

Consumer response to innovative products

with application to foods

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Dit onderzoek is uitgevoerd binnen de Mansholt Graduate School.

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Proefschrift

ter verkrijging van de graad van doctor

op gezag van de rector magnificus

van Wageningen Universiteit,

prof. dr. ir. L. Speelman,

in het openbaar te verdedigen

op dinsdag 8 juni 2004

des namiddags te half twee in de Aula.

Michaut, Anne

Consumer response to innovative products: with application to foods

/Anne Michaut

PhD thesis, Wageningen University. – With ref. – With summary in English and Dutch

ISBN: 90-8504-024-8

Abstract

This thesis aims at gaining a deeper understanding of how consumers perceive product newness and how perceived newness affects the market success of new product introductions. It builds on theories in psychology that identified “collative” variables closely associated with newness perceptions on the part of the consumer. Also, it explores the effect of newness on market success after one year and the pattern of market success during that time period.

It is hypothesized that perceived newness is a two-dimensional (rather than unitary) construct and that its two dimensions, (1) mere perception of newness and (2) perceived complexity, have different effects on product liking and market success over time. Consistent with our hypotheses, product liking linearly decreases with perceived complexity and cross section analysis reveals the same relationship with market success after one year. The hypothesized inverted-U shaped relationship does not hold in the case of product liking as it linearly increases with perceived incongruity (i.e. mere newness perception). In contrast, and consistent with our hypothesis, cross section analysis reveals an inverted-U relationship between perceived incongruity and market success after one year. Over time, the key findings from this work emphasize that high perceived product complexity is a disadvantage to new product success in the short run. However, market success of complex products increases over time once initial rejection is overcome (i.e. learning to like). In addition, the mere perception of newness does not appear to have a significant effect on the shape of the diffusion curve. Finally, for a given product, qualitative comparisons between countries suggest that incongruity and complexity may differentially participate to overall newness and therefore affect liking.

Overall, the thesis reveals the importance of considering product newness as a two-dimensional construct since each of these dimensions brings in key information to explain consumers’ response to innovative products.

Words of thanks

As any new product, a thesis follows a development process before launch. Success of the outcome is largely determined by the development process and people who contributed to it. For this reason, there are a number of persons I would particularly like to thank for their input, help or support during my doctoral research.

Firstly, I would like to deeply thank my advisors Professor Hans van Trijp and Jan-Benedict Steenkamp for their input, valuable comments and support. I appreciated their remarkable advice on the way to conduct research. Many of our discussions have not only directly contributed to improve the quality of my work but also greatly motivated me and developed my interest for academic research.

I am grateful to Professors Jacob Goldenberg and Brian Wansink for stimulating discussions and thoughtful suggestions regarding my research. My appreciation also goes to the other members of the committee, Professors Ruud Frambach, Jan Kroeze and Gerrit Antonides for spending the time to read this dissertation.

I express my gratitude to Unilever Research Vlaardingen that financially supported this thesis through Wageningen University and to a number of people who helped me in implementing my research project: Jack Stroeken and his colleagues at Innovaction, Pieter Punter and his colleagues at OP&P, the SMA and its members whom I thank for our fruitful discussions, and AC Nielsen that brought an essential contribution by providing me with adequate data to make this research possible.

Of all my Wageningen colleagues, I will start by thanking Rick Schriffenstein simply because without him I wouldn't have even thought of starting a doctoral research. I am grateful to Erno Kuiper for his insightful contribution, to Thieu Meulenberg for his valuable comments and to everybody who contributed to a pleasant working atmosphere in the 'vakgroep': Joost, Aad, Lynn, Ynte, Ivo, Erica, Frans, Jifke, Eric, Myriam, Nanuka and all the PhD students that have been there together with me, especially Ellen, Nikos, Xiaoyong and Stan. Finally, I am very thankful to Ellen and Liesbeth for their precious help during my stay at the department.

I would also like to thank the students who contributed to the development of some issues: Nieke, Meike, Twan and Christelle it was a pleasure working with you.

Finally, I would like to express my gratitude to all my friends in Wageningen for the great moments we have shared and to all my friends in France for their support. My appreciation goes to Kristine and Irina my two 'paranimfen' for their help and support in everything surrounding this defense. A special thank you to Deborah who contributed to the cover. A great thank you to Julien for his loving attention.

At last I would like to express my deepest gratitude to my parents for their support during that time. For this I would like to dedicate this book to them.

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Chapter 1.

Introduction

1.1. General context: importance of innovation

In the last decades, the business environment has developed rapidly and radically. Markets have become more global yielding fierce competition beyond country borders, the role of governments in economy has evolved, socio-demographic data and hence consumers' behavior have changed. A number of essential technological developments such as information sciences, telecommunication and computers generated drastic changes in business practices. This acceleration in technological and environmental development also lead to shorter product life cycles. In this context, innovation is not just a matter of profitability; it has become a matter of survival for businesses (Wind and Mahajan, 1997). Studies have shown that new products provide corporate vitality, enhanced performance-price index for consumers and opportunity to differentiate from competitors (Carl Fusco in Adams and LaCugna, 1994). A meta-analysis on company financial performance gives evidence of the positive impact of inputs to innovation (product and market development) on profitability (Capon et al., 1990). Besides, innovation expands, the number of new packaged goods has increased in average by 8.5% annually between 1980 and 1991 (Lawrence 1993). These findings confirm the growing importance of new products in the increasingly competitive business environment of the new millennium.

Yet, despite radical mutations in the business environment, New Product Development (NPD) practices are still dominated by the research and modeling approaches of the 1970s (Wind and Mahajan, 1997). Moreover, the large number of models available has been underutilized in practice (Mahajan and Wind, 1992). At the same time, high failure rates remain an unsolved problem. About 50% of new products launched on the market fail (Golder and Tellis, 1993) and there has been little improvement over the last two decades. Other studies still record up to 70%

failures within the two years following the launch (Ernst & Young and AC Nielsen, 2000). One may thus wonder whether the actual marketing approaches for new products are adequate. What new tools could improve the probability of successful product introductions? A better understanding of the dynamics of innovation seems essential to improve companies' success with new product introductions.

1.2. Benefits of innovation for first entrants and their limitations

We clearly indicated the critical need for companies to innovate. Obviously, many arguments support the rewarding aspects of innovation but others also emphasize large costs and risks involved (Golder and Tellis, 1993). The literature on pioneering advantage gives a great contribution to identify the potential benefits of innovation. It seeks to define the unique advantages of first entrants on the market. It also raises discussion, suggesting that research may have over-estimated these benefits.

1.2.1. What are the potential benefits of first entrants on the market?

Benefits identified are of two main origins: economy- and consumer-based. Economy-based advantages are mainly induced from the supply of the product. They are based on entry barriers (Bain, 1956; Robinson and Fornell, 1985; Urban et al., 1986), include technological leadership (Gilbert and Newbery, 1982) and emphasize the fact that pioneers benefit from a monopolistic position. They acquire a strong market position by increasing the time of entry of new competitors (von Hippel, 1994).

Consumer-based benefits are induced from the way consumers first choose and then repurchase the product (Golder and Tellis, 1993). When a consumer has a favorable consumption experience with a new product, the product will be preferred over existing products but also over later entrants because the perceived risk is lower. This advantage is all the more pronounced as the product does not require information (Schmalensee, 1982). Consumers have a "good enough" bias that reinforces their preference for the first entrant. If they are satisfied after trying a product, they are reluctant to switch to another one and lack motivation to search for alternatives (Hoch and Deighton, 1989). Provided that the new product is differentiated enough from existing ones, Carpenter and Nakamoto (1988) define the innovative product as 'prototypical'. They suggest an early experience with a new product is a *learning process*. It defines the new ideals and stands as a reference against which future products will be judged (Carpenter and Nakamoto, 1989). Once formed, this stereotype is very resistant to change and provides the innovative company with a clear advantage in terms of consumers' preferences. Therefore the innovative company does not only choose the best position but also contributes to develop it¹.

¹ Consumer judgment literature also supports this point (see Tversky, 1977)

In conclusion, the literature identified both economy- and consumer-based benefits for first entrants. However, it has also identified numerous counterparts for these positive arguments, which will be developed further.

1.2.2. Are these benefits well established?

The literature also offers a number of limitations to temper the above-mentioned benefits. The success of a new product may be diminished by information diffusion (Fershtman et al., 1990), shifts in technology or in consumer taste, and changes in resource requirements (Abell, 1978). Information diffusion helps competitors getting a grip on the innovation faster whereas shifts in technology or in consumer taste allow competitors to skip the first version of the innovation and directly implement the new technology or position their product better with respect to the present consumer taste. Although market share has proved to be influenced by the order of entry in several studies, positioning and promotion still have the greatest impact (Urban et al., 1986). Improper positioning is a risk with innovation, which favors future competitors. An improper positioning gives the opportunity for competitors to spot the ‘ideal point’ and position their product ideally (Golder and Tellis, 1993).

Additionally, pioneer advantage may not apply when the innovative company has to compete with strong later entrants such as established firms (Robinson, 1988), firms with a better organizational structure or strategy (Lambkin, 1988), or in presence of superior managerial skills (Moore et al., 1991). In fact, studies rarely consider the possibility of attraction of consumers by later entrants. Companies that first come up with a new product are often assumed to provide a good quality, to choose for the correct positioning, and to pursue the right competitive strategy (Kerin et al., 1992). But it is of interest to competitors to distinguish themselves from the first entrant for a more desirable position (Carpenter and Nakamoto, 1989), instead of adopting a me-too strategy.

Finally, there are a number of limitations to the various empirical studies supporting the benefits of innovations. First, market share averages considered may not be a satisfactory measure of the performance of individual first movers (Kerin et al., 1992). They lead to ignore the range of performance assessment apart from survival and failure. The meaning of a market share in terms of success may largely vary according to the category considered. Several other limitations arise from the nature of the databases (PIMS and ASSESSOR) used for the empirical studies (Kerin et al., 1992, Golder and Tellis, 1993): the data only include survivors; they have a broad definition of first entrants² and rely on self-report of single informants. Moreover, samples are highly heterogeneous, including industries with very different characteristics. A new study by Golder and Tellis (1993) introduces a compensation for some of these empirical limitations. They used a historical analysis, controlled the survival bias, and constrained the definition of first entrant. Results moderate the benefits of first

² “one of the pioneers in first developing such products or services” (Buzzell and Gale, 1987)

entrants previously established. The failure rate for new products increases to 47 % and the average market share decreases from 30% previously found to 10%. Including failures in market share figures is the main reason for this difference. Similarly, results concerning market leadership are also lower than previously measured. Nevertheless, this study still brings pioneers' market share advantage to the fore.

1.2.3. Conclusion on the true benefits of first entrants

In summary, most economy-based arguments seem to have counter-arguments and the empirical studies performed did not give absolute evidence. Being first on the market does not systematically result in a market share advantage; it only provides some opportunities. Converting these opportunities into a concrete advantage also depends on unobservable (endogenous) determinants such as the managerial skills of the company (Moore et al., 1991). In contrast, it is essential to mention that consumer-based arguments supporting pioneering advantage did not meet strong counter-arguments, especially with respect to the learning process (Carpenter and Nakamoto, 1988, 1989).

1.3. Success and failure of new products: the determinants

Although innovation is essential, all innovations do not result in success stories and being first on the market is not a systematic guaranty for success. In this context, it seems of particular interest to uncover the factors underlying the success of certain product innovations and the failure of others. A key pre-requisite for this exercise is a proper definition and appropriate measures of success.

1.3.1. Difficulties in measuring success in new product development

Failure could be defined as the end of the sales of a given product that entered the market, success and survival being the antonyms of this definition. However, this approach would be tremendously limited, primarily because of the multidimensionality of product development outcomes (Griffin and Page, 1996). In the first place, success encompasses commercial and financial issues, but technical objectives (Montoya-Weiss and Calantone, 1994) or opportunity window (Cooper and Kleinschmidt, 1987) are also highly relevant.

A meta-analysis (Henard and Szymanski, 2001) emphasizes four elements to delineate between measurement methods: single-item versus multi-item performance measure, subjective versus objective data, senior manager versus product manager data, and short-term versus long-term performance data. Most studies focus on commercial or financial objectives to define new product success (e.g. return on investment share and sales). In this perspective, multi-items scales have proved to be more effective in capturing a broader domain of product performance (Churchill, 1979; Griffin and Page, 1996). Subjective assessment by company managers tends to insert bias in the

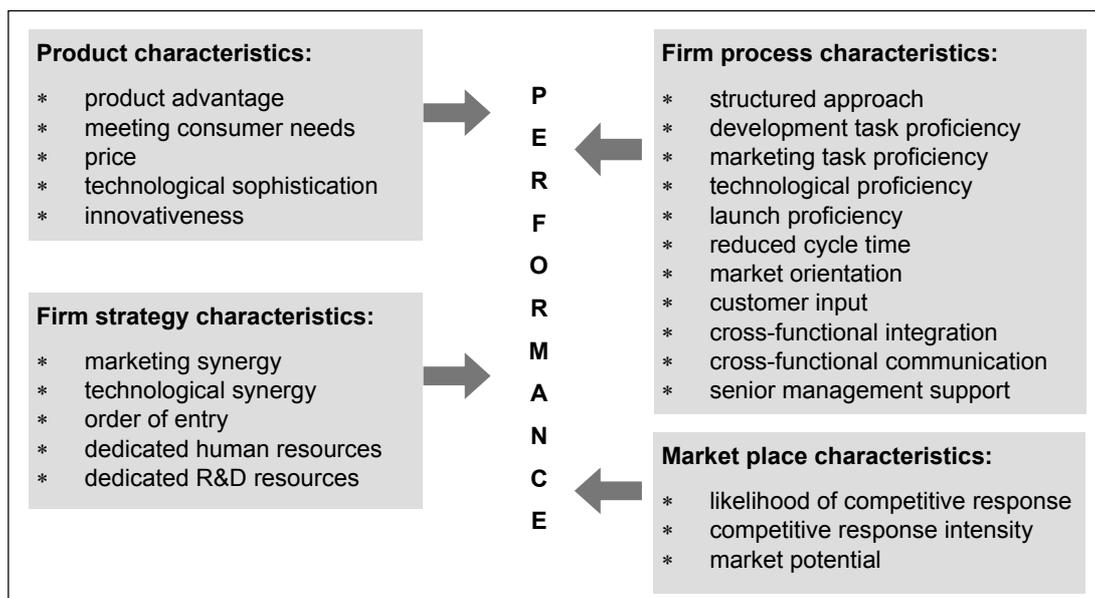
true value of new product performance (Ford et al., 1990). Moreover, responses are also dependent on whether senior managers or project managers provide the data (Griffin and Page, 1996, Montoya-Weiss and Calantone, 1994). In fact project managers are more tightly linked to the situation and more familiar to relevant details whereas senior managers have a more distant overview of activities. At last, based on diffusion theories, the point in time considered to evaluate performance will have a crucial influence on the findings. The diffusion theory is based on the premise that first purchases of a product occur over time (Sultan et al., 1990). Consequently, full effect of product, firm process, strategy and market characteristics may occur long after product introduction and the elapsed time between product introduction and success estimation may have a critical estimates of relationship strength. In summary, product performance measures are very diverse and the selection of the most appropriate measure depends on the type of new product and the business strategy (Griffin and Page, 1996).

1.3.2. Identifying drivers of new product performance

Given the essential role of innovation for companies and the high failure rates observed in practice, a number of studies have logically aimed at identifying independent variables explaining new product success. Based on the examination of literature, 18 to 24 factors of new product performance can be identified and classified into four categories (Henard and Szymanski, 2001, Montoya-Weiss and Calantone, 1994, Cooper and Kleinschmidt, 1987): market place, product, firm process and firm strategy characteristics (figure 1.1). These factors have been reported frequently enough to allow a meta-analysis investigating their effects (Henard and Szymanski, 2001). Yet, most research on the topic has been exploratory (identification of the variables) and only few explanatory studies (test of hypotheses, effects and differences) have been performed (Cooper and Kleinschmidt, 1987, Montoya-Weiss and Calantone, 1994).

In the results of explanatory studies, dominant drivers of performance are identified by testing the differences across success/failure groups. Three predictors pertain to product characteristics (meeting consumer needs, advantage and technological sophistication), two are strategy characteristics (dedicated human resources and R&D), four are process characteristics (marketing task, predevelopment task, technological and launch proficiencies) and one is a market place characteristic (market potential). Drivers such as product innovativeness, technological synergy, market orientation, customer input, cross-functional integration and communication and the competitive response intensity did not show statistically significant correlations. This may indicate that their effect on performance does not generalize across research models (Henard and Szymanski, 2001). However, since the meta-analysis considers the correlation between the drivers and success, it leaves a possibility for a non-linear relationship.

Figure 1.1. Predictors of new product performance (Henard and Szymanski, 2001)



In conclusion, exploratory as well as explanatory studies emphasize the multiple facets of performance. There may not be a single combination of factors for product performance and the combination may depend on the type of innovation (Montoya-Weiss and Calantone, 1994, Henard and Szymanski, 2001). In fact, despite the 60 studies on success factors reported in the latter meta-analysis, research is still highly needed in that field. Existing studies largely emphasized process characteristics research whereas this category of drivers had the least impact on product performance. This draws attention on the need to include dominant drivers from the three other categories (strategy, product and marketplace characteristics) in future models (Henard and Szymanski, 2001). In particular, product newness (innovativeness) belongs to an essential category of drivers and former models failed to reveal a general effect on product performance. It hence appears as an interesting success factor for further research.

The interest we show for product newness in the drivers of performance raises the problem of defining what exactly means a new product both from a company and a consumer perspective.

1.4. What is an ‘innovation’?

Consumers are facing an increasing number of ‘innovations’ or ‘new products’ every year. Around 5,000 new packaged goods were introduced in 1980 and 15,000 in 1990 in the United States (Lawrence, 1993) and AC Nielsen recently acknowledged a significant increase over the last 20 years (Ernst & Young and AC Nielsen, 2000). But what are the common characteristics of the products included in these figures? How

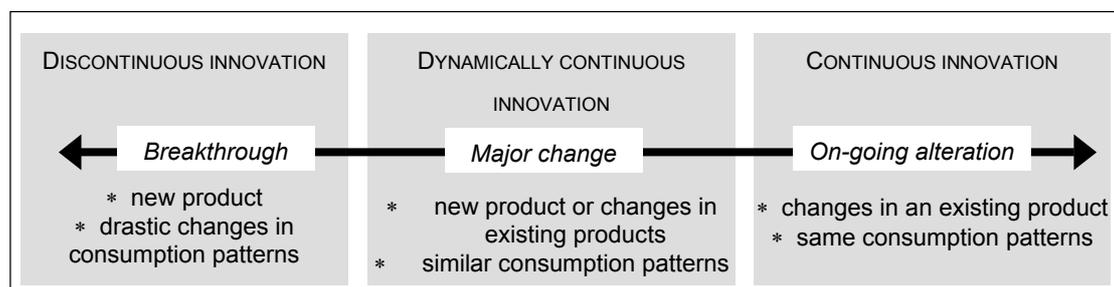
do we define innovation? What is a new product in the eye of the consumer? Classifications and innovation ratings show that products are not equal in newness³. It is thus essential to define the concept of newness in order to define the scope of this research.

In the literature, the word ‘innovation’ refers to both the product itself and the process yielding the product. The process is the conception of a new thought, behavior or anything that is then brought to reality with the concrete product (Robertson, 1967). Definitions and classifications can apply to the process and/or to the product. Since our interest lays in the consumers’ assessment of newness, we will focus on the product perspective in our attempt to classify innovations.

1.4.1. Two aspects of innovation

The literature presents different approaches in the description and classification of ‘innovations’. Specifically, we can distinguish between approaches focusing on a company perspective and other approaches relying on the consumer perception. An instance of the first type of approach is a classification based essentially on the resources of the company. It comprises three levels of innovation: the development of (1) existing product lines, (2) new product lines in areas of current technological expertise, and (3) new product lines in areas in which a business has little or no technological expertise (Johne and Snelson, 1988). This classification means a lot to company managers but may not reflect the perception of the products’ novelty by consumers. In contrast, some classifications essentially focus on consumers’ perceptions without incorporating an assessment of novelty based on company skills and resources. For instance, Robertson (1967) features three levels of innovation processes from continuous innovation to discontinuous innovation (figure 1.2), by their impact on consumption patterns.

Figure 1.2. Classification of innovations (adapted from Robertson, 1967)



³ In this dissertation the word newness will refer to the innovation as a product whereas the word innovativeness will refer to the trait of consumers choosing new products. (Blythe, 1999)

1.4.2. Integrating the two aspects in a continuum

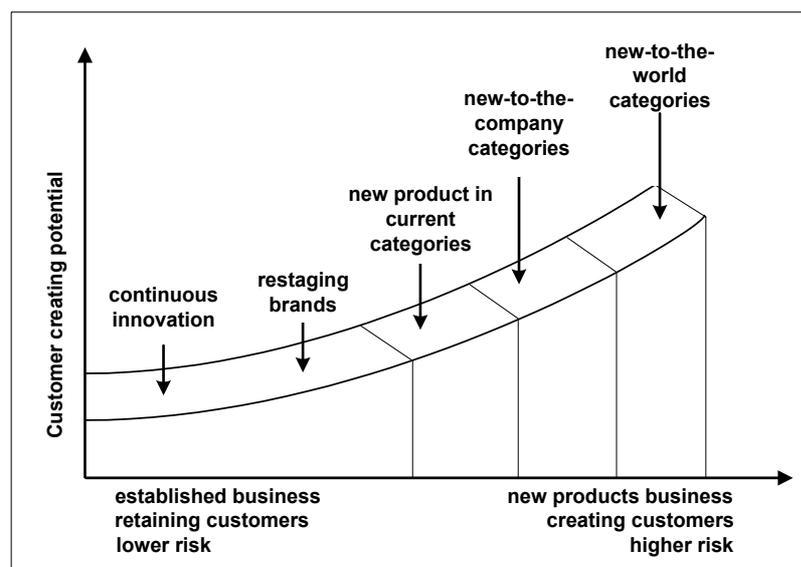
In a broader framework, some authors explicitly combine the two types of approaches by integrating them in their classification. One aspect is the market newness (also referred to as newness to the world or newness to the consumer) and the second aspect is the managerial/technological newness (also referred to as newness to the firm).

Figure 1.3. Integrating market and technological newness (adapted from Griffin and Page, 1996)

		Newness to the market	
		low	high
Newness to the firm	high	New-to-the-company (37%)	New-to-the-world (20%)
		Products improvements (20%)	Add to existing lines (20%)
	low	Costs reductions (2%)	Repositioning (1%)

Booz, Allen and Hamilton (1982) define 6 levels of newness for products and evaluate their place in total new product introductions. Griffin and Page (1996) placed these classes along the two dimensions of the classification based on Ansoff's⁴ product-market matrix (figure 1.3). Kleinschmidt and Cooper (1991) reduce the distinction to three levels. *Highly innovative products* (1) are new to the world or new to the company products, *moderately innovative products* (2) may be new to the firm or new in an existing line for the firm, and *low innovative products* (3) are modifications, repositioning, redesigned products to achieve cost-reduction.

Figure 1.4. Customer creation (Olson, in Adams and LaCugna, 1994)



⁴ Ansoff, H. Igor. Strategies for diversification. *Harvard Business Review* (September-October 1957)

An alternative approach is based on consumer creation for the company (Olson, in Adams and LaCugna, 1994). It considers both market newness and newness to the company, defining five levels of innovative products. It assumes that products with a low newness level will only retain customers, whereas products with a higher newness level will be able to create new customers for the company (figure 1.4). In this classification 'new to the company' products rate high since they do create new customers to the company as it enters the competition for this kind of products. In this model, the newer the product, the more it will attract new consumers and as a counterpart, it also acknowledges the higher risk associated to the newer products. In fact this model integrates the consumer aspect but focuses on a company perspective.

The common characteristic of the definitions above is to establish a representation of the gradient of newness. They do not feature a dichotomy between low innovative, 'incremental' or 'modified' products on one side and 'pioneering' or 'truly innovative' products on the other side but a continuum from one end to the other (Ali, 1994). Moreover, they also involve multiple dimensions in newness classification: e.g. market and technological newness, customer creation.

1.4.3. A dichotomous approach of multidimensional newness

In contrast with the previous section, other definitions disentangle consumers' and managers' perceptions of newness and dichotomize each aspect, hence characterizing four types of innovation.

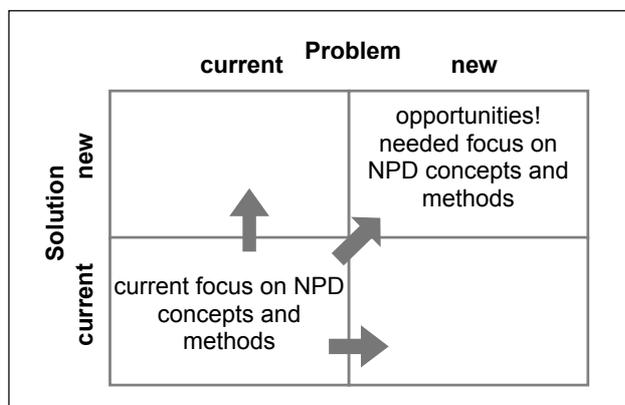
For instance, Veryzer (1998a) defines *technological* capability and *consumer* capability and characterizes current and new levels on each dimension. Technological capability deals with the fact that products involve expanding technological capabilities beyond existing boundaries, while consumer capability relates to the benefits perceived by the consumer. In this perspective, continuous innovations comprise little new technology and few new benefits. Technologically discontinuous innovations are new to the industry but do not include many new benefits whereas commercially discontinuous innovations may not comprise significantly new technologies but imply changes in usage behavior. Finally, technologically and commercially discontinuous innovations involve radically new technologies and imply significant changes in consumption patterns.

Firth and Narayanan (1996) add one aspect and integrate three dimensions in their classification of innovation clusters: market newness, technological newness, and market application newness (i.e. target newness). The first dimension relates to a dichotomy between pioneering and imitative products. In contrast the third dimension relates to the target: existing consumers, new niche, new segment and new market. The technological dimension also comprises two aspects, the technology itself: minor or major improvement, and the relation to previous technological knowledge.

Consequently, this model integrates consumer and company appreciation of newness and the ‘consumer creation’ aspect previously developed enriches it.

The above-mentioned classifications (Veryzer, 1998a, Firth and Narayanan, 1996) give a picture of various products newness perception but do not give any indications of future directions for new product development. In contrast, a similar approach characterizing four innovation types, but focusing on *problems* (consumer needs) and *solutions* (products), allows suggestions regarding future opportunities (Wind and Mahajan, 1997). In fact, current new product concepts and methods mostly focus on solutions to customers’ current problems. However, the global information age, the changes in customers and stakeholders expectations, needs, behavior, and the changes in the nature and practice of the firm, should help innovation move into three other situations (figure 1.5). This observation should favor the development of really new products, able to jump-start corporate growth (Olson, in Adams and LaCugna, 1994). In practice, although the total number of innovations has increased, the number of really new products declines and represents a small percentage of innovations (Lawrence, 1993; Ernst & Young and AC Nielsen, 2000), among which we find products like Swiffer, Febrèze, or Fruitontbijt. In the packaged good industry, if really new products were products that create a new category, only 3 or 5% of the projects would meet this criterion (Olson, in Adams and LaCugna, 1994).

Figure 1.5. NPD based on customer problems and product solutions (from Wind and Mahajan, 1997)



1.4.4. What are considered ‘really new products’?

Really new products are referred to as *radically new*, *discontinuous* or *revolutionary* products, *dislocations* and *breakthroughs*, as opposed to continuous or evolutionary innovations (Veryzer, 1998a). In terms of process, discontinuous innovation is defined as the application of significant new ideas or technologies (Tushman and Nadler, 1986). The perception of radical newness may depend on how familiar organizational members are with a particular innovation, referring to the company competency. It can be based on the absolute uniqueness of the technology applied, not only in a particular company but also in the whole industry (Nyström, 1985, Moore in Adams

and LaCugna, 1994). A criterion to define really new products is the difference with other existing products or the definition of a new category (Lehmann, in Adams and LaCugna, 1994). The difference should be tangible but also recognizable and appreciable by the consumer (Leduc, 1964: p5). A new technology is hence not sufficient for discontinuous innovation. Consumers should also appreciate the benefit of this technology. To summarize, discontinuous innovation is the “creation of a line of business new to both the firm and the customers” (O’Connor, 1998: 152). On the one hand, newness to the customer yields necessity for learning and acculturation. This implies that really new products have potential to give consumer-based competitive advantage defined in the pioneering literature. On the other hand, because they define a new category, really new products do not fit existing classifications and their fit in the organization is also unclear (Lehmann in Adams and LaCugna, 1994). Consequently, marketing support is critical to the diffusion of really new products.

1.4.5. Summary and discussion

There are different degrees and types of innovations, all consist in a change compared to existing products, but offer a great variation in the level of change. Several classifications follow the idea of a range of newness, represented by continuous changes on one or two dimensions encompassing both the company perspective (newness to the company, technological newness) and the consumer perspective (market newness, consumer’s benefit newness). From the company perspective, technological newness is obviously challenging and critical, yielding higher risk. In their assessment of product newness, managers tend to consider the company products and technological knowledge as a unit of analysis. In contrast, consumers assess new products in the market place and may not always perceive the technological dimension involved. As a result, newness classifications established by managers may not reflect appropriately consumers’ perception of product newness. Yet, product market success is more likely to be affected by consumers’ assessment of the product since they constitute the ultimate target of the product.

In fact many empirical studies in the new product development literature take a firm’s perspective towards newness (Garcia and Calantone, 2002). Although a number of product newness classifications also incorporate market newness, it is essential to note that the classifications reported in these studies are all based on managers’ evaluations (see table 1.1). We strongly believe this may be a major barrier in properly understanding newness from a consumer perspective. In particular, although the multi-dimensionality of the newness construct was acknowledged from a firm’s perspective, it was not considered in a consumer perspective. Because this type of classifications are also used in various studies on product performance we also think a better understanding of consumers’ newness perception would help establishing a link with market success of new products. Similarly, in the new product performance literature, newness evaluation is frequently limited to a one-dimensional measure

assessed by managers, whereas success measures are extensively discussed and their diversity is emphasized (Henard and Szymanski, 2001).

Table 1.1. Perspectives of newness assessment in the product development literature (adapted from Garcia and Calantone (2002))

	Consumer perspective <i>(new to the consumer)</i>	Company perspective <i>(new to the company)</i>	Both perspectives <i>(new to the world)</i>
Expert evaluation	Yoon, Lilien (1985) Ali, et al. (1995) Mishra, et al. (1996) Steenkamp, Gielens (2003)	More (1982) Cooper, de Brentani (1991) Green, et al. (1995) O'Connor (1998)	Cooper (1979) Maidique, Zirger (1984) Kleinschmidt, Cooper (1991) Lee, Na (1994) Athuane-Gima (1995) Olson, et al. (1995) Schmidt, Calantone (1998) Goldenberg, et al. (1999, 2001)
Consumer evaluation	?	non-relevant	non-relevant

Interestingly, studies in the new product development literature do not develop the issue of the evolution of newness perception over time. This seems of specific interest when considering a consumers' perspective. Indeed, certain products seem to have the ability of rapidly becoming familiar to consumers, hence losing their 'new' character. In contrast, other products seem to remain odd for a longer time without it being explained by initial perceived newness to our knowledge.

1.5. Structure of the dissertation

In the following chapters we first develop a theoretical framework incorporating a number of ideas relevant to understand newness perception by consumers. Chapter 2 reviews key issues in Berlyne's extensive work on novelty and related issues. Further, this chapter deals with ambivalent reactions to newness; namely the fact that human beings are intrinsically curious and in need of novelty and at the same time fear these new elements. Finally, a literature review on categorization and learning by analogy provides some cues about how consumers are able to make sense of new products based on their current knowledge.

Chapter 3 first sets the theoretical basis for the development of a scale to measure consumers' newness perception. This chapter presents the scale development applied to new food products in The Netherlands, its validation with different product sets and the relation with product liking. This chapter provides a detailed understanding of product newness perception from a consumer perspective.

In chapter 4 we show the contribution of this new measurement instrument in explaining market success of new products one year after their launch on the market. Food products tend to have a short product life cycle; consequently, it is particularly relevant to look at market success after one year to evaluate their success. By this assessment we determine the products with the highest potential based on their newness characteristics at the time of launch.

Further we elaborate our model over time in chapter 5 to explain how market success develops over the first year, depending of newness characteristics of the products. Uncovering the success development of products depending on newness characteristics gives some information to establish a proper marketing support for these products in the future along their life cycle.

Finally, chapter 6 investigates the generalizability of the model across countries and the differences in newness perception that can appear due to cultural differences. In this chapter the scale is applied to new fabric softeners in 6 different countries (France, Germany, Indonesia, Mexico, Thailand, USA).

The conclusion summarizes the findings developed in this dissertation, gives recommendations on how to deal with product newness to improve new product development practices and evokes interesting potential directions for further research.

Chapter 2.

Theoretical framework

2.1. Introduction

As consumers are exposed to new products, numerous situations can lead to rejection. The marketing mix may not be satisfying, i.e. a low distribution support yields little purchase opportunities, higher prices are critical to success, poor positioning generates problems to reach the target. Product characteristics were identified as an essential aspect of innovation adoption in various research fields (Gatignon and Robertson, 1991), the product can essentially fail to deliver clear superior benefits and values to consumers. In this situation, the product is a wrong investment for the company since rejection emerges from the product per se. Alternatively, rejection may be due to the novelty of the product (Ram and Sheth, 1989) rather than its intrinsic value characteristics. Due to product newness per se, consumers lack a frame of reference in which to evaluate an innovation (Olshavsky and Spreng, 1996; Stayman, et al., 1992; Veryzer, 1998b; Gregan-Paxton and Roedder John, 1997). This eventually results in misunderstanding and wrong evaluation of the product. In this latter situation, the product is a missed opportunity for the company since consumers do not recognize its true value. It implies that potentially successful new products may be rejected for reasons extrinsic to the real value of the product, yet intrinsic to the very fact that the product is new and unknown for consumers. More interesting for research, this situation gives space for improvement in the new product development process.

It is clear that being able to detect newness characteristics yielding initial rejection from consumers, independently from the objective value of the product, would bring a significant improvement for new product development. This chapter aims at developing a better theoretical understanding of the motives for acceptance and rejection of new products by consumers in relation with product newness

characteristics. For this, we propose a number of relevant complementary or competing theories highly relevant to support our reasoning in the following chapters.

The first task consists in conceptualizing the newness construct as perceived by consumers. It aims at revealing newness through elements closely associated to and accompanying newness in order to treat the construct in all its complexity instead of a superficial perception. Such an approach is critical to the proper understanding of the consequences of newness in terms of product evaluation.

Further, a literature review of elements pertaining to the immediate consequences of newness allows identifying positive as well as negative aspects for consumers. These aspects are reviewed following a framework identifying both sensory and cognitive routes yielding to the consequences of newness.

The next step consists in delineating cognitive aspects associated to newness processing from more sensory aspects exhibited in the previous section. Processes at the cognitive and psychological levels are more thoroughly reviewed with a specific attention to the categorization literature.

Finally, in light of this literature, we explore the link between product newness and evaluation. Different sources of affect are identified and their consequences on the direction of affect are considered. Further, emphasis is given to learning by analogy as a means for consumers to deal with newness, solve eventual conflict in newness processing at the sensory as well as cognitive level, and ultimately form an evaluation of the products.

2.2. The concept of newness psychologically

2.2.1. Relatively few theoretical accounts

In the marketing literature, the psychological approach of newness has received little attention. In fact, it has been treated indirectly through developments over e.g. curiosity (e.g. Loewenstein, 1994; Ziamou and Gregan-Paxton, 1999), optimal stimulation level (e.g. Mittelstaedt et al., 1976; Steenkamp and Baumgartner, 1995), surprise (e.g. Vanhamme, 2000) or categorization (e.g. Ozanne and Brucks, 1992; Olshavsky and Spreng, 1996; Moreau, et al., 2001). To get deeper insight into the psychological aspects of newness, the conceptualization proposed in this chapter builds on an early and comprehensive analysis of novelty in psychology research: Berlyne's theory of collative variables. This theory conceptually defines newness, incorporates elements around newness giving more information about the nature and type of novelty considered, and relates to antecedents and consequences of newness. This provides us with a rich, psychology-based approach, particularly valuable in our attempt to get insight into newness perceived by consumers and its consequences on product evaluation.

2.2.2. Newness: a relative concept

With respect to newness, individuals always judge an object, a situation, or living individual compared to a previous status. In this sense, judging newness implies a reference against which the new item is compared. This dependency to the reference yields some relativity in the newness judgment. Berlyne (1960) brings this issue forward by defining references in time and in the structure of the stimulus. With respect to the reference in time, he refers to long- and short-term novelty. In the case of short-term novelty, the stimulus has not been encountered lately whereas in the case of long-term novelty, the stimulus has not been encountered for a long time. Ultimately, with ‘complete’ novelty the stimulus has never been encountered before. With respect to the reference in the structure of the stimulus, he delineates ‘absolute’ novelty, when the stimulus is fully new, from ‘relative’ novelty, which applies to stimuli whose elements are not new but are assembled in a new way.

The dichotomy between absolute and relative novelty as well as the dependency between the novelty perceived and the reference considered immediately raises the problem of the relevance of the references. Whether they are extremely new or whether they are a combination of familiar elements, new stimuli keep some definite degree of resemblance with stimuli encountered previously. These previously encountered stimuli stand for a reference against which to evaluate the new stimulus. The relevance of the reference is directly linked to the degree of resemblance between the new and previously encountered stimuli. Moreover, as a new stimulus is related to categories that individuals recognize, it generates “responses corresponding to familiar stimuli by generalization” (Berlyne, 1960: 19). Consequently, Berlyne already suggested that the affect attached to previously encountered stimuli could transfer to the new stimulus to the extent that the reference is relevant enough for this generalization to occur. As a result, Berlyne (1960: 22) defines as relevant references, references for which the associated response is generalized to the new stimuli.

2.2.3. Collative variables: common properties with arousal potential

Another difficulty in newness definition comes from the fact that ‘new’ is a very common word, used in everyday language. Yet this apparent familiarity with the word does not imply that defining and explaining what a ‘new stimulus’ exactly means is easy. To overcome this problem, Berlyne (1960: 20) starts from the observation that “if all novel stimuli have certain effects on the organism that stimuli lacking in novelty do not have, they must have some properties in common to produce this effect”. Instead of trying to define newness as such, it seems more feasible to define what common properties actually make all new stimuli ‘new’. We will now focus on explaining these properties and discuss the effects in a later section dedicated to the consequences of newness.

New stimuli are defined on the basis of their common properties, meaning that newness *per se* is accompanied by other properties, closely related to newness but sufficiently distinct from it to produce their own influence on the direction of stimulus

selection or the strength of any stimulus selection process. Berlyne suggests the term 'collative' for these properties (Berlyne, 1960: 44; 1966: 30) since they depend on the comparison of stimulus elements appearing simultaneously in different sectors of a stimulus field or perceived at different times (Berlyne, 1966: 30). Collative variables are thus highly connected to information. Finally, they are of specific interest when approaching the problem of stimulus selection (Berlyne, 1960: 18) and hence in an attempt to identify determinant newness characteristics yielding acceptance or rejection of new products.

Further, Berlyne (1960: 20) proposes two hypotheses concerning the common properties of new stimuli. First, he suggests all stimuli are originally new and possess these common properties but gradually lose them as a consequence of exposure (habituation theory). In this hypothesis, at any point of time, only stimuli that do possess these properties are considered new. If later the same stimuli have lost these properties (i.e. rate lower on collative variables) they are not considered new anymore. The second hypothesis focuses on the effects of collative variables, proposing that all new stimuli have in common the property of inducing arousal. Because it focuses on the effects produced by stimulus novelty and more generally collative variables, the latter hypothesis, for which supporting arguments can be found (Berlyne 1960, 1963, 1966), is particularly relevant to our purpose in defining newness.

2.2.4. Two sub-groups identified within collative variables

When describing collative variables, common properties of new stimuli, Berlyne (1960) explicitly separates them into two sub-groups defined as having a differential relationship with newness.

The first group comprises three variables: *change*, *surprise* and *incongruity*. *Change* refers to what subjects perceive when comparing the stimulus to a stimulus previously encountered. *Surprise* comes in addition to change. It implies that the subject formed an expectation based on a previous stimulus, which is not confirmed by the present stimulus. This is explained by an old principle in psychology known as 'association by continuity', 'redintegration' or 'sensory integration' and in modern psychology as 'neural processes' or 'implicit responses' (Berlyne, 1960: 23). It can be summarized as follows: the more stimulus A and B have been associated the more the central correlates of A will activate the central correlates of B in the brain. Thus any change in the association between A and B counters the expectation based on the activation of the central correlates of B after A, and yields surprise. The term surprise is reserved for cases where the present stimulus actually contradicts the expectation induced by a previous stimulus. Moreover, *incongruity* can be explained as a special case of surprise, where the incongruous stimulus contradicts expectations based on the whole mass of past experience instead of one stimulus.

To summarize, these three variables are not only closely related to newness but also to each other. Berlyne emphasizes the difficulty to experimentally separate these

variables to test for their individual influence on stimulus selection. Yet, this problem can be turned into an evidence for their tight inter-connections. Newness directly implies change, which could be seen as the most simple and straightforward property of new stimuli. Surprise and incongruity constitute variations on the basis of change. Consequently, although conceptually distinct from each other and from newness, these variables form a homogenous group of new stimuli properties with a tight, direct and sensory, reference to newness. Further, it suggests that these three variables will exhibit similar patterns when establishing a relationship with product evaluation.

Berlyne also dedicates a specific attention to additional properties pertaining to the second sub-group: *uncertainty*, *conflict* and *complexity*. These variables are not only defined separately but also judged more delicate to understand. Heisenberg originally developed the ‘principle of *uncertainty*’ in theoretical physics. This principle basically sets limits to the measurement of a certain variable x , which can be placed in a range $x + \Delta x$, where Δx is the uncertainty of measurement. The greater the uncertainty, the greater the range of values a variable may have. Moreover, the more equal the probability of distinct values, the greater the uncertainty. As for ‘*conflict*’, the term is commonly used, yet conflict may be present at differing degrees in experiences. Effects of conflict such as neurosis, emotion, increase in reaction time have long been identified (Berlyne, 1960: 31) but should not be a means of identifying conflict since other factors intervene in these effects. Based on his research, Berlyne (1960: 32) defines determinants of conflict as (1) the number, (2) the absolute strength, and (3) the equality in strength of competing response tendencies. Finally, *complexity* may be difficult to grasp as it encompasses different cases. Complexity may increase with the number of distinguishable elements in the stimulus, or with dissimilarity between elements, or with the number of units formed by the distinct elements in the stimulus (Berlyne, 1960: 38). In fact, complexity is more related to the number of psychological parts of a stimulus rather than physical ones.

