

Understanding healthful eating from a salutogenic perspective

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Thesis

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“The purpose of life is to live it, to taste experience to the utmost, to reach out eagerly and without fear for newer and richer experience.”

-Eleanor Roosevelt

Preface

This actual PhD journey may have started in 2011 in Wageningen, but the motivations for the journey began in 2003 when I started working as a dietitian in my homeland in the USA. I worked in community-outreach settings and gave nutrition education and counseling to young parents and children. I loved my job, but life had other plans for me. In 2004, I met a tall good-looking Dutchman (my now husband). He was working for a British company and based temporarily in Connecticut. His project there came to an end and we decided that I would go back to London with him. So, in 2005, I left my family, friends, job and shoe collection behind in the USA to start a new life in the UK. From 2005-2009, I worked as a pediatric dietitian for the UK National Health Service in London. I worked mostly in weight management, providing nutrition counselling to overweight children and adolescents. Despite my support, many of my patients struggled to make long term changes to their diet and lifestyle. Many of them had underlying psychosocial issues and they lived in environments that were incredibly unsupportive for making healthier choices. As a result, I began to ask myself some questions: “How can we enable healthful eating despite all the challenges that people face? What can I do differently as a nutrition professional to support people to eat healthier?” I stepped out of practice in 2009 to complete my MSc in Nutrition and Health at Wageningen University, determined to answer these questions through further study and research. After my MSc studies, I was lucky enough to be given the opportunity to do my PhD. Ultimately this idea of “enabling healthful eating despite all the challenges” ended up inspiring the core objectives and questions behind this research. My dietitian “lenses” helped me keep sight of the practical relevance of my research and remain critical of how the scientific findings can inform a new way of doing things in nutrition promotion. Emerging from this PhD journey, I am happy to say that I have come up with some answers to these questions that I asked myself all those years back. Looking back I am so thankful for the experiences I had as a dietitian because they kept me motivated, focused and determined throughout this journey. This thesis may be finished, but stay tuned for a sequel. I hope to be fortunate enough to find the means to continue researching in the future.

I learned during this journey that having a good team of cheerleaders to inspire, support and cheer you to the finish line is essential. Therefore, I would like to take this opportunity to thank all those people that helped me along the way. First, I would like to thank my supervision team. To Maria, thank you for your continual support and advice. You have contributed to my growth as a researcher and my improved scientific communication skills are a direct result of your guidance and feedback. You have been a great model to emulate. To Laura, I am so thankful that our paths crossed all those years ago. Thank you for always being there to listen through all my highs and lows or just to make me a cup of tea and play me some inspiring music when I needed it most! With your support I have become a more critical and determined researcher. I will miss our philosophical discussions about cooking, food and life. Thank you from the bottom of my heart for everything. To Gert Jan, thank you for always taking the time out to discuss and give me feedback on my work, supporting me and for advising me with everything statistics related. To Noelle, thank you for your sage advice and especially for your expert help

with the qualitative study. I really enjoyed all our lively discussions on the social aspects of food and eating. I deeply appreciate your insights and your concern for my success. I would also like to express my gratitude to my opponents, Lynne Kennedy, Edith Feskens, Maurice Mittelmark, and Han Wiskerke. And an extra thanks to Lynne and Maurice to traveling to the Netherlands for my defense. I would also like to thank my colleagues at Health and Society and Strategic Communication for all the lively discussions and providing me with such a supportive and positive working environment. An extra thanks to my colleagues at Health and Society, thank you for your advice and encouragement and for all the inspiring conversations during our lunch walks. You are all such wonderful people and I am so thankful to have been part of this team! To Carlijn, thank you for helping to create the beautiful cover for this thesis. You helped me bring to life my research findings in the art work you created. What can I say other than this - you rock! Also, an extra thanks for all the good times and laughs, especially during our time in Girona together. Also a big thanks to Carry, Margaret, Sandra and Hedy. I am especially grateful for your fantastic secretarial support during my PhD and for always being there to answer my questions and help me with problems. And an extra thank you to Carry for helping me get this thesis to a perfect, print ready state! Also, a big thank you to the women that shared their stories with us for the qualitative study. Thanks also to Leah Rosen who was the best student one could ask for in helping with the interviews and analysis. Thank you to CentER Data for the data we collected for the quantitative study, with an added thanks to Marika for your brilliant help with the data collection. Thank you also to Ruben, Noortje and Stefanie for your support in getting this thesis printed. And an extra thank you to Stefanie for the brilliant job you did on the design and layout! Thank you to my loved ones near and far. First and foremost, thank you to my wonderful husband, Michiel. I could not have done this without your unwavering support, encouragement, patience, reassurance and understanding. Thanks for dealing with me through all the late nights, overly-caffeinated crazy moments, and stress. And of course, thanks for always reminding me that when the going gets tough, the tough get going. I love you, honey. To my beautiful daughters, Esmée and Matilda. Your smiles, laughter, kisses and hugs were my emotional fuel that kept me going along this journey. You are my inspiration in everything I do in life. Can't wait to celebrate this achievement together with lots of dancing, fun and, of course, delicious food. To Mom and Dad, thank you for being my first and most important teachers in life. You provided us with a loving home and nutritious food (you were health food nuts before it was cool to be one!). You also taught us some of life's most important lessons, amongst others to always keep smiling, that anything is possible if you work hard enough for it, and to always follow your dreams. John en Hanny, dank jullie wel voor jullie steun en het zorgen voor Esmée en Matilda. Zonder jullie hulp was het onmogelijk om binnen vier jaar mijn promotieonderzoek af te ronden! Thank you also to all my other family and good friends around the world that have supported me and encouraged me to keep going. And lastly, besides my mother, there were two other very important women that I had in my life that are no longer with us – my grandmothers, Helene Swan and Jocelyn Luciano. They taught me how important it is to approach life with fortitude, determination, and adventure. I know that they would have been so proud of me for accomplishing this.

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List of Abbreviations

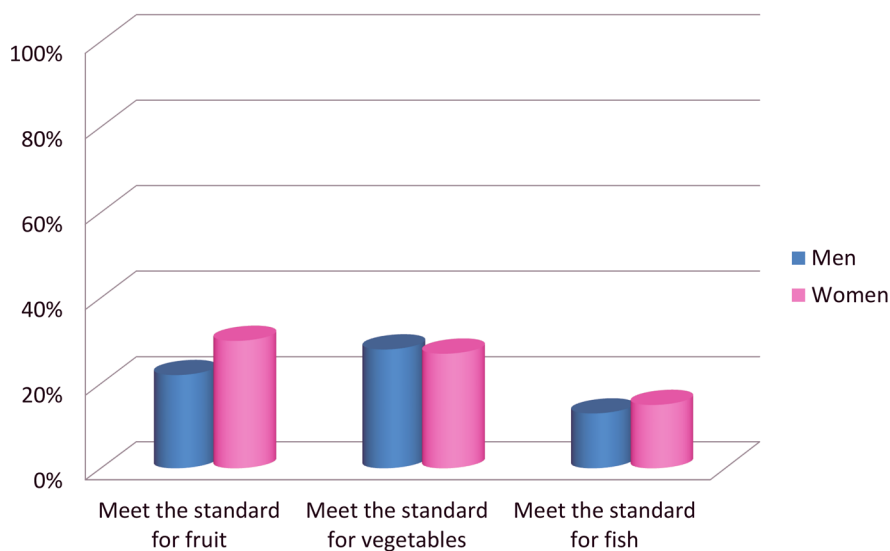
BMI	Body Mass Index
CBS	Central Bureau for Statistics
CI	Confidence interval
DQI	Dietary Quality Index
FFQ	Food Frequency Questionnaire
GRR	Generalized Resistance Resources
LISS	Long-term Internet Studies for the Social Sciences
MHLC	Multidimensional health locus of control
OECD	Organization for Economic Co-operation and Development
OR	Odds ratio
PD	Positive Deviance
SD	Standard deviation
SOC	Sense of Coherence
SOC-13	Sense of Coherence 13 item questionnaire
SOC-29	Sense of Coherence 29 item questionnaire
SRR	Specific Resistance Resources
WHO	World Health Organization

CHAPTER 1

General introduction

Problem description

Previous nutrition research has primarily focused on identifying factors associated with unhealthful eating (Williams et al., 2012). Leading risk factors at the individual-level include low socio-economic status (Darmon & Drewnowski, 2008), poor understanding of the link between nutrition and physical health (Beydoun & Wang, 2007; Eurobarometer, 2006) and lack of awareness of dietary guidelines (Biltoft-Jensen et al., 2009; Kolodinsky et al., 2007). Social norms (Lally et al., 2011; Pelletier et al., 2014) and social support (Fitzgerald et al., 2013; Kiernan et al., 2012; Tamers et al., 2011) for unhealthy eating and obesogenic food landscapes (environments that encourage the consumption of cheap, calorie-rich, fatty foods) are also major risk factors at the contextual level (Popkin, 2001; Swinburn et al., 1999). These insights have formed the basis for most nutrition promotion strategies that target improving individual nutrition knowledge or making healthier choices more affordable and accessible in supermarkets, schools and workplaces (Story et al., 2008). Yet recent dietary consumption surveys show that these strategies have had little effect. As shown in Figure 1.1., data from the Central Bureau for Statistics (CBS) show that only a small percentage of men and women in the Netherlands meet the daily standard for consumption of fruit (22% and 23% respectively), vegetables (28% and 27% respectively) and fish (13% and 15% respectively) as advised by the dietary guidelines (CBS, 2014).



Source: Health Survey/Lifestyle Monitor, CBS/RIVM 2014

Figure 1.1 The percentage of Dutch adult men and women that are not consuming recommended daily portions of fruit, vegetables, and fish

Trends in neighboring countries to the Netherlands also reflect a similar picture. The most recent German National Consumption Survey 2005-2006 found that the consumption of foods of plant origin is considerably below the dietary recommendations while the consumption of foods of animal origins exceed these (Heuer et al., 2015). In Belgium, the consumption of total fat and saturated fatty acids is significantly higher than the dietary reference intakes (Temme et al., 2010). As a result of urbanization and nutrition transition, which have led to higher accessibility and consumption of industrialized and processed foods, poor dietary patterns are also an issue in lower income countries (Popkin, 1999). National dietary data from 188 countries shows that the consumption of high fat, high salt, and processed foods has greatly increased in low, middle, and high income countries between 1990 and 2010 (Imamura et al., 2015). Between 1990 and 2010, the consumption of unhealthful items such as sugar-sweetened beverages, processed meats and saturated fat increased more than the consumption of healthful items such as legumes, whole grains, and dietary fiber in most regions of the world (Imamura et al., 2015). Consumer studies in Canada and Brazil have also shown that in recent decades, the purchase and consumption of unprocessed or minimally processed foods has been displaced by ready-to-consume and processed products, which are typically high in calories, sodium, sugars, and fat (Martins et al., 2013; Moubarac et al., 2014).

Risks of unhealthful eating patterns include obesity (Nicklas et al., 2001; Quatromani et al., 2002) and obesity-related co-morbidities including Type 2 diabetes (Misra & Ganda, 2007; Schulze et al., 2004), and cardiovascular diseases (Hu et al., 2000; Kerver et al., 2003). Poor diets are one of the highest contributors to premature deaths across the world (Forouzanfar et al., 2015), contributing to approximately 20% of deaths. The World Health Organization (WHO) sites that approximately 1.7 million (2.8%) of annual deaths worldwide are attributable to low fruit and vegetable consumption (WHO, 2016). On top of this, Organization for Economic Co-operation and Development (OECD) figures show that obesity rates remain high and continue unabated (OECD, 2014). Worldwide, the percentage of adults with a body mass index (BMI) of 25 kg/m² or greater increased between 1980 and 2013 from 29% to 37% in men, and from 30% to 38% in women (Ng et al., 2014). Global trends also show that between 1980 and 2008, the prevalence of obesity nearly doubled from 6.4% in 1980 to 12% in 2008, with half of this rise occurring in the 8 years between 2000 and 2008 (Stevens et al., 2012). It has been estimated that the combined medical costs associated with treatment of obesity and obesity related co-morbidities will increase by \$48–66 billion/year in the USA by 2030 (Wang et al., 2011). There have been outcries from the medical community that radical changes to the ‘obesogenic’ environment are necessary to reduce the burden on health care services and institutions (Haslam et al., 2006).

When faced with what potentially lies ahead of us, it begs the question: can we possibly dig ourselves out of this hole we have gotten ourselves into? Unfortunately, the answer to

that question has proven to be not as simple as it may seem. As noted by Rutter, ‘there is a seductive simplicity to the conceptualization of obesity as a straightforward problem of energy balance – calories in versus calories out.’ (Rutter, 2011) Given the fact that food choice is influenced by multiple factors; from cognitive systems (Falk et al., 2001), to social context (Devine, 2005), to the physical environment (Popkin et al., 2005), simply telling people to stop eating so much will not work. There is an acute need for new approaches to help understand how we can enable people to eat healthier in an effort to solve this global dietary and obesity crisis.

The biomedical model of health

The key idea that drives a lot of nutrition research and promotion is that eating for attaining or maintaining good individual physical health is a central goal in life. This idea is driven by a biomedical orientation, which drives the search in nutritional studies for a better understanding of the risks and benefits of certain nutrients for physical health. The biomedical model of health evolved from 17th century French philosopher Descartes’ system of dualism (Longino, 1998). Descartes differentiated for the first time between the principle of thinking, “mind”, and the principle of space, “matter” (Smith et al., 2014). This idea was revolutionary, particularly for medicine, as it made it easier to objectively investigate the human body as a separate system, without taking into account mental, spiritual, or social matters (Kriel, 1988). Since then, the biomedical model has been the dominant model in health research (Bouwman & Swan, 2014). The biomedical model orients towards pathogenesis, the study of disease origins and causes. The starting point is to understand determinants of ill-health, and that health is generated through the elimination of risks for diseases (Eriksson & Lindström, 2008). When applied to nutrition research, the underlying assumption is that eating is a physiological act, and that eating supports physical health. This risk-oriented, pathogenic view underlies the search within nutritional research and promotion for nutrients, foods, and meals that prevent, treat, or manage diet-related conditions. This view also tends to ignore the social-contextual dimension of eating. The application of the biomedical model to study determinants of unhealthful eating has led to an advancement of knowledge regarding risk-factors. Yet, by only studying risk factors, it overlooks the fact that individuals also possess, or have access to, protective factors (Ball & Dollman, 2010). Very little is known about individual and contextual factors that enable healthful eating and how these factors can be used to complement current health promotion strategies (Williams et al., 2011).

Instead of only looking at factors that determine unhealthful eating, the research presented in this thesis puts new focus on identifying factors that enable healthful eating. Why is it that despite being surrounded by cheap and plentiful unhealthy options in obesogenic food landscapes, there are still people that sustain their intentions to eat

healthfully (Bouwman et al., 2012)? What factors support them to cope well with the challenges they face?

Salutogenic model of health

The knowledge gap that results from the dominant role of the biomedical model in nutrition promotion can be addressed by applying a complementary model, Antonovsky's salutogenic model of health (Antonovsky, 1979). It is a theoretical vision of health development and it targets the search for ways to create, enhance, and improve physical, mental, and social health. Salutogenesis takes the everyday context as a starting point in searching for answers to the question "what creates health?" rather than only "what causes disease?" Within the salutogenic model, health is defined as a process and it is shaped through the interaction between people and their everyday context. This approach aligns with people's own everyday striving for quality and "goodness" in life. The underlying assumption is that healthful eating, together with other biological, material, and psychosocial resources, makes it easier for people to perceive their lives as consistent, structured, and understandable (Antonovsky, 1996). A key difference between the salutogenic and the biomedical model is the notion that health-related practices – such as eating for physical health – are a resource for living rather than a central goal in life (Antonovsky, 1987). Table 1.1 provides an overview of the major differences between the biomedical model versus the salutogenic model of health.

Table 1.1 Major differences between the biomedical model and the salutogenic models of health

	Biomedical model	Salutogenic model
Definition of health	Absence of disease	Dynamic process, shaped through the interaction between people and context.
Starting point	Pathogenesis - identifying determinants of ill-health	Salutogenesis, understanding factors that create, enhance, and improve physical, mental, social and spiritual health.
Underlying assumption	Eating is important for physical health and the prevention of disease.	Healthful eating, together with other biological, material and psychosocial resources, make it easier for people to perceive their lives as consistent, structured, and understandable
Notions	Eating for physical health is a central goal in life	Eating for physical health is a resource for living

In the salutogenic model, health is placed on the so called "ease – disease continuum". People move along this continuum between "total absence of health" and "total health" (Antonovsky, 1987). Throughout life, people are constantly being bombarded by stressors. These stressors range from psychosocial stressors (e.g. unexpected loss of a job,

relationship problems) to physical and biochemical stressors (e.g. water pollution, disease outbreaks). It is impossible to avoid these stressors since they are an inherent part of everyday life. Stressors have the potential to cause internal tension and can impact health in a negative way. Coping successfully with the tension leads to a movement towards the ease end of the continuum (healthy). If not successful, then people experience stress and breakdown (either physical or emotional) and there is movement towards the dis-ease end of the continuum (Buch, 2006).

Two central defining concepts, the “sense of coherence” (SOC) and “generalized resistance resources” (GRRS) play a key role in coping with stressors and the development of health.

The *SOC* is defined as, “a global orientation that expresses the extent to which one has a pervasive, enduring, though dynamic feeling of confidence that (1) the stimuli from one’s internal and external environments in the course of living are structured, predictable, and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement” (Antonovsky, 1987, p. 19). The SOC is made up of three interacting dimensions: meaningfulness (motivation to cope with stressors); comprehensibility (ability to comprehend the challenge at hand); and manageability (belief that you have resources to help deal with stressors) (Lindström & Eriksson, 2006). Figure 1.2 shows the dimensions that make up SOC.

Furthermore, SOC is a life orientation, which is “a way of thinking, being and taking action as a human being, it gives the direction of life. It is not only a question about the individual but the person in interaction with the living context” (Lindström & Eriksson, 2010a, p. 19). SOC seems to be a health promoting resource, which strengthens resilience and creates a positive state of subjective health (Eriksson & Lindström, 2006). The *GRRs* are “found within people as resources bound to their person and capacity, and also to their immediate and distant environment including both material and non-material qualities of the person to the whole society, such as money, housing, self-esteem, knowledge, heredity, health orientation, contact with inner feelings, social relations, existential issues, beliefs, religion and meaning of life” (Lindström & Eriksson, 2010a, p. 20). As shown in Figure 1.3, GRRs are physical, biochemical, artifactual-material, cognitive, emotional, valuative-attitudinal, interpersonal-relational, and macro-sociocultural characteristics of an individual, primary group, subculture or society that is effective in avoiding and combating a wide variety of stressors. Lindstrom & Eriksson (2010) argue that it is not only about having resources at one’s disposal, but the ability to use them in a health promoting way that makes them a GRR (p. 20).

This latter statement refers to the interconnectedness between SOC and GRRs. The GRRs give prerequisites for the development of the SOC (Lindstrom & Eriksson, 2010).

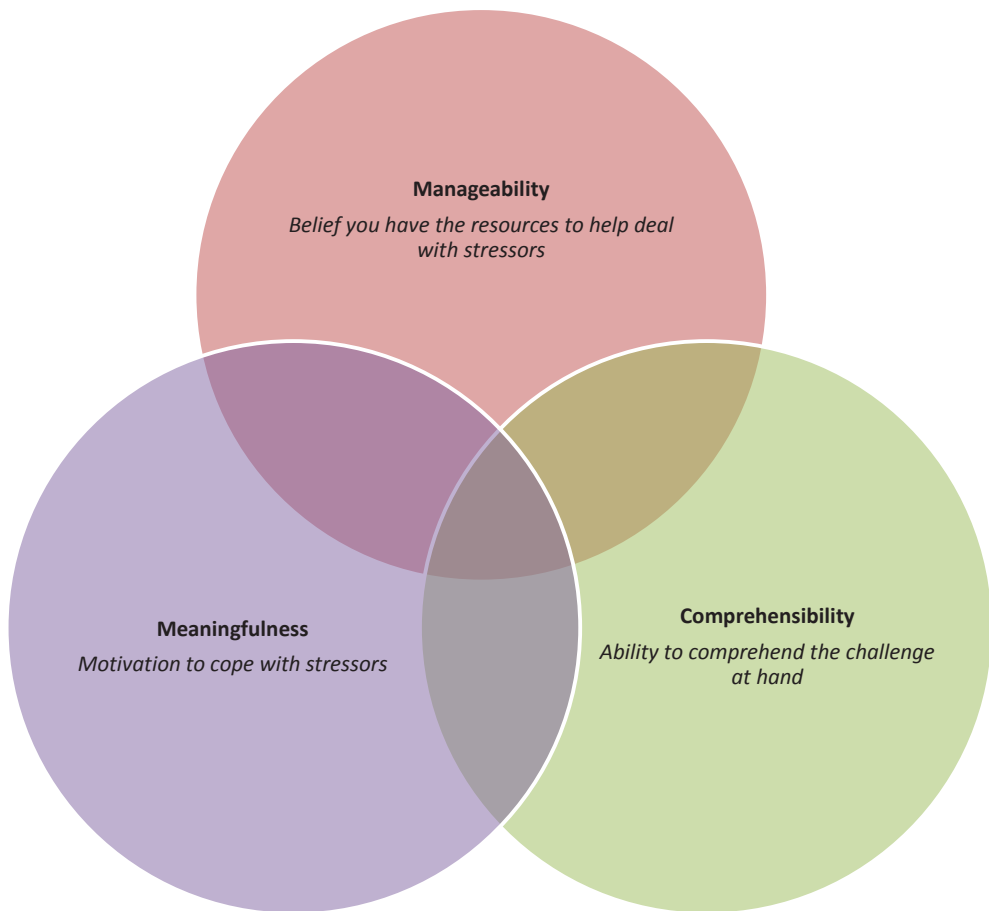
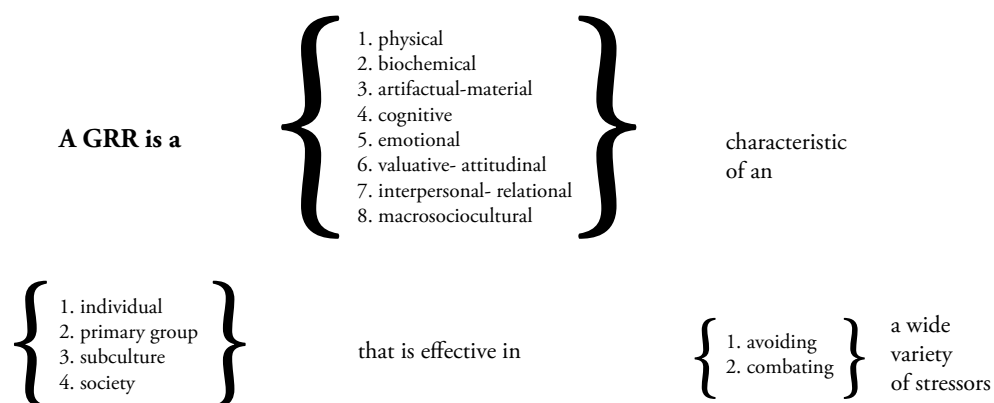


Figure 1.2 Dimensions of the Sense of Coherence

At the same time, according to Wainwright et al, (2007), people with a higher SOC are better able to identify resources and apply them in stressful situations to combat the stressors, since they see the world as more comprehensible, manageable and meaningful. Hence, the stronger a person's SOC, the greater the ability to identify and use GRRs in a way that benefits their health (Lindström & Eriksson, 2010a). When under the threat of various stressors to physical and mental health, a strong SOC enables people to use GRRs to cope with these stressors and therefore helps them to stay healthy and not succumb to disease (Antonovsky, 1987). Figure 1.4 provides an overview of the salutogenic “ease/disease continuum”.



