to significant learning, which seem somewhat different to Blooms’ Taxonomy. Using foundational knowledge (understanding knowledge), application (skills, thinking) and integration of that knowledge (connecting, creating) are comparable to Blooms taxonomy. However, by adding the human dimension (learning about oneself), caring (developing interests) and learning how to learn (becoming a better student) this taxonomy focuses more on immersing the student in a rich learning environment to become a self-directing learner. To create a more significant learning experience it might be beneficial to focus on the ‘learner’ him or herself. Furthermore, it is important to realize that the approach of designers is dynamic in nature, constantly shifting between using cognitive levels interspersed with psychomotor and affective levels to achieve successful designs.

Besides formulating the learning objectives, it is also important to reflect on how the theory and activities will be integrated into the learning experience to help achieve the learning objectives. Kolubs’ learning styles approach (Kolub, 1984) explains an effective way of alternating between various manners in absorbing knowledge, and which seems to be useful for designers. Using four ‘approaches’ - active experimentation, concrete experience, reflective observation, abstract conceptualisation - enables students to switch between concrete and abstract theories and to reflect on these theories in active and passive ways.

Figure 5.1 Scheme visualizing design research in education
Note: Framework adapted from Findeli [4]
By allowing students to experience the topic by switching between approaches, they will automatically find themselves practising cognitive, psychomotor and affective skills.

As a start in developing a suitable teaching framework for brand extension designers, the learning objectives were described using Blooms’ taxonomy, with addition of important elements from Fink (psychomotor and affective skills) and Kolb (various learning styles). In the next sub-section the teaching framework will be presented and the reasoning behind the chosen aspects will be discussed, based on the literature discussed above.

5.4 A teaching framework for creating brand extensions

This thesis started by explaining the relevance of bridging the divide between the three research disciplines of innovation management, brand management and product design, where the BE designer can be placed in the sweet spot as the merger of knowledge between these research areas. In developing a teaching framework, it is necessary to show how these fields can be used to create more successful brand extensions. It should, however, be noted that this framework is built from the perspective of the designer and will therefore not necessarily include extant literature that is solely about processes and strategies to improve the success of brand extensions (innovation management) or studies that are solely about consumer behaviour to influence the design’s success (brand management). Although it would be interesting to share all insights with students, in order to keep a more focused view, only the relevant theories that affect the design of the brand extension will be discussed. In Figure 5.2, an overview of the overall teaching framework is shown found.

That framework was developed based on the taxonomy of Bloom (1956), and extended by using parts of Fink’s taxonomy (2005) focusing on adding foundational knowledge, psychomotor (skills) and affective skills (approaches). In Figure 5.2, the levels of Bloom are clustered and represented in three circles. The outer circle represents ‘remembering and understanding’ by explaining the foundational knowledge of a research field. The second circle focuses on the levels ‘applying and analysing’ the foundational knowledge about a specific case in the form of an exercise. The smallest circle represents the level ‘evaluating and designing’ that translates knowledge into the creation of a new artefact.

The set-up of the teaching framework was based on two main goals: (1) students need to learn to define the identity of a brand by using several theoretical models (Karjalainen, 2004; Warell, 2001); and (2) to translate the brand analysis into a brand extension using the approach of semiotics (Krippendorff, 2005; Peirce, 1955). For the set-up of the teaching framework, five separate learning objectives were developed that are based on the levels of Bloom. In Figure 5.3 an overview of the content of the teaching program is shown, describing the five learning objectives and relating those to the various phases of the design process. The first two learning objectives focus on defining the identity of the brand, whereas the last three learning objectives focus on the design phase. The cognitive levels of Bloom increase during the course starting with ‘remembering and understanding’ when students follow lectures and foundational knowledge is presented.
Figure 5.5: Visualisation of the phases, learning objectives, theories and activities of the proposed teaching framework

<table>
<thead>
<tr>
<th>PHASES</th>
<th>LEARNING OBJECTIVES</th>
<th>LEVELS BLOOM</th>
<th>THEORY</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis</td>
<td>Analyze the brand identity by defining explicit and implicit design characteristics of a brand.</td>
<td>Remembering, Understanding</td>
<td>Literature-based tools to analyze brand identity (e.g., brand identity matrix) by Kotler, strategic thinking by Kotler (1998), etc.</td>
<td>Analyzing three levels in the Brand Translation Prize (Workshop) and developing new ideas based on IP</td>
</tr>
<tr>
<td>Inspiration/Generation</td>
<td>Translate the values of a brand into first, second and third order associations, and then specific design features according to the literature of semantics.</td>
<td>Applying &amp; Analysing</td>
<td>Literature seminars (Krippendorf and Peine) and explanation of Brand Translation Prize</td>
<td>Creating various concepts that balance between typology, novelty and brand 10</td>
</tr>
<tr>
<td>Conceptualisation</td>
<td>Develop different design concepts and transform the explicit and implicit design characteristics into a new product.</td>
<td>Design &amp; Evaluate</td>
<td>Theory and examples about graphical elements (2D and 3D) and explain how the design concept is created.</td>
<td>Workshop evaluation techniques (Emogran &amp; Butterfly model)</td>
</tr>
<tr>
<td>Decision Making</td>
<td>Define the role of the graphic language within the reality of products applying those graphic on a existing model.</td>
<td>Design &amp; Evaluate</td>
<td>Theory about evaluating brand specific associations by using two evaluation methods.</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td>Evaluate the design results according to the analysing phase.</td>
<td>Design &amp; Evaluate</td>
<td>Theory about evaluating brand specific associations by using two evaluation methods.</td>
<td></td>
</tr>
</tbody>
</table>

It continues by using the levels of applying and analysing, when students need to apply the new brand extension to a specific problem, by reinforcing the theoretical framework. Finally, it alludes to the mechanisms that can be used to develop.
cues of a brand, which will be incorporated in the 2D or 2.5D dimension of an already existing structural design. By balancing these two approaches, a more successful brand extension can be created. However, making decisions during the ‘translation stage’ of the process seems to be the most challenging task facing the brand extension designer, for which support is desirable.

During the translation stage, the foundational knowledge about the various research areas will be merged together into a physical artefact by using the explicit design features analysed in learning objective 2. To support students in their decision making, the design process is divided into three dimensions (2D, 2.5D and 3D). In designing three different sub-concepts, students are challenged to focus on one aspect instead of designing all the features all at once. From the results of the course, it is concluded that the set-up of dividing the design phase into a graphic design (2D) a structural design (3D) and a design that merges both design at once (2.5D), is beneficial for design students. Furthermore, an extra learning objective is developed to understand the role of graphic language within the realm of products (learning objective 4). By focusing on the graphic features of the brand (2D), students learn how to apply product graphics to an existing product (such as an archetypical helmet). In expressing the identity of the brand by only using graphic features (lines, colours etc) designers learn how to convey core values by using explicit features. Model-making plays an important role in defining a coherent and successful final brand extension. Besides making sketches on paper or renders, model-making is used to represent the design, resulting in a physical mock-up of the artefact. By focusing on the structural design (3D), students learn how to apply the foundational knowledge of balancing between typicality and novelty in their designs. In workshop sessions, these proposals will be evaluated to test the recognizability of the core values. Finally they have to create a physical model of their final 2.5D design in which both 2D and 3D proposals are merged and they focus on the powerful effects of graphical elements (2.5D). Subsequently we use such physical models in evaluation sessions, to evaluate if students were capable of translating the core values into the brand extension. This meets the final learning objective. The final work of students is graded based on two criteria: (1) the analysing phase; defining brand identity in analysing explicit and implicit characteristics and developing a brand translation prism resulting in three well-founded overarching brand values; and (2) the designing phase; by translating the brand values into a new brand extension by developing three sub-concepts (2D, 2.5D and 3D) and a final model which will be evaluated based on the defined brand values.

Using this research-through-design approach has enabled us to continuously improve and adapt the course over the past 10 years, resulting in this final framework. By alternating between using foundational knowledge from the three research fields and applying such knowledge by using designerly approaches, brand extensions can be created that are likely to be more successful in the market.

5.5 Evaluation of the teaching framework

To test the success of the teaching framework, it is validated in an existing second year Industrial Design Engineering course on advanced concept sketching. In this part of the research, it is necessary to look at the designed artefacts from a more behavioural perspective. To validate whether the development of the teaching framework resulted in more successful brand extensions, a dedicated experiment was set up to measure the results as the outputs of the teaching framework. In this experiment we aimed to measure the success for two groups: one group that followed the teaching framework as discussed and one control group.

Four important choices need to be explained in order to understand the context of the experiment. The first one is the choice of conducting this experiment in a second-year sketching course within the curriculum of Industrial Design Engineering with students. We decided to validate the teaching framework in this specific course, because it has no relationship with the learning targets of the course, so the difference in teaching the method would not compromise the results of the students. The learning target of this course focuses on enhancing drawing capabilities using a drawing tablet and the ability to use different tools/techniques in the design process (integrating sketches, photo’s, CAD models and foam models). Secondly, the set-up of the experiment as proposed enabled us to achieve a large amount of stimuli that can be evaluated to achieve more knowledge about the actual design of brand extensions, while the students focus on learning how to apply their sketching skills in a case study. Thirdly, the framework will be tested among beginning designers. These students do not have a lot of experience yet and are expected to act as novice designers or advanced beginners (Dorst & Reymen, 2004). We assume that these students are in need of a more step-by-step approach as discussed by Dorst & Reymen. The last choice that needs to be explained is the more behavioural approach of this experiment in a teaching framework that is developed using a Research Through Design-approach.

As explained in the introduction chapter this thesis aimed to bridge the gap between research the three different research fields. Therefore, it is necessary to immerse yourself in the research approach of another discipline, by not only looking from their perspective. Yet, by also using their methodologies and approaches enables us to tackle these complex issues much more easily and come up with more enriched solutions. Conducting an experiment like this enables us to evaluate the design method in a more controlled way, by splitting the group in two. One group will follow the content of the teaching framework, while the control group will only follow the regular classes. In this way the difference in success can be measured between the two groups.
5.5.1 Set up of experiment

The knowledge sessions were embedded in a 10-week design sketching course. Students followed the regular classes, focusing on learning how to use a tablet (first purple block) followed by a case study in which they learned how to go through a design process integrating various tools (second purple block). In the first lectures, they focus purely on learning how to draw and in the second part they learn how to integrate tools (such as a CAD model) in the design process by using a tablet (Figure 5.4). The second part of the course focused on designing a snow mobile, which provided us an excellent environment to execute the experiment. We decided to use the common structure of the course, however, adding extra knowledge sessions that represents the content of the (adapted) teaching framework. Of course, it was necessary to adapt the teaching framework in a way that it would fit the course with regards to the amount of hours, without removing important aspects. To keep it operable for students, we decided to present four knowledge sessions after each lecture, where both groups received extra knowledge sessions both focusing on another topic. These knowledge sessions took 60 minutes during which the students were asked to attend a short lecture, followed by specific assignments that enabled them to apply the presented knowledge on their design. The precise set-up of the sessions will be described in sub-section 5.5.3.

Nevertheless, there are also some pitfalls that we came across in combining our ‘research-in-educational’ practice with ‘behavioural science’; especially with regard to evaluating various approaches. To evaluate different design methods we proposed to split a population of students in half. However, an approach such as this requires caution around ethical dilemmas, because we need to demonstrate that it cannot be detrimental for either of the groups.

Considering this ethical dilemma, we decided to inform the board of examinations about the execution of this experiment. After several interactions, the proposal was accepted. The main reason of accepting the proposal was based on the assurance that students receive the same learning experience. It should be prevented that the group using the specific method seemed more successful, compared to the other. To prevent that, we carefully selected this specific sketching course, in which the main learning target is focused on making correct drawings (rather than making successful designs). In fact, the learning targets and the grading method were based on different aspects and had nothing to do with the design method under evaluation, which focuses on how to achieve a successful brand extension (Mulder-Nijkamp & Eggink, 2014). Thus, a successful result in the quality of drawing and a high grading result of the course would not immediately imply a successful result of a brand extension or vice versa.

However, during the experiment the question arose whether those two aspects (quality of drawing and success of a brand extension) are correlated. Our claim is that there is, of course, a relationship between the quality of drawing and the success of the design, but the difference in drawing quality between the two groups should not be discernible, due to the precautions we had taken. Both groups should be capable of designing a qualitatively good drawing and a successful design.

To keep all parties satisfied, a solution needs to be found that works for all. Finally, this resulted in changing the set-up of the experiment and proving that the difference in grading between both groups is minimal. The students had to design a snow mobile for the Lamborghini brand from scratch in four weeks and they all had to use a drawing tablet. The main structures of the two groups should be comparable. The aim of the experiment was to find out whether the group which uses the proposed new design method would come up with better brand extension designs, compared to the other. To ensure that both groups are treated the same, both of them received extra ‘knowledge’ about designing successful products to fulfill their assignments. One group received specific knowledge about designing brand extensions and the other group received knowledge about inspiration techniques. The final design results of the students were later used as ‘research data’ to investigate the successfulness of brand extensions (Mulder-Nijikamp & Eggink, 2016).

5.5.2 Measurement of the variables

To validate whether the group that followed the teaching framework was more successful compared to the control group, we decided to evaluate the design results by means of a quantitative empirical study. The model shown in Figure 5.5 presents the research model that was used to validate the results for the two groups. In this model five variables are shown, which are: the expected market success of the results, the drawing quality, the liking, the manipulation check and the grading grades. The definition and the relation of the five variables will be explained in this section. Furthermore, it will be explained how to measure these variables to gain a better understanding of the success of the teaching framework.

First, the success of the developed brand extension will be investigated by measuring the expected market success. This addresses our main research question, whether the students that followed the teaching framework were able to design brand extensions that enjoy a greater market success. To measure this variable we asked design professionals to evaluate the results, whether these professionals are best capable in evaluating design proposals. In total, 47 design experts were asked to rank the designs on the quality of the drawing and
subsequently on the expected market success, typicality, novelty and brand fit on a scale from 0 – 1000. The stimuli we used for these sessions were mixed, so professionals received designs from group A and B. The variable ‘drawing quality’ is also measured by these experts, in order to gain a better understanding in the influence of the drawing quality on the results. As previously mentioned in Chapter 4, the level of quality of the drawings might lead to less successful brand extensions. In case of this specific experiment we used all 81 snow mobiles, however, not all students presented a realistic design of a snow mobile. By asking to rank the drawing quality of all designs as the first question, we were able to consider the relation of drawing quality to market success. To answer the question whether of there is a correlation between the quality of the drawing and the success of the brand extension, the results of both groups were also examined by the instructors who are responsible for this specific course in design sketching. They examined the results based on the learning targets of the course, resulting in the variable ‘drawing grades’.

