

# **THESIS**

Master in Food, Nutrition & Health

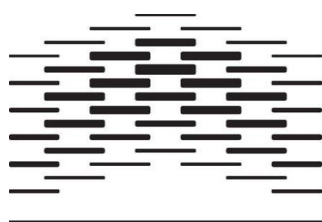
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## **Factors Associated with Maintenance of a Healthy Diet in Weight Reduction Program Participants**

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## **Foreword**

A long journey has come to an end. It has been a great, yet challenging learning experience, which has provided me with a lot of new knowledge as well as sharpened my sense of direction in relation to what I want to do for a living.

First and foremost, I want to thank my two excellent supervisors, nutritionist and PhD student Lisa Garnweidner and associate professor Dr. Scient. Sverre Pettersen. They have given me tremendous support throughout this process, and without their encouragement, motivation and scientific wisdom I would not have managed to produce this thesis as it is in its present form.

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Lastly, I want to express thanks to Briony Williamson who so kindly agreed to proofread my thesis.

Tiril C. Borge



*“I count him braver who overcomes his desires than him who conquers his enemies; for the hardest victory is over self”*

- Aristotle



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## Abstract

**Background and aim:** Many adults in Norway are actively attempting to lose weight, with higher numbers recorded in overweight and obese persons and in women. However, overweight and obesity remain highly prevalent, suggesting that all in all, successful weight loss is offset by the failures. As such, understanding why and how some people succeed in changing their weight-related behaviors, like dietary behaviors, whereas the majority does not, should be an essential research priority. Identifying predictors of successful weight loss maintenance and its corresponding behaviors are of particularly importance. Thus, the aim of this study was to investigate factors believed to be associated with successful maintenance of a healthy diet after initiation of weight reduction program participation.

**Materials and procedures:** The study sample (n=380) was comprised of current and former participants in a weight reduction program in Norway. The response rate was 9.1 percent. The study sample answered a questionnaire containing constructs aimed at measuring their self-perceived maintenance degree of a healthy diet, as well as different motivational aspects related to their dietary behavior, including self-efficacy, social support, motivation and nutrition literacy. Exploratory and semi-confirmatory factor analyses, with subsequent reliability analysis were used to establish the variable constructs for use in further analysis. Then multivariate analysis of variance was applied to examine the possible significant differences between means of each construct for participants displaying low- and high maintenance degree of a healthy diet. Lastly, simultaneous- and sequential multiple regression analyses was used to determine which variables significantly predicted the total variance in maintenance degree of a healthy diet.

**Results:** The participants with a high maintenance degree of a healthy diet displayed significantly higher degrees of goal attainment, autonomous motivation, formal- and informal support, maintenance self-efficacy, functional-, interactive- and critical nutrition literacy. The factors which displayed a significant prediction to the total variance in maintenance degree of a healthy diet were autonomous motivation for healthy eating, degree of goal attainment and maintenance self-efficacy.

**Conclusion and implications:** The results obtained in this study indicate that there exist many factors which are important for the maintenance of a healthy diet and that these factors are similar to those identified as significant for successful weight loss maintenance. This may imply that weight reduction programs should put emphasis on enabling for enhancement of these factors which seems to be important for the maintenance of dietary behaviors associated with successful weight loss and weight regain prevention, as this will facilitate the optimization of weight reduction programs efficacy. In addition, the results suggest that nutrition literacy levels among participants could be of significance in relation to maintenance of a healthy diet, which justify further exploration of this phenomenon within the weight loss domain.



## Acronyms

|                            |   |
|----------------------------|---|
| <b><math>\alpha</math></b> | <i>Coefficient Cronbach's Alpha</i>               |
| <b>BMI</b>                 | <i>Body Mass Index</i>                            |
| <b>BSCQ</b>                | <i>Brief Situational Confidence Questionnaire</i> |
| <b>BSSS</b>                | <i>Berlin Social Support Scale</i>                |
| <b>BTS</b>                 | <i>Bartlett's Test of Sphericity</i>              |
| <b>CNL</b>                 | <i>Critical Nutrition Literacy</i>                |
| <b>FNL</b>                 | <i>Functional Nutrition Literacy</i>              |
| <b>HBM</b>                 | <i>Health Belief Model</i>                        |
| <b>HCCQ</b>                | <i>Health Care Climate Questionnaire</i>          |
| <b>HL</b>                  | <i>Health Literacy</i>                            |
| <b>INL</b>                 | <i>Interactive Nutrition Literacy</i>             |
| <b>KMO</b>                 | <i>Kaiser-Meyer-Olkins</i>                        |
| <b>NL</b>                  | <i>Nutrition Literacy</i>                         |
| <b>NLQ</b>                 | <i>Nutrition Literacy Questionnaire</i>           |
| <b>NSD</b>                 | <i>Norwegian Social Science Data Services</i>     |
| <b>OE</b>                  | <i>Outcome Expectancies</i>                       |
| <b>PMT</b>                 | <i>Protection Motivation Model</i>                |
| <b>SCT</b>                 | <i>Social Cognitive Model</i>                     |
| <b>SDT</b>                 | <i>Self Determination Theory</i>                  |
| <b>TPB</b>                 | <i>Theory of Planned Behavior</i>                 |
| <b>TRA</b>                 | <i>Theory of Reasoned Action</i>                  |
| <b>TSRQ</b>                | <i>Treatment Self-Regulation Questionnaire</i>    |
| <b>TTM</b>                 | <i>Trans Theoretical Model</i>                    |



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## **1.0 Background**

In this introduction, a short overview of the global and national prevalence of overweight and obesity will be given, as well as the health risks associated with these conditions. Then the possible health benefits of weight reduction will be described together with common strategies used for weight reduction, with an emphasis on lifestyle modification. Then the importance of a healthy diet as a part of weight loss maintenance will be highlighted, followed by the aim and research questions of the study.

### **1.1 Overweight and obesity – current status**

WHO describes overweight and obesity<sup>1</sup> as a global epidemic (WHO, 2000), which indicate that combating these conditions represents one of the biggest health challenges worldwide (Swinburn & Bell, 2007). The prevalence of overweight and obesity has risen threefold or more since the 1980s, even in countries with traditionally low rates, and are today considered to be the fifth leading risk for global mortality, with at least 2.8 million adults dying annually as a result of being overweight or obese (WHO, 2006).

WHO have estimated that about 1600 million of the world's adult population was overweight in 2005, where at least 400 million were obese. Furthermore, they have estimated that in 2015 there will be approximately 2.3 billion overweight people globally and that more than 700 million of these will be obese (WHO, 2006). Norway seems to be following the global trend, with national figures showing that every eleventh Norwegian adult was obese in 2005 (SSB, 2008). In 2011, every other Norwegian man and every third Norwegian woman aged 30 to 75 years was overweight, while about one in five of the total adult population were considered to be obese (Norwegian Institute of Public Health, 2011), indicating that adiposity is increasing amongst the Norwegian people, in line with the rest of the world's population.

One essential reason for why overweight and obesity are of such a concern, is the fact that the majority of the diseases which today are considered to be the largest contributors to global morbidity and mortality, for example cardiovascular diseases, cancers, and diabetes (Haslam & James, 2005; Shaw, O'Rourke, Del Mar, & Kenardy, 2009; Stunkard & Wadden,

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<sup>1</sup> For adults, overweight and obesity status are determined by a person's body mass index (BMI), where BMI above 25 indicates overweight and BMI above 30 indicates obesity (WHO, 2006).

2002), are the precise diseases which overweight and obesity predispose for (obesity more so than overweight) (WHO/FAO, 2003). In fact, the impact of overweight and obesity on mortality has recently been presented as being nearly as significant as that of cigarette smoking (Peeters et al., 2003).

## **1.2 Possible solutions to overweight and obesity**

With an increased prevalence of overweight and obesity, there is also a corresponding rise in the number of possible solutions available for individual weight problems, reflected in a wide range of methods and programs available in today's society to promote weight reduction. Many of these methods and programs have been created based on the knowledge that weight loss in its self can reverse many of the diseases associated with obesity (Stunkard & Wadden, 2002). Even modest weight reduction has shown to have a beneficial effect on hypertension, hyperlipidemia and glucose tolerance (Haslam & James, 2005), hence, treatment aimed at lowering weight is crucial for reducing the risk of developing the secondary diseases associated with overweight and obesity (Strychar, 2006).

Research shows that over the last 30 years there has been a dramatic improvement in short term weight loss treatments, but a less successful attempt at improving long term weight loss success (Anderson, Vichitbandra, Qian, & Kryscio, 1999; Barte et al., 2010; Cogan & Ernsberger, 1999; Jeffery et al., 2000; Turk et al., 2009). This is mirrored in figures which show that as many as 40 to 70 percent of the U.S. population are trying to lose weight at any point in time (Cogan & Ernsberger, 1999). Norway show similar figures, where at least 50 percent of the population is currently dieting, with the majority of them being women (Roos, 2006). The fact that the prevalence of obesity is increasing in spite of so many people trying to lose weight, provides us with an indication that all in all, successful weight loss is offset by the failures (Jeffery et al., 2000), which again highlights the challenge which combating obesity offers.

In fact, the trend in relation to poor maintenance of weight loss has been described as the achilles heel of organized weight reduction programs (Thomas, Bond, Hill, & Wing, 2011). Focusing on identifying factors associated with success of weight loss and particularly associated with successful weight loss maintenance behaviors will increase understanding of the most significant factors involved in the weight loss maintenance process (Silva et al.,

2011), and thus provide better insight into the reasons for why some people manage to maintain behaviors associated with weight loss while others do not.

### *1.2.1 Common strategies employed to lose weight*

The most common weight reduction strategy used in organized weight reduction programs is lifestyle modification (Barte et al., 2010; Kirk, Penney, McHugh, & Sharma, 2011), which encompasses three principal components: diet, exercise, and behavior therapy (Brownell, 1999; Wadden & Foster, 2000). Behavior therapy refers to teaching people how to achieve their eating and exercise goals by approaches such as keeping records of their food intake, reinforcing the adoption of positive behaviors, modifying cues which elicit unwanted eating (e.g., the sight and smell of food) and learn new responses to them (Wadden, Butryn, & Byrne, 2004; Wing, 2002). Cognitive treatment is usually incorporated into behavioral therapy, and its fundamental beliefs are based on behaviors being directly influenced by thoughts and feelings (Beck, 1976). With cognitive treatment, people learn to form realistic outcome expectancies, to sensibly assess their improvement in modifying eating and physical activity routines, and to avoid negative thoughts if initial goals are not met (Foster, 2002). Hence, lifestyle modification aims at systematically altering behavior and thinking patterns which affect weight, by helping people to change the way they think and act with regards to their eating- and exercise habits (Brownell, 1999).

Strong evidence indicate that a lifestyle modification approach leads to better short-term and long term weight loss in comparison to only altering food intake or physical activity levels, and that this is currently the most effective in managing weight (Brownell, 1999; Curioni & Lourenco, 2005; Kirk et al., 2011; Shaw et al., 2009; Wadden, Foster, & Letizia, 1994; Wu, Gao, Chen, & Van Dam, 2009).

With regards to the type of diet lifestyle modification programs typically encourage people to eat, it generally consists of conventional foods of a person's liking, in combination with dietary restriction to avoid excessive energy intake This is indeed what the diet philosophy of the weight reduction program this study's sample have attended consists of, in addition to emphasizing the importance of eating regular, balanced and small meals, with the inclusion of extra fiber with every meal.

### *1.2.2 Factors associated with successful weight loss maintenance and its related behaviors*

With regards to individual dietary behaviors, one relatively recent review explored the psychosocial predictors of fruit and vegetable consumption in adults (Shaikh, Yaroch, Nebeling, Yeh, & Resnicow, 2008). It reviewed 14 prospective and 21 cross-sectional studies, published in English from 1994 to 2006, which together explored 25 different psychosocial constructs. The review resulted in strong suggestions regarding self-efficacy, social support, and knowledge as being predictors of adult fruit and vegetable intake. Autonomous motivation also displayed a relationship with fruit and vegetable intake, but at a weaker level than the other variables. Another review found that motivation was one the most consistent variables predicting fruit and vegetable intake (Guillaumie, Godin, & Vezina-Im, 2010), hence there is some disagreement with regards to the contribution of motivation in relation to some dietary behaviors. With regards to fat intake, it has been found that both high general eating self-efficacy (Sporny & Contento, 1995; Watters & Satia, 2009) as well as high coping self-efficacy (Renner et al., 2008) is inversely related to fat intake. Another study found that social support, self-efficacy and negative outcome expectations made important contributions to whether a person would eat a low fat, high fiber and high fruit and vegetable diet (Anderson, Winett, & Wojcik, 2007).

With regards to factors significantly associated with successful weight loss maintenance, remarkably little is known, despite the frequency of which this problem is observed (Wadden et al., 2004). However, when considering the strategies used among the American National Weight Control Registry (NWCR) members, which most likely constitutes the largest database ever accumulated on individuals successful at long-term maintenance of weight loss (Klem, Wing, McGuire, Seagle, & Hill, 1997), there is little doubt that having a consistent healthy diet as well as displaying high levels of eating control and self-monitoring is an essential component of intentional weight loss (Butryn, Phelan, Hill, & Wing, 2007; Klem et al., 1997; Wu et al., 2009) and weight loss maintenance (Brownell & Stunkard, 2002; Carraca et al., 2011; Hindle & Carpenter, 2011; Thomas et al., 2011; Ulen, Huizinga, Beech, & Elasy, 2008; Wing & Phelan, 2005). In addition, high levels of physical activity has been consistently associated with successful long-term weight maintenance (Crawford, Jeffery, & French, 2000; Kayman, Bruvold, & Stern, 1990; Teixeira et al., 2010; Wing & Hill, 2001). Furthermore, Elfhag and Rössner (2005) identified from their review that a history of weight cycling and binge eating were significant risk factors for weight regain. Moreover, dichotomous thinking, characterized by an “all or nothing” perspective has also been

described as characteristic of weight regainers whereas more flexible thinking is characteristic of weight loss maintainers (Byrne, Cooper, & Fairburn, 2003).

Although researchers have investigated psychosocial factors associated with successful weight loss maintenance, e.g. Byrne et al. (2003), Carraca et al. (2011) and Teixeira, Going, Sardinha, and Lohman (2005), little is known with regards to the psychosocial factors associated with particular behaviors important for successful weight loss maintenance, like maintenance of a healthy diet. As maintenance of a healthy diet is a behavior in itself, or comprised of a series of dietary behaviors, successful weight loss maintenance can be seen as the consequence of a set of enacted behavior; hence, the maintenance of a healthy diet and the maintenance of weight loss might have different underlying contributing factors.

Consequently, identifying factors associated with successful maintenance of a healthy diet will increase the understanding of the most critical mechanisms involved (Silva et al., 2011). This is a very important area to increase the understanding of, as knowing which factors that are significantly associated with behaviors relevant to success in weight loss and weight loss maintenance is essential for the development of effective weight loss interventions and programs (Teixeira et al., 2010). This should be a research priority (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003; Teixeira et al., 2005), and it is these type of factors which are attempted to be explored in this study.

### 1.3 The aim of the study

Based on the above rationale, the following aim of the study was selected:

*What factors appear important for the maintenance of a healthy diet<sup>2</sup> in weight reduction program participants?*

The aim will be operationalized with these research questions:

1. What degree of goal attainment, motivation, self-efficacy, perceived social support and nutrition literacy do the study sample display?
2. Are there significant differences between the participants displaying a low- or high degree of maintenance of a healthy diet<sup>3</sup>, according to the factors in question 1?
3. Which constructs significantly predict the total variance in the dependent variable; *maintenance degree of a healthy diet*?

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<sup>2</sup> In this context, healthy diet refers to the diet which is promoted at the weight reduction program .

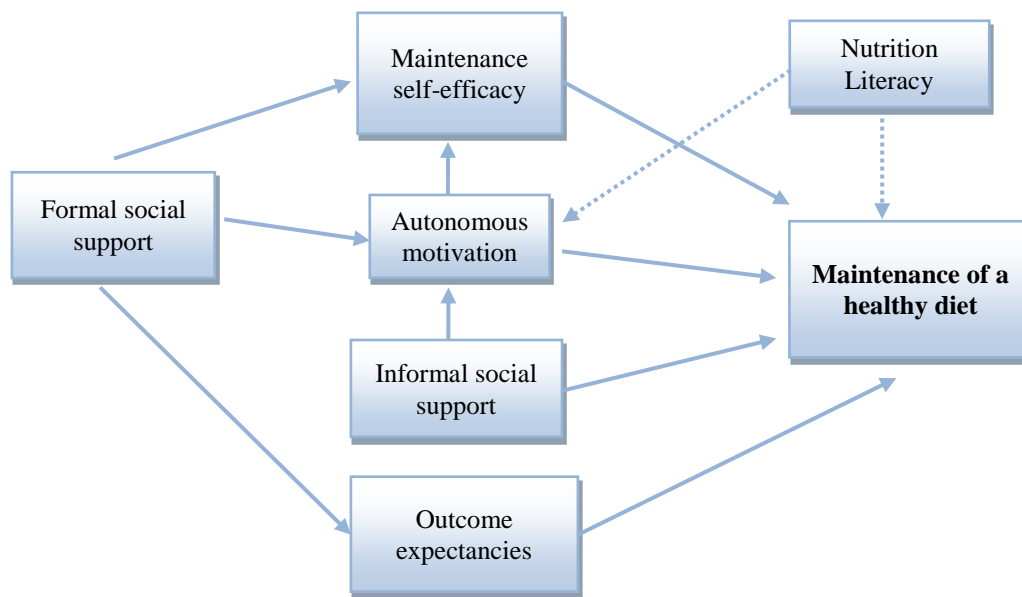
<sup>3</sup> It is important to emphasize that the dependent variable, *maintenance degree of a healthy diet*, did not necessarily directly measure the precise maintenance degree of a healthy diet among the participants. It was rather a composite measure of maintenance, indicating how well the participants perceived to have managed to maintain their healthy diet, by reporting to which degree they felt like they had succeeded in complying with the dietary recommendations they had been presented with at the weight reduction program.



