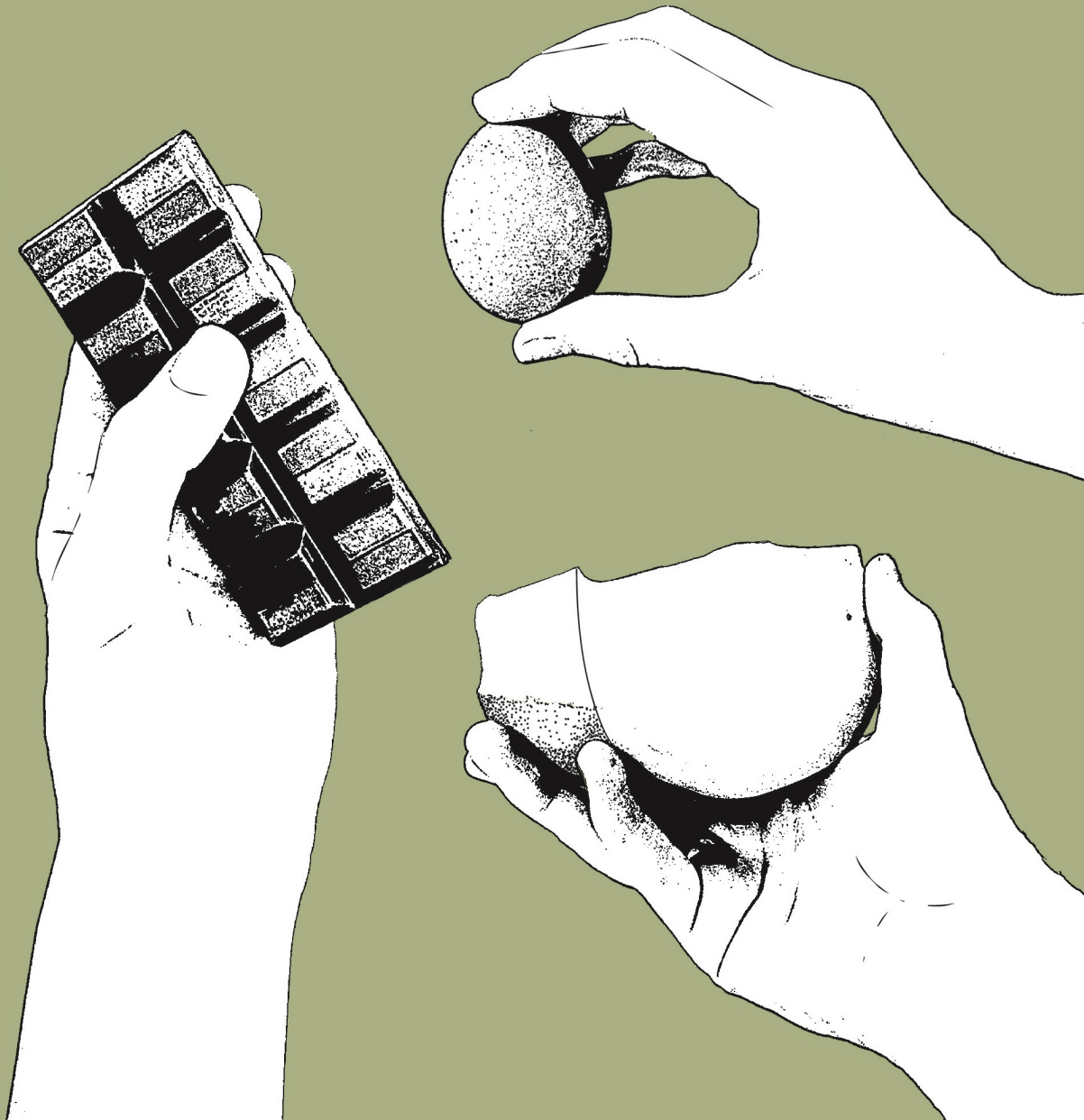


# **Understanding heterogeneity in decision-making among elderly consumers:**

## **The case of functional foods**

Lotte D. T. van der Zanden



## **Propositions**

1. The elderly consumer population can best be understood through segmentation.  
(this thesis)
2. Chronological age is not a relevant variable in consumer research.  
(this thesis)
3. In the battle against obesity, interventions should aim to change what people eat rather than how much they eat.
4. Food safety is overrated as a concern in the E-number controversy.
5. Funding universities to appoint more female professors does not increase gender equality.
6. Open access publishing has the power to initiate the next information age.

Propositions belonging to the thesis, entitled:

“Understanding heterogeneity in decision-making among elderly consumers: The case of functional foods”

Lotte D. T. van der Zanden  
Wageningen, Tuesday 4 July 2017

**Understanding heterogeneity in  
decision-making among elderly consumers:**  
The case of functional foods

**Lotte D. T. van der Zanden**

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This research was conducted under the auspices of the Wageningen School of Social Sciences (WASS).



# **Understanding heterogeneity in decision-making among elderly consumers: The case of functional foods**

**Lotte D. T. van der Zanden**

## **Thesis**

submitted in fulfilment of the requirements for the degree of doctor  
at Wageningen University  
by the authority of the Rector Magnificus,  
Prof. Dr A.P.J. Mol,  
in the presence of the  
Thesis Committee appointed by the Academic Board  
to be defended in public  
on Tuesday 4 July 2017  
at 4:00 p.m. in the Aula.

Lotte D. T. van der Zanden

Understanding heterogeneity in decision-making among elderly consumers:

The case of functional foods.

162 pages.

PhD thesis, Wageningen University, Wageningen, the Netherlands (2017)

With references, with summary in English

ISBN: 978-94-6343-143-9

DOI: <http://dx.doi.org/10.18174/410027>

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# Chapter 1

## General introduction

Part of this chapter is published as:

L. D. T. van der Zanden & H. C. M. van Trijp (2016). Chapter 16: Designing new and functional foods for the ageing. In M. M. Raats, L. C. P. G. M. de Groot & D. van Asselt (Eds.), *Food for the ageing population, 2nd edition* (pp. 323-347). Cambridge, UK: Woodhead Publishing.

## Background of the thesis

1

Life expectancy in developed countries has increased rapidly over the past century. While most people did not live past the age of 50 in 1900, the average life expectancy now lies around 80 years of age (National Institute on Aging, 2011). This increased life expectancy, in combination with a declining birth rate over the past few decades, has resulted in a strong growth of the elderly population relative to younger populations (Bongaarts, 2002), and this trend is continuing. In the next 40 years, the proportion of consumers aged 65 and older in the population is expected to rise to 20% in the United States and to 29% in Europe (European Commission, 2009; U.S. Census Bureau, 2010). Even though elderly stay healthy for a longer time, old age is still associated with a higher incidence of various conditions (e.g. osteoporosis and sarcopenia) that pose a threat to the quality of life of elderly and result in high healthcare costs (Fried, Bradley, Williams & Tinetti, 2001; de Souza Genaro & Martini, 2010). With the growth of the elderly population it is becoming increasingly important to support elderly in maintaining good health, and thereby support their wellbeing and independence.

A range of products and services have been developed that can help elderly to stay active and healthy, such as mobility aids (Allen, Foster & Berg, 2001), home modifications (Kruse et al., 2010), hearing aids (Cox, Alexander & Gray, 2005), and functional foods (Dolinsky et al., 2015). Such products and services have the potential to improve the quality of life of elderly and to help them stay independent for longer, but their acceptance is limited (Lancaster & Williams, 2002; Cox, Alexander & Gray, 2005; McCreddie & Tinker, 2005; Resnik et al., 2009). A key challenge is to position products and services for elderly on the market in such a way that elderly can see their value and will start using them.

Although the elderly consumer population was largely neglected up to the 1980s (Moschis, 2003), companies as well as health institutions are becoming increasingly aware that elderly consumers are worthwhile to direct their attention to (Moschis, 2003). Targeting this large population is not only beneficial for public health and wellbeing, but can also be profitable (Moschis, Curasi & Bellenger, 2004). Elderly consumers are relatively wealthy and willing to spend money on innovative products and services (Leek, Szmigin & Carrigan, 2001; Yoon & Cole, 2008; Karani & Fraccastoro, 2010). In developing such products and services, it is crucial to know what elderly need (i.e. their physical and psychological demands) and want (i.e. their preferred way of fulfilling these demands) and understand how they make decisions, as it is ultimately on the consumer to judge whether or not products and services are worth spending their money on (Grunert & van Trijp, 2014). Elderly consumers are, however, not understood very well and both companies and health institutions are unsure about how to

market their products and services to them (Sahyoun, Pratt & Anderson, 2004; Purinton-Johnson, 2013).

This thesis aims to provide a deeper understanding of decision-making among elderly consumers, using functional foods as an example, and thereby support companies and health institutions in effectively developing products and services that meet both the needs and wants of elderly.

### **Consumer orientation in developing products and services for elderly**

Understanding consumers as a basis for marketing decisions is the central idea behind consumer-oriented new product and service development, which states that the success of a product or service, such as a functional food, depends on the fit between its benefits and the needs and wants of the consumer (Grunert, Baadsgaard, Larsen & Madsen, 1996; Steenkamp & van Trijp, 1996; Grunert & van Trijp, 2014). In order for companies and health institutions to achieve such a fit, it is vital for them to have insight in the needs and wants of consumers, and understand the way in which consumers make purchase and consumption decisions based on these needs and wants. Employing such consumer orientation in both early (e.g. concept formulation) and later phases of development (e.g. prototype testing) positively contributes to the success of new products and services (Ernst, 2002).

#### *Framework for consumer-oriented development*

To structure thinking about the development of products and services for elderly, this thesis builds on a framework for consumer-oriented new product and service development, adapted from Grunert and van Trijp (2014) (see Figure 1.1). This framework distinguishes three key stages in the process of consumer decision-making that can be used in the process of developing products and services for the elderly: want formation, inference formation, and intention formation.

Wants, or desires, represent the benefits that consumers (consciously or unconsciously) seek in a product or service, such as safety, convenience or healthiness. The development of these wants is guided by physical and psychological needs (e.g. an increased need for protein), personality, values as well as the situation a consumer is in (Grunert & van Trijp, 2014). What elderly consumers want from food products, for example, includes the benefits that consumers want in general (e.g. great taste, high convenience and affordable price), but also includes age-specific benefits emerging from physical limitations (e.g. reduced taste sensitivity, specific nutritional needs) which may become relevant to different consumers at

different ages. Success in the development of products and services depends on the extent to which this total configuration of desired benefits is successfully identified and translated into benefits (Haley, 1968; Onwezen et al., 2010).

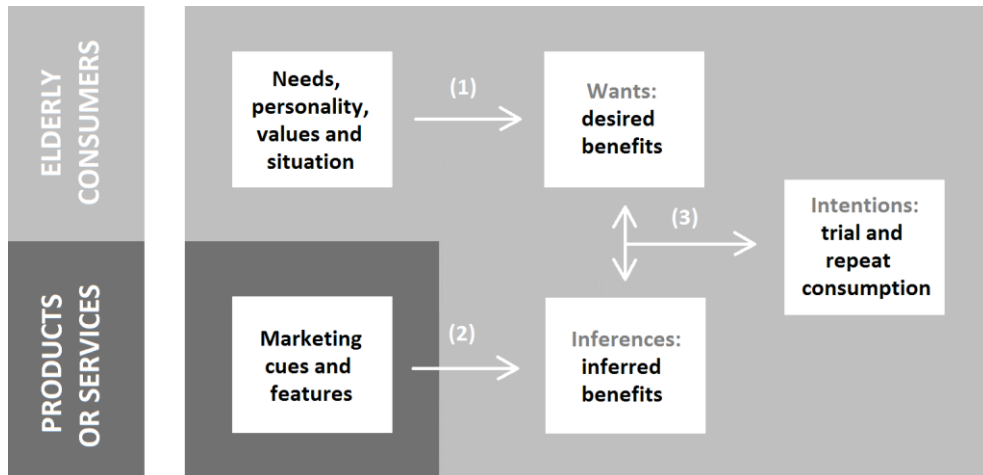


Figure 1.1. Framework of consumer decision-making, illustrating the process of forming (1) wants, (2) inferences, and (3) intentions (adapted from Grunert & van Trijp, 2014).

When confronted with products or services (e.g. in advertisements), consumers use a diversity of marketing-related cues to infer what they believe products and services have to offer in terms of (relevant) consumption benefits: the process of *inference formation*. Consumers make such inferences from a selection of cues observed in the offering (e.g. its features, packaging and communication); a process which involves a considerable amount of subjectivity. Truly “decoding” what the product or service has to offer in terms of benefits is challenging, particularly in the case of a limited amount of available information or experience with comparable products or services, or limited motivation or cognitive capacity to deeply process available information. Consumers may thus not always infer benefits as they were intended by the manufacturer (Grunert & van Trijp, 2014). Inference formation is especially challenging for innovative products and services, such as functional foods, as they tend to violate consumer expectations and habits (Grunert & van Trijp, 2014). Such products and services require positioning and communication strategies that clearly and convincingly communicate the benefits that they deliver (Costa, Dekker & Jongen, 2004).

*Consumption (i.e. usage) intentions, or goals*, are formed when consumers perceive a match between what they want (i.e. their desired benefits) and what they believe the product or service has to offer (i.e. the inferred product benefits) (Kardes, Posavac & Cronley, 2004).

Upon first-time (i.e. trial) consumption of the product or service, consumers may be able to verify some (e.g. taste, convenience) but not all (e.g. health and sustainability) inferred benefits, which may help them to decide whether the product or service is worthwhile the sacrifice (e.g. price and other costs of obtaining the product) (Grunert & van Trijp, 2014). Trial consumptions are a necessary but insufficient condition for success (Tauber, 1973). In the end, it is the experience of relevant benefits (or the lack thereof) that will determine whether or not consumers will be convinced to repeat purchase and use the product or service and become a loyal customer.

### *Characteristics of the elderly consumer population*

Although elderly share an age bracket, there is a high level of heterogeneity among them (Atchley, 1987). Elderly consumers have had a lifetime of experiences that have shaped their needs and wants in unique ways (Moschis, 2000). To some extent, this heterogeneity among elderly consumers can be explained by the fact that this population represents a variety of different cohorts, depending on the time and place they were born and raised (Schewe & Meredith, 2004). As a result of heterogeneity in needs and wants, elderly form different inferences and intentions, and will likely respond differently to interventions and marketing efforts targeted to them. Indeed, studies show that elderly consumers strongly differ from each other on a range of consumption behaviours, such as luxury purchasing (Amatulli, Guido & Natarajan, 2015), (leisure) traveling (Hildebrand, 2003; Sangpikul, 2008) and restaurant selection (Moschis, Curasi & Bellenger, 2003), as well as more psychological measures such as lifestyle (Hildebrand, 2003), cognitive age (Amatulli, Guido & Natarajan, 2015), sought product benefits (Sangpikul, 2008) and shopping orientation (Lumpkin, 2000).

To appreciate heterogeneity in the needs and wants of elderly consumers, it is critical to apply a strategic marketing approach based on market segmentation. Market segmentation is a tool used to divide broad, heterogeneous populations into smaller, more homogenous subgroups (segments) (Wedel & Kamakura, 2000). Once a population is segmented, one or more segments can be selected for targeting, and differentiated approaches can be developed, for example, through product design and positioning (Kotler, 1984). Although the population of elderly can theoretically be segmented in many different ways, the resulting segments differ in the extent to which they are able to provide informative input for interventions and marketing efforts (Kotler, 1984). For example, there is a long tradition of using *demographics* such as age to segment consumer populations, as such information is easy to identify (Mathur, Moschis & Lee, 2008) and easy to understand (Honkanen, Olsen & Myrland, 2004). Demographics account for little variation in behaviour, however, and provide limited guidance for the development and positioning of products and services



(Steenkamp & Ter Hofstede, 2002; Rozin, 2006; Locher et al., 2009). It is necessary to find more relevant ways to distinguish between consumers than those based on sheer age, such that we gain more insight into how to develop products and services for elderly that meet their diverse needs and wants.

When *positioning* products and services for elderly on the market, putting an emphasis on their age bracket is also recommended against, as elderly tend to respond negatively to products or services associated with old age (e.g. senior discounts) (Tepper, 1994; Faranda & Schmidt, 1999). This negative response is likely due to age-based stereotyping. Most Western cultures hold a negative view of old age, associating it with both physical and psychological disability (Sudbury & Simcock, 2009) and this view is reinforced by the media, in which elderly are often displayed as fragile, impaired and needy (Widrick & Raskin, 2010). In addition, most elderly feel younger than their chronological age (Sudbury & Simcock, 2009) and report not identifying themselves with old models and spokespersons in the media (Moschis & Mathur, 2006). Simply labelling products and services for elderly as “50+” will thus likely not motivate consumers to start using them. In approaching elderly with products and services, an emphasis should instead be placed on communicating the benefits that these products and services provide (Costa, Dekker & Jongen, 2004). Using such a positioning will help elderly to recognize that products and services offer benefits that match with their needs and wants, and will more likely lead to the formation of consumption intentions.

### **Functional foods for elderly consumers as an example**

On the food market, there are many opportunities for developing products and services for elderly consumers, as the nutritional needs of consumers change with age (Horwath, 2002). Due to changes in body composition, physical performance, and functioning of the organs, older adults have a decreased need for certain micro- and macronutrients, such as vitamin A, and an increased need for many others, including calcium, vitamin D and protein (Horwath, 2002; Brownie, 2006). Although increased nutritional needs among elderly can theoretically be dealt with by increasing nutritional intake, in practice this is often not feasible as food intake tends to decline with age (Martone et al., 2013). Due to illness, medicine usage and physiological changes that result from aging (de Jong, Mulder, de Graaf & van Staveren, 1999), elderly often have a reduced appetite (Martone et al., 2013) or experience issues related with the preparation and consumption of food (Maitre et al., 2014) that lead to a reduced food intake and an increased risk of developing nutritional deficiencies.

Nutritional deficiencies contribute to the development of various medical conditions, such as sarcopenia (i.e. loss of muscle mass) and osteoporosis (i.e. loss of bone mass), and thereby pose a threat to both health and wellbeing (Brownie, 2006). In addition, conditions like these impair the ability to perform routine activities of daily living (Fried, Bradley, Williams & Tinetti, 2001), including food preparation and consumption, and may thereby not only reduce independence, but also exacerbate nutritional deficiencies and cause a vicious circle that is difficult to escape from (Brownie, 2006). To maintain their independence and wellbeing, it is crucial for elderly to prevent nutritional decline in the first place, by meeting their increased nutritional needs (Brownie, 2006; Visvanathan & Chapman, 2010).

The development of functional foods may support elderly in meeting these nutritional needs (Dunne & Dahl, 2007; Betoret, Betoret, Vidal & Fito, 2011). Functional foods are conventional food products that are designed to provide a physiological benefit (Crowe & Francis, 2013). In these foods, either levels of existing components are increased (e.g. vitamins), new components are added to the food (e.g. fibres) or undesirable components (e.g. fat or sugar) are removed or replaced (e.g. in light products) (Sloan, 2000; Spence, 2006). Functional foods are widely available in the supermarket and have been launched in various markets, such as the dairy-, confectionery, soft-drinks, bakery and baby-food market (Menrad, 2003; Kotilainen, Rajalahti, Ragasa & Pehu, 2006), with well-known examples like calcium-enriched juice, omega-3-enriched spread and fibre-enriched cereals (Verbeke, Scholderer & Lähteenmäki, 2009). Foods can be enriched with virtually any functional ingredient, giving rise to many opportunities for functional foods that can help elderly consumers to meet their nutritional needs, and thereby support them in maintaining their wellbeing and independence.

### **Aim and research questions**

This thesis aims to provide a deeper understanding of decision-making among elderly consumers, and thereby support both companies and health institutions in effectively developing products and services that meet the needs and wants of elderly consumers.

It does so using (protein-enriched) functional foods as an example and concentrates on answering the following three research questions: 1) Which types of wants, inferences and intentions characterize the elderly consumer population? 2) What are relevant ways to distinguish between elderly consumers? and 3) How can elderly consumers be motivated to form consumption intentions for products and services aimed at promoting their wellbeing?

*Chapter overview*

Five chapters will focus on providing answers to one of the research questions (see Figure 1.2), and will be followed by a general discussion that concludes this thesis.

Chapter 2 provides a first insight into the everyday wants and intentions of elderly consumers (research question 1) and how these compare to those of younger consumers. The chapter identifies age-related differences in desires (i.e. wants) and goal (i.e. intentions), and seeks to explain these differences based on future time perspective. It does so using an online experience sampling method, wherein consumers aged 20 to 90 report their desires and goals, and complete the future time perspective scale. The chapter demonstrates that there are age-related differences in both desires and goals, and shows that age-related differences can be partly explained by future time perspective, thereby shedding more light on the origin of heterogeneity in wants and intentions among elderly consumers.

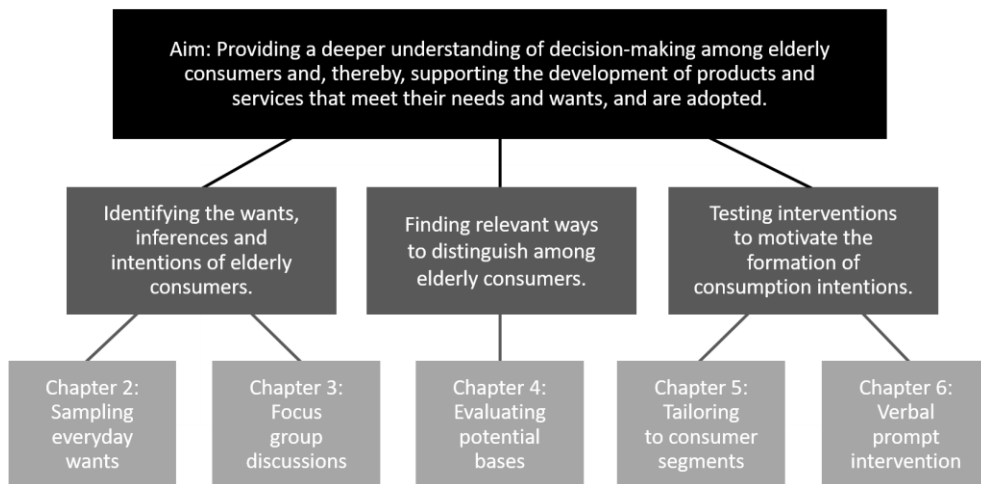


Figure 1.2. Schematic representation of the organization of this thesis.

Zooming in on consumer behaviour, Chapter 3 aims to identify wants, inferences and intentions of elderly consumers regarding functional foods (research question 1). It does so using a series of semi-structured focus group studies among institutionalized and independently living elderly consumers, wherein knowledge, perceptions and preferences regarding protein and (protein-enriched) functional foods are discussed. The chapter shows a limited acceptance of functional food among elderly consumers, which can be explained

by a lack of perceived need for these products and a range of negative inferences. In addition, the chapter confirms that heterogeneity in elderly consumers' wants, inferences and intentions can also be observed within the functional food market, and therefore requires an approach based on segmentation.

Building on the observed heterogeneity, *Chapter 4* focuses on distinguishing between elderly consumers in the functional food market (research question 2). In the form of a narrative review, it considers various ways (i.e. segmentation bases) in which elderly consumers can be segmented into smaller, more homogeneous groups. The chapter categorizes segmentation bases into three types (i.e. on the person, food and product level) and evaluates them using a set of evaluation criteria derived from the literature. It concludes that there is no single best way to segment elderly consumers in the functional food market, given that all segmentation bases have strengths and weaknesses. It strongly depends on the aim of the segmentation which base is most useful. For the development and positioning of functional foods, the chapter recommends the use of a segmentation base on the food or product level.

Following this recommendation, *Chapter 5* uses a segmentation approach to motivate the formation of consumption intentions regarding functional foods (research question 3). It segments elderly based on their willingness to trial purchase a set of carefully selected protein-enriched foods formats, that differ systematically in terms of their healthiness, novelty and type (i.e. snack versus meal). The chapter confirms that segmenting elderly consumers using a product-level base results in segments that provide instructions for product development, and it sheds light on how wants and inferences relate to intention formation among elderly consumers. In addition, the chapter demonstrates how tailoring products to the needs and wants of elderly increases the acceptance of these products for most, but not all elderly consumers. A subset of elderly rejects all protein-enriched foods presented to them.

Focusing on overcoming the identified product rejection, *Chapter 6* examines another approach to motivate consumption (research question 3) that minimizes interference from wants, inferences and intentions. In a hospital setting, it provides patients with a verbal product suggestion (i.e. verbal prompt) targeting a protein-rich food, which capitalizes on cognitive biases that make consumers respond without much thought. The chapter shows that verbal prompts can increase consumption of protein-rich food among those who have an increased need for protein. It thereby illustrates how a deeper understanding of consumer decision-making can provide useful entry points for approaching consumers with products and services that meet their needs.

# Chapter 2

## **Explaining age-related differences in goal conflict using Future Time Perspective**

Submitted as:

L. D. T. van der Zanden, E. van Kleef, R. A. de Wijk & H. C. M. van Trijp (2017).  
Explaining age-related differences in goal conflict using Future Time Perspective.

## Abstract

**Introduction.** Goal setting does not always lead to goal completion and whether or not goals are completed depends on both external and internal factors. Age has been identified as one of these factors. Compared to younger adults, older adults report more success in completing their goals and experience less goal conflict. These age-related differences cannot be explained by age itself, nor by age-related differences in the type and number of goals that people set. This study aimed to provide an explanation based on future time perspective.

**Method.** A total of 736 individuals aged 20-89 took part in an experience sampling study. In an online questionnaire, participants were asked to report any current desires and goals conflicting with these desires from a list of predefined desires and goals. The study design and materials were based on Hofmann, Baumeister, Förster & Vohs (2012). Future time perspective was measured using a combination of the Future Orientation Scale and Feelings about Life Scale.

**Results.** In line with the literature, older adults reported less goal conflict and experienced time as more limited. In line with our hypothesis, the relationship between age and goal conflict was mediated by future time perspective, but the effect was in the opposite direction. Participants who experienced time as limited reported more rather than less goal conflict.

**Conclusion.** Future time perspective cannot explain why elderly consumers experience less goal conflict than younger adults. Future studies may want to look into other possible explanations, such as expertise in decision-making.

## Introduction

Most human behaviour is goal-directed (Ajzen, 1985), meaning that it is planned, or intended, to a certain extent (Lecci, Okun & Karoly, 1994). Apart from reflexes, even the most basic behaviours, such as drinking a glass of water, involve some planning and consist of various sub goals, like extending an arm to grab the glass, that have to be completed before completing the overarching goal; drinking the water (Ajzen, 1985). Goals can also be more complex and require a more long-term pursuit of sub goals before they are completed, such as the goal to lose weight or save money to buy a new smartphone (Huffman, Ratneshwar & Mick, 2000). Setting goals does not ensure goal pursuit, however, and many goals are never completed (Ajzen, 1985; Riediger, Freund & Baltes, 2005).

Whether goals are completed depends in part on external factors like opportunities and resources, and part on internal factors like personality, abilities (Ajzen, 1985; Hoch & Loewenstein, 1991; Baumeister, 2002), as well as age. Recent studies have shown that, compared to younger adults, older adults generally report more success in completing their goals (Kehr, 2003) and rate their daily activities as more relevant for completing their goals (Riediger, Freund & Baltes, 2005). Studies have suggested that these age-related differences in goal completion cannot be explained by age-related differences in the type and number of goals that people set (Riediger, Freund & Baltes, 2005; Riediger & Freund, 2006), but may be explained by age-related differences in the way people pursue their goals (Kehr, 2003; Riediger, Freund & Baltes, 2005; Hofmann, Baumeister, Förster & Vohs, 2012). Age does not cause behaviour, however, and sheer age is therefore not a satisfying explanation for individual differences in goal pursuit (Settersten & Mayer, 1997). This study aims to provide another explanation, based on socio-emotional selectivity theory.

## Theoretical background

### *Goal setting, pursuit and completion*

Goal-directed behaviour is a complex process that originates from desires. Desires can be broadly defined as all outcomes that an individual longs for, which can be anything related to doing (e.g. the desire to eat), having (e.g. the desire for unlimited data on your smartphone) and being (e.g. the desire to be thinner). Desires can be both short-term or long-term and complex or simple (Huffman, Ratneshwar & Mick, 2000), and can be seen as the foundation of goals (see Figure 2.1).

The difference between having a goal or a desire depends on whether an individual has the *intention* to satisfy a desire. Having something as a desire, does not yet mean that one intends to put effort into trying to obtain the desired outcome (Keller, 2004). One can desire, for example, for the rain to stop pouring while knowing that nothing can be done to make it happen. Some desires thus cannot be actively satisfied. Other desires may remain unsatisfied because individuals are not motivated to pursue them. In fact, more than half of the desires that people experience throughout the day remain unsatisfied (Hofmann, Baumeister, Förster & Vohs, 2012). Once an individual has the *intention* to put effort in trying to satisfy a desire, a *goal* with underlying *sub goals* will be set (from now on referred to as *goals*) (Keller, 2004) (see Figure 2.1). All goals are thus based on desires, but not all desires lead to goals.

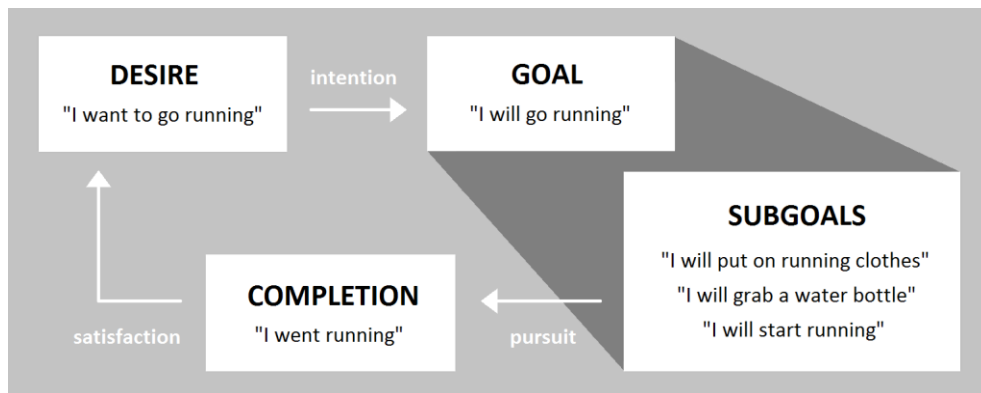


Figure 2.1. Schematic representation of goal-directed behaviour, starting with a desire and ending with its satisfaction, illustrated with the example of the desire to go running.

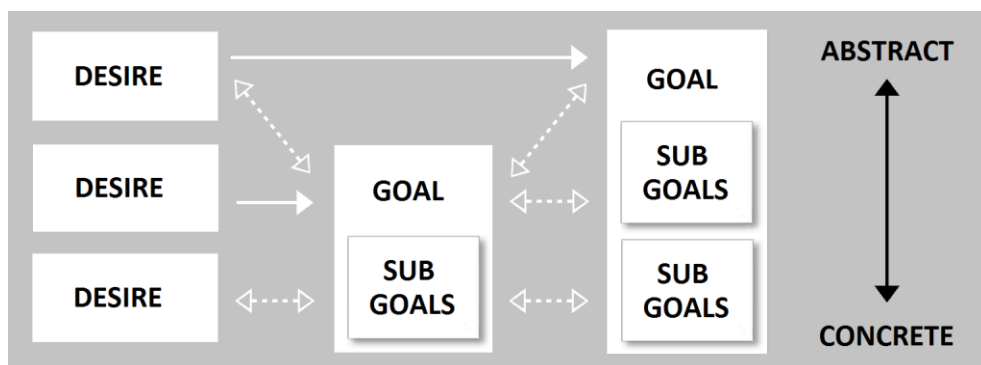


Figure 2.2. Schematic representation of the hierarchy among a set of desires, goals and sub goals. Desires may, or may not lead to goals (solid arrows), and goal conflict may, or may not exist among desires, goals and sub goals (dashed arrows) on multiple levels of the hierarchy.



Setting goals helps individuals to satisfy their desires as it creates a behavioural readiness to respond to goal-relevant opportunities (Gollwitzer, 1993) through positive automatic evaluation of opportunities that facilitate goal pursuit (Ferguson & Bargh, 2004) and negative automatic evaluation of opportunities that hinder goal pursuit (Fishbach, Zhang & Trope, 2010). Despite producing behavioural readiness, goal setting does not always lead to goal completion, which is known as the intention-behaviour gap (Gollwitzer & Sheeran, 2006). One explanation for this gap is that individuals may fail to get started in the first place. Setting a goal is only the first step towards completing it (Riediger, 2007) and to complete a goal, an individual has to perform goal-relevant behaviours. Performing such behaviours is called goal pursuit.

During goal pursuit, other difficulties may contribute to the intention-behaviour gap. People may (1) find it hard to disengage from unproductive goal pursuit, (2) face a shortage of available resources (e.g. time or effort), or (3) be distracted by other desires (and their corresponding goals) referred to as goal conflict (Gollwitzer & Sheeran, 2006; Emmons & King, 1988) (see Figure 2.2). In the face of such difficulties, individuals may either revise their goals (e.g. add new sub goals), table their goals (i.e. temporarily put them aside and pursue other goals), disengage from their goals (i.e. resist the corresponding desire) or persist in pursuing their goals (e.g. allocate more resources to their pursuit) (Austin & Vancouver, 1996; Klinger & Cox, 2004). Individuals who are able to persist in goal pursuit may, finally, complete their (potentially revised) goals and thereby satisfy their corresponding desires (see Figure 2.1).

### *Age-related differences in goal completion*

Throughout adulthood, individuals seem to have more success in completing their goals. In a study on personal goals that individuals had set for the near future, elderly were found to rate the activities they engaged in as more relevant for completing their goals than younger adults did (Riediger, Freund & Baltes, 2005). In a similar study, participants were asked to write down personal goals they wanted to achieve within a managerial training program, and elderly were found to rate their success in completing these goals after four months higher than younger adults did (Kehr, 2003). Age-related differences in goal completion were also confirmed using more objective data. In a study that focused on the goal to exercise, older adults were found to exercise more frequently than younger adults based on data obtained from sports facilities (Riediger, Freund & Baltes, 2005).

Age-related differences in goal completion may either stem from differences in desires and goal setting (e.g. elderly have desires or set goals that are easier to complete), or from

differences in pursuing these goals (e.g. elderly face fewer difficulties during goal pursuit). The literature seems to argue against the first option, because studies have suggested that there are no age-related differences in desire strength (Hofmann, Baumeister, Förster & Vohs, 2012), and age-related differences in goal completion have also been found when accounting for one's number of goals (Riediger, Freund & Baltes, 2005; Riediger & Freund, 2006) or when all participants shared the same goal (Riediger, Freund & Baltes, 2005). There is, however, considerable support for age-related differences in the pursuit of goals. Compared to younger adults, the goal pursuit of older adults less often involves conflict between their desires and goals (Hofmann, Baumeister, Förster & Vohs, 2012), inhibits the pursuit of other goals to a lesser extent (Kehr, 2003), results in less constraints in time, energy and finances, and less often involves incompatible goal-pursuit strategies (i.e. behaviours relevant for one goal cannot be pursued simultaneously with behaviours relevant for another goal) (Riediger, Freund & Baltes, 2005). In addition, compared to younger adults, goal pursuit of older adults more often involves compatible goal-pursuit strategies (i.e. behaviours relevant for one goal are the same as, or can be pursued simultaneously with behaviours relevant for another goal) and instrumental relations (i.e. completing one goal also results in completion of another goal) (Riediger, Freund & Baltes, 2005). It thus seems that elderly pursue their goals more effectively and efficiently.

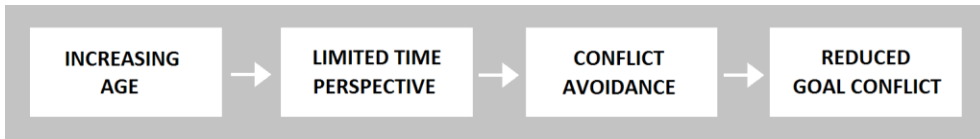
It remains unclear, though, what causes these age-related differences in goal pursuit. One often-used explanation for individual differences in goal pursuit is self-control, which is a limited mental resource (Muraven & Baumeister, 2000) that is expended in the process of pursuing goals (Shah, 2005). Elderly do not display more self-control than younger adults, however (de Ridder et al., 2011; Hofmann, Baumeister, Förster & Vohs, 2012), and self-control can thus not explain age-related differences in goal pursuit. Likely, an underlying mechanism is involved, since age itself is an empty variable, in the sense that it does not cause behaviour, but merely gives an indication of one's degree of aging (Settersten & Mayer, 1997). Although age is not a satisfying explanation for individual differences in goal pursuit, explanations may be found in the variables that co-occur with aging. This study aims to test one possible explanation for age-related differences in goal pursuit, based on socio-emotional selectivity theory.

#### *An explanation based on socio-emotional selectivity*

According to socio-emotional selectivity theory, aging individuals start to experience the lifetime they have left (i.e. their future time perspective) as limited, and therefore become increasingly motivated to derive satisfaction from life by minimizing negative affect (Carstensen, Fung & Charles, 2003). Studies have, for example, shown that elderly prefer

advertisements that focus on avoiding negative emotions (Williams & Drolet, 2005) and that older adults tend to engage in avoidance strategies to deal with marital problems (Holley, Haase & Levenson, 2013). Such strategies seem to be effective, as the frequency of negative affect decreases with age, such that, compared to younger adults, older adults express fewer worries and regrets, experience less anger, and display lower levels of emotional distress (Lecci, Okun & Karoly, 1994; Carstensen, Fung & Charles, 2003). People may also become motivated to avoid goal conflict as they age, as goal conflict produces negative affect and psychological distress (Kehr, 2003; Olsen, Wilcox & Olsen, 2005; Riediger, 2007; Boudreaux & Ozer, 2013).