Furthermore, the experience of the students in attending the knowledge sessions also need to be investigated, this variable is expressed in the variable liking. Both groups received knowledge sessions, however, the appreciation of these knowledge sessions might influence the results as well. This addresses our second main question, about how to support designers in the design process of designing brand extensions. To measure this variable, the students in both groups received a survey to evaluate their experience of the knowledge sessions they followed. We asked whether they liked the content of the extra lectures, the perceived effectiveness of the extra lectures and if they assume themselves to be good sketchers.

The final variable shown in Figure 5.5 is the manipulation check. To make sure students actually gained knowledge in the field of designing brand extensions, a manipulation check was conducted to test the level of knowledge acquisition of students. Their level of expertise was measured by performing a short test after the lectures were finished. If group 1 is able to achieve a higher score than group 2, the efficacy of knowledge sessions could be explained.

The final aspect that need to be discussed is the variation in the teaching framework and the control group. We carefully designed the set-up of both programs, to prevent ethical dilemmas as discussed previously. This will be explained in the next sub-section.

5.5.3 Content knowledge sessions

To help demonstrate that the setup of this experiment is not detrimental to either of the groups, the knowledge sessions were carefully designed. Despite the fact that a study is conducted in which two design approaches will be analysed, the final results of the course should not differ significantly between the two groups. Therefore, the learning objectives of both knowledge sessions were described at the same level. For the first group that received knowledge sessions about brand extensions, two learning objectives were described as following: (1) students will be able to understand and apply the knowledge about creating successful brand extensions (the interplay between the factors brand fit, typicality and novelty); and (2) by the end of the teaching framework, students will be able to apply the discussed techniques and will be able to translate the brand values into successful designs. For the control group, which received knowledge sessions about inspiration techniques, the learning objectives were formulated as follows: (1) students will be able to understand and apply the knowledge about using various inspiration techniques (rational, intuitive and contemplative)(Corremans & Mulder-Nijkamp, 2016); and (2) by the end of the teaching framework, students will be able to apply the discussed techniques and will be able to create successful designs.

These learning objectives do not contradict the learning objectives of the original course, but rather provide enrichment, because both approaches lead to improvement in techniques during the ideation process. The content of both methods is at similar levels but approaches the process differently by using specific techniques relevant to the overarching topic.

The challenge of designing the experiment lay in the fact that the original teaching framework was based on a 10-week program, while this experiment gave the opportunity to only teach four workshops of an hour. Therefore, it was essential to select the key learning objectives
of the original teaching framework and select the fundamental elements of knowledge and activities for this experiment. Since this course was only limited in time, we decided to leave out learning objective 4, for which students had to make a model and focus on creating a graphic design (2D), a final design (3D) and one in between (2.5D). Furthermore, we merged all the activities into smaller blocks of content.

The central themes addressed by the two groups were kept constant whereas the phases of the original teaching framework were translated into four themes in a four-step sequence (analysis, inspiration, decision making and evaluation). Both groups received specific knowledge based on their topic; however, the general themes were kept similar (Figure 5.6). At the beginning of the assignment, all students received an (hypothetical) design brief from Lamborghini. Both groups received a short introduction on their theme by explaining the ‘theory’, followed by dedicated assignments during which they were asked to apply the knowledge to their topic.

5.5.4 Assessment of results

The results will be assessed in two ways. First, all portfolios will be assessed by checking the learning objectives of the regular course focusing on the drawing skills and the integration of various tools in the design process, which will be conducted by the sketching teachers. The grades of both groups will be compared and checked to ascertain whether or not there are significant differences. Designing a brand extension is not part of the learning objectives of the course, nor is it part of the student’s assessment. We therefore expect that there will be no difference in grading between the two groups.

In this additional research phase, all final designs created by the designers will be coded anonymously and assessed by professional designers. These professional designers will rank the designs based on expected market success, and the factors of typicality, novelty, brand fit, aesthetic preference and the quality of the drawing. This final factor was added, since not all results are drawn at the same level, which might influence the results. The analysis of the results will provide an answer to the question of whether students who followed the proposed teaching framework were able to create more successful brand extensions. If and when we can confirm this, we will also have an answer to our main question.

5.6 Experimental results

To test our claim whether the quality of a drawing is related to the success of a product as discussed previously, we performed a regression analysis in SPSS, to test if the quality of drawing is related to the expected success of the design. The results of the expert analysis was used to perform this test. The analysis showed us a significant Pearson correlation of 0.74 between the level of quality of a drawing and the success of a brand extension. Thus a drawing with a high level of quality is highly correlated with the expected level of success. This result confirms our assumption, but we still cannot say anything about the differences between groups. In Table 5.1 we compared the mean averages of the two groups. Group 1 was the group applying the design method to successful brand extensions, whereas group 2 received extra knowledge about inspiration techniques that can be used to improve your design. The table shows that the average of the level of success in group 1 is higher (452.2) than for group 2 (423.6), while the quality of drawing of group 1 was lower (459.1) than for group 2 (499.4). The grading results of both of the groups were comparable. We also compared the mean gradings between the two groups, where group 1 had a slightly higher grade (7.0) compared to group 2 (6.8); however, this effect is so minimal that it can be regarded as essentially showing no difference between both groups.

<table>
<thead>
<tr>
<th>Group code</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected market success</td>
<td>1</td>
<td>282</td>
<td>452.2</td>
<td>284.78</td>
</tr>
<tr>
<td>2</td>
<td>282</td>
<td>423.6</td>
<td>294.22</td>
<td>17.52</td>
</tr>
<tr>
<td>Quality of drawing</td>
<td>1</td>
<td>282</td>
<td>459.1</td>
<td>264.70</td>
</tr>
<tr>
<td>2</td>
<td>282</td>
<td>499.4</td>
<td>289.23</td>
<td>17.22</td>
</tr>
</tbody>
</table>

Table 5.1 Comparison between group 1 (applying the method to design successful brand extensions) and group 2 (applying a design method on inspiration techniques)
When we performed an independent sample t-test between the two groups, to see whether the designs of group 1 are more successful compared to those of group 2, we saw that both aspects did not reach significance (p>0.05). However, we did see quite a large difference in the mean scores of their drawing quality (459,1 versus 499,4). Despite the fact the mean value of the quality of drawings of group 1 was lower than for group 2, the students from group 1 were able to design more successful brand extensions. Combining this with the correlation between the quality of drawing and the success of the design, these results indicate that there might be a significant effect when we control statistically for the level of quality of drawings between groups. Therefore, we performed an ANCOVA to control for the variable drawing quality, in order to make sure that this variable will not negatively influence the results.

The results do show a significant effect (p<0.05), where the level of drawing quality is kept constant at 479,26. However, the results also show that the effect of the drawing quality is larger (27%) compared to the differences between using the knowledge or not (only 1%) (Table 5.2).

### Table 5.2 ANCOVA where the level of quality was kept as a constant factor

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>Sig</th>
<th>Partial Eta Squared</th>
<th>Noncent. Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>2</td>
<td>105.8</td>
<td>&lt;.001</td>
<td>.27</td>
<td>211.7</td>
</tr>
<tr>
<td>Intercept</td>
<td>1</td>
<td>72.1</td>
<td>&lt;.001</td>
<td>.11</td>
<td>72.1</td>
</tr>
<tr>
<td>kval</td>
<td>1</td>
<td>209.9</td>
<td>&lt;.001</td>
<td>.27</td>
<td>209.8</td>
</tr>
<tr>
<td>Group code</td>
<td>1</td>
<td>5.9</td>
<td>.016</td>
<td>.01</td>
<td>5.9</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>564</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>563</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\* R Squared = .274 (Adjusted R Squared = .271)
\*\* Computed using alpha = .05

The results are somewhat disappointing; however, we do see quite a large difference in the expected levels of success between group 1 (463) and group 2 (412) (see Table 5.3).

### Table 5.3 Mean differences after controlling for quality of drawing

<table>
<thead>
<tr>
<th>Group code</th>
<th>Mean</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>463.3*</td>
<td>14.7</td>
<td>434.2</td>
</tr>
<tr>
<td>2</td>
<td>412.7*</td>
<td>14.7</td>
<td>383.7</td>
</tr>
</tbody>
</table>

\* Covariates appearing in the model are evaluated at the following values: kval = 479.26.

Furthermore, our expectation was to see a difference in the levels of brand fit. However, the results of both groups did not show a significant difference between two groups regarding the determinant brand fit, but it did show a significant effect on the determinant typicality (p<0.05), even without controlling for the level of quality. In other words, the students who used the model seem to design less typical concepts (mean TYP = 475) compared to the other group (mean TYP = 545). All the other determinants did not reach statistical significance. When controlling for the level of quality, there is a larger difference between the two groups (464.9 versus 435.3) regarding brand fit, but it did not reach significance (Table 5.4).

### Table 5.4 Independent T-test comparing the two groups

By plotting the means squares of the two groups in a table (Figure 5.7), the difference between the two groups is visualized. When we compare the means of the three main determinants between the two groups, we clearly see that the first group is more capable of balancing the three determinants. The group without knowledge tends to design more carefully, showing a high level of typicality combined with a low level of novelty. The scores of group one seem to be equally divided. This difference is quite remarkable since the group that did not receive extra knowledge about the determinants had received more assignments based on creativity.
5.7 Interpretation of the results

If we correct for the quality of the drawings, the results show a significant effect (p<0.05) on the expected success of the brand extension. However, it must be noted that the effect of the group that followed the knowledge sessions of the teaching framework is small. This can be explained through two arguments. First of all, the students used for this experiment are novice designers who had never used this method before. They might have needed some extra time to become familiar with the application of this method of creating designs. Such designers could experience a 'gap' between knowing what is important and actually applying their knowledge in practice while designing. Giving them more time to practise with the theory and to apply this to different case studies might lead to a better embedding of their knowledge. Secondly, the format of the content, in other words the way the extra knowledge was presented, differed between the two groups. In the BE knowledge group, an explanatory presentation was given to explain the effect of the three determinants. After this, the students needed to apply the knowledge in their own project by using that knowledge in the framework. The students were designated as novice designers, needing more step-by-step approaches, so the set-up of the framework was also explained in steps. In the control group, the students also received an explanatory presentation. After that, they were given much more freedom in how to deal with the presented knowledge during the design process. They could just use the knowledge as inspiration and there was no step-by-step approach set. This might have affected the way in which these designers experienced the workshops and how they were stimulated to create better designs. In the following sub-section the experience of the students that used the method are discussed; however, the results indicate that the students of the second group appreciated the workshop more compared to the first group. This might also suggest that the format for novice designers does not necessarily need to be focused on a step-by-step approach, because a more creative attitude towards translating the knowledge into new designs could also positively influence the results.

Finally, the results confirm that there is no statistically significant difference in gradings between the two groups. The difference in the average grading between 1 & 2 is marginal. Subsequently, we analyzed the extreme results that were ranked as most successful with a high quality of drawing level, and least successful with a low level of drawing quality. This approach showed that the students from group 1 were indeed able to design more successful designs and the students from group 2 were able to create more correct drawings. In Figure 5.8, the extreme combinations of both aspects are visualized. On the horizontal axis, the quality of drawing is displayed and on the vertical axis the level of success. The figure has four quadrants with - in the lower left corner - low quality and low level of success. The straight line shows the correlation as analyzed previously, whereas the grey ellipse shows the outliers of the experiment. Furthermore, we can see that the designs of group 1 (A numbers in Figure 5.8) tend to lie above the linear correlation line, which indicates that they were able to create more successful designs with fewer drawing qualities. This could be due to the influence of the proposed method; however, further analysis is needed here.
5.8 Evaluating the effect of the knowledge sessions

To measure the effectiveness of the knowledge sessions in designing more successful brand extensions, two aspects still need to be taken into account. First, it must be determined whether the students actually gained knowledge during the knowledge sessions. Secondly, in order to understand whether the knowledge sessions were also considered useful by the students, the experiences of the students need to be evaluated.

To ascertain whether or not groups have actually gained knowledge during the extra lectures, an online survey was executed in which the respondents had to answer ten questions; five questions (Questions A) were aimed to test knowledge about the method for designing successful brand extensions, and five questions (Questions B) were set up to test knowledge about the inspirational methods. In total, seventy students finished the survey (thirty-five from group A and thirty-five from group B). The survey was also completed by an extra control group of first year students to test if the knowledge of both of the groups was higher compared to the extra control group. This test should show if groups 1 and 2 scored better overall than the control group. Of course, the scores of group 1 for the questions of survey A would need to be better than for group 2 and the scores of group 2 on the questions of survey B would need to be better than for group 1. Table 5.5 shows that group 1 scored higher (3.23) on questions A compared to group 2 (2.37). Table 5.6 shows that the overall score in answering the questions from survey A was significantly higher for group 1 than for group 2 (p<0.05).

Table 5.5 Average score of two groups based on Questions A and B

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>1.00</td>
<td>35</td>
<td>6.29</td>
<td>1.178</td>
</tr>
<tr>
<td>total score_questions_A</td>
<td>1.00</td>
<td>35</td>
<td>3.23</td>
<td>.990</td>
</tr>
<tr>
<td>total score_questions_B</td>
<td>1.00</td>
<td>35</td>
<td>3.06</td>
<td>.938</td>
</tr>
</tbody>
</table>

It is remarkable that group 1 and group 2 scored almost the same on Questions B. This can mean two things: the B questions were more about general knowledge or group 2 is worse at gaining knowledge. The extra control group consisted of eighty-two first year students with almost no experience in design. They scored an average of 5.23. This is just slightly lower than the score of group 2 of the second year students (5.37). We also performed an independent T-test between groups 2 and 3 which did not reach statistical significance (p>0.05). These results indicate that the students of group 1 scored better and therefore it is shown conclusively that they actually gained knowledge during the knowledge sessions.

The other aspect that needs to be addressed is the experiences of the students that followed the knowledge sessions. Therefore, in this part, we focus on the actual effectiveness of the knowledge sessions from the perspective of the students. Several questions were asked in the survey to evaluate their experiences of the sessions.

Table 5.6 Independent T-test between the two groups based on Questions A and Questions B

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>Sig.</th>
<th>t</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>3.07</td>
<td>.003</td>
<td>.914</td>
<td>.221</td>
<td>1.508</td>
<td></td>
<td></td>
</tr>
<tr>
<td>total score_questions_A</td>
<td>3.07</td>
<td>.000</td>
<td>.867</td>
<td>.043</td>
<td>1.242</td>
<td></td>
<td></td>
</tr>
<tr>
<td>total score_questions_B</td>
<td>4.44</td>
<td>.000</td>
<td>.897</td>
<td>.043</td>
<td>1.243</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The nine questions that were answered by the students are shown in Table 5.7. The respondents were asked to answer the questions on a five points Likert scale from 1 (not at all agree) to 5 (totally agree). The results are presented in two columns; the first one combines the numbers 1, 2, 3 (not at all agree, agree and neutral), the second one combines 4 and 5 (agree and totally agree). This was done to quickly have an overview of the results.

The results show that both groups liked the assignment about a snow scooter, group 1 even more than group 2. However, the survey also showed that the students from group 2
considered the knowledge sessions more interesting than did group 1. However, applying the theory in practice still seems to be difficult for students.