## 2.0 Theory

The theoretical framework chosen for the purpose of this study, has been based on a thorough review of the dominant as well as emerging theories used in similar areas of health behavior research as that explored in this study. Health behavior theories describe and explain how and why individuals refrain from risk behaviors and adopt health behaviors, as well as aiding in elucidation of factors associated with the maintenance of these behaviors (Conner & Norman, 2005).

Components from several psychosocial theories, specifically motivation, self-efficacy, social support and outcome expectancies, were chosen, as well as the nutrition literacy concept, as it was believed, that these would be very relevant in the study of factors associated with maintenance of a healthy diet. Firstly, a conceptual model of the possible associations between the different theoretical constructs will be presented, together with an explanation of the behavior change process, as it is important to understand, considering that behavior maintenance constitutes one part of this process and that the majority of theoretical concepts chosen for this study are major contributors to the movement within the behavior change process. Lastly, each theoretical component will be explained in detail together with research on its significance with regards to dietary behavior in relation to weight loss maintenance. The believed interplay between the theoretical constructs used in this study, and their relationship with the maintenance of a healthy diet, is visually represented in Figure 1.



**Figure 1: Schematic representation of the believed inter-relationship of psychosocial factors investigated in this study, and their influence on maintenance of a healthy diet, adapted from Teixeira, Patrick, & Mata (2011)<sup>4</sup>**

## 2.1 The health behavior change process

When a person decides to adopt a new, healthy diet in relation to losing weight it requires a change in behavior. More specifically, one is required to refrain from certain previous behaviors as well as adopting new behaviors, for example portion-size control and regular eating patterns. These new behaviors then needs to be maintained over a period of time, hence the term behavior maintenance. Rothman (2000) has argued that the processes behind the initiation of health behavior change and maintaining that change differ quite extensively, which the leading theoretical models in the study of health behavior, e.g. HBM, PMT, TPB, TRA and TTM, offer little guidance regarding. In the majority of these models health behavior maintenance has generally been operationalized as action sustained over time, hence it is predicted to rely on the same set of behavioral skills and motivational aspects which facilitate the initial change of behavior (Baumeister & Vohs, 2011). However, this perception is contrary to the repeated discovery that people who successfully adopt a new health behavior pattern frequently fail to maintain that pattern of behavior over time (Rothman, 2000). In addition, interventions which have increased the intensity or extended the duration

<sup>4</sup> Nutrition literacy was not included in the original model, but as it was a part of the theoretical framework of this study, it was incorporated into Figure 1. As its relationship with maintenance of a health behavior change has not yet been elucidated, its relationship with maintenance of a healthy diet was indicated with a dotted line.

of a successful behavioral treatment program for weight loss, have shown a postponement of the onset of relapse, but still does not considerably improve the rates of long-term maintenance (Jeffery et al., 2000; Jeffery et al., 1993a; Perri, Nezu, Patti, & McCann, 1989). Given this fact that the frequent use of intervention strategies that facilitate short-term successes do little to improve rates of long-term success, indicate that there are indeed important differences in the psychological processes involved in behavioral initiation and maintenance (Rothman, 2000), and that these specific differences should be investigated further as to maximize the chance of both successful behavior initiation and successful behavior maintenance.

## **2.2 Motivation**

Motivation refers to the psychological forces or energies which impel a person toward a specific goal, and is an essential constituent in all behavioral actions (Deci & Ryan, 1985; Manger, Nordahl, & Hansen, 2012). In an attempt to investigate motivation in the study sample, key components from self-determination theory (SDT) were utilized. Firstly, the basic tenets of SDT will be briefly explained, followed by a short introduction to the concept of self-regulation, as this concept is central to the ideas of the theory. Then, autonomy, which is the predominant element in the theory, will be explained in detail together with research on its importance with regards to health behavior maintenance.

### *2.2.1 Self-determination theory – a brief introduction*

SDT will represent the dominant theoretical perspective in this study, essentially because it is the only empirical theory with an individual level approach, which emphasizes the quality of motivation in relation to behavior, and in addition have validated instruments for each of the constructs (Williams et al., 2002b). It has lately also become more and more recognized and utilized in health behavior research (Teixeira, Silva, Mata, Palmeira, & Markland, 2012).

Why this theory is so appropriate to use in relation to maintenance of a healthy diet, is that it is particularly focused on the processes by which a person acquires the motivation for initiating health behavior changes and maintaining them over time (Ryan, Patrick, Deci, & Williams, 2008; Teixeira et al., 2012), and at the same time recognizing the importance of

both psychological and social factors in maintaining healthy behaviors. (Williams, Niemiec, Patrick, Ryan, & Deci, 2009).

For many years, motivation was viewed in a one-dimensional way, as varying only in amount or quantity (Silva et al., 2008). Introducing the issue of quality into the motivational concept, Deci and Ryan (1985) developed SDT which distinguishes between extrinsic motivation (where the behavior is engaged in with the aim of achieving outcomes that are distinct from the behavior itself, for example eating healthily to lose weight) and intrinsic motivation (where the behavior is engaged in for the pure pleasure and fulfillment inherent in the participation, for example participating in a sport because one truly enjoys it) (Silva et al., 2008). In addition, SDT differentiates between qualitatively different forms of extrinsic motivation, by contrasting autonomous or self-determined vs. controlled or nonself-determined types of behavioral regulation (ibid).

SDT also proposes that for people to be able to act in a self-determined manner, three basic and universal psychological needs have to be fulfilled (Ryan & Deci, 2000). These needs are for autonomy (feeling that one's behavior is deliberately determined and its significance is personally accepted), competence (feeling that one has the ability to perform the behaviors successfully and reach the goal) and relatedness to others (feeling understood, cared for and valued by important people in one's life). For the purpose of this study, the self-efficacy term will be used instead of competence, and social support will be used instead of relatedness, since these concepts are virtually similar and can be used interchangeably.

### *2.2.2 Self-regulation*

Self-regulation is complex and multifaceted, and can be defined as a systematic process by which people seek to actively and consciously exert control over, influence and adapt their own behavioral responses, in order to achieve a goal. (Baumeister, Gailliot, DeWall, & Oaten, 2006; Baumeister, Heatherton, & Tice, 1994). Successful self-regulation requires the intentional mobilization and synchronization of thought, feeling, and action (Gollwitzer & Oettingen, 1998), in particular when facing obstacles and when there are conflicts between goals (de Ridder & de Wit, 2008).

Self-regulation of eating is one area in which individuals can positively influence their own health and wellbeing, by choosing diets based on nutritional recommendations, both with regards to the quality of the foods chosen (e.g. favoring a low fat – high fiber diet), quantity

(e.g. portion controlled meals) and pattern (e.g. eating breakfast daily). In fact, what characterizes successful long-term weight maintenance, is a sustained effort to monitor and control food intake, which suggests that self-regulation in the eating domain is fundamental (Johnson, Pratt, & Wardle, 2011), especially for people who want to lose weight and maintain that weight loss. The fact that many people find it very difficult to successfully regulate eating behaviors in the long-term, can be mirrored in the current high rates of obesity in the westernized world (Teixeira, Patrick, & Mata, 2011).

### 2.2.3 *Autonomy*

The basic principles of SDT is that human motivation varies in the degree to which it is autonomous (self-determined) or controlled (Ryan & Deci, 2000; Williams, Gagne, Ryan, & Deci, 2002a), and it argues that developing a sense of autonomy with regards to a specific behavior, e.g. eating healthily, is critical to enable maintenance of those behaviors (Teixeira et al., 2011).

To experience autonomy in relation to a behavior, the performance of that behavior has to be autonomously motivated (Deci & Ryan, 2008). Autonomous motivation can be defined as having a sense of "ownership" with respect to a behavior (Teixeira et al., 2011), which constitutes that it is engaged in with a full sense of choice (Williams, Grow, Freedman, Ryan, & Deci, 1996). Controlled motivation, however, involves feeling forced to perform a behavior, due to pressure from an external agent (e.g., doctor or partner), or due to a strong belief that one should and must perform the behavior in order to feel worthy (Ryan & Deci, 2000). According to SDT, behavior change, like a healthy dietary change, will be maintained to the extent that the motivation for a behavior is autonomous (Williams et al., 1996).

The distinction between controlled and autonomous motivation represents a continuum, so that behaviors can be characterized in terms of the extent to which they are autonomously motivated versus controlled (Williams et al., 2002a). Relating it to a healthy diet, *external motivation* is the least autonomous form of motivation, and occurs when a person has a healthy diet either to obtain rewards or to avoid punishment or sanctions. *Introjected motivation* involves internalization of behavioral regulation, but having a healthy diet is based on trying to avoid negative emotions such as anxiety or guilt. *Identified motivation* reflects having a healthy diet because one believes that it is personally meaningful and important, even though it might not necessarily be enjoyable in itself. Lastly, *Integrated motivation* is the most autonomous form of motivation and applies when one has a healthy

diet because of its intrinsic satisfaction, for example, because it is of interest or because it is believed to be an essential and natural component of one's life (Deci & Ryan, 2008). Hence, it is when a person not only appreciates having a healthy diet, but it is seen as "on par" with other key values and lifestyle patterns. According to SDT, both identified and integrated regulation are autonomous and is associated with increased maintenance of behavior change (Ryan et al., 2008), because they are well internalized in the person's behavioral repertoire and self-esteem (Teixeira et al., 2011).

Autonomous motivation has been shown to be correlated with healthier eating habits in several studies (Pelletier & Dion, 2007; Pelletier, Dion, Slovic-D'Angelo, & Reid, 2004), where participants who reported higher scores on items such as "it's fun to make meals that are good for my health," "healthy eating is part of the way I have chosen to live my life", "eating healthy is consistent with other important aspects of my life "and" eating healthy is a way to ensure long-term health benefits ", appeared more likely to have a significantly healthier diet than those who displayed less autonomy towards having a healthy diet. Autonomous motivation has also been positively associated with a number of other health behaviors, such as long-term adoption of physical activity (Fortier, Sweet, O'Sullivan, & Williams, 2007; Silva et al., 2011), long-term smoking abstinence (Williams et al., 2009) and likelihood for participation in alcohol abstinence treatment , indicating that autonomous motivation is important across various health behaviors.

Concerning maintenance of a healthy diet, SDT suggests that the maintenance of this behavior change depends not on complying with demands for change but rather on accepting the regulation for change as one's own (Williams et al., 2002b). In other words, it requires internalizing values and regulation of dietary behaviors and then integrating them with one's self so that they can become the foundation for autonomous motivation. As such, according to SDT, if reasons for having a healthy diet were controlling (e.g., because your spouse insisted, or because you would feel guilty if you didn't), successful maintenance of a healthy diet would not be a likely scenario. Such controlling reasons indicate that the person has not individually endorsed the dietary behaviors nor developed a true willingness to perform them (ibid). Instead, successful maintenance of a healthy diet is theorized to result from people truly valuing having a healthy diet and the health benefits which arises from healthy dietary behavior. Hence, people maintain a healthy diet when the reasons for eating healthily are truly their own (Williams et al., 1996; Williams et al., 2002b).

### **2.3 Self-efficacy**

Self-efficacy was first introduced by Bandura (1977), and represents the strongest determinant within the social cognitive theory (Baranowski et al., 2003). Self-efficacy can be defined as a person's belief in their own abilities to perform a specific task or action required to achieve a desired result (Schwarzer & Fuchs, 1996). This "yes I can"- cognition mirrors a sense of control over one's environment, and it reflects the belief of being able to master challenging demands, overcoming barriers and capability to handle stress. (Schwarzer & Fuchs, 1996), as well as determining how much effort people will expend and how long they will persist in the face of obstacles (Bandura, 1977).

Over the years, the self-efficacy concept has become so interesting to health psychologists that it has been incorporated into the majority of the dominant health behavior theories (Schwarzer & Fuchs, 1996). The Health Belief Model (Rosenstock, Strecher, & Becker, 1988), Theory of Planned Behavior (Ajzen, 1991), Protection Motivation Theory (Rogers, 1975), Health Action Process Approach (Schwarzer, 1992) and the Relapse Prevention Model (Marlatt & George, 1984) all incorporate self-efficacy, or a version thereof, as a central construct. Hence, this key construct which was originally developed within Bandura's social cognitive theory has proven to be an essential component in all major social cognition models (Schwarzer & Fuchs, 1996).

Self-efficacy is considered as relevant in all stages of the health behavior change process, however, it does not always constitute exactly the same construct (Bandura, 1977; Schwarzer & Fuchs, 1996). Therefore the concept can be divided into separate entities, so-called phase-specific self-efficacies, where each concept are distinct from each other and relates to where a person is situated in the behavior change process (Schwarzer & Fuchs, 1996). Phase-specific self-efficacy was first distinguished in the domain of addictive behaviors, where five categories of self-efficacy was proposed, namely resistance self-efficacy, harm-reduction self-efficacy, action self-efficacy, and two different maintenance self-efficacies; coping self-efficacy and recovery self-efficacy (Marlatt & George, 1984).

The rationale for phase-specific self-efficacy beliefs is that during the course of health behavior change, different beliefs are required to master different tasks. For example, some individuals may be confident in their ability to set ambitious goals and to take action with regards to changing their diet (high action self-efficacy), but little confidence in their ability to maintain the desired dietary change (low coping self-efficacy). On the contrary, others may have high confidence in their ability to resist temptation (high coping self-efficacy) and to

recover from a dietary lapse<sup>5</sup> (high recovery self-efficacy) but little confidence in changing their diet in the first place (low action self-efficacy) (Schwarzer & Fuchs, 1996).

As the topic of this study revolves around the maintenance of dietary behaviors, coping self-efficacy and recovery self-efficacy represents the relevant self-efficacy concepts. They are key elements in the relapse prevention model (Marlatt, Baer, & Quigley, 1995), and may be particularly useful to examine in relation to maintenance of a healthy diet.

### *2.3.1 Coping self-efficacy*

Coping self-efficacy relates to a person's confidence in their capability to deal with high risk situations which arises during the maintenance period of adopted dietary behavior(s) (Hendershot, Witkiewitz, George, & Marlatt, 2011). Once a dietary behavior change has been made, individuals with high coping self-efficacy invest more effort and persist longer with regards to maintaining that change than those who are less self-efficacious (Marlatt et al., 1995). When relating coping self-efficacy to diet, one can visualize it as how a person-, after successfully adopting a healthy diet-, will respond when confronted with high-risk situations, such as experiencing negative emotions or temptations.

Relapse Prevention Model (RPM) predicts that an individual who has made a dietary change will return to a former dietary pattern when a high-risk situation presents itself, for which coping skills are lacking (Marlatt et al., 1995). Hence, unless the person can effectively utilize alternative coping strategies to initiate an adaptive coping response, lapses are very likely to occur (Schwarzer & Fuchs, 1996). As a result of this knowledge, many weight reduction programs, including the one in this study, incorporate relapse prevention training in the program syllabus, which aims at making use of a variety of situation-tailored and specific coping strategies which in turn enhances coping self-efficacy (Marlatt & George, 1984).

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<sup>5</sup> Lapse and relapse refers to a temporary slip (lapse) or reversion (relapse) back to the initial behavior which one initially attempted to change (Marlatt & George, 1984).



### *2.3.2 Recovery self-efficacy*

Recovery self-efficacy is closely associated with coping self-efficacy, but they relate to different stages of dietary behavior maintenance. Recovery self-efficacy addresses the experience of failure, lapses, and setbacks, by referring to a person's ability to get "back on track" after a single lapse in relation to the dietary behavior (Marlatt et al., 1995). According to RPM, if a lapse occurs, the person can attribute this lapse in two different ways. People with low recovery self-efficacy tend to attribute their lapse to internal causes, by dramatizing the event, having a dichotomous way of thinking and interpreting it as a full-blown relapse (Marlatt & Gordon, 1985). Individuals with high recovery self-efficacy beliefs, however, avoid this effect by making the precise situation responsible for the lapse, and by finding ways to control the damage and maintain commitment to their goals, hence trust in their own competence to regain control after a setback or failure (Marlatt et al., 1995; Schwarzer & Renner, 2000). A display of high recovery self-efficacy after an initial lapse has been found to increase the levels of recovery self-efficacy even further (Luszczynska & Sutton, 2006), as well as promoting long-term behavior maintenance (Marlatt et al., 1995).

### *2.3.3 Importance of self-efficacy in maintaining health behavior change*

The concept of self-efficacy has received considerable attention within the health research area. In the domain of weight control, investigators have argued that self-efficacy is an important mediator of successful weight loss behaviors and enhanced weight reduction program practices (Byrne, 2002; Linde, Rothman, Baldwin, & Jeffery, 2006; Strecher, DeVellis, Becker, & Rosenstock, 1986; Wadden, Foster, & Letizia, 1992), as well as being an important protector against relapse into previous unhealthy diets (Bagozzi & Edwards, 1998; Brug, Hespers, & Kok, 1997; Gollwitzer & Oettingen, 1998), especially when combined with general lifestyle changes (Schwarzer & Renner, 2000). For example, it has been shown that higher levels of self-efficacy is one of the factors most consistently and strongly associated with higher intake of fruits and vegetables (Van Duyn et al., 2001), and has proved to be one of the most powerful distinct factors in predicting the consumption of a low fat, high fiber diet (Renner et al., 2008; Schwarzer & Renner, 2000).

Studies have also shown that manipulations of self-efficacy have been proven consistently powerful in initiating and maintaining health behavior change, which supports Bandura's notion that self-efficacy expectations reflect a person's perceived, rather than

actual, capabilities, and that it is these perceptions and not a person's true abilities that often influence behavior (Strecher et al., 1986).