We argue that, although elderly may have the same types and number of desires (and corresponding goals) as younger adults (Riediger, Freund & Baltes, 2005), they are motivated by a limited future time perspective to pursue their goals in such a way that they can avoid experiencing conflicts during goal pursuit. We thus hypothesize that age is negatively related with future time perspective (i.e. individuals with a higher age have a more limited time perspective), which is in turn positively related with goal conflict (i.e. individuals with a limited time perspective have less goal conflict) (see Figure 2.3).



*Figure 2.3.* Schematic representation of hypothesized relationship between age, future time perspective, conflict avoidance and goal conflict.

In line with the theoretical background on goal-directed behaviour, this study will take desires as its starting point, and focus on age-related differences in the extent of conflict between these desires and goals that individuals have set in the past. We base the design of our study on a study by Hofmann, Baumeister, Förster and Vohs (2012), who used an experience sampling method in a sample aged 18 to 55 to study the prevalence of desire and conflict in everyday life, and the frequency and effectiveness of resisting desires. Although not their main topic of study, Hofmann, Baumeister, Förster and Vohs (2012) found age-related differences in the extent of conflict between desires and goals, which both decreased with age. We aim to replicate these results in a sample including adults aged over 55, and we add a measure of future time perspective to test our main hypothesis that a limited time perspective explains age-related differences in goal conflict.

## Methods

### *Participants*

A total of 736 individuals (mean age = 53, age range = 20-89) took part in the study. Participants were recruited using convenience sampling methods via two online panels (the MCB university panel and the SenTo panel) (i.e. Senioren van de Toekomst / Seniors of the Future) (Kremer, 2012) and two online forums (the Fok Forum and Ouders Online).

### *Procedure*

The design of the study was based on the study by Hofmann, Baumeister, Förster and Vohs (2012). These researchers used an experience sampling paradigm in which participants were asked to wear beepers for a week, and report their desires every time the beeper went off. This design allowed for multilevel analyses on both the inter-personal level (e.g. age) and intra-personal level (e.g. context). The current study focused on the inter-personal level only, and thus allowed for a simpler design based on a single desire report per participant. Participants did this by completing an online questionnaire, which was distributed by e-mail and placed on two online forums. Participants did not receive a reward for participating.

### *Questionnaire*

The online questionnaire largely followed the questionnaire used by Hofmann, Baumeister, Förster and Vohs (2012). Participants were first asked to report whether they were experiencing any desires, or had experienced desires during the past 30 minutes before answering the questionnaire. In case of a desire, participants were asked to indicate the type of the desire from a predefined list (see Table 2.1), rate the strength of the desire (i.e. *desire strength*, “how strong is the desire?”), rate the extent to which they resisted the desire (i.e. *desire resistance*, “to what extent did you try to resist the desire?”), indicate whether they pursued the goals corresponding with the desire (i.e. “yes” / “no, I resisted the desire” / “no, I could not (yet) pursue the desire due to circumstances”). In case of goal pursuit, participants were asked to rate the extent to which they pursued these goals (i.e. *goal pursuit*, “to what extent did you pursue the behaviour corresponding with your desire?”). In addition, participants were asked whether and to what extent the desire was in conflict with any of their goals (i.e. *goal conflict*, “to what extent is the desire in conflict with one or more of your goals in life?”). In case of goal conflict, participants were asked to indicate the type of the conflicting goal from a predefined list (see Table 2.1). In case of multiple desires and/or

conflicting goals, participants were asked to indicate their main desire and/or conflicting goal and use these for the remainder of the questionnaire.

Table 2.1.

*Predefined list of desires and conflicting goals in alphabetical order.*

Types of desires	Types of conflicting goals
- Alcoholic beverage (e.g. beer)	- Charity (e.g. voluntary work)
- Expressing emotions (e.g. anger)	- Financial (e.g. saving money)
- Food (e.g. meal, snack)	- Health (e.g. staying in shape)
- Hobby (e.g. sports, reading)	- Hobby (e.g. sports, reading)
- Hygiene (e.g. housecleaning)	- Maintenance (e.g. household)
- Media (e.g. television, Facebook)	- Emotion regulation (e.g. staying calm)
- Non-alcoholic beverage (e.g. tea)	- Romantic (e.g. intimacy)
- Sex (e.g. with partner, with self)	- Self-improvement (e.g. feeling strong)
- Sleep/rest (e.g. relaxing)	- Social (e.g. making friends)
- Smoking/drugs (e.g. cigarette)	- Spiritual/religious (e.g. praying)
- Social (e.g. being with friends)	- Work/academic (e.g. achievement)
- Spending money (e.g. shopping)	
- Work/academic (e.g. working)	

All items were derived from Hofmann, Baumeister, Förster and Vohs (2012), translated into Dutch and recoded such that all scales were 7-point scales ranging from 1 to 7. In addition, certain types of desires and conflicting goals were collapsed to reduce redundancy (i.e. the desire for coffee and non-alcoholic drinks, the desire for tobacco and other substances, the desire for sports and leisure, and the conflicting goals of leisure, hobby and pleasure). In addition to the items derived from Hofmann, Baumeister, Förster and Vohs (2012), participants completed a measure of future time perspective and completed a range of demographic questions (i.e. age, gender, marital status, employment status and educational level).

Future time perspective was measured using a combination of the Future Orientation Scale (Carstensen & Lang, 1996) and the Feelings About Life Scale (Helson, 1967), as recommended by Cate and John (2007). In these scales, participants were asked to indicate their agreement with statements such as “I have the sense that time is running out” using a 7-point Likert scale ranging from 1 = “strongly disagree” to 7 = “strongly agree”. A Dutch version of the Future Orientation scale was used, validated by de Lange and colleagues (2011) and the items of the Feelings About Life scale were independently translated into Dutch by the first and

second author of this paper. The internal reliability of the translated and combined scales was .852.

### *Data preparation and analysis*

Participants were excluded from the data analysis when they did not fully complete the questionnaire (N = 50), when they used the same response for all items within the two scales used to assess future time perspective (N = 17), or when they took longer than 30 minutes to complete the questionnaire (N = 19). The final sample consisted of 650 participants.

## **Results**

### *Descriptive findings*

A total of 73.1% of the participants (N = 475) reported experiencing or having experienced at least one desire in the past 30 minutes, resulting in a total of 995 reported desires (1-7 desires per participant). The three most often reported (main) desires were related to biological needs: eating (33.3% of all reported desires), resting/sleeping (13.3%) and drinking (i.e. non-alcoholic drinks) (13.3%). A total of 52.6% of respondents reported acting upon their desire. Of the remaining participants, 28.2% reported not acting upon their desire as they resisted the desire, while 19.2% reported not acting upon their desire as they were not (yet) able to do so due to circumstances.

Among those who reported a desire, 50.7% of the participants (N = 241) also reported experiencing or having experienced goal conflict, resulting in a total of 380 reported conflicting goals (1-5 goals per participant). An overview of the types of desires and goals that were in conflict with each other is presented in Table 2.2. The three most often reported (main) conflicting goals were health (46.1% of all reported conflicting goals), academic or work achievement (12.9%) and maintenance (e.g. household) (9.5%). The three most often reported conflicts were the conflict between the desire to eat and the goal of health (33.8% of all reported conflicts), the conflict between the desire to sleep or rest and the goal to work (4.6%) and the conflict between the desire to spend time on hobbies and the goal to work (4.2%).

An ANOVA with age as the dependent variable and types of desires and types of conflicting goals as independent variables showed that the incidence of both the types of desires ( $p < .01$ ,  $\eta^2 = .057$ ) and the types of conflicting goals differed with age ( $p < .01$ ,  $\eta^2 = .055$ ). The interaction between types of desires and types of conflicting goals, however, did not

significantly differ with age ( $p > .05$ ). At different ages, the same types of desires were in conflict with the same types of goals. There was thus no need to control for types of desires and conflicting goals in our analyses on goal conflict (i.e. as conflict revolves around a combination of a desire and a conflicting goal, rather than individual desires and goals). Taking a closer look at the age-related differences in desires and goals, a series of point-biserial correlations showed that the incidence of the desire for non-alcoholic beverages ( $r_{pb} = .134$ ) and hobbies ( $r_{pb} = .107$ ) increased with age, while desires for food ( $r_{pb} = -.094$ ), sleep/rest ( $r_{pb} = -.125$ ) and sex decreased ( $r_{pb} = -.127$ ), as did work/academic goals ( $r_{pb} = -.335$ ) (all  $p$ 's  $< .05$ ).

Table 2.2.

*Types of desires and goals that were in conflict with each other.*

Types of desires	Types of conflicting goals
Alcoholic beverage	Health, Social
Expressing emotions	Emotion regulation, Health, Self-improvement, Social, Work/academic
Food	Financial, Health, Hobby, Maintenance, Romantic, Self-improvement, Work/academic
Hobby	Charity, Emotion regulation, Financial, Health, Hobby, Maintenance, Romantic, Social, Work/academic
Hygiene	Maintenance
Media	Charity, Maintenance, Social, Work/academic
Non-alcoholic beverage	Health, Maintenance, Social, Work/academic
Sex	Romantic, Self-improvement, Social
Sleep/rest	Charity, Health, Hobby, Maintenance, Romantic, Self-improvement, Social, Work/academic
Smoking/drugs	Financial, Health, Self-improvement
Social	Emotion regulation, Maintenance, Romantic, Self-Improvement, Social, Work/academic
Spending money	Financial
Work/academic	Financial, Hobby, Maintenance

*Replication of previous findings*

To replicate the results of Hofmann, Baumeister, Förster and Vohs (2012) in a sample with a wider age range, a series of Pearson correlations was performed between age and the extent of goal conflict, desire strength, desire resistance and goal pursuit. In line with Hofmann, Baumeister, Förster and Vohs (2012), age was significantly and negatively related to the extent of goal conflict ( $r = -.248, p < .001$ ), while age was unrelated to desire strength and goal pursuit (all  $p$ 's  $> .05$ ). In contrast with the findings of Hofmann, Baumeister, Förster and Vohs (2012), age was found to be significantly and negatively related to desire resistance ( $r = -.163, p < .001$ ). Compared to younger participants, older participants reported less resistance to their desires, which is consistent with the age-related difference in conflict between their desires and goals.

In line with the literature on future time perspective, a Pearson correlation between age and future time perspective showed that age was significantly and negatively related to future time perspective ( $r = -.462, p < .001$ ). Compared to younger participants, older participants perceived their future time to be more limited.

*Test of mediation hypothesis*

We hypothesized that the relationship between age and the extent of goal conflict would be mediated by future time perspective. This assumption was tested in SPSS using PROCESS, a bootstrapping procedure suggested by Hayes (2013).

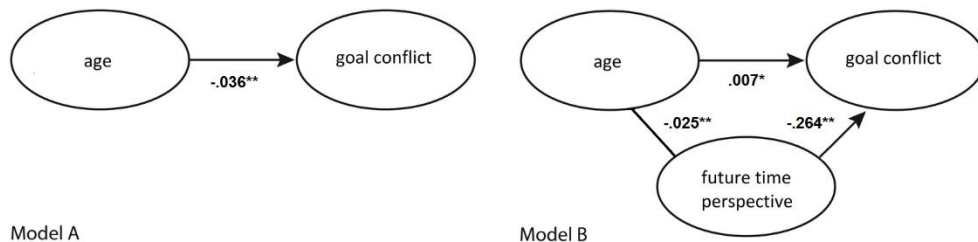


Figure 2.4. Direct (A) and mediation model (B) with beta coefficients, \*  $p < .05$ , \*\*  $p < .01$ .

The direct relationship between age and the extent of goal conflict was significant ( $B = -.036, p < .01$ ) (see Figure 2.4, Model A). When complementing the direct model with future time perspective as a mediator (see Figure 2.4, Model B), the direct relationship between age and the extent of goal conflict was still significant, but considerably smaller ( $B = .007, p < .05$ ). The relationship between age and the extent of goal conflict was mediated by future time



perspective, such that future time perspective was negatively related to age ( $B = -.025$ ,  $p < .01$ ) and was negatively related to the extent of goal conflict ( $B = -.264$ ,  $p < .01$ ), partly confirming our hypothesis.

The mediation effect was, however, not in the hypothesized direction. In contrast with our hypotheses, participants who experienced time as limited (i.e. with lower scores for future time perspective), experienced *more* rather than less goal conflict. Although future time perspective could thus explain heterogeneity in goal conflict among individuals, it could not explain the finding that the extent of goal conflict decreases as people age.

## Discussion

As people age, they are found to experience less goal conflict (Hofmann, Baumeister, Förster & Vohs, 2012), which helps them to pursue their goals (Kehr, 2003; Riediger, Freund & Baltes, 2005). Based on the available literature, we hypothesized that this age-related difference may be explained by a limited future time perspective. Using an online questionnaire based on a study by Hofmann and colleagues (2012), we aimed to replicate existing results in an extended population and test our hypotheses.

The replication was successful. In line with the literature, age was found to be negatively related to future time perspective (Carstensen, Fung & Charles, 2003) and older adults were found to display less goal conflict compared to younger adults (Hofmann, Baumeister, Förster & Vohs, 2012). Although the age-related difference in goal conflict was small, our results show that age and goal conflict are not independent. These results were found using a simple, single-report experience sampling design, indicating that they are quite robust. Descriptive analyses showed that although there were considerable age differences in the types of desires experienced, there were few differences in the types of goals that conflicted with these desires. Only the goal to work was less often in conflict with desires, with increasing age, which can be partly explained by the effects of retirement. Given that, with increasing age, the same types of desires were in conflict with the same types of goals, our hypotheses could be tested without controlling for the type of desires and conflicting goals that participants reported.

Our hypotheses were partly confirmed. Future time perspective was found to mediate the relationship between age and the extent of goal conflict, such that the direct effect of age on goal conflict reduced considerably. The mediation was, however, not in the hypothesized direction: participants with a limited future time perspective experienced *more* rather than less goal conflict. This result seems paradoxical, as our analyses (and the literature) show that

older adults have a limited future time perspective (Carstensen, Fung & Charles, 2003) and, at the same time, experience *less* goal conflict (Hofmann, Baumeister, Förster & Vohs, 2012). This paradox may be partly explained by the fact that future time perspective is not bound to age (Carstensen, Fung & Charles, 2003; Wei, Donthu, & Bernhardt, 2012); although most older adults experience time as limited, some experience time as expansive (Fung, Lai & Ng, 2001).

## 2

Given the correlative design of this study, it was impossible to test the causality of the relationship between age, future time perspective and goal conflict (Fiedler, Schott, & Meiser, 2011). It thus remains uncertain whether a limited time perspective increases goal conflict, or whether a propensity to experience goal conflict limits one's future time perspective. In addition, by using a cross-sectional design, it is not possible to separate age effects from cohort effects (Lindenberger, von Oertzen Ghisletta, & Hertzog, 2011). Future studies may overcome these limitations by manipulating future time perspective and using a more longitudinal design to explain age-related differences in goal conflict.

Using such methods, future research may want to explore in more depth why a limited future time perspective predicts an *increase* in goal conflict, despite its connection to higher age and the positivity bias, which both predict a *decrease* in goal conflict. The answer might be found in other predictors of future time perspective, besides age. The literature has suggested that a limited future time perspective also arises when people experience a serious illness or anticipate endings such as breaking up a relationship, relocation to another city or graduation from college (Carstensen, Fung & Charles, 2003). Such life events, however, not only produce a limited time perspective, but also involve a considerable number of difficult decisions and a lot of stress. Relocation, for example, is known as a highly stressful life event as it (often) involves intensive preparation, followed by separation from family and friends, and adaptation to new and unfamiliar surroundings (Raviv, Keinan, Abaxo & Raviv, 1990; Smider, Essex & Ryff, 1996). It could thus be the case that those who experience future time as limited are more often in transitional phases of their lives that involve a lot of goal conflict. Testing this hypothesis was beyond the scope of the current study, but may be an interesting avenue for future research.

It remains unclear why elderly experience less goal conflict between their desires and goals than younger people do. Although the effect is small, gaining an understanding of this phenomenon may provide useful insights in the goal-directed behaviour of (elderly) decision-makers. The results of this study suggest that this phenomenon cannot be explained by future time perspective. Given that age itself is an empty variable (Settersten & Mayer, 1997), future research may want to look into other phenomena co-occurring with age that

could explain a decrease in goal conflict. For example, lifelong experience with making everyday decisions (Worthy et al., 2011) might help elderly to quickly solve goal conflicts outside of their conscious awareness (Kleiman & Hassin, 2011), or the increase in psychological acceptance that occurs with age (Shallcross, Ford, Floerke & Mauss, 2013), might help elderly to ignore and live with their conflicts (Huffman, Ratneshwar & Mick, 2000).

## **Conclusion**

This paper successfully replicated earlier research on age-related differences in goal conflict and showed that differences cannot be explained by future time perspective. In fact, future time perspective was negatively related to the extent of goal conflict, such that people with a more limited time perspective experienced more rather than less conflict. Future studies may want to look into this paradoxical finding and explore alternative mechanisms that could underlie the decrease in goal conflict that occurs with aging.

# Chapter 3

## Knowledge, perceptions and preferences of elderly consumers regarding protein-enriched functional food

Published as:

L. D. T. van der Zanden, E. van Kleef, R. A. de Wijk & H. C. M. van Trijp (2014). Knowledge, perceptions and preferences of elderly regarding protein-enriched functional food. *Appetite*, 80, 16-22.

## Abstract

**Introduction.** Promoting protein consumption in the elderly population may contribute to improving the quality of their later years in life. Our study aimed to explore knowledge, perceptions and preferences of elderly consumers regarding protein-enriched food.

**Method.** We conducted three focus groups with independently living (ID) elderly (N = 24, Mage = 67 years) and three with elderly living in a residential home (RH) (N = 18, Mage = 83 years).

**Results.** Both ID and RH elderly were predominantly skeptical about functional food in general. Confusion, distrust and a perceived lack of personal relevance were main perceived barriers to purchasing and consuming these products, although a majority of the participants did report occasionally consuming at least one type of functional food. For the ID elderly, medical advice was an important facilitator that could overcome barriers to purchasing and consuming protein-enriched food, indicating the importance of personal relevance for this group. For the RH elderly, in contrast, sensory appeal of protein-enriched foods was a facilitator. Carrier preferences were similar for the two groups; the elderly preferred protein-enriched foods based on healthy products that they consumed frequently.

**Conclusion.** Future studies should explore ways to deal with the confusion and distrust regarding functional food within the heterogeneous population of elderly.

## Introduction

Proteins are essential components of all cells of the body and serve, among other things, to maintain the body's immune system, produce muscles, transport molecules and speed up biochemical reactions. The recommended amount of protein intake per day is 0.8 grams of protein per kilogram of body weight for adults, regardless of age (Institute of Medicine, 2005; European Food Safety Authority, 2012). This recommendation reflects the minimum protein intake necessary to avoid a negative nitrogen balance, which causes progressive loss of lean body mass.

This recommendation was made, however, despite research indicating that elderly require greater amounts of protein to maintain nitrogen balance (Morais, Chevalier & Gougeon, 2006). In addition, increased protein intake has been related to a range of health benefits in elderly, for example: faster rehabilitation after hip fractures (Schurch et al., 1998), increased lean body mass and strength (Boersheim et al., 2008) and a lowered risk of becoming frail (Beasley et al., 2010). The finding that the elderly body uses protein inefficiently (Morais, Chevalier & Gougeon, 2006) may explain these effects and supports the recommendation of a greater daily intake of protein by elderly (Wolfe, Miller & Miller, 2008).

Because the world population is greying and life expectancy is increasing (National Institute on Aging, 2011), it becomes increasingly relevant to improve the quality of the later years in life. This way, elderly can remain living independently for longer and health care costs can be reduced. Promoting protein consumption in the elderly population may contribute to both (Wolfe, Miller & Miller, 2008). Increasing nutrient intake in elderly has been challenging, however, especially in elderly with malnutrition (Dunne & Dahl, 2007) who could benefit from increased protein intake the most (Morais, Chevalier & Gougeon, 2006). Simply increasing portion sizes or meal frequency is usually not successful in elderly because of physical problems with eating or decreased appetite (Taylor & Barr, 2006; Best & Appleton, 2013).

Specialized, nutrient-dense foods, in contrast, provide large amounts of nutrients in relatively small amounts of food and may be more appropriate (Dunne & Dahl, 2007). In line with this, it has been shown that small, nutrient-dense meals can increase protein intake in elderly without lowering their overall energy intake (Lorefält, Wissing & Unosson, 2005; Smoliner et al., 2008). Replacing conventional foods with protein-enriched foods may thus be an effective way to increase protein intake in elderly.

*Functional Food*

Protein-enriched food may be considered a type of functional food; products widely described as providing health benefits beyond simply satisfying hunger and delivering their basic nutritional value (Roberfroid, 2002; Menrad, 2003). However, no single definition of functional foods has been agreed upon so far. Although most foods provide some additional health benefits (i.e. through vitamins or minerals) (Crowe & Francis, 2013), most literature is limited to functional foods that are enriched with micronutrients (e.g. vitamin-enriched yoghurt, in Krutulyte et al., 2011) or macronutrients (e.g. protein-enriched crackers, in Hooker & Teratanavat, 2008). We will only refer to these enriched types of functional food throughout the remainder of this paper.

## 3

Functional foods are often perceived to be healthier than conventional foods (Ares, Giménez & Gámbaro, 2008a; Vassallo et al., 2009) and willingness to try them is generally high, especially in older adults (Poulsen, 1999; Siegrist, Stampfli & Kastenholz, 2008). This has been explained by the finding that elderly are more interested in the health aspects of food (Roininen, Lähteenmäki & Tuorila, 1999) and are more willing to compromise on taste for health than younger adults (Urala & Lähteenmäki, 2004; Verbeke, 2006). From a marketing perspective, elderly may thus also be a suitable target group for protein-enriched food.

Nevertheless, a variety of barriers to functional food acceptance exists, for example: consumers expect functional food to taste poorly (Verbeke, 2006), to be expensive (Poulsen, 1999; Verbeke, Scholderer & Lähteenmäki, 2009) and unnatural (Poulsen, 1999; Landström, Koivisto Hursti & Magnusson, 2009). In addition, health claims attached to functional food are sometimes thought to lack personal relevance (van Kleef, van Trijp & Luning, 2005) or to be merely advertising tools (Verbeke, Scholderer & Lähteenmäki, 2009) and are confusing to both consumers (Sääksjärvi, Holmlund & Tanskanen, 2009) and dieticians (de Jong, Hoendervangers, Bleeker & Ocké, 2004). Moreover, elderly consumers report various barriers to making healthy food choices in general. Besides the barriers already mentioned, elderly may feel constrained by inconvenience in food preparation and purchase, being on a special diet (Herne, 1995; Locher & Sharkey, 2009) and by the influence of others on meal preparation (Herne, 1995; de Almeida et al., 2001).

Next to these perceived barriers, a lack of nutritional knowledge has been found to limit acceptance of functional foods (Menrad, 2003; Ares, Giménez & Gámbaro, 2008a). More specifically, both attribute knowledge (i.e. about the nutrients in food) and consequence knowledge (i.e. about the effect of nutrients on the body) are found to be necessary for functional food acceptance (Wansink, Westgren & Cheney, 2005). Identifying a lack of

attribute or consequence knowledge in elderly consumers may provide a concrete basis for intervention.

Considering the preferences and physiological needs of consumers in the process of developing functional foods may help to overcome some of the barriers to functional food acceptance. Among the various attributes that make up a functional food product (e.g. product or carrier type, functional ingredient, health claim, brand, price), carrier preferences are generally found to predict functional food acceptance most strongly (Bech-Larsen & Grunert, 2003; Ares & Gámbaro, 2007; Siegrist, Stampfli & Kastenholtz, 2008; Krutulyte et al., 2011). Elderly consumers are found to prefer healthy carriers to unhealthy ones (Vella, Stratton, Sheeshka & Duncan, 2013) and consumers, in general, are found to prefer carriers that originally contained large amounts of the enrichment (in this case protein) (Poulsen, 1999; Ares & Gámbaro, 2007).

#### *Current Study*

Although various types of functional food have been studied, protein-enriched food has not received much attention. Given that functional food acceptance also depends on the functional ingredient (Siegrist, Stampfli & Kastenholtz, 2008), it is unclear whether research findings can be generalized to this type of functional food.

Our study aims to explore the knowledge, perceptions and preferences of elderly consumers regarding protein-enriched food. We will do this by conducting focus groups, following a semi-structured protocol. Given that elderly have had a lifetime of unique experiences with food, they differ strongly in how they think about food and what role food plays in their lives (Sobal, Bisogni, Devine & Jastran, 2006; Locher & Sharkey, 2009). These differences are probably especially strong when comparing healthy, independently living elderly with less healthy elderly living in residential homes, given that elderly in the latter group generally no longer take care of their own meals. Therefore, we will conduct focus groups among both independently living elderly and elderly living in a residential home.

### **Material and Methods**

#### *Participants*

A total of 42 elderly (14 males, 28 females, aged 55+) participated in six focus groups, consisting of four to eight participants each. Three focus groups were conducted among independently living (ID) elderly (N = 24, age range 58-81) and three among elderly living in



a residential home (RH) (N = 18, age range 73-93). The ID elderly were recruited by e-mail using the Internet-based senior network SenTo (i.e. Senioren van de Toekomst / Seniors of the Future) (Kremer, 2012). The RH elderly were recruited by staff of the residential home. The study was approved by the Social Science Ethics Committee of Wageningen University and all participants gave informed consent.

The ID and RH elderly inevitably differed from each other on various demographics. The RH elderly were overall older ( $M = 82.2$ ,  $SD = 5.56$ ) than the ID elderly ( $M = 67.7$ ,  $SD = 5.92$ ),  $t(39) = -8.037$ ,  $p < .001$  and the RH elderly were more often widowed (16 out of 18) than the ID elderly (3 out of 24),  $\chi^2(1, N = 42) = 24.22$ ,  $p < .001$ . In addition, the ID elderly rated their subjective health more positively (median = 2 range = 1-5) than the RH elderly (median = 3 range = 1-5) ( $U = 104.0$ ,  $p < .01$ ,  $r = .43$ ) (1 = “excellent”, 2 = “good”, 3 = “average”, 4 = “fair” and 5 = “poor”) and the RH elderly no longer prepared their own meals. Moreover, the RH elderly were less highly educated (median = 2 range = 1-2) than the ID elderly (median = 2, range = 2-3) (1 = “primary”, 2 = “secondary”, 3 = “tertiary”) ( $U = 140.0$ ,  $p < .01$ ,  $r = .44$ ), which can likely be explained by the age difference between these groups.

### Procedure

The focus groups were conducted according to a predetermined protocol to facilitate semi-structured data collection (Table 3.1). For the independently living (ID) elderly, focus groups were located at a research facility attached to Restaurant of the Future at Wageningen University, whereas for the residential home (RH) elderly, the location was their residential home in the city of Ede. In both locations, participants sat around a large table in a private room, a facilitator was standing near a flip chart and an assistant was sitting outside the group. The first author, who was trained in interviewing techniques, facilitated all discussions. Discussions took place between 09.30 AM and 12.00 AM, lasted about two hours and were video and audiotaped for later transcription. Participants were rewarded twenty euros for completing the focus group.

Starting the focus group, participants gave informed consent and were asked to shortly introduce themselves. This was followed by a free association task, to determine participants' knowledge of the concepts “proteins” and “enriched food” (i.e. *nutritional knowledge*). For this, participants were asked to individually write down all the words they associated with these two concepts. Answers were discussed in the group (15-20 minutes). Functional food was called “enriched food” throughout the focus groups, to keep it close to the term protein-enriched food. Concepts that were unknown to the participants were clarified by the discussion facilitator at this point. Starting the next part of the focus group,

the discussion facilitator introduced the topic of protein-enriched food (in short: “a part of the adult population does not consume enough protein and, therefore, we would like to develop food enriched with protein that can help them consume enough protein in their daily diet”). Thereafter, participants were asked to imagine coming across a protein-enriched product in their supermarket. They were instructed to individually write down reasons to (not) purchase and consume products such as these, followed by a group discussion of these reasons (15-20 minutes) (i.e. *perceived barriers and facilitators*).

Table 3.1.  
*Focus group protocol.*

Stage	Content
Introduction	clarification of focus group procedure, written informed consent, introduction of the participants
Nutritional Knowledge	<ul style="list-style-type: none"> <li>● individual task: “write down all the words that come to mind when you think of proteins and enriched food”</li> <li>● group discussion of task</li> </ul>
Perceived Barriers and Facilitators	<ul style="list-style-type: none"> <li>● individual task: “write down reasons (not) to purchase and consume protein-enriched food”</li> <li>● group discussion of task</li> </ul>
Break	coffee break
Carrier Preferences	<ul style="list-style-type: none"> <li>● individual task: “sort food categories on how appropriate you think they are for protein enrichment”</li> <li>● group discussion of task</li> </ul>
Questionnaire	individual completion of questionnaire with demographics, and measures of subjective health and familiarity with functional food

After a coffee break (10-15 minutes), participants were asked to imagine having a protein deficiency and they were instructed to think about what kind of protein-enriched food product they would like to consume to increase their protein intake. To facilitate this task, participants were asked to individually sort a set of sixteen food category cards according to how appropriate they thought these foods were for protein enrichment. During a following discussion (20-30 minutes), participants were asked to clarify their answers (i.e. *carrier preferences*). At the end of the focus group, participants filled out a questionnaire that covered basic demographics, subjective health and their familiarity with nine functional food types. Responses to this questionnaire were not discussed in the group. Demographics and

subjective health were used to describe our sample of elderly and familiarity with functional foods was used to clarify results regarding the nutritional knowledge of participants.

### Materials

#### *Food category sorting task.*

Participants were asked to sort food category cards according to how appropriate they thought these foods were for protein enrichment. Sixteen processed food categories were used: bread, bread substitutes (e.g. crackers), cereals, bread spread, canned soup, sauce, microwave meals, frozen meals, meat, dairy, cheese, pastry, biscuits, candy bars, candy and savoury snacks (e.g. crisps). Food categories were obtained from a study on the diet pattern of Dutch seniors (based on data from Kremer, Hulst & Boesveldt, 2013) and were presented on white paper cards (Figure 3.1). Participants were instructed to individually sort the sixteen cards by placing each of them under one of three sorting options: “fits well”, “in between” and “fits badly”, which were printed on a strip of paper.

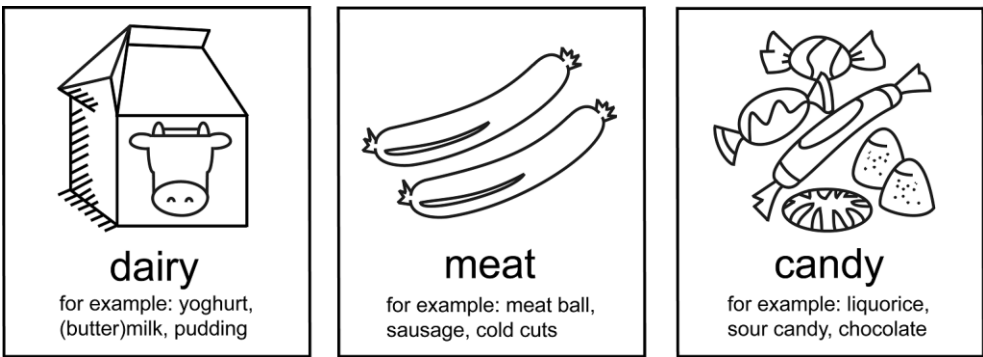


Figure 3.1. Examples of cards used in the food category sorting task.

#### *Questionnaire.*

A paper-and-pencil questionnaire covered basic demographics, subjective health and the familiarity of participants with functional foods. Participants completed the questionnaire individually after the focus group discussions ended. Subjective health was measured using the question: “in general, how would you rate your health”, with the response options 1 = “excellent”, 2 = “good”, 3 = “average”, 4 = “fair” and 5 = “poor” (DeSalvo et al., 2006). To measure familiarity with functional foods, participants were presented with colour pictures of nine types of functional food: probiotic dairy, energy drinks, products that lower cholesterol, protein shakes for muscle building, Atkins products for weight loss, Nutricia medical nutrition and products enriched with omega 3, calcium or fibres. Participants were

asked to indicate whether they 1) recognized (yes/no) and 2) occasionally consumed (yes/no) products from each of the nine types of functional food. The numbers of items recognized and consumed were counted separately as two measures of familiarity.

### *Data analysis*

For both the ID and RH elderly, no new topics emerged during the third focus group session, indicating that thematic saturation was reached after the second focus group. Audio recordings of the focus groups were transcribed verbatim. Using the software package ATLAS.ti (version 7) (ATLAS.ti Scientific Software Development GmbH, 2013), transcripts were coded into themes for each of the focus group tasks: nutritional knowledge, perceived barriers and facilitators, and carrier preferences. To minimize subjectivity bias, transcripts were independently coded by both the first author of this paper and a researcher who was not primarily involved in the project. The two coders discussed differences in coding until they agreed on a collection of 38 codes, which were combined into broader themes. For both groups of elderly, we selected the themes that recurred most often during the focus group discussions. Accordingly, we will elaborate on a total of 19 themes: seven themes in nutritional knowledge, eight themes in perceived barriers and facilitators, and four themes in carrier preferences.

## **Results**

We will discuss the results of the focus groups by deliberating on the background information of the participants, followed by the themes that occurred during each of the three focus group tasks in order of appearance within the protocol: nutritional knowledge, perceived barriers and facilitators, and carrier preferences (Table 3.2). We will use quotes of participants to illustrate how themes were discussed during the focus groups.

### *Background characteristics*

Participants were asked to indicate which of nine types of functional food they recognized (yes/no) and occasionally consumed (yes/no) to assess their familiarity with functional foods. This measure showed that all participants recognized at least one of these nine types, although a Mann-Whitney U test indicated that the ID elderly recognized more functional foods (median = 7 range = 3-9) than the RH elderly (median = 5, range = 1-8) ( $U = 78.0$ ,  $p < .01$ ,  $r = .53$ ). Nevertheless, consumption of products from these functional foods types did not differ between the two groups ( $U = 150.5$ ,  $p > .05$ ,  $r = .23$ ); 69% of all elderly occasionally consumed at least one type of functional food.

Table 3.2.

*Recurring themes for each focus group task and their order of appearance in the result section.*

<i>Nutritional knowledge</i>	<i>Perceived barriers and facilitators</i>
1. importance of protein consumption	8. trustworthiness of product
2. current level of protein consumption	9. higher product price
3. concern about the definition of EF*	10. unknown protein dose/type
4. usefulness of EF for improving diet	11. preferring conventional food
5. necessity of EF in current diet	12. restrictions due to diet
6. trustworthiness of claims on EF	13. dietary guidelines change
7. personal relevance of claims on EF	14. doctors' advice
	15. changes in product taste
<i>Carrier preferences</i>	18. original protein content
	19. intuitive carrier fit
16. presence in current diet	17. product healthiness

\*EF = enriched food

### *Nutritional knowledge*

The elderly were aware of the importance of protein consumption (Table 3.2) (theme 1) and were able to list various products that are rich in protein (e.g. eggs, legumes, bread, meat, milk and cheese). In each focus group, at least one participant described proteins as *building blocks* or *nutrients* but participants could not always explain what this meant. Some ID elderly mentioned correct functions of proteins, such as the regulation of cell production and growth of hair, muscles and nails. However, none of the RH elderly mentioned correct functions of protein. In addition, the ID elderly were generally uncertain about whether they consumed enough protein (theme 2) and planned to look it up on the Internet later. The RH elderly, in contrast, were less concerned with their level of protein consumption.

*"They are absolutely necessary."* (man, ID group, aged 66) (theme 1)

*"I think it is hard, because, how will you know it if you do not get enough protein?"* (woman, ID group, aged 65) (theme 2)

The ID and RH elderly differed in their perception of what "enriched food" meant. Although in each of the six groups enrichments such as vitamins, minerals or fibres were mentioned,

the ID elderly correctly described these as additions, whereas the RH elderly considered vegetables, fruit and bread to be enriched as well. None of the RH elderly mentioned additives before the term “enriched food” was clarified by the discussion facilitator. For the RH elderly, confusion and concern about the definition of functional foods was an important theme (theme 3).

*“I think of legumes and I think of eggs, that’s what I would call enriched food, but I can’t tell you why.”* (woman, RH group, aged 85) (theme 3)

The ID elderly, in contrast, merely wondered whether additives for preservation and improvements obtained by cultivation were enrichments too. Overall, elderly were ambivalent about the value of functional food. They indicated that these foods may be useful (theme 4) but also unnecessary (theme 5). The latter theme was more prominent.

*“If I had a temporary protein deficiency, let me put it that way, and to get it up to the mark, yes, I would gladly take a pill [...] or buy food enriched with protein.”* (woman, ID group, aged 58) (theme 4)

*“I do not have a positive view, so if it says enriched it’s not positive for me, no, I assume that if you eat healthily, you don’t need all of those enrichments.”* (man, ID group, aged 69) (theme 5)

Next to the necessity and definition of enriched foods, the RH elderly mostly discussed distrust regarding truthfulness of product claims (theme 6). They doubted whether enrichments were actually put into the products. The ID elderly also discussed the personal relevance of enriched food. They concluded that these foods are more useful for other people (e.g. pregnant women, children and vegetarians) than for themselves (theme 7). The RH elderly did not discuss this theme.