Source: Antonovsky, 1979, p. 103

Figure 1.3 Generalized resistance resources

Salutogenic evidence base

Antonovsky developed scales to measure an individual's SOC, which included the 29 item (SOC-29) and the 13 item (SOC-13) scales (Antonovsky, 1993b). These scales measure the strength of the three traits that comprise the SOC: meaningfulness, comprehensibility, and manageability. Since they were devised, they have been translated into 33 languages around the world (Eriksson & Lindström, 2005). In an extensive systematic review, the scales were found to be highly reliable, valid, and cross-culturally applicable instruments to gauge how people cope with stress and stay healthy (Eriksson & Lindström, 2005). Eriksson and Lindström (2006) found that a high SOC score was strongly associated with a better perceived physical and mental health (Eriksson & Lindström, 2006). Evidence suggests that a stronger SOC is associated with both a lower incidence of cardiovascular disease (Poppius et al., 1999) and fewer mental health problems (Torsheim et al., 2001). Strong SOC is also associated with dietary patterns more in line with dietary recommendations (Ahola et al., 2012; Ray et al., 2009); higher intake of fruit and vegetables (Packard et al., 2012; Wainwright et al., 2007); lower intake of sugars and saturated fats (Lindmark et al., 2005); and higher frequency of breakfast consumption (Ochiai et al., 2012). Furthermore, research that has applied the salutogenic model of health in the study of family eating patterns found that strong parental SOC was associated with children having healthy dietary practices, including less meal skipping; lower intake of energy-dense foods including hot dogs; chips and soft drinks; and higher intake of nutrient-rich foods including fruits and vegetables (Ray et al., 2009). Conversely, a weak SOC is associated with poorer dietary practices, such as greater intake of processed, sugar-sweetened foods and snack foods (Bernabé et al., 2010; Lindmark et al., 2011; Lindmark et al., 2005); breakfast skipping (Myrin &

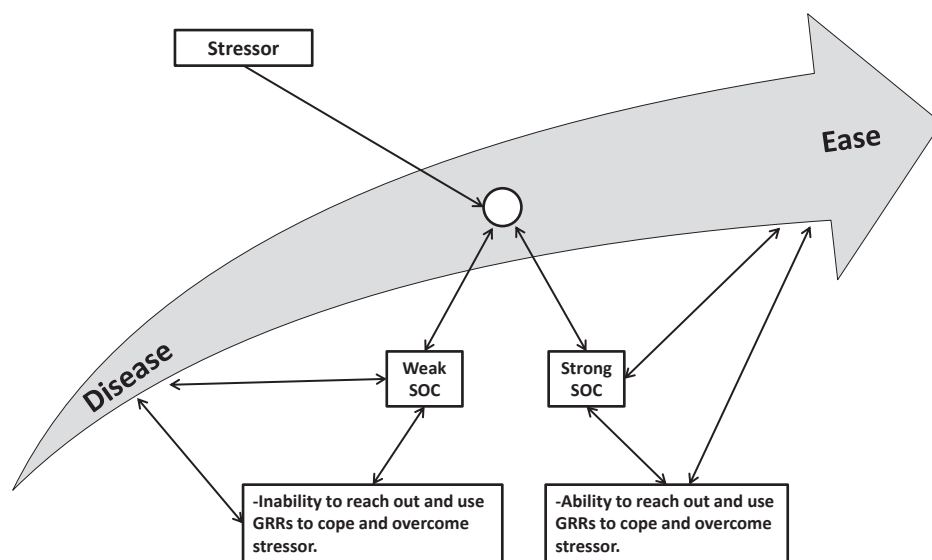


Figure 1.4 Overview of the ease-disease continuum in salutogenesis

Lagerström, 2006); lower consumption of fruit, vegetables and fiber (Wainwright et al., 2007); and higher frequency of snacks between meals (Lindmark et al., 2011).

To date, nutrition research that has applied the salutogenic theory has focused mainly on the link between SOC and eating practices. However, the mechanisms that explain this relationship remain unclear. We lack a comprehensive picture and deeper understanding of building blocks that underlie SOC and health development (Yamazaki et al., 2011). Consequently, it remains unknown what is needed in health promotion activities to strengthen SOC (Super et al., 2015).

Aim and scope of this thesis

The overall aim of this thesis is to contribute to a better understanding of healthful eating in the context of everyday life. The salutogenic framework acted as the theoretical underpinning. Instead of only looking at factors that determine unhealthy eating, this research puts new focus on identifying factors that enable healthful eating. The following objectives have been formulated:

- 1) To map factors underlying the development of SOC.
- 2) To study which of these factors are predictors for healthful eating.
- 3) To unravel how people develop healthful eating practices in everyday life.
- 4) To integrate this understanding and provide building blocks for nutrition promotion.

This research employed a mixed research design, using both quantitative and qualitative methods. This was carried out through cross-sectional survey research (objective 1 and 2) and in-depth semi-structured interviews (objective 3). The reason for employing a

mixed research design is that it increases methodological pluralism, which enhances the richness, diversity, and depth of findings as compared to mono-methodological research (Johnson & Onwuegbuzie, 2004). This is particularly useful in social science research because the study of social phenomenon tends to be nothing but linear and simplistic in nature (Esbjörn-Hargens & Zimmerman, 2009).

Chapter 2 explores the possibilities of applying the salutogenic model of health as a complementary approach to biomedical-oriented nutrition research and practice. In order to gain a deeper understanding of the building blocks that support the development of SOC, **Chapter 3** examines the association between a set of individual, social-environmental and physical-environmental factors and SOC in a cross-sectional sample of Dutch adults. Thereafter, **chapter 4** focuses on factors that predict healthy dietary practices in Dutch adults with healthful eating practices. The study in **chapter 5** presents the results of a qualitative study with female healthy eaters that applied a life course perspective to explore how the underlying mechanisms of life experiences and coping strategies foster healthful eating. The life course perspective is a framework that observes lives in time according to different social, contextual and cultural factors but also the internal responses resulting from those fluctuating external stimuli (Wethington, 2005). In doing so, it discerns patterns of change or consistency across the life span and is of particular interest to health behaviors (Szwajcer et al., 2007). Participants' retrospective accounts of the life course were accessed through narrative inquiry, which gives insights into personal experiences, provides a means for self-reflection and helps to understand the influence of the social and historical context (Hinchman & Hinchman, 1997). In **chapter 6**, the final chapter, we first present a summary of the main findings in each chapter. Next, we integrate this understanding and consider the relevance of findings for nutrition promotion and advancing the state of the art of salutogenic model of health. Then, we discuss implications for future research and methodological considerations. Finally, based on the understanding gained from this research, we provide building blocks for salutogenic-oriented nutrition promotion.

CHAPTER 2

Applying the salutogenic framework to nutrition research and practice

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Abstract

Much research has identified a sea of factors related to unhealthy diets to make sense of why people struggle to eat healthy. However, little is known of factors which empower healthy eating. Antonovsky's salutogenesis provides an innovative framework to study these factors and identify resources and mechanisms underlying healthy eating practices. We give recommendations for future research and provide examples of how salutogenesis has inspired our own research to gain new insights into the origins of healthy eating. Lastly, implications of using future findings in designing novel nutrition promotion strategies are outlined.

Biomedical model in nutrition research

For decades, nutrition and health experts have been recommending that the public consume a healthy, balanced diet, which emphasizes consumption of fruit, vegetables, and whole grains and limits foods containing high amounts of fat, sugar and salt. Despite this, recent national nutrition surveys show that the majority of people do not follow these recommendations in daily life (Van Rossum et al., 2011). The predominance of unhealthy dietary patterns, characterized by excessive intake of calories, saturated fats, processed sugars, and salt, continues to be a critical issue around the world (Imamura et al., 2015). It is well established that these unhealthy dietary patterns are a major contributor to the worldwide obesity epidemic (WHO, 2000). As a result, much nutrition research has focused on studying risk factors leading to poor dietary behaviors. Such research is driven by a biomedical model (Wade & Halligan, 2004) and orients towards pathogenesis, the study of disease origins and causes (Antonovsky, 1996). Studies start by considering disease and infirmity to determine preventive or curative strategies. In parallel, behavioral food research studies interactions between humans, their social and cultural context and physical health. These areas also share the difficulties involved in exploring contextual variables (Fischer, 2006). If humans are studied without considering contextual influences, the relevance to everyday life is limited (Green, 2006). Dietary behaviors are learned, supported and expressed through expansive social environments in which health results from a dynamic interplay between physical, mental, social and spiritual factors (Koelen, 2007; O'Donnell, 2009; van der Lucht & Lucht, 2010). Hence, biomedical-oriented research, emphasizing risks to individual, physical health, is too narrowly focused and should be complemented with a contextualized orientation, relevant and applicable to people's everyday-life.

In this paper, Antonovsky's salutogenic framework (Antonovsky, 1979) is proposed as an approach for studying and enabling healthy eating. The salutogenic framework adds two features to the current biomedical-oriented approach. Firstly, it considers all aspects of health and, views health as not only the absence of disease but as quality of life and well-being. Secondly, it aims to answer the question of how health arises from active participation in lifelong learning experiences. The use of this orientation to study the dynamic interplay between individual and context will provide better insight into how people themselves create health and will also generate a useful basis for the design of future health promoting change strategies.

Antonovsky's salutogenic framework

The salutogenic framework is based on insights from sociology and social psychology. It is a theoretical vision of health which includes the physical, mental, social and spiritual dimensions of health. It seeks to understand what creates health and how health can be developed in society. Health is defined through this framework as a dynamic process

and the word “healthy” means an active and productive life, a “good life”. Salutogenesis complements biomedical models in health research as it is centralized around the question “what creates health?” and targets the search for ways to create, enhance, and improve physical, mental, social and spiritual well-being (Antonovsky, 1996). From the salutogenic perspective, the development of health requires active involvement, participation in important decisions and subsequent actions.

The salutogenic framework includes two main constructs: the Sense of Coherence (SOC) and General Resistance Resources (GRR). SOC was defined by Antonovsky as “a global orientation that expresses the extent to which one has a pervasive, enduring, though dynamic feeling of confidence”(Antonovsky, 1987). SOC is a coping capacity that supports people in dealing with challenging situations and in maintaining a healthy life orientation (Antonovsky, 1987). It has further been described as a “sixth sense for survival” and helps in generating health-promoting abilities (Lindström & Eriksson, 2006). Evidence shows that a strong SOC is associated with an array of healthy lifestyle-related behaviors(Lindström & Eriksson, 2010a) including amongst others healthier dietary patterns (Swan et al., 2015b), physical activity (Hassmen et al., 2000), better oral health behaviors,(Lindmark et al., 2011) and non-smoking (Wainwright et al., 2007). The GRRs are health promoting resources found within people (e.g. self-efficacy, self-esteem) and in their immediate and wider contexts (e.g. social support, social capital). Meaningful life experiences throughout the life course help to develop SOC and allow one to reach out in any given situation and apply the resources appropriate to a given stressor. The stronger a person’s SOC, the greater their ability is to identify and use GRRs in a way that benefits their health (Lindström & Eriksson, 2010a). It is this process described by Antonovsky as the “ease/disease continuum”(Antonovsky, 1979), which enables people, when under the threat of various stressors to physical and mental health, to use GRRs in a health-promoting way and therefore helps them to stay healthy. When confronted with a stressor, a person with a strong SOC will be motivated to cope (meaningfulness - motivational), believe that the challenge is understood (comprehensibility - cognitive) and believe that resources (GRRs) to cope are available (manageability - behavioral) (Antonovsky, 1993a).

Salutogenic approach to nutrition research

Nutrition promotion campaigns encourage people to increase their daily intake of vegetables, fruits, and whole grains. However, do we know how people act upon these recommendations in their everyday lives (Bouwman et al., 2012)? For instance, do they serve broccoli at dinner or do they aim to keep peace with their children and serve French fries instead? When at the supermarket, do they buy fresh fruit or do they choose instead to buy one of the many cheap and calorific snack foods for sale? Salutogenic research questions that can be formulated from these situations are not why do people make unhealthy choices, but rather, how do people deal with challenges towards healthy

eating in a health-promoting manner? What factors enable people to deal successfully with these everyday challenges to healthy eating? Moreover, what lessons about food and health can we learn from them?

This line of thinking creates the basis for research towards understanding the origins of healthful eating in the everyday context and provides insights into people's resources for health. The salutogenic approach to nutrition research not only requires a shift in the formulation of research questions, but also a shift in the study population. Rather than targeting study populations with unhealthy eating practices, research will target those with healthy eating practices.

Our current research aim is to identify healthy eaters in the Dutch context and examine individual- and contextual-level resources that enable healthy eating. First, cross-sectional survey research will be carried out to identify multi-level resources that support SOC and healthy eating practices (Swan et al., 2015b). Second, in-depth interviews will be carried out with healthy eaters to study how people make sense of healthy eating throughout the life course and the resources they use to overcome situations that challenge their eating practices.

Implications and conclusions

Salutogenic nutrition research has the potential to bring to light new insights for health promotion (Bouwman & Swan, 2014). It guides the study of the dynamics between people and their environment and how health develops from this interaction. From this perspective, patterns and mechanisms rather than factors bound to either people or their environment are studied. Disjointedly studying and enacting upon people and context may be easier yet it does not do justice to reality and limits relevance and applicability in everyday eating situations. Since salutogenesis guides the study of health as an interplay between physical, mental, social and spiritual factors, it is more in line with the way people experience eating and health in their everyday lives (Bouwman et al., 2012).

We envision that the knowledge gained from salutogenic research has implications for both nutrition promotion and in tackling the epidemic of overweight and obesity. As previously stated, people with a strong SOC have an orientation towards healthier lifestyle behaviors. Insights from research can be used to develop interventions that strengthen people's SOC as a means for improving nutrition behaviors and dealing with weight issues. Furthermore, it can also aid in the design of strategies that emphasize enabling and facilitating people's personal and contextual resources that support a healthy weight.

It is important to note that we are not implying that the salutogenic framework is superior to other frameworks. It is closely related to socio-ecological frameworks, which study the dynamic interaction between people and their environment. For instance, Bronfenbrenner's model (Bronfenbrenner & Morris, 2007) applies a life-course orientation as well. In our opinion, the strength of the salutogenic framework is that

it provides an additional set of “lenses” for exploration of what creates health and in designing health-promotion strategies. Finally, we would like to conclude that carrying out salutogenic nutrition research will not require a complex change in methodological approaches. However, it requires a shift in the study population to the people who *are* managing to eat well rather than the people that are typically studied, the ones that are *not* managing to eat well. In addition, it requires a look towards resources and life experiences which shape adaptive food strategies and coping rather than studying static factors. Through this set of lenses can come a new understanding of the origins of healthy eating practices as well as the design of strategies to enable healthy lifestyle behaviors.

CHAPTER 3

Individual, social- and physical-environmental factors that underlie sense of coherence in Dutch adults

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In press

Abstract

Antonovsky's salutogenesis is a theoretical perspective on health development that explores physical, mental, spiritual, and social factors that contribute to a 'healthy life orientation' and also a theoretical approach to behavior change. Previous studies applying salutogenesis show that a high sense of coherence (SOC), a composite measure from salutogenesis indicating one's capacity to cope with stress, is associated with a healthy life orientation and lifestyle behaviors, including healthy eating patterns. However, limited evidence exists on the factors that underlie SOC, which could be used to strengthen this capacity as a means to enable healthier eating. Dutch adults (n=781) participated in a cross-sectional study examining the relationship between SOC and a set of individual, social- and physical-environmental factors. The main findings indicate that high SOC was associated with a diverse set of factors including lower doctor-oriented health locus of control; higher satisfaction with weight; higher perceived levels of neighborhood collective efficacy; higher situational self-efficacy for healthy eating; lower social discouragement for healthy eating; and higher neighborhood affordability, accessibility and availability of healthy foods. These findings can inform the design of nutrition interventions that target these factors that strengthen SOC and provide the building blocks for a healthier life orientation.

Introduction

Diet-related diseases such as obesity and diabetes have reached epidemic proportions worldwide (WHO, 2006). As a result, there has been a push within nutrition research to better understand the risks and benefits of certain nutrients and foods on physical health (Scrinis, 2013) and the study of risk factors leading to poor dietary behaviors (Swan et al., 2015a). Such research comes from a biomedical model, which is driven by the search for causes and prevention of disease and ill-health (Wade & Halligan, 2004). However, the biomedical approach insufficiently addresses the complex, multifaceted factors influencing eating. As a result, there is decreased relevance and applicability of research findings for everyday life (Van Woerkum & Bouwman, 2012). For instance, eating is much more than only a health behavior (Biltekoff, 2010). In everyday life, it is a complex, multifaceted practice influenced by many aspects (Sobal et al., 2014) including, amongst others, personal belief systems (Delaney & McCarthy, 2014) and the wider social context (Lindsay et al., 2009). Moreover, we know that people's physical health concerns are not the only force driving people's food choices (Furst et al., 1996). In everyday life, people do not just eat to fulfil physiological needs, they also strive for quality, pleasure, and goodness (Rozin, 2005). Lastly, it assumes healthful eating is a central concern in people's lives. Yet in everyday life, healthy eating is only one of the many concerns to accomplish health and it is integrated within daily practices. Eating practices are socially embedded into daily life, food is often shared with others and provides opportunities for making social contacts (Bouwman et al., 2009).

Taking this all into account, biomedically-oriented nutrition research, which emphasizes risks to individual, physical health, is too narrowly focused and should be complemented with a contextualized orientation, relevant and applicable to people's everyday-life (Swan et al., 2015a). Salutogenesis, Antonovsky's theoretical perspective on health development (Antonovsky, 1979), offers an appropriate starting point. It is a theoretical perspective on health development that explores physical, mental, and social factors that contribute to a "healthy life orientation" and also a theoretical approach to behavior change. Rather than a static state, health is defined through this framework as a life-long process and healthy means an active and productive life, a "good life". The salutogenic approach differs from the described biomedical approach in several ways. Instead of having a focus on physiological factors involved in illness and the prevention of disease, it has an emphasis on the positive aspects of health and well-being (Mittelmark & Bull, 2013), taking into account the diverse physical, mental, and social factors that promote health (Eriksson & Lindström, 2008). Furthermore, rather than studying individual health separate from the physical and social context, it studies how health is developed through resources found within people and their everyday life context (Lindström & Eriksson, 2006). Another key difference is that salutogenesis assumes health-related practices – such as eating – are a resource for living rather than a central goal in life (Koelen & Lindström, 2005).

Within the salutogenic framework, the central construct is what Antonovsky called “sense of coherence” (SOC). SOC is described as a “sixth sense” for survival and helps in generating health-promoting abilities (Lindström & Eriksson, 2006). The strength of one’s SOC is a crucial factor in facilitating and developing health. A higher SOC score is associated with better physical and mental health outcomes (Eriksson & Lindström, 2006). Furthermore, evidence suggests that SOC is also a predictor of healthy lifestyle practices. High SOC is associated with dietary patterns more in line with dietary recommendations (Swan et al., 2015b); higher intake of fruits and vegetables (Packard et al., 2012; Wainwright et al., 2007); and lower intake of sugars and saturated fats (Lindmark et al., 2005).

Given that SOC is a strong predictor of health and healthy lifestyle practices, health promotion should consider strengthening SOC within interventions (Ahola et al., 2012; Alivia et al., 2011). Evidence from a limited number of studies suggests that socio-demographic factors (Larsson & Kallenberg, 1996; Mattisson et al., 2014) and work and living conditions (Tsuno & Yamazaki, 2012; Volanen et al., 2004) relate to SOC. However, evidence remains limited and we lack a comprehensive picture and deeper understanding of the building blocks which support the development of SOC (Yamazaki et al., 2011). As a result, it remains unknown what is needed in health promotion activities to strengthen SOC (Super et al., 2015). By gaining greater insight into the factors that underlie SOC, we can help inform the development of future health promotion interventions.

The purpose of this study was to determine in a cross-sectional sample of Dutch adults if a set of individual, social-environmental and physical-environmental factors are associated with SOC. Since our study was part of a larger project interested in promoting healthy eating and preventing obesity, we identified eating-specific factors from the literature that support healthy dietary behaviors and healthy weight. In addition, we included factors arising from the individual and social- and physical-environment that have been found in previous studies to be associated with SOC (Larsson & Kallenberg, 1996; Mattisson et al., 2014; Tsuno & Yamazaki, 2012; Volanen et al., 2004). This led to the inclusion of the following eleven factors: body weight, satisfaction with weight, nutrition knowledge, flexible restraint of eating, situational self-efficacy for healthy eating, multidimensional health locus of control, social support and discouragement of healthy eating, neighborhood collective efficacy and perceived neighborhood affordability, availability and accessibility of healthy foods, and socio-demographic factors.

Methods

Study population

Participants for the study were recruited from the CentERdata Long-term Internet Studies for the Social Sciences (LISS) panel. We used a sub-group from the research panel involved in an ongoing weight monitoring project. In this project, participants

weigh themselves regularly and complete questionnaires on a regular basis regarding weight and dieting habits. Furthermore, participants complete a yearly survey that collects general health and socio-demographic data. Panel members (n=1001) 18 years and older who had measured their weight between August 2011 and January 2012 were invited to complete the internet-based survey in January 2013. The survey was completed by 944 panel members (response rate 94%). Participants with missing data, who were either pregnant, currently being treated for an eating disorder, following a modified diet due to a health problem or who had a serious illness that caused weight loss or gain were excluded from the analysis. This left a total of 781 people (78% of total sample) that were included in the final analysis.

Survey instrument

The survey instrument measured respondents SOC as well as individual, social-environmental and physical-environmental factors. Scales chosen for the study were from pre-existing, pre-validated scales and when necessary, were translated from English into Dutch. Table 3.1 provides a complete overview of variables in the survey including an example question, scale content, scale measurement, internal reliability (Cronbach's α) as found in our study, and the references to the pre-existing, pre-validated scales that they came from.