In contrast with the first group of variables, this latter group clearly offers a more delicate reference to the context, at the psychological and cognitive level. Yet, the connection to newness remains as well as inter-connections between the three variables. For instance, uncertainty rises from the impossibility for subjects to know what will follow from novel stimuli (Berlyne, 1960: 29) and the simplicity-complexity dimension reflects the patterns of novelty (Berlyne, 1960: 40-41). Moreover, conflict is closely related to uncertainty in the sense that the resolution of a conflict goes through the reduction of uncertainty below a threshold value (Berlyne, 1960: 36). Berlyne also mentions various reasons for the close connection between complexity and uncertainty, based on the determinants of complexity (1960: 40-41). To summarize, similarly to the first group, the second group of variables establishes a second homogenous group of variables associated to newness.

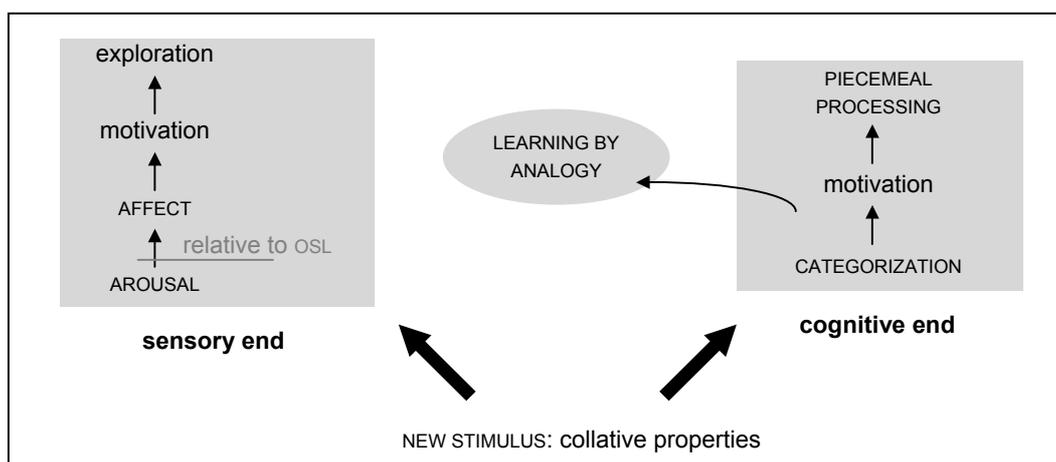
To conclude, beside newness itself, we identify 6 properties of novel stimuli, falling into two homogenous groups, which may give valuable information to get insight into newness perception by consumers.

2.3. Consequences of newness

As described in the previous section, Berlyne delineated two sub-groups in his description of collative properties of new stimuli. The first one is dominantly sensory whereas the second one would be at the psychological and cognitive level. This gives reason to believe that this distinction will reflect at the consequences level and in the processes involved (figure 2.1.).

In an early conceptualization of newness, Berlyne mostly focused on the upper, sensory end of processing, which will be developed in this section. Yet, in his theory he already planted the seeds for the cognitive aspects of information processing by mentioning that affect attached to previously encountered stimuli could transfer to new ones (Berlyne, 1960: 22), i.e. similar enough. The lower part of the figure will be treated in the next section.

Figure 2.1. Sensory and cognitive processes linked to exposure to a new stimulus



2.3.1. Collative variables, arousal potential and arousal

In the notion of arousal it is essential to delineate arousal potential, which is a stimulus characteristic, from arousal, an individual state.

In his series of papers (1960, 1967, 1971, 1973) Berlyne defines arousal potential of a stimulus as properties that tend to drive arousal upward. It refers to the ‘intensity of a stimulus’ (Berlyne, 1967) combined to its ability to excite the nervous system (Berlyne, 1973). This conceptualization is similar to the notions of ‘stimulus impact’ (Maddi and Fiske, 1961), which relates to the intensity, meaningfulness and variation of the stimulus, and ‘information rate’ (Mehrabian and Russell, 1974). Three types of determinants of arousal are identified: intensive variables (e.g. size, color), affective variables (pleasant and unpleasant forms), and collative variables (Berlyne, 1960: 171-178). The arousal potential of a stimulus is a sum of arousal potential from them all. Experiments show evidence for “a common pool of arousal that can receive

increments from a diversity of stimulus conditions” (Berlyne, 1960: 211). In other words, although they are conceptually distinct, numerous variables have arousal potential and collative variables are one source adding up to the total arousal potential of a stimulus.

Arousal is intimately related to the concept of drive and refers to the motivational state of alertness of an individual on a continuum from deep sleep to great excitement (Berlyne, 1966, 1960: 48; Mehrabian and Russell, 1974). Arousal level of an individual is a function of the environment and of the arousal potential of stimuli in the environment. When an individual is exposed to a new stimulus, collative variables exert their effect through a contribution to total arousal by adding their effect to initial arousal. Similarly, in their terminology, Maddi and Fiske (1961) refer to ‘activation’ as a state of excitation of the brain structure, affected by stimulus impact (i.e. arousal potential), whereas the term arousal is restricted to the manifestations of activation in the organism.

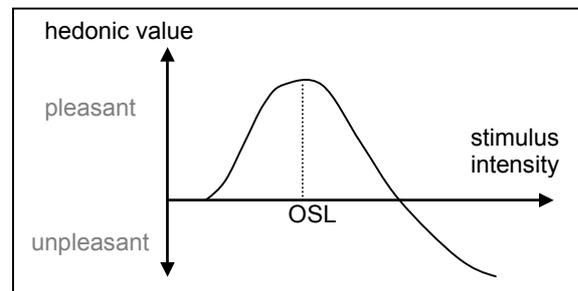
With respect to the type of relation between arousal potential and arousal, Berlyne (1960, 1967, 1973) suggests a U-shaped relationship. Yet, the left side of the U corresponds to very extreme, experimental conditions of sensory deprivation, not likely to happen in a real consumer behavior context. Focusing on the consumer behavior context, the position of Berlyne thus reduces to the right side of the U-shaped relation, namely a monotonically increasing relation between arousal potential and arousal. Similarly, Maddi and Fiske (1961) posit a monotonically increasing relation between stimulus impact and arousal. More specifically, in terms of collative variables, arousal produced by a stimulus has proved to increase with novelty and change (Berlyne, 1960: 174-175), as well as complexity and uncertainty (Berlyne, 1960: 178). In addition, several studies bring support for the propensity of surprise and incongruity to induce arousal (Berlyne, 1960: 175-177). Consistently with these theories, Steenkamp and colleagues (1996) found support for a monotonically increasing relationship between the arousal potential of a stimulus and the arousal induced by that stimulus.

2.3.2. Arousal and stimulus evaluation

It is commonly noticed that various forms of stimulation are pleasant at medium intensities but turn unpleasant at higher intensities. For instance, too little sweetness may be unsavory for a dessert but excessive sweetness may result in disgust; similarly, music is enjoyable but hurts the ears when played too loud. The relation between stimulus intensity and hedonic value is illustrated by a bell-shaped curve (see figure 2.2) introduced by Wundt in 1874 (e.g. Berlyne 1960). There is general agreement that high arousal level induced by a stimulus yields a lower evaluation of that stimulus, compared to a moderate arousal level (Fiske and Maddi, 1961; Mehrabian and Russell, 1974). Similarly, stimulus evaluation is lower for low arousal levels (Fiske and Maddi, 1961; Mehrabian and Russell, 1974; Berlyne, 1978). The

inverted-U relationship between arousal and stimulus evaluation also finds support in the consumer behavior context (Steenkamp et al., 1996).

Figure 2.2. Wundt's hypothesis illustrated



This is in line with optimal stimulation level (OSL) theory (e.g. Maddi, 1961; Zuckerman, 1994), which posits that hedonic value of a stimulus increases with stimulation as stimulation remains below the OSL of an individual. As stimulation exceeds the OSL, hedonic value of the stimulus decreases when stimulation increases. The OSL is the uniquely determined stimulation level an individual prefers, over all situations, conditions and sources (Maddi, 1961). This suggests a critical role of collative variables for stimulus selection. It emphasizes that too familiar (i.e. rating low on collative variables) or too remote (i.e. rating high on collative variables) stimuli result in lower hedonic value since they yield deviance from the optimum. In contrast, stimuli exhibiting intermediate ratings on collative variables will yield higher hedonic value. Consequently, stimuli need to be familiar enough and simultaneously distinct enough in order to remain interesting (Berlyne, 1960: 21). Additionally, an individual is more likely to recover its OSL when the deviance is small. As a consequence, small discrepancies in stimulation level are preferred over large ones: e.g. small variations in change and complexity are preferred (Berlyne, 1960: 203).

Finally, OSL theories postulate that individuals need to maintain their desired level of arousal. Consequently, in low arousal conditions, consumers seek stimuli with arousal potential i.e. stimuli with collative properties. In contrast, in conditions where arousal exceeds the optimal level subjects need to reduce arousal. This balance can be achieved through various forms of exploratory behavior developed in the next section.

2.3.3. Arousal modifying behaviors: diversive and specific exploration

As a general definition, exploratory responses afford access to information that was not previously available. Yet, two aspects of exploration have been delineated: diversive and specific exploration (Berlyne, 1960: 19, Maddi, 1961: 254). Diversive exploration aims at solving boredom and providing entertainment (Berlyne, 1960: 19). It typically characterizes exploratory behavior aiming at increasing arousal level in situations where this will be rewarding. In other words, diversive exploration occurs as arousal level is low and subjects aim at recovering their optimal level through an exploration of the surrounding world. This can be achieved with stimuli from a wide

range of sources, provided that they have arousal potential. This type of exploration is largely referred to as exploratory behavior in the marketing literature. It includes variety seeking in purchase behavior (McAllister and Pessemier, 1982 for review), recreational shopping behavior (Bellenger and Kergaonkar, 1980, Westbrook and Balck, 1985), exploratory information acquisition (Hirschman, 1980, Baumgartner and Steenkamp, 1996), exploratory consumer buying behavior (Baumgartner and Steenkamp, 1996). Thus, with respect to the issue of novelty, it refers to the case where consumers seek for novelty in their environment.

In contrast, specific exploration characterizes situations where arousal has increased and should be reduced in order to come back to the optimal level. This can occur when subjects are exposed to stimuli with a high arousal potential due to e.g. the presence of collative properties (Cancelli et al., 1980; Kim, 1999). Specific exploration aims at providing information about one particular object or event (Berlyne, 1960: 19). It characterizes a person who heads for a solution to an intellectual problem. Identifying variables eliciting exploratory behavior is crucial to the phenomenon. A number of variables e.g. novelty, complexity, incongruity, and surprise possess arousal potential, yield deviation from the OSL and generate exploration (Berlyne, 1960, Maddi, 1961). Although all collative variables generate exploration, novelty is considered most powerful in it (Maddi, 1961). In the situation where consumers are exposed to new products, specific exploration will provide additional targeted information about the stimulus, and reduce arousal generated, at least in part, by collative variables of new stimuli. Consequently, specific exploration allows reducing arousal to an acceptable level for consumers and overcoming potential initial rejection due to high arousal created by the magnitude of collative variables. Because this is of specific interest in our attempt to better understand the motives for acceptance and rejection of new products by consumers in relation with product newness characteristics, the next sections will focus on specific exploration.

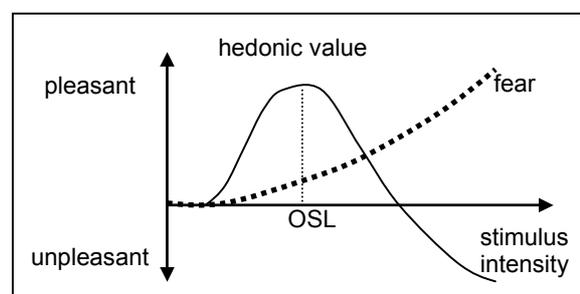
2.3.4. Approach and avoidance

While considering the drivers of exploration, the magnitude of collative variables and level of arousal potential inferred appear essential. On this topic, Berlyne mentions that individuals are more likely to engage in specific exploration when arousal potential is only slightly supra optimal since they have a higher chance to restore their OSL (Berlyne, 1960). This suggests that other factors may intervene in the process and that higher arousal may not automatically yield specific exploration and curiosity. Prior research in psychology (Kahneman, 1973), in retailing (Kahn and McAllister, 1997) or e-retailing (Menon and Kahn, 2002), supports the idea that higher levels of arousal in individuals yield to lower approach behaviors with respect to novel products or experiences.

Berlyne (1966) and Zuckerman (1979, 1990) elaborate further in this direction. Although the presence of collative variables in a stimulus often yields exploratory approach, they “in some circumstances, evoke extreme fear, which leads of course to

withdrawal, the diametrical opposite of exploratory approach” (Berlyne, 1966: 292). In other words, collative variables lead to a behavior between curiosity and fear (Berlyne, 1966: 30). Similarly, Zuckerman (1979, 1990) shows that simultaneously to arousal, fear appears, balancing stimulus attractiveness (see figure 2.3). In fact, stimulus attractiveness cumulates the hedonic value resulting from the arousal level and fear. As the level of fear increases, the approach behavior characterized by specific exploration turns into an avoidance behavior for the new stimulus. This additional piece of theory confirms that chances to engage in specific exploration are higher when arousal is slightly supra optimal. In this case, the effect of fear remains manageable. In contrast, when the deviance above OSL becomes larger, fear increases and the cumulated effect of fear and stimulation does not elicit exploration but avoidance.

Figure 2.3. Approach and avoidance illustrated



This effect can also find support in the literature relative to specific collative variables. For instance, uncertainty avoidance was found to have a negative impact on innovativeness (Steenkamp et al., 1999), thus high uncertainty will yield avoidance behavior. In contrast, other collative variables have proved to have a more positive effect on behavior, and elicit approach rather than avoidance. Mehrabian and Russell (1973) AST (Arousal Seeking Tendency) scale mentions words like ‘change’, ‘new’, ‘novelty’, ‘surprise’, ‘unfamiliar’, but not ‘complex’ or any close synonyms (Cox and Cox, 1994).

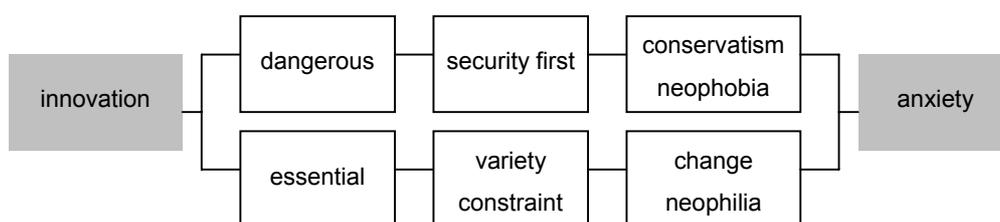
2.3.5. The omnivore paradox

The constant competition between exploration and fear that ultimately results in human behavior is particularly salient in the food domain, the domain of application in this dissertation.

An essential biological characteristic of human beings is the fact that they are omnivores. This generates a critical physiological, behavioral and cognitive paradox developed by Rozin (1976) and Fischler (1990). It provides human beings with extraordinary freedom and adaptation abilities since they can survive from a plethora of foods. Simultaneously, it also infers a constraint, which is variety. In contrast with specialized eaters, human beings cannot live from one single food but require some variety in their diet. This situation generates contradictory consequences that establish

the omnivore paradox (see figure 2.4). Because they are bound to variety, human beings are variety seekers, tend to explore, change. Simultaneously, because any new, unknown, food is potentially dangerous, they tend to be suspicious, careful and conservative in their consumption behavior. As a consequence, human beings waver between neophilia (newness approach, exploration) and neophobia (newness avoidance). They are submitted to a ‘double bind’ between the familiar and the unknown, monotony and alternation, security and variety (Fischler, 1990: 64). As a result with new foods, human beings tend to be constantly at the border between exploration and avoidance tendencies.

Figure 2.4. The omnivore paradox (Fischler, 1990: 64)



2.4. Newness processing: the cognitive end

When confronted with new products consumers have to process the new information comprised in the product and ultimately form an evaluation based on the outcome of this information processing. Several complementary or competing theories in cognitive and social psychology help us understanding how these processes take place. In this section we focus on two major fields of literature: categorization and learning by analogy, which are specifically relevant to newness and have already been applied in consumer behavior. At the end of the section we show that the two theories are not totally independent and could be integrated in a comprehensive framework.

2.4.1. Categorization: general concept

Supported by findings in cognitive psychology, notably in the work of Fiske (Fiske, 1982; Fiske and Pavelchak 1986; Fiske 1990) and Mandler (Mandler 1982), the categorization literature constitutes an interesting direction for understanding the way consumers deal with new products. Applications of this theory for consumer behavior purposes have already been discussed in several papers (Sujan, 1985; Sujan and Dekleva, 1987; Meyers-Levy and Tybout, 1989; Loken and Ward, 1990; Ozanne et al., 1992; Stayman et al., 1992; Moreau et al., 2001).

The general idea is that, the knowledge structure of a consumer is organized along categories, represented by schemas in the brain. One basic premise of the categorization theory is that, in order to understand and process their environment efficiently, people naturally divide the world around them into categories (Sujan,

1985). Consequently, when facing a new product, consumers will first try to understand it on the basis of their internal knowledge (i.e. categorize the product). If unsuccessful, they will then attempt to understand the product on the basis of external knowledge (i.e. consider the attributes of the product) to reach a proper understanding. Consumers hence integrate more and more attribute information as they move from direct, non-thoughtful categorization towards a piecemeal process. The set of potential processes is represented by a continuum from category-based to attribute-based (piecemeal) processes more than a switch from one to the other (figure 2.5).

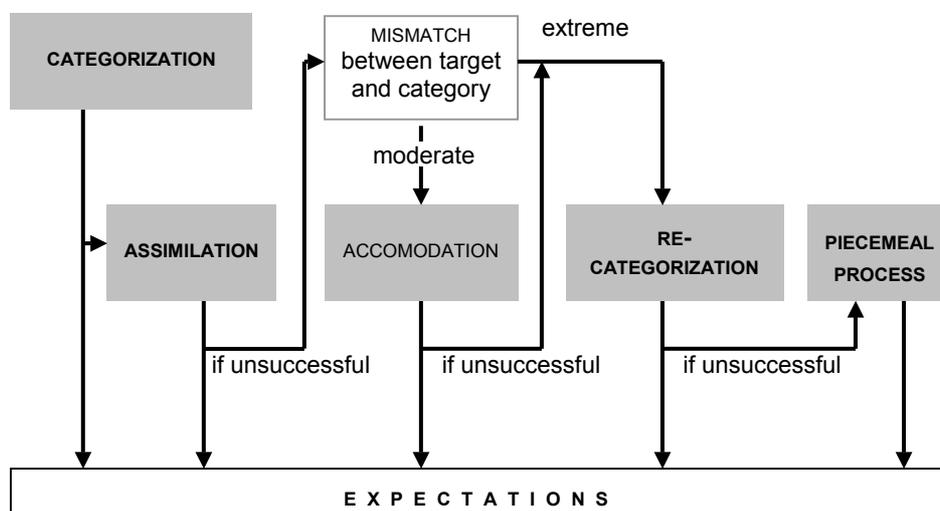
Fiske and Taylor (1991: 136) argue that:

People seem to use a continuum of impression formation processes ranging from more category-based or schematic processes to more attribute-based or individuating processes, and one can specify the information configurations that move people from one end of the continuum to another.

Further, Fiske and Neuberg (1990: 2) argue that:

Category-based processes have priority over attribute-oriented processes in two respects: perceivers attempt category-based impression formation, and if relatively category-oriented processes are successful, then the perceiver goes no further toward more attribute-based processes. The sequential priority of processes goes from category confirmation, to re-categorization, to piecemeal integration of attributes

Figure 2.5. Psychological processes involved in new product categorization



2.4.2. More insight into the psychological processes engaged in categorization

As presented above, one can distinguish two main streams of processing, complementary not competitive, namely category- and attribute-based (piecemeal) processing. Category-based processing involves two stages: categorization and evaluation, in order to form expectations (Fiske and Pavelchak, 1986). The product is first assigned a meaning (categorized) and then evaluated by forming inferences from

the schema, i.e. the affect associated with the evokes category is attached to the new product. In contrast, piecemeal processing does not begin with meaning assignment but directly deals with evaluation: product attributes are considered and evaluated one by one. The evaluation of the product is derived from an integration of these evaluations.

The literature often distinguishes categories from schemas. Categories are presented as taxonomic organizations of objects (or, more specifically, products) whereas schemas are spatially or temporally organized structures (Mandler, 1979). A schema is thus the organized structure of prior knowledge about the category stored in memory (Stayman et al., 1992), it is an 'abstract representation' (Mandler, 1982: 16) developed based on prior experiences. Yet, schemas may vary in their level of abstraction and represent perceptual (i.e. concrete) elements of an event or object as well as its abstract idea, its meaning (Mandler, 1982). The schema contains much information such as common attributes of the products constituting the category, their links, and the products' relationships to other categories. Here, we refer to categorization as the process of allocating a product to a category because it fits the consumer's schema for this category.

Initial categorization

Initial categorization occurs immediately upon encountering information sufficient for cueing a meaningful category (Fiske and Neuberg, 1990). The process is extremely rapid and essentially perceptual (Bruner, 1957). It allows reaching the most basic types of categories (cf. cognitive stereotyping literature) although this concept of basic categories depends on the context. In the food context, initial categories will probably be referred to as 'dairy products', 'soft drinks', 'sauces', or 'chocolate products' because consumers spontaneously sort food products using a taxonomic organization (Ross and Murphy, 1999). However, if consumers enter a butcher shop, they are assumed to be in a more specific context and therefore cue more specific initial categories (e.g. 'beef', 'lamb', 'poultry'...), which remain basic categories for the situation.

Categorization is the classification of the target in a basic category because it fits the schema of this category. The process is rapid and unconscious.

This stage is induced by exposure to the new product (i.e. the target) and does not require attention from the subject. Nevertheless, basic types of categories are very limited in the way that they contain few attributes (poor) and are little distinct from other categories at the same level (Sujan and Dekleva, 1987). As a result, they yield little inferences and may not satisfy consumers in their attempt to give a meaning to the new product. An evaluation of the interest or personal relevance of the product will determine whether to go further in information processing. The attention phase starts with the decision to pursue the process.

Assimilation

At this stage, subjects judge the new product typicality with regard to the initial category (Fiske and Neuberg, 1990). Entering a state of ‘attention’, they are able to consider a number of new product attributes. Assimilation occurs when these attributes match the schema of the category (Mandler, 1982), it equals a confirmation of the initial categorization. The initial schema may be refined (additional example included) but not changed in this process (Piaget, 1970). Therefore, we can propose the following definition for the assimilation stage:

Assimilation is the confirmation of the first category cued after considering some attributes of the target, when these attributes match the schema of the category.

When considering new product attributes, congruity between these attributes and the category schema leads to assimilation and provides cognitive continuity (Mandler 1982). In contrast, incongruity allows a cognitive change and results in a ‘schema switch’ as defined by Stayman and colleagues (1992). Processes described in the following sections occur when assimilation is not successful. They originate from different levels of incongruity, which result in different types of schema switch. Incongruity can be moderate, yielding a refinement of the cued category (see accommodation), or extreme, leading to the consideration of a new schema (see re-categorization).

Accommodation

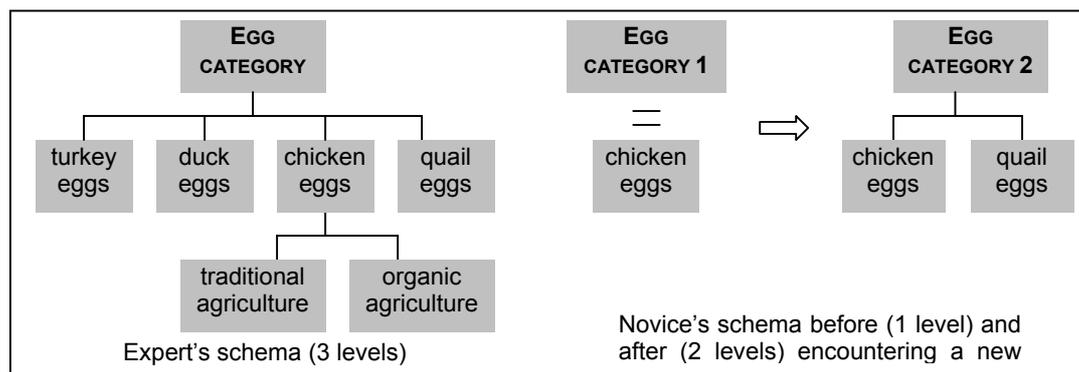
Accommodation typically occurs when a moderate mismatch appears between the new product attributes and the activated schema (Mandler, 1982). When initial schema refinement (assimilation) is not sufficient to assign the new product to the category, consumers need to accommodate their schema. We propose the following definition for accommodation:

Accommodation is the adaptation or re-organization of the schema of the first category cued after considering some attributes of the target.

We distinguish two kinds of accommodation. First, novice consumers may be little knowledgeable about a category and have an incomplete schema as a representation (Sujan and Dekleva, 1987). They need to diversify it with additional information when they encounter new category members. For instance, if subjects only met chicken eggs in the past and meet a quail egg, they recognize an egg. Nevertheless, they notice a moderate mismatch with the schema in terms of shape, size and color. Subjects complete their schema with additional information to assert the first category cued (c.f. figure 2.6). This information comes from internal knowledge (e.g. all birds have eggs and since the birds look different the eggs also look different) or from external knowledge (e.g. the information ‘egg’ on the quail egg). The process is referred to as ‘diversification’.

Diversification is the re-organization of the first schema accessed after considering some attributes. The subject integrates more examples in the first category cued.

Figure 2.6. Schema of the egg category of experts and novices



Second, experts are more knowledgeable and have more complete schemas (Sujan and Dekleva, 1987). With the same example, subjects that already have a complete schema of the egg category can look deeper within the category and cue the relevant sub-category (c.f. figure 2.6).

Sub-categorizing or sub-typing consists in shifting from the first category cued to lower level, more specific categories after considering some attributes.

For some authors like Fiske (Fiske and Neuberg, 1990; Fiske and Pavelchak, 1986), the accommodation is a type of re-categorization presented below but we choose to distinguish the two processes as being two different levels of 'schema switch' (Stayman et al., 1992).

Re-categorization

Re-categorization typically occurs when the claimed category membership is contradicted by attributes (Meyers-Levy and Tybout, 1989), namely with an extreme mismatch or severe incongruity between attributes and the activated schema. A refinement of the initial schema is not satisfying but instead of major structural changes in the cognitive structure, the solution is to find a different or alternate schema (Mandler, 1982; Fiske 1990) that fits the attributes of the new product. In fact it comes down to a delayed congruity (Mandler, 1982). We can propose the following definition of re-categorization:

Re-categorization consists in abandoning the first category and in cueing a new one based on the consideration of target attributes.

Re-categorization may be achieved by retrieving a similar exemplar fitting another schema or by directly cueing another category.

Piecemeal integration

When new product attributes do not allow either to confirm the first categorization or to re-categorize the product, the subject may proceed to an attribute-by-attribute

analysis (Fiske and Neberg, 1990). The set of evaluations is then integrated or combined to assess the overall value of the target (Sujan, 1985). The process is referred to as a piecemeal process. In this evaluation process, the initial category is considered as an attribute among others and thus has a minimal influence on the response. In a piecemeal integration process, consumers directly assess the product, without a previous meaning assignment stage. This approach was in fact the first approach considered in marketing research. Categorization theory came later as an alternative.

2.4.3. Conclusion on the categorization model

The section developed the theory that when encountering new products, consumers possess two main streams of processing the information, complementary not competitive, namely category- and attribute-based (piecemeal) processing. The pure (initial) categorization process is mainly holistic, sensory (Bruner, 1957, Olshavsky and Spreng, 1996), yet as they integrate more details and attributes to assign a meaning and form an evaluation consumers move towards a cognitive processing. In the next section we will focus on the consequence of the type of processing on consumers' affective responses and more intimate processes that allow consumers forming an evaluation of the product.

2.5. More insight into affect and product evaluation

2.5.1. Mandler's perspective: a non-monotonic relationship

Mandler (1982), theorized that the congruity between the new instance and the schema would influence the valence and strength of affective response. With respect to the strength of the affective response, the reasoning is based on arousal theory, i.e. incongruity or novelty of the product results in higher arousal which increases the extremity (strength) of the evaluation. The valence of the evaluation then depends on the success in resolving the incongruity. In this context, Mandler first argues that congruity yields moderate favorable response since consumers tend to like products that allow predictions and fit their expectations. In the incongruity scenario, pure categorization is no longer possible and cognitive elaboration is required (Fiske and Neberg, 1990). As they could be resolved without any fundamental change in current cognitive structures, moderate incongruities are those that can be successfully resolved and thus positively valued. The process of solving the incongruity is seen as rewarding and thus the outcome is more positive than in the congruity scenario. Finally, in the case of extreme incongruity, not only categorization is no longer possible but solving incongruity may result in a difficult task, requiring a radical change in the consumers' existing cognitive structures. As such incongruities yield elaboration, they may result in frustration rather than resolution and hence result in negative evaluations. Briefly, Mandler argues for a non-monotonic relationship

between products incongruity with the schema and evaluation as moderate incongruity elicit more positive evaluation than both congruity and extreme incongruity. This theorizing is in line with the psychology literature previously mentioned (Berlyne, 1960) and with the consumer behavior literature: “moderate levels of novelty will be sought, or even preferred, over non-novel or extremely novel items” (Venkatesan, 1973: 376). In the consumer behavior context, more studies found empirical support for the theory of Mandler (Meyers-Levy and Tybout, 1989; Ozanne et al., 1992. Stayman et al., 1992).

To summarize, with respect to the model previously presented in figure 2.5, findings suggest that as consumers move away from holistic categorization towards the cognitive end of the process, elaboration yields stronger positive evaluations (compared to successful initial categorization) when the conflict between the new product and the existing cognitive structure is solved. In contrast, when the conflict remains unsolved despite elaboration, frustration elicits negative evaluations.

2.5.2. Learning by analogy and its role in product evaluation

The categorization theory delineates two stages: meaning assignment and product evaluation. Yet, the evaluation phase supposes that the affect attached to the category is transferred to the new product. We now need to explain which underlying mechanisms make this possible. The ‘learning by analogy’ theory gives a good framework to explain how inferences are made from previous knowledge to assign meaning to and evaluate a new product.

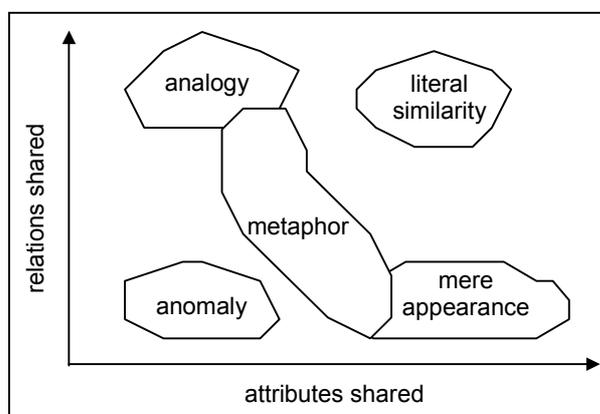
Although consumers are constantly exposed to new products, they are also able to find some similarities with products they already know or, at least, attributes, benefits or even values already familiar to them. Indeed, analogy has proved to be one strategy for dealing with novelty (Keane, 1996). When reasoning by analogy, the novel target (i.e. the new product) is seen as a new instance of something known, namely, the familiar analog (Gentner and Holyoak, 1997). Hence, subjects are learning about the new target by relating it to their previous knowledge, also referred to as the ‘source’ or ‘base’. The literature draws a distinction between similarity and analogy. Although both require an alignment of the target and the base, they consist in different relations. Analogy is defined as a “clever, sophisticated process used in creative discovery” whereas similarity is a “brute, perceptual process that we share with the entire animal kingdom” (Gentner and Markman, 1997), or a ‘mere appearance’. In other words, similarity refers to the sensory end of processing whereas analogy addresses the cognitive end mentioned previously. Other levels of shared attributes and/or relations can also be involved, the whole set forms a continuum from similarity to analogy (figure 2.7).

Given the diversity of potential relations between the base and the target, we cannot limit ‘analogy’ to the definition by Gentner and Markman, which excludes the notion of attributes shared. The term ‘analogical thinking’ has been used in a broader sense and actually refers to all kinds of elements shared: relations and attributes, and at

different levels. For instance, the definition of ‘thinking by analogy’⁵ given by Holyoak and Thagard (1997) emphasizes the structural parallel (relations shared) between the target and the base, yet the process they associate to it also involves similarity (attributes shared). In analogical thinking as defined by Gentner and Holyoak (1997), the target is confronted to the memory in which the subject will browse in order to find ‘correspondences’, based on common attributes or on common relations. Processes involved to form these correspondences between the target and analogs in the base are diverse. For instance, the analog may perfectly fit the new target, an adaptation may be required, or several pieces of information (analogs) may have to be merged in order to find a new solution (Kolodner, 1997). This diversity in analogies resembles the diversity in categorization processes presented in a previous section.

The result of analogical thinking may involve the creation of new knowledge to fill gaps in understanding, e.g. new categories and schemas, addition of new instances, new understanding of old instances, and schemas that allow them to be better accessed in the future (Gentner and Holyoak, 1997; Kolodner, 1997). It allows inferences from the base to the target, i.e. it establishes how affect attached to the base can be transferred to the target, which is of specific interest to explain the evaluation phase in categorization.

Figure 2.7. The different concepts in analogical thinking, from Gentner and Markman, 1997



2.5.3. Integrating learning by analogy to the categorization theory

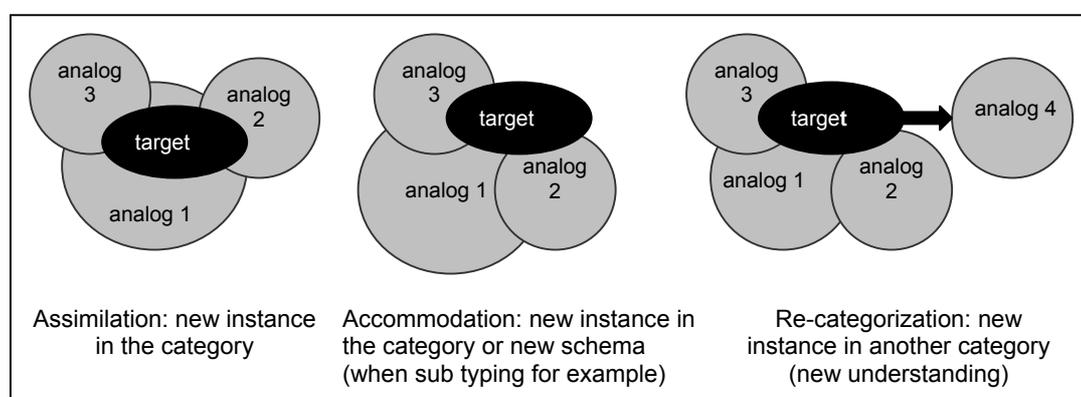
Coming back to the general categorization model (figure 2.5), consumers assign the new product to a category that provides data for evaluation. In this process, the affect attached to the category (i.e. the base) is transferred to the product (i.e. the target). Consequently, in the categorization model, evaluation by transferring affect attached to the category to the new product is an analogical process. Simultaneously, while

⁵ Thinking by analogy: Trying to reason and learn about a new situation (target) by relating it to a more familiar one (source) that can be viewed as structurally parallel.

learning by analogy, subjects need to find adequate analogs in the whole mass of previous knowledge in order to make inferences to the new target, i.e. in categorization terms, they need to find schema that properly fit the new instance. As a result, the two theories seem intimately connected and complementary.

The fact that adaptation of the analog may be necessary, or even the creation of a new solution, strengthens the parallel between learning by analogy and categorization. In categorization, the new product is related to one category, which is the analog, yet a given product can be related to several analogs (consistent with the theory of fuzzy categories). In the case of assimilation, although the target is mapped on one analog (the category cued) from which inferences are made, it can also relate to more analogs. In the case of accommodation, the mapping on the first analog cued is little appropriate, consequently, additional analogs are required for inferences. In the case of re-categorization, the initial analog does not fit and a new appropriate analog is accessed (figure 2.8). Finally, in attribute-based processes, the new product does not cue any analog from the base. Nevertheless, its separate attributes cue analogs encompassing the same attributes. In the same way, relations found in the product cue analogs with the same relations. It is essential to take into account both attributes shared, 'mere appearance' probably being essential for the initial non-thoughtful categorization, and the relations shared, also contained in the schemas, which will be useful when a more thoughtful processing is engaged.

Figure 2.8. Analogical thinking and categorization



To summarize, categorization and learning by analogy are closely related in the sense that analogies establish evidence for affect transfer and evaluation of new product at any level in the categorization continuum from mere categorization to piecemeal processing. Additionally the process involves learning not only about the new product, but also by improving the initial internal knowledge: it can be enriched (new instances), re-shaped or just increased (new schema).

2.6. Conclusion

This chapter aims at providing a global theoretical background to the topic of consumers acceptance of new products, which will be extensively used in further chapters to support our reasoning and hypotheses in empirical studies.

To start with, this chapter presents a clear view of the newness conceptualization utilized further in this thesis. It includes collative variables, elements closely associated to and accompanying newness, in order to treat the construct in all its psychological complexity instead of a superficial perception. Collative variables allow building a two-dimensional approach by delineating between sensory or perceptual elements versus cognitive elements accompanying newness. They bring in essential and information to reach a proper understanding of new product evaluation and acceptance in subsequent chapters because they refine and integrate previous knowledge for newness measurement.

Additionally, an extensive review of newness consequences at the sensory level as well as at the cognitive level gives a global picture of various processes involved in judging product newness and ultimately the product as a whole. First, this section specifically shows relationship between collative variables and arousal in a first stage and subsequently between arousal and affect, which has a central interest for the goal of this thesis. Second, it focuses on the cognitive end of the processes and emphasizes the tight link and complementarity between categorization theory and learning by analogy to explain how consumers cognitively process the new product and make sense of it based on their internal knowledge.

Uncovering the consequences of newness and their interdependency with the nature of the newness involved in the product appears as a key element in understanding the outcome of the evaluation process by consumers. Hence this chapter stands as a prerequisite and a tool to go further with empirical chapters that will try to further develop the idea of a two dimensional measure of newness and the influence of these two dimensions on new product acceptance.

Chapter 3.

What's new? A multi-dimensional approach to product newness

3.1. Introduction

New products are vital for sustainability in today's markets. Innovation specifically provides corporate vitality, enhanced performance-price index for consumers and a much needed opportunity to differentiate from competitors (Fusco, 1994). Moreover, inputs to innovation were found to have a positive impact on profitability (Capon et al., 1990). Tremendous investment and efforts in new product development reflect these findings, resulting in an abundance of product launches (Ernst & Young and AC Nielsen, 2000). Yet, what do we know about product newness? Definition and understanding of the newness construct does not appear as an easy task and "when we ask what exactly it means to say that a stimulus is novel and how novel it is, we face a whole succession of snares and dilemmas" (Berlyne, 1960: 18). Also in the literature there exist limited consensus on how to define and operationalize newness. In a recent literature review Garcia and Calantone (2002) emphasize the great heterogeneity in the typology and terminology with respect to product newness. This is a threat for research but also for the application of research findings. For this reason, we believe the construct of product newness, seen from a consumer perspective, still largely deserves further exploration.

Research showed a great interest for innovation in general and more specifically in relation with the success rate of new product introductions (see Montoya-Weiss and Calantone, 1994; Henard and Szymanski, 2001 for review). Yet, going back to these studies, it is striking that newness has been operationalized as a very simple, often one-dimensional, concept (see table 3.1). More precisely, classifications are mostly based on a simplified version of the scheme developed by Booz, Allen and Hamilton (1982), and classify innovations into three newness classes: low, moderate and high

newness. We believe that such classifications, although useful for managers to assess innovations, do not reflect adequately consumers' perception of newness.

In contrast with this stream of research, past studies already acknowledged the complexity of newness conceptualization (c.f. introduction chapter). They focused on product newness *per se* and ways of classifying new products. These attempts to define product newness lead to the conclusion that newness could not be seen as a one-dimensional construct, that more elements were to be considered. More specifically, former research (see Garcia and Calantone, 2002 for a literature review) showed a main distinction between newness to the firm and newness to the market or to the consumer. Other authors defined separate dimensions in their conceptualization of product newness; for instance they identified problem versus solution (Wind and Mahajan, 1997) or product versus technological capability (Veryzer, 1998a). Besides, other studies emphasized the importance of the beholder in newness evaluation (White and Smith, 2001), giving evidence for differences between experts, students and consumers in creativity and novelty perception. These distinctions support the idea that managers' evaluation of product newness (i.e. newness to the firm) may not reflect consumers' perception of newness (i.e. newness to the consumer).

In addition to the role of the beholder in newness evaluation, it is essential to recognize that products can be new in different ways from a consumer perspective: new technology, new attributes, new benefits, and the like. These various aspects form the nature of product newness in addition to its degree; it refers to 'what' is new in the product (Garcia and Calantone, 2002: 113). Traditional newness evaluations reflect the degree of product newness but omit the diversity of underlying structures and do not properly exhibit the complexity of the newness construct in consumers' perception. For marketing purposes, this is an important limitation because distinct types of innovations have different meanings to consumers, are not developed for the same purpose, and, most importantly, require different marketing strategies.

This chapter aims at developing an appropriate consumer-based measure of product newness. We propose a two-dimensional approach, grounded in basic psychology, and reflecting consumers' understanding and perception of the construct. It has been suggested that information processing leading to new products' acceptance or rejection could differ according to the degree (Gatignon and Robertson, 1991) and nature (Gregan-Paxton and John, 1997) of product newness. We argue that by integrating both the degree and nature of newness in our newness measurement, we should get better insight into new product characteristics leading to consumers' acceptance. This chapter remains in the scope of consumers' evaluation of the product and considers the differential effect of two newness dimensions on product liking as perceived by consumers without looking at the actual market performance.