*“Do you really believe that if it says some percentage of fruit that it is truly the case? I don’t, I don’t believe it.”* (woman, RH group, aged 90) (theme 6)

*“If you look specifically at a certain target group of which you know that they get too little protein, for example teenagers, then you should put it for example in the energy drinks.”* (man, ID group, aged 66) (theme 7)

*Perceived barriers and facilitators*

Both the ID and RH elderly reported distrust (theme 8) and higher product prices (theme 9) as important barriers to purchasing and consuming protein-enriched food (Table 3.2). They discussed the recent horsemeat scandal in Europe and referred to various television shows that exposed marketing scams such as these.

*“There is nothing extra in there, it is all just marketing, that’s all, just marketing.”* (man, RH group, aged 83) (theme 8)

*“Like that gentleman says, it will cost 20 cents more [...] you have something in your pocket that someone else wants and it is your money.”* (man, ID group, aged 66) (theme 9)

## 3

An additional important theme that arose within the ID group was their concern about the protein dosage needed to fulfil a protein deficiency (theme 10). The ID elderly indicated that a protein pill or powder might provide a more precise dosage than a protein-enriched product.

*“You don’t know the dosage, you don’t know how much is in there, you don’t know what type of protein.”* (woman, ID group, aged 63) (theme 10)

In the end, however, the ID elderly mostly preferred eating more protein-rich conventional food to increase their protein intake (theme 11). They indicated that they would only turn to protein-enriched food if eating more conventional food would not suffice.

*“I would still just look for it in the daily products, then I would look if I take in enough of it (i.e. protein) and in the most extreme case, if I do all of that and I still have a deficiency, then I would say, then I would take some pill or powder.”* (woman, ID group, aged 64) (theme 11)

The RH elderly, in contrast, did not discuss the benefits of pills or conventional foods over functional foods, and even indicated that they liked the idea of using protein-enriched food to decrease medicine intake. The RH elderly did repeatedly emphasize that these products should not be used when one is on a protein-restricted diet (theme 12). In addition, the RH elderly indicated that they felt uncertain about what was good or bad for their health because nutritional guidelines had changed over the years (theme 13). This was another important barrier to consuming protein-enriched food.

*“If protein is not forbidden it’s fine, it possibly saves out on medicines, I have no reasons to not buy it.”* (woman, RH group, aged 85) (theme 12)

*“Before, there were no discussions, then we just ate everything, it was much simpler [...] I think it is more difficult nowadays.”* (woman, RH group, aged 88) (theme 13)

For the ID elderly, an important facilitator that could help overcome barriers was medical advice (theme 14). All but one ID elderly agreed that if the family doctor would advise them to use protein-enriched food they would do so without questioning it. In contrast, the RH elderly mentioned taste as a facilitator (theme 15). In fact, participants mentioned product taste both as a reason to try and *not* to try protein-enriched food; they argued that protein enrichment could make a product taste either worse or better. Taste was an important theme among the ID elderly as well.

*“I would seek advice from the GP and probably take supplements, and if he would say ‘[enriched] milk is good for you’ then I would do it.”* (woman, ID group, aged 65) (theme 14)

*“As long as it is tasty, that is the most important thing, that it is tasty.”* (man, RH group, aged 82) (theme 15)

### *Carrier preferences*

Overall, the elderly preferred to use the products in their current diet as carriers for protein enrichment (Table 3.2) (theme 16). On the one hand, they indicated that this was practical because they would not have to change their grocery shopping or eating habits. On the other hand, they argued that protein enrichment would replenish a protein deficiency most quickly when put in these frequently consumed foods.

*“Because you have to eat it anyway and then you’ll get your protein at the same time.”* (woman, RH group, aged 73) (theme 16)

In line with this, the three carrier categories most often sorted as “fits well” during the food category sorting task were dairy, bread and cheese (Figure 3.2); food products that are widely consumed by elderly in the Netherlands (based on data from Kremer, Hulst & Boesveldt, 2013).



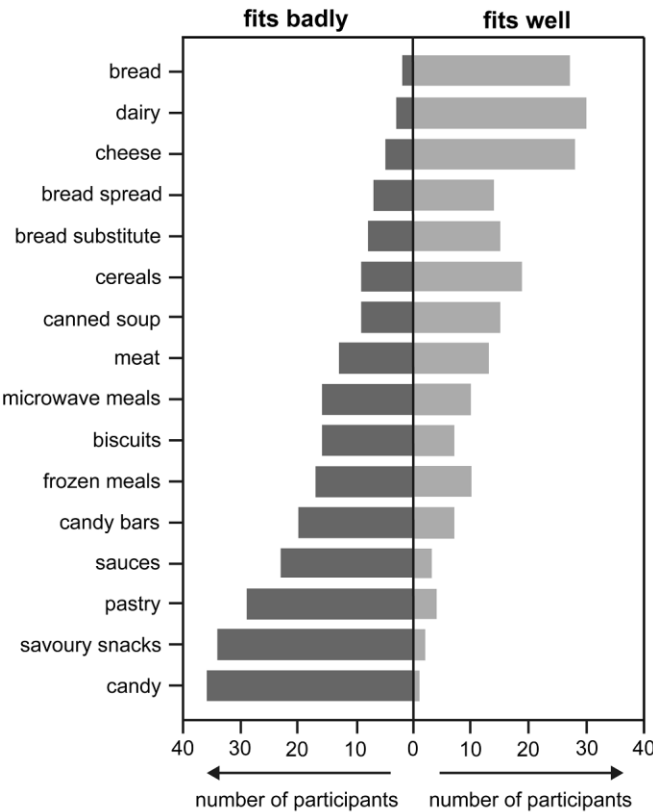


Figure 3.2. Results of the food category sorting task. The y-axis represents the 16 food categories that were sorted by the participants on their appropriateness for protein enrichment. The x-axis represents the number of participants that used the sorting option “fits badly” (dark grey) or “fits well” (light grey) to sort a food category. For clarity, the sorting option “in between” is omitted.

Participants indicated that they could imagine that other food categories would be more suitable for other people, for example: candy for children and microwave meals for busy people. Nevertheless, participants indicated that enrichment of unhealthy products could falsely associate them with being healthy, which they did not approve of (theme 17).

*“But all that stuff, snacks and candy and pastry, guys, suppose that you go enriching those, then people will say, we should buy that, we should eat that!”*  
(man, ID group, aged 76) (theme 17)

The RH elderly mainly preferred healthy products they regularly consumed, whereas the ID elderly discussed another theme regarding their carrier preferences; the feeling that it fits. This discussion largely revolved around the original amounts of protein in carriers (theme 18). Some of the ID elderly indicated that products that already contained protein were most suitable because this felt right or one would notice addition of protein less easily in these

products. Other ID elderly reported not seeing the merit of enriching a product with protein when it already contained protein.

*“For me it’s really, like, cheese is already rich in protein, so why then would you enrich it?”* (man, ID group, aged 69) (theme 18)

In addition, some elderly felt that certain carriers were suitable or not suitable for other reasons, for example: participants did not feel at ease with additions to meat and described it as “fiddling around” (theme 19). Moreover, participants stated that products that lacked nutrients, such as microwave meals, could benefit from the addition of nutrients such as protein. In other cases, elderly were not able to explain why carriers were suitable or not suitable for protein enrichment, for example regarding canned soup.

*“I have also said ‘fits badly’, because in my view you don’t go eating soup to get extra protein.”* (man, ID group, aged 66) (theme 19)

## Discussion

Three focus groups were conducted among independently living (ID) elderly and three among elderly living in a residential home (RH) to explore knowledge, perceptions and preferences of elderly consumers regarding protein-enriched food. Contrary to what is found in most studies on functional food, the elderly in our sample were predominantly sceptical about these products. This scepticism was strongly driven by distrust which is regularly found in research on functional food (e.g. Poulsen, 1999; Landström, Koivisto Hursti & Magnusson, 2009) and may be partly explained by a lack of nutritional knowledge (Menrad, 2003; Wansink, Westgren & Cheney, 2005; Ares, Giménez & Gámbaro, 2008a).

Although participants in our study had attribute knowledge about proteins (e.g. that proteins are building blocks and in which products they can be found), they lacked consequence knowledge (i.e. what protein actually does in the body). This was especially the case for RH elderly, who were also confused about the definition of functional food. Elderly consumers may thus benefit from being informed about functional foods. The difference in knowledge between the two groups of elderly may be partly explained by their level of education, which was lower for the RH elderly than for the ID elderly. In addition, the RH elderly were less familiar with a range of functional foods than the ID elderly, presumably because they only have access to a small supermarket in the residential home with a limited assortment. For ID elderly, in contrast, scepticism regarding protein-enriched food was strongly driven by their perceived lack of personal relevance.

The finding that personal relevance is related to functional food acceptance is not a new one (van Kleef, van Trijp & Luning, 2005). Objectively speaking, however, protein-enriched foods should be relevant for both ID and RH elderly. One explanation for the lack of perceived relevance in ID elderly may be that they felt relatively healthy. As long as people feel healthy, they are generally reluctant to take preventive actions to improve their health (Frewer, Scholderer & Lambert, 2003). In line with this idea, ID elderly indicated that they would only use protein-enriched foods if conventional foods would no longer suffice. A more preventive attitude may be beneficial for these elderly, because increased protein intake lowers the risk of becoming frail (Beasley et al., 2010) and protein-enriched food may therefore help them remain living independently for longer. Given that ID elderly indicated that they would be willing to use protein-enriched foods when advised by their family doctor, it may be useful to also educate health practitioners on the benefits of functional foods.

## 3

Additional barriers to purchasing and consuming protein-enriched food were, for the ID elderly, the dosage and type of protein used in protein-enriched products, and, for the RH elderly, being on a protein-restricted diet. In addition, both groups of elderly worried about the price of protein-enriched food. This was in line with the literature (de Almeida et al., 2001; Locher & Sharkey, 2009). We did not find, however, that inconvenience was an important barrier for the elderly, as it was mentioned solely in light of carrier preferences; the elderly liked the idea of using carriers that were already in their diet.

Despite the barriers found in this study, a majority of the participants reported occasionally consuming at least one type of functional food. This may be explained by the finding that consumers tend to distrust the general concept of functional foods (i.e. “food with additives”), but are relatively optimistic about concrete examples of functional food (Poulsen, 1999). Elderly also discussed facilitators that could help them overcome some of these barriers. For the RH elderly, sensory appeal was an important facilitator, possibly because they receive their meals from the residential home. Facilitators such as convenience and product price may therefore be of little importance for RH elderly. For the ID elderly, in contrast, medical advice was an important facilitator that could overcome barriers.

The elderly overall preferred to use the products in their current diet as carriers for protein enrichment. They indicated that this was practical for them and that protein enrichments would replenish a protein deficiency most quickly when put into these frequently consumed foods. In contrast with the literature, participants did not specifically prefer carriers that originally contained a large amount of protein. This may be explained by the finding that certain enrichments are perceived to fit well in various carriers, for example vitamins and minerals (Krutulyte et al., 2011). It may thus depend on the type of enrichment whether or

not enrichments are more compatible with products that already contained the enrichment originally. In addition, participants could not decide whether protein enrichment would make a product taste worse or better, which is another indicator that protein may fit well in various carriers. Finally, both ID and RH elderly preferred healthy carriers to unhealthy ones.

### *Limitations*

A qualitative approach was used because this study was one of the first to explore knowledge, perceptions and preferences of consumers regarding protein-enriched food. This approach did restrict our sample size. Although the elderly population is hard to reach, future studies on the topic of protein-enriched food should preferably recruit a larger sample and use quantitative approaches. Another limitation of this study was that the two studied groups of elderly were extremes in the elderly population in terms of health. Independently living elderly are relatively more healthy than the “average” elderly person whereas elderly living in residential homes are relatively *less* healthy. The group of elderly residing in the stage between living independently and requiring daily care deserves special attention in future studies, given that functional foods may help these elderly to postpone the moment that institutionalization becomes inevitable. Lastly, the two groups of elderly differed from each other on various demographic characteristics: RH elderly were older, more often widowed and less highly educated than ID elderly. In addition, RH elderly no longer prepared their own meals and were less familiar with functional food products than ID elderly. However, most of these demographic and psychographic differences follow from our choice of participants, and may even provide some insight into the origin of differences in nutritional knowledge, perceived barriers and facilitators, and carrier preferences regarding protein-enriched food. Future studies may want to include a diverse sample of elderly to either account for demographic differences or study them more systematically.

### *Conclusions*

This paper provided insight into what types of protein-enriched food may appeal to elderly consumers and what remains to be done to successfully promote protein consumption among elderly using these products. In line with our findings, we recommend that food producers develop tasty and healthy protein-enriched foods, based on carriers that are consumed often by elderly (i.e. bread or dairy products in the case of Dutch elderly). In addition, future studies should explore ways to deal with the confusion and distrust regarding functional food within the heterogeneous population of elderly. Family doctors may also play a role in reducing distrust, given that a large part of the elderly in our sample placed considerable confidence in their medical advice.

# Chapter 4

## Understanding heterogeneity among elderly: An evaluation of segmentation approaches in the functional food market

Published as:

L. D. T. van der Zanden, E. van Kleef, R. A. de Wijk & H. C. M. van Trijp (2014).  
Understanding heterogeneity among elderly consumers: An evaluation of segmentation  
approaches in the functional food market. *Nutrition Research Reviews*, 27, 159-171.

## Abstract

**Introduction.** It is beneficial for both the public health community and the food industry to meet nutritional needs of elderly consumers through product formats that they want. The heterogeneity of the elderly market poses a challenge, however, and calls for market segmentation. Although many researchers have proposed ways to segment the elderly consumer population, the elderly food market has received surprisingly little attention in this respect.

**Method.** This paper reviewed eight potential segmentation bases on their appropriateness in the context of functional foods aimed at the elderly: cognitive age, life course, time perspective, demographics, general food beliefs, food choice motives, product attributes and benefits sought, and past purchase.

**Results.** Each of the segmentation bases had strengths as well as weaknesses regarding seven evaluation criteria. Given that both product design and communication are useful tools to increase the appeal of functional foods, we argue that elderly consumers in this market may best be segmented using a preference-based segmentation base that is predictive of behaviour (e.g. attributes and benefits sought), combined with a characteristics-based segmentation base that describe consumer characteristics (e.g. demographics).

**Conclusion.** The effectiveness of (combinations of) segmentation bases for elderly consumers in the functional food market remains an empirical matter. We hope that the present review stimulates further empirical research that substantiates the ideas presented in this paper.

## Introduction

The elderly population is becoming an increasingly interesting consumer group from a marketing perspective. The proportion of elderly aged 65 and older in the population is expected to rise to 20% for the United States (U.S. Census Bureau, 2010) and to 29% for Europe (European Commission, 2009) in the next 40 years. In addition, elderly consumers are getting wealthier (Karani & Fraccastoro, 2010). Therefore, marketers are starting to focus their efforts on the unique needs of the elderly, in particular in the tourism domain (Mathur, Sherman & Schiffman, 1998; Purinton-Johnson, 2013). For many other domains, including the food domain, the elderly market is still under development (Moschis, 2003; Arboleya et al., 2012).

The food market holds great potential for targeting the elderly population. The nutritional needs of elderly change with advancing age, as do their preferences regarding how to meet these needs. Specifically, appetite declines with age whereas the recommended daily intake of many nutrients increases (World Health Organization, 2004). This paradox can result in nutritional deficiencies, which decrease the quality of life of elderly (Brownie, 2006) and increase healthcare costs (Marinangeli & Jones, 2013). Moreover, elderly show an interest in healthy eating (Roininen, Lähteenmäki & Tuorila, 1999) and are willing to spend money on products that meet their needs (Leek, Szmigin & Carrigan, 2001; Yoon & Cole, 2008). Marketing efforts that focus on the nutritional needs of elderly may thus be beneficial for both public health and the food industry.

However, from a marketing perspective, meeting these needs is challenging. Firstly, elderly who face a reduced appetite will likely not be able to meet their nutritional needs through an increased quantity of consumption. A more promising approach may therefore be the commercialization of nutrient-enriched food (Dunne & Dahl, 2007), which is a type of functional food (Crowe & Francis, 2013) that is relatively nutrient-dense given its volume. Commercializing these foods may pose a second challenge. Functional foods that are specifically aimed at elderly consumers may not be readily accepted by all subgroups of the elderly population, due to age-related stigmatization (Tepper, 1994; Faranda & Schmidt, 1999). In contrast, when functional foods are advertised as healthy alternatives to conventional products, elderly are overall willing to try them (Poulsen, 1999; Siegrist, Stampfli & Kastenholz, 2008; Vassallo et al., 2009). The general concept of functional food may thus appeal to elderly. Nonetheless, specific functional food products may not, which is a third challenge to meeting the nutritional needs of the elderly. Although the elderly population can be classified using an age bracket (defined here as 55 and older), it is strongly heterogeneous in its composition (Moschis, 2003). During the decade from age 50 to 60,

consumers go through many life changes and therefore become less alike (Moschis, 1992). Consequently, elderly may have similar nutritional *needs* (i.e. nutrient requirements), but their food-related *wants* (i.e. product preferences) tend to differ strongly.

Heterogeneous populations like the elderly call for a strategic marketing approach based on segmentation, targeting and positioning. Segmentation entails the identification of smaller, more homogenous subgroups (segments) within a broader, more heterogeneous population (Wedel & Kamakura, 2000). Once identified, segments can be evaluated on their potential for a specific company, and one or more segments can be selected for targeting. For these target segments, differentiated marketing programs can be developed based on product design and positioning. Many researchers have recognized the heterogeneity among elderly and proposed ways to segment this population (Moschis, 1992; Mathur, Sherman & Schiffman, 1998; Faranda & Schmidt, 1999). Nonetheless, segmentation within the elderly *food* market has received surprisingly little attention, especially when compared with the travel market. To our knowledge, only two published articles focus on segmenting elderly consumers in the food market (Morgan, 1993; Ahmad, 2003) and none has focused on the *functional* food market.

## 4

A successful approach will promote the commercialization of functional foods for the elderly. However, successful segmentation is not simply a matter of freely exploring consumer differences, because segments are not groups of consumers that occur naturally in the market (Wedel & Kamakura, 2000). Instead, segments are groups created by marketers to help them develop market strategies and meaningful groups result only from a strong theoretical basis. Therefore, one of the most critical steps in market segmentation is the selection of one or multiple variables (bases) that will be used to group consumers into segments (Wedel & Kamakura, 2000). Although, statistically, segments can be found even when a logical basis for clusters is not apparent (Hair, Black, Babin & Anderson, 2010), an inappropriate choice of base variables may result in segments that are hard to identify or do not provide informative input for marketing efforts. In contrast, a (combination of) well-selected base(s) may provide marketers with more valid segments that differ from each other in a meaningful way. Therefore, the aim of this paper is to review a range of potential segmentation bases, and critically evaluate their appropriateness in the context of functional foods aimed at the elderly.

### Segmentation Bases

Food choice depends on various interrelated higher-level and lower-level determinants and each of these sources of variability might potentially serve as a segmentation base (Haley,



1986; Moschis, 1992). To provide some structure in discussing these various bases, we organize them into three hierarchical levels that (amongst others) are regularly used in consumer research: the personal, domain and product level (van Raaij & Verhallen, 1991; Goldsmith, Freiden & Eastman, 1995; Ansari, Essegaiier & Kohli, 1999). Bases on the *person level* (also called “general level”) exist on an abstract, high level and consist of global consumer differences such as demographics (e.g. marital status) and general psychographics (e.g. personality). Bases on the *domain* or (in this case) *food* level exist on a medial level and consist of food-specific consumer differences, such as general beliefs and motives regarding food. Bases on the *product* level exist on a concrete, low level and are represented by product-specific consumer differences, such as the benefits and attributes sought by consumers as well as their product purchase behaviour.

We evaluate and compare a range of these higher and lower level segmentation bases, to determine the extent to which they can provide useful information for marketing efforts within the elderly functional food market. Based on an extensive survey of the literature and discussion among the authors, we narrow our review to: four person-related bases (cognitive age, life course, time perspective and demographics), two food-related bases (general food beliefs and food choice motives) and two product-related bases (product attributes and benefits sought, and past purchase) (see Figure 4.1). These segmentation bases are frequently discussed in either literature on the elderly population, food choice or both, and have all been studied in the context of consumer behaviour.

	Characteristics-based	Preference-based
Person level	Demographics, life course, cognitive age, time perspective	
Food level	General food beliefs	Food choice motives
Product level	Product purchase	Product attributes and benefits sought

Figure 4.1. Theoretical organization of eight potential segmentation bases.

Among these eight bases on three levels, one can distinguish between two main sets of segmentation approaches: characteristics-based versus preference / needs / benefit-based segmentation (from now on referred to as “preference-based”). Characteristics-based segmentation mainly organizes consumers into groups with similar personal characteristics and provides input for segment communication and targeting. In contrast, preference-based segmentation organizes consumers into groups with similar needs and wants and provides input for product development and strategy (Greenberg & McDondald, 1989; Greengrove, 2002; Finley, Rogers, Napier & Wyatt, 2011). In markets like the functional food market, both product development and communication for (re)positioning of existing products are useful, thus either of the two main segmentation approaches may be suitable for segmenting elderly in the functional food market. We will use this theoretical organization as a starting point for evaluating the eight selected segmentation bases on a set of evaluation criteria.

### Evaluation Criteria

The marketing literature has put forward six criteria for the evaluation of market segmentation approaches: identifiability, substantiality, accessibility, stability, responsiveness and actionability (Kotler, 1984; Dibb, 1999; Wedel & Kamakura, 2000). These criteria are operationalized as follows:

- *Identifiability*: segments can be distinguished from each other on the basis of information that is obtained objectively and easily (e.g. a validated and short scale).
- *Substantiality*: segments are large enough to be targeted profitably in terms of invested time, effort and cost as well as resulting sales.
- *Accessibility*: targeted segments can be reached with marketing efforts through multimedia or in store in a way that is not too costly. Media profiles (based on demographics) provide information on how marketers can access segments.
- *Stability*: segments are stable for at least the time that marketing efforts take place in terms of size, behaviour or consumer membership.
- *Responsiveness*: consumers within segments respond similarly to marketing efforts targeted at them and uniquely different from consumers in other segments.
- *Actionability*: segments are meaningful in that they provide instructions for the development of marketing efforts within the scope of a company’s capabilities.

The relative importance of these six criteria depends, to some degree, on the marketing objectives of the segmentation. As mentioned before, product development and communication are important tools to increase the appeal of functional foods. Given that their success depends largely on the actionability of a segmentation base, we split the criteria of actionability into actionable for design and actionable for communication. This leaves us with seven evaluation criteria. Ideally, a segmentation base is strong regarding all criteria. However, most bases face some weaknesses as well as strengths (Wedel & Kamakura, 2000; Steenkamp & Ter Hofstede, 2002), and it may be most useful to segment consumer populations on a combination of variables that complement each other (Wedel & Kamakura, 2000). We will evaluate the strengths and weaknesses of the individual eight bases first (summarized in Table 4.1) and elaborate on complementary combinations of variables in the discussion section.

Table 4.1.

*Strengths and weaknesses of potential segmentation bases by evaluation criteria.*

	ID*	SUB	ACC	STA	RES	aCOM	aDSG
<i>person-level bases</i>							
cognitive age	+-	+-	+-	++	++	+-	--
life course	--	++	+-	++	++	--	--
time perspective	+-	--	--	+-	++	++	++
demographics	++	++	++	++	--	--	--
<i>domain-level bases</i>							
general food beliefs	--	++	--	+-	++	+-	+-
food choice motives	+-	++	--	++	+-	++	++
<i>product-level bases</i>							
attributes & benefits	--	++	--	+-	++	++	++
past purchase	+-	++	+-	++	--	--	+-

\* abbreviations: ID, identifiability; SUB, substantiality; ACC, accessibility; STA, stability; RES, responsiveness; aCOM, actionability for communication; aDSG, actionability for design

### Person-Level Bases

Person-level segmentation bases are high-level bases that indicate, for example, how people perceive their future (e.g. “full of opportunities”) and themselves (e.g. “younger than my chronological age”), but also their place in society (e.g. “unemployed” or “married”). Researchers who advocate the use of person-level bases for market segmenting generally

argue that these provide a broad perspective on consumer behaviour and that segments are generalizable to various domains (Moschis, 1992; Sudbury & Simcock, 2009). Others argue that these segments may be *too* broad and therefore not able to explain and predict specific behaviour (van Raaij & Verhallen, 1991; Ahmad, 2003). We will evaluate four person-level bases: cognitive age, life course, time perspective and demographics.

### *Cognitive Age*

In the past, age was frequently used as a segmentation base (Bone, 1991; Lumbers & Raats, 2006). However, since the 1990s, marketers have started to acknowledge that people do not “act their age” and that people within the same age group are rather dissimilar (Moschis, 2003). Chronological age is an empty variable, in the sense that it does not cause behaviour (Settersten & Mayer, 1997), but merely gives a suggestion of one’s degree of *aging*. Age, in turn, is not perfectly in line with aging (Sudbury & Simcock, 2009). Aging occurs at different rates in different people and elderly often feel much younger than their chronological age (Mathur & Moschis, 2005). As a result, chronological age has made way for cognitive age; the age one feels like, looks like, acts like and the age one’s interests fit in (Barak & Schiffman, 1981; Bone, 1991).

## 4

Cognitive age results from biological, psychological and social aging, which affect how people perceive themselves (Mathur & Moschis, 2005). After retirement, for example, people may start feeling old because they want to maintain consistency between their behaviour and their identity (Mathur & Moschis, 2005). Nonetheless, the majority of elderly do not feel old (Barak & Rahtz, 1999), which may be partly explained by the perceived undesirability of old age that exists in many societies (Tepper, 1994; Barak & Rahtz, 1999). Also, the turning point from feeling young to feeling old may require the experience of a catalytic event, rather than aging in general (van Auken & Barry, 2009), and the timing of this event likely differs considerably among individuals because people respond differently to life events (Mathur & Moschis, 2005; Brownie, 2006; Delaney & McCarthy, 2011). However, as long as one lives in a stable environment, cognitive age may remain constant or change slowly (Mathur & Moschis, 2005). In line with this, the test-retest reliability of the cognitive age scale is strong; 0.88 (Barak & Schiffman, 1981; Bone, 1991).

Cognitive age mediates the effect of various demographics on behaviour (Mathur & Moschis, 2005) and it may therefore provide a rich perspective of consumers, resulting in uniquely responsive segments. Cognitively old elderly, for example, are more price sensitive than cognitively young elderly (Barak & Gould, 1985). Given the overall higher prices of functional food (Kotilainen, Rajalahti, Ragasa & Pehu, 2006), cognitively old elderly may thus be less

interested in purchasing these types of food than cognitively young elderly. However, to our knowledge, there is no literature available on the relationship between cognitive age and (functional) food choice.

Cognitive age is a better predictor of behaviour than chronological age (van Auken & Barry, 2009). Nevertheless, as a person-level variable, cognitive age is limited in predicting food choice. In addition, segments based on cognitive age are not as easily identified as segments based on chronological age. Whereas chronological age can be determined objectively and directly, using a single question, cognitive age is inferred from responses on a multi-item questionnaire, albeit a small and reliable one (split-half reliability: 0.85) (Barak & Schiffman, 1981). Moreover, there is no consensus on how to categorize subjects into cognitive age groups. One could, for example, use a cut-off score to categorize people into cognitively young versus old, or one could distinguish between people who feel younger or older than their *actual age*. Although this lack of consensus reduces identifiability of segments based on cognitive age, it does provide marketers with some influence on the composition and substantiality of segments; there is no fixed number of segments (in contrast with e.g. gender).

Irrespective of the operationalization of its groups, cognitive age provides limited instructions for marketing efforts. Questions may arise such as: do elderly who feel like sixty want different functional foods than those who feel like ninety? Actionability for product design is thus limited and, therefore, researchers usually recommend combining cognitive age with other variables (van Auken & Barry, 2009; Sudbury & Simcock, 2009). Segments do provide some instructions for communication efforts and are moderately actionable for communication. For example, research on age-related stigmatization has shown that cognitively old elderly accept age-targeted products and services such as senior discounts, whilst cognitively young elderly do not (Tepper, 1994; Moschis & Mathur, 2006). Furthermore, media profiles based on *chronological age* may provide some information on how marketers can access segments based on cognitive age, since they are correlated ( $r > 0.50$ ) (Barak & Rahtz, 1999; Mathur & Moschis, 2005). Media profiles based on other demographics may not be applicable because they are only weakly related to cognitive age (Mathur & Moschis, 2005; van Auken & Barry, 2009).

### *Life Course*

Whereas cognitive age perspectives assume that life events affect one's self-perception, life course perspectives argue that elderly who experienced similar life events will have similar needs, wants and/or behaviours (Moschis, 1992; Moschis, 2003). Life events like retirement,

remarriage, becoming a grandparent, relocation, health problems and widowhood (Sobal & Bisogni, 2009) have all been studied in the context of food consumption, but their effects tend to vary from one person and situation to another (Mathur, Moschis & Lee, 2008; Delaney & McCarthy, 2011). Retirement, for example, may provide people with more time to prepare and enjoy meals, but may also increase the tendency to snack out of boredom or inactivity (Delaney & McCarthy, 2011). This variability can be explained by the idea that life events have various direct and indirect effects (Mathur, Moschis & Lee, 2008) which interact with each other in a dynamic way (Delaney & McCarthy, 2011).

Because life events cannot be viewed in isolation (Mathur, Moschis & Lee, 2008), most researchers use combinations of life events. One example is the gerontographic life-stage model, which is specifically aimed at segmenting the elderly population. The model proposes four substantial segments: healthy indulgers (13%), healthy hermits (38%), ailing outgoers (34%) and frail recluses (15%) (Moschis, 1992), which consist of elderly who are at different but not necessarily sequential stages in their lives (Lumbers & Raats, 2006). In part because segments are based on a wide collection of measures, the life stage model predicts behaviour better than chronological age, cognitive age (Moschis, 1992; Moschis, Curasi & Bellenger, 2007) or demographics (Moschis, Curasi & Bellenger, 2004) alone and segments are differentially responsive. Ailing outgoers, for example, are interested in learning new things, whilst frail recluses want to feel secure (Moschis, Curasi & Bellenger, 2007). However, the extent to which different marketing strategies appeal to the segments varies across products (Moschis, 1992) and segments are, therefore, limited in actionability regarding both product design and communication. In addition, it has been suggested that only two segments are viable for the food market: healthy indulgers and ailing outgoers (Moschis, Lee, Mathur & Strautman, 2000).

In contrast, stability of segments based on life course perspectives is likely good, because life events are closely linked with demographics (e.g. retirement with income and occupation), which are generally stable. In line with this, the gerontographic life-stages are relatively stable, with segments varying in size by no more than two per cent across studies (Moschis, 1992). Moreover, some of the demographic information inherent in life events can be linked to media profiles (e.g. socioeconomic status), which provides marketers with information on the accessibility of segments. Although single life events may be easily identifiable using objective and direct demographic questions, questionnaires that assess a collection of life events can become quite lengthy. In addition, there is considerable variance among studies in the choice of life events and concrete information on the variables used to measure the gerontographic life-stages is lacking (Weijters & Geuens, 2003), because the model is proprietary (Faranda & Schmidt, 1999).

*Time Perspective*

Socioemotional selectivity theory is another approach that looks at the effect of life events on behaviour (Cate & John, 2007). Rather than focusing on self-perception (like cognitive age) or adaptation (life course perspectives), it assumes that differences in behaviour are based on differences in *time perspective* (Carstensen, Fung & Charles, 2003). The theory classifies time perspective into limited time and open-ended time, which can be measured using a reliable, 10-item questionnaire (internal consistency: 0.92) (Lang & Carstensen, 2002). People who perceive time as limited (regularly found in ill or old people) have a tendency to pursue short-term, emotional and present-oriented goals whereas people who perceive time as open-ended (more often found in young people) have a tendency to pursue more long-term, rational and future-oriented goals (Carstensen, Fung & Charles, 2003; Ares, Mawad, Giménez & Maiche, 2014).

On a consumer level, hedonic products (e.g. tasty food) are most appealing when time is limited, whereas utilitarian products (e.g. healthy food) are most appealing when time is open-ended (Wei, Donthu & Bernhardt, 2012). Functional foods usually provide benefits on the long run and may therefore, on the one hand, appeal most to consumers with an open-ended time perspective. On the other hand, the convenience or “quick fix” aspect of functional foods (Cornish, 2012) may appeal to those who perceive time as limited. In line with the latter, elderly living in nursing homes (i.e. who likely perceive time as limited) are more interested in functional foods than those still living independently (van der Zanden, van Kleef, de Wijk & van Trijp, 2014a). However, to our knowledge, no published studies have looked at the effect of time perspective on functional food acceptance.

Although time perspective is correlated with age, such that elderly tend to perceive time as limited, it is not *bound* to age (Carstensen, Fung & Charles, 2003; Wei, Donthu, & Bernhardt, 2012). In fact, larger differences in time perspective exist among elderly than among young adults (Fung, Lai & Ng, 2001) and the correlation between age and time perspective is not always significant within the elderly population (Fredrickson & Carstensen, 1990; Bal et al., 2010). Time perspective can also be changed temporarily using time constraints or statements (Kim, Goldstein, Hasher & Zacks, 2005; Wei, Donthu, & Bernhardt, 2012). Segments based on time perspective are therefore more or less stable depending on the context of food choice. In line with this idea, test-retest reliability of the future time perspective scale is moderate (0.50 to 0.72) (Zacher & de Lange, 2011). In addition, as elderly tend to perceive time as limited, a segment of elderly who perceive time as open-ended may not be substantial enough to be profitable. Lastly, time perspective is not strongly related to demographics other than chronological age (Cate & John, 2007), and this association is weak

within the elderly population (Fredrickson & Carstensen, 1990; Bal et al., 2010). Information on accessibility of segments based on time perspective will thus be limited.

Time perspective is, however, strongly related to one's motivations and goals (Carstensen, Fung & Charles, 2003) and may therefore provide responsive segments. Emotionally appealing advertisements are, for example, more attractive to consumers who perceive time as limited than to consumers who perceive time as open-ended (Williams & Drolet, 2005). In addition, time perspective is inferred from responses on a validated, multi-item questionnaire and is therefore moderately easy identifiable. Moreover, segments based on time perspective are actionable for both communication and design, because they provide information about the products and messages that are appealing to consumers (e.g. hedonic versus utilitarian). A recent conceptualisation of time perspective may provide even more actionability. Cate and John (2007) found that time perspective could best be operationalized as two independent dimensions: perceived limitations and opportunities. In this conceptualization, a person who sees time as limited does not necessarily see time as less full of opportunity and may be interested in, for example, products that promote health and are convenient to use at the same time.

#### *Demographics*

In contrast with time perspective, demographics are widely used as segmentation bases. They provide segments that are considerably stable (e.g. gender), substantial (e.g. education), easily identified using objective measures (e.g. age) (van Raaij & Verhallen, 1991) and intuitively easy to understand (Honkanen, Olsen & Myrland, 2004). In addition, demographics are often readily available (Wedel & Kamakura, 2000) and have been used as a basis for media profiles that provide marketers with information the accessibility of consumers.

Functional food acceptance has been related to various demographics, such as gender, education, income and age (Childs & Poryzees, 1997; Verbeke, 2006). Specifically, women and older adults are overall found to be more accepting of functional foods than men and younger adults (Poulsen, 1999; Bogue & Ryan, 2000), and consumers with lower education have more concerns about functional foods than those with higher education (Niva & Mäkelä, 2007), which may also be explained by their lower income. These findings suggest that highly-educated, wealthy, elderly women may be most interested in functional foods.

Nevertheless, differences in demographics generally do not account for much variation in actual food choice (Rozin, 2006; Locher et al., 2009). For example, the core foods eaten by



elderly vary little with income (Fanelli & Stevenhagen, 1985; Briley, 1998) and the perceived health benefits of functional foods outweigh the effects of age and gender on functional food acceptance (Verbeke, 2006). Furthermore, segments based on demographics are limited in actionability regarding both product design and communication (Steenkamp & Ter Hofstede, 2002) as they provide little instructions for marketing efforts. For example, how can marketers position functional food in a segment of well-educated, elderly women? In addition, segments are likely not uniquely responsive to marketing efforts because consumers within these segments are often considerably heterogeneous (Haley, 1986). Indeed, relationships found between demographics and food choice differ between functional foods (Ares & Gámbaro, 2007), across countries (Payette & Shatenstein, 2005), over time (Verbeke, 2006) and across studies in general.

### *Summary*

Person-level segmentation bases are generally stable, responsive and substantial. They are, however, limited in their actionability because they are not strongly related to actual food choice. Therefore, these bases provide limited instructions for marketing efforts in the functional food market. Furthermore, demographics and single life events are unique in the sense that they are measured directly with objective, one-item measures (e.g. birth date, sex). All other segmentation bases that we discuss are inferred from multi-item questionnaires.

### **Food-Level Bases**

Food-level segmentation bases are medial-level bases that indicate, for example, how people think about food and food contexts (e.g. “processed food is unhealthy”), but also how they trade-off various reasons for choosing food (e.g. health versus sensory appeal). Researchers who advocate the use of domain-level bases for market segmentation generally argue that these bases are neither *too* general (like person-level bases), nor *too* specific (like product-level bases (van Raaij & Verhallen, 1991; Geeroms, Verbeke & Kenhove, 2008). The same argument may also underline why domain-level bases are of limited use; for some purposes they are neither specific nor general enough. We will evaluate two food-level bases: general food beliefs and food choice motives.