In the end, it seems that the actual level of quality of drawing from group 1 is lower than that from group 2, while the survey showed that the students from group 1 judged themselves to be better sketchers and quite good designers. It seems that the students from group 2 liked the assignments more than group 1. It is also remarkable to see that for both groups, the extra knowledge was really easy to understand (91.7% versus 85.7%), while the application of the knowledge was much harder for group 2 (40%) versus group 1 (61.1%). This might suggest that the format of the sessions needed to be changed. Despite the fact that it is more easier to apply the knowledge, the students did not find the step-by-step assignments helpful. The less fixed setup of the second group showed that the students liked the knowledge sessions more. Furthermore, the assignments of the group using the inspiration methods were focused on using inspiration in three ways (Corremans & Mulder-Nijkamp, 2016; Mulder-Nijkamp & Corremans, 2014), resulting in alternating between intuitive, rational and contemplative exercises. It might be that by switching between techniques and approaches from more rational to intuitive, we created a stimulating and creative environment for the students. This might have influenced the experience of the students. It is also recommended that these different approaches be applied by alternating rational and intuitive exercises in the teaching framework for creating successful brand extensions.

5.9 Discussion

Design-research-in-education was used to improve our research outcomes and to improve the experience in design education at the same time. It was especially interesting to learn from the students and see how they reacted to the methods and adapted the design tools provided. Furthermore, the students were really positive about testing and evaluating new design tools. However, a pitfall is clearly finding a balance between performing an experiment that will research the correct aspects and creating an educational environment which ensures all students are able to gain knowledge at the same level. Performing a survey at the end to evaluate the results really helped to understand the reactions of students and also provided important evidence for the examination board. From a research perspective, it was valuable to test our developed method based on grounded theories in a real world case, as also discussed by other studies (Akker et al., 2006; Collins et al., 2004). In this way we were able to test the robustness of the method while at the end it also delivered 81 designs that can be further analysed.

One important aspect that still needs to be addressed is the level of quality of the drawings. Since this experiment was executed with design students, it automatically resulted in designs that might have a low quality of drawing or might be un-realistic. To interpret the results more meaningfully, it would be better to only select the designs which show comparable levels of drawing. During the calculations, the level of quality was kept at a constant level, showing a significant effect in the expected market success of group 1. Despite the fact this was a useful way to collect as many concept designs to validate the robustness of the conceptual model and to test the framework, future studies might be more beneficial if the designs that are unfinished of show a really low level of drawing quality were to be filtered. Our research has also clarified that the proposed framework and knowledge session might be less beneficial for beginning designers. The results show that designers with above average design skills benefit most from knowledge sessions. However, the results may be affected by the way of presenting the knowledge to such students.

An important aspect that has to be taken into account is the difference in nature between methods and tools. Using methods and tools can structure a process (Blessing & Chakrabarti, 2009) and could even become a mental support for designers (Daalhuizen, 2014). However, as claimed by Daalhuizen, little attention has yet been paid to the users of methodologies: the designers who are expected to benefit from the methods. It is self-evident that the designer has an important role in the application of a method to create an artefact. However, many of these tools investigate the use of scientific knowledge to facilitate rational decision making (Bayazit, 2004), but do not take into account the more creative approach of designers. This was also found in the evaluation of our own study, in which the students of the group that followed the inspiration knowledge sessions seemed to like the content more. This could be explained by alternating approaches that stimulated different hemispheres of the brain. A different approach to how designers can be supported in their processes should also be considered when developing a new tool or method. The setup of the framework and the knowledge sessions was built on previous research that claimed that novice students benefit more from structured ways of working (Dorst & Reymen, 2004; Lawson & Dorst, 2009). However, our results indicate that a more creative approach adds to the creativity and intrinsic motivation of the students to create more promising designs (Auger & Woodman, 2016).

Our results demonstrate that the students from group 1 were able to make better designs by balancing all three determinants: typicality novelty and brand fit. The designers from group 2 tended to design more cautiously because the balance between the determinants of typicality and novelty tends more towards typicality, resulting in more recognizable scooters. It is therefore even more surprising that the designs of group 1 scored better on expected market success. Those designs were considered to be more novel designs. However, the other three determinants were balanced as well and could act as the suppressor for the relatively higher score of novelty. Summarizing, this could mean that the proposed method enables designers to balance the determinants in an optimum way? However, it could also mean that the students in group 1 were more confident in creating designs. In other words, these students dared to design more novel creations, despite the fact that they might not be accepted by consumers. Overall, the students in group 1 seemed to rate their own level of drawing quality as quite high, and the satisfaction about their design also as high. This might explain the fact that they are more confident about their results than students in group 2.
5.10 Conclusion

In this chapter, the development of a teaching framework was discussed by using a research-through-design approach. This teaching framework was developed as a support for students to design more successful brand extensions. The validation of this framework was validated by setting up an experiment in which the results from two groups were measured: one group that followed knowledge sessions about brand extensions and a control group that followed knowledge session about inspiration techniques. This experiment resulted in an ethical dilemma, namely whether students would be disadvantaged by being part of this experiment. The results showed that there was no evidence that the design would be detrimental for either of the groups. Furthermore, the results of the experiment also showed valuable insights regarding the differences between the two groups in using the extra knowledge of the framework. When controlling for quality of drawing, the results did show a positive effect of expected market success. Furthermore, the students from group 1 were able to design snow mobiles which are balancing between the factors typicality, novelty and brand fit, compared to the designers of group 2 that tend to design more typical snow mobiles.

These outcomes have led to three important conclusions. First of all, in order to measure the correct effects, it is important to use stimuli that have a high level of realism during the evaluation of designs. When designs are not yet finished or are designed with a low level of drawing quality, it is harder to envision these designs as real proposals. In the experiment, this was addressed by asking design professionals to evaluate the results. It is assumed that design professionals are capable of evaluating design proposals that are less realistic and presented purely as a concept design. This way of evaluating resulted in useful insights; however, it also was quite labour intensive and it also might have led to bias in the results because professional designers might value the designs differently than the intended customers. For the continuation of this study, it would therefore be better to select designs that remove the designs that show a low level of quality to prevent failures in measuring the effect of success.

The second conclusion focuses on the level of design skills. It seems that designers with an average level of design skills and drawing quality were able to design more successful brand extensions by following the knowledge sessions. However, for less skilful designers the method was less successful. Although the results of the survey showed that the students of group 1 were able to gain knowledge on the topic of brand extensions, it does not necessarily mean that they are capable of translating their knowledge into a new design with a high level of realism. It seems that those students lack experience in translating the knowledge into successful designs. Specific methods could help them. However, the results of designers who already have a higher level of design skills are rated as more successful anyway.

The final conclusion focuses on the format of the presentation of the framework embedded during the knowledge sessions. The results indicate that the step-by-step approach that was chosen to guide novice students was less successful. In the second group, students the students liked the approach better. The more creative approach and less structured set-up might have influenced this, showing that designers also need freedom and autonomy to explore their own creativity. In the continuation of this study a better balance needs to be found in guiding students to perform specific analyses, and giving them freedom to explore their own creativity when designing a new brand extension.
CHAPTER 6

Innovating the archetype:
Discovering the boundaries of the triangular designer space


The initial draft of the document was published and presented at the international conference on Design branding and management in 2018 in Hasselt.


Parts of the documents are also published in the book The value of Design in Retail and Branding (2021) by Quartier et al. published by Emerald.


CHAPTER 6
Innovating the archetype: Discovering the boundaries of the triangular designer space

In Chapter 4, the interplay between brand fit, typicality and novelty was discussed. In that chapter, we concluded that achieving the optimal balance between typicality and novelty will indeed lead to more successful brand extensions. Furthermore, we noticed that brand fit might play an import role in creating the optimum balance in the MAYA principle acting as the counterpart of either typicality or novelty. In the qualitative content analysis, some of the respondents explicitly mentioned the brand as the counterpart of the factor of novelty or typicality. This raised the question of whether the determinants of brand fit AND typicality, described as brand typicality in Chapter 4, could be used as the counterpart of novelty in the MAYA principle. In other words, is it possible to transform the current terms of the MAYA principle into brand typicality versus novelty?

The evaluation of the Teaching Framework in Chapter 5, also shows that designers tend to design more typical and less novel designs. Designers prefer to stay 'on the safe side' and find it difficult to create a product that evokes a more novel response, even when they are stimulated to be creative by using diverse inspiration tools. The aforementioned makes clear that the aspect of novelty in particular leads to uncertainty and ambiguity among both respondents and designers. In both Chapters 4 and 5, the aspect of novelty remains equivocal. In the qualitative results of Chapter 4, we saw large differences in the rankings of novelty. Furthermore, in the qualitative content analysis we found out that respondents were not unanimous on the definition of novelty. In Chapter 5, we noticed that the control group designed more typical stimuli, whereas the group that engaged in the knowledge sessions about brand extensions was able to balance the aspect of typicality together with novelty and brand fit in creating more novel designs. This underlines the tendency of designers (and humans in general) to act in response to certainty (focusing more on typicality in creating recognizable aspects) before uncertainty (focusing more on novelty in creating novel aspects). When following the teaching framework, designers create designs that are more balanced over the three aspects of typicality, novelty and brand fit. However, the interpretation of the aspect of novelty seems to be the most uncertain 'ingredient' in creating a successful brand extension. Further research is necessary for designers to better act in response to this uncertainty.

In this chapter, we will investigate how the factor of novelty can be interpreted when designing brand extensions. According to the assumption in Chapter 3, there could be a difference in ranking for different types of products. One could, for example, respond more sensitively to archetypical products (such as the helmets from Chapter 3) compared to multitype products (such as the bikes from Chapter 3). By investigating the differences in evaluating the factor of novelty by focusing on archetypical versus multitype products, we expect to see that archetypical categories are more sensitive to radical changes in the categorical representation.

6.1 Introduction

The iconic bottle of Heinz tomato ketchup and the recognizable purple shampoo bottle of Andrélon with hair particles are known as flagship products. However, would consumers recognize a Heinz tomato juice bottle or an Andrélon soap dispenser? Playing the game the other way around: what would be perceived as typical characteristics of the Kraft Heinz or Andrélon brands when launching new innovations in different product categories? It has been widely proven that the introduction of innovations can be more successful when launched under an established brand, i.e. as a brand extension (Kapferer, 2008; Keller, 1998). However, ‘stretching the brand’ by creating new products in a completely different product category comes with uncertainties (Keller & Lehmann, 2009). One of the most important antecedents of successful brand extensions in the existing literature is the perception of ‘fit’ explained as the similarity between the brand extension and the parent brand (Aaker & Keller, 1990; Bousch & Loken, 1991; Völckner & Sattler, 2006). However, it still remains unclear what exactly constitutes a ‘perfect’ fit. We identify a gap in the literature which is currently barely addressed, namely the attribution of the visual appearance to this fit. The role of the appearance of a design is often underscored in the marketing literature, whereas the visual appearance of products is known to be a critical determinant of consumer response and therefore product success (Homburg et al., 2015; Page & Herr, 2002; Radford & Bloch, 2011). When all other factors are defined (such as the chosen product to design, the quality of the parent brand, the appropriate retail channel), the aesthetic appraisal of new brand extensions can have a large influence on the degree of acceptance. Based on the current literature, most designers and design managers only know what to design, but suffer from a lack of knowledge about how to design successful brand extensions.

This paper addresses the following two research questions, which will subsequently be explored through two case studies.

1. How novel can a new brand extension be, compared to previous product-variants, in order to accomplish the desired recognition?

2. What is the effect of novelty when used - for brand extensions - in archetype versus multitype products?

Our interpretation of previous studies is that at least three determinants play an important role when designing the appearance of brand extensions: (1) product typicality (does the design look like the archetype product, referred to as ‘goodness of an example’ (Veryzer & Hutchinson, 1998)); (2) novelty (how novel is the design, where novel refers to the amount of visual ‘newness’ in a design (Radford & Bloch, 2011)); and (3) brand fit (does the design refer to the brand characteristics) (Kreuzbauer & Malter, 2007; Mulder-Nijkamp et al., 2021). As these three determinants are mutually influencing (Mulder-Nijkamp, 2020), designing the optimal
trade-off between these three determinants will possibly lead to more aesthetically preferred products. From there, as discussed by Homburg et al. (2005) more aesthetically preferred products will result in a higher willingness to pay and a higher consumer acceptance, thus in a more successful brand extensions.

Furthermore, that we argue that the trade-off between those three determinants will also be influenced by the type of product that will be designed. For archetype products, the effect of the three determinants are different to those for less archetypical products (so-called multitype products). Furthermore, we claim that the effect of novelty used in archetype products is much more sensitive compared to in multi-typical products. Consumers prefer to stay closer to the archetypical product and are more extreme in their attitudes towards novel products.

6.2 Theoretical background
To discuss our case studies effectively, three topics require clarification: designing brand extensions, the interplay of research domains and physical appearance. Each is discussed below.

6.2.1 Designing brand extensions
The power of using brand extensions is evidenced by the sheer numbers that are launched every year (Aaker, 1990; Gerrath & Biraglia, 2021; Goedertier et al., 2015; Pontes & Pontes, 2021). In 2019 Heinz launched ‘tomato ketchup caviar’ for Valentine’s Day (Jonze, 2019) and recently the Dutch textile discounter Zeeman launched a perfume bottle and a Bluetooth speaker (Van Rompaey, 2021). By launching such brand extensions, brands hope to stand out from their competitors and generate greater brand engagement (Gerrath & Biraglia, 2021). However, it remains unclear how innovative such brand extensions can be, while still accomplishing the desired acceptance (Gerrath & Biraglia, 2021; Goedertier et al., 2015). Marketing managers face the risk of brand extension failures, which can reach rates of between 80 and 90% (Batra et al., 2010; Marketing, 2003). Moreover, brand extensions pose a risk, because they potentially can decrease or harm the equity of the core brand (Degabra & Sullivan, 1995; Simon & Sullivan, 1993). A brand extension that evokes unwelcome associations could damage the brand, and can even demolish the overall identity of the brand (Aaker, 1990). This is an even stronger argument to ensure that the aesthetic appearance of the brand extensions should be designed so as to find the optimal balance between brand and innovation. If the appearance of the design is perceived as too novel, it will lead to unwelcome associations, which could easily harm the brand. After all, understanding the interplay of all determinants that effect the success of brand extensions can inform but moreover support marketing managers and designers to design meaningful and recognizable products and to improve the success rate. This delicate relation between brand and innovation as integrated in a visual appearance raises the need for more insight into consumers’ attitudes towards such innovations (Brexendorf et al., 2015; Brexendorf & Keller, 2017).