3.2. Conceptual background

3.2.1. Various aspects of product newness

We specifically focus on consumers' perception of product newness, intending to bring more detail in the issue of newness assessment and operationalization. We acknowledge the fact that products can be new in many different ways more or less perceivable and more or less difficult to grasp for consumers, as opposed to a firm perspective. This approach appears particularly relevant for marketing purposes.

Building on early psychology work by Berlyne (1960, 1978) we suggest perceived newness is not a one-dimensional construct. Berlyne identifies a whole set of variables around newness (see chapter 2). He builds on the idea that if all novel stimuli have certain effects, in which they differ from non-novel stimuli, they must also have common properties yielding these effects. He argues variables such as incongruity, surprise or change, often occur simultaneously with novelty (Berlyne, 1960: 22). Namely, novelty often implies change, which induces surprise or incongruity. Additionally, he identifies other variables, e.g. complexity, uncertainty and conflict (Berlyne, 1960: 18), properties accompanying novelty and playing an essential role in stimulus selection. As complexity often produces uncertainty or conflict, these accompanying variables also co-occur in everyday life (Berlyne, 1978: 291). All these properties are summarized under the name 'collative' variables "since they all depend on the collation or comparison of stimulus elements, whether they be elements appearing simultaneously in different sectors of a stimulus field or elements that have been perceived at different times" (Berlyne, 1966: 30). These collative variables are not only properties of the stimulus field but also properties of the relation between the stimulus and the organism (Berlyne, 1978: 290). Therefore, they are of specific interest in our attempt to get insight into the characteristics leading to new products' acceptance through a proper understanding of the newness construct.

In relation to collative properties of stimulus, it is also essential to look at the effect on behavior. Berlyne sees collative variables as key factors, yet little investigated, initiating and controlling exploratory responses. First, collative properties have proved to be capable of increasing arousal. Yet, previous work on collative variables does not reveal the effect of separate collative variables on exploratory behavior since "several collative variables [were confounded] making it impossible to tell which was the effective factor or whether they all played some part" (Berlyne, 1960: 313). Second, work on 'orientation reaction', largely in former USSR (e.g. by Pavlov and colleagues), has shown that forms of exploratory behavior accompany recognized indices of increased arousal.

Table 3.1. Success factors studies reporting a measure of product newness (based on literature reviews by Montoya-Weiss and Calantone, 1994 and Garcia and Calantone, 2002; and extended)

Study	Newness measure	Source of newness assessment	Relationship to success
Atuahene-Gima (1995)	2 categories incremental vs. radical	Marketing, R&D and new product managers	Not investigated
Brockhoff and Chakrabarti (1988)	4 clusters of technology strategy 4 clusters of marketing strategy	R&D managers Marketing managers	Not investigated
Cooper (1979)	continuum based on 8 items	Respondents within firms	Key success factor
Cooper and de Brentani (1991)	Continuum: newness to the firm, service innovativeness, product uniqueness and superiority	Respondents within firms in financial services industry	Key success factor
Dwyer and Mellor (1991)	4 categories: improved product, line extension, new line, real innovation	Industrial product firms (UK)	Not investigated
Edgett, et al. (1992)	6 categories: radical and incremental innovation, product update, new business, process innovation, marketing innovation	British and Japanese companies (operating in UK)	Not investigated
Germünden, et al. (1992)	3 categories (technological improvement): no extent, limited extent, considerable extent	Companies in the manufacturing industry	Success increases with newness (long term)
Goldenberg et al. (2001)	3 categories (market newness): high, moderate, low	Engineers and experienced marketers	Inverted-U relationship
Kleinschmidt and Cooper (1991)	3 categories (new to the firm and to the world): low, moderate and high innovativeness	Managers or project leaders	U-shaped relationship
Maidique and Zirger (1984)	2 innovation types: (true new or adoption) and 3 degrees of technical change	Presidents, vice-presidents or senior functional managers of U.S. electronics firms	Inverted-U relationship
Mishra et al. (1996)	Continuum: product innovativeness	Managers of Korean firms	Key success factor
Sanchez and Elola (1991)	3 categories: totally new, major change or incremental change	Managing and technical directors	Not investigated
Song and Montoya-Weiss (1998)	2 categories: really new, incremental change	New product development teams in U.S. firms	Depends on other factors
Souder and Song (1997)	continuum for product radicalness	Multiple respondents within the firm	Depends on firm size
Steenkamp and Gielens (2003)	continuum	Experts' evaluation	U-shaped relationship
Teubal et al. (1976)	3 categories (product function newness)	Managers in biomedical electronics industry	Success in lowest newness group
Utterback et al. (1976)	2 categories: patent ability	Project managers	Success decreases with newness
Yoon and Lilien (1985)	2 classes: Original New Products and Reformulated New Products	Researchers, based on product description	ONPs: delayed launch improves success, RNPs: opposite

3.2.2. Evidence for perceptual versus epistemic dimension in various areas

From its Latin etymological origin, perceptual phenomena refer to the *perceptio* i.e. the fact of gathering and seizing as well as experiencing and feeling elements of the environment. Perceptual information refers to anything immediately present in the subject's perceptual field, yet referring to perceptual processing rather than raw sensations (Springer, 2001). It includes the shape, size, texture, taste and the like, can be concrete or relatively abstract but does not comprise any meaning or category identity (Morfaux, 1980; Springer, 2001). In contrast, epistemic phenomena refer to the *epistèmè* i.e. the science in Greek, by extension it became a synonym of the theory of knowledge or ways of knowing (Morfaux, 1980). Epistemic information refers to meaning assignment and location in knowledge structures; it deals with deeper information processing. The distinction between perceptual and epistemic phenomena was already present in early philosophical models, finds support in neuro-sciences, and features prominently in several areas of psychology and consumer behavior. In one of his major philosophical models, Plato already distinguished cognition from affect (the Soul). In the 17th century, Spinoza, followed by Leibniz and Kant in the 18th century, characterized two sorts of human 'ideas': (1) some imprecise qualitative phenomena (sensory images, perceptual data) that only convey superficial knowledge and (2) ideas formed in a rational and orderly manner, reaching the essence of a thing (Russ, 1990).

There is reason to believe that the two aspects are mirrored in the structure of the human brain. It comprises two hemispheres: "the left-brain reads, the right-brain scans images" (Krugman, 1977). The left hemisphere is responsible for cognitive activities (Hansen, 1981). It is sequential, unit-integrative and causal, mostly relying on verbal information and symbolic representation (Krugman, 1977; Hansen, 1981). In contrast, the right hemisphere of the brain is more holistic (Krugman, 1977; Janiszewski, 1988, 1990). It is concerned with pictorial, geometric, timeless and non-verbal information. It almost functions at a subconscious level, with little or no attention paid to the stimulus (Obermiller, 1985). The two hemispheres do not work in insulation. Millions of nerve cells from the Corpus Collosum help the two hemispheres interact with each other during information processes (Hansen, 1981). Nevertheless it is not essential that the two hemispheres interact, there can be "feeling without cognition" (Obermiller, 1985). Research also showed that the left-brain might dominate in some decisions and the right brain in some others (Hansen, 1981). Additionally, some individuals are more left-brain oriented and some others more right-brain oriented (Hansen, 1981). In conclusion our distinction finds support in the physical organization of the human brain with two hemispheres responsible for different tasks.

In terms of information processing, dual-process models have been largely developed in the fields of social and cognitive psychology. They integrate two aspects –affect and cognition – in a comprehensive framework of the functioning of the human mind (e.g. Cacioppo and Petty, 1989). They distinguish between (1) an easy, straightforward and peripheral processing mode, relying on well-known associations

and (2) a conscious and effortful processing mode, relying on the intentional retrieval of known elements. In a more specific domain of psychology, in his review of the psychology of curiosity, Loewenstein (1994) refers to the two types of curiosity originally identified by James. The first one is the “susceptibility to be excited and irritated by the mere novelty of the environment”, which *per se* relates to the perceptual aspect of novelty and perceptual curiosity i.e. the drive that is aroused by novel stimuli (Berlyne, 1960). This type of curiosity arises from the need for sensory stimulation (Loewenstein, 1994). The second one is the “scientific curiosity directed to specific items of information”, referring to the epistemic aspect, the desire for knowledge (Berlyne, 1960). This type of curiosity results from an ‘information gap’, a need to resolve uncertainty, for cognitive harmony, it motivates educational and scientific achievement and may be simply defined as a need to know (Loewenstein, 1994). Epistemic curiosity is closely related to what Malone (1981) defined as cognitive curiosity, way of modifying one’s higher level of cognitive structures. Throughout his extensive work Berlyne hints regularly at the distinction between perceptual and epistemic fields. He also brings the distinction to the concrete level by distinguishing between peripheral (or perceptual, low-level) incongruity and conceptual conflict that occurs at the deeper symbolic level, requiring mental processing. In his terminology “... perceptual incongruity ... occurs when properties regarded as incompatible are perceived together” (Berlyne, 1960: 287). In contrast, conceptual conflict arises out of “dissonance... between two cognitive elements” and “cognitive imbalance” (Berlyne, 1960: 283-284). By this distinction, Berlyne already directly hints at a differentiation within collative variables. He also refers to the work of Piaget who differentiates between perceptual and conceptual constancy reached in the intellectual development of young children.

At the behavioral level, this deeply anchored distinction between perceptual and epistemic elements becomes more tangible and expresses itself through, e.g., various corresponding profiles of consumer exploratory behavior. For instance, external-oriented consumers primarily focus on perceptual information whereas internal-oriented consumers concentrate on conceptual information for product selection (Mazis and Sweeney, 1971). Research on novices and experts (Gregan-Paxton and John, 1997) suggests that novices are more perceptual whereas the internal knowledge of experts allows them to be more epistemic. The distinction is also widespread in the context of human exploratory tendencies: sensation seeking versus cognitive curiosity (Zuckerman, 1979), sensory exploration versus epistemic exploration (Venkatraman and MacInnis, 1985), sensory versus cognitive information or experience seeking (Hirschman and Holbrook, 1982; Hirschman, 1984), exploratory acquisition of products versus exploratory information search (Baumgartner and Steenkamp, 1996). At the perceptual level, exploration is defined as a superficial need for change. In contrast, in a problem solving phase, exploration aims at developing structured criteria to choose among products: the need for novelty is more deeply anchored (Howard and Sheth, 1969) and it involves reasoning or elaboration from the consumer (Cacioppo and Petty, 1989).

3.2.3. The operationalization of the nature of perceived newness

The first issue is to specify the conceptualization of newness previously proposed (c.f. section 2.1) and operationalize it by integrating perceptual and epistemic elements. Existing newness measurement is usually reduced to a few or single items (e.g. new, unique, familiar, different), hence providing information on the degree of product newness but ignoring its nature. In this research, we intend to extend the measurement of product newness to more variables and provide a comprehensive approach of the construct. With the set of collative variables associated or connected to novelty, Berlyne proposes a very appropriate tool for newness measurement. He published an extensive literature on collative variables, showing slight changes in their verbal expression. We will use the terminology published in *Science* (Berlyne, 1966), which defines the following as collative properties: novelty, surprise, incongruity, variability or change, complexity, puzzlingness and uncertainty. The definition used in this work for each of these items is available in appendix 3.1.

Although accompanying newness, collative variables may have a “separate influence on the direction of stimulus selection or the strength of any stimulus-selecting process” (Berlyne 1960: 22). The measurement of collative variables is seen by Berlyne as a “pressing need... because the nature, and even the direction, of their motivational effects can depend very delicately on the precise degree in which they are present” (1978: 130). In addition, he stated that all collative variables are quantitative (Berlyne, 1960: 18, 1978: 291), thus a suitable basis for developing a measurement, and that stimuli can be assessed on collative variables through ratings or other verbal judgments (Berlyne, 1966, 1978). From these observations we argue that collative variables will be an appropriate tool to measure newness, its degree and nature in a more detailed and informative way than traditional measures. We also hypothesize that newer products will also rate higher on collative variables. We go beyond this, by hypothesizing that the distinction between perceptual and epistemic phenomena also appears in newness perception and can adequately be reflected in Berlyne’s set of collative variables. In other words, although the total set of collative variables may accurately reflect overall newness of a stimulus, we argue that the items differentially capture a perceptual and epistemic dimension of the phenomenon. Yet, it is not clear from Berlyne’s work what the effect of the various collative variables is but everything hints at the proposal that there are two types of collative variables (c.f. chapter 2), likely to yield two differential aspects of behavior. Some initiate more perceptual, sensory aspects of exploratory behavior and others initiate more epistemic behavior to solve a conceptual conflict.

First, we consider the set of variables directly connected to newness, which includes change (whether the stimulus differs from usual), surprise (whether the change is unexpected), and incongruity (whether the change induces an expectation which is then disappointed) (Berlyne, 1960: 22-25). For completeness, we labeled this dimension *incongruity*, largely referred to in the literature, and which incorporates the notion of change and surprise as well. *Incongruity* between the new product and

products previously encountered is the contrast immediately perceived with products that were known before. It results from a perceived contradiction between the present stimulus and expectations aroused by past experience and typically occurs when a novel stimulus differs from what “the organism has learned to treat as more likely” (Berlyne, 1960:25). Similarly, in the categorization literature (Mandler, 1982), *incongruity* is related to the uneasiness to directly assimilate the new product. Yet, solving this incongruity does not require any deep information processing, it occurs at the ‘perceptual processing’ level (Springer, 2001). Hence we relate the *incongruity* dimension to the perceptual approach of the new product by consumers; it deals with the perception of the surface properties of the stimulus, which can be integrated at the perceptual level into a global structure (Springer, 2001; Rosch, 1978).

The second set of variables includes complexity (related to the similarity and unity among elements), uncertainty (aroused by novel, complex stimuli as their outcome is unknown), and puzzlingness (closely related to uncertainty) (Berlyne, 1960). We label this dimension *complexity* as the other variables of this set are consequences and closely related to complexity (Berlyne, 1960). *Complexity* of the new product is the difficulty to comprehend and make sense of it. Berlyne emphasizes the close connection between novelty, complexity and uncertainty: a product with a high degree of synchronous complexity is also a very new product and yields uncertainty. Berlyne mentions the necessity for the subjects to reduce complexity and conflict by the acquisition of knowledge or more generally by epistemic behavior (1960, 295-300). In contrast with *incongruity*, *complexity* will require more cognitive effort from the consumer to make sense of the new product. *Complexity* but also *uncertainty* give rise to deeper information processing, i.e. epistemic behavior aiming at “equipping the organism with *knowledge*” (Berlyne, 1963: 322, 1960: 296-301). Numerous experiments showed evidence that receptiveness to information or the degree of epistemic curiosity depends on the degree of uncertainty or conflict (Berlyne, 1963: 326-329). Hence we relate the *complexity* dimension to the epistemic approach of the new product by consumers; it deals with stimulus properties that lead to a need to reduce or solve an original dissatisfaction or mental discomfort (Berlyne, 1963: 324).

Although both dimensions pertain to the newness of the product and co-occur in everyday life (Berlyne, 1978: 291), it is possible to find clear instances for each of the two dimensions. To illustrate the first dimension one may think about the refreshing colors of the iMac, incongruent with the usual gray colors of this industry. In contrast, the newness of Windows 2000 compared to Windows 98 rather illustrates the second dimension: it relies on the technical complexity of the product. Figure 3.1 displays a complete example to help understanding what type of new elements would pertain to each of the two dimensions. The basic (non-new) product is a traditional, natural taste, white color yogurt. If a subject is exposed to a blue yogurt, it will be incongruent with the schema consumers have of yogurts, blue being a rather unexpected color. This difference is clearly at the perceptual level. Now, let the subject be exposed to a yogurt that has the property of improving eyesight. This product typically comprises

more complexity than a traditional yogurt, it may also induce uncertainty and puzzlingness. How / why would a yogurt improve my eyesight? Hence this new element induces a difference at the epistemic level. Finally, let the subject be exposed to a blue yogurt, improving eyesight, an existing Japanese product presented below. This product would typically comprise both newness dimensions: incongruity due to the blue color for subjects who only know natural yogurt and complexity due to its property. Yet, they could actually make sense of the product by relating the blue color to blueberries contained in the product that have the property to improve eyesight.

Figure 3.3.1. Example illustrating the hypothesized newness dimensions

		incongruity	
		low	high
complexity	low	traditional yogurt	blue yogurt
	high	yogurt improving eyesight	blue yogurt improving eyesight



Both dimensions refer to elements consumers are able to perceive, and create stimulation (Berlyne, 1960). Our distinction between the two dimensions is grounded on the level of information processing involved for the perception or mental integration of product newness. The first, *incongruity*, dimension does not involve elaborate information processing and is mainly based on an affective reaction to the product. It defines a perceptual approach of newness. In contrast, the second, *complexity*, dimension is more defined in the cognitive domain. It requires information processing and understanding, defining an epistemic approach to product newness.

3.2.4. Incongruity, complexity and product liking

The delineation between the two perceptual and epistemic aspects of newness evoked previously may be essential in understanding the impact of product newness on liking

Berlyne makes an essential comment for understanding the relationship between newness and liking. The presence of collative variables (e.g. novelty, incongruity and complexity) in a stimulus often yields exploratory approach, yet “in some circumstances (they) evoke extreme fear, which leads of course to withdrawal, the diametrical opposite of exploratory approach” (Berlyne, 1960: 292). Consequently, collative variables lead to a behavior between curiosity and fear (Berlyne, 1966; Zuckerman, 1979, 1990), suggesting the existence of two opposite effects of product newness, one yielding specific exploratory behavior while the second yields avoidance. We propose these two antagonistic effects result from the two distinct

newness dimensions we identified. We believe that newness nature will greatly influence product liking but also market success.

An interesting approach to understand the newness-liking relationship emerges from the categorization literature as categorization processes play an essential role in consumers' judgments (Alba and Hutchinson, 1987; Cohen and Basu, 1987). According to Mandler (1982), congruity between a new stimulus and the corresponding internal schema, results in direct acceptance associated with a weak positive evaluation. A moderate incongruity level that can be managed results in a stronger positive evaluation, and an extreme incongruity that cannot be managed is evaluated negatively (Mandler, 1982). In the consumer behavior context, subjects evaluated moderately incongruent new products descriptions more positively than congruent or extremely incongruent ones (Meyers-Levy and Tybout, 1989). Similarly, Stayman et al. (1992) showed an inverted U-shaped relationship between *incongruity* and product evaluation: success may decrease, as the product is perceived as too familiar or too remote. Previous studies on affect in marketing have shown that mild/pleasant surprise, also pertaining to the *incongruity* dimension, is generally a positive emotion, yielding a positive influence on product evaluation (Erevelles, 1998). These findings suggest liking increases with newness when newness is cognitively manageable only; otherwise the effect is reversed. Berlyne points at the fact that positive or negative 'affect' depends on how far an incoming stimulus departs from (i.e. is incongruent with) the organism's adaptation level (Berlyne, 1978: 293). Following the same argument, perceptual aspects of novelty, i.e. the "mere novelty", can either be exciting or irritating (James, in Loewenstein 1994). In conclusion, subjects need the "right intermediate influx of novelty" to remain interested without becoming disconcerted and worried (Berlyne, 1978: 292). All these theories involve the perceptual aspect of novelty, labeled *incongruity*, and converge to propose an inverted-U-shaped relationship between incongruity and liking.

With respect to the second dimension, the ambiguity literature examines how people avoid ambiguity by not making decisions when information is missing and by avoiding alternatives with ambiguous attributes. Frish and Baron (1988) define ambiguity aversion by the avoidance of situations with a lack of information relevant for decision making. Additionally, Berlyne notices that more complexity implies more prolonged and vigorous exploration (1966: 28) and that the correlation between preference ranking and the duration of exploratory behavior is negative (1963: 277). *Complexity* or elements of epistemic newness make the problem-solving task more difficult but the more subjects will have to look for information in order to make sense of a given stimulus, the less positively they will evaluate this stimulus. This suggestion is supported by Berlyne in his description of the Wundt curve: "hedonic value of complex stimuli tends to rise as they become less novel, while the opposite holds for simple stimuli" (1970: 284). In a recent article Cox and Cox (2002) show that liking is lower for complex products compared to simple ones. Research shows that consumers largely behave as cognitive misers, they minimize cognitive activity in

decision making (Erevelles, 1998), even in the case of first time or risky purchases (Olshavsky and Granbois, 1979). Moreover, information seeking may increase with a relatively low uncertainty level but may decline as uncertainty reaches a very high level (Berlyne, 1966: 31). In fact, attitude towards a product is believed to be very little influenced by cognition in the first place; choices are generally made with very little awareness and the left-brain activities, i.e. cognitive processes, are very limited in purchase decisions (Hansen, 1981). Consequently, choices are mostly made on the basis of right-hemisphere activities, with recognition of an alternative. These observations already suggest that consumers will not actively solve the conceptual conflict raised by complexity of new products. For low levels of perceived *complexity*, we expect product evaluation to be positive but to turn negative as *complexity* increases. This is in line with Rogers' theory on innovation diffusion (Rogers, 1995) that establishes *complexity* as a potential barrier to product adoption.

To summarize, stimuli low in *incongruity* and *complexity* are evaluated as 'pleasing' since they do not create any perceptual or cognitive discomfort. Higher *incongruity* level yields excitement, which turns into irritation after a certain level. Higher *complexity* leads to lower evaluation. In this chapter, the study remains in the scope of consumers' evaluation; hence we will consider the differential effect of the two dimensions on product evaluation in terms of product liking. Based on the above-mentioned theories, we are able to formulate hypotheses relating the two dimensions of newness identified with product liking (see figure 3.2).

H₁. Incongruity and complexity will have differential effects on product liking.

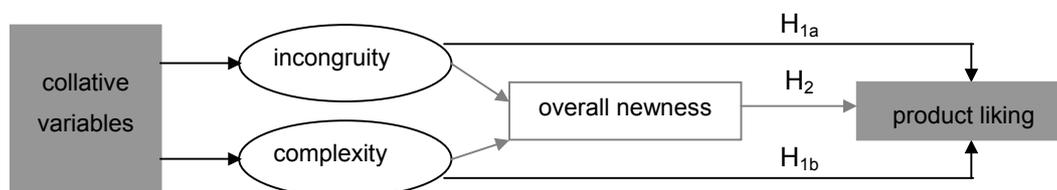
H_{1a}. Product liking varies with incongruity in an inverted-U-shaped relationship

H_{1b}. Product liking decreases with complexity

As a corollary to hypothesis H₁, we hypothesize the following for overall newness:

H₂. Product liking varies with overall newness in an inverted-U-shaped relationship

Figure 3.2. Conceptual framework



3.3. Methodology

3.3.1. Stimuli

This study involved 251 new food products obtained from two sources. The first set consists of 100 new food products from a database of innovations in the world (World Innovation Scan). They were selected on the basis of expected increasing newness for Dutch subjects: 20 products launched in the Netherlands in 1998, 40 products launched in the Netherlands in 2000, 20 products launched in other European countries in 2000 and 20 products launched outside Europe in 2000. The second set consists of 151 new food products from an AC Nielsen database of innovations launched in the Netherlands in 2000. They pertain to thirteen food categories, namely: dairy, yellow fat, soft drinks, chocolate, beer, pet food, coffee, sauces, spreads, soup, rice, snacks and ice cream.

3.3.2. Subjects

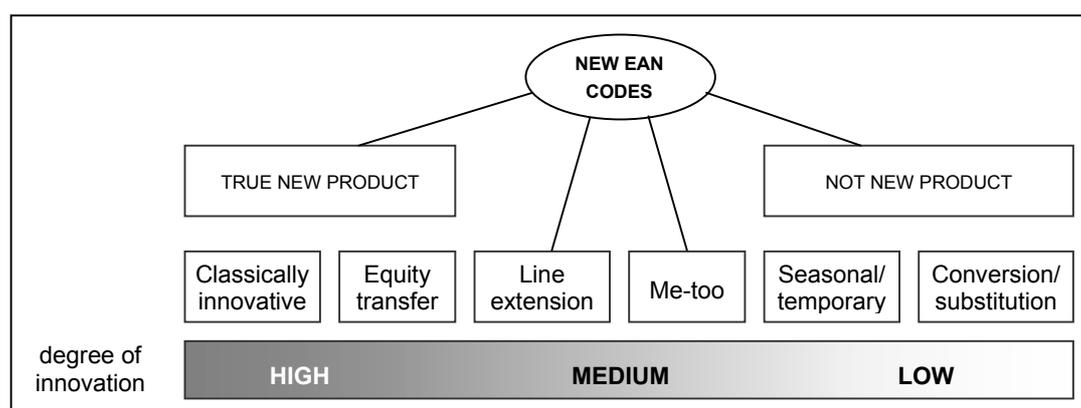
In this study, the unit of analysis is the product. Consequently, subjects are considered a replicates in the analyses. Two groups of twenty-five and thirty consumers, from 18 to 55 years old, respectively evaluated the first and second set of products. They were recruited through a market research agency. In order to control for potential differences in personality trait innovativeness, subjects were pre-selected on average innovativeness. We used a three-item scale measuring a person's reported desire to be among the first to buy new things (Bruner and Hensel, 1992).

3.3.3. Procedure and Measures

A computer interactive experiment was conducted in The Netherlands. The products were presented to the subjects in a random order. They were offered as concepts, with a visual and text on a computer screen. Subjects performed their evaluation on the same screen by rating variables on a seven-point Likert-type scale (from 1: not at all, to 7: very much). The meaning of each item was clearly stated on a separate sheet next to the computer and respondents could refer to it at any time (see appendix 3.1). For both product sets, respondents rated the six items corresponding to Berlyne's collative variables: complex, congruent, change, surprising, puzzling, and uncertain. Additionally, respondents rated three overall newness items: new, unique, and familiar (Bruner and Hensel, 1992; Henard and Szymanski, 2001). For the second set of 151 products, respondents also rated four items for product liking: attractive, desirable, useful and relevant (Deighton *et al.*, 1989). Twenty-five subjects rated the first set in one session of 120 minutes; thirty subjects rated the second set in two sessions of 90 minutes each. Subjects first received a common briefing for the course of the experiment. They were not told the products to assess were new products. For each study, an example of the computer screen presented to the subjects is shown in appendix 3.2.

Additionally, AC Nielsen provided an objective experts' assessment of product newness for the second set of products. Following the observation that newness perception varies whether the beholder is a manufacturer, retailer or consumer (White and Smith, 2001; Ernst & Young and AC Nielsen, 2000), AC Nielsen experts developed a classification of new product types (see figure 3.3). The model, Innovation Based Clustering (IBC) model, consists of six clusters of products. The new products are classified by degree of innovation from high through medium to low innovative. High innovative products are also defined as true new products and consist of two subgroups. First, classically innovative products, which are defined as technological breakthroughs such as Gillette Mach 3, and second, equity transfer products, which result from a strong name or franchise new to the category (e.g. Mars ice cream). Medium innovative products comprise line extensions, i.e. products with a new secondary characteristic such as a different taste or format, and me-too products, very similar to existing products (e.g. a store-brand cola). Low innovative products are also defined as 'not new' products and include conversion and substitution products (i.e. replacing existing products) as well as temporary and seasonal products (e.g. Easter eggs), which are not included in our study. The classification of introductions into these new product types is based on an algorithm and checked by category experts. In our study, we included only 4 types: true new, line extension, me-too and conversion. Our sample contains 2 true new, 36 line-extension, 81 me-too, and 32 conversion products. This unbalanced distribution reflects the unbalance observed in new product launches in general. In an AC Nielsen study of new products launches in 6 European countries in 1997, me-too products represented 77% of the launches, while true new products represented only 2.2% of these launches (Ernst & Young and AC Nielsen, 2000).

Figure 3.3. Innovation Based Clustering Model (source: Ernst & Young and AC Nielsen, 2000)



3.4. Data analysis

In the first group of subjects, inspection of raw data revealed that three subjects gave peculiar response patterns: using only one extreme (ones or sevens) or the center of the scale (threes and fours). Because subjects were treated as replicates in the study, we used coefficient α as a measure for inter-judge reliability on each item and scale reliability (Olney *et al.*, 1991). In the first group of subjects, inter-judge reliability (coefficient α) increased consistently for the various items by removing these three subjects. In the second group, no peculiar rating patterns were observed, however one subject did not complete the test. Computing coefficient α for inter-judge reliability confirmed this observation. Variables familiar and congruent were re-coded as unfamiliar and incongruent, respectively, and the ratings were standardized per subject per attribute for analyses.

Principal Component Analysis was performed on the first set of 100 products to explore the dimensionality of the newness concept measured by Berlyne's collative variables. Because there is no theoretical support for the orthogonality of the two factors, we performed the analysis with an oblimin rotation, which allows the two factors to be correlated. Subsequently, a confirmatory factor analysis was performed on the second set of 151 products with LISREL. The structure found was thus verified with both subsets. The variable overall newness was obtained by a Principal Component Analysis of the variables new, unique and familiar. Similarly, the dependent variable product liking was obtained by a Principal Component Analysis of the variables attractive, desirable, useful and relevant.

Finally, the data were aggregated to check the contribution of the two newness dimensions into overall newness. We validated our scale with the objective classification provided by AC Nielsen, as well as against the underlying newness structure in the first dataset. The relationship between product newness, and its dimensions, and product liking was investigated through regression analyses considering the second set of 151 products.

3.5. Results

3.5.1. The structure of newness perception: exploratory analysis

The six collative variables yielded the extraction of two factors with eigenvalues higher than 1 and explaining 74.5% of the total variance. The variables incongruent, change and surprise loaded above .5 on one dimension (see table 3.2). They were interpreted as *incongruity*, referring to a perceptual aspect of newness previously defined. The other dimension consisted of the variables uncertain, complex and puzzling. They were interpreted as the *complexity* of the product, referring to the epistemic aspect of product newness. The factor scores obtained were used in the

subsequent analyses involving *incongruity* and *complexity*. When analyzing the total set of 251 products in the same way, the same structure was found for the newness construct, showing the stability of this scale across product sets and in different range of overall product newness. Moreover, scale reliability (coefficient α) was computed for perceptual and epistemic items separately. The α values were above .70, indicating sufficient scale reliability (see table 3.2). Removing one item did not improve the scale for any of the two dimensions.

Table 3.2. Items loadings on the Principal Component (after Oblimin rotation)

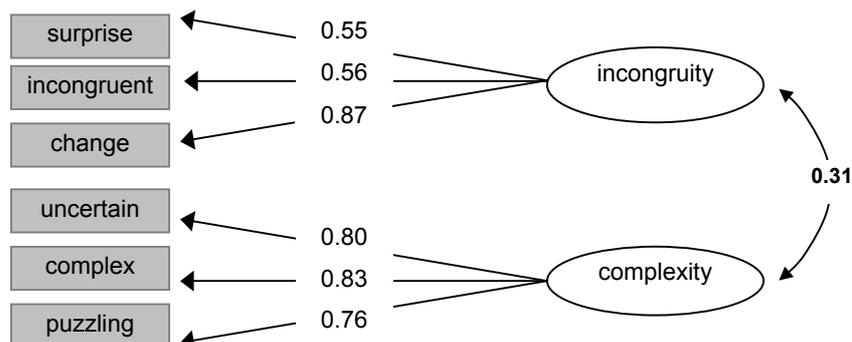
	Component	
	1	2
uncertain	.930	-.087
puzzling	.925	-.066
complex	.874	.043
incongruent	-.132	.838
surprise	.071	.760
change	.256	.696
<i>alpha</i>	.91	.71

Component correlation: .450

3.5.2. Confirmatory analysis for the two-dimensional structure of newness perception

A confirmatory analysis for the two dimensions of the newness construct was run with LISREL. This technique allows testing the dimensionality of the scale and refining the factor structure found in the exploratory factor analysis if necessary. LISREL was applied to the covariance matrix of the six collative variables for the second product set (151 products) and with a completely standardized solution. The analysis allowed rejecting the one-dimensional model, which indicated an unacceptable fit: $\chi(9)^2 = 80.26$ ($p < 0.01$), Comparative Fit Index CFI = 0.78, Tucker-Lewis Index TLI = 0.64, and Root Mean Square Error of Approximation RMSEA = 0.24. Subsequently, we analyzed the hypothesized two-dimensional model, which indicated a good fit: $\chi(8)^2 = 20.45$ ($p = 0.01$), CFI = 0.96, TLI = 0.93 and RMSEA = 0.10. Besides, the fit of the two-dimensional model was significantly better than the fit of the one-dimensional model ($\Delta(\chi)^2(2) = 59.84$, $p < 0.01$).

Figure 3.4. The LISREL path diagram for the two-dimensional model



To conclude, the good fit of the two-dimensional model confirms the results of the exploratory analysis. The first, *incongruity*, dimension comprises the variables change, incongruent and surprise whereas the second, *complexity*, dimension comprises the variables complex, uncertain and puzzling (see figure 3.4).

3.5.3. Descriptives and bi-variate analysis on aggregated data

Factors scores obtained with PCA are used for subsequent analyses. Additionally, the variable overall newness was obtained by a Principal Component Analysis of the variables new, unique and familiar. These variables loaded on one factor with adequate scale reliability ($\alpha = 0.71$). In order to describe the sample, we split products according to scores on each newness dimension as well as overall newness into tertiles: low, moderate and high newness level, in such a way that each tertile has an equal number of products ($n = 50$ or 51).

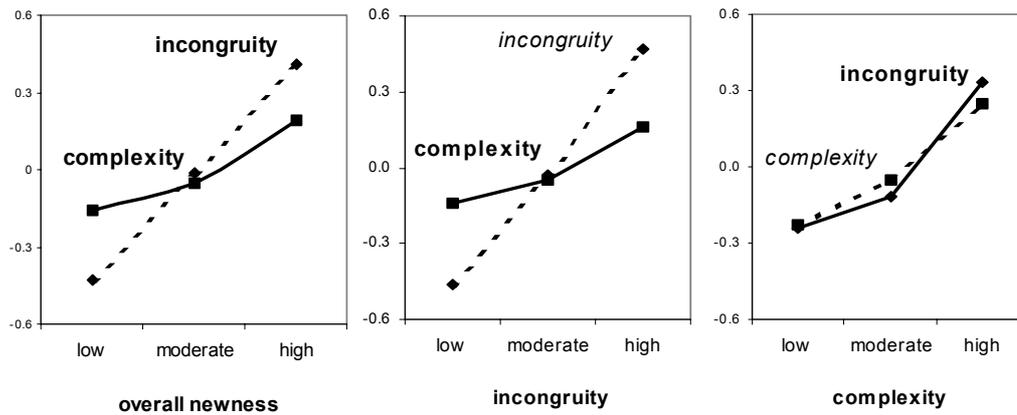
The first analysis consists in the descriptives for each dimension in the two-dimensional newness measure. The analysis enables to visualize the inter-relation between the two newness dimensions in the sample and their individual relation to overall newness. Table 3.3 shows *incongruity* and *complexity* scores exclusively for three levels of *incongruity*, *complexity* and overall newness. Results emphasize that *incongruity* increases significantly as *complexity* increases and reciprocally. Additionally, when taken separately, both *incongruity* and *complexity* significantly increase as overall newness increases (see figure 3.5), with a superior range of change for *incongruity* compared to *complexity*. These results suggest that perceived newness and *incongruity* are very similar constructs whereas *complexity* brings in additional information.

Table 3.3. Incongruity and complexity scores, relative to each other and to overall newness

	incongruity	complexity	<i>n</i>
Incongruity			
low	-.46 ^a	-.14 ^a	50
moderate	-.03 ^b	-.05 ^b	51
high	.47 ^c	.16 ^c	50
Complexity			
low	-.24 ^a	-.23 ^a	50
moderate	-.12 ^a	-.05 ^b	51
high	.33 ^b	.25 ^c	50
Overall newness			
low	-.43 ^a	-.16 ^a	50
moderate	-.01 ^b	-.05 ^b	51
high	.41 ^c	.19 ^c	50

Note: Findings sharing the same superscript are not significantly different at $\alpha < 0.05$ (SNK test)

Figure 3.5. Newness measures relative to each other

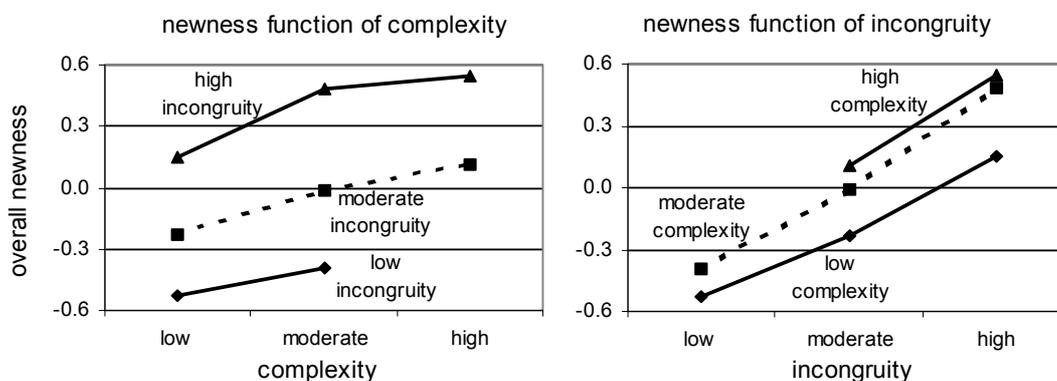


A second analysis specifically focuses on overall newness scores relative to the two newness dimensions combined. Table 3.4 shows exclusively overall newness scores for different levels of *incongruity* and *complexity*. Results confirm that overall newness increases significantly as *complexity* increases and even more as *incongruity* increases. Observing the data graphically also emphasizes that the range of perceived newness and *incongruity* is much larger for a given level of *complexity* than the range of perceived newness and *complexity* for a given level of *incongruity* (see figure 3.6).

Table 3.4. Overall newness scores, related to incongruity and complexity

		Incongruity			F
		low	moderate	high	sig.
Complexity	low	-.53 (n=25)	-.23 (n=19)	.15 (n=6)	20.86 .000
	moderate	-.39 (n=24)	-.01 (n=16)	.48 (n=11)	55.39 .000
	high	.11 (n=1)	.11 (n=16)	.55 (n=33)	19.05 .000
F		2.27	11.33	4.91	121.29
sig.		.114	.000	.012	.000

Figure 3.6. Overall newness function of complexity and incongruity



3.5.4. Incongruity, complexity and their contribution to overall newness

A correlation analysis between the overall newness variable (resulting from PCA) and both *complexity* and *incongruity* showed significant positive correlation ($p < 0.001$), confirming that collative variables are representative of newness measurement. The correlation with *incongruity* ($r = 0.71$) was higher than with *complexity* ($r = 0.39$).

Furthermore, a regression analysis (see equation a) was conducted to confirm the participation of both newness dimensions to overall newness. The aim was to determine the extent to which each dimension was contributing to overall newness. We used the factor scores previously computed for this analysis:

$$\text{overall newness} = \beta_0 + \beta_1 * \text{incongruity} + \beta_2 * \text{complexity} + u \quad (\text{a})$$

Results show that both newness dimensions contribute to overall newness⁶, $\beta_1 = 0.72$ and $\beta_2 = 0.24$, respectively ($R^2 = 0.83$). Additionally, *incongruity* weights higher into overall newness than *complexity*. When evaluating overall newness respondents tend to give a spontaneous rating without too much thinking behind. Similarly, *incongruity* refers to a perceptual, straightforward evaluation of newness by definition; it refers to elements consumers directly notice during product exposure. In contrast, *complexity* implies a more thoughtful evaluation. This may explain the higher contribution of *incongruity* in overall newness. Further, the result is in line with Berlyne's conceptualization of collative variables mentioning a first, tightly connected set of variables (*incongruity*) and a second additional set (*complexity*) that does not relate to newness in the same manner.

3.5.5. Validation using other classifications:

In the first set, products were selected with an underlying structure based on their expected newness. First, considering the time of launch, we assume that perceived newness increases from products launched in 1998 to 2000. Second, considering a spatial component, perceived newness should vary from products launched in The Netherlands, to other European countries, to countries outside Europe. For Dutch subjects, cultural differences in food consumption are wider with far away countries (Japan and the USA) than with European countries (Italy, Spain, Germany, France, UK). We tested differences in terms of item ratings between the four groups defined on the basis of their expected newness. Significant differences observed (see table 3.5) provide a validation criterion for our scales.

⁶ A regression equation including quadratic terms for both incongruity and complexity tested for non-linear effects but results were not significant. Testing for an interaction between the two dimensions did not bring any significant results either.

Table 3.5. Differences between selected newness groups in items ratings

	NL 1998 ¹	NL 2000 ²	EU 2000 ³	World 2000 ⁴	F	P
Incongruity	-.43 ^a	-.21 ^a	.13 ^b	.62 ^c	29.92	.000
incongruent	2.80 ^a	2.98 ^a	3.44 ^b	4.38 ^c	22.35	.000
surprise	2.80 ^a	3.19 ^a	3.94 ^b	4.83 ^c	33.59	.000
change	2.92 ^a	3.56 ^b	4.40 ^c	5.25 ^d	32.44	.000
Complexity	-.36 ^a	-.25 ^a	.22 ^b	.60 ^c	49.26	.000
complex	2.15 ^a	2.36 ^a	3.17 ^b	3.98 ^c	48.63	.000
uncertain	1.99 ^a	2.13 ^a	3.03 ^b	3.79 ^c	43.30	.000
puzzling	1.84 ^a	2.00 ^a	2.90 ^b	3.59 ^c	45.21	.000
Overall newness	-.61 ^a	-.26 ^b	.29 ^c	.76 ^d	51.44	.000
new	3.06 ^a	3.98 ^b	5.33 ^c	6.11 ^d	48.05	.000
unique	2.62 ^a	3.25 ^b	3.86 ^c	5.09 ^d	35.31	.000
unfamiliar	3.012 ^a	3.54 ^b	4.82 ^c	5.64 ^d	45.86	.000

Note: Findings sharing the same superscript are not significantly different at $\alpha < .05$ (SNK test)

¹ Products launched in The Netherlands in 1998.

² Products launched in The Netherlands in 2000.

³ Products launched in other European countries in 2000.

⁴ Products launched in countries outside Europe in 2000.