### *General Food Beliefs*

The experiences with food that consumers have over their lifetime affect their personal beliefs about food, such as what types of food they should or should not eat, the role of food

in their lives and how they categorize or evaluate food products (Herne, 1995; Rozin, 2006; Sobal, Bisogni, Devine & Jastran, 2006; Locher et al., 2009). These beliefs are general, in that they are not about specific food products (e.g. oranges) but about broader food categories (e.g. fruit) or about food in general (e.g. the effects of food on health). General food beliefs differ strongly among consumers and, as a consequence, the same type of food (e.g. functional food) may be perceived as healthy and convenient by some, but as unhealthy and quick-fix solutions by others (Sobal, Bisogni, Devine & Jastran, 2006).

Elderly tend to believe that their diet is already healthy (de Almeida et al, 2001; Kremer, Hulst & Boesveldt, 2013) and that improving their diet is too late (Herne, 1995; Delaney & McCarthy, 2011). Single beliefs are likely not actionable, however, because they do not directly translate into specific behaviours. For example, consumers may overall be sceptical about functional foods, but nevertheless consume specific functional foods that meet their needs or wants (van der Zanden, van Kleef, de Wijk & van Trijp, 2014a). A combination of multiple beliefs thus provides a broader perspective of consumer thought processes and food choice. In one of the few segmentation studies of the elderly food market, Morgan and Levy (Morgan, 1993) segmented elderly using a questionnaire with food-related statements (e.g. “eating at restaurants is too expensive”) and found three responsive segments: nutrition concerned, fast and healthy, and traditional couponers. Segments like these are actionable for both product design and communication, because they provide concrete information about the thought processes of consumers. For nutrition-concerned elderly, for example, marketers can emphasize the health aspects of foods and for fast and healthy elderly the convenience aspects.

One well-known questionnaire based on food beliefs is the food-related lifestyle instrument. It measures 69 food beliefs from the process of food shopping through food consumption and links them to five food lifestyle elements (Grunert, Brunsø & Bisp, 1993). However, most researchers construct their own questionnaire, with beliefs that are of central interest for specific research questions. Similar to measuring life events, there is no consensus on which food beliefs should be measured. Nonetheless, the choice of beliefs is a critical step (Hair, Black, Babin & Anderson, 2010) which strongly affects actionability. A segmentation based on beliefs about food in general will provide less information on how a functional food should be designed (actionability for design) but more information on how to approach consumers (actionability for communication) than a segmentation based on beliefs about the more specific category of functional foods.

Substantiality of segments is likely not a problem when using food beliefs, because marketers are not bound to a specific number or type of segments and can thus combine segments that

are too small. Furthermore, general food beliefs are based on a lifetime of experiences and can remain consistent over long periods of time (Edstrom & Devine, 2001). In contrast, the more specific beliefs about functional foods may not yet be strongly established in consumers' minds. In earlier studies on functional foods, beliefs used to fluctuate between as well as within experiments (Urala & Lähteenmäki, 2007; Landström, Koivisto Hursti & Magnusson, 2009) and although functional foods are more common nowadays, consumers are still ambivalent about them (van der Zanden, van Kleef, de Wijk & van Trijp, 2014a; Coleman, Miah, Morris & Morris, 2013). Segments based on food beliefs may thus be more or less stable depending on the beliefs that are measured. The availability of media profiles and, therefore, accessibility of the segments also depends on the choice of beliefs.

#### *Food Choice Motives*

Whereas food beliefs consist of what consumers think is *true*, food choice motives consist of what consumers think is *important* and which factors they consider in making food choices. The widely-used food choice questionnaire (Steptoe, Pollard & Wardle, 1995) assesses the importance of each of nine food choice motives: health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity and ethical concern (internal consistency of the scales > 0.72). A later adjustment of this scale divides the ethical motive into three motives: religion, political value and ecological welfare (Lindeman & Väänänen, 2000). Segments based on food choice motives are actionable for both product design and communication, because the motives can be directly translated into product characteristics and messages (Kornelis, van Herpen, van der Lans & Aramyan, 2010). Segments that are motivated by weight control, for example, may be interested in protein-enriched products that “increase feelings of satiety” whereas segments that are motivated by natural content may prefer products that “contain natural sources of protein”.

Usually consumers hold multiple motives (Kornelis, van Herpen, van der Lans & Aramyan, 2010) that may be more or less important depending on the context of food choice (Onwezen et al., 2010). When hospitalized, for example, people often temporarily care less about the sensory appeal of food and focus more on their health (Herne, 1995). In the case of conflicting motives, a trade-off takes place, wherein one can, for example, focus on a single motive (e.g. always choose the healthiest option). Alternatively, one can routinize ways to trade-off motives for recurring situations (e.g. only choose tasty foods during the weekend) (Sobal, Bisogni, Devine & Jastran, 2006). In addition, consumers may choose to interpret food choice motives in such a way that they are consistent with their behaviour. When consuming ice cream, for example, consumers may operationalize their health motives in terms of promoting wellbeing (i.e. enjoyment) even though the product may not benefit their physical

health (Chrysochou, Askegaard, Grunert & Kristensen, 2010; van Dam & van Trijp, 2013). Furthermore, what consumers think is important does not always align with what they actually do (Urala & Lähteenmäki, 2004). Food choice motives are thus likely not strongly predictive of actual food choice.

Trade-off tendencies of food choice motives are relatively stable within situations (Sobal, Bisogni, Devine & Jastran, 2006) and, usually, food choice questionnaires measure the importance of food choice motives in the context of “a typical day”. Food choice motives will, therefore, likely result in stable segments. In line with this, test-retest reliability of the motives ranges between 0.71 and 0.83 (Steptoe, Pollard & Wardle, 1995). In addition, trade-off tendencies may result in uniquely responsive segments. Although most consumers want products that satisfy as many motives as possible (Haley, 1986), consumers do differ in the *relative* importance of these motives (Onwezen et al., 2010). Among elderly, Locher et al. (2009) found a general interest in the motives convenience, sensory appeal and price, but considerable heterogeneity regarding the motives health, natural content, familiarity and weight control (de Almeida et al., 2001; Locher et al., 2009).

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Consumers who are motivated by health are not necessarily willing to try functional foods. These foods are expected to taste badly and perceived to be unnatural, unfamiliar and expensive (Poulsen, 1999; Verbeke, 2006; Ares, Giménez & Gámbaro, 2008c; Landström, Koivisto Hursti & Magnusson, 2009), thus the importance of sensory appeal, natural content, familiarity and price also play a role. In addition, consumers’ reasons behind food choice vary across different types of functional food (Ares & Gámbaro, 2007; Aschemann-Witzel, Maroscheck & Hamm, 2013). As a result, segments based on food choice motives have been found to differ in acceptance of some but not all functional foods (Ares & Gámbaro, 2007). This variability limits the responsiveness of segments based on food choice motives.

Furthermore, food choice motives are inferred from responses on the food choice questionnaire, rather than measured directly. The questionnaire is lengthy with its 36 items, thus segments based on food choice motives are moderately identifiable. However, there is no consensus regarding the number and type of segments that may be derived from the food choice questionnaire, which increases the influence that marketers have on the substantiality of segments. Segments that are too large may be broken down and segments that are too small may be combined with other segments. Nonetheless, segment substantiality is likely not a problem because segments based on food choice motives are often substantial enough ( $\geq 21\%$ ) (Honkanen, Olsen & Myrland, 2004; Ares & Gámbaro, 2007). In contrast, segments may not be linked to media profiles, because not all food choice motives are reliably related to specific demographics. The price motive, for example, has

been related to age in some studies (Honkanen, Olsen & Myrland, 2004; Pohjanheimo & Sandell, 2009) but not in others (Steptoe, Pollard & Wardle, 1995).

### *Summary*

Food-level segmentation bases are generally responsive and actionable because they are closely related to actual food choice. They are moderately identifiable (because they are inferred from multi-item questionnaires) and provide little information on accessibility (because they are not related to demographics). In addition, their ability to predict acceptance of specific functional foods is limited because they operate on a general food level. For example, consumers who appreciate functional foods in general may not be interested in specific functional food formats.

### **Product-Level Bases**

Product-level segmentation bases are low-level bases that indicate, for example, what kind of benefits people seek in their food consumption (e.g. “comfort”) and what kind of product attributes they prefer (e.g. “crispy texture”), but also what products consumers actually purchase. Researchers who advocate the use of product-level bases for market segmentation argue that these are strongly predictive of actual food choice (Huffman, Rathneshwar & Mick, 2000; Ahmad, 2003). Others argue that segments based on product-level bases may be *too* specific and therefore not generalizable to other products (van Raaij & Verhallen, 1991; Sudbury & Simcock, 2009). We will evaluate two product-level bases: product attributes and benefits sought, and past purchase.

#### *Product Attributes and Benefits Sought*

Food choice motives (e.g. “health”) are fulfilled by product benefits (e.g. “control of blood pressure”) which arise from product attributes (e.g. “added omega-3 fatty acids”) (van Raaij & Verhallen, 1991; Surai & Sparks, 2001). These three concepts are often used interchangeably (Olsen, Prebensen & Larsen, 2009; Onwezen et al., 2010) because they are closely related to each other. However, food choice motives reflect more general consumer tendencies, whereas the attributes and benefits that consumer seek likely differ across foods. Therefore, we evaluate product attributes and benefits together as product-level segmentation bases.

According to Haley (1986), the fact that consumers seek different benefits is the main reason why market segments exist. In various marketing domains, elderly consumers have been

segmented on the product attributes and benefits they seek (Horneman, Carter, Wei & Ruys, 2002; Shoemaker, 2010) and this has also been done for the *general* consumer population in the functional food market (Herath, Cranfield & Hensen, 2008; Hailu, Boecker, Henson & Cranfield, 2009). Examples of resulting segments are: “receptive to functional foods” (47%) and “receptive to general foods for wellbeing” (53%) (Herath, Cranfield & Hensen, 2008), or “pill lovers” (23%), “yoghurt lovers” (16%) and “pill loathers” (16%) (Hailu, Boecker, Henson & Cranfield, 2009). Moreover, one of the few researchers who discussed the segmentation of *elderly* consumers in the food market recommended using benefit segmentation (Ahmad, 2003). Nonetheless, this recommendation was not evaluated in practice.

The three attributes of functional food that are most frequently discussed in the literature are: functional ingredients (e.g. calcium), health claims (e.g. “increases bone mineral density”) and the carrier product in which functional ingredients are placed (e.g. orange juice). These attributes each affect functional food acceptance individually (van Kleef, van Trijp & Luning, 2005). In addition, ingredients and carriers interact with each other (Siegrist, Stampfli & Kastenholz, 2008; Krutulyte et al., 2011) and, as a result, some carrier-ingredient combinations are more appealing to consumers than others (Poulsen, 1999; Landström, Koivisto Hursti & Magnusson, 2009). Functional food acceptance is also affected by the way in which health claims are presented. For example, elderly prefer health claims that focus on disease prevention (e.g. “reduces risk of cancer”) over health claims that focus on health promotion (e.g. “increases energy level”) (Bogue & Ryan, 2000). However, carrier type is found to affect acceptance most strongly (Ares & Gámbaro, 2007; Siegrist, Stampfli & Kastenholz, 2008; Krutulyte et al., 2011).

Besides food-specific attributes (e.g. functional ingredients), functional foods may differ on a range of general product attributes, such as product price, package, brand and additional ingredients (Sparke & Menrad, 2006; Bogue, Sorenson & O’Keeffe, 2009; Ares, Besio, Giménez & Deliza, 2010). These attributes also contribute to the benefits that a product provides. Although individual benefits are appealing to many segments, it is the total configuration of benefits sought that differ between segments (Haley, 1986; Onwezen et al., 2010) and result in unique responsiveness. Overall, elderly prefer healthy carriers to unhealthy ones, but considerable differences exist in their specific preferences. For example, elderly are found to overall like protein-enriched bread and dislike protein-enriched candy, but differ in their acceptance of protein-enriched meat, microwave meals and canned soup (van der Zanden, van Kleef, de Wijk & van Trijp, 2014a).

Segments based on product attributes and benefits sought are actionable because they can be directly translated into marketing efforts (Haley, 1986; Ahmad, 2003) (e.g. by highlighting

certain benefits) as well as product design (e.g. by using certain carrier-ingredient combinations). In contrast, identifiability of these segments is limited. Researchers generally advise against directly measuring attributes and benefits sought (van Kleef, van Trijp & Luning, 2005) because consumers often do not exactly know why they do or do not want to purchase certain products (Riquelme, 2001; Ulwick, 2002). Instead, researchers usually let participants evaluate *product formats*, from which the attributes and benefits sought are later derived using a statistical method (e.g. conjoint analysis).

Generally, segments based on attributes and benefits sought are substantial enough ( $\geq 16\%$ ) (Hsu & Lee, 2002; Hailu, Boecker, Henson & Cranfield, 2009; Chung et al., 2011) but moderately stable. Sought attributes and benefits are linked to the food choice motives that are most important at the moment of food choice. These motives, in turn, can vary across situations (Onwezen et al., 2010) and over time (Calantone & Sawyer, 1978). However, when attributes and benefits sought are measured for a specific context, segments may be stable. In line with this, test-retest reliabilities of attributes and benefits sought have been found to vary strongly, from the weak 0.20 to the strong 0.93 (Calantone & Sawyer, 1978; Bottomley & Doyle, 2001). In addition, products and attributes sought cannot always be directly related to specific demographics (Hailu, Boecker, Henson & Cranfield, 2009) and may, therefore, provide little information on the accessibility of segments.

#### *Past Purchase*

Aside from which attributes and benefits consumers *seek*, it can be useful to look at what products consumers actually *purchase*. Research suggests that past behaviour is strongly predictive of future behaviour (Ouellette & Wood, 1998) and when behaviour is frequently performed, it may turn into a stable habit (Conner & Armitage, 2006). This applies to food choice as well (Gillespie & Johnson-Askew, 2009; Peters, 2009). Past purchase may be especially predictive of future purchase in *elderly* because they live relatively stable lives (Armireault, Godin, Vohl & Pérusse, 2008) and may thus have well-established patterns of consumption. Indeed, even olfactory losses in the elderly are not strongly related to changes in food choice (Kremer, Bult, Mojet & Kroeze, 2007; Köster, 2009). Segments based on product purchase are thus likely stable.

Nonetheless, the relationship between past and future behaviour is not especially meaningful (Ouellette & Wood, 1998). Past and future behaviour are merely *correlated* with each other because they are based on the same underlying beliefs and motivations (Ajzen, 1987). Behaviour itself does not provide much information on *why* consumers do or do not purchase certain products and actionability for communication is thus limited. How can one,

for example, promote functional food purchase among consumers who do not yet purchase functional food? In contrast, actionability for design may be moderate. For example, consumers who already purchase certain types of functional food may be interested in similar types of functional food and consumers may also be approached with functional alternatives of the conventional foods that they purchase.

Information on past behaviour may, however, only be useful in a market that is relatively static and the functional food market, in contrast, is one driven by innovation (Bäckström, Pirttilä-Backman & Tuorila, 2003). Product formats or marketing efforts from the past may therefore be a weak starting point in the commercialization of functional foods. Furthermore, few segmentation studies use purchase behaviour in isolation, because it tends to result in limited, substantial and heterogeneous segments (e.g. buyers and non-buyers of a product) which are likely not uniquely responsive to marketing efforts. Therefore, behaviour is sometimes measured in combination with other variables, such as purchase frequency (Barrena & Sánchez, 2009) or motivations (Sparke & Menrad, 2006) to establish more diverse segments. Yet more often, past behaviour is used to *describe* segments rather than as a basis for market segmentation (Littrell, Paige & Song, 2004; Shoemaker, 2010).

## 4

Segments can be identified using a self-report measure of past purchase, but self-report measures often provide unreliable results (Macdiarmid & Blundell, 1998). In addition, consumers may be unaware of functional food purchases because consumers are often unsure whether or not products are “functional” (Landström, Koivisto Hursti & Magnusson, 2009; van der Zanden, van Kleef, de Wijk & van Trijp, 2014a). A better source of information is the customer card because it objectively records what customers purchase (Ziliani & Bellini, 2004). Moreover, it records purchases across various occasions (e.g. week and weekend days), which provides a better indication of behavioural tendencies than a single purchase (Fishbein & Ajzen, 1974). Furthermore, customer cards are usually linked with customer profiles that contain various demographics as well as store patronage information on which media profiles have been based. This information can thus be used to determine the accessibility of segments. However, irrespective of the measure used, past purchase can only be measured when the product of interest is already for sale in stores. This variable may thus be of limited use for newly developed functional foods.

### Summary

Product-level segmentation bases are unique in the sense that they are able to predict acceptance of specific functional food formats, to some extent. Similar to food-level segmentation bases, segments of product-level bases are relatively strong regarding stability,



substantiality and actionability for design. In contrast, segments are not always responsive and actionable for communication. Whereas segments based on product attributes and benefits sought are both actionable and responsive, this is not the case for past purchase. In addition, although past purchase may be the strongest predictor of functional food purchase among the segmentation bases in this paper, it can exclusively be used for products that are already in stores.

## Discussion

Segmentation of elderly consumers has become increasingly interesting from a marketing perspective (Purinton-Johnson, 2013). Segmentation of elderly in the functional food market has received limited attention, however, which is surprising given its potential for both the marketing industry and health community (Poulsen, 1999; Yoon & Cole, 2008). Successful market segmentation calls for a strong theoretical basis and this review aimed to provide some insight into segmentation bases for elderly in the functional food market. One approach to segmenting elderly consumers is to use characteristics-based segmentation bases that focus on describing consumers (e.g. demographics). Another approach would be to use preference-based segmentation bases (e.g. food choice motives), which focus on gaining insight into the wants and needs of consumers. In this paper, we argued that elderly have specific food-related needs and wants, and this might justify preference-based segmentation approaches in the functional food market.

This paper evaluated a range of potential segmentation bases on their appropriateness in the context of functional foods for the elderly consumer population. Using seven evaluation criteria based on the marketing literature (Dibb, 1999; Kotler, 1984; Wedel & Kamakura, 2000), we found that all segmentation bases had strengths as well as weaknesses (see Table 4.1). It may thus not be appropriate to use a single segmentation base to segment the elderly consumer population in the functional food market. Although from a descriptive point of view one might combine all segmentation bases and look for useful information within this bulk of data, from an “understanding” and marketing point of view it may be most useful to use few bases that complement each other in terms of their strengths (Wedel & Kamakura, 2000) and provide meaningful segments.

Given that the functional food market calls for segmentation bases that are meaningful in terms of both product design and communication, elderly consumers in this market may best be segmented using a preference-based variable from the food or product level that is predictive of behaviour (e.g. attributes and benefits sought), combined with one or more characteristics-based person-level variables that describe consumer characteristics (e.g.

demographics). In the end, the effectiveness of (combinations of) segmentation bases remains an empirical matter. We hope that the present review stimulates further empirical research that substantiates the ideas presented in this paper.

### **Guidelines and Conclusion**

This paper underlines that there is no single correct way of segmenting elderly consumers in the functional food market. In fact, this is the case for most consumer groups and markets. Nevertheless, a segmentation base will provide most meaningful segments when it is matched to the marketing objectives of a study. In terms of marketing methods, studies aimed at product development will benefit most from segmentation bases on a concrete, product level, that are strongly related to product acceptance and purchase. In contrast, studies aimed at product positioning and communication call for segmentation bases that provide a broader, more general picture on how to approach consumers. These bases can be found on the more abstract person level. In addition, several practical considerations can guide the selection of segmentation bases. For example, studies that specifically aim to target all consumers in a population may want to use a segmentation base that results in few, *substantial* segments (e.g. domain and product-level bases). In contrast, studies that aim to provide international segments or segments that need to be reproducible after a period of time may want to use a segmentation base that provides relatively *stable* segments across cultures or time, respectively (e.g. person-level bases).

### **Limitations and future research**

The number of bases that can be used to segment consumer populations is virtually limitless (Haley, 1986). This paper reviewed a selection of eight segmentation bases that are frequently used in either studies on elderly consumers or food choice. However, various other segmentation bases may be useful in segmenting the elderly population within the functional food market and may be an interesting target for future research. In addition, segmentation of the elderly market is relatively understudied in the marketing literature. Therefore, there is little empirical research on diversity in elderly food choices to build on, for now. Similarly, the amount of literature on functional foods was limited and did not include all segmentation bases that were evaluated in this review. Much of the reasoning in this paper thus remains at a conceptual level. Future empirical research on market segmentation of the elderly consumer population and functional food acceptance will enable these fields to develop and move beyond the conceptual level put forward in this paper.

# Chapter 5

## **Examining heterogeneity in elderly consumers' acceptance of carriers for protein-enriched food: A segmentation study**

Published as:

L. D. T. van der Zanden, E. van Kleef, R. A. de Wijk & H. C. M. van Trijp (2015). Examining heterogeneity in elderly consumers' acceptance of carriers for protein-enriched food: A segmentation study. *Food Quality and Preference*, 42, 130-138.

## Abstract

**Introduction.** Elderly face an increased risk of nutritional deficiencies due to reduced appetites and increased nutritional needs. The development of appealing enriched functional foods holds a great potential for improving the nutritional status of this group of consumers. However, the elderly population is strongly heterogeneous, which poses a challenge to fulfilling their nutritional needs. Therefore, this study aimed to illustrate and examine the heterogeneity in elderly consumers' acceptance of carriers for enrichment.

**Method.** In an online survey, respondents (N = 303, Mage = 66.9) were asked to rate their willingness to trial purchase a set of carriers enriched with protein, that varied systematically in terms of healthiness (healthy vs. unhealthy), novelty (novel vs. traditional), and meal type (meal component vs. snack).

**Results.** Overall, respondents reported low willingness to purchase protein-enriched foods and indicated that they preferred to consume more protein-rich conventional foods, should they need to increase their protein intake. The heterogeneity in carrier acceptance, especially regarding product novelty and meal type, suggested that there was room for improvement in product acceptance. Indeed, willingness to purchase protein-enriched carriers was considerably higher for formats that were tailored to six subgroups of elderly.

**Conclusion.** These findings underline the merits of taking heterogeneity into account when commercializing functional foods among elderly. Future studies may want to look into additional ways to reduce scepticism among elderly regarding the use of enriched food.

## Introduction

During the last decades, the elderly population has strongly increased relative to younger populations and it has been predicted that the proportion of elderly aged over 65 in Europe will rise up to 30% in 2060 (European Commission, 2009). Because of this rise, scientists are devoting increasing attention to the physical and psychological wellbeing of elderly. One of their main concerns is the high incidence of protein deficiency among elderly, especially among frail elderly (Brownie, 2006; Wolfe, Miller & Miller, 2008). Both healthy and frail elderly are argued to require greater amounts of protein than younger adults do, because the elderly body metabolises protein inefficiently (Morais, Chevalier & Gougeon, 2006; Wolfe, Miller & Miller, 2008; Bauer et al., 2013). Inadequate intake of protein may threaten various bodily functions (Morais, Chevalier & Gougeon, 2006) and is a strong independent predictor of mortality in elderly people regardless of whether they live independently or in nursing homes (MacIntosh, Morley & Chapman, 2000). Higher protein intake among healthy elderly results in improved bodily function and quality of life (Wolfe, Miller & Miller, 2008), and may help prevent protein malnutrition at a later age (Morais, Chevalier & Gougeon, 2006).

### *Functional foods*

Different from elderly in geriatric care, who often receive nutritional support (Stratton et al., 2005), elderly who are still living independently generally have to manage their food intake without medical help. The functional food market may support this latter group of elderly in increasing their protein intake. Functional foods are food products with a nutritional composition that may reduce the risk of diet-related diseases or enhance physiological functions (Diplock et al., 1999). These foods may be whole foods with naturally occurring nutritional benefits (e.g. lycopene in tomatoes), foods that are enriched, fortified or enhanced with nutrients (i.e. nutrients are added or nutrient levels are increased, from now on collectively referred to as “enriched foods”) or foods that are otherwise altered (i.e. from which nutrients are removed, reduced or replaced, such as in light products) (Spence, 2006).

Protein-enriched meals have already been successfully used to increase protein consumption among hospitalized elderly (Lorefält, Wissing & Unosson, 2005; Stelten et al., 2014). Developing and commercializing protein-enriched foods that appeal to independently living elderly could help these elderly consumers to also meet their increased need of protein. As a result, these products could benefit public health by helping prevent nutritional deficiencies, improving elderly’s quality of life (Brownie, 2006) and decreasing healthcare costs (Marinangeli & Jones, 2013). In addition, enriched foods are interesting from the

perspective of the food industry, because elderly are willing to spend money on innovative products that meet their needs (e.g. what they want to be delivered) and wants (i.e. how they want it to be delivered) (Leek, Szmigin & Carrigan, 2001; Yoon & Cole, 2008).

Functional ingredients, like protein, can be incorporated in various food products (i.e. carriers), giving rise to many opportunities for protein-enrichment in the functional food market. However, not all combinations of ingredients and carriers appeal to consumers to the same extent (van Kleef, van Trijp & Luning, 2005) and the elderly consumer population is strongly heterogeneous in terms of their needs and wants (Moschis, 2003), including their food preferences (Rozin, 2006; Sobal, Bisogni, Devine & Jastran, 2006; Locher & Sharkey, 2009). More insight into this heterogeneity will help marketers to better understand the wants and needs of the elderly consumer population and will benefit the development of appealing protein-enriched foods.

#### *Current Study*

In this study, a market segmentation approach (Wedel & Kamakura, 2000) was adopted to explore heterogeneity among elderly in acceptance of various potential carriers for enrichment. A set of carriers was selected that varied systematically on three broad, underlying dimensions: healthiness (healthy vs. unhealthy), novelty (novel vs. traditional), and meal type (meal component vs. snack). These dimensions are relatively fundamental and objective, as they reflect ways in which foods are represented in the minds of consumers (Ross & Murphy, 1999; Furst et al., 2000; Blake et al., 2007).

## 5

When studying heterogeneity among consumers in the functional food market, preferences and behaviour are argued to be a better starting point than perceptions such as appropriateness (for a review, see van der Zanden, van Kleef, de Wijk & van Trijp, 2014b). Consumer perceptions are often similar (e.g. perceiving apples to be healthy) and product attributes that simply appeal to consumers often do not guide actual buying behaviour (e.g. wanting or buying apples) (Ajzen & Fishbein, 1980; Ulwick, 2002). In a natural setting, consumers first trial purchase a product and only repeat purchase it after a satisfying experience (Oliver, 1993). Therefore, this study segmented elderly consumers on their *willingness to trial purchase* various enriched foods. However, to increase protein intake among the elderly it is crucial that these consumers are not only curious about and willing to try protein-enriched foods, but that these products are also eventually incorporated into their daily diet. In addition, elderly consumers may only be willing to try protein-enriched foods they perceive to be appropriate. To obtain a more comprehensive picture of product acceptance, we explored the relationship between *perceived appropriateness* of protein-

enriched foods, *willingness to trial purchase* protein-enriched foods and *willingness to repeat purchase* these products, using a mediation analysis.

## Methodology

### *Participants*

Participants were recruited among members of the online SenTo panel (i.e. Senioren van de Toekomst / Seniors of the Future) (Kremer, 2012), which consists of 816 independently living adults between the ages of 55 and 92 years. All SenTo members were approached with the online survey and a total of 341 members (41.8%) responded. Respondents were 56-87 years old ( $M = 67.0$ ,  $SD = 6.1$ ) and the respondent sample consisted of 135 males (39.6%) and 206 females (60.4%). The sample was representative of the Dutch elderly population in terms of gender and marital status, but not in terms of age, health and living situation (CBS Statline, 2013). Respondents in our sample were still living independently and were, compared to the Dutch elderly population, relatively healthy and young. In addition, all respondents were internet users. Background characteristics were derived from the SenTo database.

### *Procedure*

Respondents received an invitation by email to fill out the online survey. Upon following the link to the survey, respondents were presented with a short introduction to the study which contained a description of proteins (i.e. “proteins are nutrients that can be found in meat, dairy, nuts and legumes”) and enriched foods (i.e. “enriched food is food with added nutrients such as proteins”). This was done to make sure that all respondents had some basic knowledge on the concept of protein-enriched food. The introduction was followed by the carrier evaluation task, during which respondents were presented with 16 carriers in a random order and were asked to rate each of them on three scales: carrier appropriateness, willingness to trial purchase and willingness to repeat purchase. After completing the carrier evaluation task, respondents were presented with a short questionnaire that assessed what means they would prefer to use to increase their protein consumption, if necessary. This measure was added to identify possible reasons for rejection of enriched food. Nine checks of €25,- were raffled among respondents who completed the questionnaire.

### *Carriers*

Carriers for the evaluation task were depicted on cards containing the name of a carrier type and a corresponding colour picture (Figure 5.1). Carrier types were restricted to processed

foods (i.e. excluding fresh products like vegetables) such that they would be realistic candidates for protein enrichment. Carriers varied systematically on three dimensions with two levels: *healthiness* (health vs. unhealthy), *novelty* (novel vs. traditional) and *meal type* (meal component vs. snack), resulting in ( $2 \times 2 \times 2 =$ ) eight unique carrier formats (Table 5.1). A set of sixteen carriers was selected for the study, based on two exploratory and one confirmatory pilot study (see Appendix). Each carrier format was represented by two carriers, to reduce the influence of unstudied characteristics of carriers (e.g. brand or taste) on evaluations of their overarching carrier format. Ratings of product acceptance of carriers within a pair were averaged such that they reflected their overarching product format rather than individual, underlying carriers. Ratings of product acceptance correlated significantly between carrier pairs at  $p < .001$  and correlations were medium to high, ranging from .370 to .651.

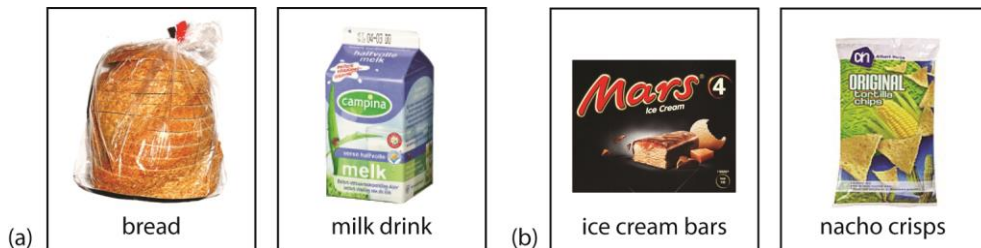


Figure 5.1. Examples of (a) healthy, traditional meal components, and (b) unhealthy, novel snacks, used as carriers for the pilot studies and the carrier evaluation task.

## 5

Three analyses of variance (ANOVA's) were performed on the data that were gathered during the exploratory pilot studies to check whether the final set of carriers differed significantly from each other, as intended, in terms of healthiness, novelty and meal type. In line with our intention, carriers selected as healthy were rated significantly more healthy ( $M = 66.5$ ,  $SD = 24.4$ ) than carriers selected as unhealthy ( $M = 27.3$ ,  $SD = 21.9$ ),  $p < .001$ ,  $\eta^2 = .419$ . Carriers selected as novel were rated significantly more novel ( $M = 61.5$ ,  $SD = 29.8$ ) than carriers selected as traditional ( $M = 15.5$ ,  $SD = 19.3$ ),  $p < .001$ ,  $\eta^2 = .457$ , and carriers selected as meal components were rated significantly more like meal components ( $M = 79.1$ ,  $SD = 26.5$ ) than carriers selected as snacks ( $M = 13.7$ ,  $SD = 20.7$ ),  $p < .001$ ,  $\eta^2 = .655$ . Data of the confirmatory pilot studies indicated that the majority of respondents sorted the healthy carriers into the category healthy (82.5%), sorted the unhealthy carriers as unhealthy (76.0%), the novel carriers as novel (79.9%), the traditional carriers as traditional (87.3%), the meal-type carriers as meal components (86.7%) and the snack-type carriers as snacks (95.9%).



Table 5.1.

*Eight Carrier Formats with their Dimension Levels.*

<i>Format</i>	<i>Healthiness</i>	<i>Novelty</i>	<i>Type</i>	<i>Selected Carriers</i>
1	Healthy	Traditional	Meal	milk drink, bread
2	Healthy	Traditional	Snack	crackers, cheese cubes
3	Healthy	Novel	Meal	soy milk, meat substitute
4	Healthy	Novel	Snack	dairy snack, granola bars
5	Unhealthy	Traditional	Meal	sauce, French fries
6	Unhealthy	Traditional	Snack	crisps, pastry
7	Unhealthy	Novel	Meal	exotic sauce, filled pasta
8	Unhealthy	Novel	Snack	ice cream bars, nacho chips

*Measures**Product acceptance.*

Product acceptance was operationalized using three measures: carrier appropriateness for enrichment with protein, willingness to trial purchase protein-enriched carriers and willingness to repeat purchase protein-enriched carriers. Carrier appropriateness was measured using the question: “To what extent do you feel that this type of product is appropriate for enrichment with protein?”. Responses were made on a 7-point Likert scale ranging from 1 = “not at all” to 7 = “very much”. Willingness to trial purchase was measured using the question: “Imagine that you can buy this type of product, enriched with protein, for the same price as the type of product without enrichment. To what extent would you be willing to purchase and try this type of product, enriched with protein?”. Responses were made on a 7-point Likert scale ranging from 1 = “not at all” to 7 = “very much”. Willingness to repeat purchase was measured using the question: “Imagine that you have tried this product, enriched with protein, and you are satisfied with its price and taste. How often would you eat this product, enriched with protein?”. The response options were: 1 = “never”, 2 = “less than once a month”, 3 = “once a month”, 4 = “every two weeks”, 5 = “once a week”, 6 = “multiple times a week”, 7 = “every day”.

*Background characteristics.*

Six demographic characteristics of respondents were derived from the SenTo database (age, BMI, gender, health, educational level, marital status) and preferred means to increase protein consumption was measured in the questionnaire. Preferred means was measured using the question “Imagine that you are at your GP for a regular check-up. The GP warns you that you need more protein and gives you three suitable options to get more protein.”

Respondents were then asked to allocate 10 points over the three options to indicate their interest in each option. The options were: (1) eat more conventional high-protein foods, (2) take supplements with protein, and (3) replace some of the products in your diet with similar products enriched with protein. In addition, respondents were allowed to allocate points to the option: “Not applicable” if they did not want to consume more protein despite the advice of the GP.

#### *Data preparation*

A total of 39 respondents were classified as invalid cases based on their evaluations on the three measures used to operationalize product acceptance. Respondents who used the response option “1” to evaluate all 16 carriers (N = 34, 10% of the sample) were considered to categorically reject protein-enriched foods. These respondents were excluded from further analyses, because their scores did not provide any variance. To gain some understanding of their categorical rejection, we did describe this group of respondents on various background characteristics. In addition, respondents who did not evaluate all items (N = 7) or used one and the same response option other than “1” to evaluate all 16 carriers (N = 2) were considered uncooperative and were therefore excluded from further analyses.

An exploratory conjoint analysis was used to examine to what extent our hypothesized model of three dimensions (i.e. healthiness, novelty, meal type) could explain variance in the product acceptance of individual respondents. The analysis showed that explained variance was high (i.e. above .80) for the majority of the respondents (170 cases, 57.0% of the remaining sample), indicating that the model explained variance well. However, for a small group of the respondents (29 cases, 9.7%), explained variance was relatively low (i.e. below .60). Given that the  $R^2$  value characterizes the internal consistency of the respondent (Orme, 2010), these respondents were considered to be inconsistent in their evaluations and were excluded from further analysis. Possibly, these respondents evaluated the carriers on the basis of other characteristics than those represented by the three dimensions (i.e. healthiness, novelty, meal type). To gain some understanding of the inconsistency in their evaluations, we described the group of inconsistent respondents on various background characteristics.

#### *Latent Class Analysis*

Heterogeneity among the respondents was explored by performing a Latent Class Analysis (LCA) using the statistical package LatentGOLD. This analysis categorised the eligible respondents (N = 303) into groups, based on their willingness to trial purchase eight carrier

formats enriched with protein. Before running the analysis, the evaluations of ‘willingness to trial purchase’ were standardized per respondent (i.e. rating – mean / SD), to account for differences in response tendencies (i.e. to avoid finding groups that were merely willing vs. unwilling to trial purchase protein-enriched functional foods). These standardized evaluations were used as the dependent variable in the analysis and the dimensions healthiness, novelty and meal type were used as the predictors.

A total of 10 models were estimated, each with a different number of consumer groups (Table 5.2). Each model was fitted ten times with random starting values. Four statistical measures of fit were used to determine the number of consumer groups that fitted the data best. The first two indices were the Bayesian information criterion (BIC; Schwarz, 1978) and Akaike’s information criterion (AIC; Akaike, 1987) with a penalty weight of three (AIC3, assumed to be more suitable for LCA than AIC; Dziak, Coffman, Lanza & Li, 2012). Both criteria indicate the deviation between the “true” model of the observed data and the estimated model. In addition, we considered the classification error, which indicates the proportion of respondents that is classified in a suboptimal group and  $R^2$ , which indicates to what extent the model explains the variance in the data. Smaller values for BIC, AIC3 and classification error, and larger values for  $R^2$  indicate a better fit with the data.

Table 5.2.

*Statistical measures of fit for solutions with 1 through 10 groups.*

# groups	BIC	AIC3	classification error	$R^2$
1	4882.41	4869.44	-	0.361
2	4696.94	4668.40	<u>0.070</u>	0.507
3	<u>4675.18<sup>a</sup></u>	4631.07	<u>0.147</u>	0.534
4	<u>4661.64</u>	<u>4601.96</u>	<u>0.159</u>	0.575
5	<u>4669.62</u>	<u>4594.37</u>	<u>0.159</u>	0.598
6	<u>4679.37</u>	<u>4588.56</u>	0.181	0.612
7	4702.25	<u>4595.87</u>	0.200	<u>0.627</u>
8	4730.80	4608.91	0.250	<u>0.622</u>
9	4758.13	4620.61	0.245	<u>0.639</u>
10	4787.65	4634.5	0.279	<u>0.638</u>

<sup>a</sup> underlined values are the four smallest values for BIC, AIC3 and classification error, and the four largest values for  $R^2$ .