The survey constructs and their related definitions are given below:

Outcome measure

Sense of Coherence (SOC) is a key concept within the salutogenic framework and is defined as an "orientation to life." A high SOC makes it easier for people to perceive their lives as consistent, structured and understandable. Participants' SOC was measured using the Dutch version of the validated English SOC-13 item scale (SOC-13) (Antonovsky, 1979).

Individual factors

Data were available on participants most recently measured weight in kilograms (kg) and body mass index (BMI).

Satisfaction with weight. Respondents body satisfaction was measured with 1 item that asked how satisfied respondents are with their current weight.

Nutrition Knowledge in this study was defined as how well participants understand the relationship between nutrition and physical health. The nutrition knowledge scale used for this study (Westenhofer et al., 1999) asked participants to respond with either true

Table 3.1 Survey measures

Variables	Scale content	Scale reference	Example questions	Internal Reliability (α)
<i>Outcome measure</i>				
SOC	Sum of 13 items, 7 point Likert scale , 1 = never disagree, 7 = very often	Derived from validated Scale (Antonovsky, 1979)	“Do you have the feeling that you are in an unfamiliar situation and don’t know what to do?”	0.89
<i>Individual factors</i>				
Body weight, height, BMI	Body weight without shoes and clothes, Self-reported height, BMI	-	-	-
Satisfaction with weight	1 item, 7 point Likert scale , 1 = highly disagree, 7 = highly agree	-	“I am satisfied with my current weight.”	-
Nutrition knowledge	Sum of 9 items True/ False 0 = incorrect, 1 = correct	Derived from pre-existing scale (Petrovici & Ritson, 2006)	“Is this statement true or false? Full-fat milk is a better source of calcium than semi-skimmed milk.”	-
Flexible restraint of eating	Sum of 17 items, 7 point Likert scale , 1 = highly disagree, 7 = highly agree	Derived from pre-existed scale (Westenhofer et al., 1999)	“When I have eaten enough, I stop eating.”	0.82
Situational self-efficacy for healthy eating	Sum of 26 items, 10 point scale of confidence: 0= not confidence, 10 = total confidence	Derived from pre-existing scale (Bandura, 2006)	“To what extent do you feel confident that you would eat healthy if you are angry or annoyed?”	0.95
Internally-oriented MHLC	Sum of 6 items, 7 point Likert scale, 1 = highly disagree, 7 = highly agree	Derived from pre-validated scale (Halfens & Philipsen, 1988)	“My health is primarily determined by what I do personally.”	0.73

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Doctor-oriented MHLC	Sum of 6 items, 7 point Likert scale, 1 = highly disagree, 7 = highly agree	Derived from pre-validated scale (Halfens & Philipsen, 1988)	“To prevent sickness it is good to consult a doctor regularly”	0.80
Chance-oriented MHLC	Sum of 6 items, 7 point Likert scale, 1 = highly disagree, 7 = highly Agree	Derived from pre-validated scale (Halfens & Philipsen, 1988)	“Whether I remain healthy is a matter of chance events.”	0.69
Socio-demographics	-	-	“Do you live with a partner, married or unmarried?”	-
<i>Social- and physical environmental factors</i>				
Perceived social support for healthy eating	Sum of 6 items, 7 point Likert scale, 1 = never, 7 = very often	Derived from pre-existing scale (Sallis et al. 1987)	Please indicate how often people in your social network react to you or other people trying to eat more healthily, ”Encouragement to not eat unhealthy food (cake, cookies, French fries) when they are tempted to.”	0.87
Perceived social discouragement for healthy eating	Sum of 5 items, 7 point Likert scale, 1=never, 7=very often	Derived from pre-existing scale (Sallis et al. 1987)	Please indicate how often people in your social network react to you or other people trying to eat more healthily”, “Refusal to eat healthy food with them.”	0.87
Neighborhood collective efficacy	Sum of 9 items, 7 point Likert scale, 1 = highly disagree, 7 = highly agree	Derived from pre-existing scale (Cohen et al. 2006)	“People in my neighborhood are willing to help their neighbors.”	0.70
Perceived neighborhood affordability, availability, and accessibility of healthy foods	Sum of 10 items, 7 point Likert scale , 1 = highly disagree, 7 = highly agree	Derived from pre-existing scale (Inglis et al. 2008)	“In my local area, I can buy affordable food of good quality.”	0.95

or false on statements regarding consumption of different food items and its impact on physical health.

Flexible restraint of eating is defined as a balanced and sensible approach to dietary intake that includes flexible restraint behaviors such as eating slowly and taking small helpings (Westenhoefer et al., 1999).

Situational self-efficacy for healthy eating measures one's confidence in carrying out healthy eating under a variety of circumstances and impediments (Bandura, 2006).

Multidimensional health locus of control (MHLC; (Halfens & Philipsen, 1988)) refers to the extent that individuals feel they have control over their own health either internally (e.g. my health is decided by my own actions), or externally through doctors (e.g. doctors determine my health) or by chance (e.g. whether I remain healthy is a matter of chance events).

Social-environmental factors

Social support and discouragement of healthy eating defined in our study as the perceived levels of support or sabotage for healthy eating that participants observe in their everyday social contexts, e.g. at home, work, social engagements (Sallis et al., 1987).

Neighborhood collective efficacy. This construct encompasses two main elements: perceived social cohesion and informal social control present in a neighborhood. It describes the willingness of community members to look out for one another (Cohen et al., 2006).

Physical-environmental factors

Perceived neighborhood affordability, availability, and accessibility of healthy foods (Inglis et al., 2008) measures perceived ease or difficulty experienced in undertaking healthy eating in local environments in terms of affordability, availability, and accessibility.

Socio-demographic factors

Data were collected about participants' gender; age; whether or not they live with a partner (married or unmarried); income level (in Euros); and highest level of education (elementary school, high school, vocational school, university degree).

Statistical analysis

Data were analyzed using SPSS 19.0 for Windows (SPSS, Chicago, IL). The internal reliability was tested by calculating Cronbach's α of each individual survey scale. Firstly, linear regression analysis was performed to determine associations between individual,

social-environmental, and physical-environmental factors, with the SOC-13 score as the dependent variable. Multiple logistic regression analysis was subsequently performed to assess the association between individual, social-environmental, and physical-environmental factors and the outcome measure SOC. Based on the median 50th percentile mark of scores, participants' SOC-13 scores were stratified into either low SOC (score of ≤ 67 , $n=395$) or high SOC (score of 68 or higher, $n=386$) groups for the multiple logistic regression analysis. SOC was examined as a dichotomous variable since previous research examining SOC and health outcomes (Eriksson, 2007) and healthy eating practices (Swan et al., 2015a) also examined it as a dichotomous variable. We were also interested to confirm these findings and see if a high SOC would also be related to the individual, social-environmental, and physical-environmental factors in a Dutch study population. Only factors that were found to be statistically significant ($p < .05$) in the linear regression analysis were entered into the multiple logistic regression model.

Results

The mean age of respondents was 55 years and 55% were male and 45% were female. The mean BMI was 25.5 kg/m², which falls in the overweight category based on the international classification status of BMI. The majority of respondents (75%) reported that they live with a spouse or significant other. For the highest level of education completed, 34% reported high school, 27% reported vocational school and 32% reported university. The mean net monthly income in euros was €2842.

Table 3.2 shows the results from the linear regression analysis. For the individual factors, the following variables were positively correlated with SOC: satisfaction with weight, flexible restraint of eating, situational self-efficacy for healthy eating, age, living with a partner, educational level and monthly income. Moreover, doctor-oriented MHLC was inversely correlated with SOC. For the social-environmental factors, perceived social discouragement for healthy eating was inversely correlated with SOC whereas neighborhood collective efficacy was positively correlated with SOC. The physical-environmental factor of perceived affordability, accessibility and availability of healthy foods was also positively correlated with SOC. The following factors were not significant: sex, BMI, nutrition knowledge, internally oriented MHLC, chance oriented MHLC, and perceived social support for healthy eating.

Table 3.3 shows the results from the multiple logistic regression analysis. In total, eight of the ten individual, social- and physical-environmental factors entered into the model were statistically significant. For the individual factors, those with a high SOC were more likely to have a higher situational self-efficacy for healthy eating, have a higher satisfaction with weight, have a lower doctor oriented MHLC, be older in age, and report higher monthly incomes. For the social-environmental and physical-environmental factors, those with a high SOC were significantly more likely to perceive lower social discouragement for healthy eating, perceive higher neighborhood collective efficacy, and perceive higher neighborhood affordability, accessibility and availability of healthy foods. Flexible restraint of eating and education level were not statistically significant in the model. The logistic multiple regression analysis with SOC delivered an explained variance of between 20.5% (Cox and Snell R square) and 27.4% (Nagelkerke R square). The Omnibus Tests of Model Coefficients showed that the full model containing all the predictors was statistically significant, $X^2 = 179.533$, (9, N=781), $p < .00001$. This indicates an acceptable goodness of fit in the model and that it was able to distinguish between respondents reporting a high and a low SOC.

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Table 3.1 Linear regression analysis investigating association between SOC-13 score and individual, social-environmental and physical-environmental factors for respondents (n=781)

	95% CI			β	P
	B	Lower	Upper		
<i>Individual factors</i>					
Age	.161	.111	.210	.218	<.0001**
Sex	1.048	-2.602	.505	.046	.186
Lives with a partner	2.612	.841	4.384	.101	.004*
Education level	1.123	.332	1.914	.097	.005*
Monthly income	.002	.001	.003	.194	<.0001**
BMI	-0.33	-.285	.220	-.011	.799
Satisfaction with weight	1.380	.993	1.766	.238	<.0001**
Nutrition knowledge	.453	-.173	1.080	.050	.156
Flexible restraint of eating	.098	.023	.173	.089	.010*
Situational self-efficacy for healthy eating	.068	.050	.085	.259	<.0001**
Internally-oriented MHLC	-.016	-.156	.124	.008	.820
Doctor-oriented MHLC	-.147	-.273	-.021	.080	.022*
Chance-oriented MHLC	-.120	-.251	.011	.063	.071
<i>Social-environmental factors</i>					
Perceived social support for healthy eating	-.033	-.148	.081	.020	.566
Perceived social discouragement for healthy eating	-.539	-.670	-.409	.273	<.0001**
Neighborhood collective efficacy	.417	.331	.503	.314	<.0001**
<i>Physical-environmental factors</i>					
Perceived affordability, accessibility and availability of healthy foods	.263	.191	.334	.244	<.0001**

* p-value <.05, ** p-value <.01

Table 3.2 Multiple logistic regression analysis with odds ratios (OR) and 95% confidence intervals (CI) for low and high SOC score and individual, social-environmental and physical-environmental factors of respondents

	OR (95% CI)		OR (95% CI)	
	Low SOC (n= 395)	p-value	High SOC (n=386)	p-value
<i>Individual factors</i>				
Age (in years)	.974 (.961-.987)	<.001**	1.03 (1.01-1.05)	<.001**
Lives with a partner	1.36 (.933-1.982)	.110	.735 (.504-1.072)	.110
Income level	.818 (.746-.896)	<.001**	1.22 (1.12-1.341)	<.001**
Education level	.945 (.841-1.062)	.344	1.06 (.94-1.20)	.344
Flexible restraint of eating	.990 (.973-1.01)	.219	1.01 (.99-1.03)	.219
Situational self-efficacy for healthy eating	.994 (.990-.998)	.005**	1.01 (1.002-1.01)	.005**
Satisfaction with weight	.875 (.803-.953)	.002**	1.14 (1.05-1.29)	.002**
MHLC Doctor oriented	1.041 (1.011-1.072)	.007**	.961 (.93-.99)	.007**
<i>Social-environmental factors</i>				
Perceived social discouragement healthy eating	1.052 (1.021-1.084)	.001**	.95 (.92-.98)	.001**
Neighborhood collective efficacy	.953 (.934-.973)	<.001**	1.05 (1.03-1.07)	<.001**
<i>Physical-environmental factors</i>				
Neighborhood affordability, accessibility, availability of healthy foods	.967 (.951-.984)	<.001**	1.03 (1.02-1.05)	<.001**

^a Low SOC score is a score of 67 and lower and High SOC score is a score \geq 68 on the sense of coherence 13 item questionnaire, * p-value <.05, ** p-value <.01

Discussion and conclusion

Our study brings forth new and significant findings since it is the first to identify a number of individual, social- and physical-environmental level factors that relate to SOC. The relationship between a limited number of factors including socio-demographic characteristics and living and working conditions and SOC had been explored in previous research. However it was not known whether other factors also underlie SOC. Specifically, SOC was positively correlated to individual, social- and physical-environmental characteristics including satisfaction with weight, neighborhood collective efficacy, age, and income level and negatively related to doctor-oriented MHLC. Furthermore, SOC was positively correlated to a number of individual, social- and physical-environmental characteristics with a specific food or eating-related component including situational self-efficacy for healthy eating and perceived neighborhood affordability, accessibility and availability of healthy foods and inversely correlated to social discouragement for healthy eating. The findings are relevant as they shed light on the types of factors that health promotion should consider when developing interventions to strengthen SOC. The factors of relevance we found can be referred to as generalized resistance resources (GRRs)(Antonovsky, 1979). Specifically, Antonovsky described GRRs as physical, biochemical, material, cognitive, emotional, attitudinal, interpersonal, or macro sociocultural characteristics of an individual or group (Antonovsky, 1979). The stronger a person's SOC, the greater his or her ability to identify and use GRRs in a health-promoting manner (Lindström & Eriksson, 2010a). It is this reciprocal process that enables people, when under the threat of various stressors to use GRRs in a health-promoting way and therefore supports them to have a healthy life orientation (Antonovsky, 1987).

Our findings are important since they shed light on the types of resources that health promotion should consider when developing interventions to strengthen SOC. However, it is important to consider that this is not as straightforward as providing a set of GRRs to strengthen SOC. For instance, such an intervention may run the risk of only benefiting those with a high SOC whom are more likely to mobilize GRRs for their health, whereas those with a low SOC will not and remain in ill health. This could even perpetuate the widening gap in health inequalities. Therefore, this will require further considerations. For instance, empowerment, which is a supporting process whereby groups or individuals are enabled to change a situation, given skills, resources, opportunities and authority, could be seen as a tool for the enhancement of SOC (Koelen & Lindström, 2005; Lindström & Eriksson, 2010b). Furthermore, governmental policies should focus on enabling participation in life experiences that allow people to identify and apply resources to support SOC. Participation is widely recognized in health promotion and one of the most fundamental elements that stands central to the empowerment concept (Lindström & Eriksson, 2010b). Yet, current nutrition promotion efforts insufficiently allow for active involvement of people themselves. Therefore, there is a need for

change in expert-driven approaches towards a co-evolutionary development process. Through this, policy makers can identify sustainable GRRs that take advantage of the community's existing resources, which enable active involvement and participation, and empowerment.

It should also be noted that although social discouragement for healthy eating was inversely associated with SOC, social support for healthy eating was not. This is an interesting finding, particularly given that social support plays such a large role in promoting health. Future research should examine this relationship further as the reason for this outcome is not entirely clear.

Previous studies in Finnish and Japanese populations have found that being married or living with a partner contributed to a strong SOC (Tsuno & Yamazaki, 2012; Volanen et al., 2004), but this was not the case in our study population. However, the quality of this relationship is probably what contributes more to SOC than partnership status alone. Volanen et al. (2004) found that those perceiving a poor relationship with their spouse or partner had a low SOC. Due to limitations in the number of survey items, we were only able to ask whether the person lived with a partner and not about the nature of the relationship.

Antonovsky theorized that SOC is developed until 30 years of age and thereafter it remains relatively stable until retirement, after which it decreases (Antonovsky, 1979). However findings from longitudinal studies have suggested that SOC can be subject to change in adulthood (Feldt et al., 2011; Schnyder et al., 2000). Future longitudinal research should examine this further by tracking the growth and stability of SOC over the life course, from early childhood into adulthood. In addition, Antonovsky proposed that SOC is developed and shaped through meaningful and coherent life experiences (Lindström & Eriksson, 2010a). Future research should study those with a high SOC and explore the breadth and nature of these experiences in relation to food, eating and health.

This study has a number of strengths. The survey instrument designed for this study included an extensive number of diverse factors. Further strengths included the study's significant sample size, a high survey response rate of 94% and the use of pre-tested, validated scales to measure the constructs in our survey instrument. Another strength was that the survey instrument had a good to excellent internal reliability and performed well, as indicated by the Chronbach's α scores ranging from 0.70-0.95.

It is important to mention that due to the cross-sectional nature of this study, we are not able to make conclusions in regards to cause and effect relationships. Future studies should be carried out in different populations and contexts, particularly given the fact that Antonovsky argued that factors underlying SOC can differ from culture and context (Antonovsky, 1979). The explained variance of the logistic regression model of between 20.5%-27.4% was not strong but moderate. However, given the exploratory nature of this study, such a value was expected. Ideally we would have included more factors in the

survey instrument but we were restricted in the number of survey items that could be asked to the research panel. Future research should examine a wider number of factors to see whether or not these could be of further relevance in explaining SOC.

In conclusion, our study brings forth new insights because it shows that GRRs arising from the individual and the social- and physical-environment relate to SOC. Advancing knowledge of GRRs that shape SOC is important as it can inform the development of health promotion interventions that strengthen SOC. This study's findings also complement what is already known from biomedical research models by bringing forth new knowledge of the complex, multidimensional factors that can contribute to a healthy orientation to eating and life. Future nutrition research should consider integrating both salutogenic and biomedical approaches within research methodologies in order to gain a more complete picture of factors driving both healthy and unhealthy eating practices. Furthermore, this study's findings provide the impetus for the further application of the salutogenic framework within health promotion research to gain deeper understanding of how these factors contribute to a healthy life orientation.

CHAPTER 4

Profiling healthy eaters: determining factors that predict healthy eating practices amongst Dutch adults

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Abstract

Research has identified multiple factors that predict unhealthy eating practices. However what remains poorly understood is which factors promote healthy eating practices. This study aimed to determine a set of factors which represents a profile of healthy eaters. This research applied Antonovsky's salutogenic framework for health development to examine a set of factors that predict healthy eating in a cross-sectional study of Dutch adults. Data were analyzed from participants (n=703) that completed the study's survey in January 2013. Logistic regression analysis was performed to test the association of survey factors on the outcome variable high dietary score. In the multivariate logistic regression model, five factors contributed significantly ($p < .05$) to the predictive ability of the overall model: being female; living with a partner; a strong sense of coherence (construct from the salutogenic framework), flexible restraint of eating, and self-efficacy for healthy eating. Findings complement what is already known of the factors that relate to poor eating practices. This can provide nutrition promotion with a more comprehensive picture of the factors that both support and hinder healthy eating practices. Future research should explore these factors to better understand their origins and mechanisms in relation to healthy eating practices.

Introduction

Much research in the study of food choice has examined individual and environmental factors that predict unhealthy eating practices (Williams et al., 2012). These have included, amongst others, lack of awareness of nutrition guidelines (Eurobarometer, 2006), and ‘obesogenic’ environments offering poor availability of affordable, healthy options (Bihan et al., 2010). Such factors have been the focus of nutrition promotion initiatives that aim to increase knowledge and awareness of the components of a healthy diet and make a wider range of affordable, convenient, and healthy options available in diverse settings. To date, these efforts have had limited effect in changing eating practices. National food surveys show that the majority of people still consume excessive amounts of fats and sugars and too few fruits, vegetables, whole grains, and fish (Van Rossum et al., 2011). Given the fact that the obesity epidemic continues unabated (Stevens et al., 2012), there is an acute need for additional approaches that explore a wider range of factors that drive eating practices to inform new nutrition promotion strategies (Van Woerkum & Bouwman, 2012).

Since so much of the past research has focused on studying factors predicting unhealthy eating, this has led to an advancement in knowledge on and understanding of risk-factors. However, as noted by Ball and Dollman (2010), “this risk-factor approach, fails to consider that individuals also possess, or have access to, protective resources, which may also impact their likelihood of an adverse outcome, either directly, or via interactions with risk factors.” Therefore, instead of looking at the determinants of unhealthy eating, it may be useful to take a different perspective and study factors that relate to resources for healthy eating and thus form part of the solution (Bouwman & Swan, 2014). This requires a perspective shift not only in factors studied, but also of the individuals we study. In order to understand how we can best promote healthy eating, we should also study those that are eating well rather than only the ones eating poorly. For example, there are still people that eat healthy despite the challenges around them. What combination of factors support these people in having healthy eating practices? Answering such questions can give greater insight into factors that both support and enable people in maintaining healthy eating behaviors and add to the current risk-informed preventative measures. Such insights could have great potential if applied to future public health and nutrition promotion efforts (Williams et al., 2011).

Nearly 35 years ago, Antonovsky proposed his framework for health development, “salutogenesis”, to study the origins of health and to explore factors that support a healthy life orientation (Antonovsky, 1979). “Salus” is Latin for health and “Genesis” is Greek for origin. The salutogenic framework is based on insights from the fields of sociology and social psychology. It is a theoretical perspective on health development that explores factors that contribute to a healthy life orientation and also a theoretical approach to change. Health is defined through this framework as a process and healthy means an active and productive life, a “good life”. From the salutogenic perspective,

the development of health requires active involvement, participation in important decisions and subsequent actions. Salutogenesis complements other perspectives that are conventionally taken in health promotion, such as “pathogenic” perspectives, from which the causes of disease and the potential to prevent disease and cure are investigated (Antonovsky, 1987).

The salutogenic framework includes two main constructs: the Sense of Coherence (SOC) and generalized resistance resources. The SOC was defined by Antonovsky as, “a global orientation that expresses the extent that one has a pervasive, enduring, though dynamic feeling of confidence” (Antonovsky, 1987). SOC is a coping capacity and as such is a factor that supports people in dealing with challenging situations and maintaining a healthy life orientation. The SOC is made up of three different traits: meaningfulness (motivation to cope with stress); comprehensibility (ability to comprehend the challenge before you); and manageability (belief that you have resources to help you) (Lindström & Eriksson, 2006). Generalized resistance resources are a broad range of factors that facilitate and support coping. Specifically, Antonovsky described these factors as physical, biochemical, material, cognitive, emotional, attitudinal, interpersonal, or macro sociocultural characteristics of an individual or group (Antonovsky, 1979). Examples can include, amongst others, individual-level factors such as money, education, self-efficacy, locus on control, and social and physical-environmental factors such as social support, social networks and social capital (Lindstrom & Eriksson, 2006). The stronger a person’s SOC, the greater his or her ability to identify and use these factors described above in a health-promoting manner (Lindström & Eriksson, 2010a). It is this process described by Antonovsky as the “ease/disease continuum”, which enables people, when under the threat of various stressors to physical and mental health, to use factors in a health promoting way as a generalized resistance resource and therefore helps them to have a healthy life orientation (Antonovsky, 1987). Therefore, there is a reciprocal relationship between SOC and generalized resistance resources in the development of health (Moons & Norekvål, 2006).