In the second set, AC Nielsen provided a classification of the products into 4 newness groups. The products belong to the classes of increasing newness from conversion to me-too to line extension, and true new. Results are not reported for the class ‘true new’ due to the small number of observations. Using the factor scores, we tested differences between classes for overall newness as well as the two newness dimensions, *incongruity* and *complexity*. A SNK test was also conducted to confirm the hierarchy between classes. Significant differences observed for overall newness show that consumers’ evaluations are in line with experts’ classification (see table 3.6). Consumers’ and experts’ judgments also coincide for *incongruity*; however, experts’ classification does not capture differences in *complexity* reported by consumers.

Table 3.6. Differences between newness classes

	Conversion	Me-too	Line-extension	True new	F	P
Overall newness	-.14 ^a	.01 ^{a,b}	.11 ^b	--	2.62	.076
Incongruity	-.09 ^a	-.05 ^{a,b}	.21 ^b	--	6.94	.003
Complexity	.01 ^a	-.03 ^a	.07 ^a	--	2.32	.101

Note: Findings sharing the same superscript are not significantly different at $\alpha < .05$ (SNK test)

3.5.6. A differential impact on product liking

We establish the relationship between newness and product liking through regression analyses. The dependent variable product liking was obtained by a Principal Component Analysis of the variables attractive, desirable, useful and relevant. These variables also loaded on one factor with good scale reliability ($\alpha = 0.88$). To allow for the variety of possible functional relationships (as identified in previous research) and to test our hypotheses, regressions include linear and quadratic terms. In the first

regression (b), *incongruity* and *complexity* are considered, together with the quadratic term for *incongruity*. In the second regression (c), independent variables are overall newness and its quadratic term.

$$liking = \beta_0 + \beta_1 * incongruity + \beta_2 * incongruity^2 + \beta_3 * complexity + u \quad (b)$$

$$liking = \beta_0 + \beta_1 * overall \ newness + \beta_2 * overall \ newness^2 + u \quad (c)$$

In table 3.7, results for the first regression equation (b) show a differential effect of *incongruity* and *complexity* on product liking ($R^2 = 0.26$). It reveals a negative effect of *complexity* ($\beta_3 = -0.39$) and a positive effect of *incongruity* ($\beta_1 = 0.68$) on perceived product liking. The squared term for *incongruity* did not reach statistical significance hence we only found a linear and positive relationship between *incongruity* and liking (non-linearity was also tested for *complexity* but did not show significant results). Results from the second regression equation (c) establish a positive effect of overall newness on product liking ($\beta_1 = 0.39$, $R^2 = 0.13$). Similarly to equation (b) the squared term for newness did not reach statistical significance hence we only found a linear and positive relationship between newness and product liking.

Table 3.7. Regression coefficients (product liking)

Dependent variable	adj. R ²	Independent variables	Standardized Coefficient Beta	Sig.	Collinearity Statistics VIF
Product liking	.260	Incongruity	.676	.000	1.639
		(Incongruity) ²	-.045	.536	1.070
		Complexity	-.391	.000	1.661
Product liking	.132	Overall Newness	.387	.000	1.044
		(Overall Newness) ²	-.061	.431	1.044

Correlation: $r_{ON, ON^2} = .173$, $r_{PN, PN^2} = .214$

To summarize, hypothesis H_{1a}, stating an inverted-U-shaped relationship between *incongruity* and liking, is not supported but hypothesis H_{1b}, stating a negative effect of *complexity* on liking, is supported. The corollary H₂, stating an inverted-U-shaped relationship between overall newness and liking is not supported. Finally, adjusted R² values show that the two-dimensional newness measurement has a better explanatory power than overall newness for product liking (.26 versus .13).

3.6. Conclusion and discussion

This study brings strong support, both conceptually and experimentally, for the distinction between two dimensions of newness in consumers' perception. The two-dimensional structure found in the exploratory analysis is confirmed by the

confirmatory analysis (LISREL). In addition, we confirmed the results using two different product sets, varying in the range of newness covered and with two groups of subjects. Analyses show that the two-dimensional structure is stable across product sets and that the two dimensions both reflect and contribute to overall product newness. We find *incongruity* to weight higher than *complexity* into overall newness. This may be due to the fact that subjects naturally tend to be more perceptual in their overall newness perception. It may also relate to the conceptualization of the two dimensions in which *incongruity* relates more tightly to overall newness than *complexity*.

The underlying structure of the product selection in the first set allows validating the scale against an expected ‘objective’ newness classification. This validation tool shows that both overall newness and the two dimensions reflect ‘objective’ product newness (table 3.5). In contrast, the AC Nielsen classification of new products shows agreement with consumers’ judgments in terms of overall newness but emphasizes the fact that the *complexity* dimension of newness is not fully captured by the experts’ classification (table 3.6). These findings underline essential differences in experts’ versus consumers’ judgments that should not be neglected when trying to explain product liking.

Relating newness to product liking reveals the specific importance of the distinction between *incongruity* and *complexity*. As hypothesized, we find a differential effect of each newness dimension on product liking. We find strong evidence for the negative effect of *complexity*. Contrary to the hypothesized inverted-U-shaped relationship, *incongruity* has a positive effect on product liking. Similarly, with respect to overall newness, we find a positive relationship with product liking instead of the expected inverted-U-shaped relationship. Bringing back this research to the more general context of product innovation, we are aware of the limited range of newness covered by the food categories in general and by the products included in this research in particular. The positive influence we find for both *incongruity* and overall newness may be due to the specific characteristics of the product set, lacking high newness levels. In this case we only get the left side of the inverted-U-shaped relationship thus the ascending part of the inverted-U curve. The relationship we find between overall newness and product liking thus remains uncertain. Yet, the differential effect of *incongruity* and *complexity* gives evidence for the superior informative content of the two-dimensional newness measure compared to former one-dimensional measures. This improvement is confirmed by the higher R^2 value in the regression analysis, strengthening the informative superiority of the two-dimensional measure over the overall newness measure.

In summary, the study points at the essential distinction between the *incongruity* and *complexity* to obtain a more informative newness measurement. The marketing literature already largely evoked the benefits of innovation, confirmed by the positive effects of *incongruity* and overall newness found here. But the identification of *complexity* as a potential failure factor for new products offers interesting perspectives

for both new product developers and marketing practitioners to improve new product success.

In terms of new product development, being able to generate a new product with high acceptance is a constant goal. In fast moving consumer goods and foods in particular, where the product life cycle is shorter and the turnover is faster than in other categories, a new product cannot afford a lengthy acceptance process from consumers. In these conditions, detecting any elements potentially fatal to rapid acceptance is a priority for new product development. By detecting perceived product *complexity* this scale gives a chance to overcome it in early stages of product development. Yet, *complexity* being an intrinsic component of overall newness, highly new products will automatically be complex. Consequently, it is the role of marketers, through an adapted marketing mix, to lower perceived new product *complexity* to a manageable level for consumers. Other characteristics of successful innovations described by Rogers (1995) such as communicability, observability and triability seem specifically important to achieve this goal.

Using this scale as a predictive tool for market success is also an interesting direction for research. In our study we find that the two-dimensional newness measure alone explains more than 25% of product liking. This gives a potential to consider the predictive ability of the measure for market success of new product introductions. The following chapter aims at verifying the differential effect of the newness dimensions on actual market success. For this, we need to include more variables, relevant to consumers but also to retailers and to the category in which the new products are launched, in a model explaining market success based on the two-dimensional newness measure.

Appendix 3.1

Items definition – two-dimensional newness

surprising	I'm surprised such a product exists
<i>verrassend</i>	<i>Het verbaast me dat een dergelijk product bestaat</i>
congruent	This product is in line with existing products
<i>vergelijkbaar</i>	<i>Dit product is in overeenstemming met bestaande producten</i>
change	This product is different from the existing products I know
<i>anders</i>	<i>Dit product is anders dan de mij bekende, bestaande producten</i>
uncertain	I don't immediately know what to do with this product
<i>onzeker</i>	<i>Ik weet niet 1-2-3 wat ik ermee aanmoet</i>
complex	It is difficult to figure out what this product is
<i>complex</i>	<i>Moelijk te doorgronden wat het is</i>
puzzling	I don't know what to do with this product
<i>raadselachtig</i>	<i>Ik weet niet wat ik ermee moet doen</i>

Items definition – overall newness

new	New, unknown product, never seen yet
<i>nieuw</i>	<i>Nieuw, onbekend product, nog nooit gezien</i>
unique	Unique, only one of this type
<i>uniek</i>	<i>Uniek, enig in zijn soort</i>
familiar	I know this product or this type of products
<i>bekend</i>	<i>Ik ken dit product of soortgelijke producten</i>

Items definition – product liking

attractive	To me, this product is exciting, interesting
<i>aantrekkelijk</i>	<i>In mijn ogen is dit product opwindend, interessant</i>
desirable	I desire this product, I must get it
<i>begeerlijk</i>	<i>Ik verlang naar dit product, ik moet dit hebben</i>
useful	This product has a useful function
<i>waardevol</i>	<i>Dit product heeft een zinnige functie</i>
relevant	This product adds something relevant to the present product assortment
<i>relevant</i>	<i>Dit product voegt iets relevants toe aan het huidige product assortiment</i>

Appendix 3.2

Questionnaire first set, 100 products (example of one screen)



Ontbijtdrank

Ontbijtdrank met vruchten en granen. Verrijkt met vezels en vitaminen.

Smaak: aardbei-sinaasappel

Wilt u de volgende vragen betreffende het product beantwoorden, a.u.b.

	zeer oneens						zeer eens
	1	2	3	4	5	6	7
nieuw	<input type="radio"/>						
verrassend	<input type="radio"/>						
uniek	<input type="radio"/>						
onzeker	<input type="radio"/>						
vergelijkbaar	<input type="radio"/>						
complex	<input type="radio"/>						
anders	<input type="radio"/>						
raadselachtig	<input type="radio"/>						
bekend	<input type="radio"/>						

Next >

Note:

<i>nieuw</i>	new
<i>verrassend</i>	surprising
<i>uniek</i>	unique
<i>onzeker</i>	uncertain
<i>vergelijkbaar</i>	congruent
<i>complex</i>	complex
<i>anders</i>	change
<i>raadselachtig</i>	puzzling
<i>bekend</i>	familiar

Questionnaire second set, 151 products (example of one screen)

Geef aan in hoeverre de hiernaast genoemde definities het product beschrijven:

Mineraalwater en fruit



Spa drank met mineraal water en fruit. Smaak: citroen en witte druiven

1 = oneens, 7 = eens

nieuw	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
verrassend	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
uniek	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
onzeker	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
vergelijkbaar	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
complex	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
anders	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
raadselachtig	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>
bekend	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
begeerlijk	<input type="radio"/>
aantrekkelijk	<input type="radio"/>
waardevol	<input type="radio"/>
relevant	<input type="radio"/>

Next >

© Logic 8

Note:

<i>nieuw</i>	new
<i>verrassend</i>	surprising
<i>uniek</i>	unique
<i>onzeker</i>	uncertain
<i>vergelijkbaar</i>	congruent
<i>complex</i>	complex
<i>anders</i>	change
<i>raadselachtig</i>	puzzling
<i>bekend</i>	familiar
<i>begeerlijk</i>	desirable
<i>aantrekkelijk</i>	attractive
<i>waardevol</i>	useful
<i>relevant</i>	relevant

Chapter 4.

Dimensions of product newness and their differential effect on market success after one year

4.1. Introduction

Although innovation is a must for the continued growth and health of companies, it is also expensive, risky, and high failure rates remain an unsolved problem. Consequently, it is crucial for firms to reach a better understanding of new product acceptance in order to screen out potential unsuccessful products as early as possible in the new product development stages. A tremendous amount of studies on success factors have already followed this well-known problem. One of the most important success factors identified in a meta-analysis of these studies is product characteristics, which comprise product advantage, meeting consumer needs, innovativeness (i.e. product newness), technological sophistication, and price (Henard and Szymansky, 2001). Moreover, Rogers (1995) emphasized the necessity to take consumers' perception and appreciation of product characteristics into account in the characteristics of successful innovations. Consequently, we believe that success will highly depend on consumers' evaluation of product characteristics. Yet, despite their obvious role for success, research did not focus on consumers' perceptions of product characteristics (Henard and Szymansky, 2001).

The previous chapter showed evidence for a differential effect of two newness dimensions on product liking. In this chapter, our intend is to verify whether these findings generalize to new product market success. More specifically, we will focus on consumers' perception of product newness, as one essential, but poorly understood, success factor. Former studies on success factors failed to establish a generalized relationship between product newness and market success. A reason for this lack of consensus could be at least partly due to the poor informative content of the product newness measures used in these studies. We demonstrated that a two-

dimensional approach of product newness, delineating *incongruity* and *complexity* performs better to explain consumers' liking of new products than regular one-dimensional measures. In this chapter, we intend to show that this two-dimensional approach also brings in valuable additional information compared to a one-dimensional measure to explain market success after one year, as measured by AC Nielsen data. For this, we investigate whether the differential effect of *incongruity* and *complexity* found for product liking also holds for market success. The model will include other relevant explanatory variables for market success of innovations.

4.2. Conceptual framework

4.2.1. Newness in market success studies

In the numerous studies on drivers of new product success, product characteristics were repeatedly identified as one of the four major success factors, together with firm strategy characteristics, firm process characteristics and marketplace characteristics (Henard and Szymanski, 2001). Surprisingly, product newness or innovativeness received relatively little attention in these studies. In their meta-analysis of predictors of new product performance, Henard and Szymanski (2001) found only 6 studies reporting product newness as a success determinant. In an earlier meta-analysis, Montoya-Weiss and Calantone (1994) reported 44 studies of which only 10 acknowledged a relationship between newness and performance and 6 reported the type of relationship. Additionally, the effect of product newness on market success remains uncertain and no generalization appears from available research results. As a matter of fact, studies have supported any of the proposed functional relationships – linear or not– between newness and success (table 3.1). Henard and Szymansky (2001) found a non-significant correlation between novelty and new product performance, indicating that the effect of newness on performance does not generalize across studies. This result may also be due to a non-linear relationship between newness and performance. Hence former studies provide much confusion and uncertainty with respect to the nature of this relationship, suggesting that marketing implications of newness have poorly been addressed in previous research.

Why is the functional relationship between newness and success still unclear? As argued in the previous chapter, past studies already acknowledged the complexity of the newness conceptualization (see Garcia and Calantone, 2002 for review). However such elaborate conceptualizations do not appear in studies relating newness to market success. From this observation and the findings of the previous chapter with product liking, we believe a more detailed and meaningful evaluation of newness, reflecting more adequately consumers' perception, will clarify the nature of the relationship between newness and market success. The newness measure previously developed considers consumers' perceptions, not only managers' evaluations and disentangles various aspects of product newness. It shows evidence for a differential effect of

incongruity and *complexity*, respectively representing the perceptual and epistemic aspects of newness, on perceived product liking. Because it both addresses newness multi-dimensionality and relies on consumers' perceptions, there is reason to believe that our operationalization of product newness will bring more insight in the newness-performance relationship.

4.2.2. Newness and market success: what relationship can we expect?

Our literature review on the nature of the relationship between newness and performance emphasizes inconsistency in the predicted relationship between product newness and market success. As a matter of fact, all possible relationships have been found and supported by theoretical argumentation. The following paragraphs aim at giving some indication on previous findings in order to build hypotheses with respect to the relationship between the two newness dimensions developed and market success.

Some studies have shown evidence for a U-shaped relationship between product newness and market performance (Kleinschmidt and Cooper, 1991; Steenkamp and Gielens, 2003). Both very innovative and non-innovative products do well whereas in-between products lag behind. The argument is that moderately innovative products are “not innovative enough to benefit from the impact of product advantage, and not close enough to the base business to gain from the effects of synergy and good marketing” (Kleinschmidt and Cooper, 1991: 250). An AC Nielsen study, performed over 1998-1999 in the Netherlands, also finds a clear U-shaped relationship between product newness and market success (Foodmagazine, 2000).

In contrast with these findings, another study has shown evidence for an inverted-U relationship between product newness and market performance (Goldenberg et al., 2001). The explanation is that trivial or radical innovations tend to be less successful because consumers need an “optimal ‘just right’ level of innovation... both new and easy to comprehend”. This observation points at two important aspects for newness operationalization. First, this research provides conceptual and experimental evidence for an inverted-U-shaped relationship between newness and success. Second, the authors disentangle two aspects: the perception, i.e. to what extent the product is perceived as ‘new’, and the comprehension, i.e. to what extent the product is perceived as ‘easy to comprehend’. This mirrors the two newness aspects developed in our scale: *incongruity* and *complexity*, or the perceptual and epistemic aspects of newness. In the same stream of thought a study on new product introductions reports that “uniqueness does not matter ... it is not valuable in and of itself ... it must have relevance to the consumer” (Ernst & Young and AC Nielsen, 2000). This means that it is not enough for a product to be perceived as new, the relevance of newness also has to be perceived and most importantly understood by consumers. Therefore this argumentation also disentangles the perception of newness and its comprehension.

How will the distinction between *incongruity* and *complexity* help us clarify this situation? First, it is essential to mention that both *incongruity* and *complexity*

participate to overall newness and cannot be separated from each other. Success is therefore made of the influence of both elements. Moreover, our newness conceptualization seems close to the conceptualization developed by Goldenberg and colleagues. They distinguish between mere newness perception and easiness to comprehend newness, which we referred to as *incongruity* and *complexity* or perceptual and epistemic aspects of newness, addressing the nature of newness. Consequently, we relate to the results of Goldenberg and colleagues to build our hypotheses. Their findings address the degree of newness by opposing the 'right' level of newness (moderate degree) to the lack (low degree) or excess (high degree) of newness hence featuring an inverted-U-shaped relationship between overall newness and market success. Because *incongruity*, the perception of newness, is conceptually and empirically closely related to overall newness (chapter 2 and 3), we also expect to find an inverted-U-shaped relationship between *incongruity* and market success. Finally, we expect *complexity*, i.e. the difficulty to comprehend, to have a negative effect on market success. Supporting this assumption, Veryzer (1998b) identified uncertainty and complexity as determinants of new product resistance, and Rogers (1995) refers to these characteristics as potential barriers to new product acceptance.

To summarize, the remarks above lead to the following hypotheses:

H₁. The degree of incongruity and complexity will have differential effects on market success after one year:

H_{1a}. Market success varies with the degree of incongruity in an inverted-U-shaped relationship

H_{1b}. Market success decreases with the degree of complexity

4.2.3. Co-variates in the model

A number of elements around the core product may influence market success and are introduced as co-variates in the model: the brand, promotional activities around the product and characteristics of its category.

Brand influence

Although brands do not always influence consumers' choice, they can play an essential role in specific contexts. The role of brands is critical when risk appears, for instance, in categories such as foods where perceived intrinsic risk is high due to the ingestion of the products (Kapferer, 1998). Moreover, brands become more necessary in a context where consumers miss references (Kapferer, 1998), thus typically in the context of innovation. Consequently, brands become a tool for consumers to master and control risk or to place new products in a frame of references, which is critical for new food products, the domain of application of this thesis. We consider the effect of the brand name attached to a new product. For this, we develop the concept of brand equity and secondly hypothesize relationships between brand strength and market success.

In relation with the scope of this study, the interest is focused on a consumer-based definition of brand equity: “the differential effect of brand knowledge on consumer response to the marketing of the brand” (Keller, 1993: 2). Brand equity occurs when the consumer is familiar with the brand and holds some favorable, strong and unique brand associations in memory (Keller, 1993). Based on this conceptualization, CONSULT Brand Strategy/Young&Rubicam developed the BrandAsset® Valuator with four pillars: differentiation, relevance, esteem and knowledge. Differentiation reflects the unique differentiated position of a brand, driving higher margins and consumer preference. Relevance is the way this unique differentiation connects with consumers, largely correlated to market-share. Together differentiation and relevance define the brand vitality, an important indicator of the future growth of a brand. Esteem reflects to what extent consumers judge the brand positively, and knowledge is the successful result, meaning that consumers know all aspects of the brand. Together esteem and knowledge reflect the stature of the brand and the degree of brand loyalty. To summarize, the four dimensions reflect what consumers think and feel about brands and offer insights into the current vitality and the stature of a brand, hence into brand equity.

Based on the conceptualization of brand equity, we intend to establish relationships between brand strength and market success. First, high brand equity generates favorable, strong and unique inferences from memory to the new product, therefore providing the new product with a consumer-based competitive advantage over new products attached to a brand of lower equity. As a result, we expect a direct positive effect of brand strength on new product success. Second, we expect an indirect effect of brand strength on market success through the relationship between newness and performance. In our operationalization of newness, the *complexity* dimension comprises uncertainty, puzzlingness, and hence potentially perceived risk. In a context of high *complexity*, i.e. where consumers miss references against which to judge the product and perceive risk, we expect the brand to provide a frame of reference and lower the negative effect of *complexity* on market success. As brand equity gives consumers a frame of reference, it also accordingly increases familiarity and diminishes the incongruity effect on performance. Consequently, we expect brand equity to lower the positive effect of moderate *incongruity* and the negative effect of high *incongruity* on market success.

H₂. Brand strength has a positive effect on market success after one year:

H_{2a}. Brand strength has a direct positive effect on market success

H_{2b}. Brand strength lowers the negative effect of complexity on market success

H_{2c}. Brand strength lowers the positive effect of moderate incongruity and the negative effect of high incongruity on market success

Promotional activities

Featuring as a key success factor for new product introductions, price is a critical element. Lower price, whether it is a regular low price or a temporary price promotion, has a positive influence on product performance (Dhar et al., 2001). Yet, considering the price of an innovation alone does not make sense. It needs to be compared to a category average price or to a promoted price for a given innovation. In this study, we include the effect of temporary price promotion on success.

Besides price promotion, we also consider sales promotions: both feature advertising and in-store display are likely to enhance the success of a particular innovation. Featured items are a popular method to influence out-of-store purchase decisions whereas display influences in-store purchase decisions by varying the relative visibility of the category (Dhar et al., 2001).

To summarize, we make the following hypothesis with regard to promotional activities in general, combining price promotion, feature advertising and in-store display:

H₃. Promotional activities positively influence market success after one year.

Category characteristics

Marketplace characteristics were identified as a critical determinant of new product success (Henard and Szymansky, 2001). More specifically, the competitive environment plays a great role in new product success (Montoya-Weiss and Calantone, 1994, Henard and Szymansky, 2001). Yet, the competitive environment differs per product category. In this context, it is essential to include undesirable potential category influences as co-variates in the model.

First, category concentration is introduced as a measure of the category competitive environment (Steenkamp and Gielens, 2003). Moreover, other category characteristics such as impulsivity of purchase in the category or ability to stockpile may be important determinants. A category in which impulsivity is higher may be more challenging for new products because consumers are more likely to go for their usual purchase without looking further at the shelf. In the same way, as stockpiling is possible in a category, purchase is less frequent and opportunities to buy the new product after its introduction will be more diluted (Narashiman et al., 1996).

To summarize, we make the following hypothesis regarding category characteristics:

H₄. Category characteristics influence market success after one year:

H_{4a}. Competition in the category negatively influences market success

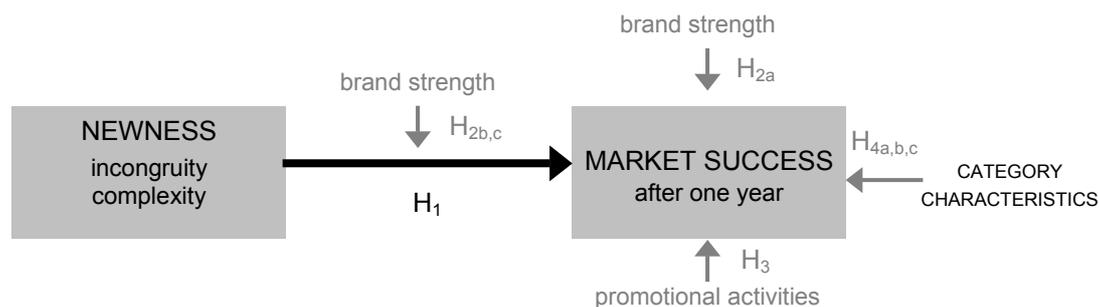
H_{4b}. Impulsivity of purchase in the category negatively influences market success

H_{4c}. Ability to stockpile in the category negatively influences market success

4.2.4. Model summary

To summarize, we test a model (see figure 4.1) looking at the effect of *incongruity* and *complexity*, the two newness dimensions, on market success after one year measured by weighted-distribution⁷ and market-share. Brand strength, promotional activities and category characteristics are included in the model as co-variates. An interactive effect of brand strength with perceived newness (*incongruity* and *complexity*) is also included to test for indirect brand strength effect.

Figure 4.1. Determinants of success (absolute success after one year): global model



4.3. Methodology

Our analyses are based on real life data. We analyzed new products (FMCGs) introduced on the Dutch market in 2000. For these products we obtained consumer data on perceived product newness and brand evaluation. In addition we have access to AC Nielsen data on the actual market success a year after introduction, and promotional activity around these products.

4.3.1. Consumer data on perceived product newness

This study involved the 151 new food products of the second product set analyzed in chapter 3, with their associated measures. In this chapter, we consider *incongruity* and *complexity* factor scores previously obtained as data for perceived product newness (computation in chapter 3).

As extensively explained in the previous chapter, an ‘objective’ assessment of product newness, based on AC Nielsen experts’ classification for the 151 products, is also available. According to this classification, our sample comprises 2 true new, 36 line-extension, 79 me-too, and 34 conversion products.

⁷ Weighted-distribution defined by AC Nielsen: weighted-distribution is the category share of the stores selling / handling the specific item.

4.3.2. Market success data

Market success data were provided by the AC Nielsen database. Success was measured in the month of launch (initial success) and at twelve months following the launch (success after one year) of each of the 151 products.

First, market success was expressed through weighted-distribution (WD). This measure gives a good feel of the product performance at the retail level at the time of launch. A previous study on the relationship between weighted-distribution and market share has shown that there exist a positive feedback between these two measures in the growth stage of a category (Bronnenberg et al., 2000). A product with higher distribution will reach a higher market share and vice versa. This momentum disappears later (after the growth stage) and the distribution remains closely related to market-share. Consequently, we believe that weighted-distribution after one year is closely related to the market share of the product. Second, we computed market share in value (MS) based on the sales value of the packages and revenue in the category, both provided by the AC Nielsen database.

We believe these two measures largely capture consumers' acceptance of the new product.

4.3.3. Co-variates: brand strength, promotional activities and category characteristics

The database (CONSULT Brand Strategy/Young&Rubicam) provided brand strength data for 50 of the 77 brands included in our study (113 of the 151 products) on the basis of consumers' perception. Brand strength is operationalized as a sum of brand vitality and brand stature scores, where each construct is measured with multiple items on a large consumer panel in 2000 in The Netherlands. To complete the dataset, we developed a brand strength measure and a procedure similar to the one used in the previous chapter for perceived product newness. For the total set of 77 brands included in the study (list in appendix 4.1), thirty consumers viewed each brand randomly presented on a computer screen with its logo and name. Consumers rated the brands on nine items (questionnaire in appendix 4.1) corresponding to the dimensions considered in the BrandAsset® Valuator and developed by Aaker (1991) and Keller (1993) in their model of brand equity; i.e. relevance, differentiation, esteem, knowledge and quality. The collected data allow imputing values missing in the initial database as explained in the subsequent data analysis section. Alternatively, the AC Nielsen database, from which the products originated, provided a brand strength dummy variable based on brand performance relative to other brands in the category. As the sales of the brand are superior to the mean in the category, the brand is defined as a top brand, else as a secondary brand.

AC Nielsen also provided data concerning the promotional activities for the new products in each period. Price promotion was available under the form of the percentage of volume sold with price promotion at $t =$ one year. Other promotional activities were described by two variables: (1) the percentage of volume sold with

feature advertising and (2) the percentage of volume sold with in-store display at $t =$ one year.

The 13 product categories included in this study (dairy, chocolate, yellow fat, soft drinks, beer, soup, coffee, sauces, spreads, pet food, rice, snacks, ice cream) are defined on the basis of AC Nielsen classification. Concentration data are provided by IRI for corresponding sub-categories and the category concentration are obtained by averaging the sub-categories concentrations. The data on impulsivity and ability to stockpile were provided under the form of factor scores (source: Narasimhan et al., 1996) for each category.

4.4. Data analysis

This study exclusively focuses on new product performance one year after each product launch on the market.

4.4.1. Independent variables and co-variates

This chapter uses the factor scores for *incongruity* and *complexity* computed for each product by PCA in the previous chapter. These scores were aggregated over respondents.

For 50 of the 77 brands (113 of the 151 products), brand strength data are obtained from the BrandAsset® Valuator. For brands not evaluated by the BrandAsset® Valuator, scores are imputed based on consumer ratings collected for the complete set of 83 brands, and for the nine brand-strength items. A linear regression of the nine items on the brand strength values provided by the BrandAsset® Valuator (adj. $R^2 = 0.70$) provided the parameter estimates subsequently used to impute missing brand strength values (appendix 4.2). The quality of the imputation is assessed on the 50 brands for which both BrandAsset® Valuator values and predicted values are available. The correlation $r = 0.87$ ($p < 0.01$) indicates a sufficient quality of the imputation. The mean value for the total sample of 77 brands is lower than when considering only the 50 brands assessed in BrandAsset® Valuator (109 versus 147). This difference is in line with the fact that the BrandAsset® Valuator mainly includes strong brands, hence adding the data for missing brands logically lowers average brand strength for the product set.

With respect to promotion, because the three promotional activities considered are correlated, we compute a new variable accounting for the percentage of volume sold with any of the different promotional activities considered by summing them.

4.4.2. Dependent variables: success measures considered

The two market success measures (i.e. weighted-distribution and market-share) are highly correlated (table 4.1) both at product launch and after one year on the market (r

= 0.61 and $r = 0.60$ respectively, $p < 0.01$). Not surprisingly, initial success measures are correlated with success measures after one year for both weighted-distribution ($r = 0.59$, $p < 0.01$) and market share ($r = 0.82$, $p < 0.01$). In theory, weighted-distribution allows cross-sectional comparison, yet in practice we observe significant differences in the initial weighted-distribution across categories. When considering market share values these differences are even larger, which shows the importance of introducing category characteristics in our model.

Table 4.1. Correlation between success measures, at the time of launch and after one year

	Initial WD	WD after 1 year	Initial MS
WD after 1 year	.589**		
Initial MS	.610**	.502**	
MS after 1 year	.330**	.596**	.821**

** Correlation is significant at the 0.01 level (2-tailed).

4.4.3. Logistic regression model: the influence of independent variables

A logistic regression analysis is performed to show the hypothesized differential effect of the two newness dimensions on market success of new products (see figure 4.1 above).

The dependent variable in the regression analysis is market share after one year. Yet, market share values considered are not only comprised between 0 and 1 but are also very close to 0 since we do not measure the market share of a brand in a category but the market share of a specific product. Yet, the linear combination of independent variables on the right side of the regression equation is not so constrained. To eliminate this problem, we transform the dependent variable market share (ms) into the expression on the left side of equation (a), referred to as ‘logistic function’ (Aldrich and Nelson, 1990: 32). It is then assumed that the transformed success variable is a linear function of the independent variable defined in equation (a).

$$\begin{aligned}
 \text{Log} \left(\frac{ms_{ij}}{1 - ms_{ij}} \right) = & \beta_{0i} + \beta_{1i} * incongruity_i + \beta_{2i} * (incongruity)^2 + \beta_{3i} * complexity_{ii} \\
 & + \beta_{4i} * strength_i \\
 & + \beta_{5i} * (strength * incongruity)_i + \beta_{6i} * (strength * complexity)_i \quad (a) \\
 & + \beta_{7i} * promotion_i \\
 & + \beta_{8j} * impulsivity_j + \beta_{9j} * stockpile_j + \beta_{10j} * concentration_j + \varepsilon_{ij}
 \end{aligned}$$

for product i in category j , where $i = 1, \dots, 151$ and $j = 1, \dots, 13$. To test hypotheses H_{1a} and H_{1b} , the first equation (a) includes the variables *incongruity* and *complexity* as independent variables. A quadratic term for *incongruity* allows for a non-linear relationship with success. Further, a number of co-variables are included in the equation. Brand strength (*strength*) is included to test its direct effect on market

success (H_{2a}). To assess the indirect effect of brand strength on the relationship between newness and success (H_{2b} and H_{2c}), we include interaction terms (*strength * incongruity*) and (*strength * complexity*). A variable (*promotion*) accounts for promotional activities around the product (H_3). To eliminate undesirable category influences (H_4), we include category characteristics in the analysis: category concentration, impulsivity of purchase in the category, and ability to stockpile. We analyze the regression equation (a) for both weighted-distribution and market share as dependent variables, ϵ_{ij} is the error term.

4.5. Results

4.5.1. Preliminary results

Using the newness tertiles established in chapter 3, the relationship between *incongruity* and *complexity*, weighted-distribution (initial and after one year), and market share (initial and after one year) is explored. In these preliminary results, market share and weighted-distribution are expressed by percentages.

Figure 4.2. The two newness dimensions related to weighted-distribution (%) and market share (%)

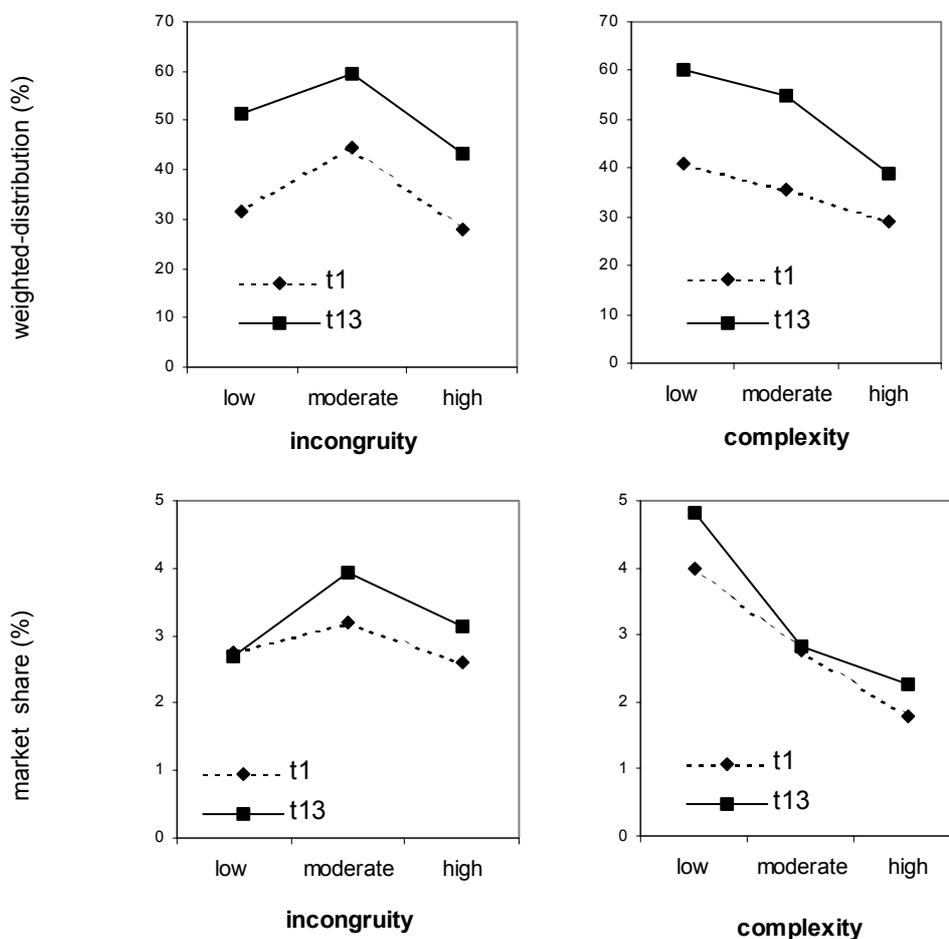


Figure 4.2 shows a tendency for an inverted-U-shaped relationship between *incongruity* and success⁸ both for initial success and success after one year, yet differences between groups are not significant (table 4.2). With respect to *complexity*, there is a significant negative influence on market success after one year. At the time of launch, the effect of *complexity* is not significant.

Table 4.2. Differences in market success (%) between newness groups

	Incongruity	complexity	wd1 (%)	wd13 (%)	ms1 (%)	ms13 (%)	n
Incongruity							
low	-.46 ^a	-.14 ^a	31.73 ^{a,b}	51.32 ^{a,b}	2.74 ^a	2.70 ^a	50
moderate	-.03 ^b	-.05 ^b	44.49 ^a	59.39 ^a	3.21 ^a	3.93 ^a	51
high	.47 ^c	.16 ^c	28.08 ^b	43.12 ^b	2.59 ^a	3.15 ^a	50
Complexity							
low	-.24 ^a	-.23 ^a	40.77 ^a	60.06 ^a	3.98 ^a	4.82 ^a	50
moderate	-.12 ^a	-.05 ^b	35.72 ^a	54.86 ^b	2.77 ^a	2.82 ^b	51
high	.33 ^b	.25 ^c	28.98 ^a	39.00 ^b	1.80 ^a	2.25 ^b	50

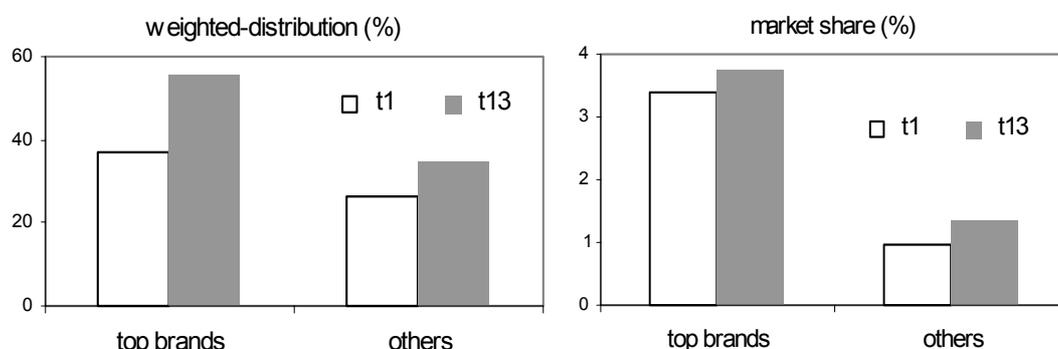
Note: Findings sharing the same superscript are not significantly different at $\alpha < 0.05$ (SNK test)

We also explore the relationship between brand strength and market success. We perform an ANOVA taking the dummy variable brand strength provided in the AC Nielsen database, which defines top and secondary brands. Results show significant differences in market success in favor of top brands both at the time of launch and after one year (table 4.3 and figure 4.3).

Table 4.3. Differences in market success (%) for top and secondary brands (as defined by AC Nielsen)

	Initial WD	WD one year	Initial MS	MS one year
Top brands	37.05	55.68	3.40	3.75
Secondary brands	26.26	34.52	0.95	1.34
F	2.291	10.086	5.858	5.906
sig.	.131	.002	.017	.017

Figure 4.3. Influence of brand strength (source: AC Nielsen) on market success (%)



⁸ In line with similarity measures between overall newness and *incongruity* emphasized in chapter 3, plotting overall newness against market success (both market share and weighted-distribution) shows patterns very similar to *incongruity*, at launch and one year after launch.

4.5.2. Results for the logistic regression analysis

We first consider market share after one year as a measure of market success in the regression equation (a) and obtain the results presented in table 4.4.

Table 4.4. Logistic regression results for market share with two newness dimensions

Adjusted R ² = 0.21	standardized coefficients	t	Sig.	hypothesis	expected effect
incongruity	0.145	1.115	0.267	H _{1a}	positive
(incongruity) ²	-0.138	-1.647	0.102	H _{1a}	negative
complexity	-0.218	-1.685	0.095	H _{1b}	negative
brand strength	0.141	1.441	0.152	H _{2a}	positive
strength * incongruity	-0.088	-0.684	0.496	H _{2c}	non sig.
strength * complexity	0.041	0.336	0.737	H _{2b}	positive
promotional activity	0.402	4.886	0.000	H ₃	positive
impulsivity in category	-0.193	-1.902	0.060	H _{4b}	negative
ability to stockpile	-0.183	-1.838	0.069	H _{4c}	negative
category concentration	0.035	0.410	0.683	H _{4a}	negative

Results show a statistically significant negative relationship between *complexity* ($\beta = -0.218$, $p = .095$) and market success (H_{1b} supported). With respect to the inverted-U shape relationship between *incongruity* and success, only the quadratic term has a significant negative effect ($\beta = -0.138$, $p = .102$) whereas the positive effect of *incongruity* remains non-significant. Yet, hypothesis H_{1a} stating that success varies with the degree of *incongruity* in an inverted-U relationship is supported⁹. Consequently, results support the hypothesis of a differential effect of *incongruity* and *complexity* on market success (H₁ supported).

With respect to co-variates, brand strength has a direct positive effect $\beta = 0.141$, $p = .152$ on market share (H_{3a} supported) but indirect effects are not significant (H_{3b} and H_{3c} not supported). Because we do not expect brand strength to have the same moderating effect for the three *incongruity* levels identified, we also perform the same analysis for the three *incongruity* groups separately. This attempt does not yield any significant results. Promotional activities have a significant positive effect ($\beta = 0.402$, $p = .000$) on market share (H₄ supported), and within category characteristics considered, impulsivity of purchase and ability to stockpile have a significant negative effect ($\beta = -0.183$, $p = .069$ and $\beta = -0.193$, $p = .060$, respectively) on market success (H_{5b} and H_{5c} supported) whereas the effect of competition in the category is non-significant (H_{5a} not supported).

⁹ Replacing the two newness dimensions *incongruity* and *complexity* by one overall newness score in this regression equation (adj. R² = .22), yields the following results: only the quadratic term (overall newness)² has a significant effect ($\beta = -0.207$, $p = .020$) whereas the linear effect is non-significant ($\beta = -0.066$, $p = .577$).

Considering weighted-distribution as a dependent variable in equation (a) gives similar results (appendix 4.3).