The appearance of the designed products is an important mediator in the communication directed at consumers (Crilly et al., 2004) and acts as carrier of meanings when communicating the designers’ intent. This implies the process of ‘semantic transformation’ (Karjalainen, 2004) in which brand characteristics become embodied in the physical design features of a product. For this reason, designers play a crucial role in translating the brand characteristics into specific visual cues. When done well, this can influence the success of innovations. By synthesizing all the various visual cues (such as defining the volume, specific lines, materials, specific tactile features and the colours) into the appearance of the product, they ‘communicate’ with the consumer and try to evoke the desired message towards the target group (Crilly, 2005).

Theories such as the MAYA principle (Most Advanced, Yet Acceptable) (Hekkert et al., 2003; Loewy, 1951) focus on achieving more insight in the attitudes of consumers, and guide designers in the process of finding the best solution. However, these theories are quite general and therefore limited in applicability. In this paper we recognize the limitations of the MAYA principle and claim that the success of brand extensions cannot be explained by a simple negative linear relationship between opposites of typicality versus novelty.

This research centres around how design features in the physical domain are used to carry semantic references to the character of a brand (Karjalainen 2007; Karjalainen and Snelders 2010). We show how specific explicit and implicit design cues influence recognition and to what extent brands should apply such brand-specific design cues in new product (packaging) designs. We will present our findings with the aid of the Triangular Designers space (Mulder-Nijkamp et al., 2021), a framework we developed for designers and design managers to support them in finding the optimum appearance for their designs. To explain the theoretical foundations for this framework, we first need to discuss the interplay between the involved research domains.

6.2.2 Interplay of research domains
A brand extension can be seen as a new product innovation from inside the brand which could revitalize the brand if accepted by consumers. Understanding the success of such new product innovations will decrease the risk of new product failures and - together with the powerful effect of branding - this can lead to a more successful and acceptable innovation (Degabra & Sullivan, 1995; Yacoub; l, 2015). To reach that goal, it is important to connect knowledge from various research domains. Designing brand extensions involves the research
domain of innovation management (since it is a new product that is going to be launched) and brand management (since it should fit to some extent to the brand). Besides these two areas, we also need to introduce a third domain: the field of Product aesthetics. Product aesthetics is part of a larger field referred to as ‘Product design’. However, in the context of this paper we want to limit ourselves to the aesthetic appearance of products, which seems to determine to a large extent the success of products (Lidwell et al., 2003). When technical specifications tend to vary less, the aesthetic appraisal of products seems to be crucial in distinguishing them from those of competitors (Eger & Drukker, 2010; Hekkert & Leder, 2008; Hekkert et al., 2003). We will briefly discuss the important literature from each research domain to give a clear explanation of our perspective and subsequently zoom in on the domain of product aesthetics.

Studies from the domain of innovation management describe the influence of the newness of innovations which evoke uncertainties among consumers (Claudy et al., 2014; Dewar & Dutton, 1986; Luecke & Katz, 2003; Veryzer, 1998). The reasons why consumers adopt certain innovations rather than others differ and are hard to predict (Claudy et al., 2014). It also matters on whether the newly developed product is an incremental (continuous) or radical (discontinuous) innovation (Dewar & Dutton, 1986; Veryzer, 1998). These insights are, of course, very relevant to designing more successful brand extensions. But in addition to these factors - knowing how to design a more incremental or radical innovation - it does not become clear how to design the physical appearance of such new product innovations. Many scholars have pointed out the lack of research into the interplay between innovations and the design of new product developments (Brexendorf et al., 2015; Hernández et al., 2018; Hultink, 2010; Veryzer, 2005). As discussed by Hernandez (2018), design has a crucial role in the consumer acceptance process and “has become the language of innovation itself”.

Taking a closer look at the domain of brand management reveals a similar picture. Current marketing literature on introducing brand extensions focuses on addressing the question of how successful a certain product-brand combination is likely to be (Aaker, 1990; Aaker & Keller, 1990; Albrecht et al., 2013; Bottomley & Holden, 2001; Pontes & Pontes, 2012; Völckner & Sattler, 2006, 2007), but does not provide guidance for new product development. The studies show successful brand extensions when there is a perception of good fit between the parent brand and the extension product (Völckner & Sattler, 2006). However, when the innovation that is to be launched is known, the physical appearance of this new product innovation becomes the most important influencing factor. One of the important determinants influencing the appearance of the brand extension is the brand identity and the current product-portfolio of the brand. The use of the brand can be elaborated more to increase the successfulness of brand extensions (Bottomley & Holden, 2001; Broniarczyk & Alba, 1994; Park et al., 1991). The connection with the core values of the brand and specific salient characteristics of the brand have been shown to also have an important impact (Kreuzbauer & Malter, 2007; Leder et al., 2007; Martínez Salinas & Pina Pérez, 2009; Page & Herr, 2002), but remains often under-exposed.

The influence of the factor of brand fit needs to be investigated in relation to the current body of literature regarding different interpretations of the term fit. To achieve a better understanding of the interplay between brand management and innovation management, we first need to zoom in on the physical appearance of products which will be discussed in the next section below.

6.2.3 Physical appearance

Although product design and the aesthetics of consumer products have been extensively researched (Berlyne, 1974; Crilly, 2005; Crilly et al., 2004; Desmet, 2002), the link with the fields of brand and innovation management remains poorly researched. However, the physical appearance of a new product innovation is an important medium between consumers and designers to communicate the message of a brand (Bloch, 1995; Crilly, 2005) and to improve the acceptation of new product innovations. Within the field of brand extensions, the delicate balance between brand recognition on the one side and the newness of the innovation at the other side seems to be crucial (Brexendorf et al., 2015; Broniarzyck & Alba, 1994). This builds on the much investigated relationship between typicality, novelty and aesthetic preference, termed the Maya principle (Most Advanced, Yet Acceptable) as mentioned earlier. The term Maya principle was first coined by Loewy, who stated that: “the consumer is influenced in his choice of styling by two opposing factors: attraction to the new, and resistance to the unfamiliar” (Loewy, 1993, p. 279). Hekkert et al. (2003) reported a major breakthrough when they found that the two factors are not by definition opposites, and that the combination of both a high level of typicality and a high level of novelty will lead to higher aesthetic preference among consumers. This finding by Hekkert et al. gave more insight into how to apply the MAYA principle. However, the applicability of the method for designers remains abstract. First of all, the theory claims to find the ultimate balance between two opposites (by maximizing both typicality and novelty). But this balance cannot be clearly identified for all product categories and situations. The Maya principle cannot be compared with a linear equation by adding the ‘right amounts’ of typicality and novelty to achieve the optimum balance. Finding the optimum balance in this delicate relation between the typicality of the brand on the one side and the novelty of new product innovation on the other is difficult (Broniarzyck & Alba, 1994; Keller & Lehmann, 2006). In such a situation, the definition of typicality must be made more clear, because consumers can evaluate the term typicality as the connection to a certain product category (does it look like a juice bottle?) or typicality referring to the connection with the brand (does it look like a Heinz bottle?). The same is true for the definition of the term novelty, which is also quite fuzzy (Hsiao & Chen, 2006; Hung & Chen, 2012) and is hard to measure. For brand extensions, the mechanism behind the MAYA principle (optimising both typicality and novelty) might be too difficult. The question arises: How novel can we make those new product innovations such that still they are accepted by consumers and how do consumers perceive the level of novelty in the appearance of products?
Previous studies found that the brand can be used in two ways: (1) The brand can act as the factor of typicality (“Hey, I recognize specific explicit cues of Heinz in this juice bottle”); and (2) It can also be explained as the factor of novelty (“Wow, I did not know that Heinz was also developing bottles with fresh tomato juice”) (Mulder-Nijkamp, 2020). This brings us to the second difficulty with respect to the MAYA principle: how does the brand impact this delicate balance? It does not take into account factors such as the innovativeness of the brand. If a brand is known as a frontrunner or innovator (say Nike or Dyson), this theory of balancing the results will probably not lead to the expected outcome. Lastly, the MAYA principle does not give an answer to the question of what to do with a product from other product categories. For example, when designing watches (more archetypical) versus designing lamps (less archetypical) the perception and adoption of novelty (Dewar & Dutton, 1986; Veryzer, 2005) will be different. In this research, we predict that the balance point will shift towards typicality or novelty, depending on the product classification.

All these factors are important to determining the optimum positioning of the to-be-designed product; however, they are currently not integrated into the MAYA principle. As a matter of fact, designers just use their experience and their own gut feelings to make specific decisions (Dorst, 2008) in the process of creating brand extensions. A theory such as the MAYA principle does not provide enough guidance for this situation. Nevertheless, the optimum choice of “ingredients” directly influences the decisions of consumers (Blijlevens et al., 2012; Bloch, 1995). Adding a specific design cue to reinforce the recognisability of the brand or just adding a striking colour to focus more on novelty could make the difference between the success of failure of a brand extension (Leder et al., 2007).

We argue that brand-specific associations (Broniarczyk & Alba, 1994) - what we term ‘brand fit’ - also play an important role in this process. For this combination of factors, we will use the term “brand typicality”, which is a combination of “product typicality” (Blijlevens, Mugge, and Schoormans 2012; Loken and Ward 1990; Veryzer and Hutchinson 1998) and ‘brand fit’ or brand categorization (Kreuzbauer, 2002; Kreuzbauer & Malter, 2005; Kreuzbauer & Malter, 2007). The determinant of brand typicality (brand fit and product typicality) can be used as the counterpart of novelty of innovations and will lead to more successful brand extensions. However, this balance needs to be seen in the relation to the new product category.

The interaction of the two seemingly opposing factors, as embedded in the Maya principle, might be too limited when a brand comes into play (Mulder-Nijkamp, 2020).

In such specific situations, we therefore state that the positioning between the following three main determinants is important to increasing the success of brand extensions:

1. The product typicality: if the product is perceived as a typical design, or ‘goodness of example’ (Veryzer & Hutchinson, 1998) with regard to the main product category it will be more successful (Blijlevens et al., 2012; Ghim & Shin, 2021; Kumar & Garg, 2010; Loken & Ward, 1990; Meyers-Levy & Tybout, 1986).

2. The novelty – showing high levels of visual “newness” (Radford & Bloch, 2001). The literature reveals that integrating novelty leads to more success in aesthetic appraisal (Bianchi, 1998; Blijlevens et al., 2012; Simonson & Nowlis, 2000).

3. Brand fit, the way in which the brand extension is connected to the brand by specific explicit cues or brand achieve specific associations (Karjalainen & Snelders, 2010; Kreuzbauer & Malter, 2005).

To do this, we will take a design-driven approach (Archer et al., 1976; Cross, 1982). By experimenting and evaluating various versions of one brand extension we will investigate how to find the optimal positioning of new designs. In other words, it is important to know WHAT needs to be designed. However, it is even more important to know HOW it needs to be designed. In this chapter we will therefore show how to combine the insights of all fields in a ‘design-driven’ way in order to create more successful brand extensions. For this purpose, we will present the two case studies described below.

In case study 1 we will create two brand extensions (tomato juice bottle for Heinz and soap dispenser for Andrélon) to investigate how novel the visual appearance of new brand extensions can be, compared to previous variants, in order to still achieve the desired acceptance. To measure the success of the proposals we create some operational definitions. By the term novel we refer to products with high levels of visual product “newness” (Radford & Bloch, 2001). We argue that consumers’ acceptance of brand-extensions can be increased by finding the optimum balance between brand typicality and novelty, where brand typicality refers to the combination of product typicality and brand fit. Within this relation, the term product typicality addresses only the question of if the new category is still seen as a reliable product from that category (does it look like a juice bottle/soap dispenser?), whereas the second term brand fit refers to brand-specific characteristics and associations (does it look like a Heinz bottle, or an Andrélon dispenser?). The term brand typicality refers to the designed product packaging fitting to the current brand (does it look like a Heinz juice bottle, or an Andrélon soap dispenser). We predict that the combination of the two aspects appears to best predict the aesthetic evaluation and buying intentions.

In case study 2, we create two brand extensions (headphones for Mercedes and Bluetooth speakers for Mercedes) to investigate the influence of archetype products versus multitype products in relation to the desired acceptance. To classify these two product categories we use the term archetypically (or prototypicality) which refers to classifying things into groups of objects that share some properties (Krippendorff, 2005; Veryzer & Hutchinson, 1998; Whitfield, 1983). Multitype products are categories in which multiple archetypes exist for the same product at the same time. The intuitive response to innovation is expected to be more sensitive to archetype products than multitype products.

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6.3 Case study 1

Our first case study will investigate to what extent brands should display their brand characteristics in new product and packaging designs in order to achieve the desired brand recognition and brand acceptance. We explore how specific design features (such as form, colour and materials) can be balanced into a design that perfectly integrates the explicit characteristics, so as to create a more meaningful (Hekkert & Leder, 2008) and congruent experience (van Rompay & Pruyn, 2011) that will be perceived as more valuable by consumers (Mulder-Nijkamp et al., 2021). Such meaningful experiences will be based on our knowledge and previous experiences and to some extent will therefore be rather consistent (Hekkert & Leder, 2008). Such meaningful experiences can be measured through increasing consumer acceptance.

Expressed differently, how innovative can a new product and its packaging be, compared to previous offerings, in order to still accomplish the desired acceptance?

We will focus on the fast moving consumer goods (FMCG) domain: brand extensions of packaging design and we will design two brand extensions; packaging for Heinz tomato juice and packaging for an Andrélon soap dispenser.

To address the research question, the hypotheses are stated as follows:

H1: The ‘brand-typical packaging design with optimum use of brand characteristics’ are rated as most typical and least novel.

H2: The ‘novel packaging design with minimal use of recognisable brand characteristics’ are rated as most novel and least typical.

H3: The designs numbers 4, 5 & 6 are balanced between typicality and novelty and attain the highest consumer acceptance.

6.3.1 Methodology

In case study 1, we started with a pre-test to determine the most suitable brands to use for this case study by analysing the recognizable characteristics, followed by the experiment to find the optimal balance for the chosen brands. For the pre-test, we aimed to find the most suitable brands with recognizable characteristics. We analysed the explicit cues (Karjalainen, 2004) of several brands by analysing current flagship products. In Figure 6.1, we represent this the other way around and divided them in three main steps: the structural packaging (the main volume); visual packaging (colours, icons, labels, etc); and verbal packaging (text, brand icons and brand name).

In this study, 242 respondents scored 11 products of 11 different brands, by means of an online survey. We had chosen an online study so as to collect as many results as possible. The selected brands differentiated from archetypical packaging such as Sportlife to more iconic packaging such as Heinz tomato ketchup and varied between few competitors (Knorr) versus many competitors (Andrélon) as can be seen in Figure 6.3. All eleven brands were deconstructed and displayed in a similar way as the Heinz example above. The deconstructed and surveyed brands included: Andrélon (shampoo), Sportlife (chewing gum), Heinz (ketchup), Ajax (detergent), Knorr (seasoning), Dref (dish soap), Arla (milk), Jack Daniels (whiskey), Oral-B (toothpaste), Orangina (soda), Melvita (honey) and Bolletje (crackers).