Antonovsky developed scales to measure SOC (Antonovsky, 1987). Findings from an extensive systematic review by Eriksson and Lindström found that a strong SOC was associated with a better perceived physical and mental health (Eriksson & Lindström, 2006). Further, studies have suggested that a strong SOC is associated with lower incidence of cardiovascular disease (Poppius et al., 1999); reduced mortality from cancer (Surtees et al., 2003); and lower rates of mental health problems (Torsheim et al., 2001; Tselebis et al., 2001). Consequently, SOC seems to promote well-being, strengthens resilience, and creates a positive state of subjective health (Eriksson & Lindström, 2006). Several studies have also proposed that a strong SOC is associated with healthier eating patterns and lifestyle choices than those with a weaker SOC. Lindmark and colleagues found in a cross-sectional study of Swedish adults, that both men and women with a strong SOC score reported higher intake of healthier food choices such as vegetables

and whole grains (Lindmark et al., 2005). They further found that those with weaker SOC scores reported higher intakes of unhealthier food choices such as pizza, French fries, and hamburgers. Moreover, research from a population-based cohort study in the United Kingdom found that men and women with a strong SOC were less likely to smoke cigarettes; less likely to be physically inactive; reported higher intake of fruits, vegetables, and fiber; and had a 20% reduced risk of all-cause mortality than those with a weaker SOC, independent of social class and education level (Wainwright et al., 2008; Wainwright et al., 2007). Ray et al. (2009) found that a strong parental SOC was associated with their children having more regular child eating patterns; lower intake of energy-dense foods; and higher intake of nutrient-rich foods.

Since its inception over 30 years ago, the framework has been applied extensively in health promotion research to study the relationship between SOC and physical and mental health as well as lifestyle behaviors (Eriksson & Lindström, 2006). However, salutogenesis is much more than just the study of the relationship between SOC and health outcomes (Mittelmark & Bull, 2013). In the salutogenic framework, both SOC and the presence of generalized resistance resources play a mutual role in the development of health. Yet to our knowledge, no previous research has examined a set of factors encompassing both constructs and to test if they predict healthy eating practices. By having a deeper understanding of all of these factors, we can gain a more comprehensive picture and deeper understanding of the interplay of factors that support the development of healthy eating behaviors. This is also relevant since it can provide us with a more complete profile of factors that predict healthy eating to complement the known factors for unhealthy eating. Such understanding can help advance the theoretical base of salutogenesis within nutrition promotion research and can inform future nutrition promotion initiatives.

Therefore, the salutogenic framework acted as the theoretical underpinning of this research and guided this study in three main ways. Firstly, it guided the selection of factors we examined in our study. We chose to examine the concept of SOC as well as other factors identified from the literature in line with Antonovsky's generalized resistance resources construct. Therefore, we searched the literature for relevant factors that relate to healthy dietary behavior at the individual, social and physical-environmental levels. Additionally, since our study was part of a larger project interested in determining factors that promote healthy eating as a means to prevent obesity, we also identified factors from the literature that support obesity prevention and healthy weight. We also examined socio-demographic characteristics and BMI since these factors are more conventionally studied as factors in relation to unhealthy eating practices and we were interested to see whether they relate to healthier eating practices within our study population. This led to the inclusion of the following set of factors that we examined in our study: individual-level factors – SOC, nutrition knowledge, situational self-efficacy for healthy eating, internally-oriented health locus of control; flexible control of

eating, socio-demographic characteristics, and BMI; social and physical-environmental factors - perceived social support and discouragement for healthy eating; neighborhood collective efficacy; and perceived food affordability, accessibility and availability. Figure 4.1 provides a full overview of all the factors examined within the study.

- **Individual level factors**
 - Sense of coherence (SOC)
 - General nutrition knowledge
 - Flexible restraint of eating
 - Situational self-efficacy for healthy eating
 - Internally-oriented health locus of control
 - Socio-demographic characteristics
 - Age
 - Gender
 - Education-level
 - Employment status
 - Income-level
 - Number of dependent children
 - Cohabitation
 - Body mass index (BMI)
- **Social and physical-environmental level factors**
 - Social support for healthy eating
 - Social discouragement for healthy eating
 - Perceived neighborhood collective efficacy
 - Perceived neighborhood affordability, availability and accessibility of healthy foods

Figure 4.1 Selection of factors guided by the salutogenic framework that were measured in the survey instrument

Secondly, because the salutogenic framework guides the study of factors supporting health, it also guided the selection of participants that we studied in our analysis. Rather than what is more commonly done and only examining populations with unhealthy eating practices, we also studied those with healthy eating practices. Therefore, we examined those in our study population reporting the healthiest dietary practices including high weekly consumption of fruit and vegetables, fish, and whole grains, and compared differences between this group and the group reporting unhealthier dietary practices. Thirdly and lastly, the framework guided the chosen statistical analysis in our study. The key idea behind the salutogenic framework is that a varied, multidimensional

set of factors support the development of a healthy life orientation. As a result, it was crucial for us to study a set of factors in a multivariate model to test whether these factors predict healthy eating in the group reporting the healthiest dietary practices.

Therefore, the aim of this research was to examine whether a set of individual, social-environmental, and physical-environmental level factors including SOC, nutrition knowledge, situational self-efficacy for healthy eating, internally-oriented health locus of control, flexible control of eating, socio-demographic characteristics, BMI, perceived social support and discouragement for healthy eating, neighborhood collective efficacy, and perceived food affordability, accessibility and availability predict healthy dietary practices in Dutch adults.

Materials and methods

Survey Instrument

Table 4.1 provides a complete overview of each item in the survey including an example question, scale content, scale measurement, and internal reliability (α value) of the specific scales included in the survey.

The following constructs, their related definitions, and literature to support their inclusion are given below:

SOC. SOC is a key concept from Antonovsky's salutogenic framework to health development and is defined as an "orientation to life" and encompasses one's capacity and motivations to cope with stress (Antonovsky, 1987). Participants' SOC was measured using the Dutch version of the validated English SOC-13 item scale (SOC-13) (Antonovsky, 1979). Evidence has suggested that a strong SOC relates to healthy eating practices (Lindmark et al., 2005; Ray et al., 2009; Wainwright et al., 2008).

Nutrition Knowledge. In this study, we defined nutrition knowledge as how well participants understand the relationship between nutrition and physical health. The nutrition knowledge scale used for this study was adapted from a pre-existing scale (Petrovici & Ritson, 2006) and participants were asked to respond with either true or false on nine different statements regarding consumption of different food items and their impact on physical health. Evidence suggests that nutrition knowledge has a positive influence on dietary-related preventative health behaviors (De Vriendt et al., 2009; Petrovici & Ritson, 2006).

Flexible restraint of eating. Flexible restraint of eating was defined within this study as a balanced and sensible approach to dietary intake that includes flexible restraint behaviors such as eating slowly and taking small helpings. The scale used for this study was adapted from a pre-existing (Westenhoefer et al., 1999) scale and consisted of 17

Table 4.1 Summary of factors measured in the study survey

Factors	Example questions	Scale content	Scale measurement	Internal Reliability (α)
<i>Individual level</i>				
Sense of Coherence (SOC)	“Do you have the feeling that you are in an unfamiliar situation and don’t know what to do?”	Sum of 13 items, adapted from pre-validated scale (Antonovsky, 1987)	7 point Likert scale , 1 = never disagree, 7 = very often	0.89
Nutrition knowledge	“Is this statement true or false? Full-fat milk is a better source of calcium than semi-skimmed milk.”	Sum of 9 items, adapted pre-existing scale (Petrovici & Ritson 2006)	True/False 0 = incorrect, 1 = correct	-
Flexible restraint of eating	“When I have eaten enough, I stop eating.”	Sum of 17 items, adapted from pre-existing scale (Westenhofer et al., 1999)	7 point Likert scale , 1 = highly disagree, 7 = highly agree	0.82
Situational self-efficacy	“To what extent do you feel confident that you would eat healthy if you are angry or annoyed?”	Sum of 26 items, adapted from pre-existing scale (Bandura, 2006)	10 point scale of confidence: 0= no confidence, 10 = total confidence	0.95
Internally-oriented health locus of control	“By taking good care of myself I can prevent myself from getting ill.”	Sum of 6 items, pre-validated Scale (Halfens & Philipsen, 1988)	7 point Likert scale , 1 = highly disagree, 7 = highly agree	0.74
Socio-demographic characteristics	“Do you live with a partner, married or unmarried?”	-	-	-
Body mass index (BMI)	Body weight (kg) without shoes and clothes, Self-reported height (m), calculated BMI kg/m ²	-	-	-

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Social- and physical-environmental level

Social support for healthy eating	Please indicate how often people in your social network react to you or other people trying to eat more healthily... "Encouragement to not eat unhealthy food (cake, cookies, french fries) when they are tempted to."	Sum of 6 items, adapted from pre-existing scale (Sallis et al., 1987)	7 point Likert scale, 1 = never, 7 = very often	0.87
Social discouragement for healthy eating	Please indicate how often people in your social network react to you or other people trying to eat more healthily... "Refusal to eat healthy food with them."	Sum of 5 items, adapted from pre-existing scale (Sallis et al., 1987)	7 point Likert scale, 1 = never, 7 = very often	0.87
Perceived neighborhood collective efficacy	"People in my neighborhood are willing to help their neighbors."	Sum of 9 items, adapted from pre-existing scale (Cohen et al., 2006)	7 point Likert scale, 1 = highly disagree, 7 = highly agree	0.70
Perceived neighborhood affordability, availability, and accessibility of healthy foods	"In my local area, I can buy affordable food of good quality."	Sum of 10 items, adapted from pre-existing scale (Inglis et al., 2008)	7 point Likert scale, 1 = highly disagree, 7 = highly agree	0.95

items. Evidence indicates that flexible restraint of eating is associated with a healthier BMI (Elfhag & Rössner, 2005; Westenhoefer et al., 1999).

Self-efficacy for healthy eating. For this study, we used Bandura's definition of self-efficacy, which is a belief in one's capabilities to carry out specific behaviors under a variety of circumstances and impediments. (Bandura, 2006) In this study, we specifically looked at self-efficacy in relation to healthy eating behavior. The construct was measured using an adapted version of a pre-existing scale (Bandura, 2006). Evidence suggests that a higher perceived self-efficacy for healthy eating has been associated with a lower risk of obesity (Cleland et al., 2010), as well as weight maintenance (Ball & Crawford, 2006; Elfhag & Rössner, 2005).

Internally-oriented health locus of control. This construct refers to the extent that someone feels that they have control over their own health (e.g. "my health is decided by my own actions"). This was measured using a pre-existing validated Dutch scale (Halfens & Philipsen, 1988). Evidence has suggested that an internal locus of control, and concepts related to an internal locus of control such as autonomy, are associated with healthier lifestyle behaviors (Norman et al., 1998) and weight maintenance (Elfhag & Rössner, 2005).

Social support and discouragement of healthy eating. Social support and discouragement of healthy eating was defined in our study as the perceived levels of support or sabotage for healthy eating that participants observe in their everyday social contexts (e.g. at home, work, social engagements). This was measured using an adaptation of a pre-existing scale (Sallis et al., 1987). Evidence suggests that social support for healthy eating is associated with lower obesity risk (Ball & Crawford, 2006; Ball et al., 2006; Brownson et al., 2001).

Perceived neighborhood collective efficacy. This construct encompasses two main characteristics: perceived social cohesion and informal social control present in a neighborhood. It describes the willingness of community members to look out for one another (Cohen et al., 2006). This was measured using an adaptation from a pre-existing scale (Cohen et al., 2006). Emerging research has suggested that neighborhoods with stronger collective efficacy experience lower levels of overweight and obesity (Cohen et al., 2006).

Perceived neighborhood affordability, availability, and accessibility of healthy foods. This construct measures perceived ease or difficulty experienced in undertaking healthy eating in local environments in terms of affordability, availability, and accessibility. It was measured using an adaptation of a pre-existing scale (Inglis et al., 2008). Findings

from a systematic literature review by Giskes et al. (2010) found that weight status was consistently associated with food environment, greater accessibility to supermarkets and lower accessibility to takeaway outlets.

Socio-demographic characteristics. Socio-demographic data were collected from respondents in the survey. Data were collected on participants' gender; age; number of dependent children living at home; whether or not they live with a partner (married or unmarried); employment status (employed full-time or part-time, unemployed, retired); income level (in Euros); and highest level of education (primary school, high school, vocational school, university degree). Furthermore, evidence suggests that socio-demographic factors including age, gender, household composition, cohabitation as well as socio-economic status predict dietary quality (Darmon & Drewnowski, 2008; Giskes et al., 2010; Ricciuto et al., 2006; Roos et al., 1998).

BMI. Data were available on participants most recently measured weight in kilograms (kg) and body mass index (BMI). Evidence suggests that overweight individuals tend to have unhealthier food choices (Berteus Forslund et al., 2005; Lahti-Koski et al., 2002).

Scales chosen for the study were pre-existing, pre-validated scales. Scales were translated from English into Dutch by a bilingual translator and were subsequently translated back and discussed by the authors to ensure that all questions were understandable and that they measured the same constructs. The SOC-13 scale was pre-tested with college students (n=32) in order to test for readability and whether the translation of scales was understandable. Then, an additional pre-testing of the wording of all survey scales was carried out within the team of researchers that oversees the research panel. From this pre-testing, minor changes were made on wording and grammar within some of the scales. Subsequently, the final version of the survey completed by the research panel participants showed Cronbach's alphas ranging from 0.70-0.95. These values indicate that the survey performed well in the study population (Cronbach, 1951).

Outcome measure: Dietary Score

Participants' eating practices were assessed by examining pre-existing dietary data on average consumption of the following five food items: raw or cooked vegetables; fruits; fish; whole wheat products (rice, grains, dough products, bread); and red meat. We examined only vegetable, fruit, fish and whole grain consumption within the analysis as these foods are the main focus of nutrition promotion campaigns and they are associated with many positive health outcomes including, amongst others, lower risk of obesity (O'Neil et al., 2010) and lower risk of cardiovascular diseases (Hu et al., 2000). We excluded red meat consumption since higher frequency of red meat consumption is associated with negative health outcomes including higher risk of heart disease (Kerver

et al., 2003). Participants could select the following options for each food item: *never, 1 to 3 times per month, 1 time per week, 2 to 4 times per week, 5 to 6 times per week or every day*. The complete rationale for dietary scoring used in the study is presented in Table 4.2. The variable "total dietary score" was computed by taking the sum of the self-reported weekly intake of vegetables, fruit, fish and whole grains. Total dietary scores ranged from the lowest 4 to the highest 20. Higher total dietary score represents healthier dietary practices and greater propensity to comply with Dutch dietary recommendations for fruit, vegetable, fish, and whole grain intake. Based on the distribution of scores, participants dietary scores were stratified into either low dietary score (≤ 14) or high dietary score (15 or higher) for the analysis. Dietary score was examined as a dichotomous variable instead of using the untransformed dietary score because this was more in line with the salutogenic framework. Since salutogenesis is about understanding the factors that support a healthy life orientation, it was important that we studied the group of participants reporting the healthiest dietary practices.

The variable "total dietary score" was computed by taking the sum of the self-reported weekly intake of vegetables, fruit, fish and whole grains. Total dietary scores ranged from the lowest 4 to the highest 20. Higher total dietary score represents healthier dietary practices and greater propensity to comply with Dutch dietary recommendations

Table 4.2 Rationale and recommendations for dietary scoring

Item	Dutch Nutrition Center Recommendations	Scoring
Raw or cooked vegetables	Daily	Less than once per week = 1; once per week = 2; 2-4 times per week = 3; 5-6 times per week = 4; every day = 5
Fruit	Daily	Less than once per week = 1; once per week = 2; 2-4 times per week = 3; 5-6 times per week = 4; every day = 5
Fish	At least twice a week	Less than once per week = 1; once per week = 2; 2-4 times per week = 3; 5-6 times per week = 4; every day = 5
Whole grain products	Daily	Less than once per week = 1; once per week = 2; 2-4 times per week = 3; 5-6 times per week = 4; every day = 5
Total dietary score	Higher total dietary score represents a propensity to better comply with dietary recommendations of the 4 listed food items	Total score was computed by taking the sum of the self-reported regular intake of vegetables, fruit, fish and whole grains

for fruit, vegetable, fish, and whole grain intake. Based on the distribution of scores, participants dietary scores were stratified into either low dietary score (≤ 14) or high dietary score (15 or higher) for the analysis. Dietary score was examined as a dichotomous variable instead of using the untransformed dietary score because this was more in line with the salutogenic framework. Since salutogenesis is about understanding the factors that support a healthy life orientation, it was important that we studied the group of participants reporting the healthiest dietary practices.

Participants

Participants for the study were recruited from the CentERdata LISS research panel. LISS stands for Long-term Internet Studies for the Social Sciences. The panel is the core element of the Measurement and Experimentation in the Social Sciences (MESS) project [101]. This project provides researchers with a platform to use existing data collected in previous studies or to carry out their own surveys and studies. Data collected in the LISS panel are freely available to all academic researchers in the Netherlands and abroad. The panel is a true probability sample of households drawn from the population register by Statistics Netherlands. Panel members regularly complete internet-based questionnaires at home, and households that could not otherwise participate are provided with a computer and Internet connection.

We used a sub-group from the research panel that is involved in a weight monitoring project. In this project, participants weigh themselves regularly and complete questionnaires on a regular basis regarding weight and dieting habits. Furthermore, participants also complete a yearly survey that collects general health and socio-demographic data. Panel members ($n=1001$) 18 years and older who had measured their weight between August 2011 and January 2012 were invited to complete the internet-based survey in January 2013. The survey was fully completed by 944 panel members (response rate 94%). Participants that were pregnant, currently being treated for an eating disorder, following a modified diet due to a health problem or with a serious illness that caused weight loss or gain were excluded from the analysis. Furthermore, participants with missing dietary data were also excluded. This left a total of 703 people whose data were included in the analysis.

Statistical Analysis

Data were analyzed using SPSS 19.0 for Windows (SPSS, Chicago, IL). Chi-square and Mann Whitney-U tests were used to investigate bivariate differences in survey factors between those with a low dietary score and a high dietary score. For the logistic regression analysis, dichotomous variables were created for the outcome variable: *high dietary score* (0=total dietary score of 14 or less, 1=total dietary score 15 or higher) as well as the following independent variables: *being female* (0= male, 1=female); *lives with a partner*

(0=no, 1= yes); *being employed* (0 = retired or unemployed, 1 = employed, full or part-time) and *strong SOC* (0= SOC-13 score 67 and less, 1= SOC-13 score 68 and higher). SOC was examined as a dichotomous variable in the multiple logistic regression analysis since the majority of previous research examining SOC and health also examined it as a dichotomous variable and we were interested to confirm these findings and see if a strong SOC would also be related to healthy eating in a Dutch study population. The cut-off point for strong SOC was chosen based on the median 50th percentile mark of scores. Participants' SOC-13 scores were stratified into either weak SOC (≤ 67) or strong SOC (68 or higher) groups for the multiple logistic regression analysis. A multivariate logistic regression analysis was subsequently performed to test for the predictive value of significant survey factors and the outcome variable 'high dietary score'. Only factors that were found to be statistically significant ($p < .05$) in the bivariate analyses were entered into the multivariate logistic regression model. For the multivariate logistic analysis, a forced entry method was chosen to test all the factors simultaneously to measure their predictive value while controlling for the effects of other factors in the model (Pallant, 2005).

Results

Descriptive analysis

In Table 4.3, descriptive statistics are shown of the differences in percentages or mean scores and SD of the survey variables for participants with low dietary score and with high dietary score. For the socio-demographic factors, gender differed significantly between groups, with more men than women having a low dietary score. The mean age also differed significantly between the groups. Those with a low dietary score tended to be younger than those with a high dietary score. Employment status and net monthly income also differed significantly between the groups. There was a higher percentage of retired people with a high dietary score compared to with a low dietary score. Moreover, the net monthly household income was significantly lower amongst the low dietary score group than amongst the high dietary score group. Furthermore, there was a significantly higher percentage of participants living alone with a low dietary score than participants with a high dietary score.

For the other factors, significant differences were found between the low and high dietary score groups and SOC, nutrition knowledge, flexible restraint of eating score, situational self-efficacy for healthy eating, social discouragement for healthy eating, neighborhood collective efficacy, and neighborhood affordability, availability, and accessibility of healthy foods.

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Table 4.3 Differences in survey factors between participants with low (range 4-14) and high dietary scores‡ (range 15-20)

Factors	Low dietary score (n=388)		High dietary score (n=315)		χ^2 or Z	p-value
	% or mean (SD)	n	% or mean (SD)	N		
<i>Individual level</i>						
SOC-13	64.99 (11.15)	388	68.81 (11.17)	315	-4.59	<.0001**
Nutrition knowledge	5.49 (1.28)	388	5.74 (1.22)	315	-2.52	.012*
Flexible restraint of eating	32.45 (9.54)	387	36.07 (10.70)	315	-4.22	<.0001**
Situational self-efficacy for healthy eating	147.55 (41.43)	387	161.52 (45.43)	315	-4.47	<.0001**
Internally-oriented health locus of control	25.72 (5.33)	387	25.87 (5.62)	314	-7.06	.480
Gender					12.1	.001*
Male	61.3%	238	47.9%	151		
Female	38.7%	150	52.1%	164		
Age (in years)	51.79 (14.55)	388	57 (14.92)	315	-5.00	<.0001**
Education level					7.02	.071
Primary school	7.5%	29	7%	22		
High school	32.5%	126	35.6%	112		
Vocational training	30.7%	119	22.2%	70		
Bachelor's degree or higher	29.4%	114	35.2%	111		
Employment status					18.85	<.0001**
Works full or part-time	59.6%	231	45.7%	144		
Retired	20.9%	81	34.9%	110		
Unemployed	19.6%	76	19.4%	61		
Net monthly household income (€)	2710.03 (1286.94)	355	3019.42 (1494.23)	295	-2.37	.018*
Dependent child in home (% yes)	37.9%	147	31.7%	100	2.61	.106
Lives with partner (married or unmarried) % no	65.1%	108	34.6%	58	8.04	.005*
BMI (kg/m ²)	25.69 (3.65)	292	25.34 (3.66)	255	1.11	.267
<i>Social- and physical environmental level</i>						
Social support for healthy eating	24.76 (6.68)	387	25.39 (6.92)	314	-1.50	.224
Social discouragement for healthy eating	14.89 (5.55)	387	13.92 (5.74)	314	-2.51	.024*
Perceived neighborhood collective efficacy	42.29 (8.99)	387	43.83 (7.62)	314	-1.76	.011*
Perceived neighborhood affordability, availability, and accessibility of healthy foods	58.46 (10.39)	387	59.79 (11.33)	314	-2.47	.014*

Abbreviations: SD standard deviation; € EUROS currency; BMI body mass index; SOC-13 sense of coherence 13 item questionnaire; †Low dietary score is a total dietary score of 14 or less and high dietary score is a total dietary score of 15 or higher, see table 2 for dietary score rationale; *Significance at the level of <.05; ** Significance at the level of <.0001.