BIC favoured a solution with four groups whereas AIC3 favoured a solution with six groups (see Table 5.2). This is not uncommon, given that BIC favours models with fewer groups,

whereas Akaike-based criteria favours models with more groups (Kass & Raftery, 1995). Similarly, classification error tends to improve with fewer classes, whereas  $R^2$  tends to improve with more groups. We chose to use the 6-group solution, given that Akaike-based criteria should be prioritized when the goal of LCA is to describe heterogeneity, whereas BIC is more suitable for yielding parsimonious models (Dziak, Coffman, Lanza & Li, 2012). The  $R^2$  of the 6-group model ( $R^2 = .612$ ) was considerably higher than the  $R^2$  of the 1-group model ( $R^2 = .361$ ), indicating that more variance in willingness to trial purchase enriched carriers could be explained by the dimensions healthiness, novelty and meal type when dividing the sample into subgroups.

# Results

## Identification of consumer groups

Among the six consumer groups yielded by the Latent Class Analysis were three large groups, consisting of at least 20% of the respondents, and three smaller groups, containing less than 15% of the respondents. Using a linear regression analysis, beta coefficients were estimated for each consumer group (see Table 5.3), to assess to what extent and in what direction carrier healthiness, novelty and meal type contribute to willingness to trial purchase enriched variants of carriers (non-significant beta coefficients are blanked out).

Table 5.3.  
*Effect of carrier dimensions on relative willingness trial purchase protein-enriched carriers by six classes of respondents.*

	Total (100%)	Group 1 (31%)	Group 2 (27%)	Group 3 (21%)	Group 4 (12%)	Group 5 (6%)	Group 6 (3%)
<i>Beta coefficients</i>							
Healthiness	1.03	1.09**	0.85**	1.59**	1.09**	0.35*	-.68*
Novelty	-0.22	0.46**	-.80**			-1.56**	-.61*
Meal type	0.40	0.72**	0.59**	0.43**	-.42*		-.67*
<i>Fit statistics</i>							
$R^2$	0.361	0.560	0.511	0.798	0.435	0.755	0.385

\* dimension has significant effect on willingness to try at  $p < .05$ , \*\* at  $p < .01$

Explained variance for the distinctive consumer groups ranged from 38.5% to 79.8% (see Table 5.3), indicating that willingness to trial purchase was better explained by healthiness,

novelty and meal type in some groups than in others. However, the explained variance of all segments increased relative to the explained variance achieved in the 1-class model ( $R^2 = .361$ ). This suggests that, irrespective of the explained variance for segments, the six-class model is more reliable than the 1-class model.

The six-class model showed little heterogeneity in respondents' willingness to try carriers that varied on the dimension healthiness. The majority of the respondents (97%) was most willing to try carriers for protein-enriched foods that were healthy and only one small group (3%) reported higher willingness to try *unhealthy* carriers for protein-enriched food (i.e. group 6). More heterogeneity was found for the dimension meal type. The majority of the respondents (79%) was willing to try meal-type carriers (i.e. groups 1-3) and small groups were willing to try snack-type carriers (15%) (i.e. groups 4 and 6) or were equally willing to try snack or meal-type carriers (6%) (i.e. group 5). Most heterogeneity was found for the dimension novelty, which divided the sample into three equal groups: 31% was most willing to try novel carriers (i.e. group 1), 36% was most willing to try traditional carriers (i.e. groups 2, 5 and 6) and 33% were equally willing to try novel and traditional carriers.

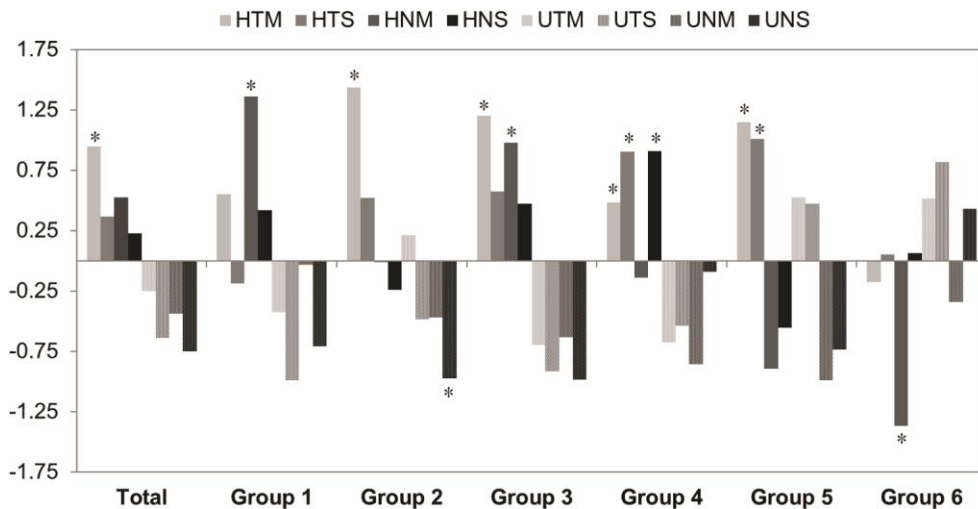


Figure 5.2. Relative willingness of the total sample and the six subgroups of respondents to trial purchase enriched variants of each of the eight carrier formats, \*  $p < .05$  (abbreviations stand for: H = healthy, U = unhealthy, T = traditional, N = novel, M = meal component, S = snack).

ANOVA's with Bonferroni-corrected post-hoc tests were used to assess whether relative willingness to trial purchase each of the 8 carrier formats differed significantly within groups (see Figure 5.2). The subgroups of respondents for which the model could explain the most

variance in willingness to trial purchase protein-enriched carriers (group 1-3 and 5: >55% explained) were significantly more willing to trial purchase one or two specific carrier formats than other formats. The two groups for which less variance could be explained (group 4 and 6: <45%) showed less clear-cut patterns in their willingness to try carriers. These subgroups were either willing to try none of the carrier formats or more than two carrier formats.

*Description of consumer groups on measures of product acceptance.*

To examine consumers' *degree* of product acceptance (i.e. which groups were more or less accepting) rather than their relative evaluations (i.e. which carriers were more or less accepted), consumer subgroups were described on their *unstandardized* evaluations of the carriers (i.e. mean evaluations). This was done using two Multivariate ANOVA's with Bonferroni-corrected post-hoc tests and the measures perceived appropriateness, willingness to trial purchase and willingness to repeat purchase. Given that all evaluations were measured on a scale from 1 to 7, evaluations above 4 were seen as product acceptance and evaluations below 4 were seen as product rejection.

The first MANOVA included all eight carrier formats and the subgroups differed significantly from each other on the three measures used to operationalize product acceptance (all  $p$ 's < .05). Nevertheless, only one mean evaluation was above 4, indicating that respondents were overall not very accepting of protein-enriched carriers (see Table 5.4). The second MANOVA included only the carrier formats that each subgroup was most willing to try (based on the beta coefficients of the linear regression analysis) (i.e. "tailored formats"). This was done to illustrate the effects of targeted marketing of protein-enriched foods on product acceptance of elderly consumers. Again, subgroups differed significantly from each other in terms of product acceptance (all  $p$ 's < .01). However, the majority of the carrier evaluations were above 4, indicating that respondents overall accepted protein-enriched carriers based on the formats tailored to them.

Three subgroups (groups 2, 3 and 5) perceived the carrier formats tailored to them as appropriate for enrichment with protein (all  $M$ 's  $\geq 5.06$ ) and were also willing to trial purchase and repeat purchase protein-enriched products based on these formats (all  $M$ 's  $\geq 4.57$ ). The three other subgroups either perceived their tailored carrier formats to be inappropriate or were unwilling to repeat purchase these formats. The subgroups to which novel carriers (i.e. group 1) or healthy snacks were tailored (i.e. group 4) perceived these formats to be appropriate and were willing to trial purchase these products, but were nevertheless unwilling to actually repeat purchase the corresponding protein-enriched

products (all  $M's \leq 3.38$ ). Alternatively, the subgroup to which unhealthy snacks were tailored (i.e. group 6) did not perceive these formats as appropriate for enrichment with protein and were not willing to consume protein-enriched variants of the carriers in these formats on a daily basis (all  $M's \leq 3.63$ ), but were nevertheless willing to trial purchase these products.

Table 5.4.

*Appropriateness, willingness to trial purchase and repeat purchase per consumer group.*

Measures <sup>•</sup>	Total	Groups						p	eta <sup>2</sup>
		1	2	3	4	5	6		
<i>All formats</i>									
Appropriateness	3.45	3.06 <sup>a</sup>	3.65 <sup>b</sup>	3.38 <sup>ab</sup>	4.86 <sup>b</sup>	4.00 <sup>b</sup>	3.74 <sup>ab</sup>	.001	.08
Willingness to:									
trial purchase	3.17	2.83	3.23	3.37	3.33	3.51	3.41	.029	.047
repeat purchase	2.58	2.35 <sup>a</sup>	2.65 <sup>ab</sup>	2.80 <sup>b</sup>	2.60 <sup>ab</sup>	2.71 <sup>ab</sup>	2.52 <sup>ab</sup>	.032	.046
<i>Tailored formats<sup>o</sup></i>									
Appropriateness	5.20	5.22 <sup>b</sup>	5.31 <sup>b</sup>	5.53 <sup>b</sup>	4.68 <sup>ab</sup>	5.06 <sup>ab</sup>	3.63 <sup>a</sup>	.002	.072
Willingness to:									
trial purchase	4.92	4.50 <sup>a</sup>	5.26 <sup>b</sup>	5.20 <sup>ab</sup>	4.59 <sup>ab</sup>	5.40 <sup>ab</sup>	4.06 <sup>ab</sup>	.001	.076
repeat purchase	4.18	3.31 <sup>a</sup>	5.15 <sup>b</sup>	4.57 <sup>b</sup>	3.38 <sup>a</sup>	4.95 <sup>b</sup>	2.44 <sup>a</sup>	.001	.293

<sup>a</sup> different lowercase letters within the same row indicate significant differences at  $p < .05$ .

<sup>•</sup> the three measures of product acceptance were assessed using a scale from 1 to 7.

<sup>°</sup> tailored formats were: group 1 = healthy, novel meal components, group 2 = healthy, traditional meal components, group 3 = healthy, traditional/novel meal components, group 4 = healthy, novel/traditional snacks, group 5 = healthy, traditional meal components/snacks, group 6 = unhealthy, novel meal components.

#### *Description of consumer groups and categorical rejecters on background characteristics*

Consumer groups were described on various background characteristics, to gain more insight into the *origin* of differences in acceptance of protein-enriched foods. This was also done for the group of respondents that categorically rejected the enriched carriers and those that evaluated the carriers inconsistently. The following characteristics were taken into account: age, BMI, gender distribution, health, educational level, marital status and preferred means to increase protein consumption (abbreviated to Preferred means). A Multivariate ANOVA with Bonferroni-corrected post-hoc tests was used for analysing the continuous data (BMI, health and age) and a non-parametric Kruskal-Wallis tests with significance-adjusted

pairwise comparisons was used for analysing the categorical data (see Table 5.5). In these analyses, we compared the six subgroups with each other (columns 2-8) and we compared the excluded group of categorical rejecters (i.e. CR) and those who made inconsistent evaluations (i.e. IE) with each other and with the total group of included respondents (columns 9-12).

Table 5.5.

*Background characteristics that differ across consumer groups.*

Measures	Groups						p	excl.			p
	1	2	3	4	5	6		CR*	IE*	incl.	
<i>Gender</i>											
% Male	28.0	55.0 <sup>b</sup>	18.5 <sup>a</sup>	26.1	50.0	37.5	.003	41.7	66.7 <sup>b</sup>	31.2 <sup>a</sup>	.019
<i>Education<sup>+</sup></i>											
% Low	0.0 <sup>a</sup>	5.0 <sup>a</sup>	5.6 <sup>a</sup>	34.8 <sup>b</sup>	21.4	25	.001	0.0	4.2	8.6	.258
% Middle	39.7	53.3	40.7	26.1	57.1	50	.229	33.3	33.3	43.7	.420
% High	60.3	41.7	53.7	39.1	21.4	25	.037	66.7	62.5	47.7	.103
<i>Preferred means●</i>											
Food	6.5	5.7	5.5	5.3	6.2	6.6	.134	8.7 <sup>b</sup>	6.2 <sup>a</sup>	5.9 <sup>a</sup>	.001
enriched	2.2 <sup>a</sup>	2.9	3.4 <sup>b</sup>	2.6	2.9	1.9	.034	0.6 <sup>a</sup>	1.1 <sup>b</sup>	2.7 <sup>b</sup>	.001
pills	0.8	1.0	0.9	1.7	0.7	1.4	.454	0.3	2.5	1.0	.169
nothing	0.5	0.3	0.2	0.4	0.3	0.1	.846	0.4	0.2	0.4	.956

<sup>a</sup> different lowercase letters in the same row indicate adjusted significance at  $p < .05$  or less.

● Preferred means was assessed by letting respondents allocate 10 points over the four options: conventional food, supplements, enriched food and not applicable.

<sup>+</sup> Educational levels are: low = elementary and preparatory education; middle = high school, middle school and vocational school; high = college or university education.

\* CR = categorical rejecters, IE = inconsistent evaluations.

Overall, respondents were more interested in using conventional food as a means to increase their protein intake ( $M = 5.9$ ) than using any of the other options (all  $p$ 's  $< .001$ ). In addition, respondents were more interested in using enriched foods ( $M = 2.7$ ) than using supplements ( $M = 1.0$ ,  $p < .001$ ). Groups of consumers did not differ significantly from each other in terms of BMI (25.5 SD = 3.7), age ( $M = 66.9$  SD = 6.1), health ( $M = 8.0$  SD = 0.8) or marital status (82.2% in a relationship, 7.0% single, 5.6% divorced, 5.2% widowed). The six groups did differ significantly from each other in terms of gender distribution, educational level and their preferred means to increase protein intake.



Among the three largest subgroups of respondents were two groups that differed from each other in terms of gender distribution. Men were overrepresented in the group that was most willing to try traditional carriers (55.0% in group 2) and the women were overrepresented in the group that was not influenced by the novelty of carriers (18.5% in group 3). Moreover, less educated respondents were underrepresented in the three subgroups that were most willing to try healthy meals as carriers for protein-enrichment (i.e. groups 1-3) (5.6% or less), and overrepresented in the small group that was most willing to try healthy snacks (i.e. group 4, 34.8% less educated).

The excluded group of categorical rejecters (i.e. CR) and those that made inconsistent evaluations (i.e. IE), differed significantly from each other or from the included respondents in terms of gender and preferred means to increase protein intake. Men were overrepresented in the group of respondents that made inconsistent evaluations (66.7%) compared to the sample of included respondents (32.1%). In addition, categorical rejecters were significantly less interested in using enriched food as a means to increase their protein intake ( $M = 0.6$ ) and were more interested in using conventional food ( $M = 8.7$ ) than both the group of respondents that were included ( $M = 2.7$  and  $M = 5.9$ ) and the excluded respondents that evaluated the carriers inconsistently ( $M = 1.1$  and  $M = 6.2$ ). These latter two groups did not differ significantly from each other in terms of preferred means to increase protein intake.

#### *Exploration of relationship between measures of product acceptance*

We argued that willingness to trial purchase would be a good basis for segmenting consumers based on the assumption that this variable would mediate the relationship between perceived appropriateness of carriers and willingness to repeat purchase enriched food products based on these carriers. This assumption was tested in SPSS using a bootstrapping procedure suggested by Preacher and Hayes (2004). The direct relationship between perceived appropriateness and willingness to repeat purchase was significant (Figure 5.3, Model A). Perceived appropriateness explained 18.5% of the variance in willingness to repeat purchase a protein-enriched carrier (coefficient = 0.430,  $p < .001$ ).

However, when complementing the direct model with willingness to trial purchase as a mediator (Figure 5.3, Model B), the direct relationship between appropriateness and willingness to repeat purchase was no longer significant (coefficient =  $-.043$ ,  $p > .05$ ). Instead, willingness to trial purchase mediated the relationship between appropriateness and willingness to repeat purchase, explaining 22.6% of variance in willingness to repeat purchase (coefficient = 0.475,  $p < .001$ ). This finding confirmed our theoretical assumptions underlying

the three measures used to operationalize product acceptance and supported the use of willingness to trial purchase as a basis for classifying respondents into subgroups.

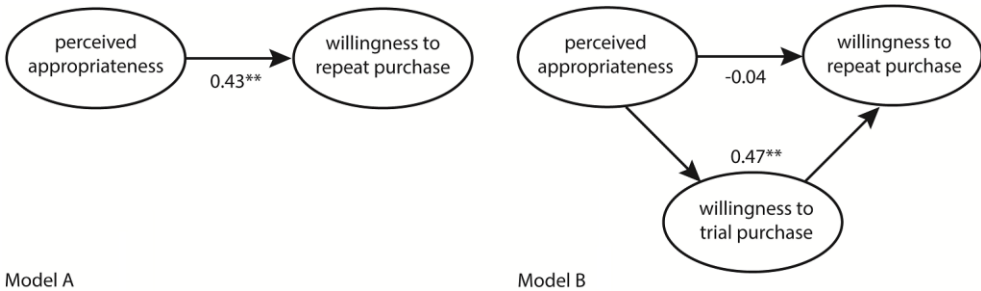


Figure 5.3. Direct (A) and mediation model (B) with coefficients, \*\*  $p < .01$ .

# Discussion

General interest in protein-enriched foods was low. Respondents reported low willingness to both trial purchase and repeat purchase protein-enriched foods and indicated that they preferred eating more protein-rich *conventional* foods, should they need to increase their protein intake. This was especially the case for the group of respondents that categorically rejected protein-enriched foods. Low acceptance of protein-enriched foods may thus be explained, at least partly, by a general scepticism towards enriched foods. However, respondents were considerably more optimistic about using protein-enriched foods that were tailored to them. This contrast is not unknown to the literature. A focus group study among elderly showed that they were sceptical of enriched food, but nevertheless consumed enriched foods on a regular basis (van der Zanden, van Kleef, de Wijk & van Trijp, 2014a). Whereas consumers thus tend to distrust the *concept* of enriched foods (i.e. “food with additives”) or dislike most of the available enriched foods, they may be relatively optimistic about enriched food that they have used before and are appealing to them (Poulsen, 1999).

Heterogeneity in acceptance of carriers was most pronounced for the carrier dimension novelty. Whereas some groups of respondents were most willing to try novel carriers, others were most willing to try traditional carriers or were not influenced by the novelty of carriers. Heterogeneity was less pronounced for the dimensions healthiness and meal type; the majority of the respondents was most willing to try healthy meal-type carriers. On average, healthy, traditional meal components were evaluated most positively. These results are in line with earlier research suggesting that, with age, people tend to become more cautious with using unfamiliar food (Tuorila, Lähteenmäki, Pohjalainen, & Lotti, 2001), focus more on the healthiness of food (Steptoe, Pollard, & Wardle, 1995; Vella, Stratton, Sheeshka &

Duncan, 2013) and perceive healthy meal components to be most appropriate for enrichment (Vella, Stratton, Sheeshka & Duncan, 2013; van der Zanden, van Kleef, de Wijk & van Trijp, 2014a). However, when looking at six subgroups of our respondents, less than half of these groups fitted the picture of the conservative elderly who prefers traditional carriers. When using a single product format to approach the needs of the elderly population, one will thus fail to meet the wants of a large part of the elderly consumer population.

Despite low general interest in protein-enriched foods, respondents were optimistic about the carrier formats that appealed to them most strongly. Most subgroups perceived these tailored formats to be appropriate and reported high willingness to trial and repeat purchase them. However, this was not the case for all subgroups of consumers. Consumers to which novel carriers (i.e. group 1) or healthy snacks appealed most (i.e. group 4) felt that these carriers were appropriate, but were not willing to purchase them. In contrast, consumers to which *unhealthy* snacks appealed most as carriers (i.e. group 6) felt that these carriers were not appropriate and did not want to repeat purchase them, but were nevertheless willing to trial purchase enriched products based on these carriers. The latter two subgroups were also among the groups that showed less clear-cut patterns in their willingness to try carriers and for which the carrier dimensions healthiness, novelty and meal type could explain the least variance. Although previous studies on functional food acceptance simply concluded that elderly consumers are more willing to try functional foods than younger adults (Poulsen, 1999), the results of this study indicate that there is considerable heterogeneity within the population of elderly regarding the acceptance of functional foods.

The measure of willingness to trial purchase various protein-enriched carriers resulted in six distinct classes of respondents, which suggested that this variable was a useful basis for examining heterogeneity among the elderly. This idea was also confirmed when looking into the relationship between willingness to trial purchase carriers and two other measures used to operationalize product acceptance: perceived appropriateness and willingness to repeat purchase. Willingness to trial purchase was strongly related to both measures of product acceptance and was shown to mediate the relationship between perceived appropriateness and willingness to repeat purchase. This result is in line with previous research which showed that the appropriateness of enriched foods affects consumers' willingness to *try* it (Ares & Gámbaro, 2007) but not their intention to *buy* it (Verbeke, Scholderer & Lähteenmäki, 2009). Although appropriateness may be a necessary condition for repeat purchase, it may not be sufficient. This finding is of practical relevance for marketing efforts. Consumers are often found to be skeptical or distrusting towards functional foods (e.g. Verbeke, Scholderer & Lähteenmäki, 2009), but our results suggest that as long as consumers are willing to trial purchase a functional food (e.g. group 4) they might be inspired to start using a functional

food on a more regular basis. In contrast, consumers that report low willingness to trial purchase a functional food in the first place (e.g. group 1) may be most difficult to reach with new product developments.

Demographic characteristics could not explain much heterogeneity in acceptance of carriers for enriched food. Although some subgroups were overrepresented by women and others by men, these groups were about equally willing to trial purchase and repeat purchase protein-enriched foods that appealed to them. On the one hand, this is not in line with previous research, showing that women are overall found to be more accepting of functional foods than men (e.g. Poulsen, 1999; Bogue & Ryan, 2000). On the other hand, these results may once again indicate that when products are targeted to the needs and wants of specific consumer groups, product acceptance may increase. Gender did explain some differences in acceptance of carriers. Consumers in the group that was overrepresented by women were influenced most strongly by the healthiness of carriers (they were most willing to try healthy carriers), whereas consumers in the groups that were overrepresented by men were influenced equally strongly by the healthiness, novelty and meal type of carriers. Moreover, the group of respondents that was excluded for evaluating the carriers inconsistently were more often men. Possibly, this group was motivated by product dimensions other than healthiness, novelty and meal type and novelty. Convenience may have played a role in this male group, for example. Especially among the elderly generation, men are less familiar with grocery shopping and preparing food than women (Brown, 2006). Educational level also explained some differences in acceptance of carriers. Groups that were most willing to try healthy meals enriched with protein were relatively highly educated and the group that was most willing to try healthy snacks was less highly educated. Other demographic characteristics could not explain differences in acceptance of carrier. This finding is in line with the idea that differences in demographics do not account for much variation in food preferences and that measures that are more closely related to actual behaviour may provide a better picture (for a review, see van der Zanden, van Kleef, de Wijk & van Trijp, 2014b).

### *Marketing Implications*

The functional food market has experienced more failures than successes (Martinez & Briz, 2000; Menrad, 2003; Bleiel, 2010) and many of these failures can be attributed to a lack of sensitivity to consumer expectations and perceptions (Grunert & Valli, 2001; Marinangeli & Jones, 2013). Not all combinations of ingredients and carriers appeal to consumers to the same extent (van Kleef, van Trijp & Luning, 2005), for example, yoghurt enriched with fish oil

may fulfill the needs of consumers who need to reduce their cholesterol level, but the expected impact of fish oil on the taste of the product likely results in product rejection (Krutulyte et al. 2011). In this study, a market segmentation approach (Wedel & Kamakura, 2000) was adopted to explore heterogeneity among elderly in acceptance of various potential carriers for enrichment. The results of this study have underlined the merits of examining heterogeneity among elderly consumers and we can conclude that the needs and wants of the elderly consumer population are best fulfilled with a range of protein-enriched products. Although, on average, healthy traditional meal-type carriers were seen as most appealing carriers for enrichment with protein, almost half of the respondents in this study were unwilling to try this type of protein-enriched product. Some additional recommendations follow from our results.

Firstly, our results suggest that willingness to trial purchase enriched food may be an important step for consumers towards using a functional food on a more regular basis. Therefore, we advise marketers to devote more attention to inspire willingness among consumers to trial purchase functional foods in the first place. For example, by means of in-store sampling or cash-back promotions. Secondly, it remains important that future studies look into alternative ways to promote the consumption of protein-enriched foods among elderly, given that these consumers are still sceptical about using these types of food as a means to increase their nutrient intake. Thirdly, we recommend marketers to look into ways to combine market segments without losing sight of consumer preferences. This is often possible for segments that do not display specific preferences. In this study, we could combine, among others, a segment that was most willing to trial purchase healthy meal components as carriers (i.e. group 3) with a segment that was most willing to trial purchase healthy, novel meal components (i.e. group 1). This system of piggybacking may help companies to also fulfil the needs and wants of smaller consumer segments that might otherwise have been unprofitable to target.

### Limitations

Protein deficiency is of particular concern among elderly (Brownie, 2006; Wolfe, Miller & Miller, 2008) because the elderly body metabolises protein inefficiently (Morais, Chevalier & Gougeon, 2006; Bauer et al., 2013). This made protein an excellent candidate for the role of functional ingredient in our research on enriched foods for the elderly. However, focusing specifically on *protein*-enriched foods may have reduced the generalizability of our results to other nutrients. Fortunately, protein is perceived to have only a small impact on product taste (van der Zanden, van Kleef, de Wijk & van Trijp, 2014a) and thus fits in with a wider

range of carriers than ingredients like fish oil (Krutulyte et al. 2011). In addition, protein is a fairly well-known nutrient, in contrast with nutrients such as oligosaccharides (Bogue & Ryan, 2000) and familiarity of functional ingredients has been strongly related to product acceptance (Ares, Giménez & Gámbaro, 2009). The results from this study are thus likely generalizable to other well-known functional ingredients with a small impact on product taste, such as vitamins and minerals.

Although carriers varied systematically on three underlying dimensions, they may have also differed on unstudied characteristics, such as nutrient content, convenience, price and taste. We tried to minimize this variance by using two extensively validated carriers to represent each carrier format and adjusting the phrasing of the measures used to operationalize product acceptance. Nevertheless, evaluations of the carriers within pairs were not always strongly correlated. By averaging the evaluations of the two carriers for each format, we tried to remove some of the variance between carriers for the same format such that evaluations would better reflect the product formats. As a result, the underlying carrier dimensions likely explain most of the variance between formats.

The respondents that took part in this study were not fully representative of the Dutch elderly population. Our sample of respondents were relatively healthy and young, and lived independently. In addition, all respondents were internet users. The subgroups found in this study may thus not reflect those found when segmenting the Dutch population as a whole. Still, this does not refute our main finding, that the elderly consumer population is strongly heterogeneous. In fact, the existence of consumer groups in this subgroup of the Dutch elderly population even emphasises the extent of heterogeneity among elderly consumers. Moreover, elderly consumers that are still healthy might be able to use enriched foods as a preventive measure. These elderly may thus benefit most from the development of appealing enriched foods.

Lastly, this study assessed consumers' acceptance of protein-enriched foods using self-reported measures and product concepts. Ideally, we would have assessed consumers' *actual* purchase and consumption of protein-enriched foods that consumers actually tried. However, at the moment, only a few protein-enriched products are available on the Dutch market. As soon as more protein-enriched foods are available, future studies may want to use more direct behavioural measures to investigate consumers' acceptance of protein-enriched foods.

# Chapter 6

## Using a verbal prompt to increase protein consumption in a hospital setting: A field study

Published as:

L. D. T. van der Zanden, H. van Essen, E. van Kleef, R. A. de Wijk & H. C. M. van Trijp (2015).  
Using a Verbal Prompt to increase Protein Consumption in a Hospital Setting: A Field Study.  
*International Journal of Behavioural Nutrition and Physical Activity* 2015, 12, 110.

## Abstract

**Introduction.** Sufficient protein intake among hospitalized patients may contribute to faster recovery and a decrease in healthcare costs, but hospitalized patients are often found to consume too little protein. This field study explored the success of a small, inexpensive intervention adapted from the marketing literature, to encourage protein consumption among hospitalized patients.

**Method.** The study was performed at a hospital where patients order food by calling a meal service. The intervention was given by telephone operators of the meal service and consisted of a verbal prompt: “Would you like some [target product] with that?”. Target products were two foods rich in protein; fruit quark and yoghurt drink. For half of the patients, the verbal prompt was preceded by verbal praise on their order, aimed to increase compliance with the prompt.

**Results.** A total of 315 hospitalized patients, aged 18-87 years took part in the study. Verbal prompts significantly increased ordering of the target products from ordering by 6.5% to 45.2% of patients. Protein content of orders showed a trend, with orders of patients receiving a verbal prompt containing a larger amount of protein than orders of patients in the control condition. At an individual level, protein content of orders increased significantly, reaching the recommended 25-30 grams of protein per main meal. Verbal praise did not increase compliance with the verbal prompt.

**Conclusion.** Although changing eating patterns is challenging, this study shows that simple interventions such as verbal prompts may be useful tools to stimulate healthy food consumption among patients during hospitalization.



## Background

Proteins are large, complex molecules that play a role in various bodily processes, such as supporting the immune system, transporting molecules and speeding up biochemical processes (Morais, Chevalier & Gougeon, 2006; Wolfe, Miller & Miller, 2008). As a result, bodily protein is gradually expended and needs to be replenished by means of food consumption (Morais, Chevalier & Gougeon, 2006). Sufficient protein intake is especially important when people get ill, because expenditure of protein increases considerably during sickness and recovery (Arnold & Barbul, 2006). Studies have shown that patients can benefit in various ways from consuming enough protein. Patients who increase their protein consumption rehabilitate faster from fractures (Schurch et al., 1998), have a reduced risk of developing pressure ulcers (i.e. bedsores) (Stratton et al., 2005), have a lower chance of being readmitted to the hospital (Norman et al., 2008) and lose less weight during hospital stay (Potter, Roberts, McColl & Reilly, 2001).

Ensuring sufficient protein intake among hospitalized patients may thus contribute to faster recovery and a decrease in healthcare costs. Nevertheless, hospitalized patients are often found to consume too little protein (Barton, Beigg, MacDonald & Allison, 2000). Motivating protein consumption among patients is challenging, because protein-rich foods are relatively difficult to chew and swallow (Best & Appleton, 2013), instigate aversion more easily than foods rich in carbohydrates (Midkiff & Bernstein, 1985), and even tend to reduce appetite (Weigle et al., 2005).

## *Interventions*

Although most consumers are aware that they have to eat certain foods and avoid others, this awareness often does not translate into actually eating a healthy diet. Consumers tend to believe that healthy foods are less tasty than unhealthy foods (Raghunathan, Naylor & Hoyer, 2006), making it difficult for health professionals to stimulate healthy food consumption among their clients, even among clients whose current health status would directly benefit from better food choices (Williamson, Hunt, Pope & Tolman, 2000; Leverence, Williams, Sussman & Crabtree, 2007). Increasing the attractiveness of choosing and eating healthy foods may help health professionals to inspire dietary changes among their patients.

With its vast background of research on affecting consumer choice, the field of marketing can provide useful input into dietary interventions. Although marketing techniques were traditionally used to increase product sales, they can also be applied and are increasingly

applied in the best interest of the consumer. Research within this field of “social marketing” shows that relatively small and inexpensive changes in the choice environment can already motivate people to make better choices (Just & Wansink, 2009), by exploiting the fact that the majority of our everyday choices are made without much deliberation (Kahneman, 2003). To stimulate healthy food choices in a canteen, for example, one could place healthy foods in more easy-to-reach places (van Kleef, Otten & van Trijp, 2012) or complement healthy foods with appealing descriptions such as “home-made” (Wansink, Painter & van Ittersum 2001). Interventions such as these could also be used to encourage adequate protein consumption among hospitalized patients.

Adequate intake of nutrients, such as protein, is the result of multiple, individual food choices made over time. Ideally, an intervention aimed at increasing protein consumption among hospitalized patients would increase protein intake within meals, without eliciting compensation behaviours at the same or a later point in time. The present study tried to take this into account by implementing an intervention right after patients completed their orders, leaving little room for immediate compensation. In addition, food orders made during the rest of the day were examined for potential compensation effects.

### *Verbal prompt*

Implementing an intervention right after consumers make their food choices provides ideal circumstances for a small and inexpensive technique adapted from the marketing literature: the verbal prompt. A verbal prompt is a product suggestion given in a question format, such as “Would you like a side of salad with your meal?”, aimed to motivate consumers to purchase a product that broadly complements what they have already ordered or purchased (Ditzenberger & Kidney, 1986). Verbal prompts provide consumers with a mandatory choice that requires an active affirmation or rejection of the product suggestion. In forced yes/no questions like these, receivers tend to display an acquiescence (i.e. affirmation) bias, responding more often with “yes” than with “no” (Krosnick & Presser, 2010).

This affirmation bias in response to verbal prompts has various underpinnings, among which two main mechanisms can be identified. Firstly, due to a limited cognitive capacity, people are constrained in the extent to which they can deliberate on their actions and decisions. As a result, consumers often rely on habits or heuristics and make decisions without much thought (Kahneman, 2003). Secondly, people are motivated to act in a socially desirable way in order to convey a favourable image of themselves (Crowne & Marlowe, 1960) and tend to cooperate or reciprocate even in one-shot interactions (i.e. with no expected future exchanges) (Fehr, Fischbacher & Gächter, 2002).

Verbal prompts are commonly used in retail settings such as restaurants (e.g. “would you like another drink?”), gas stations (e.g. “would you like a coffee?”) and fast food chains (e.g. “would you like fries with that?”) to increase the sales of these target products. More recently, verbal prompts have been used in interventions to promote desirable consumption behaviours, such as reducing portion sizes in fast-food restaurants (Schwartz, Riis, Eibel & Ariely, 2012), increasing fruit and vegetable consumption in schools (Schwartz, 2007) and increasing consumption of healthy side dishes at a cafeteria (van Kleef, van den Broek & van Trijp, 2015). The current study aimed to stimulate protein consumption among hospitalized patients using a verbal prompt.

Given that the most crucial component in the success of verbal prompt interventions is consumers’ compliance with the verbal prompt (i.e. ordering the product suggestion), this study complemented a verbal prompts intervention with a technique aimed to increase compliance: verbal praise. Verbal praise has been shown to increase compliance across various contexts, ranging from direct requests (Grant, Fabrigar & Lim, 2010) and purchase of merchandise (Cody, Seiter & Montagne-Miller, 1995) to tipping behaviour (Seiter & Weger, 2010). The compliance-enhancing effects of verbal praise are thought to be based on both interpersonal processes, such as liking of, or reciprocity towards the praise-giver (Cialdini & Goldstein, 2004), and intrapersonal processes, such as self-enhancement (Chan & Sengupta, 2010) and an increased motivation to perform the praised behaviour (Henderlong & Lepper, 2002). We expect that verbal praise, when preceding a verbal prompt, will increase compliance with the verbal prompt and increase the success of a verbal prompt intervention.

## Methods

### *Setting*

The field study took place at a 600-bed hospital in the Netherlands, which covers an area of 260,000 residents and has a mean annual admission rate of more than 21,000 patients. The hospital makes use of Sodexo’s At Your Request meal-service program (Sodexo, 2011), which is used in over 350 hospitals worldwide. In this program, patients order meals, drinks and snacks from a restaurant style menu by calling the meal service, after which the order is freshly prepared and delivered to their room within 45 minutes. On a daily basis, about 400 food orders are placed in the hospital where this study took place.

Lunch and breakfast orders were identified by dietitians of the hospital as containing too little protein and were thus both suitable targets for our intervention. However, breakfast could be ordered both in the evening and morning whereas lunch could only be ordered

during the same day. This difference in the time frame of ordering made the lunch order a more practical target and was therefore selected as the focus of our intervention.

### *Design*

The food ordering system was used as a basis for our interventions (i.e. the verbal prompt and verbal praise), which were given to the patients by five female telephone operators of the meal service. Depending on the condition, operators provided patients with only the verbal prompt (verbal prompt condition), both the praise and the prompt (praise-then-prompt condition) or none of the interventions (control condition).

### *Subjects*

A total of 315 patients took part in the study. Patients automatically took part when they 1) were aged 18 or older, 2) did not have a protein-restricted diet, 3) personally called to place an order, and 4) placed an order for lunch. Participants were 18-87 years old ( $M = 60.6$ ,  $SD = 17.8$ ) and the total dataset consisted of 46.0% males and 54.0% females. Patients were not notified of their participation in the experiment, because we could not predict which patients would call the telephone operator that took part in the experiment. Informing the patients at the start of the telephone conversation was not desirable either, given that this would likely influence the results of the interventions. This and all other procedures were approved by the research ethics committee (BCWO) of Hospital Gelderse Vallei.

### *Procedure*

The study took place before lunchtime on fourteen weekdays of four consecutive weeks, and each of the three conditions was carried out on at least four different days of the week. Each telephone operator carried out all three conditions on different days of the week, but in the same order. The control condition was always carried out on the first of three days (i.e. no intervention), the verbal prompt condition on the second day and the praise-then-prompt condition on the third day. This way, training for the final condition was built up in a stepwise fashion, making the final condition easier for the telephone operators to execute. A pilot study was used to assess the clarity of instructions for the telephone operators and to identify potential practical issues with collecting the data.