In the area of weight management, self-efficacy has shown strong predictive power with regards to successful weight loss maintenance. (Byrne, 2002; Elfhag & Rössner, 2005; Linde et al., 2006; McGuire, Wing, Klem, Lang, & Hill, 1999; Pasman, Saris, & Westerp-Plantenga, 1999; Strecher et al., 1986; Wadden et al., 1992). However, examinations of the predictive significance of self-efficacy have almost exclusively focused on its ability to predict actual weight loss (Teixeira et al., 2004a; Teixeira et al., 2004b; Teixeira et al., 2005) and weight loss maintenance (Elfhag & Rössner, 2005; Kayman et al., 1990; McGuire et al., 1999; Pasman et al., 1999), even though weight loss is not a behavior per se, but rather the consequence of a series of enacted behaviors.

Additionally, studies have either failed to test prospective links of self-efficacy with weight loss, displayed lack of implementation or reporting on proper statistical control procedures, or been unsuccessful in investigating associations between self-efficacy and relevant weight loss behaviors (Baldwin et al., 2006; Linde et al., 2006). To the degree that self-efficacy beliefs facilitate weight loss, it should depend on the constructs ability to predict the actual performance of individual weight control behaviors, like diet modification and physical activity levels (Linde et al., 2006). The number of studies focusing on this is scarce at best, hence research is needed that thoroughly examines the ongoing relationship between people's perceptions of self-efficacy for weight control behaviors, their performance of those behaviors (e.g., dietary intake), and weight loss (ibid).

Therefore, Linde and colleagues (2006) have highlighted that more data is required to elucidate the distinctive contribution of self-efficacy to the behaviors associated with weight loss and not just the weight loss itself. They have suggested that one can investigate important weight-control behaviors as dependent variables (e.g. dietary behaviors) and to focus on the association between these behaviors and self-efficacy, as well as the performance of those specific behaviors in the context of a weight loss intervention.

This study does aim at investigating the associative- and predictive nature of self-efficacy in relation to an actual behavior (maintenance of a healthy diet) rather than the consequence of those behaviors (weight loss and weight loss maintenance), as recommended.

## **2.4 Social support**

SDT proposes that, in a health context, the socio-environmental conditions, both during and after weight reduction program participation, which facilitates the satisfaction of the three basic and universal psychological needs (autonomy, relatedness and competence) will promote and facilitate internalization and integration of the regulatory processes involved with having a healthy diet, so that they are engaged in a more self-determined manner, and so, support successful maintenance of a healthy diet (Ryan et al., 2008; Silva et al., 2008). Attributable to this, SDT emphasizes the importance of having autonomy-supportive contexts, which refers to the recognition of people's perspectives, provision of positive reinforcement, support of their initiatives, provision of many options and relevant information, while at the same time minimizing force and control (Silva et al., 2008). In addition, participants recognition in other peoples lifestyle and seeing someone who has actually succeeded with the behavioral changes in question (such as program leaders and co-participants), can create a sense of unity and increase the motivation to maintain the dietary changes (Prochaska, Norcross, & DiClemente, 1994). In comparison, social contexts which are perceived as controlling, e.g. where people are pressured and told what to do, have been found to diminish autonomous motivation (Deci, Koestner, & Ryan, 1999).

### *2.4.1 Two separate forms of social support*

One can separate the social supportive context into two different social networks, where support from health care providers and other persons of authority represents one part, and support from one's personal social network (friends, family, coworkers) represents the other part. The term social network refers to the web of social relationships which surround individuals (Heaney & Israel, 2008).

Within SDT, only the autonomy support concept related to support during program participation from a person of authority has been operationalized. However, this study wanted to explore perceived social support both from the program leaders during program participation and from the study samples close social networks, since different network members are likely to provide different types of support (McLeroy, Gottlieb, & Heaney, 2001). For instance, within a health contexts, people tend to need and receive emotional support from their close personal networks, and informational support (provision of advice, suggestions and information which can be utilized to address problems) from health

professionals (Blanchard, Albrecht, Ruckdeschel, Grant, & Hemmick, 1995). Therefore, to distinguish the two types of social networks, the terms informal support and formal support will be used to illustrate the different social networks, respectively.

#### *2.4.1.1 Formal support*

Research has revealed that when individuals perceive their environment to be more autonomy supportive, they tend to show enhanced self-initiation and autonomous motivation in relation to the performance of a behavior (Deci & Ryan, 1987; Williams et al., 2002a) as well as enhanced self-efficacy for change (Williams, Freedman, & Deci, 1998a; Williams et al., 1996). (Ryan & Grolnick, 1986) found that students who perceived their teachers as more autonomy supportive were more mastery motivated and had greater perceived competence than students who perceived their teachers as more controlling. (Williams et al., 1998a) found that patients who perceived their health care providers as autonomy supportive were more motivated and felt more able to regulate their glucose levels compared to patients who perceived their health care providers as more controlling.

In a more recent study, Silva and colleagues (2010) created a weight loss intervention grounded in SDT, where the main intervention targets were increased autonomous self-regulation amongst the participants (for treatment and for exercise) and a more autonomous perceived treatment climate. They found that persons who participated in the experimental group reported significantly greater weight loss and higher intensity of physical activity as well as higher levels of self-efficacy compared to the controls.

#### *2.4.1.2 Informal support*

With regards to informal support, it has been shown to be an important factor for successful weight loss and weight loss maintenance (Elfhag & Rössner, 2005; Perri, Sears, & Clark, 1993; Wing, Marcus, Epstein, & Jawad, 1991), where receiving support from friends (Powers, Koestner, & Gorin, 2008; Wing & Jeffery, 1999) and social support availability (Hindle & Carpenter, 2011; Kayman et al., 1990) have been related to improved weight loss maintenance. In addition, research has shown that positive support from family and friends is associated with long-term positive change in physical activity and dietary behaviors (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). Wing and Jeffery (1999) found that recruiting participants to a weight reduction program with friends or with family members was

associated with lower attrition rates and better retained weight at 6 month's follow-up, versus those who were recruited alone. Similarly, a meta-analysis by conducted by Black, Gleser, and Kooyers (1990) concluded that there were significant short- and long-term benefits of including spouses in obesity treatment. In a different study, participants reported significantly greater weight loss when they perceived their family and friends as autonomy supportive of their weight loss efforts (Powers et al., 2008).

Furthermore, Hindle and Carpenter (2011) performed an in depth qualitative investigation of the experiences of successful weight maintainers, and found that the availability of social support was considered a key feature for the participants who were able to lose and maintain weight loss. Similarly, Kayman and colleagues (1990) found that weight loss maintainers were more likely to seek both informal and formal support to deal with problematic situations in their life and were likely to use problem focused coping strategies. Weight regainers or “relapsers” on the other hand, were less likely to seek support and resorted to emotion-focused strategies to cope with problems, such as eating (ibid). Hence, the availability of support appears to be a key factor in enabling people to cope with these high-risk situations.

Studies have also shown that people can initiate a behavior in the absence of social support or even in the presence of unsupportive others, but these conditions greatly thwart their ability to sustain the behavior change over time (Rothman, Hertel, & Baldwin, 2008), hence long-term social support seems to be essential in the health behavior maintenance domain.

## **2.5 Outcome expectancies and goals**

The concept of outcome expectancies is central in many dominant health behavior theories, particularly in SCT (Bandura, 1989) and HAPA (Schwarzer, 1992), and is considered to be a main encouraging factor for initial behavior change (Luszczynska & Schwarzer, 2008). Outcome expectancies can be defined as the predictive outcome beliefs of the consequences of performing a behavior or a set of behaviors (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011; Glanz, Rimer, & Viswanath, 2008).

### *2.5.1 Impact of outcome expectancies and goals on weight loss maintenance*

In comparison to behavior initiation, decisions regarding behavioral maintenance involve a consideration of whether the outcomes associated with the new pattern of behavior are sufficiently desirable to justify sustained action of that particular behavioral pattern (Rothman, 2000). Thus, the decision to maintain a behavior or a set of behaviors, e.g. eating healthily, depends on people's perceived satisfaction with the outcomes which they have gained from performing those behaviors (ibid). This notion is supported by research conducted on successful weight loss maintainers, where they report a high degree of satisfaction with how the alteration of behavior have influenced their lives (Klem et al., 1997). A different study showed that women who had sustained weight loss one year after treatment attributed greater benefits to having lost weight than did women who had failed at maintaining their weight loss (Rothman, 2000).

When it comes to determining what a satisfactory outcome really is, people tend to evaluate the outcomes they have gained by comparing them to their initial outcome expectancies and goals (Rothman, 2000). Goals can be seen as the measurable manifestations of a person's favorable outcome expectancies, and goal setting is necessary for behavior change to occur, but does not ensure that a person will really pursue the goal (Bandura, 2000). As such, there are other key factors, e.g. self-efficacy, which are essential in enabling a person to make a behavior change, and maintain it over time. However, when a new dietary behavior pattern results in a person reaching or even exceeding their goal, they will be motivated to maintain the dietary behavior. On the other hand, when the new behavior pattern fail to produce the expected outcome, people tend to be dissatisfied with the dietary behavior and feel less motivated to maintain it (Baumeister & Vohs, 2011). This idea is supported by evidence which suggests that people who have realistic outcome expectancies or goals, are more likely to sustain a new behavior pattern, since they are more likely to reach their goal, which in turn will warrant continued action of the new pattern of behavior (Byrne et al., 2003; Jeffrey, Wing, & Mayer, 1998; Linde, Jeffery, Levy, Pronk, & Boyle, 2005). Simultaneously, those who have unrealistic expectations are doomed from the onset to fail, described by (Polivy & Herman, 2000) as the "false hope syndrome".

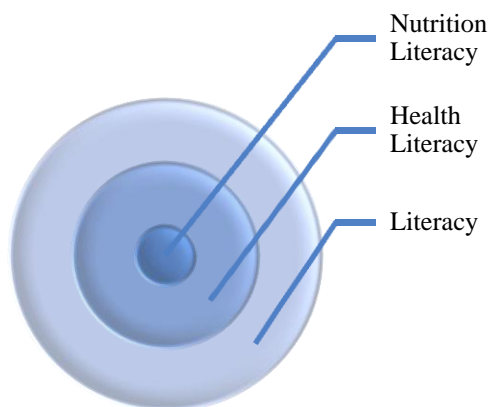
With regards to weight reduction program participation, generally the goals of the participants are to lose a certain amount of weight by the end of a specified time period. The disadvantage with this is that obese individuals tend to have very unrealistic weight loss expectations, although a weight loss of 10 percent of initial body weight is generally

considered weight loss success (Foster, Makris, & Bailer, 2005). Obese individuals generally expect a 30 percent reduction in weight (Dalle Grave et al., 2004), and in one study the expectations were as high as a 42 percent reduction in weight (Linné, Hemmingsson, Adolfsson, Ramsten, & Rössner, 2002). As a result of this, interventions aimed at improving weight loss maintenance have emphasized the advantages of a modest initial weight loss. Unfortunately this has not appeared to facilitate weight loss maintenance (Foster et al., 2004). Nonetheless, increasing people's satisfaction with their body weight at treatment completion has shown greater promise at improving weight loss maintenance (ibid).

## **2.6 Nutrition Literacy**

There are many reasons for why it was interesting to investigate the levels of nutrition literacy in this particular study sample. Firstly, weight reduction program participants have to the best of my knowledge never been investigated with regards to nutrition literacy. Secondly, low levels of nutrition literacy have been associated with poor health and an unhealthy diet (Zoellner, Connell, Bounds, Crook, & Yadrick, 2009). Thirdly, considering that Diamond (2007) found that overweight and obese people generally have lower nutrition literacy than people of normal weight, together with the findings that the majority of the participants of weight reduction programs are overweight or obese at program initiation (Franz et al., 2007), it could be very interesting to see whether the participants level of nutrition literacy is associated with the maintenance of a healthy diet.

Nutrition literacy is a concept originating from health literacy, which is considered to be highly related to the concept of general literacy, which deals with basic reading-, writing-, and numeracy skills (Kirsch, 2001). Their inter-relationship is depicted in Figure 2.

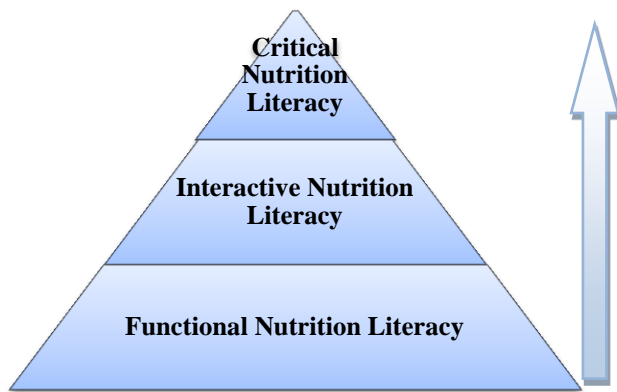


**Figure 2: Inter-relationship between literacy, health literacy and nutrition literacy**

In recent years there has emerged a new and more comprehensive approach to health literacy, which has been defined by WHO as "the mental and social skills which determine an individual's motivation and ability to access, understand and use information in a manner that promotes and maintains good health" (Nutbeam, Harris, & Wise, 2010, p. 38). A proper definition of nutrition literacy would be similar to that of health literacy, by specifying that the information in question is nutritional in nature.

As a reaction to the more rudimentary and narrow former definition of health literacy, Don Nutbeam (2000) developed a three-level hierarchical classification of health literacy, and as such broadening the scope of the concept of health literacy and opening up for the inclusion of psychological, social, and environmental factors into the theoretical framework (Tones, 2002). The three hierarchical levels are as follows: functional health literacy (FHL), interactive health literacy (IHL) and critical health literacy (CHL). For each level there is a requirement for additional skills and knowledge, but also a greater degree of empowerment and autonomy (Nutbeam, 2009). Similar to health literacy, nutrition literacy can also be hierarchically classified into functional- (FNL), interactive- (INL) and critical nutrition literacy (CNL) (Pettersen, 2009), which is visualized in Figure 3.





**Figure 3: Hierarchical levels of nutrition literacy**

### *2.6.1 Explanation of the three hierarchical levels of nutrition literacy*

(Finbråten & Pettersen, 2009; Kjøllesdal, 2009; Nutbeam, 2000).

*Functional nutrition literacy* refers to basic reading and writing skills, as well as fundamental nutritional knowledge, which are necessary to gain new knowledge, in addition to understanding and following simple nutritional advice and information in today's society. Typical of this level of nutrition literacy is to be cognitively able to receive and internalize health and nutrition information, rather than promoting critical thinking or relating to being actively involved in nutrition communication.

*Interactive nutrition literacy* involves more advanced reasoning ability than FNL, and refers to the cognitive and social skills which enable a person to actively extract information, inform themselves and find meaning from various sources of nutritional information and nutritional communication tools. Interactive nutrition literacy focuses on improving a person's ability to make independent and informed decisions on the basis of obtained nutritional knowledge and to use that knowledge actively, in a way that benefits and maintains their health.

*Critical nutrition literacy* refers to an individual's ability to use critical thinking in the seeking, analyzing and evaluation of all nutritional information. This enables a person to make sound health related decisions, by allowing them to use that information in an adequate manner to gain better health. In addition, critical nutrition literacy is necessary for the ability to actively engage in sound health promotion activities at all societal levels. In this way,

critical nutrition literacy can contribute to health- and nutrition promotion in a social context, in addition to providing individual advantage.

### *2.6.2 Why might nutrition literacy be interesting to investigate in this study?*

Low levels of general literacy have been associated with poorer health outcomes and inability to treat one's own disease (DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004). Moreover, people with poor literacy tend to be less responsive to health education, less likely to use disease prevention services, and to successfully manage chronic disease (Nutbeam, 2009). In addition, lower levels of health literacy is associated with lower self-efficacy, which can be a barrier to positive and healthy lifestyle choices (Nutbeam et al., 2010). Low levels of health literacy is also associated with poorer ability to implement glycemic control (Schillinger et al., 2002).

Furthermore, it has been found that lower literacy skills have been associated with increased BMI (Huizinga, Beech, Cavanaugh, Elasy, & Rothman, 2008), a poorer understanding of food labels (Rothman et al., 2006), and less accuracy of portion size estimation (Huizinga et al., 2009). Bearing in mind that obese individuals commonly underestimate their food intake by 30 percent to 50 percent by misjudging portion sizes and failing to recognize hidden sources of fat or sugar, or forgetting some foods eaten (Lichtman et al., 1992), accuracy of portion-size estimation is considered an essential element of successful weight management (Huizinga et al., 2009; Jeffery et al., 1993b).

Considering the evidence indicating that low literacy and nutrition literacy levels are associated with a number of characteristics which are highly related to overweight and obesity, it was considered very interesting to investigate the levels of nutrition literacy among weight reduction program participants, and to see whether those levels might be related to maintenance of a healthy diet. If this is in fact evident, it can have valuable implications for future weight reduction program developments.

### **3.0 Method**

All of the methods used in this study will be presented in the following chapter. Firstly, the details of the literature search performed will be described, followed by an explanation of the choice of study design and study sample. Next, a thorough explanation of how the questionnaire was prepared, including a description of all the variables chosen, as well as how the distribution process was performed will be clarified. Lastly, the types of analysis used in this study will be addressed.

#### **3.1 Literature search**

When searching for literature, Embase, Science Direct, PubMed, Wiley Online Library, NCBI and Bibsys were the main databases used, in addition to Google Scholar. Key words used, both together and separately, during the search were: “weight loss maintenance”, “diet”, “successful weight maintenance”, “obesity”, “weight loss”, “weight regain prevention”, “lifestyle change”, “health behavior change”, “self-efficacy”, “maintenance self-efficacy” “relapse prevention model”, “self-determination theory”, “autonomous motivation” “self-regulation”, “nutrition literacy”, “social support”, “social cognitive theory” and “predictors weight loss maintenance”. In addition, the reference lists of articles considered the most relevant for this study were studied for relevant literature.

#### **3.2 Choice of study design**

For the purposes of this study a quantitative approach was chosen, since the aim of the study was to investigate the relationship between different psychosocial factors and the maintenance of a healthy diet. This was done by means of a cross-sectional study, using a questionnaire, aiming at investigating the relationships between two or more variables at one point in time (Grønmo, 2004). This type of study design is particularly well suited to measure a phenomenon, but is limited in the fact that it only enables exploration of correlational relationships and not causal relationships (ibid).