Logistic regression analysis

Multivariate logistic regression was performed to assess the combined impact of the predictor factors and the likelihood that respondents have a high dietary score. Table 4.4 lists the odds ratios (OR) and 95% confidence intervals (CI) for the multivariate regression model. The full model containing all 12 factors was statistically significant ($p < .0001$) indicating that the model was able to distinguish between respondents with a high and a low dietary score. In the model, the likelihood ratio test based on -2LL ratio was 923.502. The classification error rate in block 0 with only the constant in the model, was 54.6% and the classification error rate for block 1 with all the independent variables included was 64.7%. The model as a whole explained between 11.7% (Cox and Snell R Square) and 15.6% (Nagelkerke R Square) of the observed variance in dietary scores.

In the multivariate model, 5 of the 12 factors showed to be significant predictors ($p < .05$) of high dietary score in the full model. These variables were: strong SOC; being female; living with a partner; self-efficacy for healthy eating; and flexible restraint of eating. The factors age, full or part-time employment, net monthly household income, nutrition knowledge and social discouragement for healthy eating did not contribute significantly to the likelihood of having a high dietary score in the full multivariate model.

Table 4.4 Multivariate logistic regression analysis with high dietary score[‡] as the dependent variable

Predictor variables	OR (95% CI)	p
Strong SOC	1.66 (1.15-2.36)	0.007**
Nutrition knowledge	1.12 (0.98-1.29)	0.10
Flexible restraint of eating	1.02 (1.01-1.04)	0.013*
Situational self-efficacy for healthy eating	1.01 (1.001-1.01)	0.009*
Being female	1.66 (1.16-2.37)	0.006**
Age (in years)	1.01 (.99-1.03)	0.08
Being employed (full or part-time)	0.74 (0.50-1.11)	0.15
Net monthly household income	1.00 (.99-1.00)	0.10
Lives with partner (married or unmarried)	1.56 (1.01-2.42)	0.045*
Social discouragement for healthy eating	0.99 (0.96-1.02)	0.38
Perceived neighborhood collective efficacy	1.01 (0.99-1.03)	0.46
Perceived neighborhood affordability, availability and accessibility of healthy foods	0.99 (0.97-1.01)	0.25

[‡]Higher dietary score indicates diet is more in line with Dutch dietary recommendations, see Table 2 for dietary score rationale; Abbreviations: SOC-13 sense of coherence 13 item questionnaire; *Significance at the level of $< .05$; ** Significance at the level of $< .01$

Discussion

The main findings of this study suggest that a combination of factors including a strong sense of coherence; being female; living with a partner; a higher flexible restraint of eating; and a higher self-efficacy for healthy eating, all predict healthier eating practices. To the best of our knowledge, this is the first study to apply the salutogenic framework to study a set of factors, including a SOC and other individual, social and physical-environmental level factors, that predict healthy eating in a cross-sectional Dutch population. The findings from this study are relevant since they can complement the known factors that relate to poor eating practices. Future food-health research should consider integrating both “salutogenic” (health-promoting) and “pathogenic” (illness- or disease-promoting) perspectives within research frameworks and methodologies. By doing this, we can shed light on factors that drive both healthy and unhealthy eating practices. Through widening the research lens to embrace both perspectives, we may be able to better understand how we can best prevent nutrition-related problems such as overweight and obesity. Different perspectives point at different aspects of the problem and thus will provide us with strategies that complement each other.

It is important to note that we studied the combined predictive ability of a set of factors in relation to high dietary score rather than measuring single factors. Factors we included in our survey have been studied in relation to food choices; however, no previous research has tested a combination of these factors in relation to healthy dietary practices. This approach to the data collection and analysis is in line with the salutogenic framework which aims to identify the dynamic set of factors that contribute to a healthy life orientation. Therefore, our findings also provide new insights into a combined, multifaceted set of factors that support healthy eating practices. This study also examined more conventionally studied factors that predict unhealthy eating practices including age; income; employment status; education level; nutrition knowledge; social support and discouragement of healthy eating; and perceived food affordability, accessibility, availability of healthy foods within our survey, to test the predictive ability of these factors in relation to healthy eating. However, these factors were not related to higher dietary score amongst the participants in our study. This suggests that amongst our study participants, a set of psychological and social factors relating to gender, cohabitation, situational self-efficacy, coping, and flexible eating strategies may play a more important role in predicting healthier eating practices than the other factors mentioned. However, further research will be needed to confirm and support these findings in other populations and contexts.

Our findings also support previous research that has found associations between SOC and healthy eating practices. People with a strong SOC have been shown to possess more resources, strategies and tools for dealing with challenging situations (Antonovsky, 1979). This may translate to various proactive emotional, behavioral or cognitive mechanisms that people employ to deal with challenges they face with eating. These

types of mechanisms have been shown in previous research to positively influence decisions relating to dietary planning (Zhou et al., 2013) and in amount of food eaten (Poelman et al., 2014). In our participants, self-efficacy and flexible restraint of eating may be just a few of these mechanisms that people employ to deal with eating-related challenges. Future research should explore these strategies and mechanisms further to better understand the relationship between SOC and healthy eating practices, and to support the further application of the salutogenic framework in nutrition promotion research.

Out of all the socio-demographic variables, being female and living with a partner were the only significant predictors of a high dietary score in the multivariate model. Reasons for the gender difference in food choices may have to do with difference in personal beliefs regarding healthy eating and dieting between men and women (Wardle et al., 2004). This may explain why women in our study population reported healthier eating practices than men. However, future research will need to examine this phenomenon further. Cohabitation, or living with others, may have a positive effect on food choices, since eating is a social practice, and people's eating patterns in relation to other people in day to day life (Delormier et al., 2009). This may play a crucial role in shaping and reinforcing healthier eating practices. Previous studies have documented a positive association between cohabitation and eating behaviors amongst older people (Vesnaver & Keller, 2011). This is interesting to note since the respondents in the high dietary score group in our study were older with a mean age of 57 years.

It is important to mention that factors we had expected to be significant, including health locus of control and social support for healthy eating did not differ significantly between the low and the high dietary score groups. Although several studies have found an association between locus of control and food practices, these associations have only been found in people with obesity (von Lengerke et al., 2007). This may explain why we found no significant differences between health locus of control constructs and the low and high dietary score groups amongst our respondents. Similarly, social support has been shown to be a predictor of eating practices specifically amongst people with lower educational attainment (Lawrence et al., 2011), overweight people (Kiernan et al., 2012), and diabetes patients (King et al., 2010). However, studies showing its predictive value amongst general adult cross-sectional populations are limited. Future research will need to explore these associations further.

It is also important to discuss several limitations of our study. Firstly, our study population does not reflect a random population sample. The participants in our study are part of an ongoing weight monitoring study that requires them to record their body weight at regular intervals. It is possible that people joined this study with a desire to lose weight, thus explaining why the mean BMI of both low dietary score and high dietary score groups is in the overweight category. Also, since our participants weigh themselves regularly, they may have a heightened awareness of their dietary, health and weight

management behaviors, which could have affected the answers given on the survey. This could have influenced the results we found, particularly for the more cognitive-related resources for healthy eating such as nutrition knowledge and flexible control of eating. Moreover, the average age of the participants that completed our survey was 57 years old. Consequently, the results may only be representative of older people. Therefore, future research should be carried out on a random population sample to confirm our study findings. Secondly, due to its cross-sectional nature, we are only able to make inferences regarding associations between the set of factors we studied, and the dietary score. Finally, due to limitations in the length of our survey instrument with the research panel, we had to rely upon pre-existing data collected from the panel on dietary intake of a select number of food items. Ideally, we would have administered a 24-hour diet recall or food frequency questionnaire. This would have provided us with more detailed data on respondents' eating practices. This study also had a number of strengths. These included its large sample size, high response rate and its use of a number of pre-tested, pre-validated scales to measure the constructs in our survey instrument.

It will be important that future research determines not only if, but how these factors specifically support a "healthy eating orientation" and to explore mechanisms that drive these factors. We plan to study these questions further in the next phases of our study through testing various mediation models and the application of qualitative methodologies. Exploring these questions will be relevant for informing the development of behavior change strategies and initiatives for nutrition promotion. Since food choices are shown to be multifaceted; dynamic; and complex (Sobal & Bisogni, 2009), future research will need to consider such questions to better understand how these processes can be used within interventions to support people in constructing healthy eating practices.

Conclusion

In conclusion, this study was, to the best of our knowledge, the first to apply a salutogenic approach to determine a combination of factors, including SOC and other individual, social and physical-environmental factors that are associated with healthy eating practices. The findings bring forth new insights, suggesting that a set of factors relating to a strong SOC, being female, cohabitation, higher situational self-efficacy for healthy eating, and higher flexible restraint of eating are associated with a high dietary score amongst a Dutch adult cross-sectional population. This study's findings support the further application of the salutogenic framework within future nutrition promotion research to gain added insights into a set of factors that contribute to healthy eating practices. Furthermore, the findings complement what is already known of the factors that relate to poor eating practices. This can then provide nutrition promotion with a more comprehensive picture of the factors that both support and hinder healthy eating practices.

CHAPTER 5

Food stories: Unraveling the mechanisms underlying healthful eating through narrative inquiry

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Under review

Abstract

This study applied salutogenesis to examine a group of healthy eaters and explore life experiences and coping strategies that foster healthful eating through narrative inquiry. Study participants included seventeen women (aged 36-54) in the highest quartile of dietary quality index scores residing in the Gelderland province of the Netherlands. Transcripts from semi-structured interviews were analysed using interpretive phenomenological analysis. The main results indicate that life experiences gave rise to coping strategies that enabled healthful eating. Experiences included during childhood: accustomed to non-processed foods and positive child-parent interactions and during adulthood: regained stability and structure in stressful life events and forged positive experiences with food. Coping strategies included: organizing eating in an uncomplicated manner; creativity in the kitchen; valuing good food with good company; approaching eating with critical self-awareness; and applying craftiness and fortitude during difficult moments. There is an interplay between life experiences and coping strategies, and this mechanism underpins healthful eating. Findings offer potential entry points for nutrition promotion to foster healthful eating. Health promotion activities should go beyond eating and also include experiential activities involving selection, purchase, and preparation of healthful foods. Besides childhood, other crucial life stages also provide opportunities to foster healthful eating. Nutrition promotion should go beyond eating for physical health towards promoting a flexible, uncomplicated approach to food in everyday life, and also include mental and social aspects of eating.

Purpose

Despite calls to change obesogenic environments and increase the availability of healthier choices, studies show that unhealthful eating and, consequently, obesity, continue unabated worldwide (Imamura et al., 2015). To date, much nutrition research has focused on studying risk factors relating to unhealthful eating (Swan et al., 2015b). Yet in order to understand how to encourage healthful eating, it will be useful to study those that are coping in obesogenic environments, rather than only study the ones that are not coping. In spite of all the unhealthy options, there are still people that eat healthy. What helps them cope with the challenges they face in a sea of unhealthy choices? Very little is known about mechanisms that foster, rather than deteriorate, healthful eating (Swan et al., 2015a). Since health promotion is led by the notion that health is a positive concept emphasizing social and personal resources, as well as physical capabilities (WHO, 1986), then gaining greater understanding into these mechanisms is important for informing effective nutrition promotion strategies.

To further explore the underlying mechanisms that foster healthful eating, we start from Antonovsky's salutogenic framework. Salutogenesis takes a life course perspective and uses the everyday social context as a starting point to understand how people cope with stressors and stay well (Antonovsky, 1979). Antonovsky emphasizes that most health research has a main focus on studying mechanisms behind health breakdown (pathogenesis), while his focus is on coping mechanisms that enable health development (salutogenesis) (Lindström & Eriksson, 2010a). A major concept in salutogenesis is the sense of coherence (SOC), which is defined as a capacity to cope with psychosocial and physical stressors (Lindström & Eriksson, 2010a). When confronted with a stressor, a person with a strong SOC will be motivated to cope; will have the ability to understand the challenge at hand; and will believe that resources are available to cope with stressors (Lindström & Eriksson, 2006). Furthermore, life experiences contribute to the development of a strong SOC and allow one to reach out in any situation and apply the resources appropriate to that stressor. A major systemic review found that those with a strong SOC have better physical and mental health (Eriksson & Lindström, 2006). Evidence also suggests a positive association between SOC and healthful eating (Ahola et al., 2012; Swan et al., 2015b). However, prior research has never applied salutogenesis to examine the mechanisms that foster healthful eating. Consequently, it remains unknown as to what could be done to strengthen SOC through nutrition promotion strategies (Super et al., 2015). Therefore, this research aims to study a group of healthy eaters and explore life experiences and coping strategies that foster healthful eating.

Participants

Healthy eaters were identified and recruited using purposive sampling from the NQplus research panel at Wageningen University. Research panel participants all live in the province of Gelderland in the Netherlands. They receive a physical health check (e.g. height, weight, blood pressure) and complete a food frequency questionnaire (FFQ) that measures consumption of the major food groups as well as salt, fat, sugar and convenience foods. From the FFQ, a diet quality index (DQI) score is computed that measures diet quality in relation to the Dutch dietary guidelines. Those meeting the following inclusion criteria at the time of sampling were recruited:

- highest quartile of DQI scores
- female
- cohabiting
- aged 35-55 years

Females living with a partner were chosen for this study since a previous quantitative study found that these two factors predicted healthful eating in a cross-sectional Dutch population (Swan et al., 2015b). Those aged 35-55 were targeted to ensure that participants had a sufficient range of life experiences to discuss with researchers. People meeting the inclusion criteria (n=33) were sent a study recruitment invitation by email. From these emails, 17 women agreed to take part in this study. The participants' ages ranged from 36-52 years old (mean age 47), they all had tertiary education and all but one were employed.

Methods

Life experiences were examined through a qualitative methodology known as narrative inquiry, which is defined as systematic listening to people's life stories (Keats, 2009). A life course perspective was taken since it can contribute to understanding social and biological pathways of health behavior over the life span (Devine, 2005). Stories were elicited through timelines, an established research tool involving drawing and visually exploring life experiences (Sheridan et al., 2011). The timelines helped guide the interviews through what participants marked as significant and meaningful life experiences. Participants were also asked to construct a "Food and Me" box, which represented aspects that were important to them in terms of eating. Participants could include any objects that were meaningful to them, such as food items, photographs, utensils, pictures of meal settings and so forth. The box was used as a tool to help participants reflect on their current eating practices and to enhance narrative depth and storytelling during the interview.

An introductory meeting of 30 minutes took place in participants' homes. Interviewers (the first and third author) explained the research aim and instructions, and provided materials for the timeline and food box. Participants signed a study consent form and were given 1-2 weeks to construct their timelines. Interviewers then returned to

participants' homes for an in-depth interview (duration 60-80 minutes) that centered on timelines. The interviewers probed with questions when they wanted participants to describe ideas or events further (e.g. how old were you when you met your partner?). All interviews were recorded on a hand held digital recorder, and were later transcribed verbatim by the research team.

Analysis of interviews

Transcripts were analyzed using interpretative phenomenological analysis (IPA). IPA was chosen since it takes into account the world of participants and analyzing articulation of events, processes and relationships (Larkin et al., 2006). Coding of transcripts followed the protocol described by Smith and Osborn (Smith & Osborn, 1997) and was guided by the overall research aim. First, transcripts were read and re-read to become familiar with the data. Then, researchers noted any salient points in the left side margin in an open coding procedure. The notes were literal and paraphrased the participant's narrative. Then, more elaborate sentences were formed on the right hand margin. These sentences were drawn directly from the left hand side comments and echoed a slightly higher level of interpretation. For instance, an open comment in the left hand margin of "enjoys cooking with her husband" was interpreted at a higher level as "cooking as a social practice." Particular attention was given to: (a) stressors, (b) heuristics, and (c) social and historical life path. Stressors were defined using Antonovsky's description as psychosocial, physical or biochemical stressors confronted in daily life (Antonovsky, 1979). Heuristics are strategies people employ to make judgments in moments of uncertainty (Peters et al., 2006). These were identified in order to examine specific coping strategies that participants employ to organize their eating practices in response to potential stressors. The social and historical life path referred to significant people and events that were important in the life course of participants. This was chosen since the social and historical context greatly influences the development of health in salutogenesis (Antonovsky, 1987) and individual food choice (Furst et al., 1996).

Findings were discussed by the research team and compared at length until a consensus was achieved on emerging themes. Then researchers attempted to make sense of the connections between emerging factors and similar factors, which were then clustered together. Researchers then compared these and produced a table of major factors, along with supporting text, which reflect food-life experiences and coping strategies across the interview transcripts.

Results

Factors operating along the life course played a key role in developing healthful eating. Specifically, participants described specific food-related as well as more general life experiences (Figure 5.1). Experiences had a cumulative learning effect through the life course and these gave rise to coping strategies for healthful eating.

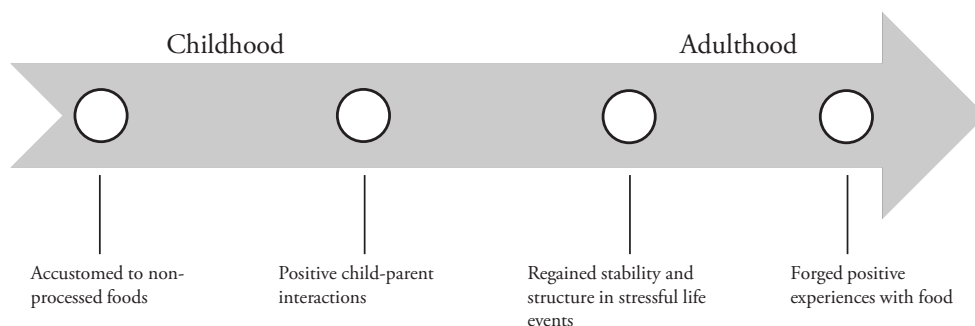


Figure 5.1 Overview of study participants' significant experiences through the life course

Life experiences

Major life experiences included during childhood: accustomed to non-processed foods and positive child-parent interactions and during adulthood: regained stability and structure in stressful life events and forged positive experiences with food.

Accustomed to non-processed foods

All participants grew up in the 1960s and 1970s, and during this time, the availability of commercially processed foods was limited in the Netherlands. This aspect is central in that their exposure to these foods was automatically restricted, thus limiting habitual consumption of these foods. Instead, they became accustomed to non-processed foods and this became the norm for them. As a result, the participants used a language of dislike or aversion towards processed foods such as ready-made meals and fast food. This was a major unifying element in the participant's narratives.

Positive child-parent interactions

Participants gave detailed descriptions of food practices from their childhood, with emphasis on the social context. These came in the form of vivid recollections regarding the presence of positive child-parent interactions around the dinner table and through caring and nurturing actions from parents. If the food was appetizing diverse and even more so, if participants recalled good family interaction, then this had a strong effect later on in the lives of the participants. In fact, when both of these elements were present, participants would re-create this positive social eating context they recalled in their youth in their current eating practices. In cases where food was not recalled that tasty or diverse, the pleasurable memories around the dinner table seemed to have moderated the effect. For instance, one participant described how although her mother was not a very good cook, she tried her best. Through her narrative, there is a feeling of warmth expressed towards her mother that seems to have moderated the negative effect of unappetizing foods. In this sense, while the taste of the food is significant, the emotions surrounding it are demonstrated to be just as crucial.

Regained stability and structure in stressful life events

All of the participants went through stressful life events during some point in their lives. Events ranged from cancer, sexual abuse and death of loved ones, to challenging transitions such as emigrating to a new country or work-related stress. For some participants, these events had a negative impact on their food habits. One common element that helped participants rebound from difficult moments was regaining stability and overall structure in their lives. This was outwardly recognized as being a contributor of good health habits for many participants. For example, one participant described a difficult period with her weight, linking it to pressure in a competitive sport she was involved in and family problems. However, later on in her narrative, she discussed how gaining a more stable life situation and having no external pressure helped her stabilize her relationship with food in a pleasurable way.

Rebounding from these challenges was facilitated for some participants through contextual factors, such as the help of a supportive partner or family. Overall, there seems to be a direct link between the emotional stability supported by contextual factors and the ability to sustain healthful eating. For example, one participant became a dysfunctional eater when she went through depression. She explained how she had food aversions due to her poor emotional state. In this case, she made the decision to go home to live with her parents in order to get the support she needed to get better. In the end, their non-judgmental approach and support helped her overcome this stressor.

Forged positive experiences with food later in life

For the participants who did not have pleasurable food experiences from childhood, building them later on in life held a crucial role. This occurred through encountering situations where they were able to associate food with positive and pleasurable experiences. Constructing positive experiences occurred at different points during adulthood and in different contexts.

For some participants, this occurred when they were “leaving the nest.” At this time, they became more interested in food through communal living with roommates, doing their own grocery shopping, becoming empowered to make their own personal choices and freeing themselves of parental structural dependence. For example, one participant mentioned that her mother followed a very traditional cooking pattern and when she left home, she began eating more exotic types of food. She managed to do so by making her own choices regarding the meals and also cooking with a friend.

For other participants, experiences were forged when they met a supportive partner that was either a hobby cook or professional chef. Partners were described as pro-active and hands-on in the kitchen and had “a positive influence” in helping them learn new things related to cooking, as well as different international cuisines. This seems to have been an important supportive factor when it came to continuing on a healthful eating path.

For participants that were able to travel outside the Netherlands, the effects were positive in that it helped them discover new cuisines, inspired new cooking styles and eating practices, and helped to develop an appreciation of different flavors. For one participant, her travels through Mexico not only had an influence on what she ate, but how she ate. She was a fast eater as a child but when she was in Mexico she learned to eat slower and take the time to enjoy her food more.

Coping strategies

Life experiences gave rise to coping strategies that helped organize eating practices towards health. Strategies included 1) organizing eating in an uncomplicated manner; 2) applying creativity in the kitchen; 3) valuing good food with good company; 4) approaching eating with critical self-awareness; and 5) applying craftiness and fortitude during difficult moments (see Figure 5.2 for an overview).

Organizing eating in an uncomplicated manner

Participants described their current eating practices as very down-to-earth and as a way of life and never in an obsessive or extreme way. The word diet rarely came up in conversations, and some even mentioned that they disliked the word. In this sense, healthful foods just seemed to be part of their lifestyle and did not require a lot of extra effort. This approach to eating also was applied to cooking practices.