Starting every experiment day, the telephone operator that was scheduled for that day was instructed on the condition that she would execute. The condition was practiced with the researcher, if necessary, and when telephone operators could give the praise and prompt

according to the instructions, the experiment was started. During the control condition and the experiment, the telephone operator was seated at a desk with a computer in which she entered the lunch orders. One of two researchers was seated next to her and recorded information on a checklist that would not be recorded in the computer of the telephone operator (e.g. whether the praise and prompt were given according to the instructions). In the control condition, telephone operators were asked to answer calls as usual. The data from this condition were used as a baseline. In the verbal prompt condition, telephone operators answered calls as usual, but ended the call with a verbal prompt. In the praise-then-prompt condition, telephone operators answered calls as usual, but ended the call with praise on the order of the patient and a verbal prompt. After lunch time, two researchers visited a subset of the patients ( $N = 128$ , 40.6% of the total dataset) in their rooms with a short questionnaire about their lunch order. All patients who were awake and in their rooms agreed to fill out the questionnaire after giving written informed consent.

### *Interventions*

Verbal prompts were given by telephone operators right after patients finished their order and consisted of the following construction: “Would you like some [target product] with that?”. Two dairy products were selected as targets for the verbal prompt in consultation with the dieticians of the hospital: fruit quark (i.e. a dessert made from fresh cheese with fruit) and yoghurt drink. These products contain a mean of 7.1 grams of protein per portion but are also smooth in texture. As a result, they may be more easy to swallow and less satiating than other protein-rich foods (Mattes, 2006), overcoming some of the physical barriers to protein consumption. Fruit quark was used as the main target for the prompt (used in 68.2% of cases), but when patients had already ordered fruit quark, or another dessert, they were prompted with yoghurt drink (used in 31.8% of cases).

Verbal praise consisted of the following construction: “Good that you ordered [food product]”. If a consumer perceives a clear ulterior motive for flattery by a salesperson, the initial positive reaction to praise is replaced by a less favourable one (Campbell & Kirmani, 2000). Therefore, praise was given right before patients were presented with a verbal prompt, reducing the possibilities for patients to deliberate on the motive for giving the praise (Figure 6.1) (Main, Dahl & Darke, 2007). Moreover, the food product referred to in the praise was based on a concrete food choice that patients made for their lunch order, such that praise was personalised, and thus varied from patient to patient. This was done to reduce perceived insincerity of the praise. In addition, telephone operators were instructed to refer in their praise to a specific product in patients’ orders (e.g. “good that you ordered brown bread”) rather than providing patients with more general praise (e.g. “you made a

good choice”). When the lunch order of a patient was too unhealthy ( $N = 4$ ) or small ( $N = 15$ ) to serve as a reasonable basis for praise (e.g. when a patient ordered snack foods or just a cup of coffee), telephone operators were instructed to not provide praise and these patients were not included in the study. In the data analysis, we explored whether excluding these patients distorted the sample of patients in the praise-then-prompt condition in terms of meal size or healthiness, by looking at the salt, fat and caloric content of their food orders.

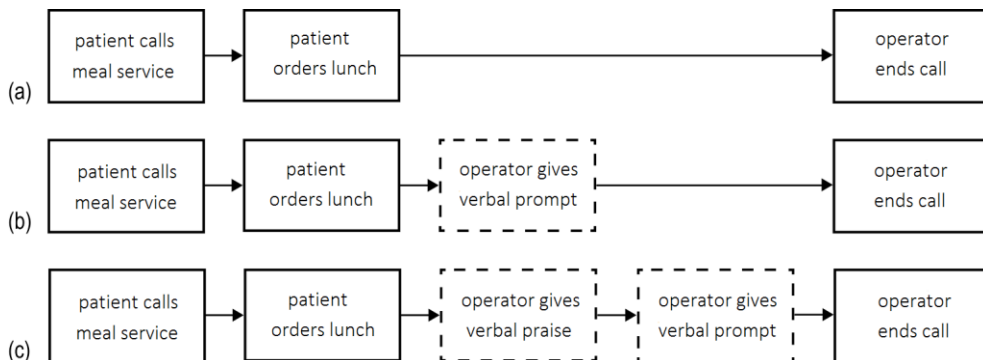


Figure 6.1. Overview of the meal ordering procedure for each of the three conditions. The control condition (a) served as a baseline, during which patients were not exposed to any of the interventions. In the verbal prompt condition (b), patients received only the verbal prompt and in the praise-then-prompt condition (c), patients received verbal praise, followed by the verbal prompt.

### Checklist and Questionnaire

On a checklist, the researchers recorded who was calling to give an order (i.e. patient vs. nurse/family/friends), whether the verbal prompt and praise were given, which target product was used for the prompt and the praise, and whether the verbal prompt and praise were given following the instructions. In addition, the checklist recorded the information necessary to visit patients with a questionnaire (i.e. patient name, hospital wing, room and bed number).

Verbal prompts are sometimes perceived to be obtrusive or pushy (Wang et al., 2014) and may cause resistance or even counterproductive effects (e.g. increasing unhealthy food consumption) (Ebster, Wagner & Valis, 2006; Whyte, Selinger, Caplan & Sadowski, 2012). However, when care is taken, perceived obtrusiveness can be avoided (van Kleef, van den Broek & van Trijp, 2015). The questionnaire was used to assess the extent to which patients perceived the verbal prompt to be obtrusive. Patients were asked to rate their agreement with 4 statements: “The telephone operator was pushy suggesting the dish”, “I found it hard

to say ‘no’ to the telephone operator”, “I felt obligated to comply to the suggestion of the telephone operator”, and “Receiving a suggestion from the telephone operator was annoying”. Ratings were made on a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. Items were adapted from van Kleef and colleagues (2015).

Given that *ordering* the target product following the verbal prompt does not necessarily mean that patients will actually *consume* it (Barton, Beigg, MacDonald & Allison, 2000), the paper questionnaire also assessed to what extent patients consumed the target product. If patients had ordered fruit quark or yoghurt drink, irrespective of whether they received a verbal prompt, they were asked to what extent they had consumed these products (using a 5-point Likert scale with the response options 1 = “ate none of it”, 2 = “ate some of it”, 3 = “ate half of it”, 4 = “ate most of it”, and 5 = “ate all of it”).

Lastly, the questionnaire contained a collection of questions added as control variables. One set of questions was used to assess patients’ reasons for (not) ordering the target product. Patients could choose from multiple response options (e.g. It is (not) good for me, I automatically responded, I did (not) feel like eating it) or write down any other reason. Patients who did not receive the verbal prompt were instructed to skip this set of questions. A second set of questions was used to assess whether the verbal prompt and verbal praise had any negative side effects on perceptions of the telephone operator and telephone conversation by the patients. Three items were used: “The telephone operator was helpful”, “The telephone operator was friendly”, and “The telephone conversation was pleasant”. Ratings were made on a 5-point Likert scale ranging from 1 = “strongly disagree” to 5 = “strongly agree”. All patients were asked to fill out this set of questions.

## *Outcome and background measures*

Three measures were used to assess the success of the interventions: ordering of the target product for lunch and protein content of the ordered lunch. In addition, the caloric content of the ordered lunch was used as descriptive variable. *Ordering of the target product* for lunch was operationalized as a binary variable indicating whether or not patients ordered fruit quark or yoghurt drink, irrespective of whether or not they had received the prompt. *Protein and caloric content of the ordered lunch* were operationalized as the number of grams of protein and the number of kilocalories in ordered food, respectively.

As protein supplementation may cause patients to eat less during subsequent meals (Fiatarone Singh et al., 2000), we also assessed the number of grams of protein and kilocalories in the breakfast and dinner orders, and across all food orders of the day (i.e. daily

protein and caloric content). Given that about half of the patients did not remain in the hospital for the whole day, daily protein and caloric content were only analysed for patients that ordered breakfast, lunch and dinner.

All data for background measures, protein and caloric content were retrieved from the hospital database. In this database, nutritional values of processed foods such as bread, cheese and soup were based on the product specifications provided by the producer. Nutritional values of unprocessed foods such as fruit, vegetables and herbs, as well as processed products for which product specifications were not yet available, were adapted from the NEVO table (i.e. Dutch Nutrient database) (RIVM, 2013).

#### *Data Preparation*

Patients were excluded from the data analysis when they did not receive the prompt in the instructed format (e.g. telephone operators used both target products in one verbal prompt) (N = 16, 16.2% of patients in the verbal prompt condition) or when they did not receive the praise in the instructed format (e.g. telephone operators did not refer to a specific product in the patient's lunch order) (N = 37, 34.9% of patients in the praise-then-prompt condition). Six patients were excluded as outliers because the protein or caloric content of their food orders exceeded 3 or more standard deviations from the mean (1.9% of the total dataset). Questionnaire data were discarded when patients provided reasons for (not) ordering that were inconsistent with their actual ordering pattern (e.g. patients did not comply with the verbal prompt, but indicated that they "did not dare to say 'no' to the telephone operator") (N = 5, 3.9% of all questionnaires). For 47 patients who participated in the study more than once, all data collected after the first participation were excluded from the data analysis (14.9% of the total dataset). The remaining dataset consisted of 102 filled-out questionnaires and 208 lunch orders made by 208 patients, of which 93 were in the control condition (44.7%), 62 in the verbal prompt condition (29.8%) and 53 in the praise-then-prompt condition (25.5%). This sample of patients will be referred to as the 'total sample' from here on.

#### *Data Analysis*

Data were analysed using SPSS version 22.0 (IBM Inc., Chicago, IL). Continuous data (e.g. protein and caloric content of orders) were analysed using (Multivariate) Analyses of Variance ((M)ANOVA's), categorical data (e.g. ordering of the target product) were analysed using non-parametric Chi-Square tests.



## Results

### *Ordering of the target products*

Descriptive statistics indicated that, in the total sample of patients, target products (i.e. fruit quark or yoghurt drink) showed up in lunch orders for 6.5% of patients in the control condition, 45.2% of patients in the prompt condition and 45.3% of cases in the praise-then-prompt condition. A non-parametric Chi-Square tests with condition as the independent variable and ordering of the target (i.e. “yes” versus “no”) as the dependent variable showed a main effect of condition on ordering of the target product,  $\chi^2(2, N = 208) = 38.426, p < .001$ . Bonferroni-corrected pairwise comparisons between the conditions (with a test value of  $.05/3 = .016$ ) indicated that the target product was ordered significantly less often in the control condition than in the prompt condition and the praise-then-prompt condition (both  $p$ 's  $< .001$ ). The verbal prompt and praise-then-prompt condition did not differ significantly from each other,  $p = .990$ .

Table 6.1.

*Protein content of the lunch order per condition.*

	Control			Prompt			Praise-then-prompt			<i>p-value</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
Total sample	93	24.0	10.8	62	26.3	11.0	53	27.0	11.2	.077
Exclusive sample*	93	24.0	10.8	28	30.3	10.5	24	30.7	9.8	< .001

\* total sample (N=208) excluding 63 patients who did not comply with the verbal prompt (N = 145)

### *Protein content of the ordered lunch*

Lunch orders of patients contained a mean of 25.4 grams of protein and 571.8 kilocalories. An ANOVA with condition as the independent variable and protein content of the lunch order as dependent variable was used to test whether condition had an effect on protein content of the lunch order of the total sample of patients (i.e. including those who did not comply with the prompt). Age, diet, gender and caloric content of food orders were accounted for. The analysis showed a trend, with lunch orders of patients in the verbal prompt and praise-then-prompt conditions containing a larger amount of protein than lunch orders of patients in the control condition ( $p = .077, \eta^2 = .027$ ) (see Table 6.1). When excluding patients who did not comply with the verbal prompt (N = 63), the main effect of condition on protein content of the lunch order was significant ( $p < .001, \eta^2 = .168$ ) (see Table 6.1).

*Daily protein and caloric content*

Combined over the whole day, food orders of the total sample of patients contained a mean of 77.1 grams of protein and 1712.8 kilocalories. An ANOVA with condition as the independent variable and protein content of all orders of the day combined as dependent variable was used to test whether condition contributed significantly to daily protein content of ordered food. Age, diet, gender and caloric content of food orders were accounted for. A total of 99 patients (i.e. including those who did not comply with the prompt) ordered breakfast, lunch and dinner (47.6% of the total sample), and were included in this analysis. The analysis showed a trend, with food orders of patients in the verbal prompt and praise-then-prompt conditions containing a larger amount of protein than lunch orders of patients in the control condition ( $p = .095$ ,  $\eta^2 = .056$ ) (see Table 6.2). When excluding patients in this group who did not comply with the verbal prompt ( $N = 27$ ), the main effect of condition on protein content of food orders was significant ( $p = .025$ ,  $\eta^2 = .121$ ) (see Table 6.2).

Table 6.2.

*Protein content of the daily order per condition.*

	Control			Prompt			Praise-then-prompt			<i>p-value</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
All-meal patients	42	73.6	31.5	30	78.2	27.3	27	81.4	26.1	.095
Exclusive all-meal*	42	73.6	31.5	15	82.2	33.2	15	84.3	23.1	.025

\* all patients who ordered breakfast, lunch and dinner ( $N = 99$ ) excluding 27 who did not comply with the verbal prompt ( $N = 72$ )

## 6

To test whether patients who complied with the verbal prompt did this to compensate for a breakfast that was small, or low in protein, a MANOVA was performed with ordering of the target product as the independent variable, and protein and caloric content of breakfast as the dependent variables. Age, diet and gender were accounted for. A total of 144 patients ordered breakfast. There was no significant difference in protein or caloric content of breakfast between patients who complied with, or did not comply with the verbal prompt (both  $p$ 's  $> .100$ ). This analysis was repeated for the dinner order, to test whether patients who complied with the verbal prompt compensated for this by ordering a small or low-protein dinner later. A total of 127 patients ordered dinner. There was no significant difference in protein or caloric content of dinner between patients who complied with, or did not comply with the verbal prompt (both  $p$ 's  $> .100$ ) (see Table 6.3).

Table 6.3.

*Breakfast and dinner of patients who complied with, or did not comply with the verbal prompt.*

		Complied			Rejected			<i>p-value</i>
		<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
Breakfast ( <i>N</i> = 144)	Protein	38	19.7	10.9	106	19.3	13.0	.709
	Calories	38	493.1	229.9	106	473.3	242.1	.675
Dinner ( <i>N</i> = 127)	Protein	40	29.2	8.9	87	26.0	10.1	.266
	Calories	40	610.2	216.6	87	554.1	198.1	.157

To test whether patients who complied with the verbal prompt did this to compensate for a breakfast that was small, or low in protein, a MANOVA was performed with ordering of the target product as the independent variable, and protein and caloric content of breakfast as the dependent variables. Age, diet and gender were accounted for. A total of 144 patients ordered breakfast. There was no significant difference in protein or caloric content of breakfast between patients who complied with, or did not comply with the verbal prompt (both  $p$ 's > .100). This analysis was repeated for the dinner order, to test whether patients who complied with the verbal prompt compensated for this by ordering a small or low-protein dinner later. A total of 127 patients ordered dinner. There was no significant difference in protein or caloric content of dinner between patients who complied with, or did not comply with the verbal prompt (both  $p$ 's > .100) (see Table 6.3).

To test whether the sample of patients in the praise-then-prompt condition was distorted in terms of meal size or healthiness (due to exclusion of patients with meals that were an inappropriate basis for praise), a MANOVA was performed on the total sample of patients with condition as the independent variable, and fat content, salt content and carbohydrate content of all orders of the day combined as the dependent variables. Age, diet, gender, ordering of the target product and caloric and protein content of food orders were accounted for. The analysis showed no significant differences between the conditions in terms of fat, salt or carbohydrate content (all  $p$ 's > .100).

#### *Reasons for ordering the target product*

Data from the questionnaire were used to gain insight into reasons for (not) ordering the target product. The questionnaire was filled out by 49.1% ( $N$  = 102) of the total sample of patients and Chi-Square tests and an ANOVA indicated that respondents were representative of the total sample in terms of gender, condition and how often the target product was

ordered, but not in terms of age. Respondents to the questionnaire were significantly older ( $M = 62.2$ ,  $SD = 18.7$ ) than patients in the total sample ( $M = 57.0$ ,  $SD = 18.7$ ) ( $p = .034$ ,  $\eta^2 = .022$ ).

Table 6.4.

*Percentage of patients who reported the reason for (not) ordering the target product.*

	Complied (N = 27)	Rejected (N = 35)	<i>p-value</i>
I do (not) like the taste	66.7%	51.4%	.301
It is (not) good for me	40.7%	31.4%	.593
I did (not) feel like eating it	40.7%	34.3%	.791
It was (not) a useful suggestion	48.1%	17.1%	.013
I automatically responded	33.3%	11.4%	.058
I ordered enough already	n.a.	11.4%	.125
I did not dare to say "no"	3.7%	n.a.	.435

Descriptive statistics showed that, among all respondents to the questionnaire who received the verbal prompt ( $N = 62$ ), the expected taste of the target products was mentioned most often as a reason (not) to order the target product (mentioned by 58.1% of the respondents). To look into differences in the reasons reported by respondents who did or did not comply with the verbal prompt, multiple non-parametric Chi-Square tests were performed, with ordering of the target as the independent variable and reporting of reasons for (not) ordering the target product as dependent variables (see Table 6.4). The two groups differed significantly in terms of reporting that the target product, suggested by the telephone operator, "was (not) a useful suggestion" ( $p = .013$ ) and marginally significantly in that they "automatically responded" to the suggestion ( $p = .058$ ). Patients who complied with the verbal prompt reported both reasons more often than patients who did not comply with the verbal prompt.

There was no significant difference between patients who did or did not order the target product in reporting of the reason "I did not dare to say 'no' to the telephone operator" ( $p = .435$ ), suggesting that obtrusiveness was not a reason for patients to comply with the verbal prompt. In line with this finding, the four items used to measure perceived obtrusiveness received low mean ratings, ranging from  $M = 1.3$  to  $M = 2.4$  (rated on a scale from 1 = "strongly disagree" to 5 = "strongly agree") and did not differ significantly between those who complied with, or did not comply with the verbal prompt, all  $p$ 's  $> .05$ .

The questionnaire also contained a control question aimed to assess if patients actually consumed the target product once they ordered it. Descriptive analyses of this data showed that 65.0% of the respondents who ordered the target product reported eating “most” or “all” of the target product (25 out of 33 patients). Only 1 patient reported not having consumed the target product after ordering it.

### *Background characteristics*

To gain some insight into potential side-effects of the verbal prompt and verbal praise, the friendliness and helpfulness of the telephone operators and the pleasantness of the conversation as evaluated in the questionnaire by patients were compared among the three conditions. ANOVA's indicated that these variables did not differ significantly between the conditions, all  $p$ 's > .05.

Demographic characteristics of patients in the total sample were explored to gain some insight into who did ( $N = 52$ ) and who did not order the target product ( $N = 156$ ). Characteristics with nominal values (i.e. gender and diet (e.g. low-sodium or diabetic diet)) were analyzed using non-parametric Chi-Square tests and characteristics with continuous values (i.e. age) were analyzed using ANOVA's. The analyses showed that patients who did and did not order the target product did not differ from each other in terms of age, diet or gender, all  $p$ 's > .05.

## **Discussion**

In this field study, a verbal prompt was used to stimulate protein consumption among hospitalized patients. Compliance to the verbal prompt was considerable: the intervention increased the ordering of two protein-rich target products nearly sevenfold. In addition, protein content of ordered lunch and all food orders of the day combined showed a trend, with orders of patients receiving only a verbal prompt or a verbal prompt and verbal praise containing a larger amount of protein than lunch orders of patients in the control condition. At an individual level, protein content of ordered food increased significantly, reaching the 25-30 grams of protein per main meal recommended by dietitians of the hospital. These results show that small, inexpensive interventions can have large effects on food choice and may contribute to improving public health and decreasing healthcare costs.

Our study replicates earlier research showing that marketing techniques, like verbal prompts, can also be applied in the best interest of the consumer (Schwartz, 2007; Schwartz, Riis, Eibel & Ariely, 2012; van Kleef, van den Broek & van Trijp, 2015), although studies have varied in

success. Compliance with the verbal prompt in these studies ranged from 2 to 33 percent, depending on the environment (e.g. fast-food restaurant vs. school canteen), target product (e.g. fruit vs. pancakes) and other contextual characteristics (e.g. face-to-face vs. by telephone). The considerable increase in ordering of target products in the current study may likely be explained by some of the predictors of affirmation bias. Affirmation bias is stronger when consumers are not able or motivated to engage in high levels of cognition in making choices (Krosnick, 1991). As we studied hospitalized patients, a large part of our subjects may have had other things on their minds (e.g. pain or fatigue due to medical reasons) than thinking deeply about their food choices, which may have made them particularly susceptible to the affirmation bias. In line with this idea, patients who ordered the target product reported more often that they “automatically responded” to the suggestion than patients who did not order the target product.

Another explanation for the success of the verbal prompt in this field study is that food products could be ordered free of charge. Monetary considerations were thus no issue in complying with the offer and likely increased affirmation. However, patients did not just order the target products and dispose of them, they also consumed the products. The majority of the patients indicated that they consumed most or all of the target products. Similar strong effects were found in a school-based intervention to increase fruit consumption, wherein fruit was provided free of charge (Schwartz, 2007). Alternatively, the fact that the product suggestions was given by respectable staff members of the hospital could have been a justification for patients to comply with the verbal prompt (Krosnick, 1999). Patients in our study might have, rightfully, felt that the product suggestion was selected carefully by the hospital. Indeed, patients who complied with the prompt reported more often than non-complying patients that they thought the target product was a useful suggestion. The verbal prompt may thus have instigated a product demand, which is traditionally the goal of marketing (Kotler, 1973).

Verbal praise did not increase compliance with the verbal prompt, which could suggest that patients did not perceive verbal praise to be genuine. This result would be in line with studies on praise which have shown that praise may backfire when observers perceive it to be insincere (Campbell & Kirmani, 2000). However, verbal praise neither increased nor *decreased* compliance with the verbal prompt and telephone operators in the different conditions were not rated as less or more friendly by patients. More likely, the verbal prompt itself was already convincing enough to yield a strong affirmation bias among patients. Even so, there was no indication that patients felt forced to order the target products and verbal prompts were not perceived to be obtrusive. Given that telephone operators also faced

difficulties in correctly providing verbal praise to patients, it may be warranted to use solely a verbal prompt in motivating patients to increase their consumption of target products.

Across the total sample of patients (i.e. including those who did not comply with the prompt) verbal prompts increased protein content of food orders considerably, but only marginally significantly. Most likely, the effect of the intervention was clouded by variance in the data. Variance in protein content of food orders was large despite accounting for variables such as age and gender, for example, ranging from 1 gram to 55 grams in the lunch orders. Given that studies have shown that protein supplementation may cause patients to compensate by eating less during other meals (Fiatarone Singh et al., 2000), we examined the protein content of breakfast and dinner orders of the patients. Analyses showed that patients who complied with the verbal prompt were not compensating for ordering a smaller or low-protein breakfast earlier that day and did not compensate by ordering a smaller or low-protein dinner later.

The meal service program of the hospital at which this study was performed provided an ideal setting for applying a simple intervention that would reach many patients. However, this setting also introduced a limitation to this study. Our intervention did not reach patients who were in the earliest stages of their recovery and asked family or nursing staff to call the meal service for them. Given that these patients could have benefited the most from consuming some additional protein, hospitals could give verbal prompts to family members and nursing staff as well. Alternatively, hospitals may want to train the other staff members such as nurses, dieticians and doctors to use the verbal prompting technique on patients. Training other staff members to use the verbal prompt technique may also be a solution for hospitals where food orders are not made by phone. Given that the verbal prompt is a simple and time-efficient intervention, various types of hospital staff should be able to apply it effectively. Future research should, however, look into the circumstances under which verbal prompts are most effective.

To gain some insight in perceived obtrusiveness of the verbal prompt and the consumption of the target products, patients were visited by one of the researchers with a paper questionnaire. Data collected from this questionnaire supported our use of a verbal prompt to increase protein consumption, but conclusions based on these data should be drawn with care. The questionnaire consisted of self-report measures, which are sensitive to social desirability, and items were not validated as they were used merely as control. Future studies on verbal prompts may, however, benefit from validating a perceived-obtrusiveness scale, such as the one developed by van Kleef and colleagues (2015) and measuring consumption of the target products using an objective measure, such as the weight of leftovers.

During the training of the telephone operators, the field study was described as the evaluation of a new type of telephone script and telephone operators were asked not to talk to each other about the experiment. However, the telephone operators were aware of recent attempts of the hospital to increase protein intake among patients and the target products were known as protein-rich products. Telephone operators were thus not fully blind to our hypotheses, which is a third limitation of this study. Efforts were made to minimize this limitation by encouraging telephone operators to strictly adhere to the telephone script in all test condition and results showed that telephone operators did not differ in terms of friendliness or helpfulness in the different conditions.

Although this study focused on increasing protein content of food orders, verbal prompts could also be used to increase consumption in general. In this field study, patients' mean daily caloric intake was 1712 kilocalories and thus well below the recommended daily caloric intake of 2000 kilocalories for women and 2500 kilocalories for men. To increase caloric intake among patients, hospitals could use a verbal prompt to encourage patients to order snacks between their main meals or use a verbal prompt at every main meal rather than only for lunch. However, future research would have to examine the effectiveness of verbal prompts when consumers are repeatedly presented with them.

## Conclusions

This study demonstrated that simple and low-cost marketing techniques can have substantial effects on food choice in a natural setting, such as a hospital, and that verbal prompts are a promising type of marketing technique in this respect. Although motivating patients to change their eating habits for a longer period of time is challenging, verbal prompts may be a useful tool for health professionals to stimulate healthy food consumption among patients at least during hospitalization. On a longer term, motivating patients to explore foods they otherwise would not have tried might inspire them to start using these foods on a more regular basis (Wardle, Herrera, Cooke & Gibson, 2003). However, respondents to the questionnaire indicated that the taste of the target product was their most important reason to both *order* and *not order* the target product. Foods that are generally seen as tasty may thus be most suitable as targets for verbal prompts.



# Chapter 7

## General discussion

### Summary and main findings

The growth of the elderly population is a point of concern for public health and, at the same time, an opportunity for the marketplace. The development of products and services, such as home modifications, mobility aids and functional foods, may support elderly in maintaining good health, and promote their independence and wellbeing. Successfully approaching elderly consumers with such products or services remains challenging, however, as the elderly consumer population is strongly heterogeneous and not well understood. This thesis aimed to provide a deeper understanding of the decision-making processes of elderly consumers, thereby also supporting health institutions and marketers in effectively acting upon what elderly consumers need and want.

Taking functional (protein-enriched) foods for elderly as example, the thesis focussed on answering three research questions: (1) Which types of wants, inferences and intentions characterize the elderly consumer population? (2) What are relevant ways to distinguish between elderly consumers? and (3) How can elderly consumers be motivated to form consumption intentions for products and services aimed at promoting their wellbeing?

Using a combination of qualitative and quantitative data, implicit and explicit methods, and literature, field and questionnaire studies, this thesis provided answers to each of the research questions. The primary findings of Chapter 2 through Chapter 6 are summarized in Table 7.1. This final chapter will elaborate on these primary findings and other secondary findings and provide recommendations for future research and for the development of products and services that promote the wellbeing of elderly consumers.

#### *Wants, inferences and intentions*

This thesis argued that it is vital to gain a deeper understanding of decision-making among elderly consumers. Building on a consumer-oriented framework (Grunert & van Trijp, 2014), this thesis sought to identify the wants, inferences and intentions of elderly consumers and how these wants, inferences and intentions interact with each other. To do so, the thesis started off in Chapter 2 with exploring and explaining age-related differences in decision-making processes. Using an experience sampling method, consumers aged 20 up to 89 years were asked to report their desires (i.e. wants) and the goals (i.e. intentions) that were in conflict with these desires. The chapter showed that although there were some age-related differences in consumers' types of desires and goals (e.g. elderly less often had work as a goal), there were no age-related differences in which types of desires were in conflict with

Table 7.1.  
*Overview of empirical chapters.*

Chapter #	Objectives	Methods	Primary findings
Chapter 2	To replicate the age-related reduction in goal conflict reported in the literature and provide an explanation based on future time perspective.	Experience sampling of desires and conflicting goals among consumers (N = 736, aged 20-89).	Future time perspective explained age-related differences in goal conflict, but not in the hypothesized direction. There were age-related differences in the type of desires and goals, but not their interaction; with increasing age, the same goals conflicted with the same desires.
Chapter 3	To explore the knowledge, perceptions and preferences of elderly consumers regarding protein and (protein-)enriched food.	Six semi-structured focus groups with elderly consumers (N = 42, aged 58-93).	Consumers were skeptical about functional foods. Main barriers to consuming protein-enriched foods were confusion, distrust and a perceived lack of personal relevance. Main motivators were sensory appeal of these foods and medical advice by a GP. Consumers preferred healthy carriers based on products they consume
Chapter 4	To review and evaluate a range of potential bases for segmenting elderly in the context of functional foods.	Narrative review in which 8 segmentation bases are evaluated using 7 criteria from the marketing literature.	Each of the bases had strengths and weaknesses regarding the 7 evaluation criteria. Elderly consumers in the functional food market may best be segmented using a base that describes their product preferences and can predict their product acceptance. The effectiveness of segmentation bases remains an empirical matter.
Chapter 5	To explore heterogeneity among elderly in acceptance of various potential carriers for enrichment.	Segmentation of elderly consumers (N = 303, aged 56-87) on their acceptance of carriers.	Consumers reported low willingness to purchase protein-enriched foods. When tailoring carriers to 6 subgroups of consumers, willingness increased considerably. One group of consumers categorically rejected all protein-enriched foods presented to them.
Chapter 6	To increase protein content in food orders among hospitalized patients using a simple, low-cost intervention.	Verbal prompt and praise intervention among patients (N = 315, aged 18-87).	The intervention increased ordering of two target products nearly sevenfold. At an individual level, protein content of lunch orders increased to the recommended amount of 25-30g per main meal. Verbal praise did not increase compliance with the verbal prompt.

which types of goal (i.e. the interaction between wants and intentions). Consumers did, however, differ in how often desires and goals were in conflict with each other; older adults experienced less conflict than younger adults, although the effect was small.

#### *Wants, inferences and intentions*

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Chapter 3 zoomed in on product-specific decision-making, and explored the wants, inferences and intentions of elderly consumers regarding functional (protein-enriched) foods. In a series of focus group studies, elderly consumers most often reported healthy products that they already used frequently as appropriate bases for enrichment with protein, such as bread and dairy products. A sorting task, however, showed heterogeneity in these wants, as certain consumers also reported wanting unhealthy products like microwave meals and snacks like candy bars. Despite reporting specific wants, the majority of elderly did not display intentions to use any type of protein-enriched food, as they did not perceive them to be personally relevant (i.e. not in line with their needs) or held various negative inferences regarding functional foods (e.g. being marketing scams, tasting poorly, having high prices). A part of the elderly did show favourable inferences and intentions, however, such that certain consumers expected enrichment to improve the taste of products and that enriched products could reduce their medicine intake. In addition, more than half of the participants reported occasionally using functional foods.

While Chapter 3 suggested that there was heterogeneity in the wants, inferences and intentions of elderly, its methodology did not allow for statistical analyses to confirm this suggestion. In addition, consumers taking part in the focus groups found it hard to explain

their wants regarding (protein-enriched) functional foods. To overcome these limitations, Chapter 4 evaluated different ways to look into the heterogeneity among elderly consumers (discussed in more depth in the next section), as a basis for Chapter 5, which aimed to study the heterogeneity in wants, inferences and intentions among elderly consumers more objectively. Chapter 5 consisted of a segmentation study, in which participants were asked to evaluate a set of potential carriers on how appropriate these were for enrichment with protein (i.e. the match between inferred and desired benefits) and to what extent they were willing to trial and repeat purchase protein-enriched variants of these products (i.e. intentions). Carriers were selected based on a conjoint design, such that they differed systematically in terms of healthiness, novelty and meal type (i.e. snack vs. part of a meal) and consumers' wants regarding protein-enriched foods could be identified in an unobtrusive manner. The chapter confirmed results from Chapter 3 by showing that the average elderly preferred healthy, traditional meals as a basis for enrichment with protein, while six subgroups of elderly showed different preferences, and that intentions to purchase these products also differed among these subgroups.

#### *Relevant ways to distinguish between elderly*

Together, Chapter 2, 3 and 5 showed that the wants, inferences and intentions of elderly consumers are strongly heterogeneous. To appreciate this heterogeneity when developing products and services that promote the wellbeing of elderly, it is critical to identify smaller, more homogeneous subgroups of elderly using market segmentation. Although one may be tempted to segment consumers into groups based on age, we argued that age is of limited use as it does not predict behaviour. Chapter 2 confirmed this idea and showed that age-related differences in wants and intentions could be explained by future time perspective. Apart from future time perspective, many other bases can be potentially used to segment elderly consumers; the number of bases on which consumers can be segmented is virtually limitless.

To gain more insight in relevant ways to distinguish between the heterogeneous population of elderly consumers, Chapter 4 evaluated eight potential segmentation bases (i.e. cognitive age, life course, time perspective, demographics, general food beliefs, food choice motives, product attributes and benefits sought, and past purchase) using evaluation criteria put forward in the marketing literature. Bases were categorized as either preference-based (i.e. resulting segments have similar needs and wants) or characteristics-based (i.e. resulting segments have similar personal characteristics), and existing at the person, domain (i.e. food) or product-level. Each of the (categories of) bases had their own strengths and weaknesses, suggesting that there is no single best way to segment (elderly) consumers. Based on the

objectives of a segmentation approach one can, however, make an informed decision regarding which segmentation base to use. Chapter 4 concluded that, in the functional food market, elderly may be best segmented using an actionable, preference-based segmentation base at the domain or product-level such as “attributes and benefits sought” and the resulting segments described using one or more person-level variables. The effectiveness of segmentation bases was, however, argued to remain an empirical matter.

Chapter 5 was used to empirically confirm the suggestions made in Chapter 4, by testing the recommended segmentation approach. In Chapter 5, elderly consumers were segmented using a preference-based product-level basis; consumers’ willingness to trial purchase a collection of functional foods. In line with predictions made in Chapter 4, the segmentation approach yielded actionable segments, as they provided concrete information for the development and communication of functional foods. In addition, the personal characteristics age, BMI, gender, educational level, health, marital status and consumers’ preferred means to increase protein consumption (i.e. using food, functional food or pills) did not explain a lot of heterogeneity in consumers’ willingness to trial purchase the presented functional foods. Together, Chapter 4 and 5 showed that it pays off to carefully consider potentially relevant ways of segmenting a consumer population before selecting one of them to put into practice.

#### *Motivating elderly to form consumption intentions*

Research has suggested that, compared to younger consumers, elderly are more positive about and more interested in the concept of enriched food (Poulsen, 1999). Chapter 3 of this thesis, however, showed that consumption intentions remain low among the majority of elderly consumers. Chapter 5 and 6 of this thesis focused on ways to increase consumption intentions regarding (protein-enriched) functional foods. Based on a consumer-oriented theoretical framework, we argued that focusing on establishing a fit between the benefits that consumers want and the benefits that a product has to offer would positively affect the consumption intentions of consumers. Chapter 5 employed a consumer-oriented approach by segmenting elderly into subgroups based on their willingness to trial purchase a collection of protein-enriched foods. Overall willingness to trial purchase these foods was low, replicating findings from Chapter 3, but purchase intentions increased considerably when tailoring products to six subgroups of elderly, as expected based on the consumer-oriented framework.

A small segment of the elderly categorically rejected all protein-enriched foods, however, in that they either evaluated all presented protein-enriched foods as inappropriate or reported

to be unwilling to trial purchase any of these foods. This group of categorical rejecters was significantly less interested in the concept of enriched foods than other consumers in the sample, suggesting that they held certain negative inferences surrounding functional foods (such as found in Chapter 3). Although certain negative (inferred) characteristics of functional foods may be overcome by tailoring products to the needs and wants of consumers, this may not be the case for characteristics that are inherent in functional foods, such as that they are enriched, fortified, enhanced or altered in another way (Spence, 2006). To reach consumers that perceive such (inferred) product characteristics as a barrier to consumption, alternative approaches are necessary.

One alternative approach may be to prevent the formation of inferences, by capitalizing on cognitive biases. This idea was tested in a field study in Chapter 6, where a verbal prompt intervention (i.e. a product suggestion) was applied to increase protein intake among hospitalized patients. This intervention was argued to motivate patients to make consumption decisions automatically and without much thought, thus avoiding the stage of inference formation. The verbal prompt consisted of the question “would you like some [target product] with that” and was provided to patients by telephone operators of the hospital who patients called to place meal orders. In line with the predictions, the intervention successfully increased ordering of two protein-rich target products. Although a single verbal prompt may only lead to trial purchase of such products, Chapter 5 suggested that motivating consumers to explore products they otherwise would not have tried may also inspire more frequent use. Achieving trial purchase is therefore a valuable first step in motivating elderly consumers to use products and services aimed at promoting their wellbeing.