### **3.3 Study sample**

The sample in this study consisted of current and former participants in a weight reduction program, offered in all counties in Norway as well as at Svalbard, for people with weight problems and poor dietary habits. They focus on lifestyle modification to reduce weight and managing to keep it off for an extended period of time by raising awareness of bad habits and incorporation of new good habits. In addition, they motivate participants to change their lifestyle through focus on the change processes, craving management, food and emotions, high-risk situations, etc. Since its start-up in 1981 this program has helped thousands of people to gain better health and to reach their ideal weight.

### **3.4 Distribution of questionnaire**

The questionnaire was distributed via email and was sent to 4184 valid email addresses. These email addresses constitutes a registry receiving a monthly newsletter from the weight reduction program provider, where the majority represent current and previous participants. It was sent out by the program provider, as it was thought that this would be considered, by the sample, to be a more trustworthy distribution source. Distributing the questionnaire from the student's email account or questback account was not a potential option anyway, as NSD did not permit it.

### **3.5 Preparation of questionnaire**

In the early phase of questionnaire preparation, the main focus was to find measuring instruments, for each of the independent variables, which had already been developed, which then could be translated and adapted to the target group or used as inspiration for development of a similar but more appropriate measuring tools. Using an already developed measuring tool is often advised, as it increases the likelihood of one measuring what one actually wants to measure, as well as capturing all the aspects of that phenomenon (Ringdal, 2007). This will be highlighted in greater detail when addressing the validity and reliability of the study (see Chapter 5.1.6).

The finished questionnaire consisted of one dependent variable, seven independent variables and a range of background- and lifestyle variables. The items included in the dependent variable aimed at investigating the degree of maintenance of a healthy diet after

commencement in a weight reduction program. The independent variables contained items aimed at investigating aspects of the respondent's motivation to continue having a healthy diet, perceived formal and informal support, coping self-efficacy, recovery self-efficacy, as well as their level of nutrition literacy.

### *3.5.1 Dependent variable; maintenance degree of a healthy diet*

The dependent variable was comprised of twelve items, each referring to a different aspect of the healthy diet as it was taught at the weight reduction program, which together aimed at measuring the degree of maintenance of a healthy diet. The twelve items were as follows:

“I feel that I have managed to maintain the healthy diet I learned to follow at the Libra Health and Nutrition program participation, by”:

1. Eating four to five regular meals a day
2. Having a varied and balanced diet
3. Focusing on getting enough fiber in my diet
4. Drinking enough water
5. Eating the recommended daily bread-, fruit-, and condiment- portions
6. Eating vegetables at all meals
7. Following Libra's advice during the preparation of healthy meals
8. Limiting the intake of alcohol
9. Limiting intake of foods high in sugar and white flour
10. Limiting intake of sugary drinks
11. Limiting intake of foods high in saturated fat
12. Planning what to eat in advance of meals

Together, these twelve items became one combined measure of maintenance of a healthy diet.

### 3.5.2 Independent variables

#### 3.5.2.1 Operationalization of motivation

To investigate the quality of motivation in the study sample, a questionnaire called the *Treatment self-regulation questionnaire (TSRQ)* was used. It is a theoretically derived scale and is designed to assess the different qualitative forms of motivation identified within the SDT framework (Levesque et al., 2007). It seeks to investigate why people engage in some healthy behavior or try to change an unhealthy behavior, and does this by assessing the degree to which a person's motivation for health behavior is relatively autonomous or self-determined versus controlled (ibid). It was initially developed by Ryan and Connell (1989) and has since then been used in many studies investigating the quality of motivation in relation to specific health behaviors (Levesque et al., 2007; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997; Ryan, Plant, & O'Malley, 1995; Williams et al., 2002a; Williams et al., 1996; Williams, Rodin, Ryan, Grolnick, & Deci, 1998b). Later studies has validated its theoretical structure (Levesque et al., 2007).

There were three items originally included in this scale, which was left out of the finished questionnaire, related to amotivation. It was decided to do this as the weight reduction program participants were believed to care and reflect about their dietary behaviors; hence it was very unlikely that there is no form of motivation behind their dietary behavior.

#### 3.5.2.2 Operationalization of maintenance self-efficacy

Continued interest in weight control self-efficacy has motivated the development of numerous scales to assess this construct, such as the Weight Efficacy Life-style Questionnaire (Clark, Abrams, Niaura, Eaton, & Rossi, 1991), Situation-based Dieting Self-Efficacy Scale (Stotland, Zuroff, & Roy, 1991), Eating Self-Efficacy Scale (Sallis, Pinski, Grossman, Patterson, & Nader, 1988), Three-factor Eating Questionnaire (Karlsson, Persson, Sjostrom, & Sullivan, 2000), Nutrition Self-Efficacy Scale (Schwarzer & Renner, 2009) and Perceived Competence Scale for dietary maintenance (Williams et al., 1998a). However, these were considered inappropriate to use in this study, as they did not relate to maintenance self-efficacy or were considered too simplified in their ability to measure this phenomena as it was intended to be measured in this study.

With regards to scales specific to coping- and recovery self-efficacy for maintenance of a healthy diet, the attempt of retrieving any was unsuccessful. However, there have been

some scales developed for the purpose of assessing coping self-efficacy within the area of addictive behavior, e.g. The Alcohol Abstinence Self-Efficacy Scale (DiClemente, Carbonari, Montgomery, & Hughes, 1994), the Drinking Self-Efficacy Questionnaire (Young, Oei, & Crook, 1991) and the Situational Confidence Questionnaire (Annis, 1986). These questionnaires are based on the notion that certain situations or occasions can pose a threat to a person's sense of behavioral control and, consequently, result in a lapse or relapse. Based on investigations on relapse triggers in alcoholics who had attended treatment for substance abuse, Marlatt (1996) identified and categorized certain characteristics of such lapse-inducing situations, namely negative emotional states (anger, anxiety, depression, frustration, boredom), conflict with others, social pressure and positive emotional states (celebrations, testing one's personal control and temptations), and labeled them high risk situations. When answering these types of questionnaires the respondents are to indicate how confident they are in refraining for drinking in each of the specified high risk situations. The level of confidence displayed is positively correlated with the degree of coping self-efficacy.

To be able to utilize any of these questionnaires in this study, it was necessary to find a similarity between eating behavior and addictive behavior. Certain particular eating behaviors, especially displays of dietary disinhibition, like binge eating, has been characterized as displaying similar behavioral patterns as other addictive behaviors (Corwin & Grigson, 2009; Pelchat, 2009). Binge eating can be characterized as a pattern of overeating episodes followed by feelings of loss of control, guilt, and attempts to restrict eating to lose weight (Linde et al., 2004), and has been found to be triggered similar high risk situations as that of heavy drinking (Birch, Stewart, & Brown, 2007). Binge eating constitutes a pronounced problem in obese eating behavior (Elfhag & Rössner, 2005), as well as being a significant predictor for weight regain after successful weight loss (McGuire et al., 1999) Binge eating has also been related to a history of weight cycling (Sherwood, Jeffery, & Wing, 1999) which in itself have been found to be associated with unsuccessful weight loss maintenance (Ball et al., 1999; Haus, Hoerr, Mavis, & Robison, 1994; McGuire et al., 1999).

Considering weight loss maintenance, binge eaters generally display a pattern of early major weight regain and poorer outcome one year following weight-loss treatment, compared to none-binge eaters (Raymond, de Zwaan, Mitchell, Ackard, & Thuras, 2002; Yanovski, 2003). A comprehensive review by Elfhag and Rössner (2005) revealed that disinhibited eating was one of the factors associated with weight regain. Another study by Wing and Phelan (2005) showed similar findings, where lower levels of dietary disinhibition was seen as a predictor of successful weight loss maintenance. In addition, estimates of the prevalence

of binge eating have been as high as 23–55 percent in individuals seeking weight loss treatment (Fairburn, Hay, & Welch, 1993; Robertson & Palmer, 1997; Spitzer et al., 1992), compared to two percent in the general community (Spitzer et al., 1992).

Based on this evidence and a further inspection of the different scales, the Brief Situational Confidence Questionnaire (BSCQ) was chosen, as it seemed like the most adaptable questionnaire out of all those mentioned. An extensive literature search resulted in the belief that this scale has most likely never been used in a context similar to that of this study; hence the scale had to be translated as well as carefully adapted to the context in question. It is worth noting that it was initially only aimed at measuring coping self-efficacy, but it was believed that it could be adapted in such a way that it would successfully measure both self-efficacy concepts in relation to dietary behavior in the study sample.

The BSCQ is a measuring tool which assesses a person's coping self-efficacy with regards to resisting to use drugs in response to high-risk situations (Annis, 1986). Based on the Marlatt and George (1984) investigation of relapse determinants, the BSCQ focus on eight high risk situations: negative emotional states, negative physical states, positive emotional states, testing personal control, urges and temptations, interpersonal conflict, social pressure and festive events. This instrument has been shown to be psychometrically sound (Kirisci, Moss, & Tarter, 1996), and has mainly been used to assess alcoholics' urge to drink heavily (Breslin, Sobell, Sobell, & Agrawal, 2000; Miller, Ross, Emmerson, & Todt, 1989). Originally this was a 100-item questionnaire, but a brief eight-item version, decided to be used in this study, was derived from it and validated, and compared favorably to the original measuring tool (Breslin et al., 2000).

To assess coping self-efficacy, the respondents were asked to “imagine themselves as they are -“right now”- in each of the high risk situations presented above. Then they were asked to indicate on a 6-point Likert-scale to which degree they were confident, at that present time, that they could exercise control over their eating in each of the situations. To assess recovery self-efficacy, the respondents were first asked to imagine that they recently had had a lapse with regard to eating (i.e. were in a situation where they felt like they did not manage to exercise control over their eating). Then they were asked to indicate on a 6-point Likert-scale to which degree they were confident that they could exercise control over their eating in each of the situations after the lapse had occurred.



### *3.5.2.3 Operationalization of formal support*

The Health Care Climate Questionnaire (HCCQ) is an instrument which seek to measure to what degree a specific context is autonomy supportive (Deci & Ryan, 1985). For the purposes of this study it aims at investigating the autonomy support of the program leader during program participation. It was developed with SDT as a theoretical framework, which considers that the features of a person's social contexts influences many aspects of that person, for example their motivation and welfare (Deci & Ryan, 1985). More specifically, it considers that the nature of the social context, conceptualized as autonomy supportive versus controlled, greatly influences a person's self-determined motivation and health behavior (ibid).

HCCQ exists in two formats; a long form containing 15 items and a short form containing six of those items. It was originally developed to evaluate patients' opinion of the degree to which they believe their health-care providers to be autonomy supportive versus controlling (Williams et al., 1996). It has been used to study many different health behavior areas, e.g. intentional weight loss (ibid), smoking cessation (Williams, Cox, Kouides, & Deci, 1999), glucose control in diabetes patients (Williams et al., 1998a) and adhering to medication prescriptions (Williams et al., 1998b). When testing for reliability, the coefficient Cronbach's alpha ( $\alpha$ -value) for the 15 items has consistently been above 0.90, and for the six-item scale it has been above 0.85 (Wilson & Rodgers, 2004).

As there was already a concern regarding the length of the questionnaire, it was decided to use the short six-item version of the scale. It was translated and adapted to be context specific, so that the questions in the scale referred to "your program leader" instead of "your physician", which was the wording originally used.

### *3.5.2.4 Operationalization of informal support*

The Berlin Social Support Scale (BSSS) was developed by Schulz and Schwarzer (2003) and it distinguishes itself from other social support scales by measuring both cognitive and behavioral aspects of social support. It consists of six subscales, namely perceived support, actually provided support, received support, need for support, support seeking, and protective buffering. Reliability has been demonstrated in several studies (Schulz & Schwarzer, 2003, 2004).

Initially, when preparing the questionnaire, it was decided that the complete BSSS should be included in the questionnaire. However, as it was desirable to keep the length of the questionnaire as short as possible, it was decided to use only one of the subscales, namely received support. It was translated and adapted with care, as to avoid affecting the integrity of the scale. Nevertheless, the small pilot study conducted generated some negative comments regarding that particular scale, specifically that the respondents felt like it was too general. As a result of this, a new, more target- and context specific scale was developed, with the BSSS and the social support for eating scale (Sallis et al., 1987) used as inspiration. It was intended to measure the weight reduction program participants received and perceived social support, particularly in relation to maintaining a healthy diet.

#### *3.5.2.5 Operationalization of degree of goal attainment*

Due to the evidence presented in Chapter 2.5 regarding the influence of the degree of satisfaction with the outcomes attained and its influence on health behavior maintenance, it was decided to incorporate a measure of this phenomenon into the questionnaire. This indicator was comprised of an attitude statement, where the respondents were to specify on a 6-point Likert-scale to what degree they felt like they had achieved the goals which they put forward at the initiation of the last weight reduction program they participated in.

#### *3.5.2.6 Operationalization of Nutrition Literacy*

To assess the level of nutrition literacy in the sample, it was chosen to use the majority of Nutrition Literacy Questionnaire (NLQ), mainly because this is currently the only developed tool to measure nutrition literacy in adults. It is a relatively novel measuring tool, originally developed by Diamond (2007), and contains a reasonably large number of attitude statements, aimed at measuring different levels of nutrition literacy (Dalane, 2011; Kjøllesdal, 2009). Previous studies have revealed four subscales, namely one construct for *FNL* and *INL* and two for *CNL* (Aarnes, 2009; Dalane, 2011; Kjøllesdal, 2009). The two *CNL* constructs were named *CNLaction* and *CNLscientific*, and differed significantly from each other (ibid). *CNLaction* relates to being actively involved in issues within the nutrition arena, while *CNLscientific* refers to how one in a scientific and critical sense relates to nutrition and dietary information as well as the sources of that information (ibid). Due to the nature of the topic of this study as well as the length of the questionnaire, it was decided that all but one of the

items in the *CNLaction* construct were excluded from the questionnaire. Additionally, minor changes were made to the items within the constructs to create the best fit between constructs and study sample, as this target group had not previously been investigated using the NLQ.

### *3.5.3 Background- and lifestyle variables*

For the purpose of this study, general background variables were used as well as some more specific to the actual topic and interest of the study. General background variables included age, gender, education, income, relationship status, number of children and region of residence. Lifestyle variables included were tobacco-, scruff- and breakfast habits, levels of physical activity, sources of dietary information, sources of social support, frequency of weight monitoring, previous weight loss attempts, number of weight reduction programs attended and time since the most recent weight reduction program was completed.

## **3.6 Process towards a finished questionnaire**

When considering the structure and layout of the questionnaire, the aim was to present it in such a way that it would follow the “cognitive flow” of the respondent, and keep them interested throughout the whole questionnaire (Haraldsen, 1999). To do this, relative easy/simple questions were placed in the beginning and the end of the questionnaire, while the questions which needed more thought, consideration and reflection were placed in the middle of the questionnaire. The first question of any questionnaire should be of high relevance to the respondent as well as the topic of the questionnaire (Haraldsen, 1999), hence the questionnaire was initiated with the attitude statement aimed at eliciting thoughts regarding their personal goal attainment. Then the questions present themselves in the following order: simple single- and multiple choice questions regarding their weight reduction program participation, attitude statements regarding their diet, and motivational aspects of their diet, questions regarding social support, maintenance self-efficacy, nutrition literacy, and finally the majority of the background- and lifestyle variables.

### *3.6.1 Pilot testing of the questionnaire*

After the questionnaire had been prepared, it was sent out to three former weight reduction course participants who also were program leaders, as well as the CEO of the program organizer, with the intention to provide feedback on the structure and layout of the questionnaire, as well as the individual attitude statements. This resulted in alterations of one scale as well as the exclusion of a general nutritional knowledge test, as it became considered as inappropriate for this particular study context. After alterations had been done according to the feedback, the questionnaire was considered ready and sent out to the newsletter recipients.

## **3.7 Statistical methods utilized**

In the following section the statistics chosen to be used in the analysis of the data will be individually described in the order it was applied in the actual data analysis.

### *3.7.1 Transfer of data to SPSS*

As Questback was used for collecting responses from the sample, the data was transferred directly from that software into SPSS. Then the dataset was scrutinized for any possible errors resulting from the transfer. It was found that where the sample had chosen to not answer a question, a “0” was displayed instead of “.”. To be able to perform certain statistical analysis, like a missing value analysis, all the “0” were replaced by “.”, since the missing value analysis interpret 0 as an actual answer (Pallant, 2010).

### *3.7.2 Recoding of variables*

Many of the independent variable attitude statements were recoded into new variables for the purpose of further analysis, where each negative item was firstly reversed, as the scale needed to have the same measurement level on all items to be able to be used in e.g. factor- and reliability analysis. Then, for both the dependent and independent continuous variables, each item of each construct was added together and then averaged, as to produce one average score for each of the individual constructs.

### *3.7.3 Descriptive statistics*

To get an overview of what the sample had answered as well as sample characteristics, descriptive statistics was produced for a range of the background- and lifestyle variables. Descriptive statistics should be performed on the original dataset, not after performing the missing value analysis (Pallant, 2010). In addition, descriptive statistics was used to obtain means and standard deviations for each construct.

### *3.7.4 Missing value analysis*

Missing, which refers to items in the questionnaire which have been unanswered, need to be corrected for before doing any further sophisticated analyses, as many of the analyses in SPSS do not accept or are very sensitive to missing data (Ringdal, 2007). One can therefore perform what is called a missing value analysis, which estimates the values of each missing answer based on the pattern of answers that respondent has displayed throughout the remaining questionnaire, without changing the means of the constructs significantly (ibid). Since many of the analyses intended to be performed in this study are not robust against missing values (e.g. factor-, reliability- and multiple regression analysis), a missing value analysis was performed prior to embarking on these types of analysis (Pallant, 2010). If the mean values for the items are virtually identical before and after the MVA, one can continue with further analysis.