4.5.3. Overall newness and market success

We analyze product performance after one year, considering the AC Nielsen success evaluation along five groups based on weighted-distribution results after one year:

- if weighted-distribution = 0%, products are ‘dead’
- if 0% < weighted-distribution < 5%, products are ‘almost dead’
- if 5% < weighted-distribution < 49%, products are ‘in-between’
- if 50% < weighted-distribution < 89%, products are ‘successful’
- if weighted-distribution > 90%, products are ‘star’

Table 4.5. % of products per group defined by newness level and weighted-distribution after one year

	star > 90	successful 50 - 89	in between 5 - 49	almost dead 0 - 5	dead 0	
total	16.6	41.7	23.8	9.9	8.0	[100%]
<i>n</i>	24	61	36	15	12	151
true new	-	(100)	-	-	-	[1.3%]
line-extension	22	53	19	6	-	[23.8%]
me-too	10	42	22	13	14	[52.3%]
conversion	26	26	35	9	3	[22.5%]

According to this definition, the sample considered offers 58.3% of successful products (successful and star), which is slightly higher than the usual success rates proposed in the literature and practice for new product success rates (i.e. 50 to 70% failures). Looking at the repartition of products per success group and per newness group (table 4.5) suggests a U-shaped repartition of successful products in relation with newness: line-extension and conversion products being more successful than me-too products.

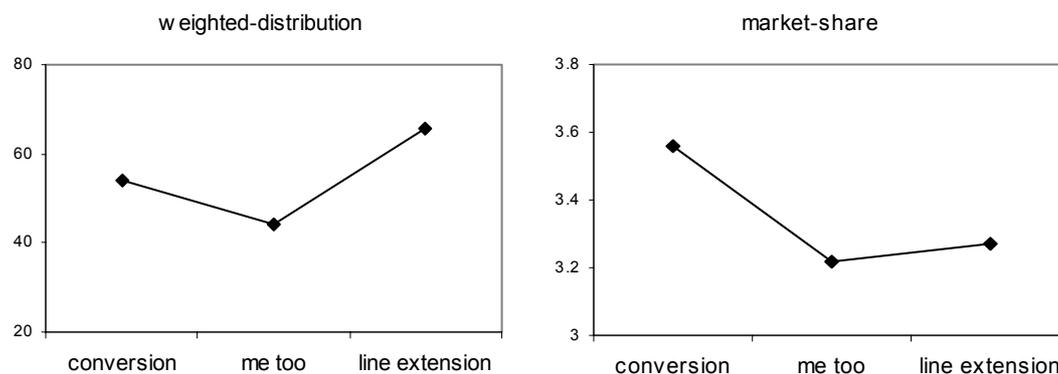
As true new products are poorly represented in the sample, we reduce the sample to three newness groups: conversion, me-too and line-extension products, for a valid analysis. An ANOVA is performed to examine significant differences in weighted-distribution and market share one year after launch for the three newness groups defined by AC Nielsen experts. For both success measures, results (table 4.6 and figure 4.4) suggest a U-shaped relationship between newness and market success after one year. These results are differing from consumers’ evaluations, which suggest an inverted-U-shape relationship between newness and market success.

Table 4.6. Experts' newness evaluation and its relationship with market success

AC Nielsen newness classification	N	weighted-distribution	market-share
Conversion	32	53.93 ^{a, b}	3.56 ^a
me too	79	44.04 ^a	3.22 ^a
Line extension	36	65.89 ^b	3.27 ^a
F		5.45	0.05
Sig.		.005	.952

Note: Findings sharing the same superscript are not significantly different at $\alpha < 0.05$ (SNK test)

Figure 4.4. Influence of product newness classes (source: AC Nielsen) on market success



4.6. Conclusion and discussion

Our study emerged from the observation that, despite numerous studies on drivers of new product success, product newness or innovativeness received relatively little attention in the literature. Besides, the lack of consistency in newness operationalization has led to confusion as to what empirical studies actually report (Garcia and Calantone, 2002). As a result, the effect of product newness remains uncertain and findings support any of the proposed functional relationships –linear or not– between newness and success. In this chapter, we developed some hypotheses, based on the psychology and marketing literature in order to get a better understanding of the effect of newness on market success.

Previous studies intending to establish a relationship between product newness and market success, treated newness as one-dimensional concept, and failed to find a stable relationship across studies. In this study, we find support for a differential effect of the two newness dimensions we consider (*incongruity* and *complexity*) on market-success. This means that from a consumer perspective, we are able to identify two distinct newness elements having a differential effect on market success. At this point it is essential to realize that the contribution of *incongruity* and *complexity* to overall

newness may vary across industries and newness levels, e.g. in high technology industries, the global *complexity* level is substantially higher than in the food domain considered in this study. Consequently, although the separate influence of each newness dimension remains stable there is reason to believe that the relationship between overall newness and market success may differ according to the contribution of the two dimensions to overall newness. We suggest that whether the domain considered is high or low in *incongruity* and *complexity*, independently of a given product, the contribution of each dimension to overall newness and hence to its effect on market success may vary. In this context, looking at each newness dimension separately would improve the consistency of results across studies.

Consistently with the results previously found for product liking, we find a negative effect of *complexity* on market success after one year. Besides, the analysis of the market data also shows an inverted-U shaped relationship between *incongruity* and market success, which could not be characterized for product liking. Can these results be used to improve the efficiency of new product development and marketing in order to increase new product performance in the future?

First, the level of *complexity* is the most critical effect found in our study for new product success. Research already emphasized the importance of lowering barriers for new product acceptance in terms of usage opportunities and understanding of the product. Nevertheless, our results suggest that the *complexity* barrier is still highly present for a number of new product introductions. This observation emphasizes the need for both new product developers and marketers to lower the level of perceived product *complexity* in order to increase new product acceptance. Interestingly, the newness measurement developed allows identifying this barrier in early stages of new product development eventually and from a consumer perspective. According to our results, this may be critical in new product development and concept testing. Second, our study reveals positive aspects of newness, which take part in the ascending part of the inverted-U-shaped relationship found between *incongruity* and success. Further research could aim at identifying positive elements and threshold levels to be able to emphasize them in new product development to improve product attractiveness and hence new product success.

To summarize, the interest of our study lays in the fact that we delineate between some positive and negative elements of product newness, which can be quantified for each product and from a consumer perspective. In this sense, we believe our findings are more actionable than overall newness results which only refer to positive and negative levels of newness in terms of degree but not in terms of nature. In addition, through its consumer perspective, our study tends to substantiate the studies supporting an inverted-U-shaped relationship between newness and success. This result is in line with the recent results found by Goldenberg et al. (2001) specifically focusing on newness to the market, hence to consumers. In contrast, from the experts' evaluation perspective, our results are in line with studies supporting a U-shaped relationship between newness and performance (Kleinschmidt and Cooper, 1991;

Steenkamp and Gielens, 2003). These studies are also based on experts' evaluation of product newness. This observation points at the discrepancy between consumers' and experts' newness evaluation, in terms of newness assessment *per se* but also in the way it affects performance.

Finally, we identify a number of limitations to this study. First, the newness range incorporated in the study is reduced due to the product category investigated. Including other product categories, with higher newness levels could yield different results. Yet, because results found for both the *incongruity* and the *complexity* dimension and theoretically and empirically in line with former results, there is reason to believe that the separate influence of these two dimensions will remain across industries and newness levels. Second, we consider success after one year for all categories in the sample. We argue that in the food domain, where product life cycles are rather short, one year is a valid estimate of market success of a new product. Yet, this arbitrary measurement point does not take into account eventual small discrepancies between food categories.

Appendix 4.1

List of brands included in the study

1 almhof	21 doritos	41 liptonice	61 roosvicee
2 baronie	22 douwe egberts	42 lutti	62 serv_a_port
3 bastini	23 dubbel cooler	43 m&m's	63 sisi
4 becel	24 fanta	44 magnum	64 smiths
5 bertolli	25 felix	45 marmite	65 snickers
6 blueband	26 friesche vlag	46 melkunie	66 solero
7 bonne maman	27 frutesse	47 merci	67 spa
8 bonzo	28 gourmet	48 milka	68 toffiffee
9 brand	29 grolsch	49 mona	69 twix
10 brugse	30 han	50 murphy's	70 unox
11 cadbury	31 heineken	51 nescafe	71 verkade
12 carlsberg	32 heinz	52 nestle	72 warsteiner
13 cereal	33 hero	53 ola	73 whiskas
14 conimex	34 hertog	54 old el paso	74 wolf
15 côte d'or	35 honig	55 patak	75 yogho yogho
16 croky	36 hotpop	56 pedigree	76 yoki
17 danone	37 karvan cevitam	57 pickwick	77 zonnatura
18 danootje	38 knorr	58 poco choco	
19 del monte	39 la gelateria	59 reese	
20 dommelsche	40 laban foods	60 rivela	

Questionnaire – example of a screen



Nooit **Heel vaak**

Ik heb dit merk eerder gezien of ervan gehoord ◻ ◻ ◻ ◻ ◻ ◻ ◻

Ik heb dit merk eerder gebruikt ◻ ◻ ◻ ◻ ◻ ◻ ◻

Dit merk vind ik in het algemeen:

Slecht

Onaantrekkelijk

Niet aangenaam

◻ ◻ ◻ ◻ ◻ ◻ ◻

◻ ◻ ◻ ◻ ◻ ◻ ◻

◻ ◻ ◻ ◻ ◻ ◻ ◻

Goed

Aantrekkelijk

Aangenaam

Helemaal mee oneens

Helemaal mee eens

Dit merk is voor mij anders dan andere merken ◻ ◻ ◻ ◻ ◻ ◻ ◻

Dit merk heeft belangrijke voordelen vergeleken met andere merken ◻ ◻ ◻ ◻ ◻ ◻ ◻

Dit is een merk dat staat voor kwaliteit ◻ ◻ ◻ ◻ ◻ ◻ ◻

Dit merk is belangrijk voor mij ◻ ◻ ◻ ◻ ◻ ◻ ◻

Appendix 4.2

Computation missing BrandAsset® Valuator values: regression analysis and descriptives of the initial BrandAsset® Valuator values and imputed values

Adjusted R ² = 0.70	Standardized	t	Sig.
	Coefficients		
known brand	.204	1.558	.127
used brand	.828	3.685	.001
good brand	-.145	-.344	.733
liked brand	-.249	-.572	.571
attractive brand	.029	.096	.924
differentiated brand	-.145	-.627	.534
advantage compared to other brands	.293	1.053	.299
quality brand	.377	1.459	.152
relevant brand	-.281	-1.379	.176

	N	Minimum	Maximum	Mean	Std. Deviation
initial b.a.v. values	50	19.07	198.45	146.70	43.05
initial and imputed values	77	-34.76	194.59	108.97	67.54

Appendix 4.3

Regression results for weighted-distribution with two newness dimensions

Adjusted R ² = 0.39	r	sig	standardized coefficients	t	Sig.
	incongruity	-.148	.071	.177	1.640
(incongruity) ²	-.273	.001	-.159	-2.238	.027
complexity	-.267	.001	-.149	-1.450	.149
brand strength	.386	.000	.326	4.213	.000
strength * incongruity	-.021	.800	-.106	-1.029	.305
strength * complexity	-.185	.023	-.104	-1.124	.263
promotional activity	.445	.000	.403	6.129	.000
impulsivity in category	-.174	.032	-.338	-4.217	.000
ability to stockpile	.159	.052	-.070	-.884	.378
category concentration	-.012	.883	.043	.648	.518

Note: in the case of weighted-distribution, the dependent variable is not transformed since weighted-distribution figures are not all close to zero.

Chapter 5.

Newness characteristics of individual products and their effects on market success over time

5.1. Introduction

The previous chapter examined the effect of new product *incongruity* and *complexity* on market success after one year. Yet, such an approach does not explain the success obtained in terms of diffusion after launch and the way products with different newness characteristics build their success. The purpose of this chapter is hence to include some dynamics by incorporating the evolution over time instead of a static observation. How can we expect the product initial perceived *incongruity* and *complexity* to influence the market success over time during the year following product launch?

We previously defined *incongruity* as a perceptual facet of newness. The perception of this dimension does not require any deep information processing and can be managed by consumers at the ‘perceptual processing’ level (Springer, 2001). In contrast, *complexity* is related to an epistemic aspect of newness, which requires deep, effortful and conscious information processing to be solved. These first observations lead us to believe that initial perceived *incongruity* and *complexity* will differentially influence market success over time since consumers will manage them differently.

In this section we will first elaborate on the effects of exposure on the way consumers will manage newness. We specifically consider the two-factor learning-satiation theory and processing fluency/attribution model. Second, we consider the likelihood and effects of two types of information processing on affect towards the products. We believe these theories provide us with valuable insight for the relationship between product newness characteristics (*incongruity* and *complexity*) and the evolution of product acceptance over time.

5.2. Research framework

5.2.1. Exposure and affect towards a new product

We make the general statement that consumers have more chances to get exposed to the product repeatedly as time passes after launch. They may encounter the product in stores, in advertising, by seeing others consuming it, and the like. This leads us to consider the literature on mere exposure effects to explore possible influences of the two newness dimensions over time. The terminology “mere exposure” refers to a condition which “just makes the given stimulus accessible to the individuals’ perception” (Zajonc, 1968: 1) hence covering the wide variety of situations in which consumers may encounter a new product.

A large number of studies focused on exposure effects on product evaluation and more specifically on new stimuli evaluation. In social psychology, Zajonc (1968) found evidence that mere repeated exposure to novel stimuli enhances liking for these stimuli. In a review of literature (Bornstein, 1989; Bornstein and D’Agostino, 1992) confirmed this finding and similar results have been found in the marketing literature (Obermiller, 1985; Cox and Cox, 1988; Janiszewski, 1988; Veryzer and Hutchinson, 1998). Despite this strong evidence, other studies found opposite or different results; namely 25% of the studies reviewed by Bornstein (1989) report a negative or inverted-U relationship between exposure and affect. Consequently, we will focus on theories taking opponent processes into account and explaining both positive and negative affect due to repeated exposure.

Several theories have been offered, including response competition, arousal theories, classical conditioning, intuition as artifact, expectancy arousal, satiation/generation and two-factor theories, of which the two-factor theories provide the most flexible explanation (Cacioppo and Petty, 1979). Berlyne (1970) introduced the interplay of two factors to solve the apparent contradiction, giving birth to the two-factor learning/satiation theory. He argues “positive habituation”¹⁰ and “tedium” occur at different exposure levels, and in relation to the degree of *complexity* of the product. In his reasoning, complex stimuli generate initial discomfort and uncertainty. He argues with repeated exposure, these stimuli become less uncertain, more familiar, comfortable and appealing. Consequently, and in agreement with the “uncertainty reduction” explanation of exposure effects (Berlyne, 1970; Obermiller, 1985), repeated exposure enhances liking for these stimuli. In contrast, simple stimuli already generate familiarity, comfort and liking after few exposures, partly resulting from a low uncertainty level. For these stimuli, higher exposure levels enhance boredom, reactance and tedium, yielding a decrease in incremental learning and hence in liking

¹⁰ Here ‘habituation’ means uncertainty reduction that results from repeated exposure. This use of the term ‘habituation’ is in conflict with the traditional use to describe a reduction in responsiveness to a stimulus. The term ‘learning’ has been more traditionally used to describe the decrease in uncertainty due to repeated exposure.

(Sawyer, 1981). To summarize, under repeated exposure, the two-factor learning/satiation theory proposes an inverted-U response curve for novel stimuli, with the ascending part reflecting “positive habituation” whereas the descending part reflects “tedium”. It suggests for new and familiar (simple) stimuli, satiation should appear faster, i.e. after fewer exposures, than for new and unfamiliar (complex) stimuli.

In fact, studies that found a positive effect of repeated exposure on liking are in line with this theory. First, the positive effect obtained in certain studies could be due to the visual *complexity* of the stimuli used (Zajonc, 1968; Bornstein and D’Agostino, 1992). For instance, they use stimuli such as Chinese characters, totally unknown for western subjects. The features of these characters become more familiar with repeated exposure, which in turn has a positive effect on liking. It is however essential to note that here there is no deep information processing or understanding involved, no arguments or acceptance cues are presented, there is no explicit advocacy to judge. These conditions make mere exposure theories particularly relevant (Petty and Cacioppo, 1986: 9). Subjects do not understand better the characters, they only get more acquainted with their features (shape, size...), resulting in a positive effect on liking. For such stimuli, few repeated exposures are not sufficient to reach the descending part of the curve. Second, in other instances, the positive effect of repeated exposure could be due to the fact that there was only one exposure previous to the preference measure (Janiszewski, 1988; Veryzer and Hutchinson, 1998), hence not sufficient to initiate “tedium” and negative evaluation of the stimulus.

5.2.2. Exposure and processing fluency

In the two-factor learning-satiation theory, authors went beyond the conclusions exposed in the previous section and explained the mere exposure effect through the processing fluency/attribution model (Bornstein and D’Agostino, 1992). The model is based on the premise that repeated exposure to a stimulus would result in its representation in the memory. As the same stimulus is encountered on a subsequent occasion, it is more easily processed (Bornstein and D’Agostino, 1992; Janiszewski, 1993; Shapiro, 1999). In this situation, subjects often misattribute the processing fluency to liking, truth or acceptability (Bornstein, 1989; Janiszewski and Meyvis, 2001).

Encoding of a stimulus results in perceptual fluency (Janiszewski, 1988; Janiszewski and Meyvis, 2001; Shapiro, 1999). Because encoding is only based on features (i.e. perceptual information, not its meaning), perceptual fluency effects are expected to be strongest when there is perfect match between encoded features and features of the stimulus encountered (Shapiro, 1999). Perceptual fluency effects are particularly evident when novel stimuli are involved (Shapiro, 1999). As already identified, novel and different perceptual information will be easily encoded and recognized in subsequent occasions. In fact, studies investigating perceptual fluency effects on evaluative judgments typically consider novel stimuli (Seamon *et al.*, 1995).

In recent papers, authors argue fluency effects can extend beyond instances of perceptual fluency and lead to feelings of conceptual fluency (Shapiro, 1999; Janiszewski and Meyvis, 2001). In other words, exposure to stimuli can create perceptual fluency through a feature-based representation in the memory but subjects can also develop a meaning-based representation of the stimulus, allowing conceptual fluency. Conceptual fluency is expected to affect judgment regarding a stimulus that relies on conceptually based processes. For instance, it considers the extent to which a product fulfills the goals of a particular buying-situation. Hence conceptual fluency does not rely on a perceptual (feature-based) match between information encoded and stimulus but is facilitated by additional information such as context for instance (Shapiro, 1999). In fact, if subjects are exposed to the stimulus alone, with no context, going beyond perceptual processing is difficult (Shapiro, 1999). As a consequence, whether the product is seen independently, i.e. allowing only product features to be encoded, or with additional information, i.e. incorporating conceptual elements, is very important to determine the kind of processing that can occur under exposure.

5.2.3. Levels of information processing

Given the great number of products launched each year on the market, consumers are constantly exposed to new products in their daily life. The plethora of launches gives reason to believe that consumers, having a limited processing capacity, cannot process all information provided (Bettman, 1979; Payne, 1976). Despite their motivation to hold correct attitudes (Petty and Cacioppo, 1986: 6), they remain at a very superficial level of processing for a great part of information and tend to behave as cognitive misers (McGuire, 1969). We believe understanding the routes of attitude formation is a key element to understand their outcome, that is affect towards new products.

The Elaboration Likelihood Model (ELM) distinguishes between two routes of attitude formation: a peripheral and a central route (Petty and Cacioppo, 1986), related to low and high elaboration likelihood respectively. When elaboration likelihood is low, individuals do not use much of their cognitive resources to process information (Petty and Cacioppo, 1986: 13). Affect towards the stimulus is not based on the careful consideration of issue-relevant information, but rather on the association of the stimulus with positive or negative cues. This defines the peripheral route, characterized by the absence of argument scrutiny and grounded on heuristics processing and attributional reasoning, affective and social role mechanisms. In contrast, the central route requires more cognitive effort (Petty and Cacioppo, 1986: 14) and encompasses any mechanism that implicates argument-based processing. Both peripheral cues (in the peripheral route) and persuasive arguments (in the central route) may affect persuasion and the attitude form. The orientation towards the one or the other route is dependent on many factors, among which personality characteristics (motivation and ability to process information) but also the target characteristics (task importance, message content, communication modality...) or environment (time pressure, experience, anxiety, message repetition...) (Eagly and Chaiken, 1993).

Theories on repeated exposure, and more specifically the fluency/attribution model, give reason to believe that the two routes can occur as consumers are exposed to new products. It should be emphasized that although conceptual fluency can occur under repeated exposure, it is not the rule and perceptual fluency dominates. Hence, we expect the central route to be less likely and consumers to mostly rely on peripheral cues to form attitude about the new product in the first place. Conceptual fluency requires specific information such as context information for instance, information that needs to be understood to motivate the use of the central route. Other conditions also have to be met for the central route to be possible, in the environment and from the subject.

5.2.4. Conclusion: exposure and new product evaluation

In the previous sections we reviewed relevant literature on mere exposure effects and information processing for new product evaluation. What does this mean in terms of attitude formation for new products? More specifically, how do these theories relate to the effect of perceived *incongruity* and *complexity* on market success of new products over time?

Let us first consider *incongruity*, previously defined as a perceived contradiction between the new product and what the organism knows (Berlyne, 1960: 25). We emphasized that the perception of this aspect of newness does not require any deep information processing and occurs at the ‘perceptual processing’ level (Springer, 2001). It relies on peripheral cues capable of affecting persuasion without argument scrutiny (Petty and Cacioppo, 1986: 134) thus allowing consumers minimizing cognitive activity. These are the conditions most typical of mere exposure theories (Petty and Cacioppo, 1986: 9) where repeated exposure first creates “positive habituation” and later “tedium”.

In the case of high *incongruity*, because there is no representation of the stimulus in the memory, initial acceptance is low due to a lack of perceptual fluency. With repeated exposure, perceptual fluency increases resulting in higher acceptance (Bornstein, 1989; Janiszewski and Meyvis, 2001). Literature in psychology suggests that this is also partly due to the fact that when an initial novel stimulus is repeated, it loses its novelty, and becomes less incongruent (Berlyne, 1960: 87, 195). After a large number of exposures, “tedium” will appear, generating lower acceptance. As a result, we can expect the growth curve of high *incongruity* products to present an inverted-U shape over time. For low *incongruity* products, initial perceptual fluency is expected to be high since similar stimuli are represented in the memory. With repeated exposure, “tedium” increases resulting in lower acceptance. Consequently, the inverted-U shape is flattened: the intercept is higher (i.e. higher initial acceptance) but the growth phase is missing or limited. The decline appears earlier than for high *incongruity* products.

In contrast, the *complexity* dimension of newness was previously defined as the difficulty to comprehend and make sense of the product. This dimension requires an

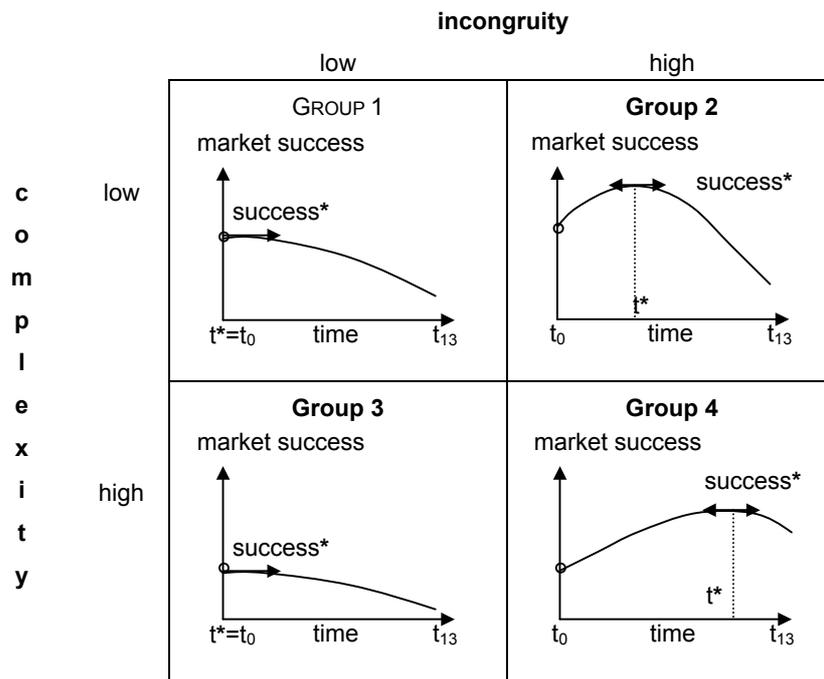
epistemic behavior from the consumer, the acquisition of knowledge (Berlyne, 1960: 295-300): “understanding a strange object... will break the deadlock which is delaying arousal reduction by... reducing conflict” (Berlyne, 1960: 196). Consequently, *complexity* requires processing through the central route, encompassing argument-based processing. Due to cognitive misery, lack of motivation, time pressure, and the like, consumers may not engage in this route. However, theories previously reviewed support the fact that repeated exposure may lead to this type of processing (Shapiro, 1999) yielding not only perceptual but also conceptual fluency about the product. Consequently, conceptual fluency increases with repeated exposure as the elaborative process of learning accompanies it. The stimulus then becomes more easily understood, conflict and uncertainty are reduced yielding positive affect (Berlyne, 1970).

High *complexity* novel products thus allow more learning than familiar ones (Stang, 1975). Repeated exposure gives the opportunity for attending to, thinking about and elaborating upon the message arguments thus enhances persuasion. As a result, positive affect and acceptance will be more persistent over time (Janiszewski and Meyvis, 2001) than positive affect generated by high *incongruity* level, which do not require elaboration. As a result, we expect *complexity* to yield positive affect towards the stimulus once processed and conceptual fluency is reached. Despite the fact that this positive affect is more persistent over time than positive affect raised by perceptual fluency, we can expect tedium to appear in the long run. Tedium focuses cognitive energy on counter-arguing thus decreases persuasion. Supporting this reasoning, Rethans and colleagues (1986) found consistency between the pattern of elaboration and the two-factor model. In the case of low *complexity* products, initial acceptance is high due to conceptual fluency. With repeated exposure, tedium appears and induces a decrease in acceptance level over time.

Yet, we have to keep in mind that *incongruity* and *complexity* should not be treated as separate characteristics of the product since they coexist and both contribute to product newness. The interaction between the two characteristics should be taken into account.

Figure 5.1 below summarizes the expected relationship between the two newness dimensions and market success. We particularly focus on differences in the position of the intercept, in the position of the maximum success (success*), and the slope of the growth curve among the four groups. Globally, the model follows a bell-shape curve over time. Yet, due to differences in the expected position of the maximum success during the first year, only the increasing or decreasing part of the curve appears for some groups.

Figure 5.1. Expected relationship between newness dimensions and product market success



Previous results showed that initial liking strongly decreases with *complexity* therefore, we expect products of low *complexity* (group 1 and 2) to have a higher initial success than products of high *complexity* (group 3 and 4), irrespective of the *incongruity* level. In the case of low *incongruity* and low *complexity* (group 1), we expect a high position of the intercept, due to both perceptual and conceptual fluency, resulting in high initial acceptance. As *incongruity* increases (group 2), conceptual fluency maintains a high level of initial acceptance. Supporting this expectation, previous results showed that initial liking increases with *incongruity*.

We argue success of low *incongruity* (group 1 and 3) products will decrease over time, due to boredom after few exposures. In contrast, success of high *incongruity* (group 2 and 4) products will increase over time as perceptual fluency increases, until boredom appears generating a decrease in success. Additionally, we expect consumers to process *incongruity* faster than *complexity* since *incongruity* can be solved at the perceptual level whereas *complexity* requires deeper information processing. Consequently, within high *incongruity* products, we expect acceptance to increase faster for low *complexity* products (group 2) than for high *complexity* products (group 4). Besides, we expect tedium to appear sooner as well, resulting in an earlier decrease in acceptance. This is in line with the two-factor theory that posits that simple stimuli yield a faster learning rate and subsequently a faster satiation rate, relative to complex stimuli (Janiszewski and Meyvis, 2001). In terms of market success, high *incongruity* should allow a faster take-off for new products than high *complexity* but also should generate shorter-term success compared to high *complexity* products.

5.2.5. Final model and Hypotheses

In this chapter, we mainly focus on the variation in the effect of *incongruity* and *complexity* on market success over time. Resulting from the elements established in research framework section above (figure 5.1), we build a model that allows for distinct growth trajectories according to the level of *incongruity* and *complexity* of the products. For this purpose, we define four product groups based on two levels (high and low) for each dimension. We formulate the following hypotheses:

H₁. The growth curve of new products over time varies according to the initial level of incongruity and complexity of the products.

H_{1a}. Initial success is higher for low complexity than for high complexity products

i.e. $\forall i \in (\text{group } 1 \oplus 2), \text{success}_{t=0} > \text{success}_{t=0}, \forall i \in (\text{group } 3 \oplus 4)$

H_{1b}. Success of low incongruity products decreases over time whereas success of high incongruity products will show an inverted-U shape over time

i.e. $\forall i \in (\text{group } 1 \oplus 3), \text{success}^ = \text{success}_{t=0}$*

$\forall i \in (\text{group } 2 \oplus 4), \text{success}^ > \text{success}_{t=0}$*

$\forall i, \text{success}_{t=13} < \text{success}^$*

H_{1c}. Within high incongruity products, success increases faster for low complexity than for high complexity products

i.e. $\forall i \in \text{group } 2, (d\text{success} / dt)^ > (d\text{success} / dt)^*, \forall i \in \text{group } 4$*

Beside newness characteristics, other elements may influence the growth curve trajectory of new products. First, promotional activities during the year may influence the growth trajectory of a product. Both feature advertising and in-store display are likely to enhance the success of a particular innovation (Dhar et al., 2001; Steenkamp and Gielens, 2003). Such promotional activities increase the chances of exposure to the product: featured items are a popular method to influence out-of-store purchase decisions and display influences in-store purchase decisions (Dhar et al., 2001). Consequently, we argue feature and display have an influence on out-of-store and in-store chances of exposure to the new product. In the elements we developed in the research framework section, we established the key-role of exposure in the influence of newness characteristics over time. We therefore include promotional activities as a time-varying covariate in our model. In contrast with the previous chapter, we do not include other variables¹¹.

H₂. At any time, promotional activities create a positive shift in the level of the growth curve.

i.e. $\forall t, \forall i, \text{success}(\text{promotion}) > \text{success}(\text{no promotion})$

¹¹ We already assessed the influence of brand strength and category characteristics in the previous chapter. We expect these effects to remain the same irrespective of the period considered.

Figure 5.2. Model tested in this chapter



5.3. Hierarchical Linear Models: a suitable tool

The basic problem consists in relating the individual products and their properties to the way they evolve over time in terms of success. Hierarchical linear models (HLM) provide us with an adapted and powerful tool for research on individual change (Bryk and Raudenbush, 1992: 131). Each level in the structure is formally represented by its own sub-models. Sub-models express relationships among variables within a given level and specify how variables at one level influence relations occurring at another (Bryk and Raudenbush, 1992: 4). As a result, HLM allows relating the market success data over time to variables describing the products. In the present application, we study the structure and predictors of individual product success over time with a two-level model. At level-1, market success for each product is represented by an individual growth trajectory that depends on a unique set of parameters. These individual growth parameters at level-1 are the outcome variables of the level-2 model, where they depend on some product level characteristics, i.e. newness in our case.

We assume that $success_{it}$, the observed success at time t for product i , is a function of a systematic growth trajectory (or growth curve) plus random error. In our case, we express the systematic growth over time as a polynomial of degree two since we made the hypotheses of non-linear growth curves in our hypotheses. We add a measure of promotional activity (feature, display) to the level-1 model, as it is a time-varying covariate (Bryk and Raudenbush, 1992: 151). We define the level-1 model as:

$$\log\left(\frac{success}{1-success}\right)_{ti} = \pi_{0i} + \pi_{1i} * period_t + \pi_{2i} * period_t^2 + \pi_{3i} * promo_{ti} + e_{ti} \quad (a)$$

for $i = 1, \dots, 151$ products, where $period_t$ is the trend variable at time t . Each product is observed on t_i occasions where $t = 1, \dots, 13$ over one year, hence $period$ takes integer values from -6 to $+6$. The predicted initial market share can be computed at $period = -6$. We define $promo_{ti}$ as the promotional activity for product i at time t . The growth trajectory parameter for product i is π_{pi} where $p = 1, \dots, 3$ in our model. The intercept (π_{0i}) represents the success at $period = 0$, i.e. at $t = 7$. The random error e_{ti}

is assumed to have a normal structure, i.e. normally distributed with a mean of zero and a constant variance.

In equation (a), we make the assumption that the growth parameters may vary across products. The intercept (π_{0i}) and the growth parameters for the trend variable (π_{1i} and π_{2i}) are allowed to vary at level-2 as a function of measured product characteristics. The general equation (b) for the level-2 model represents this variation for these parameters:

$$\pi_{pi} = \beta_{p0} + \beta_{p1} * d_{incongruity_i} + \beta_{p2} * d_{complexity_i} + \beta_{p3} * d_{incongruity_i * complexity_i} + r_{pi} \quad (b)$$

where $p = 0, 1$ and 2 , with $i = 1, \dots, 151$ products. The dummy variables $d_{incongruity_i}$, $d_{complexity_i}$ and $d_{incongruity_i * complexity_i}$ define newness characteristics of product i . Namely, $d_{incongruity}$ indicates the sign of *incongruity* and $d_{complexity}$ indicates the sign of *complexity* (-1 is low, +1 is high)¹². The third dummy $d_{incongruity * complexity}$ is the interaction between the two dimensions (-1 if *incongruity* and *complexity* are of opposite signs, +1 if they are of same sign). The random effect r_{pi} for product i has a mean of zero. The random effects are assumed multivariate normally distributed with full covariance matrix.

For each growth parameter we obtain the following equations (1) to (4):

$$\pi_{0i} = \beta_{00} + \beta_{01} * d_{incongruity_i} + \beta_{02} * d_{complexity_i} + \beta_{03} * d_{incongruity_i * complexity_i} + r_{0i} \quad (1)$$

$$\pi_{1i} = \beta_{10} + \beta_{11} * d_{incongruity_i} + \beta_{12} * d_{complexity_i} + \beta_{13} * d_{incongruity_i * complexity_i} + r_{1i} \quad (2)$$

$$\pi_{2i} = \beta_{20} + \beta_{21} * d_{incongruity_i} + \beta_{22} * d_{complexity_i} + \beta_{23} * d_{incongruity_i * complexity_i} + r_{2i} \quad (3)$$

Since in our case there is no reason why the growth parameter for promotion may vary across products, we fix $\beta_{31} = \beta_{32} = \beta_{33} = 0$ hence:

$$\pi_{3i} = \beta_{30} \quad (4)$$

To summarize, replacing (1), (2), (3) and (4) in (a), the final equation (c) to estimate is as follows:

$$\log\left(\frac{\text{success}}{1 - \text{success}}\right)_{ti} = \beta_{00} + \beta_{01} * d_{incongruity_i} + \beta_{02} * d_{complexity_i} + \beta_{03} * d_{incongruity_i * complexity_i} + (\beta_{10} + \beta_{11} * d_{incongruity_i} + \beta_{12} * d_{complexity_i} + \beta_{13} * d_{incongruity_i * complexity_i}) * \text{period}_t + (\beta_{20} + \beta_{21} * d_{incongruity_i} + \beta_{22} * d_{complexity_i} + \beta_{23} * d_{incongruity_i * complexity_i}) * \text{period}_t^2 + \beta_{30} * \text{promo}_{ti} + \text{error term} \quad (c)$$

¹² Cut-off values were the means for each dimension.

* error term = $e_{ti} + r_{0i} + t * r_{1i} + t^2 * r_{2i}$, normally distributed, with a mean of zero as all its components.

finally, equation (c) can be simplified by replacing $d_{incongruity}$, $d_{complexity}$ and $d_{incongruity*complexity}$ with their value for each group (i.e. depending on the group the value is 1 or -1). Figure 5.3 shows a summary of the expression of $\log(\text{success}/1 - \text{success})$ for each newness group defined.

Figure 5.3. Expression of the logistic regression of success at time t for the four groups of newness defined

		incongruity	
		low ($d_{incongruity} = -1$)	high ($d_{incongruity} = +1$)
c o m p l e x i t y	low (-1)	Group 1 $(\beta_{00} - \beta_{01} - \beta_{02} + \beta_{03})$ $+ (\beta_{10} - \beta_{11} - \beta_{12} + \beta_{13}) * \text{period}_t$ $+ (\beta_{20} - \beta_{21} - \beta_{22} + \beta_{23}) * \text{period}_t^2$ $+ \beta_{30} * \text{promo}_{it} + \text{error term}$	Group 2 $(\beta_{00} + \beta_{01} - \beta_{02} - \beta_{03})$ $+ (\beta_{10} + \beta_{11} - \beta_{12} - \beta_{13}) * \text{period}_t$ $+ (\beta_{20} + \beta_{21} - \beta_{22} - \beta_{23}) * \text{period}_t^2$ $+ \beta_{30} * \text{promo}_{it} + \text{error term}$
	high (+1)	Group 3 $(\beta_{00} - \beta_{01} + \beta_{02} - \beta_{03})$ $+ (\beta_{10} - \beta_{11} + \beta_{12} - \beta_{13}) * \text{period}_t$ $+ (\beta_{20} - \beta_{21} + \beta_{22} - \beta_{23}) * \text{period}_t^2$ $+ \beta_{30} * \text{promo}_{it} + \text{error term}$	Group 4 $(\beta_{00} + \beta_{01} + \beta_{02} + \beta_{03})$ $+ (\beta_{10} + \beta_{11} + \beta_{12} + \beta_{13}) * \text{period}_t$ $+ (\beta_{20} + \beta_{21} + \beta_{22} + \beta_{23}) * \text{period}_t^2$ $+ \beta_{30} * \text{promo}_{it} + \text{error term}$

5.4. Methodology

As in the previous chapter, our analyses are based on real life data. We analyzed the same 151 new products (FMCGs) introduced on the Dutch market in 2000.

For each of these products we have access to AC Nielsen data collected every four weeks during one-year following the introduction on the actual market success. The data covered a minimum of twelve months for all products, i.e. thirteen data points. Although market success was expressed through both weighted-distribution and market share in value, we focus on the latter market share measure in this chapter since previous analyses (see chapter 4) showed strong correlations between the two measures and similar results with respect to the independent variables considered. The database also provided us with data on the promotional activity around the products for the same periods.

Finally, we include the consumer data on perceived product newness (*incongruity* and *complexity*) to the data set. Thirty consumers rated the 151 new food products on newness variables. We used the factor scores previously computed: *incongruity* and *complexity* scores for each product as well as overall newness scores (see chapter 3 for more details).

5.5. Data analysis

We first provide general descriptive concerning the data to get a feel of the underlying relationships between the variables. We look at market share (in %) for various levels of *incongruity* and *complexity*. We also assess the differential in market share (in %) between strong brands and other brands (BrandAsset® Valuator) present in our sample.

In a second stage, two data sets were built in order to perform the HLM analysis. The first data set addresses the level-1 analysis and includes the time series data for market success and promotional activities. For the data analysis, market share values are considered as a measure of market success. Because market share values are small in the sample, mostly close to zero, this dependent variable is transformed for the regression analysis with HLM, similarly to the transformation operated in chapter 4. The new dependent variable considered is as follows: $\log(\text{success}/1 - \text{success})$. Promotional activities consist of in-store display (i.e. % products sold with display), feature advertising (i.e. % products sold with feature) and price-promotion activities (i.e. % products sold with a price promotion). Similarly to the previous chapter, a global variable for promotional activity was computed, combining all three promotional activities (i.e. % products sold with at least one promotional tool).

The second data set addresses the level-2 model and includes consumer data on perceived newness (*incongruity* and *complexity*) under the form of dummy variables, time-invariant in this study.

We perform an HLM analysis to determine the influence of the various explanatory variables, time-variant and time-invariant, on the evolution and market share over time.

5.6. Results

5.6.1. General information on the data over time

We first make general observations concerning the data over time to verify the findings after one year described in the previous chapter. More specifically we first observe the market share of products for various levels *incongruity* and *complexity*. Products were split in two equal groups based on the factor scores for each dimensions thus resulting in the definition of four newness groups.

Results in table 5.1 and figure 5.4 show that low *complexity* products have a higher initial market share compared to high *complexity* products. This advantage is maintained over time when high *complexity* is combined with low *incongruity*. In contrast, when combined with low *incongruity*, high *complexity* products are able to take off and reach market share values similar to the ones of low *complexity* products.

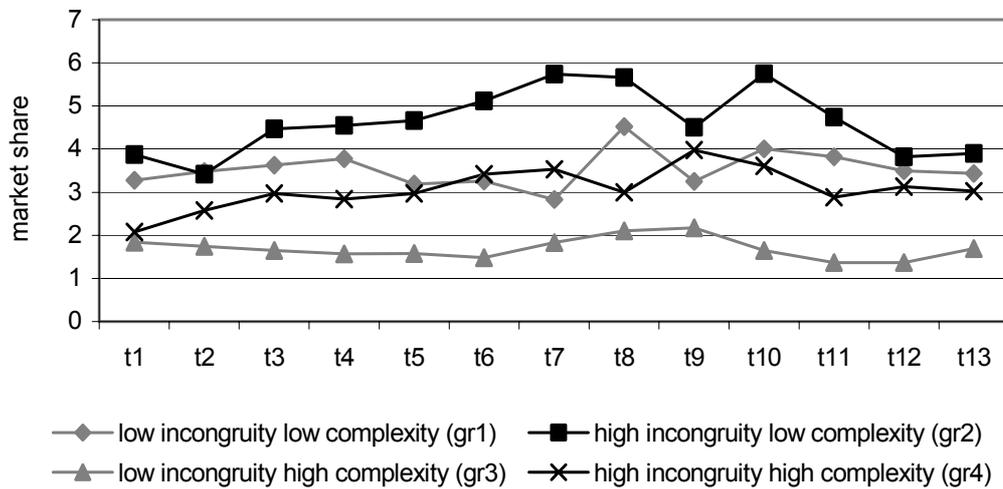
Table 5.1. Market share (in %) over time for various levels of incongruity and complexity

Group	t1	t2	t3	t4	t5	t6	t7	t8	t9	t10	t11	t12	t13
1	3.28	3.48	3.63	3.78	3.19	3.26	2.83	4.52	3.25	4.00	3.82	3.50	3.43
2	1.84	1.74	1.65	1.57	1.58	1.48	1.83	2.10	2.17	1.65	1.37	1.37	1.69
3	3.87	3.42	4.47	4.55	4.66	5.12	5.74	5.66	4.50	5.75	4.74	3.82	3.90
4	2.08	2.58	2.97	2.84	2.97	3.42	3.53	3.00	3.98	3.61	2.88	3.13	3.02
F	0.612	0.355	0.776	1.192	0.951	1.175	1.111	1.158	0.256	0.880	1.124	0.386	0.435
sig.	0.608	0.785	0.509	0.315	0.418	0.321	0.347	0.328	0.857	0.453	0.341	0.763	0.728

Note: The groups are defined following the split considered in the hypotheses formulation

- group 1: low incongruity – low complexity
- group 2: low incongruity – high complexity
- group 3: high incongruity – low complexity
- group 4: high incongruity – high complexity

Figure 5.4. Market share over time for two different levels of incongruity and complexity



Comparing the high and low *complexity* groups for initial market share allows testing for hypothesis H_{1a} stating that initial success is higher for low *complexity* products compared to high *complexity* products.