Respondents were shown images of packagings with an increasing numbers of brand characteristics. The scale of ‘no recognisable brand characteristics’ to ‘optimum use of all recognisable brand characteristics’ consisted of five to eight steps depending on whether the brand’s product packaging could exhibit all the characteristics. Showing an extra characteristic every step, respondents had to state their point of brand-recognition. The notoriety scores of the brands were also taken into account based on the EURIB TOP-100 essential brands (Riezebos, 2015) and displayed in the a scale (Figure 6.2). The darker the colour the higher the notoriety score.
The results of the pre-test show that iconic packagings appear to need fewer brand characteristics than archetypical packaging to be recognised. Iconic brands (such as Andrélon, Heinz, Orangina) are mainly recognised by their overall shape and shape aspects (structural design) while archetypical brands (Bolletje, Ajax, Oral B) gain recognition through graphic detailing (visual and verbal design). Therefore, we decided to start the next experiment with two of the most recognizable iconic brands: Heinz and Andrélon.

For the main experiment, we designed two brand extensions: a soap dispenser for Andrélon and a tomato juice package for Heinz. The choice of these product-brand combinations was based on the current literature about successful brand extensions (Aaker & Keller, 1990; Völckner & Sattler, 2006) taking into account the different levels of fit; in this case, a high level of fit (substitute) for Andrélon and a low level of fit (transfer) for Heinz. The two brands are also differentiated from each other in their looks, history, and values; Heinz promotes itself as being trustworthy and authentic; Andrélon on the other hand has a more flexible and modern image. When designing a novel look, the values of the two brands must be taken into account (Karjalainen, 2004; Karjalainen & Snelders, 2010).

To investigate the successfulness and the optimal balance between brand typicality and novelty, eight fictitious proposals for new package innovations of the tomato juice package for Heinz and the soap dispenser for Andrélon (Figure 6.3) were made. These eight proposals were slightly increasing in novelty and decreasing in branded design characteristics (Mulder-Nijkamp & Eggink, 2014, 2016).

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Therefore, the first design of a tomato juice package was really recognizable as a Heinz product by using a lot of the striking design cues based on the structural packaging. The final one was a completely novel design only using the Heinz logo. The designs in the middle of Figure 6.3 (numbers 4, 5, and 6) show more of a balance between brand fit and novelty, presumably leading to more successful brand extensions.

6.3.2 Procedure

In total 80, respondents who were recruited via Facebook and ranked the various product packaging designs of both brands by means of an online survey. After the actual ranking process, the respondents were also asked about their attitudes towards the brands, the perceptual fit, the expectation of the new brand extensions and the credibility of brands to produce this brand extension. This was measured in order to test if the designed brand extensions are reliable and follow the dimensions of fit defined by Aaker & Keller (1990). The respondents ranked the product packaging designs relative to each other on purchase intention. To achieve this, the respondents were shown eight images and were asked the question “Which bottle would you buy?”. Subsequently, they had to rank on aesthetic preference (which design do you consider aesthetically the prettiest?), brand fit (which packaging do you consider the most typical ‘Heinz or – the Andrélon’ design?), product typicality (which design resembles a “juice bottle” or “soap dispenser” the best?). To prevent sequence effects, respondents were shown four of the eight designs at once (1, 3, 5, 7 or 2, 4, 6, 8) and were presented with them in a random order. The survey was designed in this way to reduce the survey time. To increase visible differences between the designs, we decided to combine all odd and all even numbers.
6.3.3 Findings

Results were mapped in graphs for Heinz (Figure 6.4 - left) and Andrélon (Figure 6.4 - right). The numbers on the x-axis represent the eight designs, and the Y-axis shows the average scores of the rankings by respondents. The left graph [a] in Figure 6.4 shows the combined scores for Aesthetics (dark grey) and Purchase (light grey) for Heinz. From the graph, it can be seen that designs 4, 5 and 6 have the highest ratings on both Purchase behaviour and Aesthetics.

The Andrélon graph [c] shows the highest purchase intention for designs 3, 4 and 5. Aesthetic ratings are highest for designs 5 and 6, but do not show a clear peak. For designs 6, 7 & 8 Aesthetics are rated more highly than those for designs 3 and 4; however, design 3 and 4 are more likely to be purchased. Graph [b] in the middle shows the combined scores for Brand fit and Novelty for the Heinz brand. The lowest design numbers (most left) are rated with the highest brand fit and least novel. The highest design numbers are rated with least fit to the brand and most novel. The optimum balance was found for design 5, and to a lesser extent for designs 3, 4 and 6. Design 5 is both most balanced in its brand fit and novelty, and most likely to be purchased by consumers in graph [a]. We can also see that product typicality plays an important role in graph [E3]. The peak of the most recognizable bottle is on 5 which confirms the optimal balance between brand typicality (taking into account brand fit and product typicality) and novelty in relation to aesthetic preference and buying intention.

In the case of the Heinz packaging, the most desirable design (number 5) resembles the intersection point between decreasing brand fit, and increasing product novelty, and also matches with the most optimal brand typicality (Figure 6.4 - left). For Andrélon, this effect is the same, although the outcome is less obvious. Graph [d] shows the combined scores for brand fit and novelty. The optimum balance was found in design 4, and to a lesser extent in designs 3, 5 and 6. Design 4 is both the most balanced in graph [d] and the most likely to be purchased by consumers in graph [c]. The peak of the most recognizable soap dispenser is not consistent; designs 3, 8 and 5 are most recognizable as soap dispensers. In the case of Andrélon packaging, the most desirable design (number 4) resembles the intersection point between decreasing brand fit and increasing product novelty, but does not completely match the most brand typical design visualized in graph [J3]. When we compare product typicality and brand fit, it seems that brand fit seems to be negatively correlated to novelty for both product categories. The results show that consumers indicate the first design as fitting the brand, but at the same time not as prototypical for its category. It can be concluded that the mechanism behind the MAYA principle (Hekkert et al., 2003; Loewy, 1951) seems to also interact with the factor brand fit, while the combination of both brand and product typicality is a better determinant of desirability. The optimal balance of brand typicality (including brand fit and product typicality) seems to be packaging number 5 [graph E3].

The graph in Figure 6.5 shows a scatter chart of the purchase intention data and standardised brand fit data for Heinz and Andrélon. For the brand fit score, 0 is the lowest possible score; 1 is the highest possible score. The purchase score is the actual and not-normalised score, where 1 is the lowest possible ranking and 4 the highest possible ranking score. For both graphs, a second order polynomial trendline (one hill) has been added to illustrate the relationship between brand fit and purchase intention rankings. For Heinz, the the R-squared value is 0.9527, which is a good fit of the line to the data. For Andrélon, the R-squared value is 0.5932, which indicates a moderate fit. From the graph, it can be concluded that when brand fit is averaged (0.5), purchase intention scores peak. For Andrélon, the same finding can be observed, but less strongly.
6.3.4 Discussion

The results of this first case study are promising, but we also need to mention some limitations. The first point we want to make is about the applicability of the outcome. We investigated the balance between brand typicality and novelty by trying to find the optimal intersection for a new packaging design. In fact, this point of balance will be different for every product (Mulder-Nijkamp et al., 2021). It depends on the designer’s intention as to what mix of elements (product typicality, brand fit or novelty) will be used to achieve the final result. Every designer can mix this balance between novelty, typicality and brand fit for their product category and can use this as a strategy tool to visualize the alternative solutions.

Secondly, we only tested this using two design studies so we cannot say that these conclusions will hold true for all brand extensions. More categories of products need to be investigated. The third limitation is about the number of participants and the process of ranking. As the sample of this survey was rather small, the empirical significance of the following results is to be validated in an extended survey. Furthermore, the procedure of ranking the products needs to be explained. During testing, we asked consumers to rank four designs at once, so they first rated 1, 3, 5 and 7 in relation to each other and after that they ranked numbers 2, 4, 6 and 8. Later, we combined these outcomes in one graph. This way of testing might have influenced the results. We deliberately derided to perform the rankings in this way for two reasons. Testing all designs at once might lead to an unpleasant and tedious experience. Furthermore, it can be really hard for consumers to actually see differences between designs that are next to each other.

The fourth limitation is about the creation of the designs. For this case study, we designed eight versions of brand extensions decreasing in brand fit and increasing in novelty. The steps in between the designs might not always be consistent in level of increase. In the case of Andrélon, for example, we saw that the product typicality scores are not consistent. If we zoom in on the packaging of Andrélon we assume that the gap between packaging 3 and 4 is quite big. The use of a completely different soap pumping system changes the design substantially. That might have influenced the results. Other product categories and corresponding designs need to be verified to further deepen our understanding of such a significant design change.

6.3.5 Conclusion from case study 1

From Figure 6.4 it can be seen that the brand-typical packaging design with optimum use of brand characteristics is rated as most typical and least novel, which confirms hypothesis 1. However, consumers refer to product typicality by comparing the designs to the archetypical category. They score designs 1, 2 and 3 as less recognizable as a juice bottle. From the same graph we can conclude that novel packaging designs with minimal use of recognisable brand characteristics are rated as most novel and least typical, which confirms hypothesis 2.

Hypothesis 3: “The designs numbers 4, 5 & 6 are balanced between typicality and novelty and attain the highest consumer acceptance” can be partly confirmed because the results for Andrélon show less strong results according to Figure 6.5.

6.4 Case study 2

While the new way of looking at the Maya principle in case study 1 gives the designer new insights about searching for the optimal balance between brand fit, product typicality and novelty, it does not take into account the degree to which a brand may be seen as innovative or say anything about the kind of extension that will be designed. For instance, the innovativeness of the brand, or the specific type of product that is going to be designed could possibly significantly influence the optimal balance.

If we take a chair, headphones, a watch or a smartphone as an examples of a brand extension the optimal balance is expected to vary greatly from brand extensions of lamps, perfume bottles or loud speakers. Archetypicality describes products with a single prevalent example of their category. When we think about the product ‘chair’ most people have a similar mental image of a chair in mind - four legs, straight etc.). Other products with more than a single prevalent example of their category (i.e. when we think about the product ‘perfume’ people have a several mental images of a perfume in mind - cylindrical, cubical, coloured etc.) consist of multiple coexisting archetypes. They are therefore classified as ‘multitype’ products.
In the second case study, we will investigate the effect of novelty - for brand extensions - in archetype versus multitype products.

The intuitive response to innovation is expected to differ as between archetypical or multitype products. For watches, a radical innovation seems riskier than for desk lights. To see if this holds true or if the degree of innovation is not related to the product typicality of a product, the hypotheses to be tested are stated as follows:

H4: An archetypical product is more appreciated if it has a lower innovation degree.

H5: A multitype product is more appreciated if it has a higher innovation degree.

6.4.1 Methodology

For this research, headphones were chosen as the archetypical product and Bluetooth (BT) speakers as the multitype. Both products relate to each other as personal audio devices and serve the same main function: "to provide audio stimuli to its users". In a pre-test, similar to Hung and Chen's (Hung & Chen, 2012) approach, 10 industrial design students were asked to draw a pair of headphones and a BT speaker in a quick sketch (Figure 6.6). Despite the small number of sketches, the archetype for headphones is both dominant and unambiguous.

For BT speakers, there seems to be more variety in the participants’ associations. Of all headphones, there is only one in-ear variant, there are six headphones without audio cable, and nine out of ten sketches show round or oval-shaped shells. The archetype is therefore wireless and has round shells with a thick bridge.

The assessment of the BT speakers shows four models that are at least partly spherical, four rectangular models and two versions that are cylindrical in shape. Thus there are at least three archetypes of which two seem to be more prevalent in this limited sample. This first assessment confirms the choice of products, as the definitions of archetypical and multitype are applicable.

To further validate this first assessment, a market research study was executed. A large number of novel products of the two product categories were collected and compared to the best seller listings on Amazon. Most headphones on the list correspond with the headphone archetype, such as the model QuietComfort from Bose or the wireless Beats Headphones. However, the list shows much more form variety for the speaker category. All three archetypes could be identified in the list without a single dominant form.

The main study is based on the chosen archetypes for each product category. An overall of six designs per category were investigated on various aspects. We created the first general archetype of each category in accordance with Mercedes-Benz styling. Mercedes-Benz has a strong brand image and values that are implemented into their design (high class, elegant cars with status). The general process is based on the chosen archetypes per product category. An overall of six designs per category will be investigated on various aspects. The designer created the first general archetype of each category in accordance with Mercedes-Benz styling. From here on, five incremental innovations facilitate the required level of novelty and variety. The final design evolution of the 12 product proposals is shown in Figure 6.7.

The main objective during the design phase was to create an attractive and brand fitting design for each iteration, while making sure the difference between each step still facilitates a reasonable evolution of the designs. We expected to find the optimal balance for headphones around designs 2&3 and for speakers around designs 4&5.
6.4.2 Procedure

An online survey was conducted to evaluate the developed proposals and distributed via Facebook to attract as many respondents as possible. In this survey, we used the visual analogue scale for rating, ranking and paired comparison (Sung and Wu 2018) while this results in more reliable data compared to using Likert scales or semantic differential scales (Osgood, Succi, and P. H. Tannenbaum 1957). The respondents ranked six proposals (in random order) of two product categories (headphones and speakers). They first ranked the speakers and secondly the headphones. The first task for each participant was to rank the products per category from 1 (the best ranking) to 6 (the lowest ranking), by dragging them into their preferred order until they match their personal preferences based on the question “Rank the speakers according to your personal preferences based on the visual appearance. All the speakers have the same technical functionalities”. The first two questions familiarized participants with the products and allowed for a comparison of all proposals of the category. Directly after the general ranking, participants rated all the 12 products in a mixed order. Respondents were asked to position the proposal based on specific attributes by answering an associated question. For instance, product typicality was associated with the question “I think this product looks like a typical Bluetooth speaker”. They were asked to answer the question on a scale from 0 (strongly disagree) to 100 (strongly agree) using a slider. The attributes that were to be ranked, in the original order: product typicality (“I think this product looks like a typical Bluetooth speaker”), innovativeness (“I think this product looks innovative”), purchase preference (“I would like to buy this product”), brand match (“I think this product matches Mercedes Benz as a brand”), unusuality (“I think this product looks like an unusual Bluetooth speaker”), novelty (“I think this product looks novel”), and style appreciation (“I appreciate the styling of this product”).

Unusuality served as a control question for product typicality just like the combination innovativeness–novelty and purchase preference-style appreciation. The instruction clearly stated that every rating had to be based on the visual attributes of the products, to avoid other factors from influencing the outcomes (price, usability, etc). The questionnaire ended with general questions about the participants’ background and level of expertise with respect to Mercedes-Benz, BT speakers, and headphones.

6.4.3 Findings

In total, 60 respondents started the survey. Every question of the survey was answered by at least 43 participants, while most of the questions had 50 or more responses. The average age of participating consumers was 25, with nearly all of them having an academic background in a technical field; 57% were male and 43% female.