### *3.7.5 Factor analysis*

Factor analysis is a way of systemizing the variables and reducing the data, and is used when one wants to find a pattern within a set of items, grouping them into respective factors (Clausen, 2009; Kahn, 2006; Pallant, 2010). The pattern is based on the correlations between the observed items, and the items grouping into a factor measures different aspects of the phenomena that factor represents (Eikemo & Clausen, 2007). There are two main types of factor analysis, namely exploratory and confirmatory, where exploratory is the most commonly used, in the form of principal component analysis (ibid). Exploratory and semi-confirmatory are the ones used in this study.

Two statistical measures generated when performing a factor analysis which helps assess the “factorability” of the data (Pallant, 2010). First is the Kaiser Meier Olkins (KMO)

index, which provide information regarding the factorability of the items, by giving an indication of whether the variables belong together in a substantial manner, or the extent to which the variance between them is common (Clausen, 2009). The KMO index should be 0.6 or higher to enable for the generation of appropriate factors from a factor analysis (Tabachnick & Fidell, 2007). The second is the Bartlett's test of sphericity, which should be significant at a 0.05 level or less (Pallant, 2010).

When sampling adequacy has been established, one can move on to perform a factor extraction, which is a way of establishing the minimum number of factors needed to best represent the interrelationship between the variables (Pallant, 2010), either by using exploratory or confirmatory factor analysis. One can base the estimation of number of factors on the Kaiser's criterion, where factors with an eigenvalue of 1 or above correspond to the number of factors retained (Clausen, 2009; Pallant, 2010), which represents exploratory factor analysis. For all the items, except for the nutrition literacy items, the factor extraction was based on the Kaiser's criterion. For the nutrition literacy constructs, all of the items were analyzed at the same time and the factor extraction was based on "forcing" the items into a fixed number of factors, hence in a semi-confirmatory manner. Several possible numbers of factors were explored.

It is also common to use the rotation function to maximize high correlations between the variables in one factor and correspondingly lower correlations of other factors (Johannessen, 2009). The most commonly used method of rotation is the orthogonal rotation, in which factors do not correlate with each other (Clausen, 2009). Varimax is the most recognized orthogonal rotation, and is characterized by each variable loading to a high degree on one factor, while at the same time loading to a low degree on other factors (ibid). As the Varimax function simplifies the factors (Eikemo & Clausen, 2007), as such making them easier to interpret, it was chosen to utilize this type of rotation when rotation needed to be applied.

All variables which were included in the factor analysis are appointed a value, called a factor loading (Pallant, 2010). The item factor loadings within a construct is an index of the correlation of that item with the other items, as well as being a measure of "respondent agreement"; The higher the factor loading, the higher correlation with the other items and the higher "agreement rate" among the respondents, as well as the higher the correlation with the factor itself (Clausen, 2009). With regards to what factor loading which are suitable to include in a factor, it is generally accepted that any value below 0,3 is ignored (ibid).

The advantage with the scales used in this study was that the majority had been previously developed; hence there was an idea of how and in what way the items would cluster together. However, the scales had not been applied to this particular target group before, which means that the data could have shown different patterns from that obtained in other studies where the scales had been utilized.

### *3.7.6 Reliability analysis*

A reliability analysis is concerned with the trustworthiness and “quality” of the chosen scales, by investigating the internal consistency of them (Pallant, 2010). The internal consistency is a measure of whether the items which the scale is comprised of, measure the same underlying phenomena (ibid). The indicator used as a measure of internal consistency is coefficient Cronbach’s alpha ( $\alpha$ ) and it provides information regarding the systematic relationship between the items within the construct (Christophersen, 2009). Preferably the  $\alpha$ -value should be 0.7 or above (DeVellis, 2012), but not as high as 1. However, if the scale consists of fewer than ten items, a lower  $\alpha$ -value is acceptable, as long as the mean inter-item correlation is between 0.2 and 0.4 (Briggs & Cheek, 1986). Most of the scales utilized in this study had already been developed and hence had gone through reliability analysis. They had all displayed a  $\alpha$ -value of 0.7 or above, but since the reliability of a scale can vary depending on the sample (Pallant, 2010), it was essential to perform a reliability analysis on each of the scales used in this study.

### *3.7.7 Correlation analysis*

Before embarking on more advanced statistical analysis, correlation analysis needed to be performed. When testing for correlation there is no dependent or independent variable per se, hence one cannot claim that one variable affects the other; its more related to the degree of co-variation (Eikemo & Clausen, 2007). The most common correlation test performed on normally distributed data is the Pearson’s Correlation Coefficient test, which measures the degree of linear correlation between two continuous variables (ibid). The value  $r$  measures the degree of linearity, while the prefix determines whether it is a positive or negative correlation (ibid). When investigating the correlation between categorical variables and continuous variables, one will have to use the equivalent non-parametric test, which is the Spearman Rho test (ibid). Cohen (1988) gives the following guidelines for interpreting the strength of

relationship between two variables: Small correlation:  $r = 0.10$  to  $0.29$ ; medium correlation:  $r = 0.30$  to  $0.49$  and large correlation:  $r = 0.50$  to  $1.00$ .

### *3.7.8 Multivariate analysis of variance*

To compare the difference in means between groups and whether this difference is significant or not one can use a test called multivariate analysis of variance (MANOVA) (Pallant, 2010). This is appropriate when one has more than one dependent variable, which all has to be continuous, and one categorical independent variable (ibid). MANOVA compare all the groups, and indicate whether the mean differences between the groups on the combination of dependent variables are significant or not (ibid). The specific group of tests which checks for a possible significant difference between the means of the groups, are called post hoc tests (Stevens, 2009). The post hoc test chosen for this study was the Tukey's HSD. It is quite a conservative test which has the advantage of lowering the risk of making a Type I error (incorrectly deducing a difference, when in fact there is no significant difference) (ibid).

### *3.7.9 Multiple regression analysis*

Multiple regression analysis is based on and related to correlation, but enables for a much more sophisticated investigation of the association between a set of variables (Pallant, 2010). This type of analysis is used when one wants to predict scores on a continuous dependent variable from scores of a group of independent variables (ibid). It can be used to investigate the predictive power of a set of variables and to evaluate the relative explanatory contribution of each individual independent variable to the dependent variable (ibid). For the purpose of this study, the aim of performing multiple regression analysis is to investigate which independent-, background- and lifestyle variables are able to predict the total variance in dependent variable, as well as how powerful this prediction is. The analysis will present information regarding all the significantly contributing independent variables together as one, as well as the relative contribution of each of the individual variables (ibid). In a standard or simultaneous multiple regression analysis all the independent variables which show a significant correlation with the dependent variable, is entered into the analysis together (Christophersen, 2009).

In a sequential, also called hierarchical, multiple regression analysis the independent variables are entered into the regression model in a specific order of priority, with the aim of



revealing how new variables changes the effects of variables already included in the model, and how new variables increases the predicted variance in the dependent variable (ibid). However, firstly one should check for correlations between the independent variables and the dependent variables, as this will enable exclusion of variables which seem insignificant with regards to predictability (ibid).

For the purpose of this study, multiple regression analysis was performed in two separate steps. Firstly, a simultaneous multiple regression analysis will be performed with the continuous independent variables to investigate which of them contributes significantly to the variance in the dependent variables, as well as their collective predictive power. Then a sequential multiple regression analysis will be performed, where the background- and lifestyle variables which exhibit significant correlation with the dependent variable will represent one “block”, and entered first into the analysis. Then the independent variables identified in the simultaneous multiple regression analysis will be entered into a second “block”. This allows for investigation of how much the independent variables explain the variance in the dependent variable after the background- and lifestyle variables have been controlled for (Pallant, 2010).

There were a number of assumptions which needed to be examined before performing a multiple regression analysis. Firstly, the scores needed to be normally distributed (Pallant, 2010). In addition, the sample size needed to be adequately large. Tabachnick and Fidell (2007) suggests using this formula,  $N > 50 + 8m$ , as a rule of thumb, where  $m$  equals the number of independent variables. One also needed to control for multicollinearity (when independent variables are highly correlated) (ibid). Lastly, this type of analysis is very sensitive to very high or very low scores (outliers), hence one should check for this with descriptive statistics (ibid).

## 4.0 Results

In this section the results will be presented in line with the research questions. The research questions were as follows:

1. What degree of goal attainment, motivation, self-efficacy, perceived social support and nutrition literacy do the study sample display?
2. Are there significant differences between the participants displaying a low- or high degree of maintenance of a healthy diet, according to the factors in question 1?
3. Which constructs significantly predict the total variance in the dependent variable; *maintenance degree of a healthy diet*?

Before focusing on answering the research questions, the process of dividing the dependent variable, *maintenance degree of a healthy diet*, into an appropriate number of maintenance degrees will be highlighted, in addition to presentation of the sample characteristics. To answer research question one, the results of the factor- and reliability analysis will be presented together with descriptive information for each established construct. Then the results of the MANOVA will be presented, aimed at elucidating research question two. Lastly, a simultaneous- and sequential linear multiple regression was performed to answer research question three, and the outcomes thereof will conclude this chapter of results.

### 4.1 Division into degrees of maintenance of a healthy diet

Since the aim of this study was concerned with the possible difference between those in the study sample who displayed a high degree of maintenance and those who displayed a low degree of maintenance, the dependent variable; *maintenance degree of a healthy diet*, needed to be divided into different maintenance degrees. As one of the research questions involved highlighting differences between participants with low- and high maintenance degrees, it was preferable to have as high cumulative percent of the study sample within the low and the high maintenance degree as possible.

Initially it was decided to divide the dependent variable into four maintenance degrees. This resulted in inclusion of only 33 percent of the study sample within the low- and high maintenance degree groups. This was considered as rather low, hence it was attempted to divide the dependent variable into three different maintenance degrees instead. The

corresponding variable scores and sample percentage included in each of those three maintenance degrees is presented in Table 1.

**Table 1: Overview of the three different maintenance degrees of a healthy diet, with corresponding variable scores and sample percentages for each degree**

| Maintenance degree        | Dependent variable score | Sample size within group (%) |
|---------------------------|--------------------------|------------------------------|
| Low maintenance degree    | <=3.5                    | 20                           |
| Medium maintenance degree | 3.51-4.5                 | 35                           |
| High maintenance degree   | 4.51-6                   | 45                           |

As seen from Table 1, the cumulative percentage of the low- and high maintenance degree is 65 percent when the dependent variable is divided into three maintenance degrees, which is much more preferable than the percentage obtained with four maintenance degrees. Hence it was decided that *maintenance degree of a healthy diet* should be divided into three maintenance degrees.

#### **4.2 Sample characteristics**

Out of the 4184 questionnaires sent out electronically, 380 persons chose to respond, which generated a response rate of 9.1 percent. The majority of the respondents were middle aged (65 percent), women (94 percent), married (65 percent) with kids (85 percent). Furthermore, 74 percent reported a household income of above 500.000 NOK and 54 percent had a bachelor degree or equivalent. With regards to lifestyle characteristics, Table 2 provides an overview, presented as the percentage for the whole study sample, as well as for the three maintenance degrees of a healthy diet.

**Table 2: Sample characteristics for the total sample and three maintenance degrees of a healthy diet, with regards to lifestyle variables**

| Sample characteristics   | Total      | Maintenance degree |            |            |
|--|------------|--------------------|------------|------------|
|  |            | Low                | Medium     | High       |
| <b>Time past since participation in weight reduction program</b> |            | %                  |            |            |
| Currently participating in a program                             | 4          | 4                  | 2          | 6          |
| 0-12 months  | 28         | 21                 | 31         | 33         |
| Less than 2 years ago  | 23         | 19                 | 27         | 22         |
| 2 - 5 years ago  | 34         | 43                 | 34         | 25         |
| More than 5 years ago  | 11         | 13                 | 7          | 14         |
| <b>n</b>   | <b>376</b> | <b>75</b>          | <b>132</b> | <b>169</b> |
| <b>Previous dietary attempts</b>                                 |            | %                  |            |            |
| None   | 12         | 12                 | 8          | 17         |
| 1 - 4  | 48         | 51                 | 46         | 46         |
| 5 -10  | 20         | 19                 | 25         | 16         |
| More than 10   | 20         | 19                 | 21         | 21         |
| <b>n</b>   | <b>378</b> | <b>75</b>          | <b>132</b> | <b>171</b> |
| <b>Weight monitoring</b>   |            | %                  |            |            |
| Weekly   | 55         | 47                 | 49         | 68         |
| Monthly  | 26         | 29                 | 27         | 21         |
| Yearly   | 14         | 17                 | 18         | 8          |
| Do not monitor weight  | 6          | 7                  | 6          | 4          |
| <b>n</b>   | <b>379</b> | <b>75</b>          | <b>133</b> | <b>171</b> |
| <b>The major social support giver in relation to diet</b>        |            | %                  |            |            |
| Spouse   | 36         | 31                 | 37         | 39         |
| Family   | 21         | 23                 | 22         | 19         |
| Coworkers  | 5          | 4                  | 7          | 4          |
| Friends  | 14         | 20                 | 11         | 11         |
| Previous program participants                                    | 2          | 1                  | 3          | 2          |
| Program leaders  | 11         | 9                  | 10         | 14         |
| None of the above  | 11         | 12                 | 11         | 11         |
| <b>n</b>   | <b>378</b> | <b>75</b>          | <b>132</b> | <b>171</b> |
| <b>Level of physical activity</b>                                |            | %                  |            |            |
| Low  | 21         | 36                 | 18         | 9          |
| Moderate   | 53         | 47                 | 58         | 53         |
| Dynamic  | 20         | 15                 | 19         | 27         |
| High   | 5          | 1                  | 5          | 10         |
| Very high  | 0          | 0                  | 0          | 1          |
| <b>n</b>   | <b>372</b> | <b>72</b>          | <b>131</b> | <b>169</b> |
| <b>Frequency of breakfast consumption</b>                        |            | %                  |            |            |
| Daily  | 92         | 85                 | 94         | 98         |
| Not daily  | 8          | 15                 | 6          | 2          |
| <b>n</b>   | <b>372</b> | <b>73</b>          | <b>131</b> | <b>168</b> |
| <b>Number of courses participated in</b>                         |            | %                  |            |            |
| 1 - 3  | 91         | 94                 | 90         | 87         |
| 4 - 7  | 9          | 6                  | 9          | 12         |
| <b>n</b>   | <b>380</b> | <b>75</b>          | <b>133</b> | <b>172</b> |
| <b>Frequency of diet related information searches</b>            |            | %                  |            |            |
| Never  | 3          | 6                  | 2          | 1          |
| 1-3 times a year   | 20         | 21                 | 23         | 16         |
| 1-3 times every 6 months   | 16         | 22                 | 14         | 11         |
| 1-3 times a month  | 28         | 25                 | 25         | 34         |
| 1-3 times a week   | 23         | 13                 | 27         | 29         |
| 4-6 times a week   | 5          | 7                  | 5          | 3          |
| Every day  | 6          | 7                  | 5          | 6          |
| <b>n</b>   | <b>370</b> | <b>72</b>          | <b>131</b> | <b>167</b> |

Looking at the numbers for the sample as a whole, one can see that almost everyone ate breakfast on a daily basis, and the majority had a moderate or dynamic physical activity level. In addition, the greater part of the sample had tried to lose weight previously.

Considering the differences between the maintenance degrees, there are some characteristics worthy of mentioning. In general, the participants with a high maintenance degree displayed higher frequency of no previous dietary attempts, higher frequency of weight monitoring, higher level of physical activity and higher frequency of daily breakfast consumption, in comparison to the other maintenance degrees, and particularly to the low maintenance degree. These results were put through a Chi<sup>2</sup> test to see if there actually was a significant difference between the maintenance degrees with respect to these characteristics, and this was found for all variables except for previous dietary attempts.

#### **4.3 Maintenance degree of a healthy diet, degree of goal attainment, motivation, self-efficacy, perceived social support and nutrition literacy levels displayed by the study sample**

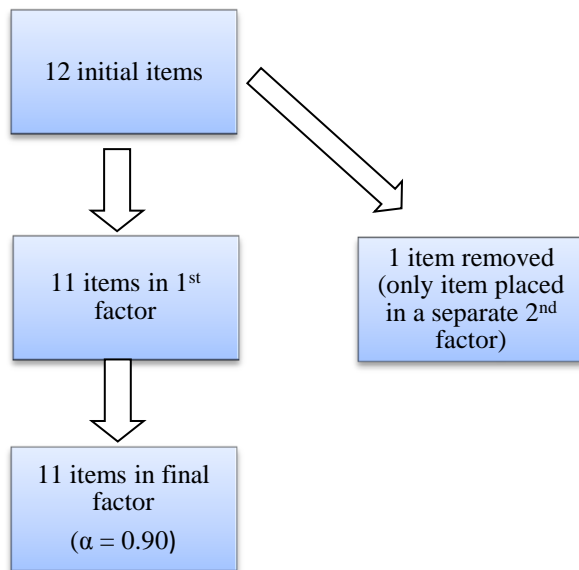
To be able to answer research question one, and for further analysis of the data, several methods were applied to “manipulate” the data. Firstly, as most of the analyses performed for the purpose of this study were very sensitive to missing data, e.g. factor-, reliability- and multiple regression analysis (Pallant, 2010), a missing value analysis (MVA) via the regression method was performed to estimate the values on all the continuous items in the questionnaire which had not been initially answered by the study sample. The mean and standard deviation for each of the continuous constructs, with the dependent variable listed first, before and after the MVA is presented in Table 3.