One participant described in a very nonchalant way how she easily whips up a quick and healthy stir fry meal in 20 minutes. Another participant described how she cooks meals from scratch every day despite the fact that she was a busy working mother with two children. She also had the perception that cooking fresh meals was an uncomplicated matter and she left more complex dishes for the weekend when she had more time for it. She further described her strategy as having selected a number of recipes that she knew by heart and could prepare in half an hour.

Applying creativity in the kitchen

Many of the participants discussed how they were experimental in the kitchen, prepared colorful and diverse dishes, and were not afraid of tasting new foods or to cook foreign dishes. This was especially the case for participants who had been uninspired by the food they ate during childhood. Some discussed how they now like many vegetables that they used to think were unpalatable. They either learned this through trial and error with cooking, by finding inspiration in cook books, or being exposed to exotic foods through their travels. It is also important to note that the participants had developed a good amount of cooking skills after the years or had a partner with an interest in cooking, so this helped them in approaching new recipes in a confident manner.

Valuing good food, with good company

Food played a larger role than just to support and nourish physical health. The participants associated food with pleasurable tastes and enjoyable social contexts. For them, food means enjoyment and fun, and for many it was also a hobby. For most of the participants, food had a high priority in their lives and it was integrated into a larger scheme of social interaction and quality family times. By doing so, food was associated with fun and pleasurable moments with loved ones. While some kept it more intimate by simply eating sit down meals with their families on a regular basis, others enjoyed making it a bigger social event, for example, with cooking clubs.

Many also mentioned that during childhood, sweets or cakes were served as a weekend treat or during celebratory moments. When these were served, they were homemade and not something bought from the shops. They reflected on these experiences and how they supported them in appreciating the value of homemade, fresh tastes. Therefore, they were not tempted by ready-made cakes and sweets available at the shops. Instead they found it more enjoyable and tasty to make these things themselves at home.

Approaching eating with critical self-awareness and flexibility

Many participants exhibited a high degree of foresight and mindfulness towards food. When faced with food cravings due to a poor state of mind, stress or tiredness, they were able to step back and separate their emotions from physical hunger. For example, one participant was able to resist temptation by taking a “time out” and thinking about why she wanted to eat something and trying to be fully aware of her actions’ potential aftermath and long-term effects. Another participant was able to reflect on a difficult time in her past and why she lost a lot of weight. Emerging from that experience, she became more conscious and aware of her current eating practices, helping her see that being “happy in her own skin” supports her in eating better.

Participants did not talk about following strict diets, nor did they have many self-prescribed rules about what and how much they ate. If they did have some rules for themselves, these rules were not set in stone and they were modified depending on the context or their state of mind. This allowed them a certain level of flexibility since they typically did not deny themselves if they had any cravings. Participants explained that they occasionally treat themselves to things like chocolate or ice cream and never feel guilty about it. Some said that if they did indulge, they chose for “higher quality” treats (e.g. dark chocolate with 80% cacao solids versus milk chocolate). One participant described her tactic to prevent overeating when buying her favorite treat, ice cream. When she occasionally buys it she always gets the mini individual sizes rather than a large portion. In this sense the idea of indulging oneself in moderation and not being too rigorous with oneself was very strong and seemed to help participants to stay on track with their eating.

Applying craftiness and fortitude during difficult moments

Time was often evoked as a limitation as the participants were busy juggling work, social obligations and in some cases, children. However, in many situations, strategies were crafted in order to work around these inevitable time limitations and sustain healthful eating. For one participant, juggling a part time job with a long commute, raising two children, and staying on track with her eating was a challenge. She described how she got up at 5 am every morning so she had time to prepare healthful foods and snacks for the day ahead.

Although some participants had faced a diagnosis or health condition, they did not act helplessly. They had a rational and accepting language towards the matter and attempted to overcome it with a high level of determination. For example, there was an overall feeling of personal strength throughout the narrative of one participant that had gone through cancer. She described herself as “mentally strong” and “not panicking easily.” She realized that though it was important to have people around her to support her through it, she ultimately needed to learn to cope with it herself. In this sense, having the self-confidence that they would be able to cope and handle things that came their way, was at the core of these participant’s strength and power.

Conclusion

Overall, the main findings from this study bring forth new insights into how factors along the life course give rise to healthful eating. Specifically, we found that the interplay between life experiences and coping strategies acts as the underlying mechanism fostering healthful eating (Figure 5.2).

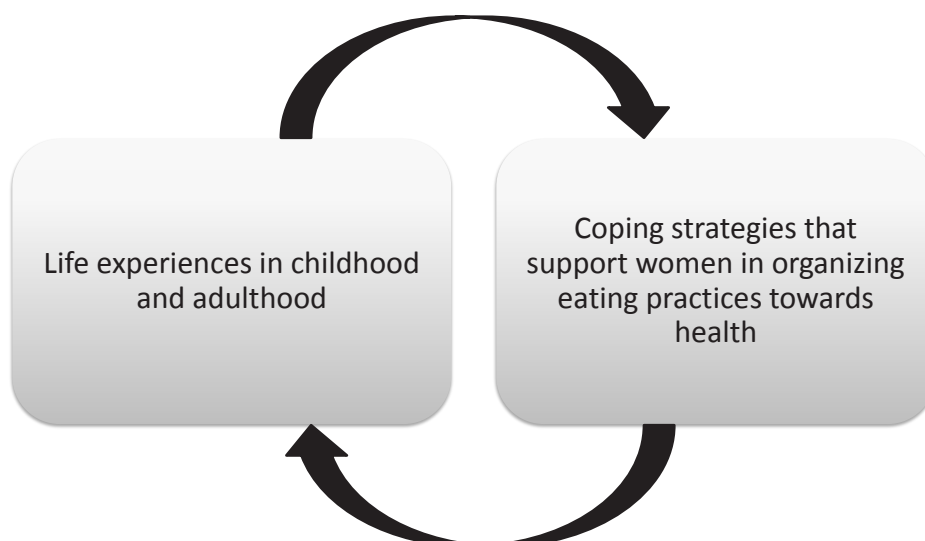


Figure 5.2 Interplay between life experiences and coping strategies support women in organizing eating practices towards health through the life course as shown in the research findings

Furthermore, life experiences had a cumulative learning effect during the life course and were not restricted to only childhood. Drawing from Wittgenstein's metaphor (Wittgenstein, 1953), although participant's experiences were unique and personal, they bear a "family resemblance" to one another. In the family resemblance theory, "it is not necessary to look for unity. Things which may be thought to be connected by one essential common feature may in fact be connected by a series of overlapping similarities, where no one feature is common to all" (Wittek & Kvernbekk, 2011). Findings also suggest that participants' coping strategies go beyond supporting only nutrition behaviors and towards dealing with food and eating in the context of everyday life. Participants took a flexible and uncomplicated approach to eating and applied critical self-awareness, self-belief, and resourcefulness when facing stressors. Moreover, emotionally- and socially-supportive contexts were instrumental in constructing coping strategies. Advancing knowledge of this interplay between overall life circumstances and coping strategies for healthful eating is important for health promotion.

In nutrition promotion, much attention is directed towards the individual, with a focus on increasing knowledge on nutritional content and risks and benefits of current eating habits on physical health (Bouwman & Swan, 2014). Yet this approach overlooks the social context in which eating occurs, and thus nutrition advice can be difficult for people to apply in everyday life. When discussing ways they construct healthful eating, participants referred more to these socially-embedded, action-oriented strategies, and less to macronutrients or eating for physical health. A recent review of qualitative studies confirms that people assign diverse personal, social and cultural meanings to healthful eating (Bisogni et al., 2012). Nutrition promotion would benefit from complementing existing efforts by developing personally- and contextually-relevant strategies that enable healthful eating (Bisogni et al., 2012). Such strategies form part of the solution and help people in accomplishing lifestyle changes in the context of their everyday lives (Van Woerkum & Bouwman, 2012). Our findings also show that there can be multiple entry points for nutrition promotion strategies in that strengthening coping strategies can foster more coherent and meaningful life experiences and vice versa. For example, by emphasizing the benefits of cooking and sharing wholesome meals together with loved ones, health promotion can help people in forging more positive experiences with food. In health education, there is a strong emphasis on supporting healthful eating in childhood since it is a crucial stage in developing lifelong health behaviors (Schwartz et al., 2011). However, for participants in our study that had inadequate childhood food experiences, there was a possibility to forge these later in life. This is quite relevant as it suggests that it is never too late to promote healthful eating. This finding gives impetus for the development of nutrition promotion strategies that encompass all life course stages.

Another important finding is that participants were not overly strict about what they ate (many disliked the word diet) and that healthful eating represented a way of life,

thus not requiring too much effort. A previous qualitative study with Dutch consumers about healthful eating also found that participants emphasized a relaxed approach to eating and distanced themselves from being perceived as “health freaks” (Bouwman et al., 2009). Previous quantitative studies found that having a flexible approach to eating, as opposed to a dichotomous approach was associated with healthier eating practices (Swan et al., 2015b). These findings underpin the importance of communication strategies that incorporate a more relaxed approach into nutrition advice rather than a prescriptive approach. This can help people to build changes into their everyday lives and make healthful eating manageable in the long term.

For many participants, a warm and supportive social context was in the backdrop of their narratives. Therefore, positive interactions went beyond food itself and towards making an opportunity for togetherness and sharing. This is in line with a previous study that found that food upbringing, particularly enjoyable family activities and rituals that included fruits and vegetables, positively influenced fruit and vegetable consumption later in life (Devine et al., 1998). This supports the fact that there should be more of an emphasis on encouraging a positive social atmosphere and interactions with food within nutrition promotion. Part of these positive interactions can involve activities including cooking clubs or community gardens, which have been shown to promote healthier eating (Gatenby et al., 2011).

Study strengths include its rigorous recruitment process of healthy eaters, which was based on DQI score derived from an extensive FFQ. Another strength was the research tool of timelining. Since this study facilitated storytelling and self-reflection, interviews were not led by the researchers own agendas but by what participants felt meaningful and relevant. Due to the purposive selection criteria, participants were all cohabiting, well-educated women living in eastern Netherlands with ages between 36-52 years. Therefore, we do not know if findings can transfer to other groups. However, our findings can be considered a grounded indication of a research phenomenon that deserves further attention. Future research should explore these questions further to understand what generates healthful eating in other socio-demographic groups and cultural contexts. Nutrition research and practice should consider applying the timeline methodology as it can be a useful tool to get deeper insights into the “whys and hows” of eating behavior, and the social and historical context that influences healthful eating. The findings brought forth in this study offer nutrition promotion alternative factors along the life course that enable healthful eating. Firstly, besides focusing only on childhood, nutrition promotion should also take into account other crucial life stages as these can also provide significant opportunities to shape healthful eating practices. Secondly, interventions should also look beyond only focusing on eating for physical health and include the mental and social factors that support healthful eating. Thirdly, nutrition advice should be made less complex and didactic, and instead promote a

flexible, uncomplicated approach and encourage positive interactions and experiences with food.

This study provides the impetus for further application of salutogenesis in nutrition promotion research. Pathogenic approaches in nutrition research identify determinants of unhealthful eating. Salutogenesis complements this knowledge by bringing forth new understanding of factors and mechanisms that enable healthful eating. Through this additional salutogenic lens, we can gain a more complete understanding of the origins of healthful eating in the everyday context.

CHAPTER 6

Conclusion and discussion

Introduction

The overall aim of this research was to contribute to a better understanding of healthful eating in the context of everyday life. To accomplish this, we applied the salutogenic model of health and mapped factors underlying the development of SOC and studied which of these factors are predictors for healthy eating. We also unraveled how people develop healthful eating practices in everyday life. The integrated findings are used to propose building blocks for salutogenic-oriented promotion of healthful eating.

In this chapter, we first summarize the main findings from each chapter followed by the overall conclusion and an integrated understanding of healthful eating. Then, we discuss the relevance of our findings, implications for future research and methodological considerations. Finally, we translate the new insights brought forth in this research into 3 specific building blocks for salutogenic-oriented nutrition promotion.

Summary of main findings

The main empirical findings of the studies undertaken in this research project described in chapters 2 to 5 are outlined in Table 6.1.

In **chapter 2**, we explored the possibilities of applying the salutogenic framework as a complementary approach to biomedical-oriented nutrition research and practice. Previous studies take a mostly biomedical-oriented approach and focus on unhealthful eaters to better understand risk factors that determine unhealthful eating. Though relevant for curative medicine, such an approach limits the evidence base for health promotion, which is guided by the principles that personal and social resources are preconditions for health and well-being (WHO, 1986). On top of this, biomedical-oriented nutrition promotion takes a reductionist approach and studies and enacts upon either the individual or the external environment. Disjointedly studying and enacting upon people and context may be easier yet it does not do justice to reality and limits relevance and applicability in everyday eating situations. The salutogenic model of health can provide complementary knowledge on what is already known through biomedical approaches. It guides the study of the dynamics between people and their environment and how health develops from this interaction. Moreover, since salutogenesis guides the study of health as an interplay between physical, mental, and social factors, it is more in line with how people experience eating in their everyday lives.

In the study in **chapter 3**, we examined individual, social, and physical-environmental factors that underlie SOC in a cross-sectional sample of Dutch adults. Dutch adults (n=781) participated in a cross-sectional study examining the relationship between SOC and a set of individual, social- and physical-environmental factors. The main findings indicate that high SOC was significantly ($p<0.05$) associated with a diverse set of factors including lower doctor oriented MHLC; higher satisfaction with weight; higher situational self-efficacy for healthy eating; lower perceived social discouragement

Table 6.1 Summary of main research findings

Thesis Chapter	Questions and main findings
Chapter 2	<p data-bbox="379 311 473 334"><u>Objective</u></p> <p data-bbox="379 340 1156 396">Explore the possibilities of applying the salutogenic framework as a complementary approach to biomedical-oriented nutrition research and practice.</p> <p data-bbox="379 426 515 450"><u>Main findings</u></p> <p data-bbox="379 455 904 479">Most nutrition research has a biomedical-orientation by:</p> <ul data-bbox="431 484 1142 658" style="list-style-type: none"> • Focusing on studying risk factors leading to poor dietary behaviors. • Orienting towards pathogenesis, the study of disease origins and causes. • Considering disease and infirmity to determine preventive or curative strategies. • Emphasizing risks to individual, physical health. • Studying eating practices without considering contextual influences. <p data-bbox="379 689 1156 745">The salutogenic framework complements the current biomedical-oriented approach and provide research insights that have greater relevance in everyday life by:</p> <ul data-bbox="431 751 1184 981" style="list-style-type: none"> • Considering all aspects of health, viewing health as not only the absence of disease but as quality of life and well-being. • Answering the question of how health arises from active participation in lifelong learning experiences. • Providing a framework to study the dynamic interplay between individual and context. • Guiding the study of patterns and mechanisms rather than factors bound to either people or their environment are studied.
Chapter 3	<p data-bbox="379 1006 473 1029"><u>Objective</u></p> <p data-bbox="379 1035 1156 1091">Map the association between a set of individual, social-environmental, and physical-environmental factors and SOC in Dutch adults.</p> <p data-bbox="379 1122 515 1145"><u>Main findings</u></p> <p data-bbox="379 1151 984 1174">Statistically significant factors in the multivariate model ($p < 0.05$)</p> <ul data-bbox="431 1180 1184 1441" style="list-style-type: none"> • Higher situational self-efficacy for healthy eating • Higher satisfaction with weight • Lower doctor oriented MHLC • Lower perceived social discouragement for healthy eating • Higher perceived neighborhood collective efficacy • Higher perceived neighborhood affordability, accessibility and availability of healthy foods • Age • Income level <p data-bbox="379 1472 788 1495">Non-statistically significant factors ($p \geq 0.05$)</p> <ul data-bbox="431 1501 921 1734" style="list-style-type: none"> • Gender • Employment status • Education level • Cohabitation • BMI • Nutrition knowledge • Internally oriented and chance oriented MHLC • Perceived social support for healthy eating

Chapter 4

Objective

Map the association between a set of individual, social-environmental, and physical-environmental factors and healthy dietary practices in Dutch adults.

Main findings

Statistically significant factors in the multivariate model ($p < 0.05$)

- Strong sense of coherence
- Higher flexible restraint of eating
- Higher situational self-efficacy for healthy eating
- Being female
- Cohabitation

Non-statistically significant factors ($p \geq 0.05$)

- Age
- Employment status
- Income level
- Education level
- Nutrition knowledge
- Flexible restraint of eating
- Internally oriented MHLC
- Perceived social support for healthy eating
- Perceived social discouragement for healthy eating
- Perceived neighborhood collective efficacy
- Perceived neighborhood affordability, availability and accessibility of healthy foods

Chapter 5

Objective

Unravel the underlying mechanisms of life experiences and coping strategies that foster healthful eating.

Main findings

- Factors operating along the life course played a key role in developing healthful eating. Specifically, food-related and more general life experiences had a cumulative learning effect through the life course and these gave rise to coping strategies for healthful eating.
- There is an interplay between participants' life experiences and coping strategies, and this mechanism underpins healthful eating.
- Factors along the life course

Life experiences

- Accustomed to non-processed foods in childhood
- Positive child-parent interactions in childhood
- Regained stability and structure in stressful life events during adulthood
- Forged positive experiences with food in adulthood

Coping strategies

- Organizing food in an uncomplicated manner
 - Applying creativity in the kitchen
 - Valuing good food with good company
 - Approaching eating with critical self-awareness and flexibility
 - Applying craftiness and fortitude during difficult moments
-

for healthy eating; higher perceived levels of neighborhood collective efficacy; and higher perceived neighborhood affordability, accessibility and availability of healthy foods. Non-significant factors ($p \geq 0.05$) included gender; employment status; education level; cohabitation; BMI; nutrition knowledge; flexible restraint of eating; internally oriented MHLC; chance oriented MHLC; perceived social support for healthy eating. These findings are relevant since they can inform the design of nutrition interventions that target factors that strengthen SOC and provide the building blocks for a healthier life orientation.

Next, the study in **chapter 4** aimed to determine a set of individual, social and physical-environmental factors that predict healthy eating practices in a cross-sectional study of Dutch adults. Data were analyzed from participants ($n=703$) that completed the study's survey and logistic regression analysis was performed to test the association of survey factors on the outcome variable high dietary score. In the multivariate logistic regression model, five factors contributed significantly ($p < 0.05$) to the predictive ability of the overall model: being female; cohabitation; a strong sense of coherence; flexible restraint of eating; and self-efficacy for healthy eating. Non-significant factors ($p \geq 0.05$) in the multivariate logistic regression model included age; employment status; net monthly household income; education level; nutrition knowledge; internally oriented MHLC; perceived social support and discouragement for healthy eating; perceived neighborhood collective efficacy and perceived neighborhood affordability, availability and accessibility of healthy foods. Findings complement what is already known of the factors that relate to poor eating practices. This provides nutrition promotion with a more comprehensive understanding of the factors that both support and hinder healthy eating practices.

Lastly, the qualitative study in **chapter 5** examined a group of healthy eaters and applied a life course perspective to explore life experiences and coping strategies that foster healthful eating. The study was undertaken with seventeen Dutch women (aged 36-54) in the highest quartile of dietary quality index (DQI) scores. The main findings showed that factors operating along the life course played a key role in developing healthful eating. Specifically, life experiences gave rise to coping strategies that enabled healthful eating. Experiences included during childhood: accustomed to non-processed foods and positive child-parent interactions and during adulthood: regained stability and structure in stressful life events and forged positive experiences with food. Coping strategies included: organizing eating in an uncomplicated manner; applying creativity in the kitchen; valuing good food with good company; approaching eating with critical self-awareness; and applying craftiness and fortitude during difficult moments. The findings suggest that there is an interplay between life experiences and coping strategies, and this mechanism underpins healthful eating. Findings can inform nutrition promotion on factors along the life course that enable healthful eating.

Conclusion and integrated findings

This research carried out four studies. Based on the findings from these studies, we conclude that healthful eating results from exposure to individual- and context-bound factors during childhood and adulthood and involves specific mental and social capacities relevant to cope with everyday life situations and challenges. As shown in Table 6.2, the integrated findings from the studies show that healthful eating results from three composite factors.

Overall we found that healthful eating results from three composite factors in particular. Firstly, healthful eating results from and enables **balance and stability in life**, represented by a strong SOC, which characterizes a balanced mixture of giving meaning to eating as an integral part of life, comprehending its importance to oneself, and having competencies to manage its organization in the everyday social context. In the life course, healthful eating also results from having regained stability and structure in stressful life events and applying craftiness and fortitude during difficult moments. Secondly, healthful eating is rooted in a **sense of agency**, which refers to the feeling of being in control of one's own actions (Haggard & Chambon, 2012), in regards to the ability to take responsibility, have autonomy, and “be in the driver's seat” with ambitions and actions related to eating and life in general. This sense of agency results from and enables flexibility, lower doctor oriented MHLC, applying creativity in the kitchen, and approaching eating with critical self-awareness. Thirdly, healthful eating results from and enables **sensitivity to the dynamics of everyday life**, with regards to how people deal with and navigate through everyday challenging situations by applying individual- and context-bound factors including situational self-efficacy for healthy eating, organizing eating in an uncomplicated manner, valuing good food with good company, and perceiving less social discouragement for healthy eating from family and friends.

Table 6.3 provides the complete picture of previously known risk factors and factors indicated in our studies. Along with examining health-promoting factors, we also examined factors that have been shown to predict unhealthful eating in previous research including BMI; socio-economic factors; nutrition knowledge; restraint of eating; self-efficacy; MHLC; social support and discouragement of healthy eating; collective efficacy; and perceived food affordability, accessibility, and availability of healthy foods. Few of the indicated factors in our studies converged (*highlighted in pink in Table 6.3*) with risk factors for unhealthful eating found in previous studies, including coping, self-efficacy, restraint of eating, and social situation. Thus, the set of factors related to the origins of health substantially diverged (*highlighted in green in Table 6.3*) from the set of factors related to the origins of disease. The salutogenic approach is rooted within health promotion, which differs from the biomedical approach that is rooted in disease prevention. Therefore, this leads to different research questions and

Table 6.2 Highlighted in pink, green and blue, the three composite factors that enable healthful eating as shown in the integrated research findings

Factors	Survey: factors associated with healthful eating	Survey: Factors associated with SOC	Interviews: Factors operating along the life course
<i>Individual factors</i>			
Weight-related	Non-significant	Higher satisfaction with weight	Not appearing
Socio-demographic	Being female	Are older Have a higher income	Not appearing
Coping factors	Strong SOC	Factor not studied	Regained stability and structure in stressful life events Applying craftiness and fortitude during difficult moments
Nutrition knowledge	Non-significant	Non-significant	Not appearing
Food-related skills and abilities	Factor not studied	Factor not studied	Applying creativity in the kitchen
Restraint of eating	Flexible restraint of eating	Non-significant	Approaching eating with critical self-awareness and flexibility
Self-efficacy for healthful eating	Higher situational self-efficacy for healthy eating	Higher situational self-efficacy	Organizing eating in an uncomplicated manner
Locus of control	Non-significant	Lower doctor-oriented MHLC	Forged positive experiences with food
Childhood food-related factors	Factor not studied	Factor not studied	Accustomed to non-processed foods

Social-environmental factors

Bonding	Factor not studied	Factor not studied	Positive child-parent interactions
Social situation	Cohabitation	Non-significant	Valuing good food with good company
Social support and discouragement	Non-significant	Lower perceived social discouragement for healthy eating	Not appearing
Neighborhood social relations	Non-significant	Higher perceived neighborhood collective efficacy	Not appearing

Physical-environmental factors

Perceived neighborhood food environment	Non-significant	Higher perceived affordability, accessibility and availability of healthy foods	Not appearing
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Pink = balance and stability

Green = sense of agency

Blue = sensitivity to the dynamics of everyday life

thus, different results. From this, we conclude that the ‘origins of health’ differ from the ‘origins of disease’. Hence, factors that foster and support healthful eating are not simply the reversed version of the factors known to increase the risk of unhealthy food choices. This implies that a different set of factors should inform health promoting strategies, in addition to the factors informing strategies targeting the prevention of diet-related illnesses.