Table 5.2. Intercept means (i.e. initial market share in %) comparison between groups

groups	mean difference	F	Sig.
low versus high complexity			
complete sample	.823	1.724	.191
low incongruity group	.777	.376	.542
high incongruity group	1.051	1.084	.301
low versus high incongruity			
complete sample	.301	.240	.625
low complexity group	-.321	.142	.707
high complexity group	-.048	.001	.975

Yet results (see table 5.2) do not show any significant results when comparing initial market share between low and high *complexity* groups whether it is on the complete sample (mean difference = 0.823, $p = 0.191$), on the low *incongruity* subgroup (mean difference = 0.777, $p = 0.542$), or on the high *incongruity* subgroup (mean difference = 1.051, $p = 0.301$). Consequently, H_{1a} is not supported. Additionally, there are no significant differences in initial market share between groups based on high and low *incongruity* either.

5.6.2. HLM analysis: market success evolution during the first year after launch

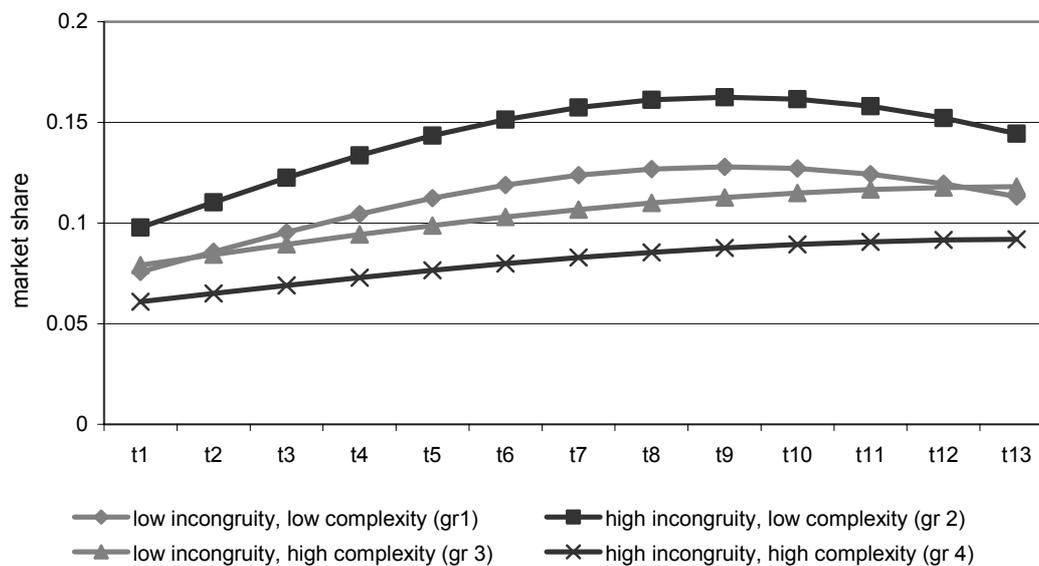
We evaluate the growth curve over the first year after launch for each product, according to its *incongruity* and *complexity* level with a HLM analysis. Results are presented in table 5.2.

First, significant intercept values for *period* ($\beta_{10} = 0.037$, and $p < 0.01$) and *period*² ($\beta_{20} = -0.006$, and $p < 0.01$) in the logistic regression support a bell-shape diffusion curve over time, for all levels of *incongruity* and *complexity* (see also figure 5.5). Yet, differences appear in the shape of the growth curve. Looking at the linear trend of the growth curve (*period*), results do not show any significant effect of *incongruity* (β_{11}) and *complexity* (β_{12}). For the quadratic trend of the growth curve (*period*²), *incongruity* (β_{21}) does not show any significant effect. Yet, a positive influence of the dummy variable *complexity* appears ($\beta_{22} = 0.003$, and $p < 0.10$). As a result, *incongruity* does not significantly influence the bell-shape of the curve. In contrast, with the positive effect on the quadratic trend, *complexity* flattens the curve. Consequently, hypothesis H_{1b} stating that success of low *incongruity* product decreases over time whereas success of high *incongruity* products will show an inverted U-shape over time is not supported¹³.

¹³ Replacing the two dummy variables for *incongruity* and *complexity* by one dummy variable for overall newness, yields the following results: significant intercept values for *period* ($\beta_{10} = 0.035$, $p < 0.01$) and *period*² ($\beta_{20} = -0.006$, $p < 0.01$) also support a bell-shape diffusion over time, for all newness levels. For the linear (*period*) and quadratic (*period*²) trends of the growth curve, results do not show any significant effect of overall newness.

Table 5.3. Regression results for market share with two newness dimensions

		Coefficient	Standard error	T-ratio	Approx. df	P-value
t = 7						
intercept	β_{00}	-2.041	0.073	-27.856	131	0.000
$d_{\text{incongruity}}$	β_{01}	0.007	0.083	0.089	131	0.930
$d_{\text{complexity}}$	β_{02}	-0.224	0.083	-2.712	131	0.007
$d_{\text{incongruity}} \cdot \text{complexity}$	β_{03}	-0.140	0.082	-1.703	131	0.088
Period π_1						
intercept	β_{10}	0.037	0.009	4.077	131	0.000
$d_{\text{incongruity}}$	β_{11}	-0.009	0.014	-0.643	131	0.520
$d_{\text{complexity}}$	β_{12}	0.001	0.014	0.096	131	0.924
$d_{\text{incongruity}} \cdot \text{complexity}$	β_{13}	0.003	0.014	0.217	131	0.829
Period² π_2						
intercept	β_{20}	-0.006	0.001	-4.235	131	0.000
$d_{\text{incongruity}}$	β_{21}	-0.001	0.002	-0.711	131	0.477
$d_{\text{complexity}}$	β_{22}	0.003	0.002	1.744	131	0.081
$d_{\text{incongruity}} \cdot \text{complexity}$	β_{23}	0.002	0.002	1.017	131	0.310
Promotion π_3						
intercept	β_{30}	0.007	0.001	9.508	1441	0.000

Figure 5.5. Estimated growth curve¹⁴ for the four groups of newness described (promotion excluded)

Additionally, this analysis confirms the positive effect of promotional activities ($\beta_{30} = 0.007$, and $p < 0.01$). Hence hypothesis H_2 stating that promotional activities create a positive shift in the level of the growth curve is supported.

¹⁴ $z = \log\left(\frac{\text{success}}{1 - \text{success}}\right) \Leftrightarrow \text{success} = \exp(z) / (1 + \exp(z))$ (Aldrich and Nelson, 1984)

5.6.3. HLM analysis: the influence of complexity for high incongruity products

Hypothesis H_{1c} posits that within high *incongruity* products, success increases faster over time for low *complexity* products than for high *complexity* products. We perform the same logistic regression analysis as in the previous section, but considering only high *incongruity* products.

Table 5.4. Regression results for market share for high incongruity products exclusively

			Coefficient	Standard error	T-ratio	Approx. df	P-value
T = 7							
intercept	β_{00}		-2.143	0.111	-19.339	64	0.000
d _{complexity}	β_{01}		-0.361	0.106	-3.392	64	0.001
Period π_1							
intercept	β_{10}		0.023	0.011	2.107	64	0.035
d _{complexity}	β_{11}		0.002	0.012	0.198	64	0.843
Period² π_2							
intercept	β_{20}		-0.005	0.002	-2.256	64	0.024
d _{complexity}	β_{21}		0.005	0.002	2.300	64	0.021
Promotion π_3							
intercept	β_{30}		0.009	0.001	9.290	708	0.000

With significant intercept values for period ($\beta_{10} = 0.023$, and $p < 0.05$) and period² ($\beta_{20} = -0.005$, and $p < 0.05$), results in table 5.3 first support a bell-shape diffusion curve over time, for all levels of *incongruity* and *complexity*. Similar to the previous analysis, *complexity* does not show any significant effect on the linear trend, but does show a positive significant effect on the quadratic trend ($\beta_{21} = 0.005$, and $p < 0.05$). Hence *complexity* has an effect on the shape of the growth curve by flattening it. For low *complexity* products, success increases faster (H_{1c} supported) but also decreases faster than for high *complexity* products.

5.7. Conclusion and discussion

After showing a differential effect of the two newness dimensions: *incongruity* and *complexity*, on new product market success after one year in the previous chapter, the next step was to demonstrate the influence of the two dimensions on the growth curve over the first year after launch. In other words after explaining market success after one year, this chapter intends to explain how we get there. This appears as a critical piece of information for marketers in order to support the new product with appropriate actions during its first year on the market.

For clarity, hypotheses and findings are summarized in table 5.5. With respect to the effect of the two dimensions on the growth curve and as expected, we find a general inverted-U shape over time, independently of the *incongruity* and *complexity* level. Concerning the specific effect of each dimension, *incongruity* does not appear as having any significant effect on the shape of the curve whereas *complexity* shows a

flattening effect. The flattening effect of *complexity* supports hypothesis H_{1c} stating that the slope of the inverted-U curve would be steeper for low *complexity* products compared to high *complexity* products. In practice this means that simple products will take-off faster than complex ones but will also have a shorter life cycle. Such products provide fast short-term success but fail to provide long term competitive advantage for the company. Consequently, managers should take this element into account when allocating resources for innovation, as well as marketers when planning the marketing mix of such products and their promotional support over time. In contrast, because *incongruity* does not show any significant effect on the shape of the curve, hypothesis H_{1b} stating that success for low *incongruity* product decreases over time is not supported. The fact that this study deals with aggregate data (as opposed to trial purchase data) may explain the lack of effect of *incongruity*. Aggregated data includes purchases of all types of adopters from innovators to early and late majority to laggards. In this context, the decreasing phase in the inverted-U, corresponding to tedium, may take longer to appear over time as it is hidden by first purchases of later adopters. Consequently a longer time period may be needed to identify this effect.

With respect to initial success, we expected complex products to start lower than simple products. Unfortunately this difference is not significant and hypothesis H_{1a} is not supported. This may be due to a sample bias, as we only selected products that already reached distribution, it maybe that very complex products did not reach that stage. Another explanation may be the type of product included in this research, which are all consumer packaged goods and hence not very complex in nature. It may be interesting for future research to see the effect with wider *complexity* range.

Table 5.5. Summary of the results and hypotheses

	hypothesis	result
H ₁ .	a $success_{t=0}$ (low complexity) > $success_{t=0}$ (high complexity)	not supported
	b $success^*$ (low incongruity) = $success_{t=0}$ $success^*$ (high incongruity) > $success_{t=0}$ and $success^*$ (high incongruity) > $success_{t=13}$	not supported
	c For high incongruity products: $(dsuccess / dt)$ (low complexity) > $(dsuccess / dt)$ (high complexity)	supported
H ₂ .	success (promotion) > success (no promotion)	supported

To summarize, this study confirms previous findings that emphasized *complexity* as having the strongest effect on market success of new products. Here *complexity* appears to slow down new product take-off. Yet, although all products exhibit an inverted-U curve over time, it is essential to notice that, in contrast with simple products, highly complex products did not reach the decreasing part of the inverted-U during the first year after launch. Consequently, it would be interesting to look at data on a longer period to see whether complex products finally reach higher market success levels over time. This would establish important managerial implications. If complex products were able to reach higher success over a longer period, they would

Newness characteristics of individual products and their effects on market success over time

constitute elements of long term competitive advantage which companies are constantly seeking in their new product development.

Chapter 6.

Newness perception across countries

6.1. Introduction

Despite an increasing globalization and a growing interest in cross-national or cross-cultural research, research in consumer behavior has not followed this trend in terms of theory testing (Steenkamp and Burgess, 2002; Sharma and Weathers, 2003). As a matter of fact, empirical studies have predominantly been carried out in the USA or in Western countries. Such samples are not representative of the majority of consumers who live in different cultural, economic and political environments (Steenkamp and Burgess, 2002). It is crucial for consumer behavior as an academic discipline that models developed in one country can be extended to others (Steenkamp and Baumgartner, 1998). Yet, extending theories and constructs to other countries and cultures requires to previously assessing cross-national validity of the findings (Douglas and Craig, 1997; Bagozzi, 1994; Hui and Triandis, 1985). In this perspective, research must particularly address the equivalence of constructs, samples and measurement (Craig and Douglas, 2002; Mullen, 1995). Else, conclusions remain ambiguous if not erroneous (Steenkamp and Baumgartner, 1998; Netemeyer et al., 1991) at the international level.

The notion of construct equivalence is grounded in the 'etic' perspective. Research using multi-item scales in multiple countries splits into two distinct approaches. The first approach, labeled 'emic' relies on the idea that constructs have to be studied independently in each cultural context since criteria are relative to internal characteristics. In contrast, the second 'etic' approach is based on the assumption that it is possible to identify universal constructs and measures. It typically refers to scales developed in one country and extended to one or more additional countries. This approach assumes that a construct, which is found in one country, is the same in the additional countries of interest. Establishing the universality of the construct is thus a

main concern when applying this approach. Construct equivalence examines whether the focal concept or construct serves the same function (functional equivalence) cross-nationally and whether it is expressed similarly (conceptual equivalence) (Singh, 1995).

Measurement equivalence addresses the question of “whether or not, under different conditions of observing and studying phenomena, measurement operations yield measures of the same attribute” (Horn and McArdle, 1992, p.117). It does not necessarily derive from construct equivalence (Craig and Douglas, 2002: 260): some concepts can be expressed differently in various cultures, thus requiring the use of adapted items. Yet, critical reviews have identified a lack of concern for this issue (Steenkamp and Baumgartner, 1998; Mullen, 1995; Netemeyer et al., 1991; Parameswaran and Yaprak, 1987). In the variety of techniques that have been used to assess measurement equivalence, there is general agreement that the Multiple Group LISREL (Jöreskog, 1971) represents a powerful and comprehensive approach to testing for cross-national measurement equivalence (Mullen, 1995; Steenkamp and Baumgartner, 1998, Sharma and Weathers, 2003).

In this research, we previously developed a scale considering two distinct newness dimensions (*incongruity* and *complexity*) instead of the traditional one-dimensional conceptualization. This scale has initially been developed in The Netherlands where evidence for a differential effect of the two dimensions on product liking and market success was also found. Our interest is now to use a cross-national setting to test for the generalizability of the model in more countries to be able to compare results in different countries.

This chapter hence addresses two main issues. First, it addresses the generalizability of the model by investigating cross-national equivalence of the two-dimensional newness scale, i.e. whether the two-dimensional structure of the construct is equivalent in the 6 countries studied on three different continents (France, Germany, Mexico, The USA, Indonesia, and Thailand). In this perspective, we focus on the newness construct across countries, provide theoretical support for construct equivalence and test for measurement equivalence. Additionally, we investigate whether the differential effect of the *incongruity* and *complexity* dimensions on product liking remains across cultures. Second, and provided measurement equivalence across countries, it is particularly relevant for marketing purposes and new product launch decisions to compare newness perception of specific products across countries. We explore potential differences in newness (i.e. *incongruity* and *complexity*) ratings across countries based on the potential influence of cultural characteristics and market characteristics for the product category. Finally, it seems of particular interest to evaluate potential differences in the magnitude of the effects of the two newness dimensions on product liking across countries.

6.2. Conceptual framework

6.2.1. Newness conceptualization and influence on product liking: generalizability in a multicultural context

Two dimensions considered in the newness conceptualization

The newness scale developed in this research differs from previous ones in that it considers two dimensions in the construct. First, *incongruity*, summarizing the change, surprise, and incongruent, represents the perception of newness, the contrast immediately perceived between the new stimulus and what was known before, the contradiction with expectations. It also relates to the uneasiness to directly assimilate the new product. Second, *complexity* is a subtler dimension summarizing the complexity, uncertainty, and puzzlingness variables. *Complexity* represents the epistemic aspect of newness, it refers to the difficulty to comprehend and make sense of a new stimulus. It consequently requires more cognitive effort from consumers and gives rise to deeper information processing. We relate *complexity* to the epistemic approach of the new product by consumers; it deals with stimulus properties that lead to a need to reduce or solve an original dissatisfaction or mental discomfort (Berlyne, 1963: 324).

Universality of the newness construct

Before exploring the cross-cultural equivalence of the two-dimensional newness conceptualization, it is essential to emphasize that literature and practice clearly support cross-national relevance of the newness construct. Nothing in previous research indicates that the notion of newness perception is unique to certain cultures. On the opposite, the notion of newness has long been identified in various research areas and with different subjects, humans as well as in the animal world. The universality of the newness construct itself is therefore not an issue. Moreover, with respect to the marketing field, numerous studies around the world show the relevance of the construct in various cultural settings (see Garcia and Calantone, 2002 for review).

More specifically, we operationalize newness by means of collative variables, derived from Berlyne's work. Collative variables are simple entities (e.g. surprise, change or uncertainty) used in everyday language and in various cultures. In his extensive work on collative variables, Berlyne mostly focused on human behavior referring to studies with adults or young children to support his findings. He also reports results with other mammals (e.g. experimental settings with rats) thus emphasizing the relevance of collative variables for a large variety of subjects. Although Berlyne's experiments were mainly conducted in North America, his work, developed in the 1960s, has now been largely applied and collative variables have been studied together or separately in various cultural settings. Consequently, previous research provides support for the cross-national relevance of the items selected and their relationship to newness.

Yet, the distinction between perceptual (sensory) and epistemic (cognitive) aspects of newness on which the scale is based, is a more crucial point for the concern of construct equivalence in this research. This distinction is extensively developed in chapter 3 for the initial scale development. It finds its roots in ancient philosophical models delineating cognition from affect but also sensory images or perceptual data and ideas reaching the essence of things (Russ, 1990). More recently, neuro-sciences bring support for this distinction through the physical organization of the human brain and the tasks insured by each of the two hemispheres. Namely, the left brain is responsible for cognitive activities whereas the right brain plays a major role for holistic ones (Krugman, 1997). In terms of information processing, dual-process models reflect the same delineation as well as findings in more specific domains of psychology (e.g. Berlyne, 1960; Loewenstein, 1994). Finally, the distinction features prominently at the behavioral level and becomes more tangible, e.g. in the context of human exploratory tendencies. To summarize, the literature offers a great diversity of domains where the distinction between perceptual and epistemic elements has been characterized. It also shows consistencies across centuries and cultures, bringing strong support for the universality of the theoretical origin of the construct.

To summarize, theory and previous empirical studies provide some support for the universality of the newness construct, operationalized through collative variables, as well as for the two-dimensional nature of the construct. Hence, there is reason to believe that the newness scale developed on the basis of Berlyne's collative variables and characterized by the *incongruity* and *complexity* dimensions will be generalizable cross-nationally.

H₁. The pattern of factor loadings for the two-dimensional newness scale is cross-nationally equivalent (configural invariance).

Moreover, if metric invariance (i.e. equivalent factor loadings) is satisfied we could compare newness across countries provided scalar invariance is also supported.

Differential effect of incongruity and complexity on product liking

The idea for a differential effect of *incongruity* and *complexity* on product liking emerges from evidence in different research areas that collative variables lead to a behaviors ranging from curiosity to fear (Berlyne, 1966; Zuckerman, 1979, 1990). This strongly suggests that all collative variables cannot be interpreted in the same way and should be divided meaningfully to reflect their differential effect.

Besides, literature in psychology and consumer behavior proposes theories on the effect of *incongruity* and *complexity* on product liking. With respect to the *incongruity* dimension, categorization theory suggests an inverted-U-shaped relationship with product liking (Mandler, 1982). This inverted-U-shaped relationship between *incongruity* and liking found support in the consumer behavior context (Meyers-Levy and Tybout, 1989; Stayman et al., 1992) but also in various studies on affect in marketing (Erevelles, 1998). Namely, moderate *incongruity* results in the highest

product liking scores whereas congruent or very incongruent products yield lower scores because they do not arouse any interest in the first case or are too remote in the second case. In contrast, theories on uncertainty, ambiguity, complexity and information processing converge to suggest a negative effect of *complexity* on product liking (Berlyne, 1963, 1966; Frish and Baron, 1988; Hansen, 1981; Erevelles, 1998; Olshavsky and Granbois, 1979; Cox and Cox, 2002). Moreover, *complexity* has been established as a potential barrier to product adoption (Rogers, 1995). Most of these studies have been carried out in North America and in Europe. Yet, research in diverse areas (e.g. psychology, education, marketing) showed support for the differential effect of *incongruity* and *complexity* on liking hence evoking some universality in the findings.

Consequently, although most studies were carried out in Western countries, several elements in the literature suggest the cross-national generalizability of the differential effect of *incongruity* and *complexity* on product liking.

- H₂. The differential effect of incongruity and complexity appears cross-nationally*
- H_{2a}. Incongruity shows an inverted-U-shaped relationship with liking*
- H_{2b}. Complexity shows a decreasing relationship with liking*

6.2.2. Newness perception and influence on product liking: comparisons in a multicultural context

The literature brings some support for cross-national equivalence of the two-dimensional scale previously developed, yet, nothing indicates that given products would receive equivalent ratings across countries, i.e. the perception of newness may vary across countries. Further, the differential effect of *incongruity* and *complexity* may be common to various cultural settings, but differences may appear in the magnitude of these effects for given products.

Cultural characteristics and newness perception

Culture is an internal characteristic however specific to a group or category rather than to an individual. It is a “collective phenomenon, because it is at least partly shared with people who live or lived within the same social environment” (Hofstede, 1991: 5). It distinguishes the members of one group or category of people from another. For instance, Hofstede (1991) reports the four-dimensional (4-D) model of differences among national cultures. Each country is characterized by a score on each of the four dimensions: *power distance*, *collectivism* versus *individualism*, *femininity* versus *masculinity*, and *uncertainty avoidance*. These dimensions have been established by identifying issues qualifying as common basic problems worldwide having consequences for the functioning of societies or individuals within them (Hofstede, 1991). The goal is to find relevant cultural characteristics to address newness evaluation and more specifically in the scope of our newness conceptualization.

Certain country-level factors, such as dominant cultural values or patterns can be expected to have a direct influence on the measurement of individual-level traits. For instance, innovativeness¹⁵ (Baumgartner and Steenkamp, 1996) is positively influenced by cultural characteristics such as individualism and masculinity whereas consumers in cultures characterized by higher uncertainty avoidance level are less innovative (Steenkamp et al., 1999). Observing the scores on these three variables for countries included in our study gives reasons to believe that innovativeness will also differ between countries (table 6.1). Beside their influence on innovativeness, these cultural characteristics may also influence product ratings on newness by bringing bias in the perception of the two dimensions. For instance, in cultures of high uncertainty avoidance, consumers may be more likely to identify uncertainty in products and hence overestimate the *complexity* dimension compared to consumers in low uncertainty avoidance cultures. On the other hand, individualism and masculinity positively influence innovativeness and make consumers more open to new products. This may lead them to underestimate *incongruity* as they naturally tend to go towards new products and therefore have more experience with them.

Table 6.1. Index values of countries included in this study for 3 variables influencing innovativeness (adapted from Hofstede, 1991)

	uncertainty avoidance		individualism		masculinity	
	UAI score	score rank	IVD score ¹	score rank ²	MAS score	score rank
Germany	65	29	67	15	66	9/10
France	86	10/15	71	10/11	43	35/36
USA	46	43	91	1	62	15
Mexico	82	18	30	32	69	6
Indonesia	48	41/42	14	47/48	46	30/31
Thailand	64	30	20	39/41	34	44

- (1) index scores representing the relative position of each country
 (2) ranking among the 50 countries and 3 regions included in Hofstede's studies

Market status and consumption of laundry products

Chapter 2 displays a review of approaches consumers may use to process information about new products. It emphasizes that in all cases consumers make their assessment in relation to their internal knowledge and its organization at the moment they encounter the new product. In the categorization theory particularly, consumers evaluate the *incongruity* between the new instance (e.g. new product) and what they already know. Consequently, initial knowledge plays a key role in evaluation as it serves as a reference. In this context, it is essential to emphasize that consumers from different cultures and different countries may vary with respect to their current knowledge of various product categories, or in the way they consume these products.

¹⁵ Innovativeness (propensity to try new products) measured by the Exploratory Acquisition of Products scale

Consumers' category knowledge and market status of the category may have an impact on the magnitude of the *incongruity* perceived between cultures for given products.

The percentage of consumers using laundry products, the number of brands present on the market or consumers brand loyalty give some indication of cultural context for the product. For instance (see table 6.2), in all countries included in the study, a majority of consumers report one laundry load per week. In some countries a high proportion of households are more frequent washers (France, USA and Indonesia) whereas in one country (Mexico) a large proportion of consumers washes less frequently. There is reason to believe that in countries where consumers tend to wash more often, the acquaintance with laundry products is higher, i.e. that their previous knowledge of the category is wider. With respect to softener use, a large majority of consumers use softener for every load but there are discrepancies between countries with respect to brand loyalty (see table 6.2). The less brand loyal consumers (USA) may be more aware of the market offer and more exposed to innovation than the more brand loyal consumers (Mexico and Indonesia).

Table 6.2. Consumption and market status for laundry care products¹⁶

	number of laundry loads per week (% of households)			% households always using softener	% households loyal to one brand	importance of fragrance (5 pts scale)
	> 1	= 1	< 1			
Germany	7	87	6	81	56	4.1
France	28	68	4	85	42	4.3
USA	28	68	4	71	16	4.0
Mexico	7	58	35	92	76	4.2
Indonesia	39	59	2	99	75	4.1
Thailand	12	77	11	94	56	4.2

Conclusion and hypotheses over product newness perception across countries

In the case of scale generalizability across countries, it is essential to acknowledge that products may not be rated equally new in different countries due to cultural characteristics but also to the market status for laundry care products in these countries and the behavioral attitude of consumers towards these products. Among cultural characteristics, we select uncertainty avoidance as being specifically related to product *complexity* as this newness dimension also includes uncertainty. We hypothesize that as uncertainty avoidance increases (see table 6.1: France and Mexico > Germany and Thailand > Indonesia and USA), consumers will be more likely to identify uncertainty in products and hence overestimate their *complexity* dimension.

With respect to *incongruity*, it seems reasonable to assume that previous knowledge, established by market status of the category and cultural consumption habits will have

¹⁶ Source: IFF (International Flavors&Fragrances) consumer insight

a dominant influence. This previous knowledge serves as a reference for the consumer to assess the new instance. Perceived *incongruity* is expected to be lower in countries where consumers are heavy users of laundry softeners and in countries where consumers are non-loyal to their brands as it allows them testing many different products and new products in particular. According to the data (table 6.2) there are no main differences in washing frequency and softener usage between the countries. However consumers' brand loyalty varies across countries. Consumers being little brand loyal have more opportunities to acquire knowledge about the existing products and build a richer internal schema of the category (i.e. as experts). In contrast, we hypothesize that brand loyal consumers will rate *incongruity* higher (Mexico and Indonesia > Germany, France, Thailand > USA) as they are less able to match the new instance to their internal schema.

H₃. Products' newness ratings are not cross-nationally equivalent.

H_{3a}. According to uncertainty avoidance ratings in each country, we expect complexity ratings to range as follows:

France and Mexico > Germany and Thailand > Indonesia and USA

H_{3b}. According to the market and consumption status of laundry softener in each country, we expect incongruity ratings to range as follows:

Mexico and Indonesia > Germany, France, Thailand > USA

Newness and product liking across cultures

As mentioned previously, innovativeness has been found to be culture dependent (Steenkamp et al., 1999). As innovativeness influences new product choice, there is reason to believe that new product choice and new product liking will also be culture dependent. Coming back to the newness dimensions, cultural differences in uncertainty avoidance may translate into differences in the influence of *complexity* on product liking, as uncertainty pertains to the *complexity* dimension. We hypothesize the negative influence of *complexity* on product liking to increase with uncertainty avoidance across cultures. With respect to *incongruity*, cultures showing high individualism and masculinity tend to be more innovative, and hence to rate new products higher on liking. Consequently, we hypothesize that new product liking is maximum for more *incongruent* products in cultures of high individualism and masculinity compared to cultures of low individualism and masculinity.

Yet, cultural characteristics may influence the intensity of the effect. More specifically, there is reason to believe that the negative effect of *complexity* will be highly emphasized by *uncertainty avoidance* level in the culture considered. Second, we expect the effect of *incongruity* to be affected by *individualism* and *masculinity* as these characteristics yield higher innovativeness:

H_4 . The magnitude of the effect of the two newness dimensions differs across countries

H_{4a} . The magnitude of the negative effect of complexity varies across countries as follows:

France and Mexico > Germany and Thailand > USA and Indonesia

H_{4b} . The level of incongruity for which liking is highest ranges as follows across countries:

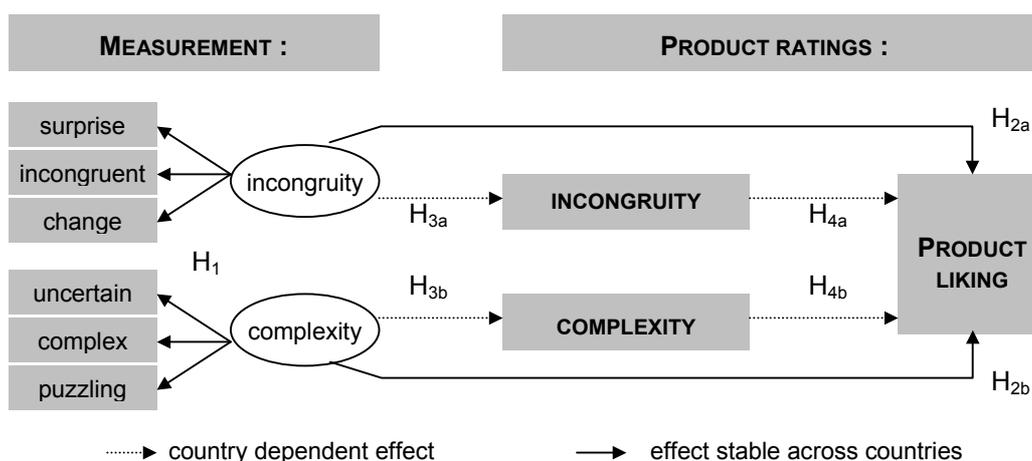
Germany and USA > France and Mexico > Thailand and Indonesia

6.2.3. Summary and final model

To summarize, the model comprises two main elements: 1) the measurement, i.e. the collative variables and their distribution into two sub-dimensions (*incongruity* and *complexity*), and 2) product ratings, i.e. newness evaluation and product liking (figure 6.1).

First, we hypothesize the generalizability of the model developed in chapter 3. With respect to the newness measure, we hypothesize that the measure will be valid in all countries studied in this chapter (H_1). With respect to the influence of the newness dimensions on product liking, we hypothesize the same differential effect of the two newness dimensions, i.e. an inverted-U-shaped relationship between *incongruity* and liking (H_{2a}) and a decreasing relationship between *complexity* and liking (H_{2b}). Second, and provided the generalizability of the model, we expect country-level differences in product evaluation on these two dimensions (H_{3a} and H_{3b}), and a culture dependent magnitude of the effect of *incongruity* and *complexity* on product liking (H_{4a} and H_{4b}).

Figure 6.1. The model



6.3. Methodology

A blind, monadic, in home product test is conducted. The test is conducted in six countries: Germany, France, The USA, Mexico, Indonesia, and Thailand. Recruitment procedures for respondents and test methodology are identical in all countries.

6.3.1. Stimuli

Stimuli are all fabric softeners¹⁷. The products mainly comprise a new fragrance, which currently does not exist in the market (products f1 to f5), or a new fragrance technology (T) giving additional properties to the fabric softener. In terms of new fragrances, some products were in line with existing fragrances in the industry (f1 and f2 and f3) whereas others were quite remote (f4 and f5). Consumers mostly rate the importance of the fragrance very high in softener attributes (see table 6.2) and in most countries as the number one determinant of their softener choice (number one in Germany, France, Mexico, Indonesia and Thailand, number two behind performance in the USA). Consequently, fragrance newness appears as a key element of product newness in the domain of fabric softeners.

In each country, 3 to 6 products are placed as blind test products at eligible respondents (one product per respondent). Table 6.3 gives more insight into the identification of the products tested in each country in order to identify comparable newness ratings in the analysis.

Table 6.3. New stimuli tested per country

	number of products tested per country	new fragrance					new technology T
		similar to existing fragrances			dissimilar to existing fragrances		
		f1	f2	f3	f4	f5	
Germany	5	✓	✓	✓	✓	✓	
France	6	✓	✓	✓	✓	✓	✓
US	5		✓	✓		✓	✓
Mexico	4	✓		✓		✓	✓
Indonesia	3			✓		✓	✓
Thailand	3			✓		✓	✓

6.3.2. Subjects

Respondents are recruited door-to-door by trained interviewers across a variety of locations in each country giving a representative sample of consumers with respect to variables relevant to this particular type of products (e.g. water hardness).

¹⁷ Because these products are prototypes, no precise information about the innovative character of the products will be provided in this section.

Respondents are all woman aged between 20 and 60. All respondents use laundry softeners on a regular basis and are responsible for household shopping. In each country, 100 respondents participated for each product placed, i.e. 300 to 600 respondents per country.

6.3.3. Procedure and Measures

Once an interviewer has verified that a respondent fulfills the recruitment criteria in terms of product usage, the respondent is given a test product and asked to use the product for 14 days putting products that are normally used aside. At the end of the 14-day placement period the interviewer returns and a recall interview is completed to explore the respondent's evaluation of the product. As part of the larger data collection task, consumers are asked to indicate their level of agreement with statements concerning newness aspects. For this and similarly to chapter 3, respondents rated the six items corresponding to Berlyne's collative variables: complex, congruent, change, surprising, puzzling, and uncertain. Additionally, respondents rated three overall newness items: new, unique, and familiar (Bruner and Hensel, 1992; Henard and Szymanski, 2001). Subjects performed their evaluation by rating variables on a five-point Likert-type scale (from disagree strongly to agree strongly). On the same type of scale, respondents also rated four items for product and fragrance liking: attractive, desirable, useful and relevant (Deighton et al., 1989). For all scales, items were translated and back-translated by local research agencies that carried out the interviews.

6.4. Data analysis

Confirmatory Factor Analysis (CFA) models have been commonly used to test for measurement invariance across particular groups (Steenkamp and Baumgartner, 1998, Byrne, 1998). Within CFA models, we distinguish various levels of factorial invariance including configural invariance, metric invariance and scalar invariance.

6.4.1. CFA models for measurement invariance: general framework

This approach is based on the extension of the classic model of factorial invariance and is expressed in a LISREL sub-model (Byrne, 1998: p.309) as follows for each country g ($g=1, \dots, G$):

$$x_i^g = \tau_i^g + \Lambda_{ij}^g \xi_j^g + \delta_i^g \quad (1)$$

where x_i^g is a $p \times 1$ vector of observed items i ($i=1, \dots, p$)

ξ_j^g is a $m \times 1$ vector of latent variables j ($j=1, \dots, m$)

τ_i^g is a $p \times 1$ vector of items intercepts

δ_i^g is a $p \times 1$ vector of measurement errors

Λ_{ij}^g is a $p \times m$ matrix of factor loadings

It is assumed that $E(\delta^g) = 0$ and that $Cov(\xi^g, \delta^g) = 0$. Equation (1) results in the following relation between the observed variable means and the latent means:

$$\mu^g = \tau^g + \Lambda^g \kappa^g \quad (2)$$

where μ^g is a $p \times 1$ vector item means

κ^g is a $m \times 1$ vector of latent means

In cross-national research, model identification is usually realized by setting the factor loading of one item per factor to one; subsequently, this factor loading is referred to as a marker for the factor, identical in all countries (Byrne, 1998, Steenkamp and Baumgartner, 1998). Moreover as τ^g and κ^g cannot be identified simultaneously, specific constraints on the parameter are necessary. Steenkamp and Baumgartner (1998) propose two solutions for this. First, to fix the intercept of each latent variable's marker-item to zero in each country (i.e. $\mu_{marker}^g = \kappa_{marker}^g$). A second option would be to set the vector of latent means to zero in the reference country (i.e. $\kappa^{reference} = 0$) and to constrain one intercept per factor to be invariant across countries (for a factor loading invariant across countries). Latent means in other countries are hence estimated relative to the latent means in the reference country.

In addition, the covariance structure is specified and the variance-covariance matrix of x in country g is expressed as follows:

$$\Sigma^g = \Lambda^g \Phi^g \Lambda^{g'} + \Theta^g \quad (3)$$

where Φ^g is a variance-covariance matrix of the latent variables in ξ^g

Θ^g is the variance-covariance matrix of δ^g (usually diagonal matrix)

As mentioned in introduction, we distinguish various levels of factorial invariance. First, configural invariance relates to the fact that items in the measurement instrument should exhibit the same configuration of salient and non-salient factor loadings across countries. Configural invariance is supported if 1) the specified model fits the data well in all countries, 2) all salient factors are significantly and significantly different from zero, and 3) correlations between the factors are significantly < 1 . No constraints are applied on salient factor loadings, only non-salient loadings are set to zero across countries, i.e. if item i does not load on factor j :

$$\lambda_{ij}^{(1)} = \dots = \lambda_{ij}^{(G)} = 0 \quad (a)$$

Second, metric invariance is satisfied if difference scores on the items can be meaningfully compared across countries and if these differences are reflecting cross-national differences in the underlying construct (Steenkamp and Baumgartner, 1998). Factor loadings express the relation between changes in latent scores and changes in observed scores. As a result, constraining the loadings to be the same across countries allows testing for metric invariance:

$$\Lambda^{(1)} = \dots = \Lambda^{(G)} \quad (b)$$

Moreover, the model needs to satisfy scalar invariance in order to conduct mean comparisons across countries. Scalar invariance means that differences in the means

of the underlying constructs yield differences in the means of the observed items (Steenkamp and Baumgartner, 1998).

$$\tau^{(1)} = \tau^{(2)} = \dots = \tau^{(G)} \quad (c)$$

Factor variance and covariance invariance insure that correlations between the latent constructs are invariant across countries:

$$\Phi_{jj}^{(1)} = \Phi_{jj}^{(2)} = \dots = \Phi_{jj}^{(G)} \quad (d)$$

$$\Phi_{jk}^{(1)} = \Phi_{jk}^{(2)} = \dots = \Phi_{jk}^{(G)} \quad (e)$$

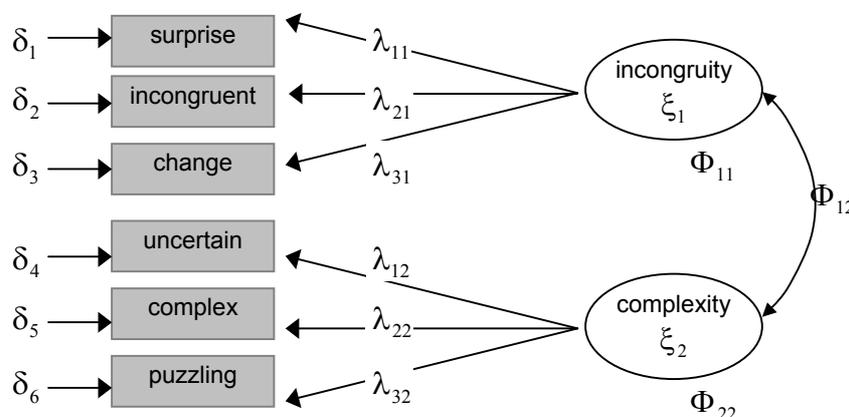
where $j=1, \dots, m$ and $k=1, \dots, [j-1]$

At last, invariance of the amount of measurement error across countries, indicates that items are equally reliable across countries:

$$\Theta^{(1)} = \Theta^{(2)} = \dots = \Theta^{(G)} \quad (f)$$

The present application tests the equivalence of newness measurement and structure across six countries (i.e. $g=1, \dots, 6$). In particular, it aims at determining whether the two newness dimensions (i.e. $j=1, 2$) and their measurement instrument (6 items i.e. $i=1, \dots, 6$), are equivalent across countries. The baseline model of newness for each of the six countries involved in the study is presented in figure 6.2.

Figure 6.2. Baseline model of newness for each of the six countries involved



As analyses focus on multigroup comparisons with constraints between groups, all parameters should be estimated simultaneously (Byrne, 1998), which means that specifications for each group must reside in the same file. Thus input files for each group are stacked one after the others in the LISREL syntax file.

6.4.2. Hypothesis testing

Testing for the generalizability of the model, we first consider newness conceptualization (with *incongruity* and *complexity*) and hypothesis H_1 . According to the guidelines of the previous section we start with testing for the equivalence of

factor loadings (configural invariance). Later, and provided configural invariance, we consider invariance of the measurement model by testing for metric and scalar invariance in order to make quantitative comparisons between countries.

Second, we consider the differential effect of *incongruity* and *complexity* on product liking, by performing a regression analysis. Similarly to the original model developed, the dependent variable is thus product liking (computed factor loading of the 4 liking variables rated by respondents). Independent variables are *complexity* and *incongruity* scores as well as a quadratic term for *incongruity* to account for a non-linear relationship.

Third, measurement model invariance allows making quantitative cross-country comparisons of the magnitude of the effects of the two dimensions and means comparisons for the common set of products. First, after obtaining mean *incongruity* and *complexity* scores for each product in each country, we explore significant differences in mean scores and relate them to cultural characteristics. Similarly, regression coefficients explaining the effect of the two dimensions on product liking can also be compared cross-countries.

Finally, if invariance of the measurement model cannot be established, data may be analyzed separately for each of the six countries involved. We investigate the structure of the scale in each countries to get an indication on newness perception. For this purpose, we first perform a PCA (Principal Component Analysis) on the 6 newness variables included in the research to investigate the dimensionality of the scale and second confirm the structure with LISREL. We also investigate the impact of the dimensions on product liking to see whether the direction of the effects are identical and significant. Yet, comparison of magnitude of the effects cross-country and means comparison are then excluded.