**Table 3: Mean and standard deviation (S.D.) for the continuous constructs before and after MVA**

| <b>Continuous constructs</b>             | <b>n</b> | <b>Before MVA<br/>Mean <math>\pm</math> S.D.</b> | <b>After MVA<br/>Mean <math>\pm</math> S.D.</b> |
|--|----------|--|---|
| Maintenance degree of a healthy diet     | 380      | 4.24 $\pm$ 0.93                                  | 4.24 $\pm$ 0.92                                 |
| Degree of goal attainment                | 369      | 3.79 $\pm$ 1.60                                  | 3.77 $\pm$ 1.59                                 |
| Autonomous motivation for healthy eating | 375      | 4.67 $\pm$ 0.91                                  | 4.65 $\pm$ 0.92                                 |
| Controlled motivation for healthy eating | 375      | 4.93 $\pm$ 1.00                                  | 4.93 $\pm$ 0.97                                 |
| Formal support                           | 379      | 4.7 $\pm$ 1.05                                   | 4.7 $\pm$ 1.05                                  |
| Emotional informal support               | 380      | 5.47 $\pm$ 0.86                                  | 5.47 $\pm$ 0.86                                 |
| Dietary informal support                 | 380      | 4.28 $\pm$ 1.17                                  | 4.28 $\pm$ 1.16                                 |
| Coping self-efficacy                     | 375      | 3.84 $\pm$ 1.03                                  | 3.84 $\pm$ 1.02                                 |
| Recovery self-efficacy                   | 364      | 4.09 $\pm$ 1.13                                  | 4.09 $\pm$ 1.11                                 |
| FNL                                      | 369      | 4.44 $\pm$ 0.88                                  | 4.44 $\pm$ 0.87                                 |
| INL                                      | 371      | 4.20 $\pm$ 0.94                                  | 4.20 $\pm$ 0.92                                 |
| CNL <sub>scientific</sub>                | 366      | 3.71 $\pm$ 1.02                                  | 3.72 $\pm$ 1.00                                 |
| CNL <sub>pseudoscientific</sub>          | 366      | 4.21 $\pm$ 0.86                                  | 4.21 $\pm$ 0.86                                 |

It is clearly observable that the means practically did not change after the MVA, hence further analysis commenced. After performing the MVA, all the negative attitude statements were reversed and labeled “recode” followed by the specific question number. The assessment of which of the statements which were considered negative and therefore appropriate to be reversed, was purely based on a subjective interpretation of which of the particular attitudes one should be rewarded for having and not.

#### 4.3.1 Establishment of the dependent variable



**Figure 4:** Flow chart for the establishment of the dependent variable, *maintenance degree of a healthy diet*

It was desirable to obtain only one factor as it would represent the dependent variable, maintenance degree of a healthy diet; hence the rotation function was not applied in this case. The analysis yielded a KMO-value of 0.931 with a significant Bartlett's Test of Sphericity (BTS) ( $p < 0.01$ ), which indicates that the items were well suited for a factor analysis. The overview of the items included in the factor and their respective factor loadings are presented in Table 4.

**Table 4: Items and their respective factor loadings included in the dependent variable construct; maintenance degree of a healthy diet**

| <b>I feel that I have managed to maintain the healthy diet I learned to follow during the Libra program participation, by:</b> | <b>Factor loading</b> |
|--|-----------------------|
| Eating the recommended bread, fruit and condiment portions.  | .795                  |
| Having a varied and balanced diet.   | .775                  |
| Emphasizing the inclusion of enough fiber in my diet.  | .771                  |
| Limiting the intake of foodstuff containing much sugar and white flour.  | .764                  |
| Following Libra’s advice when preparing healthy dinners.   | .764                  |
| Planning what to eat in advance of the meals.  | .755                  |
| Limiting the intake of food containing much saturated fat.   | .755                  |
| Eating four to five regular meals a day.   | .740                  |
| Eating vegetables with all meals.  | .596                  |
| Limiting the intake of sugar containing beverages.   | .576                  |
| Drinking adequate amounts of water.  | .536                  |

KMO-value: 0.931, BTS:  $p < 0.01$

The items included in the factor in Table 4 were aimed at collectively measuring the degree of maintenance of a healthy diet. Eleven of the twelve initial statements were included in the final factor. One statement, related to limiting the intake of alcoholic beverages, did not load on the factor, hence it was not included. The statements were organized in such a way that the higher factor loading it presented with, the stronger relationship it had with the factor itself.

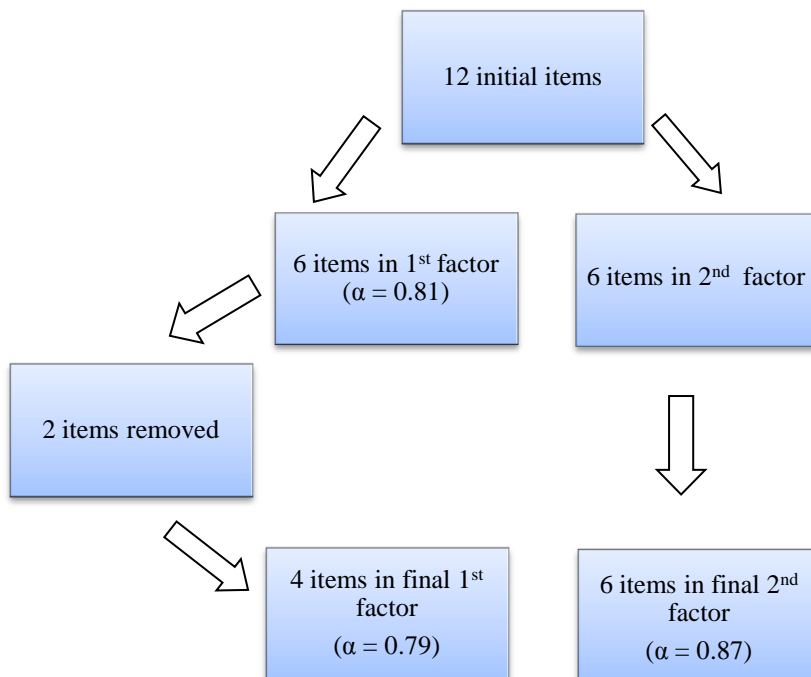
One can clearly see that the majority of the items included had a relatively high factor loading. This indicates that there was a high correlation between all of the items, especially the top eight items, which displayed a factor loading of above 0.7. This also indicates that there were a strong and clear relationship between those items and the factor. As seen from Table 4, the sample showed highest agreement regarding portion control, having a balanced and varied diet, while at the same time limiting foods high in saturated fats, sugar and white flour as well as planning what to eat ahead of meals.

The reliability analysis performed yielded an  $\alpha$ -value of 0.90. Since values above 0.8 are what is desirable (Pallant, 2010), the value obtained for this construct was high and definitely satisfactory.



### 4.3.2 Establishment of independent variables

#### 4.3.2.1 Constructs aimed at measuring motivation



**Figure 5: Flow chart for the establishment of constructs measuring different qualitative aspects of motivation**

When performing a factor analysis on the items aimed at measuring motivation, two factors emerged; one which were believed to measure controlled motivation with regards to having a healthy diet (first factor), named *controlled motivation for healthy eating*, and one which were believed to measure autonomous motivation for having a healthy diet (second factor), called *autonomous motivation for healthy eating*. Even though all six items in the first factor displayed a relationship with that factor, two items were excluded. This was because, excluding them increased the variance explained by that one factor from 51 percent to 63 percent. Neither the KMO-value nor the  $\alpha$ -value decreased significantly by excluding the two items; hence there were valid reasons for doing so. The overview of the items included in the first factor and their respective factor loadings are presented in Table 5.

**Table 5: Items and their respective factor loadings included in the *controlled motivation for healthy eating* construct**

| The reason for why I have a healthy diet is:        | Factor loading |
|---|----------------|
| Because others would be upset with me if I did not. | .851           |
| Because I feel pressure from others to do so.       | .827           |
| Because I want others to approve of me.             | .755           |
| Because I want others to see I can do it.           | .731           |

KMO-value: 0.749, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.79

All of the initial items in the second factor were included in the final factor. An attempt was made to try and include the two items, which were excluded from the first factor, into the second factor, but this decreased the  $\alpha$ -value and the explained variance significantly, and so those items were permanently excluded.

The overview of the items included in the second factor and their respective factor loadings are presented in Table 6.

**Table 6: Items and their respective factor loadings included in the *autonomous motivation for healthy eating* construct**

| The reason for why I have a healthy diet is:  | Factor loading |
|---|----------------|
| Because I feel that I want to take responsibility for my own health.                                    | .860           |
| Because I personally believe it is the best thing for my health.  | .808           |
| Because I have carefully thought about it and believe it is very important for many aspects of my life. | .807           |
| Because it is an important choice I really want to make.  | .781           |
| Because it is consistent with my life goals.  | .762           |
| Because it is very important for me being as healthy as possible.                                       | .704           |

KMO-value: 0.868, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.87

As seen from Table 6, the sample displayed highest agreement with regards to taking responsibility for their own health by having a healthy diet, and that having a healthy diet was an important part of their lives.

#### 4.3.2.2 Constructs aimed at measuring social support

##### *Formal support*

The factor analysis performed with the items which was aimed at measuring the samples perceived social support from their program leaders during program attendance, yielded one factor, named *formal support*, where all items were included. The overview of the items included in the factor and their respective factor loadings are presented in Table 7.

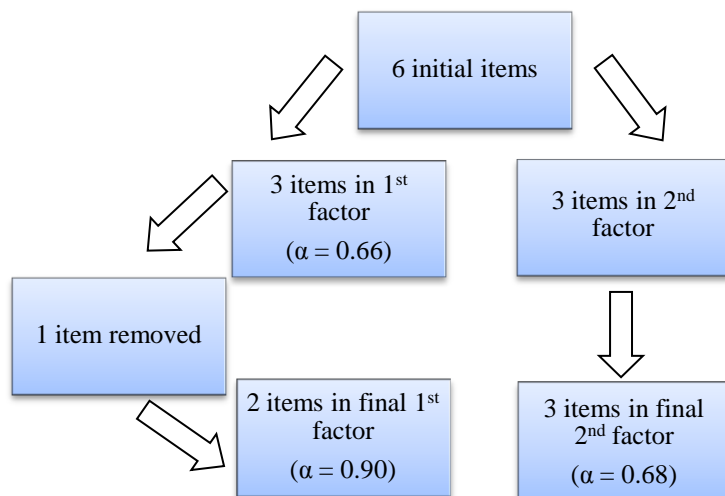
**Table 7: Items and their respective factor loadings included in the *formal support* construct**

| <b>I feel that my program leader:</b>  | <b>Factor loading</b> |
|--|-----------------------|
| Listened to how I wanted to do things with regards to my diet.                                   | .918                  |
| Understood to how see things with regards to my diet.  | .904                  |
| Tried to understand how I see things with regards to my diet before suggesting possible changes. | .888                  |
| Encouraged me to ask questions regarding changes to my diet.                                     | .884                  |
| Conveyed confidence in my ability to make changes to my diet.                                    | .879                  |
| Provided me with choices and options regarding changing my diet.                                 | .843                  |

KMO-value: 0.913, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.94

As seen from Table 7, all of the items had a very high factor loading, indicating a strong and clear relationship between all items and the factor. The  $\alpha$ -value obtained were 0.94, indicating that the construct displayed a very high level of internal consistency.

*Informal support*



**Figure 6: Flow chart for the establishment of constructs measuring informal support**

When performing factor analysis on the items intended to measure informal support, two factors emerged. In the first factor, aimed at measuring the sample’s perceived social support from people within their social network, named *emotional informal support*, all three items displayed a relationship with the factor. However when one item was removed, the  $\alpha$ -value increased significantly, as well as the total explained variance of that factor (from 67 percent to 91 percent), and so that item was excluded. The KMO value did however decrease slightly from 0.57 to 0.50. An overview of the items included in the factor and their respective factor loadings are presented in Table 8.

**Table 8: Items and their respective factor loadings included in the *emotional informal support* construct**

| I feel that I have people in my life who: | Factor loading |
|---|----------------|
| Accepts me for who I am.                  | .954           |
| Show that they care about me.             | .954           |

KMO-value: 0.50, BTS:  $p < 0.01$ ,  $\alpha$ -value 0.90

The second factor, named *dietary informal support*, incorporated three items, and an overview of them, together with their respective factor loadings are presented in Table 9. This factor aimed at measuring the perceived level of dietary support from people within the study samples social network.

**Table 9: Items and their respective factor loadings included in the *dietary informal support* construct**

| <b>I feel that I have people in my life who:</b>                                  | <b>Factor loading</b> |
|---|-----------------------|
| Eat food in my presence which I try to limit the intake of (scale reversed).      | .849                  |
| Offers me food I try to limit the intake of (scale reversed).                     | .846                  |
| Do not give me support regarding maintenance of my healthy diet (scale reversed). | .640                  |

KMO-value: 0.61, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.68

#### 4.3.2.3 Constructs aimed at measuring coping- and recovery self-efficacy

When performing a factor analysis on the eight items intended to measure the study samples level of confidence in their ability to control their eating in response to certain high risk situations, only one factor emerged, and it was named *coping self-efficacy*. The same situation occurred when performing a factor analysis on the eight items intended to measure the sample's level of confidence in their ability to exercise control over their eating in response certain high risk situations after they initially had experienced a lapse, and it was named *recovery self-efficacy*. The two factors with their individual items and respective factor loadings are presented in Table 10 and 11.

**Table 10: Items and their respective factor loadings included in the *coping self-efficacy* construct**

| <b>Right now I would be able to exercise control over what I eat in situations involving:</b>  | <b>Factor loading</b> |
|--|-----------------------|
| <b>Testing control with regards to my diet</b><br>(E.g. if I wanted to be sure I could handle eating unhealthy foods now and then.)                                  | .783                  |
| <b>Temptation</b><br>(E.g. if I were in a situation where I previously had often eaten unhealthy, if I started thinking about how good junk food would have tasted.) | .782                  |
| <b>Social pressure</b><br>(E.g. if someone had pushed me to unhealthy eating with them or someone would offer me junk food.)   | .763                  |
| <b>Conflict with others</b><br>(E.g. if I had an argument with a friend, partner or colleague.)  | .739                  |
| <b>Unpleasant feelings</b><br>(E.g. if I was depressed or when things went bad for me.)  | .719                  |
| <b>Physical discomfort</b><br>(E.g. if I were in pain, felt restless or physically tense.)   | .707                  |
| <b>Pleasant feelings</b><br>(E.g. if something good happened, and I would feel like celebrating.)  | .693                  |
| <b>Festive events</b><br>(E.g. if I wanted to celebrate something, if I was enjoying myself at a party.)   | .652                  |

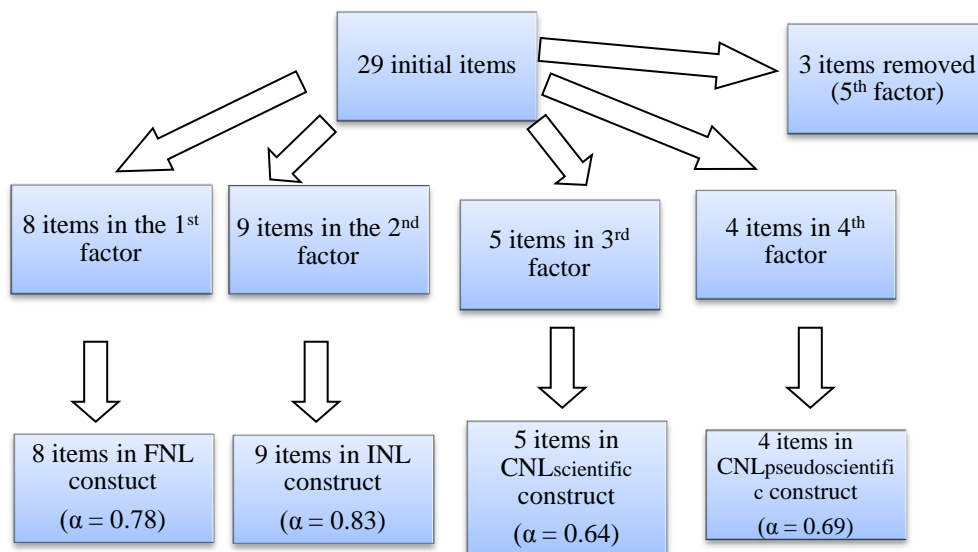
KMO-value: 0.836, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.87

**Table 11: Items and their respective factor loadings included in the *recovery self-efficacy* construct**

| <b>(Imagine that you recently were in a situation where you were unable to control what you ate).<br/>After the lapse I would be able to exercise control over what I eat in situations involving:</b> | <b>Factor loading</b> |
|--|-----------------------|
| <b>Temptation</b><br>(E.g. if I were in a situation where I previously had often eaten unhealthy, if I started thinking about how good junk food would have tasted)                                    | .891                  |
| <b>Testing control with regards to my diet</b><br>(E.g. if I wanted to be sure I could handle eating unhealthy foods now and then)   | .881                  |
| <b>Social pressure</b><br>(E.g. if someone had pushed me to eat unhealthy foods with them or someone would offer me junk food)   | .842                  |
| <b>Pleasant feelings</b><br>(E.g. if something good happened, and I would feel like celebrating)   | .820                  |
| <b>Conflict with others</b><br>(E.g. if I had an argument with a friend, partner or colleague)   | .817                  |
| <b>Unpleasant feelings</b><br>(E.g. if I was depressed or when things went bad for me)   | .804                  |
| <b>Physical discomfort</b><br>(E.g. if I were in pain, felt restless or physically tense)  | .789                  |
| <b>Festive events</b><br>(E.g. if I wanted to celebrate something, if I was enjoying myself at a party)  | .784                  |

KMO-value: 0.908, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.93

#### 4.3.2.4 Constructs aimed at measuring hierarchical levels of nutrition literacy



**Figure 7: Flow chart for the establishment constructs measuring hierarchical levels of nutrition literacy**

The factor analysis performed on the nutrition literacy items were done in a semi-confirmatory manner, which indicates that one requests a certain amount of factors being extracted, instead of utilizing the Kaisers Criterion (Christophersen, 2009). Previous studies have obtained four different constructs, with two corresponding to critical nutrition literacy, namely *CNLscientific* and *CNLaction* (Aarnes, 2009; Dalane, 2011; Kjøllesdal, 2009). All items from the *CNLscientific* construct were included in this study, however, only one item from the *CNLaction* construct obtained in those studies, related to influencing friends and family to eat healthily, were included. Thus, different numbers of fixed factors were explored, namely four, five and seven, and the final constructs were obtained when forcing the items into five different factors. The fifth factor had a very low  $\alpha$ -value (0.38); hence the possibility of including the items therein in one of the other four factors was considered. One of the items in the fifth factor did load on the *INL* factor, but it displayed the smallest factor load within the *INL* factor. In addition, it was believed that that item did not contribute much to the explanation of the phenomenon, since other items in the *INL* factor measured similar aspects of that phenomenon. Hence it was excluded from all of the factors. The remaining two items in the fifth factor were also excluded, as they did not load on any other factors.