Discussion of integrated findings

The integrated findings show that healthful eating goes beyond physical health and is related to a number of mental and social factors. In terms of social factors, we found in the quantitative study that cohabitation and in the qualitative study valuing good food and good company and positive parent-child interaction supported healthful eating. There are also a number of mental factors underlying healthful eating. For example, in the quantitative study, mental factors included SOC; situational self-efficacy for healthful eating and higher flexible restraint of eating. In the qualitative study, other mental factors that supported healthful eating included regained stability and structure

Table 6.3 Overview of the divergence and convergence of factors found in previous research to be associated with unhealthful eating and factors associated with SOC and healthful eating identified in this research

Factors	Factors associated with unhealthful eating in previous research	Factors associated with healthful eating in this research	Factors associated with SOC in this research	Factors operating along the life course in this research
Individual factors				
Weight-related	Lower satisfaction with weight (Forman-Hoffman, 2004; Neumark-Sztainer et al., 2006) Higher BMI (Bertus Forslund et al., 2005; Lahti-Koski et al., 2002)	Non-significant	Higher satisfaction with weight	Not appearing
Socio-demographic	Lower socio-economic status (Darmon & Drewnowski, 2008) (Beydoun & Wang, 2007; Turrell et al., 2002)	Being female	Higher age Higher income	Not appearing
Coping	Weak SOC (Bernabé et al., 2010; Lindmark et al., 2011; Lindmark et al., 2005; Myrin & Lagerström, 2006; Wainwright et al., 2007)	Strong SOC	Factor not studied	Regained stability and structure in stressful life events Applying craftiness and fortitude during difficult moments
Nutrition knowledge	Poor nutrition knowledge (Beydoun & Wang, 2007; Biloft-Jensen et al., 2009; Eurobarometer, 2006; Kolodinsky et al., 2007)	Non-significant	Non-significant	Not appearing
Food-related skills and abilities	Factor not studied	Factor not studied	Factor not studied	Applying creativity in the kitchen
Restraint of eating	Lower flexible restraint of eating (Contento et al., 2005; Westenhoefer et al., 1999)	Higher flexible restraint of eating	Non-significant	Approaching eating with critical self-awareness and flexibility
Self-efficacy for healthy eating	Lower self-efficacy (Fitzgerald et al., 2013; Stotland et al., 1991)	Higher situational self-efficacy for healthy eating	Higher situational self-efficacy for healthy eating	Organizing eating in an uncomplicated manner
Locus of control	Higher chance-oriented MHLC (Bennett et al., 1994; Steptoe & Wardle, 2001)	Non-significant	Lower doctor-oriented MHLC	Forged positive experiences with food

Childhood food-factors	Using food to control behavior through reward or punishment (Puhl & Schwartz, 2003); and parental restrictive feeding practices (Birch & Fisher, 2000; Fisher & Birch, 2000)	Factor not studied	Factor not studied	Accustomed to non-processed foods
Social-environmental factors				
Bonding	Factor not studied	Factor not studied	Factor not studied	Positive child-parent interactions
Social situation	Living alone (Dean et al., 2009; Horwath, 1989)	Cohabitation	Non-significant	Valuing good food with good company
Social support and discouragement	Lower social support (Conklin et al., 2014; Fitzgerald et al., 2013; Kiernan et al., 2012; Tamers et al., 2011)	Non-significant	Lower social discouragement for healthy eating	Not appearing
Neighborhood social relations	Lower collective efficacy (Carroll-Scott et al., 2013; Cohen et al., 2006)	Non-significant	Higher perceived neighborhood collective efficacy	Not appearing
Physical-environmental factors				
Perceived neighborhood food environment	Obesogenic food environments, with poor supermarket accessibility and greater accessibility to takeaway outlets (Giskes et al., 2010; Timperio et al., 2008) Lower perceived neighborhood affordability, accessibility, availability of healthy foods (Caspi et al., 2012)	Non-significant	Higher perceived neighborhood affordability, accessibility, availability of healthy foods	Not appearing
Green = factors for healthful eating that diverged with factors for unhealthful eating		Pink = factors for healthful eating that converged with factors for unhealthful eating		

in stressful life events; applying craftiness and fortitude during difficult moments; organizing eating in an uncomplicated manner; applying creativity in the kitchen; and approaching eating with critical self-awareness and flexibility. The findings from the qualitative study also show that the role of healthful eating had multiple meanings in participants' lives, through an expression of affection, leisure, and identity. Other research has also shown that eating involves other factors besides physical health, such as taste, convenience, costs, moral concerns, and the maintenance of relationships (Sobal et al., 2006). These factors often take precedence over physical health concerns. A systematic review of qualitative studies also confirms that people assign diverse personal, social, and cultural meanings to healthful eating (Bisogni et al., 2012). Scrinis (2008)

argues that a narrow focus on physical health, so-called nutritionism, may thus have limited value in everyday life. The lack of attention the biomedical model pays to social and historical circumstances in which health behaviors are constructed has been widely addressed in literature (Fischer, 2006; Green, 2006). The emphasis on physical health is apparent in current nutritional guidelines (Delormier et al., 2009). For instance, nutritional guidelines are oriented toward the physical side of health, overlooking the social embeddedness of food and health behavior. Along with being a social activity, other research shows that eating behaviors are also influenced by broader contextual factors such as social capital (Johnson et al., 2010) and the historical and physical context (Furst et al., 1996). What our research adds to this is that healthful eating is about keeping the balance between the mental, social and physical dimensions of eating in everyday life.

Although we were not able to measure participants' SOC in the qualitative study, we did observe striking similarities between the 3 elements of SOC (meaningfulness, comprehensibility, and manageability) and factors that participants used to cope with everyday life situations and challenges. For example, the women we interviewed dealt with challenges in relation to eating using high levels of mindfulness (which has a meaningfulness component); reflective capacities (which has a comprehensibility component) and either they or their partners were competent cooks (which has a manageability component). Also similar to SOC, they portrayed coping capacities through the life course in their ability to regain stability and structure in stressful life events and through applying craftiness and fortitude during difficult moments.

The findings from the quantitative studies provided important insights into factors that relate to SOC and healthful eating (the "what" question), while in the qualitative study we gained additional insights by exploring the meanings of these factors in the context of participants' everyday lives (the "how" question). For example, in the quantitative study we see that flexible restraint of eating predicts healthful eating and in the qualitative study, this flexibility factor in relation to eating was made more explicit in that participants had a set of personal "rules" for eating, yet these were modifiable depending on the context or their state of mind. Also, we see in the quantitative study that cohabiting predicted healthful eating. We further explored the role of partners in women's lives in the qualitative study and found that many participants had partners that were passionate about cooking and they helped inspire new ways of cooking and in approaching new recipes in a confident manner.

Although nutrition knowledge was not a significant predictor of healthful eating or SOC in the cross-sectional studies, we did identify another type of knowledge that supported healthful eating in the qualitative study. For example, most of the women portrayed themselves to be skilled and competent cooks and displayed high levels of self-efficacy in selecting, purchasing, and preparing nutritious meals. This competence originates in procedural knowledge, which relates to knowledge on *how* to do things

and use certain skills. This is different from declarative knowledge, which has to do with *knowing the facts* such as knowing nutrient and vitamin content of foods (Hiebert, 2013). These findings also relate very much to a new concept in health promotion called food literacy. Food literacy is defined as ability to understand the nature of food and how it is important to you, and the ability to gain information about food, analyze it, and act upon it (Vidgen & Gallegos, 2010). Therefore, although knowledge is important, the skills and competencies to actively deal with food and eating in everyday life is just as crucial for enabling healthful eating. A recent document from the WHO, the *Vienna Declaration on Nutrition and Non-Communicable Diseases in the Context of Health 2020* suggests that more strategies should be developed that focus on improving food literacy (WHO, 2013).

The composite factors of balance, agency and dynamics-sensitivity that we found in our integrated research are not part of current change strategies in nutrition promotion. For instance, nudging has become quite a popular change strategy in recent years (Marteau, 2011). Nudging influences people's "choice architecture" in terms of their motives and decision making through indirect suggestions and subtle changes in the food environment (Thorndike et al., 2014). Examples of this include putting healthy choices at eye level in the supermarket and making a salad the default side order option in restaurants instead of French fries. However, nudging has been criticized because it tends to be paternalistic or coercive by tricking people into making the right choice (Ashcroft, 2011). There is a large ethical objection to such strategies as they undermine participation and the autonomy of a person, which are the cornerstones of health promotion (Mittelmark, 2008). Another issue relates to the growing variety of convenient, tasty and healthful foods that are available to consumers (Bouwman & Swan, 2014). If needed, consumers can also buy functional foods, in the form of health claim carrying products that offer a range of supposed benefits for health. These products may lead to the idea that critical thinking by individuals on how to organize healthful eating in everyday life can be handed over to experts. As a consequence, this jeopardizes the "dynamics-sensitivity" since consumers themselves may deal with healthful eating as uncomplicated and unproblematic, as not requiring thoughtful consideration, because someone else is already taking care of it (Bouwman et al., 2009).

The integrated findings also put to question the provision of tailored nutrition advice on why, what, and how to eat for health. The current expert-driven nature of nutrition advice may reduce the need for self-reliance and critical thinking and hence autonomy in relation to food choice. It can be questioned who is actually in the driver's seat in the food-health arena, where complex nutritional information is oversimplified by experts and presented in claims, logos, and guidelines on physical health (Van Woerkum & Bouwman, 2012). The idea of "you are what you are told to eat" seems to replace "you are what you eat" (Bouwman & Swan, 2014). This expert-driven approach may

jeopardize the development of SOC and critical thinking on how to organize healthful eating in everyday life (Bouwman et al., 2009).

Advancing the state of the art of salutogenesis

The integrated research findings have advanced the state of the art of the salutogenic model of health. Previous nutrition research applying salutogenesis has focused on understanding the linear relationship between SOC and healthful eating. Consequently, there was limited understanding of building blocks that underlie the development of SOC and healthful eating and it was unknown what is needed in health promotion activities to strengthen SOC (Super et al., 2015). The integrated research findings have brought forth new understanding of factors and mechanisms that drive forward the relationship between SOC and healthful eating. Specifically, one’s ability to effectively cope with stressors challenging healthful eating, which is enabled through an interplay between GRRs (e.g. self-efficacy, cooking skills, flexibility) and the cumulative learning effect of life experiences in both childhood and adulthood. The interplay between GRRs and life experiences shapes a strong SOC and drives forward the development of healthful eating practices. It is this salutogenic process that supports eating practices directed towards health. An overview of this process is shown in Figure 6.1.

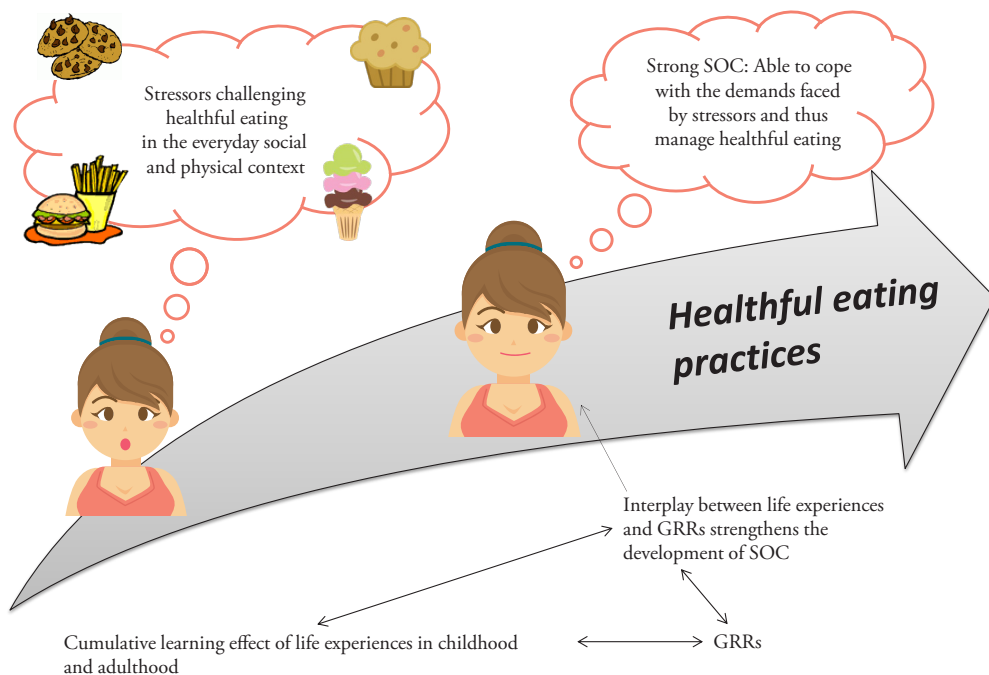


Figure 6.1 Salutogenic process underlying SOC and healthful eating

Although Antonovsky elaborated the most on GRRs, he also postulated on the potential of specific resistance resources (SRRs) in the development of health (Mittelmark, 2013). SRRs are defined as health promoting factors that are useful when dealing with particular situations of tension or specific stressors (Antonovsky, 1979). However, the relationship between SRRs, SOC and health has not been studied in previous empirical research. We regard some of the GRRs identified in our studies as potential SRRs with an eating or food-related component that supports SOC. For example, situational self-efficacy for healthy eating can help deal with specific stressors particularly evoked from the current organization of the food system such as confusing nutritional claims, unhelpful media messages, or seductive food marketing advertisements. Future research is required to examine these potential SRRs further and confirm whether they also predict a high SOC in other study populations.

Methodological considerations

This research had a number of strengths. The mixed methods design employed in our research led to in-depth, nuanced understanding of healthful eating. For example, we mapped factors in the cross-sectional survey research, and then in the qualitative research, we delved into these factors further to understand how they influenced the development of healthful eating. The survey instrument designed for this study was also extensive and included a number of diverse physical, mental and social factors. The timeline methodology employed in the qualitative study was also a valuable tool in eliciting life stories and exploring underlying meanings of factors operating along the life course. Since the timelines were created by participants, interviews were not led by the researchers own agendas, but by what participants felt meaningful and relevant. Timelines guide interviews through what participants themselves marked as meaningful life experiences (Fade & Swift, 2011) and help them to reflect and explore how they have shaped their current health practices (Sheridan et al., 2011). Further strengths included the quantitative study's significant sample size, a high survey response rate of 94% and the use of pre-tested, validated scales to measure the constructs in our survey instrument. Another strength was that the survey instrument had a good to excellent internal reliability and performed well indicated by the Chronbach's α scores ranging from 0.69-0.95 This research also carried out a rigorous recruitment process to identify healthy eaters for the qualitative study. We coupled with a large scale nutrition study at Wageningen University department of Human Nutrition and identified healthy eaters from their research panel that were in the highest quartile of DQI score. DQI is a very comprehensive measurement of healthful eating because it is derived from an extensive food frequency questionnaire (FFQ) that measures consumption of the major food groups as well as salt, fat, sugar, and convenience foods.

It is also important to discuss potential limitations of this research. Firstly, participants in our quantitative studies were not drawn from a random population sample. They

were recruited from an ongoing weight monitoring study that requires them to record their body weight at regular intervals. Therefore, they may have a heightened awareness of their dietary, health and weight management behaviors, which could have affected the answers given on the survey. This could have influenced the results we found, particularly for the more psychological factors such as situational self-efficacy for healthy eating and flexible restraint of eating. Future research should be carried out on a random population sample to confirm our study findings. Secondly, due to restrictions in the length of our survey instrument with the research panel, we had to rely upon pre-existing data collected from the panel on dietary intake of fruit, vegetables, whole grain products, and fish. Preferably we would have used DQI score, which was what was used in our qualitative study. Applying DQI provides more detailed data on respondents' eating practices. Thirdly, the explained variance of the logistic regression models in both quantitative studies was moderate. Ideally we would have included more factors in the survey instrument, such as cooking skills or measuring social networks, but as already mentioned, we were restricted in the number of survey items that could be asked to the research panel. Finally, the qualitative study utilized purposive selection criteria to recruit a group of healthful eaters. The participants that were included in our study were all cohabiting, well-educated women living in eastern Netherlands with ages between 36-52 years. Therefore, we do not know if findings can transfer to other groups. However, our findings can be considered a grounded indication of a research phenomenon that deserves further attention. Future research should explore these questions further to understand what generates healthful eating in different socio-demographic backgrounds or cultures.

Implications for future research

Salutogenic research approaches

Future nutrition promotion research should consider applying the salutogenic model of health to further complement the current evidence base derived from biomedically-oriented nutrition research. Whereas the biomedical model of health informs factors that prevent disease and ill-health, the salutogenic model informs factors that create health and well-being through change processes, empowerment, and participation (Gregg & O'Hara, 2007). However, we do not suggest a complete change to using only the salutogenic model, nor do we suggest that this model is superior. We plea for a shift from the current emphasis on disease, disability and poor functioning, to a more balanced approach in which positive aspects of well-being also receive attention (Mittelmark & Bull, 2013).

Due to the cross-sectional nature of the quantitative studies in chapters 3 and 4, we are not able to make conclusions in regards to causal relationships between the factors we studied and healthful eating. Therefore, future longitudinal research should track the

growth and stability of SOC and individual and context-bound factors across the life course, and see how this may play an influence in the development of healthful eating practices. Studies can also be carried out in different populations, countries and contexts since factors underlying SOC may differ from culture and context (Benz et al., 2014). Future research must also go beyond quantitative research and also apply qualitative methodologies as these can be a useful for an in-depth understanding of how healthful eating is shaped through the life course as shown in our studies.

Need for change in expert-driven approaches

Future research should also consider how the current complexity of nutrition advice may hinder the opportunity for forging life experiences that are required to establish a strong SOC. SOC develops through life experiences that are characterized by consistency, an underload-overload balance and participation in socially-valued decision making (Antonovsky, 1979). The fast changing, and at times conflicting, evidence on the relationship between specific foods and nutrients on health may not provide for consistency. Further, the enormous attention paid to food-health in the media may lead to an overload of information. The importance of participation is widely recognized in health promotion and central to human rights. Yet, the current expert-driven nutrition promotion efforts insufficiently allow for active involvement of people themselves (Bouwman, 2009). Therefore, there is a need for change in these approaches towards a co-evolutionary development process. By doing this, research can support the calls for a change in expert-driven nutrition promotion approaches towards a participatory process in which consumers actively work with experts in defining problems, identifying solutions, and devising new strategies regarding eating for health (Bouwman et al., 2009; Delormier et al., 2009). This can lead to research findings being more relevant and applicable in the context of people's everyday lives.

Take advantage of the synergies with positive deviance

Salutogenesis provides both a framework to study health development and a framework for behavioral and social change. Although salutogenesis has a strong theoretical foundation, previous research has mostly focused on the association between SOC and health. The Positive Deviance (PD) approach, which was developed directly out of practice and applies participatory research methods to enable behavioral and social change, provides a relevant approach to combine with salutogenesis. Comparable to salutogenesis, PD focuses on those that are coping well with risks, to gain better insights into the factors underlying health. PD is based on the observation that in every community there are people with uncommon behaviors or strategies, which enable them to find better solutions to problems than their peers, while having access to the similar resources and facing similar or worse challenges (Marsh et al., 2004).

In comparison to prescriptive, expert-driven approaches, which are difficult to sustain without ongoing external support (Marsh et al., 2004), PD has an assets-based, problem-solving, community-driven approach to behavioral and social change (Schooley & Morales, 2007). Coupling the PD approach with salutogenesis can be highly useful and relevant for health promotion research since they can together guide the development of sustainable, contextually-relevant, and socially-embedded strategies for healthful eating.

Applying systems thinking to nutrition promotion to research on food, eating and health

Salutogenesis takes an ecological orientation towards health to study the dynamics between people and their environment and how health develops from this interaction along the life course. This ecological orientation takes into account the complexity of individuals developing within embedded systems (Wendel & McLeroy, 2012) and has been applied extensively in other disciplines outside of the health promotion domain. For instance, Bronfenbrenner's ecological systems theory (Bronfenbrenner & Morris, 2007) from psychology examines individual and contextual factors that influence human development across the life span. With regards to the understanding of childhood obesity, Davison and Birch (2001) applied this theory to map the factors associated with the development of overweight at the multiple levels of the child, family, community and society. Another model emphasizing the interaction between people and their context is the food choice process model that studies how life course events affect major influences on food choice that includes ideals, personal factors, resources, social contexts, and the food context (Furst et al., 1996).

In addition to the ecological orientation, these models apply systems thinking (Lindström & Eriksson, 2010a). As noted by Green (Green, 2006), systems thinking is a paramount characteristic of health promotion, since it considers the multiplicity of variables as a resource to be used for deeper analysis rather than a factor that needs to be controlled. Systems thinking provides the framework for understanding complex phenomena like health issues by examining the dynamics between multiple levels influencing the individual (Edwards, 2005). Although support for systems thinking in the field of public health and health promotion is growing, it remains a complex undertaking and there are many practical challenges to its implementation (Trochim et al., 2006).

Lundy's Integral Map provides an organizing framework to apply systems thinking to create effective and sustainable health promotion actions (Lundy, 2010). This map is based on Integral Ecology's All Quadrant All Levels (AQAL) model (Esbjörn-Hargens & Zimmerman, 2009) and organizes the determinants of health, well-being and human development in four dimensions and perspective sets (quadrants): (1) experience, "I" (individual-interior perspective); (2) culture, "We" (collective-interior perspective); (3) behavior, "It" (individual-exterior perspective); and (4) social systems, "Its" (collective-exterior perspective).