6.5. Results

6.5.1. CFA models for measurement invariance

Testing for measurement invariance starts with testing for configural invariance of the construct (i.e. the same configuration of salient and non-salient factor loadings across countries). Results from the LISREL analysis (table 6.4) including the six countries and six variables of the study does not show an acceptable fit of the configural invariance model : $\chi(48)^2 = 332.65$ ($p = 0.000$), Comparative Fit Index CFI = 0.92, Tucker-Lewis Index TLI = 0.84, and Root Mean Square Error of Approximation RMSEA = 0.121. Giving a closer look at the output files shows serious problems with the factor loadings (within groups, completely standardized loadings) of the variable 'incongruent' in all countries but Mexico. For the countries Thailand and Indonesia, variables 'incongruent' and 'surprise' load very low on the *incongruity* dimension (0.2 - 0.3). Finally, the variable uncertainty gives low loadings (< 0.5) in certain

countries such as Mexico, Indonesia and France. Given these observations, the same analysis is run after removing the variable incongruent. Despite a slight improvement in model fit (table 6.4), the model remains unacceptable: $\chi(24)^2 = 167.69$ ($p = 0.000$), CFI = 0.95, TLI = 0.88, and RMSEA = 0.122. The last attempt consist in removing the worst performing countries for the scale (Indonesia and Thailand) and run the analysis once again. Results with such restrictions are not non satisfactory (table 6.4). Additionally, the variable ‘uncertainty’ keeps low loadings (< 0.5) in Mexico and France. We conclude that the data does not allow to conclude for configural invariance of the construct across countries (H_1 not supported).

In this context, the analyses will be further run separately in each country in order to examine the direction of the effects of the two newness dimensions across countries. This will however not permit any quantitative comparisons of the magnitude of the effects or product ratings comparisons across countries.

Table 6.4. Summary table for configural invariance

	All countries All items	All countries Reduced set of items (‘incongruent’ out)	Reduced set of countries (Indonesia and Thailand out) Reduced set of items (‘incongruent’ out)
Chi ² (df)	332.65 (48)	167.69 (24)	117.45 (16)
CFI	0.92	0.95	0.96
NFI	0.91	0.94	0.95
TLI	0.84	0.88	0.90
RMSEA	0.121	0.122	0.118

6.5.2. Newness measurement: separate analyses per country

For all countries involved, the data was appropriate for factor analysis. When analyzing the data per country, from six newness variables included in the research, PCA extracted two factors explaining 56 to 65% of the total variance depending on the country. Using the scree-plot method and Horn’s parallel test (Horn, 1965) supported the extraction of two factors in each country.

Table 6.5. items loadings per country on Principal Component Analysis (after Oblimin rotation)

component	Indonesia		Thailand		Germany		France		Mexico		USA	
	1	2	1	2	1	2	1	2	1	2	1	2
surprise	-.730		.862		.766		.810		.833		.816	
change	-.802		.830		.796		.862		.732		.840	
incongruent	-.547			-.619	.690			.670		.667		.713
complex		.801		.838		-.775	.665			.766	.667	
uncertain		.555		.795		-.816		.831		.758		.764
puzzling		.819		.785		-.691	.804			.793		.662
<i>r</i>		.147		.021		-.146		.189		.299		.264

In line with the bad fit of the configural invariance model tested, the content of the dimensions varies across countries (table 6.5). More specifically, and consistently with our previous remark, this analysis identifies a problem with the variable ‘incongruent’ which varies the most across countries.

We perform the same analyses after removing the variable ‘incongruent’. Results show more consistency across countries (table 6.6). In all countries, except France, the first dimension identified comprises the variables change, and surprise and can be labeled *incongruity*. The variables complex, uncertain and puzzling pertain to the second dimension labeled *complexity*. In France, the two dimensions come out differently: uncertainty alone loads on the second factor whereas all other variables load on the first factor.

Table 6.6. items loadings per country on Principal Component Analysis (after Oblimin rotation)

component	Indonesia		Thailand		Germany		France		Mexico		USA	
	1	2	1	2	1	2	1	2	1	2	1	2
surprise	.830		.866		-.844		.816		.870		-.856	
change	.769		.854		-.851		.864		.689		-.878	
complex		.804		.851		.804	.653			.812		.697
uncertain		.551		.833		.831		.949		.749		.816
puzzling		.820		.820		.643	.804			.830		.836
<i>r</i>		-.111		.112		-.228		.148		.277		-.343

These findings were tested with a LISREL confirmatory analysis (table 6.7). Results show that the two dimensional measurement (surprise and change on the one hand, uncertainty, complex, puzzling on the other) shows a satisfactory goodness of fit in Thailand, Mexico and the USA, and to a lesser extent for Germany and Indonesia.

Table 6.7. Goodness of fit statistics for the LISREL model in separate countries

	Indonesia	Thailand	Germany	France	Mexico	USA
Chi ² (df)	37.46 (4)	12.82 (4)	65.43 (4)	---	13.29 (4)	10.55 (4)
P-value	0.000	0.012	0.000	---	0.009	0.032
GFI	0.95	0.98	0.95	---	0.99	0.99
AGFI	0.82	0.94	0.81	---	0.95	0.95
NFI	0.81	0.96	0.88	---	0.97	0.98
TLI	0.56	0.93	0.72	---	0.95	0.97
RMSEA	0.169	0.086	0.176	---	0.078	0.069

Consequently, when analyzing the countries separately it is possible to identify the two newness dimensions as in the baseline model for five countries: Indonesia, Thailand, Germany, Mexico and the USA. The first *incongruity* dimension is reduced to two variables (surprise and change) whereas the second *complexity* dimension

comprises three items (complex, uncertain and puzzling). We will pursue the analyses in separate countries, except France, to investigate perceived newness of the different products and the direction of the effect of *incongruity* and *complexity* on product liking.

6.5.3. Product newness perception

Although we should refrain from quantitative comparisons across countries, it seems interesting to look at the newness perception of the different products (f1 to f5 and T) in each country. Looking at scores (table 6.8) obtained on each dimension, based on factor loadings computed for each separate country, results are consistent with *a priori* expectations. Generally, products f1, f2 and f3, which were the result of a moderate change, rate lower on the two dimensions than f4, f5 and T, which resulted from a more radical change. Yet, results show a number of exceptions. For fabric softeners similar to previously existing products, f1 does rate high of both newness dimensions in Mexico and f3 appears to be perceived as being rather complex in the USA and Thailand. In contrast, f5 shows rather high *incongruity* scores (as expected) but low on *complexity* at least in the USA, Mexico and Thailand.

Table 6.8. Newness perception for each product in each separate country (factor scores)

		new fragrance					new technology
		similar to existing fragrances			dissimilar to existing fragrances		
		f1	f2	f3	f4	f5	T
Germany	incongruity	-0.34	0.11	-0.16	0.12	0.28	
	complexity	-0.01	-0.02	-0.09	0.10	0.02	
France	incongruity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	complexity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
USA	incongruity		-0.01	-0.19		0.11	0.09
	complexity		-0.11	0.15		-0.08	0.03
Mexico	incongruity	0.07		-0.13		0.07	0.00
	complexity	0.11		0.03		-0.13	-0.01
Indonesia	incongruity			-0.07		-0.01	0.09
	complexity			-0.11		0.09	0.02
Thailand	incongruity			-0.09		0.07	0.02
	complexity			0.07		-0.19	0.12

6.5.4. Perceived newness and liking

This analysis is conducted in all countries except France. We investigate the direction of the effect of each dimension on product liking in each country separately through a regression analysis.

Results (table 6.9) confirm a negative and significant effect of *complexity* on product liking (H_{3b} supported), which appears very strongly in the USA ($\beta = -0.519$). With

respect to *incongruity*, the quadratic term is not significant in any country except Germany. Consequently, the study globally shows evidence for a significant positive relationship between *incongruity* and product liking as was found in the initial country of application of the scale (H_{3a} partially supported). Moreover, the positive effect of *incongruity* appears specifically strongly in Indonesia ($\beta = 0.713$) and Mexico ($\beta = 0.506$). In terms of variance explained, the two dimensions have the a strong explanatory power for product liking in Indonesia (55%) but low in Germany (14%).

Table 6.9. Regression analysis on product liking in separate countries

Country	Adjusted R ²		standardized beta	t	Sig.	expected	result
Indonesia	.551	complexity	-.151	-3.815	0.000	negative	supported
		incongruity	.713	17.487	0.000	positive	supported
		incongruity ²	.000	-0.011	0.991	negative	n.s.
Thailand	.218	complexity	-.405	-7.610	.000	negative	supported
		incongruity	.308	5.964	.000	positive	supported
		incongruity ²	-.081	-1.516	.131	negative	n.s.
Germany	.140	complexity	-.356	-8.309	0.000	negative	supported
		incongruity	.091	-2.111	0.035	positive	supported
		incongruity ²	-.174	-4.147	0.000	negative	supported
France		complexity	n.a.			n.a.	
		incongruity	n.a.			n.a.	
		incongruity ²	n.a.			n.a.	
Mexico	.228	complexity	-.196	-4.166	.000	negative	supported
		incongruity	.506	10.169	.000	positive	supported
		incongruity ²	.018	.387	.699	negative	n.s.
USA	.257	complexity	-.519	-10.489	.000	negative	supported
		incongruity	.326	6.453	.000	positive	supported
		incongruity ²	.053	1.092	.275	negative	n.s.

6.6. Conclusions and discussion

Measurement equivalence appears as a key requirement in behavioral sciences for cross-national research (Hui and Triandis, 1985; Steenkamp and Baumgartner, 1998). In fact a lack of measurement invariance yields erroneous results when comparing countries on a quantitative basis. In this study we intended to provide evidence for the generalizability of the model by investigating cross-national equivalence of the two-dimensional newness scale and demonstrating the differential effect of the two newness dimensions on product liking in a cross-national context. This aimed at comparing newness perception of specific products in relation to the potential influence of cultural and market characteristics, as well as at evaluating potential differences in the magnitude of the effects on product liking across countries.

Measurement invariance was tested using the confirmatory factor analysis framework. This analysis did not yield satisfying results in terms of model fit early in the sequential procedure of the test and we had to refrain from quantitative comparisons

cross-countries. Yet, we could pursue the analyses by treating each country separately for within country comparisons of product newness perception. Additionally, we could examine the direction of the effects of the two newness dimensions across countries.

With respect to newness perception, results allow comparing products within a country and see which dimension drives newness of a particular product. Emphasizing the position of a product on the two dimensions in each country may be a key issue for successfully marketing this new product. In fact a new product should not be introduced and marketed in the same way whether perceived *incongruity* and/or *complexity* is the main driver of its newness for consumers. In this research, although quantitative comparisons cannot be performed, it appears that the nature of newness of a particular product may vary between countries (i.e. a same product may be perceived complex in one country but simple in another and the same goes for *incongruity*). Consequently, it seems that knowing the nature of product newness for consumers in a particular country may help managers finding a more adapted marketing mix for new product launches.

In the five countries (Indonesia, Thailand, Germany, Mexico and the USA) where the two newness dimensions could be identified, results confirm the negative effect of product perceived *complexity* on product liking. With respect to product *incongruity* we find no evidence for an inverted-U relationship with product liking, however and consistent with previous results (chapter 3) we find a positive influence of this dimension on product liking. In summary, in countries where the two newness dimensions are identified, these two dimensions exhibit a differential effect on product liking with a positive effect of perceived *incongruity* and a negative effect of perceived *complexity*. Yet, the explanatory power of the two dimensions for product liking greatly varies between countries (from 14 to 55%). This should thus be taken into account when evaluating the effect of perceived newness (country-dependent) on new product acceptance in a country.

The failure to demonstrate cross-national measurement invariance may have various origins. First it may be that there is indeed no measurement invariance across-countries for the two-dimensional scale. However we found strong theoretical basis that suggests that the two dimensions exist in various cultures and that the variables used do relate to newness (i.e. collative variables) and to each of the two dimensions, at least for some of them. Hence we do hope that the lack of invariance could be due to other effects. For instance, the translation of the scale was left to the local agencies that supposedly translated and back translated the items. Problems with the variable 'incongruent' tend to suggest that this procedure was not properly done across countries. Additionally, one main limitation may be the type of product at stake in the application. We used fabric softener, a product for which choice and hence liking is highly driven by the perception of the scent of the product in most countries. This means that the evaluation of the product as well as the evaluation of the newness itself is mainly based on sensory and hedonic elements. This may bring bias in the newness

evaluation which could explain the bad performance of the scale overall in these circumstances. Hence further research could extend in two distinct directions, first evaluating the performance of the scale with similar products in the country where it was originally developed, or second testing for invariance of the scale across countries with new packaged goods similar to the original scale development sample.

Chapter 7.

General conclusion and discussion

7.1. Summary and conclusions

This thesis specifically focuses on the issue of consumers' perception of product newness, on the influence this perception may have on product evaluation, and ultimately on product success on the market.

Chapter one emphasizes the importance of innovation for businesses, potential advantages and risks at stake when companies are first on the market. It reflects on the way newness has been conceptualized in the literature in the past, from a consumer perspective, from a company perspective, or both, and points the lack of emphasis on consumers' newness evaluations in past studies as the focus was mostly on experts' evaluations to facilitate data collection. The concluding section highlights the need for a theoretical basis to conceptualize newness, and presents themes and contributions of individual studies that form following chapters.

The importance of innovation for businesses together with the interest for consumers' reaction to innovation have given rise to a number of studies in psychology and consumer behavior. Chapter two gives the theoretical basis for a two-dimensional conceptualization of the newness construct. It clearly shows that, in the concern to get a complete picture of newness from a consumer's perspective, the operationalization of the construct should not be limited to newness *per se*. It should include more elements, taken from the psychology literature, closely related to newness, and falling into two major homogenous groups. Chapter two provides an extensive review on the consequences of newness at the sensory and cognitive level, essential to subsequently understand the impact of perceived product newness on new product acceptance.

Chapter three to five develop three related empirical studies, presenting the issue at hand and the rationale for each individual study as well as the hypotheses tested and

major findings. For clarity, key elements of each individual study are presented in table 7.1.

Table 7.1. Summary of the methods and findings in chapters 3 to 5

chapter	method	findings
3	<ul style="list-style-type: none"> • Computer-based questionnaires • New packaged goods (2 sets of 100 and 153 products) • Dutch consumers (2groups) 	<p>Two-dimensional newness construct: <i>incongruity</i> relates to the perceptual approach of newness by consumers whereas <i>complexity</i> requires more cognitive effort for consumers to make sense of the new product.</p> <p>Differential effect of the two dimensions on product liking: positive effect of <i>incongruity</i> versus negative effect of <i>complexity</i>.</p>
4	<ul style="list-style-type: none"> • Consumers' data collected in chapter 3 (2nd set of 153 products) • Market data (AC Nielsen database) at t = one year 	<p>Differential effect of the two dimensions on market success after one year: inverted-U effect of <i>incongruity</i> versus negative effect of <i>complexity</i>.</p> <p>Discrepancy between experts and consumers in newness assessment, and in the impact on market success.</p>
5	<ul style="list-style-type: none"> • Consumers' data collected in chapter 3 (2nd set of 153 products) • Longitudinal market data (AC Nielsen database), from launch to t = one year 	<p>Inverted-U diffusion curve over time, independent of the <i>incongruity</i> and <i>complexity</i> level.</p> <p><i>Incongruity</i>: no effect on the shape of the curve (may be due to the length of the period considered).</p> <p><i>Complexity</i>: flattening effect hence complex products take-off slower but in contrast with simple products, complex products did not reach the decreasing part of the inverted-U during the first year after launch.</p>

Chapter three identifies two dimensions pertaining to the newness construct. First, the dimension *incongruity*, which expresses the contrast immediately perceived between the new product and products that were known before or expectations aroused by past experience (Berlyne, 1960). It relates to the perceptual approach of newness by consumers and involves perceptual processing (Rosch, 1978, Springer, 2001). Second, the dimension *complexity* reflects the difficulty consumers may have to make sense of a new product. Consumers need to reduce *complexity* by the acquisition of knowledge, i.e. by epistemic behavior (Berlyne, 1960). In contrast with *incongruity*, *complexity* will thus require more cognitive effort from the consumer to make sense of the new product.

The contribution of this newness conceptualization is two-fold. First, it provides a complete picture of multiple elements participating to newness perception by consumers and potentially critical to new product acceptance. From this perspective, it brings a contribution to the literature on the newness construct that mainly approached newness as a one-dimensional continuum (Robertson, 1967, Johne and Snelson, 1988, Olson, in Adams and LaCugna, 1994) or as a multi-dimension construct delineating various dimensions such as newness to the firm, to the industry, to the consumer, to the market, to the world (Booz, Allen and Hamilton, 1982, Kleinschmidt and Cooper,

1991, Griffin and Page, 1996, Firth and Narayanan, 1996, Wind and Mahajan, 1997, Veryzer, 1998a). Yet, all these approaches did not specifically focus on consumers' perception of product newness although consumers are most relevant in product acceptance. Second, this conceptualization provides a clear delineation between two dimensions in newness perception by consumers. Because one dimension (*incongruity*) is mainly based on sensory perception whereas the other one (*complexity*) is more cognitive, this conceptualization is also more actionable than previous ones as it has direct implications for information processing and potentially new product acceptance. Supporting this, findings show a differential effect of the two dimensions on new product liking. Namely, *incongruity* exhibits a positive relationship whereas *complexity* exhibits a negative relationship with market success.

Chapter four goes beyond consumers' data on product liking and uses real life market data to assess the differential effect of the two newness dimensions identified on new product success. Findings establish a strong negative effect of *complexity* on market success of new products whereas *incongruity* exhibits an inverted-U relationship. First, by generalizing the differential effect of the two newness dimensions identified to market success, chapter four emphasizes the superiority of a two-dimensional newness conceptualization in identifying the positive and negative elements of newness from a consumers' perspective. This allows clarifying cases where new product rejection is due to newness. It clearly identifies perceived *complexity* as a negative element for market success and suggests better results could be achieved by decreasing new products' perceived *complexity*. Second, overall newness (assessed by consumers) also exhibits a tendency for an inverted-U relationship with market success, hence chapter four hints at a potential discrepancy between consumers and the experts' newness evaluation considered in this research (AC Nielsen's IBC model) in the way it affects performance. This emphasizes the necessity of taking consumers' opinion into account in order to understand what newness characteristics may drive consumers' acceptance of new products, and thus new product success.

Further, chapter five investigates the evolution of new products' success in the first year after launch depending on the two newness dimensions identified. Findings emphasize an inverted-U diffusion curve over time independently of the level of *incongruity* and *complexity* of the product. The inverted-U diffusion curve also holds when considering overall newness in place of the two newness dimensions. With respect to the specific effect of the two dimensions, *incongruity* fails to show any significant effect on the shape of the curve which may be due to the fact that we're dealing with aggregate data. Consequently we will refrain from making any conclusions regarding the effect of *incongruity* on the diffusion curve over time based on this study. Besides, *complexity* appears to have a flattening effect on the inverted-U curve: low *complexity* products tend to take-off faster than high *complexity* products. In that chapter 5 contributes to reinforce the negative effect of *complexity* on new products' acceptance on the short term but it is essential to notice that, contrary to simple products, complex products do not reach the decreasing phase on the inverted-

U within the first year after launch. Hence this suggests that complex products could potentially reach higher acceptance on the long run but data on one year after launch do not allow to test for that. Hence we can conclude on a competitive advantage of simple products over complex ones for early market success, yet, in the long run, data suggest that complex products could reach higher success levels (see figure 5.5 in chapter 5).

The last empirical chapter (chapter 6) deals with the issue of scale equivalence across countries. There is great interest in demonstrating scale equivalence in order to compare newness perception of specific products and related preference ratings across countries. The data collected do not allow concluding for measurement equivalence across countries for the two-dimensional newness measurement. Nevertheless, we could identify the two newness dimensions (*incongruity* and *complexity*) in five of the six countries. Qualitatively, results show that the nature of newness of a given product is not perceived the same in various countries, which means that for a same product, newness could be mainly driven by *incongruity* in one country and in contrast by *complexity* in another. Consequently, new products marketing practices should differ between countries to take such differences into account. Moreover, findings confirm the positive influence of *incongruity* and the *negative* influence of *complexity* found in initial scale development. Yet, the explanatory power of the two dimensions for product liking greatly varies between countries which should be included when making recommendations for new product acceptance.

Innovation is essential on today's markets for companies to maintain their competitive position but remains extremely risky and expensive (Golder and Tellis, 1993). New tools and methodologies allowing a better forecast of future new product acceptance are still highly necessary (Wind and Mahajan, 1997), and specifically consumer adapted methodologies (Steenkamp et al., 1994, Steenkamp and van Trijp, 1996). With respect to newness assessment, this thesis emphasizes the unique information brought in by consumers and its influence on market success.

First, this thesis identifies perceived *complexity* as a barrier to new product acceptance by consumers. The main recommendation for new product development would thus be to set perceived simplicity as an essential key to success. This does not mean that the product has to be simple in nature but that consumers have to understand it, whether it is immediately or over time, to guarantee its success. The fact that complex products are still in an increasing phase of market success at the end of the first year after launch suggests that acceptance could consist in a longer process for complex products compared to simple ones. Consequently, although initial perceived *complexity* appears as a barrier for short term success, it may not a barrier for long term success of a new product as long as consumers are able to solve the conflict generated by *complexity* over time. Through theoretical issues developed in chapter 2, 3 and 5 (e.g. Berlyne, 1960; Shapiro, 1999; Janiszewski and Meyvis, 2001), we know that if conflict between the new product and an existing cognitive structure remains

unsolved, frustration elicits negative evaluations. In contrast, if repeated exposure or epistemic behavior leads to feelings of conceptual fluency, it results in positive evaluations for the new product. This idea is summarized by Berlyne as follows “understanding a strange object... will break the deadlock which is delaying arousal reduction by... reducing conflict” (Berlyne, 1960: 196). Consequently, complex products could go through an evolution over time from rejection to acceptance as cognitive dissonance is solved. If such products encounter success on the long term companies should refrain from eliminating them in early phases of new product development on the basis of initial rejection. As a result, the concluding recommendation regarding complex products would be to test whether perceived *complexity* can effectively be reduced over time by means of marketing tools and in particular with adapted communication strategies.

The second main finding establishes a positive relationship of *incongruity* with product liking and an inverted-U relationship with market success (i.e. a positive relationship until a certain point only, after which the effect is reverse). This different result may be due to the fact that the study includes new packaged goods and thus remains in low newness levels in comparison with technological products for instance. As a consequence, liking may remain in the increasing phase of the inverted-U. Why do we then observe an inverted-U relationship with market success? We could hypothesize that the *incongruity* threshold level, after which acceptance decreases, may be lower for actual purchase compared to product liking. Consumers have been found to overestimate their liking for products, which does not reflect in actual purchase behavior (Namias, 1959). Following this, it may be that the range of newness included in this research does not reach the threshold level for product liking but overpasses it for actual purchase behavior and hence market success. To summarize, perceived *incongruity*, as long as it remains moderate, appears as a potential tool to increase acceptance.

7.2. Limitations and future research

This section will identify a number of limitations that can be attributed to this research. First, all studies presented in this thesis focus on information about perceived product newness and do not include a number of other product characteristics which could largely influence new product success. For instance, product quality (Sethi, 2000), product advantage, product ability to meet consumers’ needs, product price, or product technological sophistication have been found to have a major influence on new product market success (Henard and Szymanski, 2001). Second, although chapter six includes more countries most of the research on newness and its influence on market success has been developed in The Netherlands with Dutch new packaged goods and Dutch consumers. Third, this thesis focuses on consumers’ acceptance of new products however it cannot be freed from the influence of retailers. In fact, our studies only include products that first reached retailers’

acceptance as the sample only includes products referenced by retailers. Hence we do not include data for all new projects that did not even reach any distribution. Finally, and related to the previous point, we should mention that products included are rather successful products. In order to get some understanding of market success and to perform analyses in a useful way, there is a need for a bias towards products that make it for some time on the market.

Notwithstanding these limitations, this research filled a number of gaps in the theoretical account for newness conceptualization and its influence on new products' acceptance. It also suggests a number of promising issues for future research on the influence of product newness on market success of new products.

Managing to decrease consumers' perceived *complexity* or to increase perceived *incongruity* (to a moderate level only) appears as a critical issue to improve new product success. The fact that complex products gain success over time suggests that something could be done to facilitate their acceptance in the first place, or increase the speed at which they gain success (steeper diffusion slope). For instance, marketing tools can be used to decrease perceived *complexity*, or to facilitate product understanding and comprehensibility, resulting in higher acceptance for these products. In contrast, for low *complexity* products, comprehensibility is not an issue, but similar tools can be used to enhance competitive advantage based on *incongruity*, or difference with existing products. Consistent with this, Wansink (1994) showed that the most familiar (similar to existing) products should emphasise their newness by focusing on the differences whereas the most innovative products should refer to the familiar domains to reassure consumers. A number of theories could yield promising future research in this field.

One first direction for research could be to work on the type of information associated to the product. The literature on learning by analogy and categorization provides a number of elements in this direction. Learning by analogy suggests making parallels with existing products at the attributes or at the structural level. These parallels being based on similarities to increase perceived familiarity for complex products and make them simpler, in contrast emphasizing differences could help dislocating simple and congruent products and increase their perceived competitive advantage. Similarly, categorization theories suggest assigning the product to categories to help consumers make sense of it. In contrast, dislocating a product from a category could help enhancing its differences with existing products and its perceived *incongruity* with the category. Consequently, category assignment may be a key issue in new product success and this should not be left to the only responsibility of the retailer.

Another direction for research deals with the observability and triability of the product, two key success elements (Rogers, 1995) for new products. These two elements appear specifically essential in our case as they allow getting a better feel of 'what the product does' and 'what the product really is'. As a result, observability and triability may be critical in making sense of a product when necessary or in enhancing its true novelty if adequate. Investigating the relative importance of product

observability and triability in enhancing acceptance for new products depending on their *complexity* and *incongruity* level would have key managerial implications. This would be highly relevant to derive best promotion practices according to the newness type of the product. For instance with respect to complex products, initiating a first try (e.g. through sampling or free pack) and let consumers experiment this new product may be critical to its acceptance and future purchase. In contrast, for incongruent products other incentives such as price promotions or advertising may be more efficient to initiate a purchase.

Finally, our research included brand effect (strong brands versus secondary brands) and identified a positive influence of brand strength on market success. However, investigating the power of the brand at decreasing perceived *complexity* could be of interest. In other words, it seems interesting to investigate whether branding a product can allow launching more complex products as the brand has a reinsuring effect on consumers.

To summarize, after uncovering the effect of perceived *incongruity* and *complexity* on new product acceptance, it appears of interest to investigate the effect of various marketing tools on the perception of these two dimensions in order to make additional managerial recommendations.

References

A

- Aaker, D. (1991). *A. Managing Brand Equity, capitalizing on the value of a brand name*. New York: The Free Press, a Division of Macmillan, Inc.
- Abell, D. F. (1978). Strategic windows, *Journal of Marketing* 42 (July) : 21-28.
- Adams, M. and LaCugna, J. (1994). And now for something completely different: "really new products". Marketing Science institute. Report No. 94-124.
- Alba, J. W. and Hutchinson, W.J., (1987). Dimensions of consumer expertise. *Journal of Consumer Research*, 13 (March): 411-454.
- Aldrich, J.H. and Nelson, F.A. (1984.). *Linear Probability, Logit, and Probit models*. Sage University Series on Quantitative applications in the social Sciences no.07-045, Newbury Park and London. Sage Publications.
- Ali, A. (1994). Pioneering versus incremental innovation: review and research propositions, *Journal of Product Innovation Management* 11 : 46-61.
- Ali, A. Krapfel, R. and LaBahn, D. (1995). "Product innovativeness and entry strategy: impact on cycle time and break-even time." *Journal of Product Innovation Management* 12: 54-69.
- Atuahene-Gima, K. (1995). An exploratory analysis of the impact of market orientation on new product performance, *Journal of Product Innovation Management* 12 : 275-293.

B

- Bagozzi, Richard P. (1994). ACR Fellow Speech, *Advances in Consumer Research* 21 : 8-11.
- Bain, J.S. (1956). *Barriers to New Competition*, Harvard University Press, Cambridge MA.
- Baumgartner, H. and J.-B.E.M. Steenkamp (1996). Exploratory consumer buying behavior: Conceptualization and measurement. *International Journal of Research in Marketing* 13: 121-137.
- Bellenger, D.N. and P.K. Kergaonkar (1980). Profiling the Recreational Shopper. *Journal of Retailing*, Elsevier Science Publishing Company, Inc. 56: 77.
- Berlyne, D.E. (1960). *Conflict, arousal and curiosity* McGraw-Hill, New-York
- Berlyne, D.E. (1963). Complexity and incongruity variables as determinants of explanatory choice and evaluative ratings, *Canadian Journal of Psychology* 17 (3): 274-290.
- Berlyne, D.E. (1966). Curiosity and exploration, *Science* 153 : 25-33.
- Berlyne, D.E. (1967). Arousal and Reinforcement, *Nebraska Symposium on Motivation*, 15: 1-110.
- Berlyne, D.E. (1970). Novelty, complexity, and hedonic value, *Perception and Psychophysics* 8 (5A): 279-286.
- Berlyne, D.E. (1971). *Aesthetics and Psychobiology*, Appleton-Century-Crofts, New York.
- Berlyne, D.E. (1973). The vicissitudes of aplopathematic and thelematoscopic pneumatology (or the hydrography of hedonism), in: Berlyne, D. E. and Madsen, K. B., *Pleasure, Reward, Preference: their nature, determinants, and role in behavior* Academic Press, New York and London : 1-33.
- Berlyne, D.E. (1978). Curiosity and learning, *Motivation and Emotion* 2 : 97-175.
- Bettman (1979). *An information processing theory of consumer choice*. Addison Wesley, Reading MA.
- Bluthe, J. (1999). Innovativeness and Newness in High-tech Consumer Durables. *Journal of Product*

- and Brand Management; 8 (5): 415-429
- Blythe, J. (1999). Innovativeness and newness in high-tech consumer durables. *Journal of Product and Brand Management*; 8 (5): 415-429.
- Booz, Allen, and Hamilton, (1982). *New Product Management for the 1980s* Booz, Allen & Hamilton, New York
- Bornstein, R.F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968-1987, *Psychological Bulletin* 106 (2): 265-289.
- Bornstein, R.F. and D'Agostino, P.R. (1992). Stimulus recognition and the mere exposure effect, *Journal of Personality and Social psychology* 63 (4): 545-552.
- Brockhoff, K. and Chakrabarti, A.K., (1988). R&D / marketing linkage and innovation strategy: Some West-German experience, *IEEE Transactions on Engineering Management*, 35, 3 (August): 167-174.
- Bronnenberg, B.J.; Mahajan, V., and Vanhonacker, W.R. (2000) The emergence of market structure in new repeat-purchase categories: the interplay of market share and retailer distribution, *Journal of Marketing Research*, 37:16-31
- Bruner II, G.C., Hensel, P.J., (1992). *Marketing sales handbook: a compilation of multi-items measures*. Chicago, Illinois: American Marketing Association.
- Bruner, J.S. (1957). Going beyond the information given, in: Bruner, J. S., Gruber, H., Terrell, G., and Wertheimer, M., *Contemporary approaches to cognition* Harvard University Press, Cambridge M.A. 151-156.
- Bryk, A.S. and Raudenbush, S.W. (1992). *Advanced Qualitative Techniques in the Social Sciences: Hierarchical Linear Models: Applications and Data Analysis Methods* Sage publications Inc., USA
- Buzzell, R.D. and Gale, B.T. (1987). *The PIMS principles: Linking strategy to performance*, The Free Press, New York
- Byrne, B.M. (1998). *Structural Equation Modeling with Lisrel, Prelis and Simplis: Basic concepts, application and programming*. Lawrence Earlbaum Associates, Inc., NJ. p. 412.

C

- Cacioppo, J.T., Petty, R.E., (1989). The Elaboration Likelihood Model: the role of affect and affect-laden information processing in persuasion, in: *Cognitive and affective responses to advertising*, Cafferata, P., Tybout, A.M., Massachusetts: Lexington Books, 69-89.
- Cacioppo, J.T. and Petty, R.E. (1979). Effects of message repetition and position on cognitive response, recall, and persuasion, *Journal of Personality and Social Psychology* 37 (1): 97-109.
- Cancelli, A.A., Duley, S.M., Meredith, K.E. (1980). Subjective uncertainty as a predictor of specific exploration. *Journal of Psychology* 104(1): 3
- Capon, N., Farley, J.U., Hoenig, S.M., (1990). Determinants of financial performance - A meta-analysis, *Management Science*, 36, 10, 1143-1159.
- Carpenter, G.S. and Nakamoto, K. (1988). Market pioneering, learning and preference, *Advances in Consumer Research* Vol.15, M. Houston, ed. Provo, UT: Association for consumer research : 275-279.
- Carpenter, G.S. and Nakamoto, K. (1989). Consumer preference formation and pioneering advantage, *Journal of Marketing Research* 53 (August) : 285-298.
- Churchill, G.A. JR. (1979). A paradigm for developing better measures of marketing constructs, *Journal of Marketing Research* 16 : 64-73.
- Cohen, J. and Basu, K. (1987). Alternative models of categorization: towards a contingent-processing framework. *Journal of Consumer Research*, 13 (March): 4, 455-472.
- Cooper, R.G. (1979). The dimensions of industrial new product success and failure. *Journal of marketing*, 43 (summer): 93-103.
- Cooper, R.G. and Kleinschmidt, E. (1987). What separates winners from losers?, *Journal of Product Innovation Management* 4 : 169-184.
- Cooper, R.G. and de Brentani, U. (1991). New industrial financial services: what distinguishes the

References

- winners. *Journal of Product Innovation Management*. 8: 75-90.
- Cox, D. and A. Cox (1988). What does familiarity breed? Complexity as a moderator of repetition effects in advertisement evaluation, *Journal of Consumer Research* 15 (June) : 111-116.
- Cox, D. and A. Cox (1994). The effect of arousal seeking tendency on consumer preferences for complex product designs. *Advances in Consumer Research* 21(1): 554.
- Cox D. and A. Cox (2002). Beyond first impressions: the effects of repeated exposure on consumer liking of visually complex and simple product designs. *Journal of the Academy of Marketing Science*, 30(2): 119-130.
- Craig, S.C. and Douglas, S.P. (2002). *International Marketing Research*. Second edition. Prentice Hall, Inc., NY.

D

- Deighton, J.R., Romer, D., and McQueen, J. (1989). Using Drama to persuade. *Journal of Consumer Research*, 16: 335.
- Dhar, S., Hoch, S., and Kumar, N. (2001). Effective category management depends on the role of the category. *Journal of Retailing*, 77: 165-184.
- Douglas, S.P. and Craig, S.C. (1997). The changing dynamic of consumer behavior: Implications for cross-cultural research. *International Journal of Research in Marketing*. 14: 379.
- Dwyer, L.. and Mellor, R. (1991). New product process activities and project outcomes, *R&D Management*, 21, 1, 31-42.

E

- Eagly, A.H. and Chaiken, S. (1993). Process theories of attitude formation and change: the elaboration likelihood and heuristic-systematic models, in: Eagly, Alice H. and Chaiken, Shelly, *The psychology of attitudes* Harcourt Brace College Publishers, Orlando, US : 305-349.
- Edgett, S., Shipley, D., and Forbes, G., (1992). Japanese and British companies compared: Contributing factors to success and failure in NPD, *Journal of Product Innovation Management*, 9, 3-10.
- Erevelles, S. (1998). The role of affect in marketing. *Journal of Business Research*, 42: 199-215.
- Ernst & Young and AC Nielsen (2000), *New Product Introduction, Successful Innovation/Failure: A Fragile Boundary*, Paris: Ernst & Young Global Client Consulting.

F

- Fershtman, C., Mahajan, V., and Muller, E. (1990). Market share pioneering advantage: a theoretical approach, *Management Science* 36 (August) : 900-918.
- Firth, R.W. and Narayanan, V.K. (1996). New product analysis of large, dominant product manufacturing firms: An exploratory analysis. *Journal of Product Innovation Management*, Blackwell Publishing Limited. 13: 334.
- Fischler, C. (1990). *L'omnivore (The omnivore)*. Le gout, la cuisine et le corps. Odile Jacob, Paris.
- Fiske D.W. and Maddi, Salvatore R. (1961). A conceptual framework, in: Fiske, D.W. and Maddi, S.R. *Functions of varied experience*. The Dorsey Press Inc. Homewood, Ill.
- Fiske, S.T. (1982). Schema-triggered affect: applications to social perception, in: Clark, Margareth S. and Fiske, Susan T., *Affect & Cognition: The 17th Annual Carnegie Symposium* Lawrence Erlbaum Associates, Hillsdale, New-Jersey : 3-36.
- Fiske, S.T. and Pavelchak, M.A. (1986). Category-based versus piece-meal-based affective responses: development in schema-triggered affect, in: Sorrentino, Richard M. and Higgins, Tory E., *The Handbook of Motivation and Cognition* Guilford Press, New-York : 167-203.

- Fiske, S.T. and Neuberg, S.L. (1990). A continuum of impression formation from category-based to individuating processes: influences of information and motivation on attention and interpretation, *Advances in Experimental Social Psychology* 23 : 1-73.
- Fiske, S.T. and Taylor, S.E. (1991). Social categories and schemas, in: Fiske, Susan T. and Taylor, Sheeley E., *Social cognition 2nd Edition* ed. McGraw Hill, New York : 96-141.
- Foodmagazine (2000). Eindelijk! De waarheid over nieuwe producten. *Innovaties en me-too's ten onrechte bespot*. April issue.
- Ford, G.T., Smith, D.B., and Swasy, J.L. (1990). Consumer skepticism of advertising claims: testing hypotheses from economics of information, *Journal of Consumer Research* 16 : 433-441.
- Frish and Baron (1988). Ambiguity and Rationality. *Journal of Decision Making*, 1: 149-157.
- Fusco, C., (1994). And now for something completely different: "really new products", in: Adams, M., LaCugna, J., *Marketing Science Institute*, Report 94-124.

G

- Garcia, R. and Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review, *Journal of Product Innovation Management*; 19: 110-132.
- Gatignon, H., Robertson, T.S. (1991). Innovative decision processes, in: Robertson, T.S., Kassarian H.H., *Handbook of Consumer Behavior*, Englewood Cliffs, NJ: Prentice Hall. 316-348.
- Gentner, D. and Holyoak, K.J. (1997). Reasoning and Learning by analogy- Introduction, *American Psychologist* 52 (January) (1): 32-34.
- Germünden, H.G., Heydebreck, P., and Herden, R., (1992). Technological interweavement: a means of achieving innovation success, *R&D Management*, 22, 4, 359-376.
- Gilbert, R.J. and Newberry, D.M.G. (1982). Preempting patenting and the persistence of monopoly, *American Economic Review* 72 (June) : 514-526.
- Goldenberg, J., Lehmann, D.R., and Mazursky, D. (2001). The idea itself and the circumstances of its emergence as predictors of new product success. *Management Science*, 47 (January 1): 69-84.
- Goldenberg, J., Lehmann, D.R., and Mazursky, D. (1999). The Primacy of the idea itself as a predictor of new product success, *Marketing Science Institute (Working Paper Report No. 99-110)*
- Golder, P.N. and Tellis G.J. (1993). Pioneer advantage: Marketing logic or marketing legend? *Journal of Marketing Research (JMR)*. American Marketing Association. 30: 158.
- Golder, P.N. and Tellis G.J. (1997). Will it every fly? Modeling the takeoff of really new consumer durables. *Marketing Science*, INFORMS: Institute for Operations Research. 16: 256.
- Green, S.G., Gavin, M.B., and Aiman-Smith, L. (1995). Assessing a multidimensional measure of radical technological innovation, *IEEE Transactions on Engineering Management* 42 (August) (3): 203-214.
- Gregan-Paxton, J., John, D., (1997). Consumer learning by analogy: a model of internal knowledge transfer, *Journal of Consumer Research*, 24, 266-284.
- Griffin, A. and Page, A.L. (1996). PDMA success measurement project: Recommended measures for product development success and failure. *Journal of Product Innovation Management*, Blackwell Publishing Limited. 13: 478.

H

- Hansen, F. (1981). Hemispherical lateralization: implications for understanding consumer behavior. *Journal of Consumer Research*, 8(June): 23-36.
- Henard, D.H. and Szymanski, D.M. (2001). Why some products are more successful than others, *Journal of Marketing Research* 38 (August): 362-375.
- Hirschman, E.C. (1980). Innovativeness, Novelty Seeking, and Consumer Creativity. *Journal of*

References

- Consumer Research 7(3): 283.
- Hirschman, E.C., (1984). Experience seeking: A subjectivist perspective of consumption, *Journal of Business Research*, 12, 115-136.
- Hirschman, E.C., Holbrook, M.B., (1982). Hedonic Consumption: emerging concepts, methods and propositions, *Journal of marketing*, 46, 92-101.
- Hoch, S.J. and Deighton, J.R. (1989). Managing what consumers learn from experience, *Journal of Marketing* 53 (Spring) : 1-20.
- Hofstede, G. (1991). *Cultures and Organizations: Software of the Mind*. UK, Mac Graw-Hill.
- Holyoak, K.J. and Thagard, P. (1997). The analogical mind, *American Psychologist* 52 (January) (1): 35-44.
- Horn, J.L. (1965). A rationale and test for the number of factors in factor analysis, *Psychometrika*, 30, 179-185.
- Horn J.L., McArdle J.J., (1992). A practical and theoretical guide to measurement invariance in aging research, *Experimental Aging Research*, 18 (Fall-Winter), 117-144.
- Howard, R.W., Sheth, J.N., (1969). *The theory of buyer behavior*, New York.
- Hui, C.H. and Triandis, H.C. (1985). Measurement in cross-cultural psychology: a review and comparison of strategies, *Journal of Cross-cultural Psychology* 16 (June): 131-152.

J

- Janiszewski, C. (1988). Preconscious processing effects: the independence of attitude formation and conscious thought, *Journal of Consumer Research* 15 : 199-209.
- Janiszewski, C. (1990) The influence of print advertisement organization on affect toward a brand name. *Journal of Consumer Research*, 17(June): 53-65.
- Janiszewski, Chris (1993). Preattentive mere exposure effects. *Journal of Consumer Research*. 15 (september): 376-392.
- Janiszewski, C. and Meyvis, T. (2001). Effects of brand logo complexity, repetition and spacing on processing fluency and judgment, *Journal of consumer Research* 28 : 18-32.
- Johne, F.A. and Snelson, P.A. (1988). Success factors in product innovation: a selective review of the literature, *Journal of Product Innovation Management* 5 : 114-128.
- Jöreskog, K.G. (1971). Simultaneous factor analysis in several populations, *Psychometrika* 36 (December): 409-426.