### **Limitations and recommendations for future research**

This thesis sought out to increase understanding of decision making among elderly consumers. While doing so, it stumbled upon a practical question, namely: when do consumers become elderly consumers? There is no consensus regarding a cut-off point for old age, and elderly have been defined in the scientific literature as individuals aged “over 45” (e.g. Weijters & Geuens, 2003), “over 50” (e.g. Sudbury & Simcock, 2009), “over 55” (e.g. Moschis & Friend, 2008), “over 60” (e.g. Delaney & McCarthy, 2011) and “over 65” (e.g. Mattila, Karjaluoto & Pento, 2000). It is, however, hard to predict when an individual will actually make the switch from a “young” to an “old” consumer. Age only gives a rough indication of one’s degree of biological, psychological and social maturation, as such maturation occurs at different rates in different consumers and also due to different causes (Settersten & Mayer, 1997). The population of elderly thus cannot simply be defined using

an age bracket. Future research may want to seek alternative ways to define the elderly population, possibly based on the biological, psychological, and social processes that co-occur with aging (e.g. expertise and cognitive decline) and directly affect the decision-making processes of consumers (Strough, Karns & Schlosnagle, 2011). Until such definitions are established, researchers may want to primarily focus their efforts on collecting large, diverse samples of elderly participants, rather than seeking out participants of a specific age bracket. In line with this reasoning, this thesis pragmatically collected its participants from a large panel of elderly consumers, the SenTo panel (i.e. Senioren van de Toekomst / Seniors of the Future) (Kremer, 2012), which happened to define elderly as those aged 55 and older.

As a result of using the SenTo panel, the elderly studied in this thesis were, however, not fully representative of the Dutch elderly population. Most elderly (except for the residential home elderly in Chapter 3) were relatively healthy and young, lived independently and had access to the internet. The wants, inferences and intentions that were identified in this thesis may thus not be generalizable to all Dutch elderly, let alone to elderly in other countries. Having studied a relatively uniform group of elderly does not, however, refute the main finding of this thesis (and may even strengthen it), that the elderly population is strongly heterogeneous and that it pays off to appreciate and understand this heterogeneity when developing products, services and interventions for elderly consumers. Although heterogeneity among elderly is increasingly appreciated by the industry, Chapter 4 illustrated that literature on diversity in elderly is still limited, as elderly consumers have long been overlooked (Moschis, 2003). Future research may focus on filling this gap in the literature and continue increasing our understanding of elderly consumers.

Although most pronounced among elderly (Moschis, 2003), heterogeneity is also present in other, younger populations. Appreciating such heterogeneity by using segmentation as a research tool provides researchers with useful insights above and beyond those of the average participant, and can help researchers to increase understanding of their study populations if bases for segmentation are carefully selected. Chapter 4 showed how such bases can be evaluated using a set of criteria put forward in the marketing literature: identifiability, substantiality, accessibility, stability, responsiveness and actionability (Kotler, 1984; Dibb, 1999; Wedel & Kamakura, 2000). So far, these criteria have not been operationalized into measurable units, however, which makes them difficult to apply and, possibly as a consequence, sparsely used by researchers. Future research may want to explore ways to facilitate the use of these or other evaluation criteria, to promote a careful selection of segmentation bases and motivate the use of segmentation as a research tool.



Apart from using segmentation as a research tool, future research may also benefit from using a combination of implicit and explicit methods and measures. Most of the studies in this thesis looked at consumers as rational decision-makers, for example by studying their explicit, self-reported preferences and purchase intentions. Although consumer preferences are found to be strongly predictive of behaviour (Greenwald, Poehlman, Uhlmann & Banaji, 2009), the outcomes of explicit measures may not always translate well to real-life situations as human decision-making is not purely rational, but strongly affected by emotions (Schwarz, 2002), heuristics, cognitive biases (Strough, Karns & Schlosnagle, 2011) and the environment (Thaler & Sunstein, 2008). In line with this idea, Chapter 3 showed that while consumers could indicate their (explicit) product preferences, they found it hard to verbalize the (implicit) reasons underlying their preferences. Chapters 5 and 6 sought to better appreciate the characteristics of human decision-making. To do so, consumers in Chapter 5 were asked to report their preferences regarding a set of products that differed systematically in terms of healthiness, novelty and type (i.e. meal vs. snack). By presenting these products to participants in a conjoint design, the explicit product preferences of the participants could be translated into their implicit preferences regarding healthiness, novelty and the meal type of products. In addition, the design allowed us to generalize the results of Chapter 5 to products that were not used in the study. In Chapter 6, real-life behaviour was studied in a field intervention that aimed to promote protein consumption among hospitalized patients. In addition, the verbal prompt intervention was applied in such a way that it capitalized on one of the cognitive biases in human decision-making, the affirmation bias. Future research may benefit from using more of such implicit methods and focus on real-life behaviour to fully appreciate the characteristics of consumer decision-making.

### **Recommendations for industry and health institutions**

The success of a product or service, such as a functional food, depends on the fit between what consumer need and want, and what they believe a product or service has to offer (Grunert & van Trijp, 2014). We therefore argued that it is useful for industry and health institutions to understand the wants, inference and intentions of consumers, and how they make consumption decisions based on these wants, inferences and intentions. For example, by exploring elderly consumers' inferences regarding protein-enriched foods, Chapter 3 showed that while elderly held various negative inferences with regard to the general concept of enriched foods (i.e. "food with additives"), they were relatively optimistic about specific products. Insights like these can subsequently guide industry and health institutions in developing and commercializing products and services. This particular insight suggests that industry and health institutions may want to avoid activating the general concept of enriched food and its negative associations. Rather than emphasizing the modified nature of

functional foods (e.g. Iglo: “extra added Omega 3 makes these fish fingers even more healthy”), manufacturers may want to express the presence of functional ingredients more carefully (e.g. Kellogg: “source of Vitamin D”). By taking a consumer-oriented approach and focusing on understanding elderly consumers, industry and health institutions can gain and apply useful insights like these in developing and marketing their products and services.

One vital aspect in understanding the elderly population that deserves special attention from the industry and health institutions is the heterogeneity of this population. Elderly differ strongly in their wants, inferences and intentions. As shown in Chapter 5, it pays off to take into account this heterogeneity when developing products and services for elderly consumers. This is especially true for functional foods, since experts and consumers are found to disagree on which products are suitable for enrichment. Pills, for example, are liked by marketers as carriers for health claims (van Kleef, van Trijp, Luning & Jongen, 2002) but not by consumers (see Chapter 5) and certain groups of consumers prefer indulgent carriers such as chocolate as carriers for health claims (see Chapter 5) while marketers are less inclined to invest in such products (van Kleef, van Trijp, Luning & Jongen, 2002). Since the start of this thesis, various protein-enriched foods have been launched on the Dutch market (e.g. by Danone, Arla and Frieslandcampina), but these are limited almost exclusively to the dairy market (with the exception of some cereals and granola bars). Although Chapter 3 and 5 showed that enriching dairy products with protein appeals to a large part of the elderly consumer population, limiting protein-enriched foods to the dairy market does not appreciate the heterogeneity among elderly consumers. To reach a larger part of the elderly consumer population with products and services like protein-enriched foods, it is important that industry and health institutions understand and take into account heterogeneity among elderly consumers when developing and commercializing such products and services.

## Conclusion

This thesis has provided various insights into the wants, inferences and intentions of elderly consumers and has thereby increased our understanding of the way in which elderly make decisions. Most notably, the thesis has shown that although elderly consumers share an age bracket they are part of a strongly heterogeneous population, which can even be observed when zooming in on decision-making regarding one specific product category (i.e. protein-enriched foods). In trying to understand and take into account this heterogeneity, it pays off to focus on variables that are predictive of behaviour, such as the benefits that consumers seek, while demographic characteristics like age provide only few insights. Lastly, taking a consumer-oriented approach can also benefit industry and health institutions in developing and commercializing products and services for elderly consumers.

# References

## REFERENCES

### A

Ahmad, R. (2003). Benefit segmentation: A potentially useful technique of segmenting and targeting older consumers. *International Journal of Market Research*, 45, 373-389.

Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl & J. Beckmann (Eds.), *Action control. From cognition to behaviour* (pp. 11-39). Berlin, DE: Springer-Verlag.

Ajzen, I. (1987). Attitudes, traits, and actions: Dispositional prediction of behaviour in personality and social psychology. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 1- 63). San Diego, CA: Academic Press.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52, 317–332.

Allen, S. M., Foster, A., & Berg, K. (2001). Receiving help at home: The interplay of human and technological assistance. *Journal of Gerontology: Social Sciences*, 56B, S374-S382.

de Almeida, M. D. V., Graça, P., Afonso, C., Kearney, J. M., & Gibney, M. J. (2001). Healthy eating in European elderly: Concepts, barriers and benefits. *The Journal of Nutrition, Health & Aging*, 5, 217-219

Amatulli, C., Guido, G., & Natarajan, R. (2015). Luxury purchasing among older consumers: exploring inferences about cognitive Age, status, and style motivations. *Journal of Business Research*, 68, 1945-1952.

Ansari, A., Essegai, S., & Kohli, R. (1999). Internet recommendation systems. *Journal of Marketing Research*, 37, 363-375.

Arbolea, S., González, S., Salazar, N., Ruas-Madiedo, P., de los Reyes-Gavilán, C., & Gueimonde, M. (2012). Development of probiotic products for nutritional requirements of specific human populations. *Engineering in Life Sciences*, 12, 368-376.

Ares, G., Besio, M., Giménez, A., & Deliza, R. (2010). Relationship between involvement and functional milk desserts intention to purchase. Influence on attitude towards packaging characteristics. *Appetite*, *55*, 298-304.

Ares, G., & Gámbaro, A. (2007). Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite*, *49*, 148-158.

Ares, G., Giménez, A., & Gámbaro, A. (2008a). Influence of nutritional knowledge on perceived healthiness and willingness to try functional foods. *Appetite*, *51*, 663–668.

Ares, G., Giménez, A., & Gámbaro, A. (2008b). Uruguayan consumers' perception of functional foods. *Journal of Sensory Studies*, *23*, 614-630.

Ares, G., Giménez, A., & Gámbaro, A. (2008c). Understanding consumers' perception of conventional and functional yogurts using word association and hard laddering. *Food Quality and Preference*, *19*, 636-643.

Ares, G., Giménez, A., & Gámbaro, A. (2009). Consumer perceived healthiness and willingness to try functional milk desserts. Influence of ingredient, ingredient name and health claim. *Food Quality and Preference*, *20*, 50-56.

Ares, G., Mawad, F., Giménez, A., & Maiche, A. (2014). Influence of rational and intuitive thinking styles on food choice: Preliminary evidence from an eye-tracking study with yogurt labels. *Food Quality and Preference*, *31*, 28-37.

Arnold, M., & Barbul, A. (2006). Nutrition and wound healing. *Plastic and Reconstructive Surgery*, *117*, 42-58.

Aschemann-Witzel, J., Maroscheck, N., & Hamm, U. (2013). Are organic consumers preferring or avoiding foods with nutrition and health claims? *Food Quality and Preference*, *30*, 68-76.

Atchley, R. C. (1987). *Aging: Continuity and change* (2nd ed.). Belmont, CA: Wadsworth.

ATLAS.ti Scientific Software Development GmbH. (2013). ATLAS.ti Qualitative Data Analysis (Version 7) [Software].

## REFERENCES

van Auken, S., & Barry, T. E. (2009). Assessing the nomological validity of a cognitive age segmentation of Japanese seniors. *Asia Pacific Journal of Marketing and Logistics*, 21, 315–328.

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin*, 120, 338-375.

## B

Bäckström, A., Pirttilä-Backman, A. M. & Tuorila, H. (2003). Dimensions of novelty: A social representation approach to new foods. *Appetite*, 40, 299-307.

Bal, P. M., Jansen, P. G. W., van der Velde, M. E. G., de Lange, A. H., & Rousseau, D. M. (2010). The role of future time perspective in psychological contracts: A study among older workers. *Journal of Vocational Behaviour*, 76, 474-486.

Barak, B., & Gould, S. (1985). Alternative age measures: A research agenda. *Advances in Consumer Research*, 12, 53-58.

Barak, B., & Rahtz, D. (1999). Perceived youth: Appraisal and characterization. *International Journal of Aging and Human Development*, 49, 231-257.

Barak, B., & Schiffman, L. G. (1981). Cognitive age: A nonchronological age variable. *Advances in Consumer Research*, 8, 602-606.

Barrena R., & Sánchez, M. (2009). Consumption frequency and degree of abstraction: A study using the laddering technique on beef consumers. *Food Quality and Preference*, 20, 144-155.

Barton, A. D., Beigg, C. L., MacDonald, I. A., & Allison, S. P. (2000). High food wastage and low nutritional intakes in hospital patients. *Clinical Nutrition*, 19, 445-449.

Bauer, J., Biolo, G., Cederholm, T., Cesari, M., Cruz-Jentoft, A. J., Morley, J. E., Phillips, S., Sieber, C., Stehle, P., Teta, D., Visvanathan, R., Volpi, E., & Boirie, Y. (2013). Evidence-based recommendations for optimal dietary protein intake in older people: A position paper from the PROT-AGE Study Group. *The Journal of Post-Acute and Long-Term Care Medicine*, 14, 542-559.

- Baumeister, R. F. (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behaviour. *Journal of Consumer Research*, 28, 670–676.
- Beasley, J. M., LaCroix, A. Z., Neuhouser, M. L., Huang, Y., Tinker, L., Woods, N., Michael, Y., Curb, D., & Prentice, R. L. (2010). Protein intake and incident frailty in the Women's Health Initiative Observational Study. *Journal of the American Geriatrics Society*, 58, 1063–1071.
- Bech-Larsen, T. & Grunert, K. G. (2003). The perceived healthiness of functional foods. A conjoint study of Danish, Finnish and American consumers' perception of functional foods. *Appetite*, 40, 9-14.
- Best, R. L., & Appleton, K. M. (2013). The consumption of protein-rich foods in older adults: An exploratory focus group study. *Journal of Nutrition Education and Behaviour*, 45, 751-755.
- Betoret, E., Betoret, N., Vidal, D., & Fito, P. (2011). Functional foods development: Trends and technologies. *Trends in Food Science & Technology*, 22, 498-508.
- Blake, C. E., Bisogni, C. A., Sobal, J., Devine, C. M., & Jastran, M. (2007). Classifying foods in contexts: How adults categorize foods for different eating settings. *Appetite*, 49, 500-510.
- Bleiel, J. (2010). Functional foods from the perspective of the consumer: How to make it a success? *International Dairy Journal*, 20, 303-306.
- Boersheim, E., Bui, Q. U., Tissier, S., Kobayshi, H., Ferrando, A. A., & Wolfe, R. R. (2008). Amino acid supplementation improves muscle mass, strength and physical function in elderly. *Clinical Nutrition*, 27, 189-195.
- Bogue, J., & Ryan, M. (2000). Market-oriented new product development: Functional foods and the Irish consumer. *Agribusiness Discussion Paper 27*. Department of food economics. National University of Ireland, Cork.
- Bogue, J., Sorenson, D., & O'Keeffe, M. (2009). Cross-category innovativeness as a source of new product ideas: Consumers' perceptions of over-the-counter pharmacological beverages. *Food Quality and Preference*, 20, 363-371.
- Bone, P. F. (1991). Identifying mature segments. *The Journal of Consumer Marketing*, 8, 19-32.

## REFERENCES

Bongaarts, J. (2002). The end of the fertility transition in the developed world. *Population and Development Review*, 28, 419-443.

Bottomley, P. A., & Doyle, J. R. (2001). A comparison of three weight elicitation methods: Good, better, and best. *Omega*, 29, 553-560.

Boudreaux, M., & Ozer, D. (2013). Goal conflict, goal striving, and psychological well-being. *Motivation and Emotion*, 37, 433-443.

Briley, M. E. (1998). The determinants of food choices of the elderly. *Journal of Nutrition for the Elderly*, 9, 39-45.

Brown, J. L. (2006). Intra-family influences on food choice at mid-life. In R. Shepherd & M. Raats (Eds.), *The psychology of food choice* (pp. 1-18). Oxfordshire, UK: CABI Publishing.

Brownie, A. (2006). Why are elderly individuals at risk of nutritional deficiency? *International Journal of Nursing Practice*, 12, 110-118.

## C

Calantone, R. J., & Sawyer, A. G. (1978). The stability of benefit segments. *Journal of Marketing Research*, 15, 395-404.

Campbell, M. C., & Kirmani, A. (2000). Consumers' use of persuasion knowledge: The effects of accessibility and cognitive capacity on perceptions of an influence agent. *Journal of Consumer Research*, 27, 69-83.

Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion*, 27, 103-123.

Carstensen, L. L., & Lang, F. R. (1996). *Future Orientation Scale*. [questionnaire] Retrieved from: <https://lifespan.stanford.edu/projects/future-time-perspective-ftp-scale>.

Cate, R. A., & John, O. P. (2007). Testing models of the structure and development of Future Time Perspective: maintaining a focus on opportunities in middle age. *Psychology and Aging*, 22, 186-201.



- CBS Statline (2013). *Bevolking; geslacht, leeftijd en burgerlijke staat, 1 januari*. Centraal Bureau voor de Statistiek, Den Haag.
- Chan, E., & Sengupta, J. (2010). Insincere flattery actually works: A dual attitudes perspective. *Journal of Marketing Research*, 47, 122-33.
- Childs, N. M., & Poryzees, G. H. (1997). Foods that help prevent disease: consumer attitudes and public policy implications. *Journal of Consumer Marketing*, 14, 433-447.
- Chung, H. S., Hong, H., Kim, K., Cho, C., Moskowitz, H. R., & Lee, S. (2011). Consumer attitudes and expectations of ginseng food products assessed by focus groups and conjoint analysis. *Journal of Sensory Studies*, 26, 346–357.
- Chrysochou, P., Askegaard, S., Grunert, K. G., & Kristensen, D. B. (2010). Social discourses of healthy eating. A market segmentation approach. *Appetite*, 55, 288-297.
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, 55, 591-621.
- Cody, M. J., Seiter, J. S., & Montagne-Miller, Y. (1995). Men and women in the marketplace. In: P. J. Kalbfleisch & M. J. Cody (Eds.), *Gender, power, and communication in interpersonal relationships* (pp. 305-329). Mahwah, NJ: Lawrence Erlbaum.
- Coleman, K. L., Miah, E. M., Morris, G. A., & Morris, C. (2013) Impact of health claims in prebiotic-enriched breads on purchase intent, emotional response and product liking. *International Journal of Food Sciences and Nutrition*, 65, 164-171.
- Conner, M., Armitage, C. J. (2006), Social psychological models of food choice. In R. Shepherd & M. Raats (Eds). *The Psychology of Food Choice* (pp. 41-57). CABI Press, Oxfordshire, UK.
- Cornish, L. S. (2012). It's good for me: It has added fibre! An exploration of the role of different categories of functional foods in consumer diets. *Journal of Consumer Behaviour*, 11, 292-302.
- Costa, A. I. A., Dekker, M., & Jongen, W. M. F. (2004). An overview of means-end theory: potential application in consumer-oriented food product design. *Trends in Food Science & Technology*, 15, 403-415.

## REFERENCES

Cox, R. M., Alexander, G. C., & Gray, G. A. (2005). Who wants a hearing aid? Personality profiles of hearing aid seekers. *Ear and Hearing, 26*, 12-26.

Crowe, K. M., & Francis, C. (2013). Position of the Academy of Nutrition and Dietetics: Functional Foods. *Journal of the Academy of Nutrition and Dietetics, 113*, 1096-1103.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Psychiatry, 24*, 349-354.

## D

van Dam, Y. K., & van Trijp, H. C. M. (2013). Relevant or determinant: Importance in certified sustainable food consumption. *Food Quality and Preference, 30*, 93-101.

Delaney, M. & McCarthy, M. (2011) Food choice and health across the life course: A qualitative study examining food choice in older Irish adults. *Journal of Food Products Marketing, 17*, 114-140.

DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self-rated health question. *Journal of General Internal Medicine, 21*, 267–275.

Dibb, S. (1999). Criteria guiding segmentation implementation: reviewing the evidence. *Journal of Strategic Marketing, 7*, 107-129.

Diplock, A. T., Aggett, P. J., Ashwell, M., Bornet, F., Fern, E. B., & Roberfroid, M. B. (1999). Scientific concepts of functional foods in Europe: Consensus document. *British Journal of Nutrition, 81*, 1–27.

Ditzenberger, R., & Kidney, D. (1986). *Selling: Helping customers buy*. Cincinnati, OH: South Western Publishing.

Dolinsky, M., da Silva Corrêa de Oliveira, R. M., de Souza Rocha, G., Barroso, S. G., das Dores, S. M. C., & Azeredo, V. B. (2015). Effects of functional foods consumption on the lipid profile and nutritional status of elderly. *International Journal of Cardiovascular Sciences, 28*, 400-408.

Dunne, J. L., & Dahl, W. J. (2007). A novel solution is needed to correct low nutrient intakes in elderly long-term care residents. *Nutrition Reviews*, 65, 135-138.

Dziak, J. J., Coffman, D. L., Lanza, S. T., & Li, R. (2012). *Sensitivity and specificity of information criteria* (Technical Report Series No. 12-119). The Methodology Center, Pennsylvania State University.

## E

Ebster, C., Wagner, U., & Valis, S. (2006). The effectiveness of verbal prompts on sales. *Journal of Retailing and Consumer Services*, 13, 169-176.

Edstrom, K. M., & Devine, C. M. (2001). Consistency in women's orientations to food and nutrition in midlife and older age: A 10-year qualitative follow-up. *Journal of Nutrition Education*, 33, 215-223.

Emmons, R. A., & King, L. A. (1988). Conflict among personal strivings: Immediate and long-term implications for psychological and physical well-being. *Journal of Personality and Social Psychology*, 54, 1040-1048.

Ernst, H. (2002). Success factors of new product development: A review of the empirical literature. *International Journal of Management Reviews*, 4(1), 1-40.

European Commission (2009). *The social situation in the European Union 2009*. Luxembourg: Publications Office of the European Union.

European Food Safety Authority. (2012). Scientific opinion on dietary reference values for protein. *EFSA Journal*, 10, 2557.

## F

Fanelli, M. T., & Stevenhagen, K. J. (1985). Characterizing consumption patterns by food frequency methods: core foods and variety of foods in diets of older Americans. *Journal of the American Dietetic Association*, 85, 1570-1576.

Faranda, W. T., & Schmidt, S. L. (1999). Segmentation and the senior traveler: Implications for today's and tomorrow's aging consume. *Journal of Travel & Tourism Marketing*, 8, 3-27.

## REFERENCES

Fehr, E., Fischbacher, U., & Gächter, S. (2002). Strong reciprocity, human cooperation and the enforcement of social norms. *Human Nature*, 13(1), 1-25.

Ferguson, M. J., & Bargh, J. A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology*, 87, 557–572.

Fiatarone Singh, M. A., Bernstein, M. A., Ryan, A. D., O'Neill, E. F., Clements, K. M., Evans, W. J. (2000). The effect of oral nutritional supplements on habitual dietary quality and quantity in frail elders. *The Journal of Nutrition, Health and Aging*, 4, 5–12.

Fiedler, K., Schott, M., & Meiser, T. (2011). What mediation analysis can (not) do. *Journal of Experimental Social Psychology*, 47, 1231-1236.

Finley, D. S., Rogers, G., Napier, M., & Wyatt, J. (2011). From needs-based segmentation to program realignment: Transformation of YWCA of Calgary. *Administration in Social Work*, 3, 299-323.

Fishbach, A., Zhang, Y., & Trope, Y. (2010). Counteractive evaluation: Asymmetric shifts in the implicit value of conflicting motivations. *Journal of Experimental Social Psychology*, 46, 29–38.

Fishbein, M., & Ajzen, I. (1974). Attitudes toward objects as predictors of single and multiple behavioural criteria. *Psychological Review*, 81, 59-74.

Fredrickson, B. L., & Carstensen, L. L. (1990). Choosing social partners: How old age and anticipated endings make people more selective. *Psychology of Aging*, 5, 335–347.

Frewer, L., Scholderer, J., & Lambert, N. (2003). Consumer acceptance of functional foods: Issues for the future. *British Food Journal*, 10, 714-731.

Fried, T. R., Bradley, E. H., Williams, C. S., & Tinetti, M. E. (2001). Functional disability and health care expenditures for older persons. *Archives of Internal Medicine*, 161, 2602-2607.

Fung, H. H., Lai, P., & Ng, R. (2001). Age differences in social preferences among Taiwanese and mainland Chinese: The role of perceived time. *Psychology and Aging*, 16, 351–356.

Furst, T., Connors, M., Sobal, J., Bisogni, C. A., & Falk, L. W. (2000). Food classifications: Levels and categories. *Ecology of Food and Nutrition*, 39, 331-355.

## G

Geeroms, N., Verbeke, W., & Kenhove, P. V. (2008). Health advertising to promote fruit and vegetable intake. Application of health-related motive segmentation. *Food Quality and Preference*, 19, 481–497.

Gillespie, A. M. H., & Johnson-Askew, W. L. (2009). Changing family food and eating practices: The family food decision-making system. *Annals of Behavioural Medicine*, 38, 31–36.

Goldsmith, R. E., Freiden, J. B., & Eastman, J. K. (1995). The generality/specificity issue in consumer innovativeness research. *Technovation*, 15, 601–612.

Gollwitzer, P. M. (1993). Goal achievement: the role of intentions. In W. Stroebe & M. Hewstone (Eds.), *European Review of Social Psychology, Volume 4* (pp. 141–185). Chichester, UK: Wiley.

Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 38, 69–119.

Grant, K. G., Fabrigar, L. R., & Lim, H. (2010). Exploring the efficacy of compliments as a tactic for securing compliance. *Basic and Applied Social Psychology*, 32, 226–233.

Greenberg, G., & McDonald, S. S. (1989). Successful needs/benefits segmentation: A user's guide. *Journal of Consumer Marketing*, 6, 29–36.

Greengrove, K. (2002). Needs-based segmentation: Principles and practice. *International Journal of Marketing Research*, 44, 405–421.

Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using the implicit association test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*, 97, 17–41.

Grunert, K. G., Baadsgaard, A., Larsen, H. H., & Madsen, T. K. (1996). *Market orientation in food and agriculture*. Boston, MA: Kluwer Academic Publishers

## REFERENCES

Grunert, K. G., Brunsø, K., & Bisp, S. (1993). *Food-related life style: Development of a cross-culturally valid instrument for market surveillance (MAPP Working Paper 12)*. Aarhus, Denmark: The Aarhus School of Business.

Grunert, K. G., & Valli, C. (2001). Designer made meat and dairy products: consumer-led product development. *Livestock Production Science*, 72, 83–98.

Grunert, K. G., & van Trijp, H. C. M. (2014). Consumer-oriented new product development. In N. K. van Alfen (Ed.), *Encyclopedia of agriculture and food systems* (pp. 375–386). San Diego, CA: Academic Press.

## H

Hailu, G., Boecker, A., Henson, S., & Cranfield, J. (2009). Consumer valuation of functional foods and nutraceuticals in Canada: A conjoint study using probiotics. *Appetite*, 52, 257–265.

Hair, J. F. Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Chapter 9: Cluster Analysis. In J. F. Hair Jr., W. C. Black, B. J. Babin & R. E. Anderson (Eds.), *Multivariate data analysis, 7th edition* (pp. 505-564). Upper Saddle River, NJ: Pearson Prentice Hall.

Haley, R. I. (1968). Benefit segmentation: A decision-oriented research tool. *Journal of Marketing*, 32, 30-35.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.

Helson, R. (1967). Personality characteristics and developmental history of creative college women. *Genetic Psychology Monographs*, 76, 205–256.

Henderlong, J., & Lepper, M. R. (2002). The effects of praise on children's intrinsic motivation: A review and synthesis. *Psychological Bulletin*, 128, 774-795.

Herath, D., Cranfield, J., & Henson, S. (2008). Who consumes functional foods and nutraceuticals in Canada? Results of cluster analysis of the 2006 survey of Canadians' Demand for Food Products Supporting Health and Wellness. *Appetite*, 51, 256–265.

Herne, S. (1995). Research on food choice and nutritional status in elderly people: A review. *British Food Journal*, 97, 12-29.

Hildebrand, E. D. (2003). Dimensions in elderly travel behaviour: A simplified activity-based model using lifestyle clusters. *Transportation*, 30, 285-306.

Hoch, S., & Loewenstein, G. (1991). Time-inconsistent preferences and consumer self-control. *Journal of Consumer Research*, 17, 492-507.

Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012). Everyday temptations: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology*, 102, 1318-1335.

Holley, S. R., Haase, C. M., & Levenson, R. W. (2013). Age-related changes in demand-withdraw communication behaviours. *Journal of Marriage and Family*, 75, 822-826.

Honkanen, P., Olsen, S. O., & Myrland, Ø. (2006). Preference-based segmentation: A study of meal preferences among Norwegian teenagers. *Journal of Consumer Behaviour*, 3, 235-250.

Hooker, N. H., & Teratanavat, R. (2008). Dissecting qualified Health Claims: Evidence from experimental studies. *Critical Reviews in Food Science and Nutrition*, 48, 160-176.

Horneman, L., Carter, R. W., Wei, S., & Ruys, H (2002) Profiling the senior traveler: An Australian perspective. *Journal of Travel Research*, 41, 23-37.

Horwath, C. C. (2002). Chapter 31: Nutrition and ageing. In J. Mann & A. S. Truswell (Eds.), *Essentials of Human Nutrition*, 2nd edition (pp. 551–565). New York, NY: Oxford University Press.

Hsu, C. H. C., & Lee, E. J. (2002). Segmentation of senior motorcoach travelers. *Journal of Travel Research*, 40, 364-373.

Huffman, C., Ratneshwar, S., & Mick, D. G. (2000). Consumer goal structures and goal-determination processes. In S. Ratneshwar, D. G. Mick & C. Huffman (Eds.), *The why of consumption* (pp. 9-35). London, UK: Routledge.

## I

Institute of Medicine (2005). *Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acids*. Washington, DC: National Academy Press.

## REFERENCES

### J

de Jong, N., Hoendervangers, C. T., Bleeker, J. K., & Ocké, M. C. (2004). The opinion of Dutch dietitians about functional foods. *Journal of Human Nutrition and Dietetics*, 17, 55–62.

de Jong, N., Mulder, I., de Graaf, C., & van Staveren, W. A. (1999). Impaired sensory functioning in elders: The relation with its potential determinants and nutritional intake. *Journal of Gerontology*, 54, 324-331.

Just, D. R., & Wansink, B. (2009). Smarter lunchrooms: Using behavioural economics to improve meal selection. *Choices*, 24(3), 1-7.

### K

Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioural economics. *American Economic Review*, 93, 1449-1475.

Karani, K. G., & Fraccastoro, K. A. (2010). Resistance to brand switching: The elderly consumer. *Journal of Business & Economics Research*, 8, 77-83.

Kardes, F. R., Posavac, S. S., Cronley, M. L. (2004). Consumer inference: A review of processes, bases, and judgment contexts. *Journal of Consumer Psychology*, 14, 230–256.

Kass, R. E., & Raftery, A. E. (1995). Bayes factors. *Journal of the American Statistical Association*, 90, 773-795.

Kehr, H. M. (2003). Goal conflicts, attainment of new goals, and well-being among managers. *Journal of Occupational Health Psychology*, 8, 195–208.

Keller, S. (2004). Welfare and the achievement of goals. *Philosophical Studies*, 121, 27-41.

Kim, S., Goldstein, D., Hasher, L., & Zacks, R. T. (2005). Framing effects in younger and older adults. *Journals of Gerontology: Psychological Sciences and Social Sciences*, 60, 215–218.

van Kleef, E., Otten, K., van Trijp, H. C. M. (2012). Healthy snacks at the checkout counter: A lab and field study on the impact of shelf arrangement and assortment structure on consumer choices. *BMC Public Health*, 12, 1072. doi: 10.1186/1471-2458-12-1072



van Kleef, E., van den Broek, O., van Trijp, H. C. M. (2015). Exploiting the spur of the moment to enhance healthy consumption: Verbal prompting to increase fruit choices in a self-service restaurant. *Applied Psychology: Health and Well-Being*, 7, 149-166.

van Kleef, E., van Trijp, H. C. M., & Luning, P. (2005). Functional foods: health claim-food product compatibility and the impact of health claim framing on consumer evaluation. *Appetite*, 44, 299–308.

van Kleef, E., Van Trijp, H. C. M., Luning, P., & Jongen, W. M. F. (2002). Consumer- oriented functional food development. How well do functional disciplines reflect the ‘voice of the consumer’? *Trends in Food Science and Technology*, 13, 93–101.

Kleiman, T., & Hassin, R. R. (2011). Non-conscious goal conflict. *Journal of Experimental Social Psychology*, 47, 521-532.

Klinger, E., & Cox, W. M. (2004). Motivation and the theory of current concerns. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counselling. Concepts, approaches, and assessment* (pp. 3-28). Chichester, UK: Wiley.

Kornelis, M., van Herpen, E., van der Lans, E., & Aramyan, L. (2010). Using non-food information to identify food-choice segment membership. *Food Quality and Preference*, 21, 512-520.

Kotilainen, L., Rajalahti, R., Ragasa, C., & Pehu, E. (2006). *Health enhancing foods: Opportunities for strengthening the sector in developing countries (Agriculture and Rural Development Discussion Paper 30)*. Washington, DC: The World Bank.

Köster, E. P. (2009). Diversity in the determinants of food choice: A psychological perspective. *Food Quality and Preference*, 20, 70–82.

Kotler, P. (1973). The major tasks of marketing management. *Journal of Marketing*, 37, 42-49.

Kotler, P. (1984). *Market Management*. Englewood Cliffs, New York, NY: Prentice-Hall.

Kremer, S. (2012). SenTo. A multidisciplinary Dutch initiative on healthy 55+ers food needs and wants. *Appetite*, 59, 630.

## REFERENCES

Kremer, S., Bult, J. H. F., Mojet, J., & Kroeze, J. H. A. (2007). Compensation for age-associated chemosensory losses and its effect on the pleasantness of a custard dessert and a tomato drink. *Appetite*, 48, 96-103.

Kremer, S., Hulst, J., & Boesveldt, S. (2013). Eating behaviour of healthy, independent living Dutch seniors. An exploratory study. *Appetite*, 71, 480.

Krosnick, J. A. (1991). Response strategies of coping with the cognitive demands of attitude measures in surveys. *Applied Cognitive Psychology*, 5, 213–236.

Krosnick, J. A. (1999). Survey research. *Annual Review of Psychology*, 50, 537-567.

Krosnick, J. A., & Presser, S. (2010). Question and questionnaire design. In J.D. Wright & P. V. Marsden (Eds.), *Handbook of survey research, 2nd edition* (pp. 263-313). West Yorkshire, England: Emerald Group.

Kruse, R. L., Moore, C. M., Tofle, R. B., LeMaster, J. W., Aud, M., Hicks, L. L., Minor, M. A., Canfield, S. M., & Mehr, D. R. (2010). Older adults' attitudes toward home modifications for fall prevention. *Journal of Housing for the Elderly*, 24, 110-129.

Krutulyte, R., Grunert, K. G., Scholderer, J., Lähteenmäki, L., Hagemann, K. S., Elgaard, P., Nielsen, B., & Graverholt, J. P. (2011). Perceived fit of different combinations of carriers and functional ingredients and its effect on purchase intention. *Food Quality and Preference*, 22, 11–16.

## L

Lancaster, G., & Williams, I. (2002). Consumer segmentation in the grey market relative to rehabilitation products. *Management Decision*, 40, 393-410.

Landström, E., Koivisto Hursti, U. K., & Magnusson, M. (2009). "Functional foods compensate for an unhealthy lifestyle". Some Swedish consumers' impressions and perceived need of functional foods. *Appetite*, 53, 34-43.

Lang, F. R., & Carstensen, L. L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology and Aging*, 17, 125–139.

- de Lange, A. H., Bal, M. P., Van der Heijden, B. I. J. M., De Jong, N., & Schaufeli, W. B. (2011). When I'm 64: Psychological contract breach, work motivation and the moderating roles of future time perspective and regulatory focus. *Work & Stress*, 25, 338-354.
- Lecci, L., Okun, M. A., & Karoly, P. (1994). Life regrets and current goals as predictors of psychological adjustment. *Journal of Personality and Social Psychology*, 66, 731-741.
- Leek, S., Szmigin, I., & Carrigan, M. (2001). Older consumers and food innovation. *Journal of International Food & Agribusiness Marketing*, 12, 71-89.
- Leverence, R. R., Williams, R. L., Sussman, A., & Crabtree, B. F. (2007). Obesity counseling and guidelines in primary care: A qualitative study. *American Journal of Preventive Medicine*, 32, 334-339.
- Lindenberger, U., von Oertzen, T., Ghisletta, P., & Hertzog, C. (2011). Cross-sectional age variance extraction: What's change got to do with it? *Psychology and Aging*, 26, 34-47.
- Lindeman, M., & Väänänen, M. (2000). Measurement of ethical food choice motives. *Appetite*, 34, 55-59.
- Littrell, M. A., Paige, R. C., & Song, K. (2004). Senior travellers: Tourism activities and shopping behaviours. *Journal of Vacation Marketing*, 10, 348-362.
- Locher, J. L., Ritchie, C. S., Roth, D. L., Sen, B., Vickers, K. S., & Vailas, L. I. (2009). Food choice among homebound older adults: Motivations and perceived barriers. *The Journal of Nutrition, Health and Aging*, 13, 659-664.
- Locher, J. L., & Sharkey, J. R. (2009). An ecological perspective on older adult eating behaviour. In C. W. Bales & C. S. Ritchie (Eds.), *Nutrition and health: Handbook of clinical nutrition and aging*, 2<sup>nd</sup> edition (pp. 3-17). New York, NY: Humana Press.
- Lorefält, B., Wissing, U., & Unosson, M. (2005). Smaller but energy and protein-enriched meals improve energy and nutrient intakes in elderly patients. *Journal of Nutrition, Health and Aging*, 9, 243-247.
- Lumbers, M., & Raats, M. (2006). Food choices in later life. In R. Shepherd & M. Raats (Eds.), *The psychology of food choice* (pp. 289-310). Oxfordshire, UK: CABI Publishing.