Similar to other frameworks and models that apply systems thinking, the integral map involves the examination at micro, meso, and macro levels of social activity simultaneously rather than separately (Edwards, 2005). Furthermore, similar to the salutogenic model, the Integral Map focuses on the interaction between an individual and their context and how they influence one another. In our studies, the salutogenic model of health guided the understanding of healthful eating with the individual as the unit of analysis. The identified factors can be regarded as part of the “I”- inner-collective perspective including SOC, situational self-efficacy, flexible restraint of healthful eating, coping strategies, and life experiences; the outer-individual “IT” perspective including being female and cooking skills; the inner-collective “WE” perspective including cohabitation and living with a partner that enjoys cooking. Figure 6.2 shows the integral map of factors identified in our studies.

Figure 6.3 provides an overview of factors that can be relevant to gain an integral understanding of healthful eating. Biomedically-oriented food and nutrition research tends to emphasize the exterior-individual by examining factors relating to physical health, nutrition knowledge, dietary choices, and the exterior-collective by examining factors associated with the food system, such as obesogenic food landscapes. This map can be applied in future research to guide the study of factors from all perspective sets. In

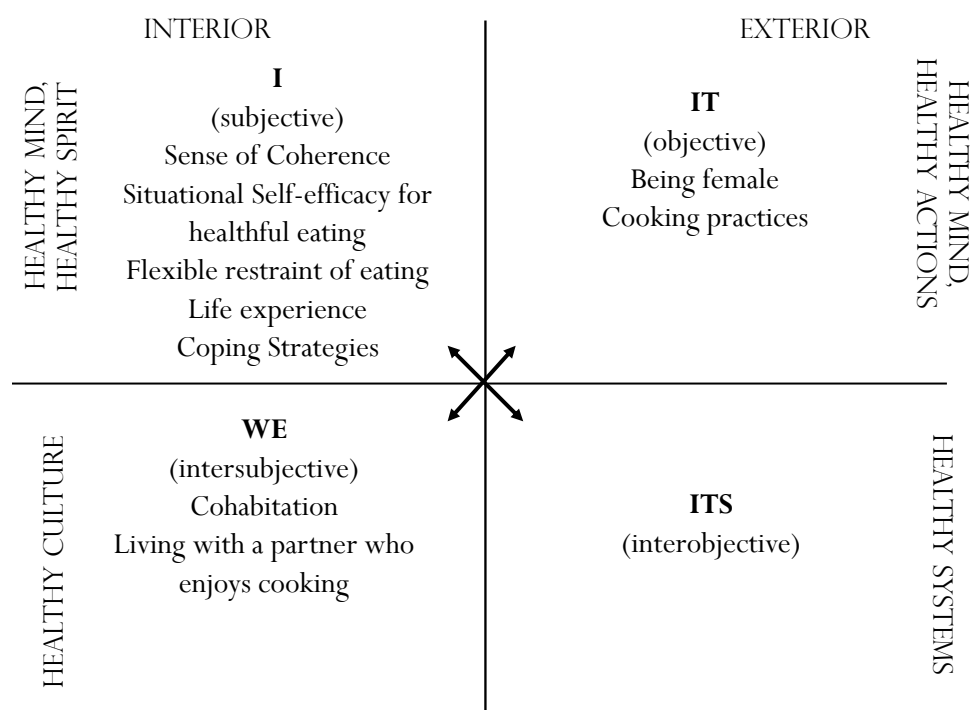


Figure 6.2 Integral map of factors identified in our studies (adapted from Lundy 2010)

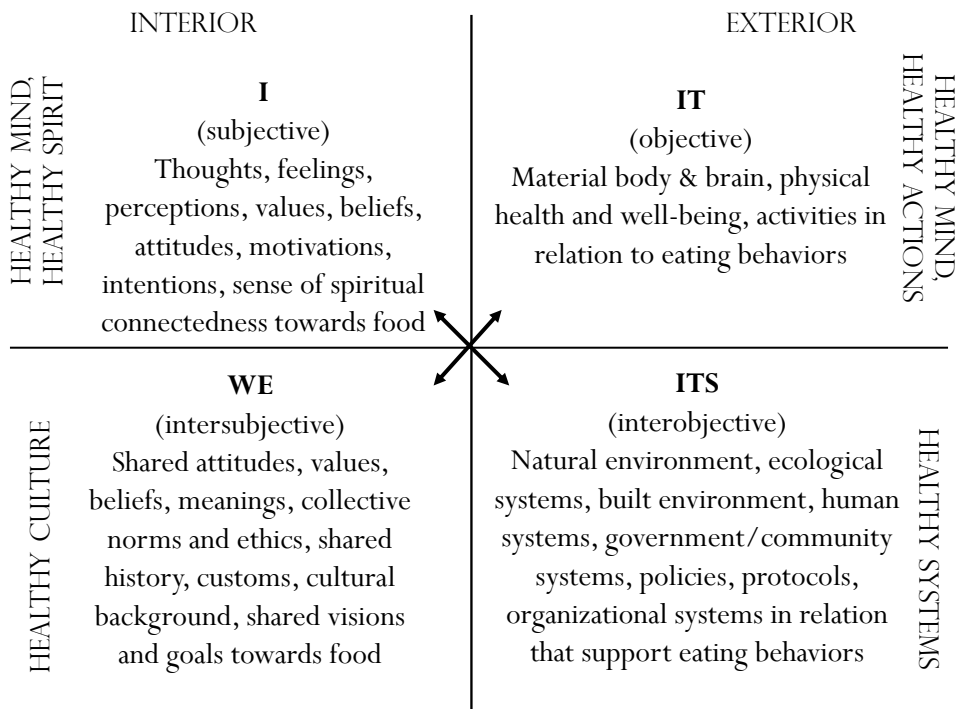


Figure 6.3 Integral map for integral study of healthful eating (adapted from Lundy 2010)

addition to our studies, research should take the outer-collective perspective as the unit of analysis and, in line with the salutogenic model, assess systems-level factors supportive to healthful eating such as the natural and built environment, social networks, and government policies. It can also serve as a tool to guide the development of salutogenic strategies and interventions targeting healthful eating. By enacting upon the different levels, as well as upon the dynamics between these levels, health promotion practitioners can show how healthy behaviors are linked to healthy minds, healthy culture, and healthy social and environmental systems (Lundy, 2010).

Another route in systems thinking with regards to food, eating and health is to consider ‘balance’ as a key indicator of health status. The Sense of Coherence can be regarded as the equivalent of the concept of homeostasis in the biomedical sciences. This concept is also about keeping balance, but on the physical dimension. Establishing and maintaining homeostasis is discussed in the systems biology literature as being a powerful component for recovery from illness and the maintenance of well-being (Jonas et al., 2006; Novosel’tsev & Novosel’tseva, 2012). It is regarded as the most desirable condition of body functioning since its loss or destruction always leads to some type of pathology. The resulting state of being able to maintain or regain homeostasis is called physiological resilience and is regarded an indicator for physiological health (van der

Greef et al., 2010; van Ommen et al., 2009). In the social sciences, resilience refers to the capacity to bounce or spring back from a physical, emotional, financial or social challenge (Resnick et al., 2011) and merely relates to mental resilience. The biomedical meaning of homeostasis and resilience can be regarded as a comprehensive construct of balance, resistance and adaptability. A striking similarity with our findings is that healthful eating is represented by the threesome of balance, agency (which involves being steadfast with regards to the self) and dynamics sensitivity. At present, biomedical research studies the mechanisms involved in restoring homeostasis after eating certain foods or food compounds. Interdisciplinary research could leave behind the current fragmented understanding of food, health and well-being by integrating the social and biomedical understanding of “remaining balance” and study the processes that influence health and well-being before as well as after swallowing food.

Building blocks for salutogenic-oriented nutrition promotion

The new insights brought forth in this research have implications for nutrition promotion strategies. Outlined below are building blocks that are needed for salutogenic-oriented strategies.

Building block 1. Taking a holistic orientation to food, including physical, mental, and social dimensions of health

Biomedical-oriented nutrition strategies educate the public on why, what and how much to eat to avoid disease or remain in good physical health. Such strategies have been around for decades, and have inspired such old adages as “an apple a day keeps the doctor away.” This has led to the widespread notion that eating for physical health is a central goal in people’s lives. However, this notion is at odds with how people experience healthful eating in the context of everyday life. Healthful eating goes beyond the physical act of eating and involves other dimensions. The social dimension of eating is often overlooked in nutritional strategies. Nutrient-based dietary guidelines are also directed at the individual and advice is given on foods that people should restrict or consume on a regular basis. However, decisions and actions regarding food choices are not made in a vacuum, they are constructed and embedded in the larger context. Therefore, nutrition promotion strategies should take a more holistic orientation to food, emphasizing a balance between all dimensions underlying healthful eating in everyday life. Brazil provides an excellent example of taking a holistic approach to national dietary guidelines. In their revised guidelines released in 2014, they not only advise people on foods that promote physical health, they also emphasize social and mental dimensions of eating. For instance, people should also eat mindfully and, whenever possible, in company of others; that they should develop, practice, and share cooking skills; and that the preparation and eating of meals occur in warm, friendly and pleasant environments (Ministry of Health of Brazil, 2014).

Building block 2. Supporting a healthful life orientation

Nutrition promotion should consider developing strategies to support a healthful orientation to life through strengthening SOC. By doing this, we can help people become more capable of seeing that they can cope with any situation (amongst others, eating), independent of whatever is happening in life (Koelen & Lindström, 2005). Nutrition promotion must also emphasize empowerment as a tool for supporting a healthful life orientation (Koelen & Lindström, 2005; Lindström & Eriksson, 2010b). Strategies should also emphasize active participation in life experiences that help to strengthen SOC. By enabling active involvement and empowerment, we can better support people to develop their sense of agency and thus gain control of the factors shaping their health (Wallerstein, 1992). Nutrition promotion should also move away from making nutrition advice too didactic and move towards promoting flexibility and balance in eating and life. This can be accomplished by not only focusing on strengthening food- and eating-specific factors like cooking skills, but also on more general health promotion factors like mindfulness, critical thinking, and stress management. Such skills support adaptive behavior, enable individuals to deal effectively with the demands of everyday life, and are fundamental building blocks for health promotion (Nutbeam, 1998). By teaching people these basic life skills for health promotion, the pieces relating to eating and health will fall into place. This means going beyond only teaching people how to navigate through the supermarket or the kitchen but also supporting them in navigating through life. Such an approach can help people in accomplishing lifestyle changes in the context of their everyday lives (Van Woerkum & Bouwman, 2012) and in constructing adaptive coping strategies to manage healthy food practices as life circumstances change (Bisogni et al., 2005).

Building block 3. Facilitating health-directed learning processes through positive interactions and experiences with food

Salutogenic nutrition promotion translates to strategies that facilitate health-directed learning processes. These learning process require reflecting on what will create health, what the available resources are, and how to improve quality of life (Lindström & Eriksson, 2010a). For instance, strategies that support health-directed learning processes must focus on strengthening procedural knowledge such as food literacy and healthful cooking practices. They should also include socially-embedded experiences involving the selection, purchase, and preparation of healthful food such as taste lessons in schools and community cookery clubs. Strategies should also encourage positive parent-child interactions at the dinner table and recommend that people cook regularly with partners, family or friends. From the salutogenic perspective, experiences that are balanced; consistent; and socially-valued facilitate this healthy learning process. Given that life experiences have a cumulative learning effect through the life course, nutrition

promotion strategies should take into account other crucial life stages besides childhood, such as leaving the nest, marriage, and retirement. It is never too late to encourage positive experiences with food and eating. Fostering healthful eating practices can occur at all moments through the life course.

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Summary

The biomedical model of health orients towards pathogenesis, the study of disease origins and causes. The starting point is to understand determinants of ill-health, and health is defined in this model as the absence of disease. When applied to nutrition research, the underlying assumption is that eating is a physiological act, and that eating supports physical health. This risk-oriented, pathogenic view also underlies the search for determinants of unhealthful eating. However, there is such an emphasis on finding risk factors, that the biomedical model overlooks the fact that individuals also possess, or have access to, factors that support healthful eating. As a result, very little is known on factors that enable healthful eating and how these factors can be used to complement current health promotion strategies. The overall aim of this research was to contribute to a better understanding of healthful eating in the context of everyday life. We applied a complementary research framework, the salutogenic model of health, to 1) map factors underlying the development of sense of coherence (SOC); 2) study which of these factors are predictors for healthy eating; 3) unravel how people develop healthful eating practices in everyday life; and 4) integrate this understanding and provide building blocks for nutrition promotion. This research employed a mixed research design, using cross-sectional survey research and in-depth interviews.

Chapter 2 explored the possibilities of applying the salutogenic framework as a complementary approach to biomedical-oriented nutrition research and practice. Nutrition research takes a mostly biomedical-oriented approach to better understand risk factors that determine unhealthful eating. Though relevant for curative medicine, such an approach limits the evidence base for health promotion, which is guided by the principles that personal and social resources are preconditions for health and well-being. Moreover, biomedical-oriented nutrition promotion takes a reductionist approach and studies and enacts upon individual or the external environment separately. Disjointedly studying and enacting upon people and context may be easier, yet it does not do justice to reality and limits the relevance and applicability in everyday eating situations. The salutogenic model of health can provide complementary knowledge on what is already known through biomedical approaches. It guides the study of the dynamics between people and their environment and how health develops from this interaction. Since salutogenesis guides the study of health as an interplay between physical, mental, and social factors, it is more in line with how people experience eating in their everyday lives. In the study described in **chapter 3**, we examined individual, social, and physical-environmental factors that underlie SOC. Dutch adults (n=781) participated in a cross-sectional study examining the relationship between SOC and a set of individual, social- and physical-environmental factors. The main findings indicate that high SOC was significantly ($p < .05$) associated with a diverse set of factors including lower doctor oriented multidimensional health locus of control (MHLC); higher satisfaction with weight; higher situational self-efficacy for healthy eating; lower perceived social discouragement for healthy eating; higher perceived levels of neighborhood collective

efficacy; and higher perceived neighborhood affordability, accessibility and availability of healthy foods. Non-significant factors ($p \geq .05$) included gender; employment status; education level; cohabitation; BMI; nutrition knowledge; internally oriented MHLC; chance oriented MHLC; and perceived social support for healthy eating. These findings are relevant since they can inform the design of nutrition interventions that target factors that strengthen SOC and provide building blocks for a healthier life orientation. Next, the study in **chapter 4** aimed to determine a set of individual, social and physical-environmental factors that predict healthy eating practices in a cross-sectional study of Dutch adults. Data were analyzed from participants ($n=703$) that completed the study's survey and logistic regression analysis was performed to test the association of survey factors on the outcome variable high dietary score. In the multivariate logistic regression model, five factors contributed significantly ($p < .05$) to the predictive ability of the overall model: being female; cohabitation; a strong sense of coherence; flexible restraint of eating; and self-efficacy for healthy eating. Non-significant factors ($p \geq .05$) in the multivariate logistic regression model included age; employment status; net monthly household income; education level; nutrition knowledge; internally oriented MHLC; perceived social support and discouragement for healthy eating; perceived neighborhood collective efficacy and perceived neighborhood affordability, availability and accessibility of healthy foods. Findings complement what is already known of the factors that relate to poor eating practices. This can provide nutrition promotion with a more comprehensive understanding of the factors that both support and hinder healthy eating practices.

Lastly, the qualitative study described in **chapter 5** examined a group of healthy eaters and explored life experiences and coping strategies that foster healthful eating through narrative inquiry. The study was undertaken with seventeen Dutch women (aged 36-54 years) in the highest quartile of dietary quality index scores. The main findings showed that life experiences gave rise to coping strategies that enabled healthful eating. Childhood experiences included: accustomed to non-processed foods and positive child-parent interactions. Adulthood experiences included: regained stability and structure in stressful life events and forged positive experiences with food. Coping strategies included: organizing eating in an uncomplicated manner; creativity in the kitchen; valuing good food with good company; approaching eating with critical self-awareness; and applying craftiness and fortitude during difficult moments. The findings suggest that there is an interplay between life experiences and coping strategies, and this mechanism underpins healthful eating. Findings offer potential entry points for nutrition promotion to foster healthful eating.

When integrating the research findings in **chapter 6**, we found that healthful eating results from three composite factors: balance and stability, sense of agency, and sensitivity to the dynamics of everyday life. Firstly, healthful eating results from balance and stability in life, represented by a strong SOC, which characterizes a balanced mixture of giving

meaning to eating as an integral part of life, comprehending its importance to oneself, and having competencies to manage its organization in the everyday social context. In the life course, healthful eating also results from the ability to regain stability and structure in stressful life events and craftiness and fortitude during difficult moments. Healthful eating is also rooted in a sense of agency (the feeling of being in control of one's own actions), with regards to the ability to take action related to eating and life in general. This sense of agency is enabled through flexibility, lower doctor oriented MHLC, applying creativity in the kitchen, and approaching eating with critical self-awareness. Thirdly, healthful eating results from a sensitivity to the dynamics of everyday life, with regards to the how people deal with and navigate through everyday challenging situations by applying individual- and context-bound factors including situational self-efficacy, organizing eating in an uncomplicated manner, valuing good food with good company, and perceiving less social discouragement for healthy eating from family and friends.

Few of the factors associated with SOC and healthful eating converged with risk factors for unhealthful eating found in previous studies, including coping, self-efficacy, restraint of eating, and living situation. Our findings show that the set of factors related to the origins of health substantially diverged from the set of factors related to the origins of disease. From this, we conclude that the “origins of health” differ from the “origins of disease”. Hence, factors that foster and support healthful eating are not simply the reversed version of the factors known to increase the risk of unhealthful food choices. This implies that a different set of factors should inform health promoting strategies, in addition to the factors informing strategies targeting the prevention of diet-related illnesses.

The new insights brought forth in this research provide building blocks for salutogenic-oriented nutrition promotion.

1. Strategies should take a more holistic orientation to food and eating, emphasizing a balance between physical, social, and mental health. Similarly, dietary guidelines should emphasize more than what and how much to eat for physical health and also consider the social and mental dimensions.
2. Nutrition promotion should develop strategies to support a healthful orientation to life. Through strengthening SOC, people can become more capable of coping with any situation or challenge, independent of whatever is happening in life. Nutrition promotion should also strengthen more general health promotion factors including mindfulness, critical thinking, and stress management because these skills support adaptive behavior when life circumstances change.
3. Strategies should facilitate health-directed learning processes through positive interactions and experiences with food. For instance, strategies that support health-directed learning processes should improve food-related procedural knowledge such as food literacy and cooking skills. They should also include socially-embedded

learning experiences involving the selection, purchase, and preparation of healthful food; encourage positive parent-child interactions at the dinner table; and recommend that people cook regularly with partners, family or friends.

About the author

Curriculum vitae

Emily Swan was born on 25 September 1980 in Waterbury, Connecticut, USA. She grew up in Connecticut and graduated from Wooster School with her high school diploma in 1998. Emily studied nutrition and dietetics at Russell Sage College in Troy, New York, from which she graduated in 2002 with her BSc in Nutrition. She went on to complete her clinical training in dietetics at Emory University Hospital in Atlanta, Georgia from 2002-2003. She is a registered dietitian with the USA Commission of Dietetic Registration since 2003. Emily first worked as a program nutritionist for the Women, Infant and Children Supplemental Food Program in Norwalk, Connecticut where she provided nutrition counseling sessions on prenatal nutrition, infant and child nutrition and breastfeeding advice. Then Emily moved to the UK and worked for the National Health Service from 2005-2009 as a pediatric dietitian. She developed and led parent cooking classes and nutrition workshops in daycare centers and primary schools. Emily also provided multi-disciplinary clinics and group treatment sessions for overweight children and adolescents and delivered targeted training programs on childhood obesity prevention, identification and treatment for health professionals. In 2009, Emily left the UK and moved to the Netherlands to study nutrition at Wageningen University. She graduated in 2011 with her MSc in Nutrition and Health, with a specialization in public health nutrition. In 2011, she started her doctoral research at Health and Society in the Social Sciences Group at Wageningen University, which resulted in this thesis. Emily is married to Michiel and they have two daughters together, Esmée (2012) and Matilda (2015). Though she considers herself a world citizen, she has dual American-Dutch nationality. She proudly naturalized as a Dutch citizen in October 2015.

List of publications

International scientific journals

Swan E, Bouwman L, Hiddink GJ, Aarts N, Koelen M. Individual, social- and physical-environmental factors that underlie sense of coherence in Dutch adults. In press.

Swan E, Bouwman L, Hiddink GJ, Aarts N, Koelen M. Applying the salutogenic framework to nutrition research and practice. *American Journal of Health Promotion*. 2015 Nov-Dec;30(2):71-3.

Swan E, Bouwman L, Hiddink GJ, Aarts N, Koelen M. Profiling healthy eaters: determining factors that predict healthy eating practices amongst Dutch adults. *Appetite*. 2015;89:122-30.

Swan, E.C.; Bouwman, L.I.; Roos, N.M. de; Koelen, M. How science thinks and practice acts: bridging the gap in weight management interventions for adolescents. *Family Practice*. 2012 Apr;29 Suppl 1:i117-i125.

Book chapter

Bouwman L, Swan E. Eating from a Nutrition Point of View. In: Thompson PB, Kaplan DM, eds. *Encyclopedia of Food and Agricultural Ethics - 3 volumes*: Springer; 2014:p. 1860.



Emily Swan
Wageningen School of Social Sciences (WASS)
Completed Training and Supervision Plan

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
ETC-PHHP Sumer School Public Health & Health Promotion	ETC-PHHP	2013	8
Presentations at both domestic and international conferences (see list below)		2012-2014	6
Participation in EU Salutogenic Eating Network	Girona, Spain, Rennes, France	2013-2014	1
B) General research related competences			
Project and time management	WGS	2012	1.5
Information literacy for PhDs	WGS	2012	0.6
Interpretive Research Methods and Methodologies	WASS	2013	4
Scientific Publishing	WGS	2013	0.3
Writing own PhD research proposal		2011-2012	6
Voice Matters: Voice and Presentation Skills Training	WGS	2014	0.4
C) Career related competences/personal development			
Teaching and supervising students	HSO, COM	2012-2014	4
Career Assessment	WGS	2015	0.3
Total			32.1

*One credit according to ECTS is on average equivalent to 28 hours of study load

List of domestic and international conferences

Scientific presentation 'Profiling healthy eaters: determining factors that predict healthy eating practices amongst Dutch adults' International Conference for Communication in Healthcare, Amsterdam RAI, the Netherlands. (September 2014).

Scientific presentation 'Factors that predict healthy eating in Dutch Adults' PhD Day, Wageningen University, the Netherlands (May 2014).

Poster presentation 'What predicts healthy eating?', Nordic Health Promotion Research Conference, Vestfold University College, Norway (June 2013).

Invited workshop 'Salutogenic Window of Opportunity in Nutrition Promotion' In 23rd Annual Art & Science of Health Promotion Conference, Hilton Head Island, South Carolina, USA. (March 2013).

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