The general ranking of dragging and dropping all stimuli was actually the first introduction to the stimuli, so this gives insight into the preferences of the participants. It appears that product liking will be readily formed through a process that integrates design information only (Page & Herr, 2002), which makes this into a really significant measure of the likely success of the designed object. A linear point system was used to evaluate the degree of preference. As a design was ranked, the rank would be added as a numerical value to the total amount of ranking points. In this way, the best ranking is indicated by the design with the least amount of total points. For the speakers, the ranking clearly shows that more advanced iterations 4 and 5 are preferred above the rest (Figure 6.8, left). Only after these iterations, the original archetype (spk1) is valued higher than speakers 2 and 3. The most advanced concept (spk6) is least liked.

![Figure 6.8 Category ranking of the Bluetooth speakers and headphones](image)

For the archetypical product category of headphones, the ranking is distributed differently to those of the speakers (Figure 6.8, right). Here the 2nd iteration (hp2) is liked far more than the following hps and hp3. The designs with lower innovation degrees clearly show higher preference than the more advanced designs. Iterations 4 to 6 are accordingly ranked with a substantial difference from the first three.

Looking at the combined rankings (Figure 6.9) remarkable relations become clear. Overall, the first three headphones are appreciated more than the first five speakers. This indicates a very strong preference for the low innovation side (iterations 1-3) for the headphones and a wide gap between the third and fourth iteration. Further, there is almost no mix between the two product categories. It appears as if the speakers show a more moderate ranking, while the headphones tends to show more extreme results. The final iteration of both categories is least liked and the final headphones have by far the lowest ranking.
Each iteration is rated as being less typical than the previous one (sp1=highest, sp6=lowest in table 6.1). Equivalent results are found for innovativeness. Scores for the headphones are comparable with one exception, while design 4 seems to be perceived as being comparably innovative compared to design 5. This shows that an evolution towards high innovation and low product typicality could be achieved as intended. It is a confirmation of the choice of designs and their usability in such an academic setting. We were able to create designs with increasing innovation and decreasing product typicality ratings.

Both purchase preference and style appreciation lead to an almost similar ranking for each of the iterations, even though the range in which they apply is different. The style has a slightly greater appreciation than the purchase intention. This might be caused by the fact consumers also consider other factors, with respect to purchase intention, such as the necessity of buying such an object. The comparison between the rankings in the context of all speakers (Figure 6.9) and the appreciation of the individual speakers differs rather strongly.

Table 6.1: individual scores for speakers (top) and headphones (bottom)

<table>
<thead>
<tr>
<th></th>
<th>typicality</th>
<th>innovativeness</th>
<th>purchase</th>
<th>brand fit</th>
<th>unusuality</th>
<th>novelty</th>
<th>style appreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>spk1</td>
<td>69.98</td>
<td>40.57</td>
<td>51.4</td>
<td>58.86</td>
<td>31.5</td>
<td>45.02</td>
<td>55.23</td>
</tr>
<tr>
<td>spk2</td>
<td>64.96</td>
<td>42.78</td>
<td>49.14</td>
<td>49.71</td>
<td>36.28</td>
<td>46.5</td>
<td>51.44</td>
</tr>
<tr>
<td>spk3</td>
<td>47.94</td>
<td>53.28</td>
<td>47.28</td>
<td>44.69</td>
<td>50.36</td>
<td>51.93</td>
<td>50.32</td>
</tr>
<tr>
<td>spk4</td>
<td>40.13</td>
<td>71.69</td>
<td>66.8</td>
<td>62.31</td>
<td>69.36</td>
<td>71.81</td>
<td>76.35</td>
</tr>
<tr>
<td>spk5</td>
<td>30.06</td>
<td>75.63</td>
<td>66.14</td>
<td>59.53</td>
<td>76.28</td>
<td>71.28</td>
<td>66.25</td>
</tr>
<tr>
<td>spk6</td>
<td>21.69</td>
<td>80.96</td>
<td>55.98</td>
<td>59.98</td>
<td>77.25</td>
<td>78.28</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>typicality</th>
<th>innovativeness</th>
<th>purchase</th>
<th>brand fit</th>
<th>unusuality</th>
<th>novelty</th>
<th>style appreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>hp1</td>
<td>85.72</td>
<td>38.33</td>
<td>61.15</td>
<td>61.98</td>
<td>23.48</td>
<td>45.2</td>
<td>63.18</td>
</tr>
<tr>
<td>hp2</td>
<td>80.56</td>
<td>43</td>
<td>62.65</td>
<td>63.38</td>
<td>25.81</td>
<td>47.09</td>
<td>66.15</td>
</tr>
<tr>
<td>hp3</td>
<td>72.37</td>
<td>45.51</td>
<td>60</td>
<td>66</td>
<td>33.14</td>
<td>49.32</td>
<td>66.94</td>
</tr>
<tr>
<td>hp4</td>
<td>43.24</td>
<td>59.35</td>
<td>40.49</td>
<td>49.2</td>
<td>57.27</td>
<td>58.96</td>
<td>46.6</td>
</tr>
<tr>
<td>hp5</td>
<td>54.56</td>
<td>58.79</td>
<td>48.12</td>
<td>61.9</td>
<td>51.18</td>
<td>56.2</td>
<td>58.88</td>
</tr>
<tr>
<td>hp6</td>
<td>23.83</td>
<td>77.69</td>
<td>34.37</td>
<td>53.83</td>
<td>76.89</td>
<td>69.88</td>
<td>51</td>
</tr>
</tbody>
</table>

In Figure 6.10, we see the visual ranking of both speakers and headphones for novelty and innovativeness. The results are comparable, indicating that the participants interpreted the words ‘innovativeness’ and ‘novelty’ correctly. It is remarkable to see there is a gap that appears between products of the same category, as seen in Figure 6.10.
Unless we had found an increasing level of product typicality in the designs as stated earlier, the gap might indicate that design differences are too big to create a solid “connection”. For the speakers, it might be a better solution to keep iterations 4-6 also squarish, to stay closer to the original archetype. For the headphones, the loss of the bridge was the most dramatic change for participants, and explained why they might not easily connect those designs to a uniform group. The results show a strong correlation between the control questions which means that consumers judged the products correctly (Table 6.2). A very strong negative correlation exists between product typicality and innovativeness for speakers (-0.97) and for headphones (-0.99). This confirms findings of previous studies, and shows how product typicality may be used as a counter-predictor of innovativeness and vice versa.

A positive correlation between product typicality and brand fit of 0.76 exists for the headphones category. Furthermore, product typicality is related to the purchase preference and style appreciation. For the speakers category there is no correlation between brand fit and product typicality, but there is a very strong correlation between innovativeness and style appreciations (0.84).

The correlations indicate a higher importance of visual styling for headphones and a stronger connection between product typicality and brand fit. For speakers, higher degrees of innovation relate to more appreciation and higher purchase preferences, while a similar effect is created by increased product typicality for headphones.

Table 6.2: Correlations between measured variables.

<table>
<thead>
<tr>
<th></th>
<th>Speakers</th>
<th>Headphones</th>
</tr>
</thead>
<tbody>
<tr>
<td>typicity</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>innovativeness</td>
<td>-0.97676</td>
<td>-0.988057</td>
</tr>
<tr>
<td>purchase preference</td>
<td>-0.5925</td>
<td>0.984662</td>
</tr>
<tr>
<td>brandfit</td>
<td>0.561779</td>
<td>0.735331</td>
</tr>
<tr>
<td>untypicality</td>
<td>0.806756</td>
<td>0.612858</td>
</tr>
<tr>
<td>novelty</td>
<td>0.99666</td>
<td>0.978305</td>
</tr>
<tr>
<td>style appreciation</td>
<td>0.73366</td>
<td>0.844994</td>
</tr>
</tbody>
</table>

A positive correlation between product typicality and brand fit of 0.76 exists for the headphones category. Furthermore, product typicality is related to the purchase preference and style appreciation. For the speakers category there is no correlation between brand fit and product typicality, but there is a very strong correlation between innovativeness and style appreciations (0.84).

6.4.4 Interpretation of findings

The direct comparison between innovativeness and product typicality of both headphones and speakers is shown in Figure 6.11. It is clear that the innovativeness ratings begin and end at the same level. The difference grows towards higher degrees of innovation and concers iterations 3-5. The product typicality graph varies much more strongly between the product categories. It is almost linear for speakers with an exception between spk2 and spk3. A similar slope increase appears between hp3 and hp4 and again between hp4 and hp6. This ultimately leads to a wider product typicality range for the headphones, which is overcome only at the last iteration between hp6 and spk6.

It is remarkable to see that the claim Loewy (1951) coined describing the Maya principle as finding the balance between the two opposites of typically and novelty is not supported. According to the MAYA principle, combined with the work of Hekkert et al. arguing that product typicality and novelty are joint predictors for aesthetic preference (2003), the optimal balance of the category speakers seems to be at 3. The rankings clearly show a preference for 4&5. The same is true for the optimal balance of the headphones category. The optimal balance shows the fourth design as the optimum solution, while the consumers choose either 2 or 1 as the most preferred option. Based on the overall ranking, most advanced yet acceptable means something different for speakers (high advancement) or headphones (low advancement). This observation relates to the expected outcome that multitype products such as speakers are more likely to be accepted with higher innovation degrees, than are archetypical products, such as headphones.

Figure 6.11 Direct comparison between innovativeness and product typicality for both categories.
One question still remains unanswered: Could brand fit be added to this mechanism and explain why consumers react differently based on the research described in previous chapters? Although we did not find a convincing correlation, we do see an effect. If we take the scores of brand fit into account, we noticed that the overall rankings of the consumers do match the overall appreciation of consumers (Table 6.1).

In Figure 6.12, we plotted the three determinants (product typicality blue, innovativeness orange and brand fit in gray) for the speakers category in one figure, and we clearly see the bump for speaker 4. This underpins case study 1 in which the combination of product typicality, novelty and brand fit was used to arrive at the optimum result.

![Figure 6.12](image)

The fact that almost none of the proposals were mixed (see Figure 6.9) might be due to a higher sensitivity for archetypical products. It was the archetypical category of headphones that was ranked to be either extremely positive or extremely negative, whereas all designs of the speakers are positioned in-between. As the stronger archetype is present in the category of the headphones, minor changes may already trigger dislike or at least seek the attention of participants more strongly than is the case with the multitype category of speakers. Furthermore, it becomes easier for designers to deviate from an archetype that is clearly defined.

Investigation of the relative positions for each rating showed that almost none of the designs are directly and easily comparable with each other, as the degree of innovation and product typicality varied throughout the evolution. More specifically, the degree of innovation in both categories is about the same for the first three and the final iterations. The rated distance between spk2 and hp2 is <1 point. However, the ranking of the products with a similar degree of innovation is however completely different. Hp2 is most preferred in its category, while spk3 is ranked second to last.

This is compelling evidence for a product dependent preference for innovation. It means for the present example, the most attractive degree of innovation is not fixed, but depends on the product type.

### 6.4.5 Discussion

The small sample size for this research makes essential validation with a bigger sample to allow firm conclusions to be drawn. Furthermore, the results indicate strong category internal relations and effects. However, it may be helpful to have a wider product span of 20 or even 100 designs. Further results may provide stronger evidence for a purchase preference than from just six designs. Moreover, having observed only a single archetype and a single multitype product hardly provides valid results for the entire classification of archetype and multitype products. Additional tests with new product categories that widen the perspective are therefore important. For this reason, it may also become necessary to have products clearly classified. It would be beneficial to propose a reliable method to test specific product categories before starting to develop a new brand extensions. The test that was applied in subsection 6.4.1 could be used as a starting point, such that respondents would be asked to draw a typical version of a new-to-design brand extension. Furthermore, the two categories need not be fixed, but could also be seen on a spectrum from “very archetypical”, via “somewhat archetypical”, to “multitype”. Furthermore, maybe there could be another division of product categories that might also influence the results (for example, from business-to-business or business-to-consumer products). Last but not least, the classification of a product category can also change over time, for instance when a dominant archetype prevails over others (Eger & Drukker, 2010).

One of the resulting assumptions is the higher sensitivity for changes of archetype products. To test if this assumption holds true, a follow-up test to measure the acceptability of changes in archetypical products could yield relevant information. Another option would be to assess whether archetype products in other studies have also shown tendencies to more extreme rankings. The direct relation between archetypicality and the measured variables may be a special case for the specific product types used. The current results show that headphones benefit from higher product typicality, while speakers have increased ratings for higher degrees of innovation. Would it be interesting to see if this is also the case for other product categories with a similar archetype or multitype characteristic. Furthermore, it is still necessary to identify if there is an actual maximum for multitype product typicality rating and if archetypical products generally have a higher level of product typicality. The final point we want to raise is that we need to validate the results obtained against a bigger sample size.
6.4.6 Conclusion from case study 2

Finding an answer to the question: “What is the effect of novelty when used - for brand extensions - in archetype versus multitype products?” resulted in two main findings.

1. Based on this second case study, we conclude that the joint effect of product typicality and novelty as claimed by Hekkert et al. (2003) cannot automatically be used to predict the aesthetic preference of consumers for all product categories. The well-known MAYA principle means something different for speakers (high advancement) and for headphones (low advancement). Based on the correlation scores (Table 2) and the graph (Figure 6.11) we can confirm that multitype products, such as speakers, are more likely to be accepted with higher innovation degrees, confirming hypotheses 5. Furthermore, archetype products such as headphones are more sensitive to changes in the prototypicality of their design, confirming hypotheses 4.

2. Secondly, a positive correlation between product typicality and brand match of 0.76 was found for the headphones. Furthermore, product typicality is related to the purchase preference (0.98) and style appreciation (0.85). For the speakers, we did not see a correlation with brand fit. However, we did see a strong correlation between novelty and purchase preference (0.99) and style appreciation (0.84). These results indicate a higher importance of a novel visual styling for speakers and a stronger connection between product typicality and brand fit for headphones.

6.5 General discussion

The case studies have shown interesting results and provide designers with more in-depth knowledge on how the balance of typicality, novelty and brand fit in the creation of new brand extensions could make a difference. From case study 1, we conclude that the term brand typicality cannot be seen as a replacement for the term typicality in the MAYA principle, while both factors lead to different findings. We do see a clear effect of the aspect, of brand fit in the results of case study 1, providing evidence that using a linear scale (from typical to novel) to design more successful brand extensions does not show the complete picture. Expanding this linear line into a field with three entities (typicality, novelty and brand fit) provides a better overview of the determinants that affect the success of brand extensions.

From case study 2, we have learned how to deal with the uncertainty of the aspect of novelty. The results show that the definition of the MAYA principle is not unambiguous. It becomes unclear whether a product follows the principle or not and when the level of advancement of the chosen product category is not taken into account. Looking at the headphones it still remains unanswered whether hp2 is the most advanced yet acceptable version as it has the highest ranking. Or is it more wise to opt for hp3, because it is more advanced than the previous ranks and still has a high overall ranking? That is why the MAYA principle - by finding the balance between two opposites - is not the ultimate tool to decide on the best choice for a new market introduction.