The four nutrition literacy factors which emerged, together with their individual items and their respective factor loadings, are presented in Tables 12 to 15. The factor presented in Table 12 aimed at measuring the sample's level of basic reading and comprehension skills related to nutritional information, as well as fundamental nutritional knowledge. The factor presented in Table 13 aimed at measuring the sample's ability to make independent and informed decisions on the basis of obtained nutritional knowledge and to use that knowledge actively, in a way which maintains and benefits their health. The factors presented in Table 14 and 15 aimed at measuring different aspects of the study sample's ability to implement and use critical thinking in the seeking, analyzing and evaluation of all nutritional information.

*FNL construct*

**Table 12: Items and their respective factor loadings included in the *FNL* construct**

| <b><i>FNL</i> construct items</b>  | <b>Factor loading</b> |
|--|-----------------------|
| I am having trouble understanding the technical terms that dietitians use (scale reversed).  | .775                  |
| I find it hard to understand written dietary information (scale reversed).   | .752                  |
| If I read about dietary information affecting my health, I find it hard to get anything out of the information (scale reversed).         | .718                  |
| I think that dietitians use a language that is difficult to understand (scale reversed).   | .708                  |
| I find it difficult to know how to change my diet if I get advice from my doctor, nurse or other health care personnel (scale reversed). | .702                  |
| I find that dietary brochures use a language that is easy to understand.   | .522                  |
| I know which agencies within the health care system that I should contact for help to change my diet.                                    | .456                  |
| I find it difficult to separate scientific nutrition information from non-scientific diet information (scale reversed).                  | .417                  |

KMO-value: 0.858, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.78



*INL construct*

**Table 13: Items and their respective factor loadings included in the *INL* construct**

| <b><i>INL</i> construct items</b>   | <b>Factor loading</b> |
|---|-----------------------|
| I welcome any initiative to gather information about diets which are relevant to me.  | .723                  |
| I have a healthier diet based on dietary information I have made available to me.   | .707                  |
| I gladly follow the current debate (e.g. on TV) about what is considered a healthy diet.  | .706                  |
| I would take the initiative to talk about what constitutes a healthy diet with nutritional experts (such as my family doctor, nurse, etc.) if this was relevant for me. | .693                  |
| I am happy to discuss with my peer group (e.g. family, friends, and colleagues) what is considered a healthy diet.  | .664                  |
| I tend to read about what is considered to be a healthy diet.   | .660                  |
| I use the internet when I am seeking more dietary information.  | .606                  |
| I try to influence others (e.g. family, friends) to eat healthy.  | .592                  |
| I have good knowledge of what the official Norwegian recommendations for a healthy diet are.  | .461                  |

KMO-value: 0.878, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.83

*CNLpseudoscientific construct*

**Table 14: Items and their respective factor loadings included in the *CNLpseudoscientific* construct**

| <b><i>CNLpseudoscientific</i> construct items</b>   | <b>Factor loading</b> |
|---|-----------------------|
| I let myself be influenced by dietary advice that I read about in newspapers, magazines, etc.                         | .770                  |
| I have confidence in the different diets that I read about in newspapers, magazines, etc.                             | .689                  |
| I often refer to newspapers and magazines when I discuss diet with others.  | .651                  |
| I have confidence in that the media's presentation of new scientific findings about healthy diets is correct.         | .621                  |
| I have confidence in that some alternative medicine methods (such as health food) provide me credible dietary advice. | .603                  |

KMO-value: 0.739, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.69

The items in Table 14 were initially thought to relate to a CNL construct. During the process of trying to find out what to call the construct, *CNLpseudoscientific* came to mind. Pseudoscience can be defined as claims and arguments presented in a way which make them

appear as scientific albeit lacking in supporting evidence and plausibility (Shermer, 2002). The fact that alternative medicine is commonly recognized and characterized as being pseudoscientific in nature (Park, 2000), as well as the media being a well-known vehicle for the proclamation of pseudoscience (Goldacre, 2008), *CNLpseudoscientific* seemed like a fitting name for the construct.

### *CNLscientific construct*

**Table 15: Items and their respective factor loadings included in the *CNLscientific* construct**

| <i>CNLscientific</i> construct items  | Factor loading |
|---|----------------|
| Diet information that I read should be scientifically based.  | .765           |
| I know what the criteria are for a health claim to be characterized as scientifically sound.  | .759           |
| I base my diet on the information I receive from scientifically based literature (e.g., the Health Directorate information material). | .742           |
| I am critical regarding the diet information that I receive from various sources in the society.                                      | .480           |

KMO-value: 0.67, BTS:  $p < 0.01$ ,  $\alpha$ -value: 0.64

As seen from Table 15, the sample shows high agreement on three out of the four items. The last item, related to being critical to the nutrition information received from different sources in society, did have a relatively low factor loading, but as it was quite high above the cut-off level for inclusion in the factor. The item was believed to contribute to the explanation of the factor, in addition to not considerably increasing the  $\alpha$ -value by being excluded, thus it was decided to be included in the factor.

### 4.3.3 Summary of constructs

**Table 16: Summary of final construct variables**

| Construct variables                      | No. of items | $\alpha$ -value | KMO Sampling adequacy | Total explained variance (%) |
|--|--------------|-----------------|-----------------------|------------------------------|
| Maintenance degree of a healthy diet     | 11           | 0.90            | 0.92                  | 60                           |
| Controlled motivation for healthy eating | 4            | 0.79            | 0.76                  | 63                           |
| Autonomous motivation for healthy eating | 6            | 0.87            | 0.87                  | 62                           |
| Formal support                           | 6            | 0.94            | 0.91                  | 79                           |
| Emotional informal support               | 2            | 0.90            | 0.50                  | 91                           |
| Dietary informal support                 | 3            | 0.68            | 0.61                  | 62                           |
| Coping self-efficacy                     | 8            | 0.87            | 0.84                  | 54                           |
| Recovery self-efficacy                   | 8            | 0.93            | 0.91                  | 70                           |
| FNL                                      | 8            | 0.78            | 0.86                  | 42                           |
| INL                                      | 9            | 0.83            | 0.88                  | 43                           |
| CNL <sub>scientific</sub>                | 4            | 0.64            | 0.67                  | 50                           |
| CNL <sub>pseudoscientific</sub>          | 5            | 0.69            | 0.74                  | 45                           |

As one can see from Table 16, the  $\alpha$ -values ranged from 0.64 (*CNL<sub>scientific</sub>*) to 0.94 (*formal support*), with the majority of the constructs displaying a  $\alpha$ -value of above 0.78, which strongly indicates that the phenomena one wanted to measure was in fact measured by the items included in the individual constructs. The total explained variance refers to how much of the variance within the sample is explained by that factor (Clausen, 2009), and here the percentage ranges from 42 percent (*FNL*) to 91 percent (*emotional informal support*). All constructs except *emotional informal support* had a KMO value of above 0.6, which was initially set as a minimum value for factorial suitability. However, there is some disagreement in the literature with regards to whether 0.5 or 0.6 should be an acceptable minimum, hence it was decided to retain that factor and include it in further analysis.

With regards to what levels of the different phenomena's measured which the study sample reported, the mean and standard deviations for each continuous constructs, with the dependent variable listed first, are presented in Table 17.

**Table 17: Mean and standard deviation (S.D.) for *maintenance degree of a healthy diet* and the independent variables**

| <b>Construct variables</b>               | <b>Total<br/>Mean ± S.D.</b> | <b>Low<br/>maintenance<br/>degree<br/>Mean ± S.D</b> | <b>Medium<br/>maintenance<br/>degree<br/>Mean ± S.D</b> | <b>High<br/>maintenance<br/>degree<br/>Mean ± S.D</b> |
|--|------------------------------|--|---|---|
| Maintenance degree of a healthy diet     | 4.28 ± .92                   | 2.91 ± .44   | 4.00 ± .28  | 5.10 ± .41  |
| Degree of goal attainment                | 3.77 ± 1.59                  | 2.46 ± 1.38  | 3.48 ± 1.39   | 4.57 ± 1.34   |
| Autonomous motivation for healthy eating | 4.65 ± .92                   | 3.70 ± .97   | 4.54 ± .73  | 5.16 ± .63  |
| Controlled motivation for healthy eating | 2.07 ± .97                   | 2.24 ± .98   | 2.04 ± .92  | 2.02 ± 1.00   |
| Formal support                           | 4.70 ± 1.05                  | 4.23 ± 1.04  | 4.60 ± 1.02   | 4.99 ± .98  |
| Emotional informal support               | 5.47 ± .86                   | 4.97 ± 1.23  | 5.43 ± .76  | 5.72 ± .60  |
| Dietary informal support                 | 4.28 ± 1.16                  | 3.94 ± 1.16  | 4.32 ± 1.09   | 4.39 ± 1.20   |
| Coping self-efficacy                     | 3.84 ± 1.02                  | 3.16 ± 1.03  | 3.56 ± .85  | 4.36 ± .87  |
| Recovery self-efficacy                   | 4.09 ± 1.11                  | 3.24 ± 1.13  | 3.88 ± .91  | 4.63 ± .95  |
| FNL                                      | 4.44 ± .87                   | 4.07 ± .94   | 4.43 ± .78  | 4.61 ± .87  |
| INL                                      | 4.20 ± .92                   | 3.54 ± .87   | 4.13 ± .80  | 4.54 ± .86  |
| CNL <sub>scientific</sub>                | 3.72 ± 1.00                  | 3.41 ± .94   | 3.57 ± .98  | 3.97 ± 1.00   |
| CNL <sub>pseudoscientific</sub>          | 4.21 ± 0.86                  | 4.43 ± 0.80  | 4.18 ± 0.84   | 4.13 ± 0.88   |

When looking at the mean values for the three maintenance degrees in Table 17, a general trend emerged, with values for all constructs, except *controlled motivation for healthy eating* and *CNL<sub>pseudoscientific</sub>*, showing a positive correlation with maintenance degree of a healthy diet. For *controlled motivation for healthy eating* and *CNL<sub>pseudoscientific</sub>*, values displayed a negative correlation with degree of maintenance of a healthy diet. Thus, with increasing degree of maintenance, there can be seen a corresponding increase in *degree of goal attainment*, *autonomous motivation for healthy eating*, *formal support*, *dietary informal support*, *emotional informal support*, *coping self-efficacy*, *recovery self-efficacy*, *FNL*, *INL* and *CNL<sub>scientific</sub>*, and a decrease in *controlled motivation for healthy eating* and *CNL<sub>pseudoscientific</sub>*. Whether the values were significantly different between the three degrees of maintenance, was explored in relation to research question two.

If one are to use the same division criteria for the independent constructs as for the three maintenance degrees of a healthy diet when estimating the level of for each construct for the whole study sample, one can see that the participants in general displayed a high degree of *autonomous motivation, formal support and emotional informal support*; a medium degree of *maintenance of a healthy diet, goal attainment, dietary informal support, coping self-efficacy, recovery self-efficacy, FNL, INL and CNL<sub>scientific</sub>*, and *CNL<sub>pseudoscientific</sub>*, and a low degree of *controlled motivation*.

Interestingly, the sample generally reported a higher level of recovery self-efficacy than coping self-efficacy. For the medium- and high maintenance degree participants the difference was considered significant at a 0.01 level, while for the low maintenance degree the results were not significant. These results indicates that the participants who displayed medium or high degree of maintenance of a healthy diet were more confident in their ability to control their food intake after they had initially lapsed than before a lapse had occurred, which is not the case for sample displaying a low degree of maintenance.

Since the nutrition literacy constructs were aimed at measuring hierarchical levels of nutrition literacy, it was interesting to investigate whether there was a difference between the means for each of the four constructs. One can see from Table 17 that the level of *FNL* is slightly higher than the level of *INL*, which again is higher than the level of *CNL<sub>scientific</sub>*. The level of *CNL<sub>pseudoscientific</sub>* was about the same level as *INL*. To see whether these means were significantly different from each other, a paired sample t-test was performed, and the corresponding results are presented in Table 18.

**Table 18: Mean differences between all nutrition literacy constructs (paired samples t-test for the total study sample and the three maintenance degrees**

| Nutrition literacy construct comparison                    | Total  | Low maintenance degree | Medium maintenance degree | High maintenance degree |
|--|--------|------------------------|---------------------------|-------------------------|
| FNL-INL  | .24**  | .54**                  | .30**                     | .07                     |
| FNL-CNL <sub>scientific</sub>                              | .72**  | .66**                  | .86**                     | .63**                   |
| FNL-CNL <sub>pseudoscientific</sub>                        | .23**  | -.36*                  | .25**                     | .48**                   |
| INL-CNL <sub>scientific</sub>                              | .48**  | .12                    | .56**                     | .56**                   |
| INL-CNL <sub>pseudoscientific</sub>                        | -.01   | -.90**                 | -.05                      | .41**                   |
| CNL <sub>scientific</sub> -CNL <sub>pseudoscientific</sub> | -.48** | -1.02**                | -.61**                    | -.16                    |

\*Mean differences are significant at a 0.05 level

\*\*Mean differences are significant at a 0.01 level

For the total sample it was found a significant difference between all mean scores on a 0.01 level, except for *INL* and *CNLpseudoscientific*. For the low maintenance degree there was a significant difference between all nutrition literacy constructs except for *INL* and *CNLscientific*. For the medium maintenance degree there was seen a significant difference between all nutrition literacy constructs except for *INL* and *CNLpseudoscientific*. Lastly, for the high maintenance degree participants there was seen a significant difference between all nutrition literacy constructs, except for *FNL* and *INL*, and *CNLscientific* and *CNLpseudoscientific*.

#### **4.4 Inspection of possible significant differences between low- and high maintenance degree participants via multivariate analysis of variance**

To be able to answer research question two, a test which compared the means for each construct corresponding to each individual maintenance degree had to be performed. The test most appropriate to use for this particular data, was a MANOVA test, short for *multivariate analysis of variance*. MANOVA can be used to investigate the interactions among the dependent variables and among the independent variables (Stevens, 2009). Since this was intended to be a comparison between those who displayed a high degree of maintenance and those who displayed a low degree of maintenance, only results for the low- and high maintenance degree participants were considered.

However, before performing a MANOVA, several assumptions had to be examined for. Firstly, the variables included in the analysis had to be normally distributed. Whether variable data were normally distributed or not was investigated by looking at the skewness for each of the constructs. A skewness of less than 1 or more than -1 would indicate that the data was normally distributed (Pallant, 2010). The skewness for all the continuous constructs in this study is presented in Table 19.

**Table 19: Skewness of all construct variables**

| Construct variables                      | Skewness |
|--|----------|
| Maintenance degree of a healthy diet     | -.340    |
| Degree of goal attainment                | -.289    |
| Autonomous motivation for healthy eating | -.658    |
| Controlled motivation for healthy eating | -.884    |
| Formal support                           | -.736    |
| Emotional informal support               | -2.171   |
| Dietary informal support                 | -.332    |
| Coping self-efficacy                     | -.177    |
| Recovery self-efficacy                   | -.346    |
| Maintenance self-efficacy                | -.250    |
| FNL                                      | -.317    |
| INL                                      | -.254    |
| CNL <sub>scientific</sub>                | -.117    |
| CNL <sub>pseudoscientific</sub>          | -.161    |

As seen from Table 19, the skewness of all construct except *emotional informal support* indicates a normal distribution. They all displayed a negative skew, which signify a clustering of scores to the right, indicating a tendency of the study sample to agree with the attitude statements (Tabachnick & Fidell, 2007). Although the constructs were classified as normally distributed, they were not perfectly normal, as this would have given a skewness of zero (ibid). Nonetheless, for the purpose of this study they were believed to be normal enough to include in further analysis, except for *emotional informal support*. With regard to this construct, its skew distribution was most likely due to outliers (eight outliers present, where two were considered extreme cases), and the level of significance will therefore not be presented for this construct, as it most likely does not display the correct picture. However, the construct was included in the analysis to generate the mean differences for the construct between the low- and high maintenance degree participants , and it may be worth noting that a significance level of 0.01 was indeed found, which gives a possible indication of an actual difference, although the results cannot be trusted. Nevertheless, the difference between the mean values for the low- and high maintenance degree participants for all constructs and their respective significance level is presented in Table 20.

**Table 20: Multiple comparisons of mean values for each continuous construct between the participants with low- and high maintenance degree of a healthy diet.**

| Continuous constructs                    | Tukey's HSD<br>Mean difference between<br>low- and high maintenance degree |
|--|--|
| Maintenance degree of a healthy diet     | 2.19**   |
| Degree of goal attainment                | 2.11**   |
| Autonomous motivation for healthy eating | 1.46**   |
| Controlled motivation for healthy eating | .24  |
| Formal support                           | .76**  |
| Emotional informal support               | .74  |
| Dietary informal support                 | .45*   |
| Coping self-efficacy                     | 1.20**   |
| Recovery self-efficacy                   | 1.40**   |
| FNL                                      | .53**  |
| INL                                      | 1.00**   |
| CNL <sub>scientific</sub>                | .56**  |
| CNL <sub>pseudoscientific</sub>          | -.30*  |

\*Mean differences are significant at a 0.05 level

\*\*Mean differences are significant at a 0.01 level

Looking at Table 20 one can see that there were significant differences between the mean values of the low- and high maintenance degree participants with regards to all normally distributed constructs except for *controlled motivation for healthy eating*. This indicates that the participants with a high maintenance degree of a healthy diet displayed significantly higher levels of *degree of goal attainment*, *autonomous motivation for healthy eating*, *formal support*, *emotional-* and *dietary informal support*, *coping self-efficacy*, *recovery self-efficacy*, as well as higher levels on *FNL*, *INL*, *CNL<sub>scientific</sub>*, and lower levels of *CNL<sub>pseudoscientific</sub>*.