## REFERENCES

Lumpkin, J. R. (2000). Shopping orientation segmentation of the elderly consumer. *Journal of the Academy of Marketing Science*, 13, 271-289.

## M

Macdiarmid, J., & Blundell, J. (1998). Assessing dietary intake: Who, what and why of under-reporting. *Nutrition Research Reviews*, 11, 231-253.

MacIntosh, C., Morley, J. E., & Chapman, I. M. (2000). The anorexia of aging, *Ingestive Behaviour and Obesity*, 16, 983-995.

Main, K. J., Dahl, D. W., & Darke, P. R. (2007). Deliberative and automatic bases of suspicion: Empirical evidence of the sinister attribution error. *Journal of Consumer Psychology*, 17, 59-69.

Maitre, I., van Wymelbeke, V., Amand, M., Vigneau, E., Issanchou, S., & Sulmont-Rossé, C. (2014). Food pickiness in the elderly: Relationship with dependency and malnutrition. *Food Quality and Preference*, 32, 145-151.

Marinangeli, C. P. F., & Jones, P. J. H. (2013). Gazing into the crystal ball: future considerations for ensuring sustained growth of the functional food and nutraceutical marketplace. *Nutrition Research Reviews*, 26, 12-21.

Martinez, M. G., & Briz, J. (2000). Innovation in the Spanish food and drink industry. *International Food and Agribusiness Management Review*, 3, 155-176.

Martone, A. M., Onder, G., Vetrano, D. L., Ortolani, E., Tosato, M., Marzetti, E., & Landi, F. (2013). Anorexia of aging: A modifiable risk factor for frailty. *Nutrients*, 5, 4126-4133.

Mathur, A., & Moschis, G. P. (2005). Antecedents of cognitive age; A replication and extension. *Psychology and Marketing*, 22, 969-994.

Mathur, A., Moschis, G. P., & Lee, E. (2008). A longitudinal study of the effects of life status changes on changes in consumer preferences. *Journal of the Academy of Marketing Science*, 36, 234-246.

Mathur, A., Sherman, E., & Schiffman, L. G. (1998). Opportunities for marketing travel services to new-age elderly. *Journal of Services Marketing*, 12, 265-277.

- Mattes, R. D. (2006). Fluid energy - Where's the problem? *Journal of the American Dietetic Association*, 106, 1956-1961.
- Mattila, M., Karjaluoto, H., & Pento, T. (2000). Internet banking adoption among mature consumers: Early majority or laggards? *Journal of Services Marketing*, 17, 514-528.
- McCreadie, C., & Tinker, A. (2005). The acceptability of assistive technology to older people. *Ageing and Society*, 25, 91-110.
- Menrad, K. (2003). Market and marketing of functional food in Europe. *Journal of Food Engineering*, 56, 181-188.
- Midkiff, E. E., & Bernstein, I. L. (1985). Targets of learned food aversions in humans. *Physiology and Behaviour*, 34, 839-841.
- Morais, J. A., Chevalier, S., & Gougeon, R. (2006). Protein turnover and requirements in the healthy and frail elderly. *The Journal of Nutrition, Health & Aging*, 10, 272-283.
- Morgan, C. M. (1993). Segmentation study aims to help marketers understand diverse seniors market. *Quirk's Marketing Research Review*. ArticleID: 19931002.
- Moschis, G. P. (1992). Gerontographics: A scientific approach to analyzing and targeting the mature market. *The Journal of Services Marketing*, 6, 17-26.
- Moschis, G.P. (2000). Consumer behaviour in later life: Multidisciplinary approaches and methodological issues. *Research in Consumer Behaviour*, 9, 103-128.
- Moschis, G. P. (2003). Marketing to older adults: An updated overview of present knowledge and practice. *Journal of Consumer Marketing*, 20, 516 – 525.
- Moschis, G., Curasi, C. F., & Bellenger, D. (2003). Restaurant-selection preferences of mature consumers. *Cornell Hotel and Restaurant Administration Quarterly*, 44, 51-60.
- Moschis, G., Curasi, C. F., & Bellenger, D. (2004). Patronage motives of mature consumers in the selection of food and grocery stores. *Journal of Consumer Marketing*, 21, 123-133.

## REFERENCES

Moschis, G., Curasi, C., & Bellenger, D. (2007). Patronage motives of mature consumers in the selection of food and alcoholic beverage brands. *Journal of Food Products Marketing*, 13, 61-80.

Moschis, G. P., & Friend, S. B. (2008). Segmenting the preferences and usage patterns of the mature consumer health-care market. *International Journal of Pharmaceutical and Healthcare Marketing*, 2, 7-21.

Moschis, G. P., Lee, E., Mathur, A., & Strautman, J. (2000) *The maturing marketplace: Buying habits of baby boomers and their parents*. Westport, CT: Quorum Books.

Moschis, G. P., & Mathur, A. (2006). Older consumer responses to marketing stimuli: The power of subjective age. *Journal of Advertising Research*, 46, 339-346.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126, 247-259.

## N

National Institute on Aging. (2011). *Global Health and Ageing* (NIH Publication No. 11-7737). Washington, DC: U.S. Department of Health and Human Services.

Niva, M., & Mäkelä, J. (2007). Finns and functional foods: socio-demographics, health efforts, notions of technology and the acceptability of health-promoting foods. *International Journal of Consumer Studies*, 31, 34-45.

Norman, K., Kirchner, H., Freudenreich, M., Ockenga, J., Lochs, H., & Pirlich, M. (2008). Three-month intervention with protein and energy rich supplements improve muscle function and quality of life in malnourished patients with non-neoplastic gastrointestinal disease - A randomized controlled trial. *Clinical Nutrition*, 27, 48-56.

## O

Oliver, R. L. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research*, 20, 418-430.

Olsen, S., Prebensen, N., & Larsen, T. (2009). Including ambivalence as a basis for benefit segmentation. A study of convenience food in Norway. *European Journal of Marketing*, 43, 762–783.

Olsen, S. O., Wilcox, J., & Olsson, U. (2005). Consequences of ambivalence on satisfaction and loyalty. *Psychology and Marketing*, 22, 247-269.

Onwezen, M. C., Reinders, M. J., van der Lans, I. A., Sijtsema, S. J., Jasiulewicz, A., Guardia, M. D., & Guerrero, L. (2012). A cross-national consumer segmentation based on food benefits: The link with consumption situations and food perceptions. *Food Quality and Preference*, 24, 276-286.

Orme, B. (2010). *Getting started with conjoint analysis: Strategies for product design and pricing research. Second edition*. Madison, Wisconsin: Research Publishers LLC.

Oullette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behaviour predicts future behaviour. *Psychological Bulletin*, 124, 54-74.

## P

Payette H., & Shatenstein, B. (2005). Determinants of healthy eating in community-dwelling elderly people. *Canadian Journal of Public Health*, 96, 27-31.

Peters, E. (2009). A perspective on eating behaviours from the field of judgment. *Annals of Behavioural Medicine*, 38, 81-87.

Pohjanheimo, T., & Sandell, M. (2009). Explaining the liking for drinking yoghurt: The role of sensory quality, food choice motives, health concern and product information. *International Dairy Journal*, 19, 459–466.

Potter, J. M., Roberts, M. A., McColl, J. H., & Reilly, J. J. (2001). Protein energy supplements in unwell elderly patients - A randomized controlled trial. *Journal of Parenteral and Enteral Nutrition*, 25, 323-329.

Poulsen, J. B. (1999). *Danish consumers' attitudes towards functional foods* (MAPP Working Paper 62). Aarhus, Denmark: Aarhus School of Business.

## REFERENCES

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behaviour Research Methods, Instruments & Computers*, 36, 717-731.

Purinton-Johnson, E. F. (2013). Segmenting the mature market: Have marketers matured along with their market? In J. Zhu & W. I. Mondal (Eds.), *Proceedings of the American Society of Business and Behavioural Sciences* (pp. 579-588). Las Vegas, NV: ASBBS.

## R

van Raaij, W. F., & Verhallen, T. M. M. (1991). Domain-specific market segmentation. *European Journal of Marketing*, 28, 49-66.

Raghunathan, R., Naylor, R. W., & Hoyer, W. D. (2006). The unhealthy = tasty intuition and its effects on taste inferences, enjoyment, and choice of food products. *Journal of Marketing*, 70, 170-184.

Raviv, A., Keinan, G., Abaxo, Y., & Raviv, A. (1990). Moving as a stressful life event for adolescents. *Journal of Community Psychology*, 18, 130-140.

Resnik, L., Allen, S., Isenstadt, D., Wasserman, M., & Lezzoni, L. (2009). Perspectives on use of mobility aids in a diverse population of seniors: Implications for intervention. *Disability and Health Journal*, 2, 77-85.

de Ridder, D., Lensvelt-Mulders, G., Finkenauer, C. F., Stok, M., & Baumeister, R. F. (2011). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviours. *Personality and Social Psychology Review*, 16, 76-99.

Riediger, M. (2007). Interference and facilitation among personal goals: Age differences and associations with well-being and behaviour. In B. R. Little, K. Salmela-Aro, & S. D. Phillips (Eds.), *Personal project pursuit: Goals, action, and human flourishing* (pp. 119-143). Mahwah, NJ: Lawrence Erlbaum Associates.

Riediger, M., & Freund, A. M. (2006). Focusing and restricting: Two aspects of motivational selectivity in adulthood. *Psychology and Aging*, 21, 173-185.



Riediger, M., Freund, A. M., & Baltes, P. B. (2005). Managing life through personal goals: Intergoal facilitation and intensity of goal pursuit in younger and older adulthood. *Journals of Gerontology Series B, Psychological Sciences and Social Sciences*, 60, 84–91.

Riquelme, H. (2001). Do consumers know what they want? *Journal of Consumer Marketing*, 18, 437-448.

RIVM (2013). *NEVO online version 2013/4.0* [online database].

Roberfroid, M. B. (2002). Global view on functional foods: European perspectives. *British Journal of Nutrition*, 88, 133–138.

Roininen, K., Lähteenmäki, L., & Tuorila, H. (1999). Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite*, 33, 71-88.

Ross, B. H., & 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. (2006). The integration of biological, social, cultural and psychological influences on food choice. In R. Shepherd & M. Raats (Eds.), *The psychology of food choice* (pp. 19-39). Oxfordshire, UK: CABI Publishing.

## S

Sääksjärvi, M., Holmlund, M., & Tanskanen, N. (2009). Consumer knowledge of functional foods. *The International Review of Retail, Distribution and Consumer Research*, 19, 135-156.

Sahyoun, N. R., Pratt, C. A., & Anderson, A. (2004). Evaluation of nutrition education interventions for older adults: A proposed framework. *Journal of the American Dietetic Association*, 104, 58-69.

Sangpikul, A. (2008). A factor-cluster analysis of tourist motivations: A case of U.S. senior travellers. *Tourism*, 56, 23-40.

Schewe, C. D., & Meredith, G. (2004). Segmenting global markets by generational cohorts: determining motivations by age. *Journal of Consumer Behaviour*, 4, 51–63.

## REFERENCES

- Schurch, M., Rizzoli, R., Slosman, D., Laszlo Vadas, L., Vergnaud, P., & Bonjour, J. (1998). Protein supplements increase serum insulin-like growth factor-I levels and attenuate proximal femur bone loss in patients with recent hip fracture: A randomized, double-blind, placebo-controlled trial. *Annals of Internal Medicine*, 128, 801-809.
- Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, 6, 461-464.
- Schwarz, N. (2002). Situated cognition and the wisdom of feelings: Cognitive tuning. In L. Feldman Barrett & P. Salovey (Eds.), *The wisdom in feelings* (pp. 144-166). New York, NY: Guilford Press.
- Schwartz, M. B. (2007). The influence of a verbal prompt on school lunch fruit consumption: A pilot study. *International Journal of Behavioural Nutrition and Physical Activity*, 4, 6. doi: 10.1186/1479-5868-4-6.
- Schwartz, J., Riis, J., Elbel, B., & Ariely, D. (2012). Inviting consumers to downsize fast-food portions significantly reduces calorie consumption. *Health Affairs*, 31, 399-407.
- Shallcross, A. J., Ford, B. Q., Floerke, V. A., & Mauss, I. B. (2013). Getting better with age: The relationship between age, acceptance, and negative affect. *Journal of Personality and Social Psychology*, 104, 734-749.
- Seiter, J. S., & Weger, H. J. (2010). The effect of generalized compliments, sex of server, and size of dining party on tipping behaviour in restaurants. *Journal of Applied Social Psychology*, 40(1), 1-12.
- Settersten, R. A. Jr., & Mayer, K. U. (1997). The measurement of age, age structuring, and the life course. *Annual Review of Sociology*, 23, 233-261.
- Shoemaker, S. (2010). Segmenting the mature market: 10 years later. *Journal of Travel Research*, 39, 11-26.
- Siegrist, M., Stampfli, N., & Kastenholz, H. (2008). Consumers' willingness to buy functional foods. The influence of carrier, benefit and trust. *Appetite*, 51, 526-529.
- Sloan, A. E. (2000). The top ten functional food trends. *Food Technology*, 54, 33-62.

Smider, N. A., Essex, M. J., & Ryff, C. D. (1996). Adaptation to community relocation: the interactive influence of psychological resources and contextual factors. *Psychology and aging, 11*, 362-372.

Smoliner, C., Norman, K., Scheufele, R., Hartig, W., Pirlich, M., & Lochs, H. (2008). Effects of food fortification on nutritional and functional status in frail elderly nursing home residents at risk of malnutrition. *Nutrition, 24*, 1139-1144.

Sobal, J., & Bisogni, C. A. (2009). Constructing food choice decisions. *Annals of Behavioural Medicine, 38*, S37-S46.

Sobal, J., Bisogni, C. A., Devine, C. M., & Jastran, M. (2006). A conceptual model of the food choice process over the life course. In R. Shepherd & M. Raats (Eds.), *The psychology of food choice* (pp. 1-18). Oxfordshire, UK: CABI Publishing.

Sodexo. (2011). At Your Request Room Service Dining [electronic document]. <http://sodexo2.btchosting.com/pdf/Hospital%20Testimonials/FNS/AtYourRequest-RoomServiceDining2-12.pdf>. Accessed February 2017.

de Souza Genaro, P., & Martini, L. A. (2010). Effect of protein intake on bone and muscle mass in the elderly. *Nutrition Review, 68*, 616-623.

Sparke, K., & Menrad, K. (2006). Cross-European and functional food-related consumer segmentation for new product development. *Journal of Food Products Marketing, 15*, 213-230.

Spence, J. T. (2006). Challenges related to the composition of functional foods. *Journal of Food Composition and Analysis, 19*, 4-6.

Steenkamp, J. E. M., & Ter Hofstede, F. (2002). International market segmentation: issues and perspectives. *International Journal of Research in Marketing, 19*, 185-213.

Steenkamp, J. E. M., & van Trijp, H. C. M. (1996). Quality guidance: A consumer-based approach to food quality improvement using partial least squares. *European Review of Agricultural Economics, 23*, 195-215.

Stelten, S., Dekker, I. M., Ronday, E. M., Thijs, A., Boelsma, E., Peppelenbos, H. W., & de van der Schueren, M. A. E. (2014). Protein-enriched 'regular products' and their effect on protein

## REFERENCES

intake in acute hospitalized older adults; a randomized controlled trial. *Clinical Nutrition*, 34, 409-414.

Step toe, A., Pollard, T. M., & Wardle, J. (1995). Development of a measure of the motives underlying the selection of food: The Food Choice Questionnaire. *Appetite*, 25, 267-284.

Stratton, R. J., Ek, A. C., Engfer, M., Moore, Z., Rigby, P., & Elia, M. (2005). Enteral nutritional support in prevention and treatment of pressure ulcers: a systematic review and meta-analysis. *Ageing Research Reviews*, 4, 422-450.

Strough, J., Karns, T. E., & Schlosnagle, L. (2011). Decision-making heuristics and biases across the life span. *Annals of the New York Academy of Sciences*, 1235, 57-74.

Sudbury, L., & Simcock, P. (2009). Understanding older consumers through cognitive age and the List of Values: A UK-based perspective. *Psychology & Marketing*, 26, 22-38.

Surai, P. F., & Sparks, N. H. C. (2001). Designer eggs: From improvement of egg composition to functional food. *Trends in Food Science & Technology*, 12, 7-16.

## T

Taylor, K. A., Barr, S. I. (2006). Provision of small, frequent meals does not improve energy intake of elderly residents with dysphagia who live in an extended-care facility. *Journal of the American Dietetic Association*, 106, 1115- 1118.

Tauber, E. M. (1973). Reduce new product failures: Measure needs as well as purchase interests. *Journal of Marketing*, 37, 61-64.

Tepper, K. (1994). The role of labeling processes in elderly consumers' responses to age segmentation cues. *Journal of Consumer Research*, 20, 503-519.

Thaler, R., & Sunstein, C. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.

Tuorila, H., Lähteenmäki, L., Pohjalainen, L., & Lotti, L. (2001). Food neophobia among the Finns and related responses to familiar and unfamiliar foods. *Food Quality and Preference*, 12, 29-37.

## U

Ulwick, A. W. (2002). *Turn customer input into innovation*. Harvard Business Review, January, 92-97.

Urala, N., & Lähteenmäki, L. (2004). Attitudes behind consumers' willingness to use functional foods. *Food Quality and Preference*, 15, 793–803.

Urala, N., & Lähteenmäki, L. (2007). Consumers' changing attitudes towards functional foods. *Food Quality and Preference*, 18, 1–12.

U.S. Census Bureau (2010). *The next four decades, the older population in the United States: 2010 to 2050. Current population reports: Population estimates and projections* (Series P25, No. 1138). Washington, DC: U.S. Department of Commerce.

## V

Vassallo, M. Saba, A., Arvola, A., Dean, M., Messina, F., Winkelmann, M., Claupein, E., Lähteenmäki, L., & Shepherd, R. (2009). Willingness to use functional breads. Applying the Health Belief Model across four European countries. *Appetite*, 52, 452–460.

Vella, M. N., Stratton, L. M., Sheeshka, J., & Duncan, A. M. (2013). Exploration of functional food consumption in older adults in relation to food matrices, bioactive ingredients, and health. *Journal of Nutrition in Gerontology and Geriatrics*, 32, 122-144.

Verbeke, W. (2006). Functional foods: Consumer willingness to compromise on taste for health? *Food Quality and Preference*, 17, 126–131.

Verbeke, W., Scholderer, J., & Lähteenmäki, L. (2009). Consumer appeal of nutrition and health claims in three existing product concepts. *Appetite*, 52, 684-692.

Visvanathan, R., & Chapman, I. (2010). Preventing sarcopaenia in older people. *Maturitas*, 66, 383-388.

## REFERENCES

### W

Wang, Y., Leon, P. G., Acquisti, A., Cranor, L. F., Forget, A., & Sadeh, N. (2014). A field trial of privacy nudges for Facebook. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2367-2376). New York, NY: ACM.

Wansink, B., Painter, J., & van Ittersum, K. (2001). Descriptive menu labels' effect on sales. *Cornell Hotel and Restaurant Administration Quarterly*, 42, 68-72.

Wansink, B., Westgren, R. E., & Cheney, M. M. (2005). Hierarchy of nutritional knowledge that relates to the consumption of a functional food. *Nutrition*, 21, 264-268.

Wardle, J., Herrera, M. L., Cooke, L., & Gibson, E. L. (2003). Modifying children's food preferences: The effects of exposure and reward on acceptance of an unfamiliar vegetable. *European Journal of Clinical Nutrition*, 57, 341-348.

Wedel, M., & Kamakura, W. A. (1999). *Market segmentation: Conceptual and methodological foundations*. Norwell, MA: Kluwer Academic Publishers.

Wei, Y., Donthu, N., & Bernhardt, K. L. (2012). Effects of cognitive age, dispositional time perceptions, and time view manipulations on product attribute evaluations. *Journal of Business Research*, 66, 2171-2177.

Weigle, D. S., Breen, P. A., Matthys, C. C., Callahan, H. S., Meeuws, K. E., Burden, V. R., & Purnell, J. Q. (2005). A high-protein diet induces sustained reductions in appetite, ad libitum caloric intake, and body weight despite compensatory changes in diurnal plasma leptin and ghrelin concentrations. *The American Journal of Clinical Nutrition*, 82, 41-8.

Weijters, B., & Geuens, M. (2003). Segmenting the senior market: Professional and social activity level. *Asia Pacific Advances in Consumer Research*, 5, 140-147.

Whyte, K. P., Selinger, E., Caplan, A. L., & Sadowski, J. (2012). Nudge, nudge or shove, shove – The right way for nudges to increase the supply of donated cadaver organs. *American Journal of Bioethics*, 12, 32-39.

Widrick, R. M., & Raskin, J. D. (2010). Age-related stigma and the golden section hypothesis. *Aging & Mental Health*, 14, 375-385.

Williams, P., & Drolet, A. (2005). Age-related differences in responses to emotional advertisements. *Journal of Consumer Research*, 32, 343–354.

Williamson, A. R., Hunt, A. E., Pope, J. F., & Tolman, N. M. (2000). Recommendations of dietitians for overcoming barriers to dietary adherence in individuals with diabetes. *The Diabetes Educator*, 26, 272–278.

Wolfe, R. R., Miller, S. L., & Miller, K. B. (2008). Optimal protein intake in the elderly. *Clinical Nutrition*, 27, 675–684.

World Health Organization (2004) *Vitamin and mineral requirements in human nutrition, second edition*. Geneva, Switzerland: World Health Organization.

Worthy, D. A., Gorlick, M. A., Pacheco, J. L., Schnyer, D. M., & Maddox, W. Y. (2011). With age comes wisdom: Decision making in younger and older adults. *Psychological Science*, 22, 1375–1380.

## Y

Yoon, C., & Cole, C. A. (2008). Aging and consumer behaviour. In C. H. Haugtvedt, P. M. Herr & F. R. Kardes (Eds.), *Handbook of consumer psychology* (pp. 247–270). New York, NY: Psychology Press.

## Z

Zacher, H., & de Lange, A. H. (2011). Relations between chronic regulatory focus and future time perspective: Results of a cross-lagged structural equation model. *Personality and Individual Differences*, 50, 1255–1260.

van der Zanden, L. D. T., van Essen, H., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2015). Using a verbal prompt to increase protein consumption in a hospital setting: a field study. *International Journal of Behavioural Nutrition and Physical Activity*, 12, 110.

van der Zanden, L. D. T., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2014a). Knowledge, perceptions and preferences of elderly regarding protein-enriched functional food. *Appetite*, 80, 16–22.

## REFERENCES

van der Zanden, L. D. T., van Kleef, E., de Wijk, R. A., & van Trijp, C. M (2014b). Understanding heterogeneity among elderly consumers: An evaluation of segmentation approaches in the functional food market. *Nutrition Research Reviews*, 27, 159-171.

van der Zanden, L. D. T., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2015). Examining heterogeneity in elderly consumers' acceptance of carriers for protein-enriched food: A segmentation study. *Food Quality and Preference*, 42, 130-138.

van der Zanden, L. D. T. & van Trijp, H. C. M. (2016). Chapter 16: Designing new and functional foods for the ageing. In M. M. Raats, L. C. P. G. M. de Groot & D. van Asselt (Eds.), *Food for the ageing population, 2nd edition* (pp. 323-347). Cambridge, UK: Woodhead Publishing.

Ziliani, C., & Bellini, S. (2004). Retail micro-marketing strategies and competition. *International Review of Retail, Distribution and Consumer Research*, 14(1), 7–18.



# Summary

## SUMMARY

The population of elderly has grown considerably over the past few decades, due to reduced birth rates and increased life expectancy. Old age is, however, still associated with a higher incidence of various health conditions that pose a threat to quality of life and result in high healthcare costs. Various products and services could help elderly to stay active and healthy for longer if they were adopted, such as mobility aids, home modifications and functional foods. A key challenge is to position products and services like these on the market in such a way that elderly can see their value and will start using them. In doing this, it is crucial to know what elderly need and to understand how they make decisions. This thesis therefore aims to provide a deeper understanding of decision-making among elderly consumers. It does so using functional foods as an example, and concentrates on answering the following research questions: 1) *Which types of wants, inferences and intentions characterize the elderly consumer population?* 2) *What are relevant ways to distinguish between elderly consumers?* and 3) *How can elderly consumers be motivated to form consumption intentions for products and services aimed at promoting their wellbeing?*

An experience-sampling paradigm shows that there are age-related differences in both desires (i.e. wants), such as the desire for food, and goals, such as the goal to work (i.e. intentions), but not in the way these wants and intentions interact with each other (Chapter 2). Young and old consumers experience the same types of conflict between their wants and intentions. The extent of conflict does change with age however, such that older adults experience conflict less often and less strongly than younger adults. This age-related difference can be partly explained by the way in which consumers perceive the time they have left in their lives. Those who perceive time as limited, experience more conflict. Zooming in on product-specific decision-making, a series of focus groups indicates that elderly consumers overall want to use healthy products that they use frequently as a basis for enrichment with protein (Chapter 3). Most elderly do not display intentions to purchase and use such products, however, either because they do not feel the need to use functional foods or because they hold various negative inferences regarding functional foods, such as a high price or bad taste. Importantly, elderly consumers differ strongly in their wants, inferences and intentions, suggesting that segmentation of this population is warranted.

A narrative review reveals that there are various ways to segment the elderly consumer population, for example based on age, future time perspective or purchase behaviour, and every approach has its strengths and weaknesses (Chapter 4). Based on the objectives of a segmentation approach one can, however, make an informed decision regarding which segmentation base to use. In the functional food market, elderly consumers may best be segmented using a segmentation base on the food or product level (i.e. rather than the person level) that results in segments in which consumers have similar needs and wants, for

example the attributes benefits that consumers seek. A segmentation study shows that using such a segmentation base results in segments that provide concrete instructions for the development of functional foods (Chapter 5). The resulting segments of elderly have unique preferences that do not necessarily reflect those of the average elderly consumer and thereby provide useful insights that can help increase our understanding of elderly consumers.

Segmentation also provides a basis for tailoring products to the needs and wants of elderly consumers. A segmentation study illustrates that such tailoring can increase elderly consumers' willingness to try protein-enriched foods for the first time (i.e. trial purchase), as well as their willingness to use such products on a more regular basis (i.e. repeat purchase) (Chapter 5). For a small group of elderly, tailoring proves to be ineffective, however, as they categorically reject all types of protein-enriched foods presented to them. These elderly are relatively uninterested in the concept of functional foods, which may be due to negative inferences surrounding such products. Overcoming the activation of such negative inferences may be useful in motivating elderly consumers to use protein-enriched foods. A field study in a hospital setting shows that the implementation of a verbal prompt intervention that motivates consumers to make decisions without much can increase the consumption of protein (Chapter 6). By understanding and capitalizing on cognitive biases in human decision-making, interventions like these can motivate consumers to form consumption intentions even when they hold negative inferences about products or services.

Overall, this thesis shows that although elderly consumers share an age bracket they are strongly heterogeneous in their wants, inferences and intentions. This heterogeneity is robust, as it can even be observed when zooming in on decision-making regarding a specific product category (i.e. protein-enriched foods). Our understanding of the elderly consumer population increases by studying this heterogeneity, as it provides insights beyond those that apply to the group of elderly that reflect the average. In studying heterogeneity, it pays off to focus on bases that are predictive of behaviour while demographic characteristics like age provide only few insights. Industry and health institutions can also benefit from an increased understanding of the composition of the elderly population and how they make decisions. Such understanding may provide them with concrete instructions for the development and commercialization of products and services for this growing group of consumers

# Acknowledgements

## ACKNOWLEDGEMENTS

First and foremost, I would like to thank **Koen Halfwerk**, my husband and best friend, for his unconditional love and support. You were there for me through all my ups and downs (mostly downs), brainstormed with me when I was stuck with my analyses or writing, twice moved across the country for me, and even drove me to my meetings in Wageningen (I am so sorry for that)! Together with my parents, you made it possible for me to finish my PhD after the birth of our son without having to rely on day care (although we almost succumbed to the temptation...). Dear Koen, I feel so lucky to have you and I love you very much.

Of course, I would also like to thank my supervision team for setting up the research project and allowing me to work on it. Thank you, **Hans van Trijp**, for helping me to sharpen my writing (and for drawing all those nice models). I especially enjoyed writing the chapter for *Food for the Ageing Population* with you. Thank you, **Ellen van Kleef**, for our brainstorm sessions and for involving me in the nudging project at Ziekenhuis Gelderse Vallei, which I really liked. And thank you, **René de Wijk**, for making me look at my research from another point of view and, especially, for being there for me when I needed some moral support. Thank you, all, for always taking the time to look at my work and comment on it!

Dear members of the committee, **Hans Kasper**, **Klaus Grunert**, **Lisette de Groot** and **Monique Raats**, I would also like to thank you, for taking the time to read and evaluate my PhD thesis, and for coming all the way to Wageningen to participate in the public defence.

Thanks also to **all the staff of MCB**, for many nice chats and for providing me with useful feedback during the lunch clubs. A special thanks to **Ilona de Hooge** for helping Koen and me out with the baby essentials when we were really short in time. And **Betina Piqueras Fiszman**, thank you for helping me to improve my Spanish and for letting me teach you some Dutch. A big thanks to **Ellen Vossen** and **Liesbeth Hijwegen**. Over the past four years you have helped me with so many small and big things, ranging from batch scanning documents (which I forgot over and over) to declaring expenses from abroad (which I did wrong over and over). Thank you for your patience and for always showing an interest in how I was doing.

To **all the PhDs of MCB, LAW, RME and ECH**, thank you for sharing PhD experiences during the PhD colloquia, it was really nice to be “in the same boat” with you. It was great to have you, **Kunalai Ploydanai**, as my roommate. I think we were a good match, and I will always remember our battle against the ladybugs. Thanks also to **Eva van der Zee** for our many talks about, well... about what not!? (and, of course, always with a nice cup of tea). And thank you **Grace Tan Hui Shan**. Your discipline, stories, food and music are truly inspiring. Thank you both for being my paranymphs! I am very happy to have you on my side during the defence.

Thank you also, **Roxanne van Giesen**, **Colin Bos** and **Aleksandra Berezowska**, for helping me out many times as my seniors, and showing me that it is actually possible to finish a PhD. Thank you **Gerben Bekker** and **Peter Prins** for pulling me away from my computer to join the other PhDs for lunch. Thank you, **Robert Goedengebure** for sharing the burden of organising both the section and MCB day out in the same year with me. I really enjoyed your company and was proud of the result! (Oh, and I'm sorry for always mispronouncing your name...)

A special thanks to the members of the 2014-2015 WASS PhD Council: **Albert Aalvanger**, **Farahnaz Pashaei Kamali**, **Luis Carter**, **Paul Rotering** and **Sabina Super**, and the members of the WASS office **Esther Roquas**, **Heleen Danen**, **Maartje van de Velde**, and **Marcella Haan**. It was great to work with you on things that were not directly related to my PhD project, which I really needed from time to time. It was interesting to get to know the ways of the university and I hope that I have also contributed to its improvement. Please know that I will always look back upon you and my time in the council with a warm heart.

Of course, I would also like to thank all the participants that were willing to selflessly spend their valuable spare time taking part in my studies. What would I have done without you!? Thank you also to **Charlotte Petri**, **Harmen van Essen**, **Louise den Uijl**, the staff of **Hospital Gelderse Vallei**, the **Nutrition Alliance Gelderse Vallei** and the staff of residential home **Vilente de Klinkenberg** for their support and assistance in my data collection. And thank you, **Ivo van der Lans**, for your help with my data analyses.

A big thank you also to those who closely followed my progress. Thank you, **Bert Halfwerk** and **Carla Workel**, for always showing an interest in how I was doing and for sending me all those newspaper items. Thank you, **Eva Goosen** for always (magically?) remembering that I was collecting data, writing an article or waiting for a review, even though we don't speak each other very often. Thank you, **Mart van der Zanden** and **Naoual Abdellaoui** for reminding me to enjoy life! Your determination and the big steps you both have taken were an inspiration, and I am proud to be your sister. Also, I love that we still celebrate the holidays together, and I wouldn't want it any other way! (No pressure...) And thank you, **Opa Frans**, **Oma Truus**, **Opa Jan** and **Oma Thea**, for teaching me to appreciate the little things in life.

Last but not least (or: lest best), I would like to thank my parents, **Frans van der Zanden** and **Marielouise van der Zanden**. Words cannot describe how thankful I am for all the love and support you have given me, and for who you have raised me to be. I love you very much.

*Lotte*

## About the author

### Personal profile

Lotte van der Zanden was born in Eindhoven, the Netherlands, on February 18<sup>th</sup>, 1989. She studied Psychology at the Radboud University in Nijmegen, and graduated cum laude in 2010. She then started a two-year Research Master in Behavioural Science at the same university, which included an internship at the University of Sheffield, the United Kingdom. Her master's thesis focused on interventions to achieve behavioural change, specifically aimed at eating behaviour. She graduated bene meritum in 2012.

The same year, Lotte started a PhD project at the Marketing and Consumer Behaviour group of Wageningen University, which resulted in the current thesis. Her research focused on understanding heterogeneity in the decisions of elderly consumers, which was illustrated with the case of protein-enriched food. She used both qualitative and quantitative methods, and study designs based on questionnaires as well as field studies and a literature review.

During her PhD project, Lotte presented her research at several international conferences, published four papers and one chapter, and won the Pangborn Young Scientist award. In addition, she represented her fellow PhDs in the WASS PhD council and served as an education assistant for the course Social Psychology. Lotte graduated in 2017.

Currently, Lotte is looking for work as a writer, text editor or translator, and is thinking about setting up her own business. She can be contacted at: [lottevanderzanden@gmail.com](mailto:lottevanderzanden@gmail.com).

### Publications

- van der Zanden, L. D. T., van Essen, H., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2015). Using a verbal prompt to increase protein consumption in a hospital setting: a field study. *International Journal of Behavioural Nutrition and Physical Activity*, 12, 110.
- van der Zanden, L. D. T., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2014a). Knowledge, perceptions and preferences of elderly regarding protein-enriched functional food. *Appetite*, 80, 16-22.
- van der Zanden, L. D. T., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2014b). Understanding heterogeneity among elderly consumers: An evaluation of segmentation approaches in the functional food market. *Nutrition Research Reviews*, 27, 159-171.
- van der Zanden, L. D. T., van Kleef, E., de Wijk, R. A., & van Trijp, C. M. (2015). Examining heterogeneity in elderly consumers' acceptance of carriers for protein-enriched food: A segmentation study. *Food Quality and Preference*, 42, 130-138.
- van der Zanden, L. D. T. & van Trijp, H. C. M. (2016). Chapter 16: Designing new and functional foods for the ageing. In M. M. Raats, L. C. P. G. M. de Groot & D. van Asselt (Eds.), *Food for the ageing population, 2nd edition* (pp. 323-347). Cambridge, UK: Woodhead Publishing.



## Training and supervision

Completed project, research and career-related activities.

Abbreviations stand for: *ESD* = Educational Staff Development; *ESS* = European Sensory Science Society; *MCB* = Marketing and Consumer Behaviour Group; *WASS* = Wageningen School of Social Sciences; *WGS* = Wageningen Graduate School.



Activity	Organiser, location	Year
<b>Project-related activities</b>		
<i>Course:</i> Introduction for new PhD candidates	WASS, Wageningen	2013
<i>Course:</i> Master Classes in Social Psychology I - IV	MCB, Wageningen	2014-2015
<i>Course:</i> Philosophy and Ethics of Food Science	WGS, Wageningen	2014
Oral presentation at WASS PhD Day 2014	WASS, Wageningen	2104
Oral presentation at Pangborn 2015	ESS, Goteborg, SE	2015
Poster presentation at EuroSense 2014	ESS, Copenhagen, DK	2014
Poster presentation at Pangborn 2015	ESS, Goteborg, SE	2015
<b>General research-related activities</b>		
<i>Course:</i> Voice and Presentation Skills Training	WGS, Wageningen	2013
<i>Course:</i> Techniques for Writing and Presenting	WGS, Wageningen	2013
<i>Course:</i> Scientific Publishing	WGS, Wageningen	2013
<i>Course:</i> Workshop carousel	WGS, Wageningen	2015
Participation in PhD lunch colloquia	WASS, Wageningen	2012-2016
Teaching assistance for Social Psychology	MCB, Wageningen	2013-2015
Membership WASS PhD Council	WASS, Wageningen	2014-2016
<b>Career-related activities</b>		
<i>Course:</i> Interpersonal Communication	WGS, Wageningen	2014
<i>Course:</i> Teaching and Supervising Students	ESD, Wageningen	2014
<i>Course:</i> Mobilising Your Scientific Network	WGS, Wageningen	2015
<i>Course:</i> Career Orientation	WGS, Wageningen	2015
<i>Course:</i> Entrepreneurship in and outside science	WGS, Wageningen	2015
Supervision of Bachelor and Master theses	MCB, Wageningen	2013-2014
Organization of PhD lunch colloquia	WASS, Wageningen	2014-2015

The research described in this thesis was financially supported by the Wageningen IPOP Customized Nutrition program, funded by Wageningen University & Research, the Dutch Ministry of Economic Affairs, Agriculture & Innovation, the WASS graduate school and Unilever Research and Development Vlaardingen.

Financial support from Wageningen University & Research for printing this thesis is gratefully acknowledged.

Cover design by Lotte D. T. van der Zanden  
Printed by Digiforce / Proefschriftenmaken.nl, Vianen

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