Some critical notes need to be made when interpreting these results. First of all, we have to reemphasize that the cases are fictitious and the designs are conceptual sketches. This might have influenced the results, so we recommend repeating the study with tangible mock-ups to better experience consumers behaviour toward the designs. Secondly, more research in the direction of creating novel designs is required. The presented results for the speakers come with a higher level of uncertainty with regard to the dimension of novelty when we compare it to the results for the headphones. The designs of the more novel speakers presented in the second study could easily have been in a completely different direction. The question is raised as to why design 6 was considered the most novel one. As already mentioned in earlier work (Mulder-Nijkamp, 2020), the perception of novelty can vary a lot. It can be based on a more radical styling, but it can also be based on using a new material or new way of using a design. We recommend looking into the dimension of novelty more thoroughly and trying to discover different directions of novelty based on the current models. In a follow up study, more pre-tests could be done to define how novelty is perceived in these designs.
6.6 General conclusions

The results of both case studies clearly show the complexity of designing aesthetically preferred brand extensions which cannot only be ‘understood’ by maximizing the two opposing factors of typicality and novelty (Hekkert et al., 2003). Instead of that we created a triangular space in which brand typicality interacts with novelty and where designers can visualize their own design proposal by mixing the elements of novelty, product typicality and brand fit, depending on their specific situations. The three elements (brand fit, product typicality and novelty) form a triangular interplay that show the feasible solutions in a ‘designer space’ (Figure 6.13). Moreover, presenting and using the abstract MAYA theory in a more visual way could better support designers and design managers in defining the future characteristics for their products.

The second study shows us that (at least for the given examples) archetype and multitype products also have this pronounced balance point, with the difference that it shifts towards product typicality or novelty, based on the product classification. This designer space is much smaller for archetype products (such as headphones and watches) than for multitype products (such as lamps and speakers). For the latter, much more ‘space to design’ is available to create innovative alternatives. The results of the case studies also showed that consumers are more sensitive to changes in products with a stronger archetype.

Mastering the triangular designer space by using it as a strategic tool to position and evaluate solution alternatives will support designers and design managers in increasing the success rate of brand extensions.
CHAPTER 7

Bridging the divide between behavioural research and design science
CHAPTER 7

Bridging the divide between behavioural research and design science

The aim of this research was to support designers in designing successful brand extensions by combining knowledge from three research fields. In this thesis the role of the designer has been made central by focusing on the two following main research questions.

1. Which factors, influenced by designers, affect the expected success of a brand extension?

2. How can designers be supported in influencing these factors to create successful brand extensions?

The holistic design approach has led to the development of two research lines which are interwoven in this thesis: a behavioural line that describes which factors affect the success of brand extensions and a design-based support line that describes how designers can influence these factors.

In the next sub section, the responses to these research questions are summarized, followed by a discussion and a path for future research. Finally, it culminates in practical implications from the research and design perspectives, explaining how the insights gained can be used in a broader perspective.

7.1 Findings

The holistic overview of the three research fields discussed in Chapter 1 mentioned the gap in designing brand extensions. Extent literature from the research field of brand management describes the contingencies under which a successful brand extension can be launched (Aaker & Keller, 1990; Bottomley & Holden, 2001; Völckner & Sattler, 2006). However, considering these contingencies alone does not guarantee a successful brand extension if the artefact itself is not considered. From the field of innovation management, the focus is merely on the strategy (Beverland et al., 2010) or the process of innovation (Veryzer, 1998; Zhang, 2022) to improve the acceptance of radical innovations, yet the actual physical design of these radical innovations remain unaddressed. Both research fields barely consider the effect of the designed artefact itself, while this certainly impacts the acceptance of brand extensions. Those researchers consider the object as a ‘black box’, over-looking the effects the appearance may cause in the process of acceptance. However, this thesis has proposed that the aesthetic appearance of brand extensions plays a central role in the acceptance process of consumers. A more holistic overview was visualised by combining insights from three different research fields, with the aesthetic appearance of the brand extensions firmly in the middle. From Chapter 1, it became clear that the designer him or herself should be placed at the centre, where they have to integrate knowledge from three research fields into the aesthetic appearance of a brand extension. Figure 7.1 highlights the central position of the Brand Extension (BE) designer in this context.
Chapter 2 focused on the designers’ perspective and identified the relevant factors that designers can use to improve the aesthetic appearance of brand extensions. It became evident that brand extensions must match the parent brand in order to be recognized and therefore must incorporate design features referring to specific brand characteristics and values (Krippendorff, 2005). However, the process of semantic transformation is quite difficult to apply for novice designers (Karjalainen, 2007). Even a subtle change can have a large impact in consumers’ perceptions, and therefore in mis-understanding the intended character. In Chapter 2, a Brand Translation Prism (BTP) was developed via a ‘research through design’ process to support designers in creating a better brand fit in brand extensions. This model helps students to explicitly deconstruct all visual stimuli of the brand into explicit physical cues in 3D, 2.5D and 2D (Mulder-Nijkamp & Eggink, 2011) and, subsequently, connects to first and second order associations, leading to the overarching brand values. The evaluation of the proposed method was based on a two-step evaluation and has been continually adapted over the years. The final version of the model is shown in Figure 7.2.

![Brand Translation Prism for supporting designers in the process of semantic transformation](image)

First, the Brand Translation Prism was used in a practical design case by approximately 500 students from two universities in The Netherlands and Belgium, in order to test whether its use leads to more credible and recognizable designs (Chapters 2 and 3). As a second step in the evaluation, a teaching framework was set up to teach students how best to design brand extensions and to measure the differences between groups of students who followed that program and students who did not (discussed in Chapter 5). Despite the fact that students designed recognizable brand extensions through using the framework, there were also some students who were unable to create coherent designs. The analysis of the brand by using the framework by these students was executed in a sufficiently or good way; however, translating these knowledge into the aesthetic appearance still led to a failure. This identified a gap between the analysis phase and the actual integration of knowledge into the creation of a new design. The designs that were not graded sufficiently highly showed more extreme designs and were not designated as a recognizable design in their category and also lacked coherence. This clarified the need for a more thorough investigation into the effects of the aspects of novelty and its counter effect typicality, better known as the MAYA (Most advanced, Yet accepted) principle (Loewy, 1951) related to the success of the designs.

Chapter 3 explained how balancing the factors of typicality and novelty under the MAYA principle could influence the aesthetic preference of consumers in designing brand extensions. We tested empirically two types of brand extensions from Chapter 2 (bikes and helmets) to see whether the designs that balance between the aspects of novelty and typicality are more successful. Building on the work of (Hekkert et al., 2003), we hypothesized that the joint influence of typicality and novelty should lead to more successful brand extensions. The results do show a significant effect in the success of brand extensions, although the influence on the designs of the product category of helmets is weaker. This might well be due to the archetypical structure of helmets compared to that of bikes, for which designers have more ‘freedom’ in designing a range of shapes. The analysis of the results also showed a high standard deviation of the factor of novelty, indicating the ambiguous character of the term novelty. Therefore, in a second study the effect of the environment was taken into account, by placing two bike designs (a typical design and a novel design) in two environments (a typical environment and a novel environment). We assumed that by placing the novel bike in a novel environment, the overall score of novelty would be higher compared to placing the same bike in a typical environment. However, the results indicate no difference in placing a typical design in the typical environment or in a more novel environment. However, when placing a novel design in a typical environment, the novelty ranking was higher compared to a novel design placed in a novel environment.

Chapter 4 discovered the role of brand fit, which can be used as suppressor or amplifier of the interplay between typicality and novelty. The aim of this chapter was to find out whether there is an interaction between the three factors of typicality, novelty and brand fit related to the expected market success of brand extensions. By setting up an extended empirical study to evaluate a larger number of brand extensions evaluated by professionals working at design agencies, we were able to test the interplay between the three factors. The designs used for the test were the outcomes of a teaching framework (discussed in Chapter 5), which were evaluated on characteristic expected market success and the factors of typicality, novelty and brand fit. The respondents ranked the designs on a numerical scale and were asked to ‘think out loud’ during the process of ranking, resulting in both a quantitative and a qualitative dataset. From the quantitative dataset, we discovered that brand fit highly correlates to the expected market success of brand extensions. The results show a significant positive effect of
brand fit on the expected market success and a linear relationship between the interaction of typicality and novelty, and market success. Furthermore, it was found that the interaction of typicality and novelty jointly leads to a higher level of expected market success, whereas the independent effects of typicality and novelty do not lead to significant results. The results also show a higher standard deviation for the factor of novelty. Based on this outcome, we decided to analyse the qualitative dataset by applying a qualitative content analysis (Mayring, 2014). All the protocols of the professional designers were transcribed, in order to find out if certain patterns exist when regarding the factor of novelty. It showed that the factor of novelty is ambiguous and leads to uncertainty among respondents. The results also show that the respondents use brand-related characteristics as the counter part for novelty or as an amplifier for typicality. The factor of brand fit seems to act as a suppressor of novelty and may be termed brand typicality. Chapter 6 further investigated the balance between the three factors of typicality, novelty and brand fit.

In Chapter 5, the development and evaluation of the aforementioned teaching framework for the design of successful brand extensions is described. To evaluate whether the teaching method led to more successful brand extensions, a dedicated study was set up. Students attended a series of four knowledge sessions to support them in creating successful brand extensions. Half of the group followed knowledge sessions about creating brand extensions, while the other half followed knowledge sessions on a different topic (creativity). The overall set-up and presentation of the content was on a comparable level between both groups. The results showed that the effect of the teaching method is significant, when controlling for the drawing quality. It was remarkable to see that students using the knowledge sessions about brand extensions were more capable of balancing the three determinants of typicality, novelty and brand fit, whereas the other group created designs with a higher levels of typicality and lower levels of novelty. The effect of the method is not yet big; however, this was just the first time these students had applied this methodology. The experience of the students was also evaluated, and the results showed that the students actually expressed that the method did support them; however, overall the other teaching framework used by the control group was preferred. This can perhaps be explained by the set-up of the teaching framework. It was decided to support the students with step-by-step assignments; however, the sessions of the control group allowed more freedom in the process of how to design the brand extension.

In Chapter 6, the role of typicality, brand fit and novelty on product success was explored even further, by pushing the boundaries of recognizable designs for archetype and multitype products. The results of the study were made tangible for future product designers in the form of a triangular designers space. From the first case study, we concluded that the MAYA principle (Hekkert et al., 2003; Loewy, 1951) seems to work differently for brand extensions, whereas the combination of both brand fit and product typicality is a better determinant of desirability. The term brand typicality (including brand fit and product typicality) seems to best predict the optimum balance, while the results show that when brand fit is averaged the purchase intention scores peak.

Furthermore, the results also show that when typicality and novelty are balanced, consumer acceptance increases. In the second case study, the boundaries of novelty were investigated by testing archetype products versus multitype products. From this second case study, we can conclude that the joint effect of product typicality and novelty as claimed by Hekkert et al. (2003) cannot automatically be used to predict the aesthetic preference of consumers for all product categories. This study confirmed that multitype products are more likely to be accepted for higher innovation degrees. Furthermore, archetype products are more sensitive to changes in the prototypicality of the design. It also showed again that balancing the three determinants of typicality, novelty and brand fit leads to higher purchase intentions. Finally, it culminates in the introduction of the triangular designers space where the determinants of typicality, novelty and brand fit jointly influence the success of brand extensions (Figure 7.3).
7.2 Discussion & future research

This thesis has focused on designing successful brand extensions by bridging the gap between behavioural research and design-based practice. The interaction between these two main domains has provided new insights into differences of approach in tackling the topic of brand extensions by focusing on the consumer (brand management), the process and strategy (innovation management) and the artefact (product design). The origins of behavioural research can be seen as mainly rational in nature in finding the truth, whereas the essence of design science is seen as more creative and holistic. In the interwoven relation between these two domains, designers are responsible for merging the insights from behavioural research into the practice of designing successful brand extensions. However, the continuous transition between being creative and approaching the process from a more holistic perspective, and focusing on rational facts in using a more analytical perspective, remains complicated. One could imagine the flexibility and adaptability of the skills that this would demand of a designer in constantly switching between these approaches.

From this thesis, it is concluded that studying the interaction between the fields is difficult, while the processes, approaches and communication jargon of the two disciplines are different in nature. However, it is strongly recommended to bridge the gap between the research fields, in order to design more successful brand extensions. If researchers address the emerging design problems from only their own perspectives, the body of knowledge might be limited in nature and not particularly applicable to real life situations. By bridging the gap between disciplines, the approaches can be combined and that will lead to a better understanding of the complexity inherent in designing brand extensions. This requires researchers to step out of their comfort zone, which might be difficult and challenging. This thesis started out from an interdisciplinary approach, and took the first steps in placing the designer in the ‘sweet spot’ between three research fields. However, in order to become as large as the body of knowledge in marketing or innovation management, further research in crossing ‘the borders between disciplines’ in the field of brand extensions is needed. To design more successful brand extensions, it is also necessary to build a better collaboration between research disciplines. Involving design education could form a key factor in this crossing of borders.

The role of education has been central to this thesis and made it possible to bridge the gap between the research fields effectively. There are three main outcomes that result from this interaction: (1) impact on education; by teaching designers how to approach the process of designing brand extensions and resulting in more successful brand extensions; (2) more test stimuli, using the designs of these novice designers to achieve a larger sample size to test the hypothesis; and (3) design approach: designing an educational teaching framework via a research-through-design approach. First of all, the impact on education: by following the teaching framework, students were able to create more recognizable and successful brand extensions. In fact, by designing successful brand extensions, students learn to incorporate ‘the story of a brand’ in the physical appearance of a brand extension. The importance of storytelling in relation to consumer experience has already been demonstrated in leading to positive brand associations (Lundqvist et al., 2013). In such stories, consumers use brands as props or anthropomorphic actors (Woodside et al., 2008), where the actual design of the brand extension can be used as a physical artefact of the brand. Therefore, the design of the physical artefact becomes an important factor in successfully translating the story of a brand. In fact, these students made the story more tangible by creating a physical artefact that emphasized the story of the brand. As students managed this process in transforming stories into physical artefacts, they used this knowledge in a much broader sense. Secondly, we used the educational context to achieve a larger stimuli sample size to test the influence of aesthetic appearance on the success of brand extensions. Consumer studies in the marketing literature often suggest that using students as respondents is seen as a weakness. However, in this thesis these students played a central role. They were characterized as the “Brand Extension Designer” placed at the ‘sweet spot’ in the intersection of the three research fields. Using the designs from these students made it possible to evaluate how novice designers use the frameworks in an educational context. Furthermore, it provided us with a larger number of stimuli to test the hypothesis and provided an answer to the research questions. It should be noted, however, that placing students in a central role might also result in some stimuli that are less realistic, as described in Chapter 5.
In future studies, it will therefore be better to only select the designs that use an average or above level of drawing quality by performing a pre-study. However, the set-up described in Chapter 5 made it possible to also look at the designs that were less successful in order to also learn from those examples.