K

- Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ, Prentice Hall.
- Kapferer, J-N. (1998). *Les leviers de la valeur ajoutée*. Kapferer, Jean-Noël. *Les marques, capital de l'entreprise*, third edition. Paris: Edition d'Organisation, 17-44.
- Keane, Mark T. (1996). On adaptation in analogy: tests of pragmatic importance and adaptability in analogical problem solving, *The Quarterly Journal of Experimental Psychology* 49 A (4): 1062-1085.
- Keller, K.L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *Journal of Marketing*, 57: 1-22.
- Kerin, Roger A., Varadarajan, Rajan P., and Peterson, Robert A. (1992). First mover advantage: A synthesis, conceptual framework and research propositions, *Journal of Marketing* 56 (October) : 33-52.
- Khan, B.E. and L. McAlister (1997). *Grocery revolution: the new focus on the consumer*. Reading, MA, Addison-Wesley.
- Kim, S.-i. (1999). Causal bridging inference: A cause of story interestingness. *British Journal of*

Psychology 90(1): 57.

- Kleinschmidt, E.J. and Cooper, R.G. (1991). The impact of product innovativeness on performance, *Journal of Product Innovation Management* 8 : 240-251.
- Kolodner, J.L. (1997). Educational implications of analogy, *American Psychologist* 52 (January) (1): 57-66.
- Krugman, H.E. (1977). Memory without recall, exposure without perception. *Journal of Advertising Research*, 17(4): 7-12.

L

- Lambkin, M. (1988). Order of entry and performance in new markets, *Strategic Management Journal* 9 (summer) : 127-140.
- Lawrence, R. (1993). Inside new-product statistics: more or less... new or not?, *Journal of Advertising Research* 33 (2): RC-3-RC-6.
- Leduc, R. (1965). Comment lancer un produit nouveau : conception, développement, commercialisation [s.n.], Paris.
- Lee, M. and D. Na (1994). "Determinants of technical success in product development when innovative radicalness is considered." *Journal of Product Innovation Management* 11: 62-68.
- Loewenstein, G.F. (1994). The psychology of curiosity: a review and reinterpretation. *Psychological Bulletin*, 116, (1): 75-98.
- Loken, B. and Ward, J. (1990). Alternative approaches to understanding the determinants of typicality, *Journal of Consumer Research* 17 : 111-126.

M

- Maddi, S.R. (1961). Exploratory behavior and variation-seeking in man, in: Fiske, D.W. and Maddi, S.R. *Functions of varied experience*. The Dorsey Press Inc. Homewood, Ill.
- Maddi, S.R. and Fiske D.W. (1961). An appraisal of the proposed conceptual framework, in: Fiske, D.W. and Maddi, S.R. *Functions of varied experience*. The Dorsey Press Inc. Homewood, Ill.
- Mahajan, V. and J. Wind (1992). New product models: practice, shortcomings and desired improvements. *Journal of Product Innovation Management*; 9(2): 128-139.
- Maidique, M. A. and Zirger, B. J, (1984). A study of success and failure in product innovation: The case of U.S. Electronics industry, *IEEE Transactions on Engineering Management*, EM-31, (4): 192-203.
- Malone (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science*, 4: 333-369.
- Mandler, G., (1982). The structure of value: accounting for taste. Clark, Margareth S. and Fiske, Susan T. *Affect & Cognition: The 17th Annual Carnegie Symposium*. Hillsdale, New-Jersey: Lawrence Erlbaum Associates, 3-36.
- Mandler, G. (1979). Emotion. In: Hearst, E. *The first century of experimental psychology*.
- Mazis, M.B., Sweeney, T.W, (1971). Novelty and personality with risk as a moderating variable, 406-411.
- Mc Guire, W.J. (1969). The nature of attitudes and attitude change. In: Lindzey, G. and Aronson E. *The handbook of social psychology*, 3: 136-314
- McAlister, L. and E. Pessemier (1982). Variety Seeking Behavior: An Interdisciplinary Review. *Journal of Consumer Research* 9(3): 311.
- Mehrabian, A. and J. A. Russell (1973). A measure of Arousal seeking tendency. *Environment and Behavior* 5(3): 315-333.
- Mehrabian, A. and J. A. Russell (1974). *An approach to environmental psychology*. Cambridge, MA, The MIT Press.
- Menon, S. and B. Kahn (2002). Cross-category effects of induced arousal and pleasure on the internet

References

- shopping experience. *Journal of Retailing* 78(1): 31-40.
- Meyers-Levy, J. and Tybout, A. M., (1989). Schema congruity as a basis for product evaluation. *Journal of Consumer Research*, 16 (June): 39-54.
- Mishra, S., Kim, D., and Lee, D.H. (1996). Factors affecting new product success: cross-country comparisons. *Journal of Product Innovation Management*, 13: 530-550.
- Mittelstaedt, R. A., S.L. Grossbart, et al. (1976). Optimal Stimulation Level and the Adoption Decision Process. *Journal of Consumer Research* 3(2): 84.
- Montoya-Weiss, M.M. and Calantone, R., (1994). Determinant of new product performance: A review and meta-analysis, *Journal of Product Innovation Management*, 11, 397-417.
- Moore, M.J., Boulding, W., and Goodstein, R.C. (1991). Pioneering and market share: is entry time endogenous and does it matter?, *Journal of Marketing Research* 28 (February) : 97-104.
- More, R. A. (1982). "Risk factors in accepted and rejected new industrial products." *Industrial Marketing Management* 11: 9-15.
- Moreau, C.P., A.B. Markman, et al. (2001). 'What Is It?' Categorization Flexibility and Consumers' Responses to Really New Products. *Journal of Consumer Research* 27(4): 489.
- Morfaux, L.M., (1980). *Vocabulaire de la philosophie et des sciences humaines*. 13^e Edition. Armand Colin, Paris.
- Mullen, M.R. (1995). Diagnosing measurement equivalence in cross-national research, *Journal of International Business Studies* 26 (3): 573-596.

N

- Namias, J. (1959). Intentions to Purchase Compared with Actual Purchases of Household Durables. *Journal of Marketing*, American Marketing Association. 24: 26.
- Narasimhan C., Neslin S.A. and Sen S.K. (1996). Promotional elasticities and category characteristics. *Journal of Marketing*, 60, (2): 17-30
- Netemeyer, R.G., Durvasula, S., and Lichtenstein, D.R. (1991). A cross-national assessment of the reliability and validity of the CETSCALE, *Journal of Marketing Research* 28 (August): 320-327.
- Nyström, H. (1985). Product development strategy: an integration of technology and marketing, *Journal of Product Innovation Management* 2 : 25-33.

O

- Obermiller, C. (1985). Varieties of mere exposure: the effects of processing style and repetition on affective response. *Journal of Consumer Research*, 12(June): 17-30.
- O'Connor, Colarelli G. (1998). Marketing learning and radical innovation: a cross case comparison of eight radical innovation projects, *Journal of Product Innovation Management* 15 : 151-166.
- Olney, T.J., Holbrook, M.B., and Batra, R., (1991). Consumer responses to advertising: The effects of ad content, emotions, and attitude towards the ad on viewing time, *Journal of Consumer Research*, 17, 440-453.
- Olshavsky, R.W. and Granbois, D.H. (1979). Consumer decision making - fact or fiction? *Journal of Consumer Research*, 6(September): 93-100.
- Olshavsky, R.W. and R.A. Spreng (1996). An exploratory study of the innovation evaluation process. *Journal of Product Innovation Management* 13(6): 512.
- Olson, E.M., Walker, Orville C., and Ruekert, R.W. (1995). Organizing for effective new product development: the moderating role of product innovativeness, *Journal of Marketing* 59 (January) (1): 48-62.
- Ozanne, J.L., M. Brucks and Grewal D. (1992). A study of information search behavior during the categorization of new products. *Journal of Consumer Research* 18(4): 452

P

- Parameswaran, R. and Yaprak, A. (1987). A cross-national comparison of consumer research measures, *Journal of International Business Studies* 18 (Spring): 61-73.
- Payne, J.W. (1976). Task complexity and contingent processing in decision making. An information search and protocol analysis. *Organizational Behavior and Human Performance*. 16 (august): 366-387.
- Petty, R.E. and Cacioppo, J.T. (1986). *Communication and persuasion. central and peripheral routes to attitude change* Springer-Verlag, New York
- Piaget, J. (1970). Piaget's Theory. in: P.H. Mussen. *Carmichael's Manual of Child Psychology* (3rd edition) vol.1. Willey, New York..

R

- Ram, S. and Sheth, J. (1989). Consumer resistance to innovations: the marketing problem and its solutions, *Journal of Consumer Marketing* 6 (2 (spring)): 5-14.
- Rethans, A.J., Swasy, J.L., and Marks, L.J. (1986). Effets of television commercial repetition, receiver knowledge, and commercial length: a test of the two-factor model, *Journal of Marketing Research* 33 : 50-61.
- Robertson, T.S. (1967). The process of innovation and diffusion of innovation. *Journal of Marketing*. 31: 14-19.
- Robinson, W.T. (1988). Sources of market pioneer advantages: the case of industrial goods industries, *Journal of Marketing Research* 25 (February) : 87-94.
- Robinson, W.T. and Fornell, Claes. (1985). Sources of market pioneer advantage in consumer goods industries, *Journal of Marketing Research* 22 (August) : 305-317.
- Rogers, E.M. (1995). *Diffusion of Innovations*, fourth edition ed. New York: The Free Press.
- Rosch, E. (1978). Principles of categorization. In: Rosch, Eleanor and Lloyd, Barbara B. *Cognition and categorization*. Hillsdale, New Jersey: Lawrence Erlbaum Associates publishers, 27-48.
- Ross, B.H. and Murphy, G.L. (1999). Food for thought: Cross-classification and category organization in a complex real world domain., *Cognitive Psychology* 38 : 495-553.
- Rozin, P. (1976). The selection of foods by rats, humans, and other animals. In: Rosenblatt, J.S., Hinde, R.A., Shaw, E. and Beer, C. *Advances in the study of behavior*. New York, Academy Press: 21-76.
- Russ, J. (1991). *Les Chemins de la pensée*. Second edition. Armand Colin, Paris.

S

- Sanchez, A.M. and Elola L.N., (1991). Product Innovation Management in Spain, *Journal of Product Innovation Management*, 8, 49-56.
- Sawyer, A.G. (1981). Repetition, Cognitive Response, and Persuasion. In: Petty, R.E., Ostrom, I.M. and Brock, T.C., *Cognitive Responses to Persuasion*. Hillsdale, NJ. Erlbaum: 237-262.
- Schmalensee, R. (1982). Product differentiation advantages of pioneering brands, *American Economic Review* 72 (June) : 349-365.
- Schmidt, J. B. and R. J. Calantone (1998). Are really new product development projects harder to shut down? *Journal of Product Innovation Management*, Blackwell Publishing Limited. 15: 111.
- Seamon, J.G., P.C. Williams, M.J. Crowley, I.J. Kim, S.A. Langer, P.J. Orne, and D.L. Wishengrad (1995). The mere exposure effect is based on implicit memory: effects of stimulus type, encoding conditions, and number of exposures on recognition and affect judgments. *Journal of Experimental Psychology: Learning, Memory, and Cognition*; 1995 Vol. 21 Issue May, p711-721
- Sethi, R. (2000). New Product Quality and Product Development Teams. *Journal of Marketing*,

References

- American Marketing Association. 64: 1.
- Shapiro, S. (1999). When an ad's influence is beyond our conscious control: perceptual and conceptual fluency effects caused by incidental ad exposure, *Journal of Consumer Research* 26 : 16-36.
- Sharma, S. and D. Weathers (2003). Assessing generalizability of scales used in cross-national research. *International Journal of Research in Marketing*. 20: 287.
- Singh, J. (1995). Measurement issues in cross-national research, *Journal of International Business Studies* 26 (3): 597-619.
- Song, M.X. and Montoya-Weiss, M.M. (1998). Critical development activities for really new versus incremental products. *Journal of Product Innovation Management*, 15, 124-135.
- Souder, W. E. and Song, M.X. (1997). Contingent product design, and marketing strategies influencing new product success, and failure in U.S. and Japanese electronic firms. *Journal of Product Innovation Management*, 14: 21-34.
- Springer, K. (2001). Perceptual boundedness and perceptual support in conceptual development. *Psychological Review*, 108(4): 691-708.
- Stang, D.J. (1975). Effects of "Mere Exposure" on learning and affect, *Journal of Personality and Social Psychology* 31 (1): 7-12.
- Stayman, D.M., D.L. Alden, K.H. Smith (1992). Some effects of schematic processing on consumer expectations and disconfirmation judgments. *Journal of Consumer Research*, *Journal of Consumer Research*, Inc. 19: 240
- Steenkamp, J-B.E.M., ter Hofstede, F., and Wedel, M. (1999). A cross-national investigation into the individual and national cultural antecedents of consumer innovativeness, *Journal of Marketing* 63 (April) (2): 55-69.
- Steenkamp, J-B.E.M., van Trijp J.C.M. and TenBerge J.M.F. (1994). Perceptual mapping based on idiosyncratic set of attributes. *Journal of Marketing Research*. 31: 15-27.
- Steenkamp, J.-B.E.M. and H. Baumgartner (1995). Development and cross-cultural validation of a short form of CSI as a measure of optimum... *International Journal of Research in Marketing* 12(2): 97.
- Steenkamp, J.-B.E.M., Baumgartner, H., and van der Vulp, E. (1996). The relationships among arousal potential, arousal and stimulus evaluation, and the moderating role of need for stimulation, *International Journal of Research in Marketing* 13 : 319-329.
- Steenkamp, J-B.E.M. and van Trijp J.C.M. (1996). Task experience and validity in perceptual mapping: a comparison of two consumer-adaptive techniques. *International Journal of Research in Marketing*. 13(3): 265-276.
- Steenkamp, J-B.E.M. and Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research, *Journal of Consumer Research* 25 (June): 78-90.
- Steenkamp, J-B.E.M. and Burgess, S.M. (2002). Optimum stimulation level and exploratory consumer behavior in an emerging consumer market, *International Journal of Research in Marketing* 19 : 131-150.
- Steenkamp, J-B.E.M. and Gielens, K. (2003). Consumer and Market drivers of the trial probability of new consumer packaged goods, *Journal of Consumer Research*, 30 (3): 368-385.
- Sujan, M. and Dekleva, C. (1987). Product categorization and inference making: some implications for comparative advertising, *Journal of Consumer Research* 14 (December) : 372-378.
- Sujan, M. (1985). Consumer knowledge: Effects of evaluation strategies Mediating Consumer Judgments, *Journal of Consumer Research* 12 (June) : 31-46.
- Sultan, F., Farley, J.U., and Lehman, D.R. (1990). A meta-analysis of applications of diffusion models, *Journal of Marketing Research* 27 : 70-77.

T

- Teubal, M., Arnon, N., and Trachtenberg, M., (1976). Performance in innovation in the Israeli electronics industry: a case study of biomedical electronics instrumentation, *Research Policy*, 5, 354-379.
- Tushman, M. and Nadler, D. (1986). Organizing for innovation, *California Management Review* 28 : 74-92.

Tversky, A. (1977). Features of similarity, *Psychological Review* 84 (July) : 327-352.

U

Urban, G.L., Carter, T., Gaskin, S., and Mucha, Z. (1986). Market share rewards to pioneering brands: an empirical analysis and strategic implications, *Management Science* 32 (June) : 645-659.

Utterback, J.M., Allen, T.J., Hollomon, H.J., and Sirbu Jr., M.A., (1976). The process of innovation in five industries in Europe and Japan, *IEEE Transactions on Engineering Management*, EM-23, 1, 3-9.

V

Vanhamme, J. and D. Snelders (2003). What If You Surprise Your Customers ... Will They Be More Satisfied? Findings from a Pilot Experiment.. *Advances in Consumer Research* 30(1): 48-56.

Venkatesan, M. (1973). Cognitive consistency and novelty seeking, in: Ward, S. and Robertson, Thomas. S., *Consumer Behavior: Theoretical Sources* Prentice Hall, Englewood cliffs, NJ : 354-384.

Venkatraman, M.P., MacInnis, D.J. (1985). The epistemic and sensory exploratory behaviors of hedonic and cognitive consumers, *Advances in Consumer Research*, 12, 102-107.

Veryzer, R.W. (1998a). Discontinuous innovation and the new product development process. *Journal of Product Innovation Management*, Blackwell Publishing Limited. 15: 304.

Veryzer, R.W. (1998b). Key factors affecting customer evaluation of discontinuous new products. *Journal of Product Innovation Management*, 15, 136-150

Veryzer, R.W. and Hutchinson, W.J. (1998). The influence of unity and prototypicality on aesthetic responses to new product designs, *Journal of Consumer Research* 24 : 374-392.

von Hippel, E. (1994). "Sticky information" and the locus problem solving: implications for innovation. *Management Science*. 40, (4): 429-439.

W

Wansink, B. (1994). Advertising's impact on category substitution, *Journal of Marketing Research*, Vol. 31 (November): 505-515.

Westbrook, R.A. and W.C. Black (1985). A Motivation-Based Shopper Typology. *Journal of Retailing* 61(1): 78.

White, A. and Smith, B.L. (2001). Assessing advertising creativity using the creative product semantic scale. *Journal of Advertising Research*, November-December: 25-37.

Wind, J. and Mahajan, V. (1997). Issues and opportunities in new product development: An introduction to the special issue. *Journal of Marketing Research*. 34 (1): 1-12.

Y

Yoon, E. and Lilien, G.L., (1985). New industrial product performance: The effects of market characteristics and strategy, *Journal of Product Innovation Management*, 3, 134-144.

[Young&Rubicam, http://www.yr.nl/engels/nederland/hetmerk/consult/body.html](http://www.yr.nl/engels/nederland/hetmerk/consult/body.html)

Z

Zajonc, (1968). Attitudinal effects of mere exposure. *Personality and Social Psychology Monographs*, 9(2): 1-27.

Ziamou, P. and J. Gregan-Paxton (1999). Learning of New Products: Moving Ahead by Holding Back. *Advances in Consumer Research*, Association for Consumer Research.

Zuckerman, M. (1979). Sensation seeking and risk taking. *Emotions in personality and psychopathology*. C. E. Izard: 163-197.

Zuckerman, M. (1990). The psychophysiology of sensation seeking. *Journal of Personality* 58: 313-345.

Zuckerman, M. (1994). Behavioral expressions and biosocial bases of sensation seeking. Cambridge University Press

Zuckerman, M., S. Ball, et al. (1990). Influences of sensation seeking, gender, risk appraisal and situational motivation on smoking. *Journal of Addictive Behaviors* 15: 209-220.

Summary

In the rapidly and radically evolving environment of recent decades, innovation is no longer a matter of profitability but it has become a critical survival factor for companies. Yet, innovation is expensive and risky: high failure rates on the market remain an unsolved problem. In this context, companies and their managers now have a crucial need for new tools to improve the probability of successful product introductions. To address this issue, a better understanding of consumers' acceptance of new products appears essential to gain insights into the dynamics of innovation and to improve companies' success with new product introductions.

Interest has been aroused by the observation that potentially successful new products may be rejected for reasons extrinsic to the real value of the product, yet intrinsic to the very fact that the product is new and unknown to consumers. Consequently, the ability to detect newness characteristics which lead to initial rejection by consumers, independently of the objective value of the product, would bring a significant improvement in new product development processes. The objective of this thesis is thus to gain a deeper understanding of the perception of newness by consumers in order to uncover elements which have a determinant influence on the direction of the affect towards new products. This research reviews a number of theories in psychology that enable the listing of elements which are closely associated and which are part of newness from a consumer perspective. Additionally, theories on the consequences of newness and theories on information processing by consumers give insight into a potential differential effect of the various newness elements on consumers' affect and ultimately on consumers' acceptance of new products. More specifically, this research builds on theories on arousal, categorization and learning by analogy that provide a theoretical understanding of the motives for acceptance and rejection of new products by consumers in relation to product newness characteristics.

The first empirical study conducted in this thesis (chapter 3) aims at developing an appropriate consumer-based evaluation of product newness. It proposes a two-dimensional conceptualization and measurement of newness, grounded in basic psychology, and reflecting consumers' understanding and perception of the construct. The scale is developed with two separate sets (n=100 and n=153) of new food products in the Netherlands. It includes a number of variables, which split into two separate dimensions. First, the scale comprises an incongruity dimension, i.e. a perceptual or sensory facet of newness, which does not require any deep information processing and can be managed by consumers at the 'perceptual processing' level. Second, the scale includes a complexity dimension, related to an epistemic aspect of newness, which requires deep, effortful and conscious information processing to be solved. Consequently, this two-dimensional scale provides an interesting contribution

to the literature on the newness construct as it addresses both the nature (cognitive or sensory) and the degree of product newness as consumers rate the products on the variables pertaining to the scale. The second contribution of this empirical study lies in the differential effect of the two dimensions on affect towards the new product. Preference data (second product set, n=153), show evidence for a differential effect of incongruity and complexity on new product liking. Namely, complexity exhibits a negative relationship whereas incongruity exhibits a positive relationship with new product liking. Moreover, the two-dimensional conceptualization of product newness performs better in explaining consumers' liking of new products than regular one-dimensional measures.

In this context, the second empirical study (chapter 4) aims at verifying whether these findings generalize to new product market success. The study is based on the acknowledgement that previous studies on success factors failed to establish a generalized relationship between product newness and market success. This failure could be at least partly due to the poor informative content of the product newness measures used in these studies. A logistic regression analysis is performed (second product set, n=153) including product newness characteristics (incongruity and complexity) and other relevant explanatory variables (i.e. brand strength, promotional activities, and category characteristics) for the market success of innovations. Results show that the two dimensions bring in valuable additional information to explain market success after one year. More specifically, the differential effect of incongruity and complexity found for product liking also holds for market success after one year. Consistent with the previous empirical study involving product liking, this study identifies a negative effect of complexity on market success after one year. With respect to incongruity, it shows an inverted-U shaped relationship with market success.

The purpose of the third empirical study (chapter 5) is to include some dynamics and incorporate the evolution over time to gain a better understanding of the situation after one year. This empirical study (second product set, n=153) elaborates on the effect of exposure on the way consumers manage newness and considers the effects of various types of information processing on affect. It uses Hierarchical Linear Modeling to investigate the potential influence of initial perceived incongruity and complexity on market success over time during the year following product launch. Results show a general inverted-U diffusion curve independent of the newness level. With respect to the newness dimensions, they confirm previous findings, that emphasized complexity as having a negative effect on new product success in the short run (one year): in a longitudinal study complexity appears to slow down new product take-off in the year of launch. In the long run however, conclusions may be rather different. As simple products are already on the decreasing part of the inverted-U one year after launch, complex products are still on the increasing part of the curve. This clearly suggests that simple products are successful in the short run whereas complex products gain success in the long run.

The last empirical chapter (chapter 6) addresses the generalizability of the model in six countries in Europe, Asia and America. The test conducted to investigate cross-national equivalence of the scale (multigroup LISREL for confirmatory factor analysis) failed to establish configural equivalence for the two-dimensional newness measurement across countries. However the two dimensions could be identified in five of the six countries. Qualitative comparisons between countries show that, for a given product, perceived newness may be driven by incongruity or complexity depending on the country. As a result, marketing practices should differ between countries to account for such differences. Moreover, findings across countries confirm the positive influence of incongruity and the negative influence of complexity on product liking.

The conclusion of the dissertation emphasizes the importance of considering product newness as a two-dimensional rather than a one-dimensional construct to explain consumers' acceptance of new products. It points at key information brought in by each of the two dimensions. First, if complexity appears as a barrier to new product success in the short run, it seems both theoretically and empirically reasonable to mention that complex products may go through an evolution from rejection to acceptance over time. This implies that new product developers and marketers should focus on rapidly and effectively reducing perceived complexity for such products and therefore develop adequate tools for this purpose. Second, perceived incongruity appears as a potential leverage for new product liking and hence should be used to attract attention towards new products and facilitate their acceptance. Finally, it is suggested that further research addresses the generalizability of these findings with more diverse product categories and the effectiveness of marketing tools to carry out the recommendations.

Samenvatting

In een milieu dat zich de afgelopen decennia snel en drastisch ontwikkeld heeft, is vernieuwing niet langer belangrijk om winstgevend te blijven, maar het is voor bedrijven een voorwaarde in de strijd om te overleven. Toch is innovatie duur en riskant: in veel gevallen mislukt de lancering op de markt en de reden blijft veelal een onopgelost probleem. In deze context zijn de nieuwe instrumenten waarmee men de slagingskans van de introductie van een nieuw product kan vergroten van cruciaal belang voor bedrijven en hun managers. Om deze kwestie te behandelen is het nodig een beter beeld te krijgen van de acceptatie van nieuwe producten door de consument opdat wij inzicht krijgen in de dynamiek van vernieuwing en zo het succes van bedrijven kunnen vergroten wanneer zij een nieuw product introduceren.

Het is interessant om op te merken dat nieuwe producten, die de potentie hebben om succesvol te worden, soms verworpen worden op basis van redenen die niet inherent zijn aan de werkelijke waarde van het product, maar wel inherent zijn aan het feit dat het product nieuw is en onbekend voor de consument. Wanneer men in staat zou zijn om aan te geven welke nieuwheidskenmerken leiden tot de eerste afwijzing door de consument, afhankelijk van de objectieve waarde van het product, dan zou dat een belangrijke verbetering betekenen voor de ontwikkelingsprocessen van nieuwe producten. Het doel van deze dissertatie is meer inzicht te krijgen in de perceptie van de consument van wat nieuw is, om elementen die van beslissende invloed zijn op de richting van het affect ten opzichte van nieuwe producten aan het licht te brengen. Dit onderzoek behandelt een aantal theorieën uit de psychologie, dat ons in staat stelt de elementen te inventariseren, die nauw verbonden zijn met nieuwheid en die daar deel van uitmaken vanuit het perspectief van de consument. Bovendien geven theorieën over de consequenties van nieuwheid en theorieën over informatieverwerking door consumenten, inzicht in een potentieel differentieel effect van de verschillende elementen van nieuwheid op het affect van de consument en uiteindelijk de acceptatie van de consument van nieuwe producten. Dit onderzoek bouwt met name voort op theorieën betreffende prikkeling, categorisering en analoog leren, die een theoretisch inzicht verschaffen in de motieven voor acceptatie en afwijzing van nieuwe producten door consumenten wat betreft de nieuwheidskenmerken van producten.

De eerste empirische studie van deze dissertatie (hoofdstuk 3) heeft als doel een goede consumentenevaluatie te ontwikkelen van de nieuwheid van producten. Hierin wordt een tweedimensionale conceptualisering en meting van nieuwheid geïntroduceerd, die onderbouwd wordt vanuit de basale psychologie en die het consumentenbegrip en de perceptie van conceptie weerspiegelt. Er wordt een schaal ontwikkeld met twee aparte reeksen ($n=100$ en $n=153$) van nieuwe voedingsproducten in Nederland. De schaal bevat een aantal variabelen, die weer onderverdeeld worden in twee aparte dimensies.

Allereerst bevat de schaal een incongruentie dimensie, d.w.z. een perceptueel of sensorisch aspect van nieuwheid, dat geen diepgaande informatie verwerking behoeft en dat door consumenten gehanteerd kan worden op het 'perceptuele verwerkingsniveau'. Daarbij bevat de schaal een complexiteitsdimensie, die gerelateerd is aan een epistemologisch aspect van nieuwheid, die een diepgaande, moeilijke en bewuste informatie verwerking vereist. Derhalve levert deze tweedimensionale schaal een interessante bijdrage aan de literatuur over de conceptie nieuwheid, aangezien deze zowel de aard (cognitief of sensorisch) als de mate van nieuwheid aan de orde stelt wanneer de consument de producten waardeert aan de hand van de variabelen op de schaal. De tweede bijdrage van deze empirische studie is gelegen in het differentiële effect van de twee dimensies op het affect ten opzichte van het nieuwe product. Gegevens over voorkeur (tweede product set, n=153), tonen aan dat er een differentiële affect bestaat wat betreft incongruentie en complexiteit ten opzichte van de voorkeur voor een nieuw product. Complexiteit vertoont namelijk een negatieve relatie terwijl incongruentie een positieve relatie aangeeft tot de voorkeur voor een nieuw product. Bovendien kan men met de tweedimensionale conceptualisering van de nieuwheid de voorkeur die een consument heeft voor een nieuw product beter verklaren dan met een gewone eendimensionale maatstaf.

In deze zelfde context beoogt de tweede empirische studie (hoofdstuk 4) te verifiëren of deze bevindingen in het algemeen leiden tot succes van een nieuw product op de markt. De studie kwam voort uit het feit dat eerdere studies over succes factoren er niet in slaagden een algemeen verband te leggen tussen de nieuwheid van een product en het succes op de markt. Dit kwam waarschijnlijk niet in de laatste plaats doordat de maatstaven voor de nieuwheid van een product, die in deze studies werden gebruikt, onvoldoende informatie bevatten. Er wordt een logistische regressie analyse gemaakt (tweede product set, n=153) waarin de kenmerken van de nieuwheid van een product (incongruentie en complexiteit) behandeld worden naast andere relevante en verklarende variabelen (zoals de kracht van een merk of promotie activiteiten) voor het slagen van vernieuwde producten op de markt. Uit de resultaten blijkt dat de twee dimensies waardevolle informatie toevoegen, die een verklaring geeft voor het succes op de markt na een jaar. Vooral het differentiële effect van incongruentie en complexiteit, zoals dat gevonden wordt voor productwaardering, zorgt voor succes op de markt na een jaar. In overeenstemming met de voorgaande empirische studie over productwaardering, wordt er in deze studie vastgesteld dat complexiteit een negatief effect heeft op het succes op de markt na een jaar. Incongruentie geeft een effect in de vorm van een omgekeerde "U" op het succes op de markt.

Het doel van de derde empirische studie (hoofdstuk 5) is er enige dynamica in op te nemen en de tijdsevolutie erin te integreren om de situatie na een jaar beter te kunnen begrijpen. Deze empirische studie (tweede product set, n=153) gaat uitvoerig in op het effect van publiciteit op de manier waarop consumenten omgaan met nieuwheid en het behandelt het effect van de verschillende manieren van informatie verwerking op het affect. Het maakt gebruik van Hiërarchisch Lineair Moduleren om onderzoek te

doen naar de mogelijke invloed van de eerste waarneming van incongruentie en complexiteit op het succes op de markt over een periode van een jaar na de lancering van een product. De resultaten laten een algemene verspreidingscurve in de vorm van een omgekeerde “U” zien, onafhankelijk van het nieuwniveau. Wat betreft de dimensies van nieuwheden, worden eerdere bevindingen bevestigd. Deze bevindingen bevestigden dat complexiteit een negatief effect heeft op het succes van een nieuw product op de korte termijn (een jaar). In een studie over een langere termijn blijkt complexiteit het aanslaan van een nieuw product te vertragen in het jaar van de lancering. Op de lange duur zouden de conclusies echter wel eens heel anders kunnen zijn. Terwijl eenvoudige producten al op het afnemende deel van de omgekeerde “U” zitten na de lancering, zitten complexe producten nog op de toenemende curve. Dit wijst er duidelijk op, dat eenvoudige producten binnen een korte periode succesvol zijn, terwijl complexe producten pas na een langere periode succes hebben.

Het laatste empirische hoofdstuk (hoofdstuk 6) behandelt de mogelijkheid om het model in zes landen in Europa, in Azië en Amerika te generaliseren. De proef, die werd uitgevoerd om de gelijkwaardigheid te onderzoeken van de schaal tussen de nationaliteiten (multigroep LISREL analyse van de versterkende factoren) slaagde er niet in een gelijkwaardigheid vast te stellen voor de tweedimensionale nieuwhedenmaatstaf tussen de landen onderling. De twee dimensies konden echter wel aangetoond worden in vijf van de zes landen. Kwalitatieve vergelijkingen tussen landen onderling, tonen aan dat het opmerken van nieuwheden veroorzaakt zou kunnen worden door incongruentie of complexiteit, afhankelijk van het land. Om dergelijke verschillen te ondervangen, dienen de marketing praktijken van landen onderling te verschillen. Bovendien bevestigen bevindingen in verschillende landen de positieve invloed van incongruentie en de negatieve invloed van complexiteit op de waardering voor een product.

De conclusie van deze dissertatie benadrukt dat het van belang is om de nieuwheden van een product te zien als een tweedimensionaal en niet als een eendimensionaal gebeuren om de acceptatie van de consument van nieuwe producten te verklaren. Het duidt aan welke sleutel informatie beide dimensies met zich mee brengen. In de eerste plaats, wanneer complexiteit een barrière lijkt te vormen voor het succes op de korte termijn, dan is het zowel theoretisch als empirisch redelijk om aan te voeren dat complexe producten op den duur kunnen evalueren van afwijzing naar acceptatie. Dit betekent dat diegenen die nieuwe producten ontwikkelen en verhandelen zich moeten concentreren op het snel en effectief reduceren van de waarneming van complexiteit voor dergelijke producten en daarvoor geschikte instrumenten moeten ontwikkelen. In de tweede plaats lijkt waargenomen incongruentie een mogelijke invloed te hebben op productwaardering en daarom zou het gebruikt moeten worden om de aandacht te vestigen op nieuwe producten en hun acceptatie te bevorderen. Ten slotte wordt nader onderzoek voorgesteld naar de mogelijkheid om deze bevindingen te generaliseren aan de hand van meer verschillende product categorieën en naar de effectiviteit van marketing instrumenten om de aanbevelingen uit te voeren.

Résumé

Avec l'évolution rapide et tangible de l'environnement dans les dernières décennies, l'innovation n'est plus uniquement un problème de rentabilité mais constitue un facteur essentiel de survie pour les entreprises. Cependant elle reste coûteuse et risquée : le taux élevé d'échec des nouveaux produits sur le marché reste un problème irrésolu. Dans ce contexte, les entreprises et leurs dirigeants ont un besoin vital d'outils nouveaux pour améliorer les chances de succès lors du lancement d'une innovation. Pour répondre à ce problème, une meilleure compréhension du processus d'acceptation des nouveaux produits par les consommateurs apparaît essentielle pour mettre à jour les dynamiques de l'innovation et améliorer la performance des entreprises dans ce domaine.

On observe notamment qu'un produit potentiellement appréciable peut être rejeté par les consommateurs pour des raisons extrinsèques à sa valeur réelle, et pourtant intrinsèques à sa nature du fait même de sa nouveauté et de sa méconnaissance de la part des consommateurs. En conséquence, la capacité à identifier les caractéristiques de nouveauté entraînant un rejet initial du produit, indépendamment de sa valeur réelle, améliorerait significativement le processus de développement de nouveaux produits. L'objectif de cette thèse est donc d'acquérir une meilleure connaissance de la nouveauté perçue par les consommateurs afin de discerner les éléments ayant une influence déterminante sur l'affect vis à vis des innovations. Cette recherche utilise des théories en psychologie permettant de lister les éléments étroitement associés à la nouveauté ou en faisant partie intégrante dans la perception de la part des consommateurs. En complément, des théories sur les conséquences de la nouveauté et le traitement de l'information par les consommateurs nous renseignent sur l'effet différentiel potentiel de ces éléments sur l'affect et finalement sur la réponse des consommateurs aux nouveaux produits. Plus spécifiquement, des théories sur l'excitation, la catégorisation et l'apprentissage par analogie fournissent un fondement théorique des motivations des consommateurs pour l'acceptation ou le rejet d'un nouveau produit en relation avec ses caractéristiques de nouveauté.

La première étude empirique (chapitre 3) vise à développer un système adapté d'évaluation de la nouveauté d'un produit. Elle propose un concept et une mesure bidimensionnels, fondés sur des bases psychologiques et reflétant la compréhension et la perception du construit par les consommateurs. L'échelle est développée à partir de deux échantillons distincts (n=100 et n=153) de nouveaux produits alimentaires lancés aux Pays-Bas. Les variables sont réparties selon deux dimensions identifiées. En premier lieu l'incongruité, une dimension perceptive ou sensorielle immédiatement saisie par le consommateur et ne requérant pas de traitement complexe de l'information. En second lieu la complexité, une dimension conceptuelle ou

épistémologique, se référant à des éléments requérant une réflexion consciente et intense pour traiter et comprendre l'information disponible. En conséquence, cette échelle bidimensionnelle fournit une contribution intéressante à la littérature sur le construit de la nouveauté dans le sens où elle incorpore à la fois la nature (perceptive ou épistémologique) et le degré de la nouveauté car les consommateurs évaluent la position du produit sur chacun des items de l'échelle. La seconde contribution de cette étude empirique s'appuie sur l'effet différentiel des deux dimensions sur l'affect vis à vis d'une innovation. Des données sur la préférence (2ème échantillon, n=153), prouvent un effet différentiel de l'incongruité et de la complexité sur l'appréciation d'un nouveau produit. A savoir, la complexité a une incidence négative tandis que l'incongruité a une incidence positive quant à l'appréciation du produit. De plus, une conceptualisation bidimensionnelle du construit permet mieux d'expliquer l'appréciation d'un nouveau produit que les mesures unidimensionnelles usuelles.

Dans ce contexte, la seconde étude empirique (chapitre 4) vise à vérifier si ces résultats se généralisent aux performances de marché. L'étude se base sur le constat que les études précédentes sur les facteurs de succès des nouveaux produits ont échoué à démontrer une relation généralisée entre nouveauté et succès. Cet échec pourrait être au moins en partie dû à la pauvreté du contenu informatif des mesures de nouveauté utilisées dans ces études. Ce chapitre utilise une régression logistique incluant les caractéristiques de nouveauté (incongruité et complexité) ainsi que d'autres variables explicatives pertinentes (par ex. la force de la marque ou les activités promotionnelles) pour expliquer le succès des innovations sur le marché (2ème échantillon, n=153). Les résultats montrent que chacune des deux dimensions apporte une contribution substantielle. L'effet différentiel de l'incongruité et de la complexité trouvé pour l'appréciation du produit se maintient quand il s'agit du succès sur le marché un an après lancement. En accord avec l'étude précédente, cette étude identifie un effet négatif de la complexité sur le succès. Concernant l'incongruité, elle montre une relation en U-inversé.

Le but de la troisième étude empirique (chapitre 5) est d'inclure une dynamique et d'incorporer une évolution temporelle permettant d'acquérir une meilleure compréhension de la situation un an après lancement. Cette étude (2ème échantillon, n=153) considère l'effet de l'exposition au produit sur la façon dont les consommateurs gèrent la nouveauté, et l'effet de différents types de traitement de l'information sur l'affect. Elle explore l'influence potentielle de l'incongruité et de la complexité initialement perçues sur le succès tout au long de l'année suivant le lancement du produit en utilisant un Modèle Hiérarchique Linéaire. Les résultats montrent une courbe de diffusion en U-inversé, indépendamment du niveau de nouveauté. Concernant les deux dimensions, les constats précédents sont confirmés : l'étude met en avant la complexité comme élément ayant un effet négatif sur le succès d'un produit à courte échéance (un an) : dans l'étude longitudinale, la complexité ralentit l'essor du nouveau produit. En revanche sur le long terme, les conclusions pourraient être sensiblement différentes. Alors que les produits simples se trouvent

déjà dans la partie décroissante de la courbe un an après leur lancement, les produits complexes sont encore sur la partie croissante de cette courbe. Ceci suggère donc clairement que les produits simples réussissent sur le court terme alors que les produits plus complexes accèdent au succès à plus long terme.

Le dernier chapitre empirique (chapitre 6) aborde le problème de la généralisation du modèle dans six pays en Europe, Asie et Amérique. Le test conduit pour examiner l'équivalence internationale de l'échelle (LISREL multi-groupes pour une analyse de facteur confirmative) ne permet pas d'établir une équivalence configurale concernant la mesure bidimensionnelle dans ces pays. Cependant les deux dimensions ont pu être identifiées dans cinq des six pays étudiés. Des comparaisons qualitatives entre pays ont montré que, pour un produit donné, la nouveauté perçue pouvait émaner principalement de l'incongruité ou de la complexité selon le pays. Conséquemment les pratiques marketing devraient aussi varier d'un pays à l'autre pour tenir compte de ces différences. De plus, les résultats dans les différents pays confirment l'influence positive de l'incongruité et négative de la complexité sur l'appréciation d'un nouveau produit (lors de la première exposition au produit).

La conclusion de cette thèse met en avant l'importance de considérer la nouveauté du produit comme un construit bidimensionnel plutôt qu'unidimensionnel. Elle précise l'information unique apportée par chacune des deux dimensions. En premier lieu, si la complexité apparaît comme une barrière au succès des innovations sur le cours terme, il semble à la fois théoriquement et empiriquement raisonnable de mentionner que les produits plus complexes pourraient évoluer d'une situation de rejet vers celle de l'acceptation au cours du temps. Ceci implique que le développement et le marketing des nouveaux produits devraient se focaliser sur la réduction rapide et effective de la complexité perçue des produits et, pour ce faire, développer des outils adéquats. En second lieu, l'incongruité perçue apparaît comme un levier potentiel pour l'appréciation des innovations et donc devrait être utilisée pour attirer l'attention sur les nouveaux produits et faciliter leur acceptation. Enfin, il est suggéré que la recherche à venir se porte sur la possibilité de généralisation de ces résultats sur d'autres catégories de produits et sur l'efficacité d'outils marketing pour mener à bien nos recommandations.

Curriculum Vitae

Anne Michaut (Beaumont - France, 1975) received her highschool diploma in 1993 at Lycée Hoche in Versailles (France), where she began studying agronomics at preparation school. She obtained an engineer degree from the École Nationale Supérieure Agronomique de Toulouse (France) in 1998 and a Master of Science degree with specialization in Marketing and Consumer Behavior in 1999 at Wageningen University (The Netherlands) after completing a master thesis entitled “influence of product-odor congruency on product evaluation” supervised by Dr. Rick Schifferstein. In the same year, she began her doctoral dissertation research at Wageningen University. Since September 2003 she has been an Assistant Professor at HEC School of Management, Paris.

Her main research interests are in new product development, consumer behavior and international marketing.