Thirdly, the research-through-design approach that was followed throughout the time of the study resulted in a huge amount of rich data that were gained during the yearly educational cycle. However, while the body of knowledge was constantly improving, comparing the results with previous years became increasingly complex. Developing the body of knowledge in designing brand extensions evolved in an continually adapted and improved framework. Furthermore, the set-up and presentation of the educational framework also changed. The results presented in Chapter 5 did show that the students were capable of designing more successful brand extensions. However, how the content was presented to them could also have had a significant influence on the results. The group that received more general knowledge sessions enjoyed much more freedom in the design process, resulting in the feeling that they could use inspiration in their own way, while the group that received brand extension knowledge sessions were asked to follow a step-by-step process. This might indicate that the approach suggested in this framework might be limiting students in their design processes. This reverts back to the approach of designers who are constantly balancing between their analytical rational skills and implementing those insights into a more creative holistic design as mentioned at the beginning of this chapter. It would therefore be beneficial to look further into the educational literature to find how the content of knowledge sessions can be best presented to the students.

To conclude with, the final focal point addresses how both the Brand Translation prism and the Triangular Designers space can be used in the process of designing more successful brand extensions. In fact, both models were developed in a research-through-design process based on different research fields. By using these models, students are challenged to apply the approaches from both fields. However, when using these models students need to be aware of the fact that both prisms approaches the topic in different way. The setup of the Brand Translation prism is based on a more analytical attitude by following steps to connect the design features with overarching core values, while the Triangular Designers space enables designers to use their knowledge in a more creative and holistic way and gives students more freedom in dealing with the design of their brand extension. Nevertheless, both frameworks can be used to design successful brand extensions.

In giving students freedom in how to compose each framework, they can determine their own approach in combining the two research fields. In Figure 7.5 (left), the combined framework is visualised as an hourglass, in which the analysis of the design features (top of the framework) leads to the most important brand characteristics. In the designer space, the designer can then choose the right balance between the three factors of brand fit, novelty and typicality.

However, it can also be used from another starting point (as visualised in Figure 7.4) using the diamond-shaped framework. When a brand has not been around long and has not yet built a large brand portfolio, it might be hard to start by analysing design features. By using the Brand Translation Framework the other way around, starting with the core values, the most important explicit design features can be created by designers themselves.
7.3 Practical implications for researchers and designers

The research presented in this thesis contributes to the work of designers and researchers in the field of brand extensions. From a research perspective, the key learning is based on the influence of the design of the brand extension itself. It is remarkable to notice that the extent literature has not yet considered the design of brand extensions themselves as an important influence on the success of brand extensions. Treating the design of the brand extension as a ‘black box’ is precarious and might lead to serious financial loss. Therefore, it is useful for researchers to understand what factors can be used by designers that influence the success of brand extensions. Furthermore, that, it might be hard to analyse the effect of these factors using the methods currently known in the fields of innovation and brand management. Comparing the more explorative nature of designers versus the more scientific approach of finding the correct answer (Cross, 1982) might conflict with each other. There is not one ‘good’ answer in designing a brand extension; in fact, there are numerous ways to design a brand extension even when using the same ‘building blocks’. The difference in creating a successful brand extension depends on how well these building blocks are integrated into a coherent aesthetic appearance, which makes for an almost impossible task. To solve this, researchers need to collaborate and bridge the gap between the three research areas to discover which research method would result in the best of both worlds.

Practical implications from the perspectives of designers and design managers are about how best to design the ‘black box’. For designers, the knowledge in this thesis is beneficial for two reasons. On the one hand, it shares knowledge about the response of consumers to new packaging innovations. On the other hand, it shares the ‘designers’ space’ which could be used as an important strategic tool to visualise the various solutions available to brand managers. More knowledge about the response of consumers to certain stimuli helps designers to design more meaningful products. This thesis has shown case studies for bikes, snow mobiles and packaging designs, focusing on real-life artefacts. However, this technique is, of course, not limited to product designs. It can be applied in a broader sense, for example when designing a product-service combination. This can be illustrated through the question: What would happen if Rituals were to enter the healthcare market? In a case study with third-year students in Antwerp we explored various combinations of branded health care services (Eggink & Mulder-Nijkamp, 2018) for which students had to design a product-service combination based on a given problem statement and the analysis of an existing brand. One group used the statement ‘contemporary people are far too busy to go to the doctor’ and designed a mobile phone app providing online doctor assistance, supported by a small toolkit for home diagnostics. Based on their target group, these students selected the Rituals brand to emphasize the self-care aspect of the product-service combination. They designed the toolkit using both explicit design features (the design of a luxury cosmetics-like jar with wooden lid instead of a standard medicine box) and implicit features of the brand (using the Ritual experience of opening the jar with medicines of the highest quality).

In this example, the brand is used as a catalyst for improving the experience in both explicit and implicit ways. The proposed design techniques resulted in a surprising combination and seems to be equally valid when applied to both intangible and tangible services.

However, the specific balance between all elements, such as form characteristics, colour, typography and materials is not the uniform answer to all questions. This can be explained in a clear way by using a metaphor: it is about cooking a tasteful diner with delicious ingredients. You need to know what ‘ingredients’ are needed to cook a delicious meal. These can be compared to the brand characteristics of your design. An extensive analysis of such characteristics gives the designer understanding about the basic elements that can be used for the final design. As you will know, the most difficult part of making a delicious meal is the process of cooking it. Just mixing all the ingredients in a cooking pot does not guarantee a good result. This can be compared to the process of designing. It needs to be done by experienced designers who know how to use the ingredients to come up with the best solution. Finally, the taste of your meal will be evaluated by your guests. In this thesis, we have provided insight by sharing knowledge about the ‘tastes’ of humans and by giving you ‘cooking tools’ by presenting the triangular designer-space in which the three aspects interact with each other. Finally, it is the designer who needs to mix the ingredients by following his or her own vision and creating a successful new artefact for the brand.
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Design plays a key role in society. It touches nearly every aspect of our world. By just looking around, you are surrounded by designed artefacts. While doing so, you might refer only to the material artefacts in your surroundings. However, we design not only material artefacts, but everything is designed: our homes, our infrastructure, educational systems, our laws and even our religions. The reason to explain this is to emphasize that the practice of design is broad and can be found everywhere.

My thesis focused on designing successful brand extensions by bridging the gap between behavioural research and design-based practice. Jumping back and forth from behavioural insights and applying those in design-based practice, resulted in valuable experiences in designing successful brand extensions. However, the framework is not limited to designing only brand extensions, but can also be applied in a far broader context. In fact, all designs that are created by human beings consist of ‘explicit cues’ that convey a certain story (Borja de Mozota, 2004) in order to convince users to understand what they are experiencing (Cooper & Press, 2003). Taking the example of religions shows us how important design is in conveying a story, especially in the immersive nature of a religion. To explain that properly, we have to go back to the 16th and 17th centuries, when the differences between Protestants and Catholics led to major differences in their respective way of propagating their religion. Catholics invested quite heavily in design by decorating their churches using impressive stain glass windows and beautiful carved sculptures, while most Protestants did not believe in decorating environments in which religion is experienced. They believe that the core of religion is experienced by your mind, not by your senses. It does not matter where you are when you want to be close to God, as long you believe and you feel it in your heart. This belief resulted in basic simple churches using straight lines and white surfaces to emphasize the functionality of the church, while the belief of the Catholics resulted in decorating all physical ‘products’ to emphasize their ‘closeness’ to God.

“As Catholics, we believe that the material world is sacramental and deeply symbolic; that is to say that everything created can mediate God’s presence to us; communicate his divine nature, his plan, and his love (Raia, 2018)”.

Both religions are conveying their own story, based on their own ‘brand’ values and beliefs. These values result in certain associations and are propagated via explicit cues in the aesthetic appearance of all touchpoints such as example the building, the Bible, and the clothes of the priest.
Even in this example, the balance between conveying the brand values in a meaningful way seems important. The designer’s space presented in this thesis could support the design of these objects (such as the design of the building). By balancing between typicality (what do human beings understand as being a church?), novelty (how far can we stretch this?) and their brand values (experiencing the symbolic meaning of Catholics being close to God). The building of the church in Figure 8.2 might be too novel compared to what Catholics would currently feel comfortable with.

Currently, religions are facing challenges as there is decreasing interest among new generations to join in the current ways of expressing faith. This might suggest (among other things) for a redesign of churches, taking into account the designers’ space in order to redesign specific characteristics. One Catholic parish priest, James Crichton, who had a significant voice within the Liturgical Movement in Britain, explained how architecture and theology could be reconfigured in relation to one another for the modern world (Proctor, 2014).

‘A church is a miniature of the Mystical Body, a concrete realisation of the heavenly Jerusalem ... It is a cell of the Catholic Body, it is the ecclesia, the meeting place of the people ...(Proctor, 2014)

It is evident that the revitalization of religions is not only related to the aesthetic appearance of touch points, because it is also strongly related to the culture of churches, their approaches, their language and their overall ‘behaviour’. However, when redesigning all aspects in a coherent and congruent way, it might be a first step in reconnecting with younger generations.

While describing this example of explaining the importance of design in religions I clearly remembered visiting an exhibition in Den Bosch in 2019 which was called ‘Design in The Third Reich’ (Dwarswaard, 2019). In this exhibition, many objects were displayed, from uniforms to architecture, showing that the Nazi regime paid exceptional attention to design. It illustrates how Nazi ideology was woven into everyday life and the consequences it had, most terribly the Holocaust. I was overwhelmed by how all these visual touch points were aligned with each other, expressing the main ‘brand values’ of aggression, dominance and suppression to emphasize their story.
Visiting this much-debated exhibition also led to mixed emotional feelings: on the one hand I was stunned by the way Nazis reflected their visual design language in every detail of their regime. The buildings of the architect Albert Speer signalled dominance, aggression and power by using huge volumes, straight lines and concrete as material (figure 8.3), but also the affiches, the clothes and the use of the swastika logo projected a similar design language.

Design is something that I love to analyse, explore and discuss, especially how it can be used as a tool to design objects that convey a story and deliver meaningful experiences. However, this exhibition made me realise that Hitler’s regime used design as a tool to emphasize and seduce civilians into believing his dominant message of ‘everything will get better’ by launching the Third Realm. Sadly, he succeeded. It made German civilians believe that he could actually improve the world. It literally made me feel sick that design was used as an instrument to make the cruel Nazi regime as strong as it became. However, at the end of the exhibition the last word was given to a survivor of the Treblinka concentration camp, which made me realise that this exhibition was also a way of conveying and telling a story. By giving one of the survivors the last word, this exhibition was not a glorification of Nazi art. It actually made visitors experience how design was used in the past, aiming to stimulate debate and, above all, not forgetting our past.

Design matters. We feel like and are in a real sense all quite different people depending on what’s in front of our eyes. Design plays an important role in this process, but it also needs to be flexible in coping with changing moods and identities, and with an continually evolving society. The example of the Nazi regime described above makes us submissive, and speaks to our emotions. However, there are many more examples which can be mentioned where design plays an important role in order to stimulate social debate, such as the Golden Coach or the upside-down flags as farmers protest. In these examples the role of design can be used as a means of expression to discuss and debate about societal issues.

As previously described in this thesis, it is not only about the artefact, the approach of designers do matter as well. Currently, we face many big challenges: the war in Ukraine, climate change and financial crises. All these challenges could also be characterized as ‘design’ problems, involving not only artefacts, but also a complete system of aspects that are related to each other causing the complexity. By addressing these complex challenges by using a designerly approach, we are able to connect the relevant knowledge of various disciplines and explore possible solutions. It is our responsibility to bridge the gap between the various relevant disciplines, in order to solve the complex challenges facing our society. In my Comenius project entitle “sustainable packaging as a synthesis between education and society” (Mulder-Nijkamp et al., 2019), for example, we aim to create design professionals in the field of packaging that are able to collaborate with various relevant disciplines. Through this transdisciplinary way of working (van der Bijl-Brouwer, 2022) we are able to connect knowledge and approaches from various relevant fields, leading ultimately to more meaningful designs (Mulder-Nijkamp & Koeijer, 2022).

In these processes, the approach of designers is key in connecting between the various disciplines and using design methods to approach these complex challenges.

I would like to conclude saying that design is just the instrument: the designer him or herself is responsible for creating designs that deliver meaningful experiences that will help make the world a little better. Helping the designer to create more responsible designs through collaboration among disciplines and using the available tools – such as the designers’ space - in a responsible way would lead to a more unified society. We must not forget that the next generation will be designing the future.
ABOUT THE AUTHOR

Maaike Mulder-Nijkamp was born in Enschede in 1980. She obtained her bachelor degree ‘Industrieel Product Ontwerpen’ at the University of Applied Sciences (HTS) in Enschede. After that she worked for several design agencies. Sketching was one of her passions, so in 2004 she decided to become a part-time sketching teacher at the developing Industrial Design Engineering educational program at the University of Twente. In 2007 she became a full-time teacher, as teaching aspiring design students felt as a real passion. She started her master in Industrial Design Engineering next to her fulltime job. In 2012 she graduated cum laude, followed up with a PhD trajectory.

Maaike has been working for the University of Twente as a lecturer and researcher for several years now. She is involved in several courses in Industrial Design Engineering, focusing on sketching, branding, design & product aesthetics. In 2016 she published the book ‘Muses in design’ about inspiration techniques in the process of designing new products. Besides her PhD on creating successful brand extensions, she was involved in a research project in the field of sustainable packaging, in which she was responsible for the development of an educational program aimed at the acceleration of sustainable packaging development. In 2020 she continued this transdisciplinary collaboration for which she received a Comenius Senior Fellowship award. In this project, she founded Packalicious, a learning community which brings academia, and the public and private sectors together to come up with intrinsically sustainable product-packaging solutions by means of transdisciplinary approaches. In this project the designerly approach which has been the core of this PhD dissertation forms a crucial part. She also runs the special interest group transdisciplinary collaboration for the Dutch Comenius network.

Maaike is part of the research cluster Product-Market Relations at the University of Twente, part of the department of Design Production and Management, at the faculty of Engineering Technology. She loves to build bridges between various aspects connecting science and practice, and connecting different disciplines by focusing on a creative, designerly approach. Next to her work Maaike enjoys running, playing guitar, painting, and enjoying family time. Maaike is married to Niels Mulder and together they have two kids: Sanna (10) and Nora (6).

LIST OF PUBLICATIONS

Academic Journal Papers


Mulder-Nijkamp, M. (2020). Bridging the gap between design and behavioral research: (Re)searching the optimum design strategy for brands and new product innovations. Creativity and Innovation Management, n/a(n/a). doi:10.1111/caim.12393

Academic conference publications


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**Books and Book chapters**


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**Grants**

Comenius grant – Senior Fellow – 2020-2022


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It is good to have an end to journey toward, but it is the journey that matters in the end.

- Ernest Hemingway -