#### 4.5 Prediction of total variance in maintenance degree of a healthy diet via multiple regression analysis

a)

Firstly, the prediction of total variance in maintenance degree of a healthy diet collectively by the independent variables was investigated. The first step in this analysis was to obtain the correlation coefficients for all of the normally distributed independent variables with the dependent variable, and they are presented in Table 21.

**Table 21: Correlation coefficients for the independent variables with *maintenance degree of healthy diet***

| Independent variables                    | Maintenance degree of healthy diet (r) |
|--|--|
| Autonomous motivation for healthy eating | .63**                                  |
| Degree of goal attainment                | .57**                                  |
| Controlled motivation for healthy eating | .13*                                   |
| Formal support                           | .32**                                  |
| Dietary informal support                 | .14*                                   |
| Coping self-efficacy                     | .56**                                  |
| Recovery self-efficacy                   | .56**                                  |
| Maintenance self-efficacy                | .60**                                  |
| FNL                                      | .29**                                  |
| INL                                      | .46**                                  |
| CNL <sub>scientific</sub>                | .26**                                  |
| CNL <sub>pseudoscientific</sub>          | -.10                                   |

\*Correlations are significant at a 0.05 level

\*\* Correlations are significant at a 0.01 level

Regarding which correlation coefficient values that were preferable to include in multiple regression analysis, (Pallant, 2010) and (Clausen, 2009) suggests a correlation coefficient value of above 0.3. However, since three of the constructs with a correlation coefficient below 0.3 did show a significant correlation with the dependent variable, it was decided that all correlations which were significant at a 0.01 level would be entered into the analysis.

When inspecting the correlation matrix with regards to inter-item relationships, it was found that coping self-efficacy and recovery self-efficacy were strongly correlated ( $r=0.75$ ). (Pallant, 2010) suggests that the correlation between two independent variables should not be

above 0.70, and recommends either to omit or possibly merge the two highly correlated independent variables. Since these two constructs both measured self-efficacy, although at different stages of the behavior maintenance stage, it was decided to merge them into one variable, named *maintenance self-efficacy*, which represented the self-efficacy construct used in further analysis. It was included in the correlation matrix to inspect for additional correlations, and it did not display a correlation of above 0.70 with any of the other variables. As such all variables, except the *controlled motivation for healthy eating* construct and *CNLpseudoscientific* construct, were included in the analysis. The preliminary multiple regression analysis with these independent variables generated the  $\beta$ -values presented in Table 22.

**Table 22:  $\beta$ -values for each independent variable which showed a significant correlation with the dependent construct variable *maintenance degree of a healthy diet***

| Independent variables                    | $\beta$ -values |
|--|-----------------|
| Autonomous motivation for healthy eating | 0.325**         |
| Degree of goal attainment                | 0.293**         |
| Formal support                           | 0.012           |
| Dietary informal support                 | 0.033           |
| Maintenance self-efficacy                | 0.225**         |
| FNL                                      | 0.050           |
| INL                                      | 0.046           |
| CNLscientific                            | 0.035           |

\* $\beta$ -values are significant at a 0.05 level

\*\*  $\beta$ -values are significant at a 0.01 level

The  $\beta$ -value or  $\beta$ -coefficient is a standardized regression coefficient and provides us with information regarding how much each of the independent variables uniquely predict the total variance in the dependent variable (Pallant, 2010). If it is significant at a 0.05 level or below, one can conclude that that variable is making a significant prediction of the total variance in the dependent variable (ibid). From Table 22 one could see that the constructs *autonomous motivation for healthy eating*, *degree of goal attainment* and *maintenance self-efficacy* had a significant  $\beta$ -value, hence they were included in further analysis. The remaining independent variables in Table 22, although displaying a significant correlation with the dependent

variable, *maintenance degree of a healthy diet*, did not contribute significantly to the total variation in the dependent variable; hence they were excluded from further analysis.

After the independent variables which seemed to significantly predict the variance in the dependent variable had been extracted, different assumptions needed to be controlled for in advance of performing a multiple regression analysis (Tabachnick & Fidell, 2007). A normal distribution for the constructs had already been clarified, as well as a significant correlation between the independent variables and the dependent variable, which leaves the assumptions of outliers, multicollinearity, and sample size (Pallant, 2010).

#### *4.5.1 Examination of assumptions*

##### *Outliers*

To check for possible outliers, a box plot was produced for each of the three variables. There were some outliers detected, however, none of which displayed extreme points. To investigate whether these outliers could be considered problematic, the mean for each variable was compared to its respective 5 percent trimmed mean (Pallant, 2010). Two respective mean values which were similar would indicate that the outliers were not problematic (ibid). Descriptive statistics were produced for the independent variables intended to be used in the multiple regression analysis to compare the mean and trimmed mean for each independent variable. The two mean values corresponding to each of the three variables were believed to be very similar, hence it was concluded that the outliers present were not problematic with regards to further analysis.

##### *Multicollinearity*

To check for possible multicollinearity, one could inspect two different indexes which were provided from the preliminary multiple regression analysis for the independent variables, namely Tolerance and VIF (variance inflation factor) (Pallant, 2010). Tolerance is a marker of how much of the variability of the particular independent variable is not explained by the other independent variables included in the model, and the VIF value is just the inverse of the tolerance value (ibid). A Tolerance value of less than 0.1 and a VIF value above 10 would

both indicate multicollinearity (ibid). All the four independent variables displayed a tolerance value of above 0.6 and a VIF value below 2; hence it was assumed that multicollinearity did not exist for the independent variables intended to be used in the multiple regression analysis.

#### *Sample size*

Given the formula for calculating sample size requirements provided by (Tabachnick & Fidell, 2007) ( $n > 50 + 8m$ , where  $m$ = number of independent variables), a sample size of 90 would meet the minimum prerequisite. The sample size for this analysis was 380, hence way above these requirements.

#### *4.5.2 Final analysis*

After deciding which independent variables would be appropriate to use in the missing value analysis, they were entered into the analysis to see how much variance in the dependent variable, *maintenance degree of a healthy diet*, they together predicted. The value which provided this information was the *R Square* ( $R^2$ ). The  $\beta$ -values for each of the four independent variables are presented in Table 23.

**Table 23:  $\beta$ -values and respective unique contribution of the independent variables to the total variance in the dependent variable, *maintenance degree of a healthy diet***

| <b>Independent variables</b>             | <b><math>\beta</math>-value</b> |
|--|---------------------------------|
| Autonomous motivation for healthy eating | .390**                          |
| Degree of goal attainment                | .301**                          |
| Maintenance self-efficacy                | .267**                          |

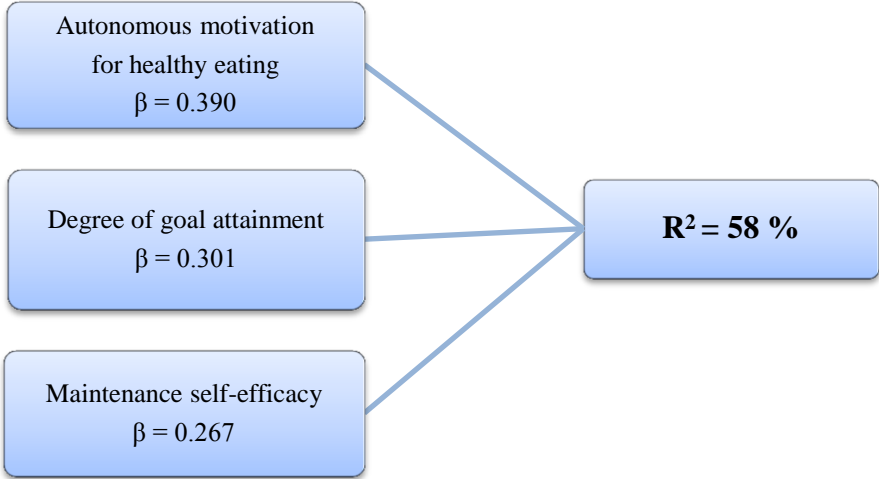
$R^2$ : 0.58

\*\* $\beta$ -values are significant at a 0.01 level

As can be seen from Table 23, all predictions of the variance in the dependent variable were statistically significant at a 0.01 level. With regards to the quantity of contribution, the construct *autonomous motivation for healthy eating* had the highest  $\beta$ -value; hence this

variable displayed the highest explanatory contribution to the total variance in the dependent variable.

The  $R^2$ -value obtained in the analysis was 0.58 which can be expressed as 58 percent. Hence, the three independent variables included in the analysis predicted 58 percent of the variance in the dependent variable, *maintenance degree of a healthy diet*. The result was considered significant ( $p < 0.00$ ), and it is visualized in Figure 8.



**Figure 8: Significant ( $p < 0.00$ ) predictors for 58 % variance in *maintenance degree of a healthy diet***

**b)**

Secondly, prediction of total variance in maintenance degree of a healthy diet by the background- and lifestyle variables was investigated. As the background- and lifestyle variables had not yet been investigated with regards to correlations with the dependent variable, this was the first step required to be performed. The correlation coefficients of all the background- and lifestyle variables with the dependent variable are presented in Table 24.

**Table 24: Correlation coefficients for the background- and lifestyle variables with the dependent variable, maintenance degree of a healthy diet**

| Background- and lifestyle variables                  | Maintenance degree of healthy diet (rho) |
|--|--|
| No. of courses participated in                       | .04                                      |
| Physical activity level                              | .29**                                    |
| Breakfast habits                                     | .20**                                    |
| Smoking habits                                       | -.05                                     |
| Snus habits  | .01                                      |
| No. of kids  | .11*                                     |
| Education  | -.04                                     |
| Income   | .01                                      |
| Area of residence                                    | .04                                      |
| Relationship status                                  | .16**                                    |
| Age  | .22**                                    |
| Gender   | .07                                      |
| Search for information regarding diet related issues | .12*                                     |
| Support giver in relation to diet                    | -.08                                     |
| Time since last program participation                | -.12*                                    |
| Previous diet attempts                               | -.07                                     |
| Weight monitoring                                    | -.13*                                    |

\*Correlations are significant at a 0.05 level

\*\* Correlations are significant at a 0.01 level

It was chosen to use the same selection criteria as for inclusion in the simultaneous multiple regression analysis, hence only the variables which displayed a significant correlation on a 0.01 level was incorporated into further analysis. One can see from Table 25 that this only included *physical activity level*, *breakfast habits*, *relationship status* and *age*.

Additionally, it was desirable to sift out the variables which did not significantly predict any of the variance in the dependent variable, by inspecting the  $\beta$ -values and their respective significance levels. These results are presented in Table 25.

**Table 25:  $\beta$ -values and skewness of background- and lifestyle variables which showed a significant correlation with the dependent variable, *maintenance degree of a healthy diet***

| Background- and lifestyle variables | $\beta$ -value | Skewness |
|-------------------------------------|----------------|----------|
| Age                                 | .216**         | -.253    |
| Relationship status                 | .084           | -.328    |
| Breakfast habits                    | .107*          | -5.420   |
| Physical activity level             | .319**         | .544     |

\* $\beta$ -values are significant at a 0.05 level

\*\* $\beta$ -values are significant at a 0.01 level

When looking at Table 25, only the background variable *age* and the lifestyle variable *physical activity level* displayed significant  $\beta$ -values on a 0.01 level. The only other variable which had a significant  $\beta$ -value, on a 0.05 level, was *breakfast habits*. However, as seen from the skewness value for that respective variable, it was not normally distributed, which this type of analysis is very sensitive for (Tabachnick & Fidell, 2007). Hence, *breakfast habits* were excluded from further analysis, while *age* and *physical activity level* was included. These variables were then incorporated into the analysis together with the three independent variables. This was done by entering the background- and lifestyle variable into one “block” and then entering the three independent variables into a second, separate block. This created the effect of controlling for the background- and lifestyle variable, to see the true contribution of the independent variables to the total variance in the dependent variable, without the possible interference of the background- and lifestyle variable (Pallant, 2010). The  $\beta$ -values for the two blocks of variables and its respective significance levels are presented in Table 26.

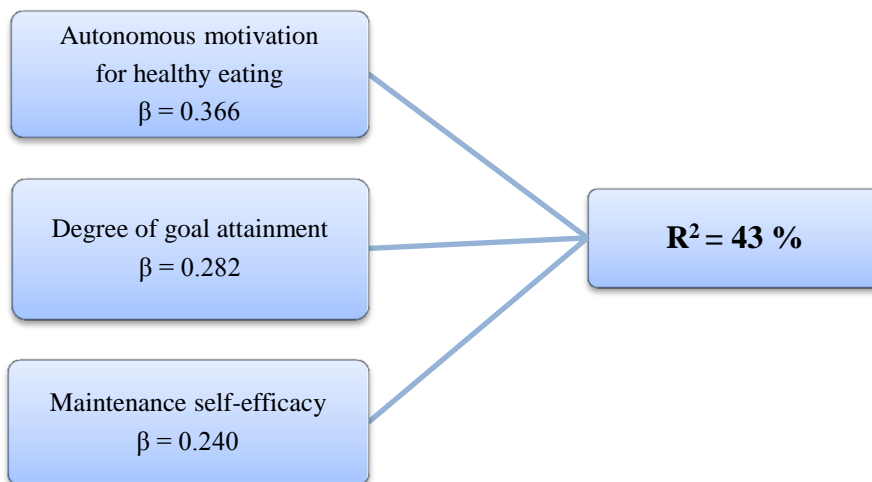
**Table 26:  $R^2$  and  $R^2\Delta$  values for the two blocks of background-, lifestyle- and independent variables, which significantly predicted the variance in the dependent variable, *maintenance degree of a healthy diet*.**

| Block of variables | $R^2$ | $R^2\Delta$ |
|--------------------|-------|-------------|
| 1                  | .16   | .16**       |
| 2                  | .59   | .43**       |

\*\* $R^2\Delta$  values significant at a 0.01 level

1. Physical activity level, age
2. Physical activity level, age, autonomous motivation for healthy eating, degree of goal attainment, maintenance self-efficacy.

As seen from Table 26, the  $R^2$ -values indicate that the two blocks together predicted 59 percent of the total variance in the dependent variable. The background- and lifestyle variable alone predicted 16 percent, while adding the independent variables, increased the prediction of the total variance in the dependent variable with an additional 43 percent; hence the independent variables still contributed a great deal to the variance even when *physical activity* and *age* had been controlled for. The  $\beta$ -values for each independent variable, after controlling for the background- and lifestyle variables are presented in Figure 9.



**Figure 9: Significant ( $p < 0.01$ ) predictors for 43 % variance in *maintenance degree of a healthy diet*, when background- and lifestyle variables have been controlled for.**

When comparing the  $\beta$ -values for the three independent variables before and after controlling for *physical activity level* and *age*, one can see that they did not change considerably. These results indicates that if someone in the sample displayed a higher level of autonomous motivation for healthy eating, more confidence in their ability to avoid a dietary lapse as well as more confidence in their ability to recover from a lapse, they felt to a higher degree that they had reached their goals, and they showed a higher level of physical activity, they also displayed a higher degree of maintenance of a healthy diet.



## **5.0 Discussion**

### **5.1 Methodological discussion**

In this section all aspects of the methodology used will be discussed. The section is introduced by discussing issues which may have affected the study's data quality, by evaluating the study sample, study design and distribution method. Then, an assessment of the variables included in the study and the statistical methods used to generate and analyze these variables are presented. Then, an assessment of the study's validity and reliability will be given, as well as how ethical considerations have been maintained in this study.

#### *5.1.1 Study design*

Considering that this study wanted to investigate factors associated with the maintenance of a healthy diet, the ideal type of study would probably be a longitudinal study, as it enables for measurements of the psychosocial variables at several points in time (e.g. at initiation of weight reduction course, at the end and a year after completion). Since this was not possible due to the limited scope of time, a cross-sectional study was chosen. It has been argued that cross-sectional designs can lead to significant systematic errors and overestimation of associations between psychosocial constructs and behavior (Weinstein, 2007), but it is still considered a good method for providing quantitative information from a study sample at one point in time (Ringdal, 2007), and is therefore the most appropriate procedure to use for this study, at least when the optimal is not a possibility.

#### *5.1.2 Study sample*

As mentioned in Chapter 4.2, the study generated a response rate of 9.1 percent, which is very low. There is currently no standard with regards to what percentage which would be considered a good response rate (Margetts, Vorster, & Venter, 2003), though according to Ringdal (2007), a response rate of about 60 percent is generally viewed as satisfactory, which highlights how dismal the response rate for this study was. However, it is worth noting that a small number of the people the questionnaire was sent out to had not attended any weight reduction course; they were just recipients of the weight programs newsletter. The program managers did not have a system in place which enabled them to separate the program

participants email addresses from the ones who only were newsletter recipients. Hence, the true number of the actual study sample was unknown, but it was ensured that the newsletter recipients constituted a very small number. As a result of this, the response rate stated might be an underestimation of the true percentage of respondents.

Nevertheless, a low response rate was expected, as this is common for electronically distributed questionnaires (Haraldsen, 1999), which proved to be the case for this study. In advance of questionnaire distribution it was considered to provide incentives to increase the possibility of a higher response rate. However, this idea was later discarded, as it would be practically impossible to identify which of the recipients that had responded, since the questionnaire was completely anonymous. If it had been distributed directly from Questback this could have been possible, but this was not allowed according to NSD regulations. Actual measures which was put in place in an attempt to improve the response rate, was to send out three reminders; two directly by email and one incorporated into one of the weight reduction program newsletters which was sent out while the questionnaire was still active.

With regards to the characteristics of the people who chose to respond, one can speculate on whether the respondents differ in any way from the people who chose not to answer the questionnaire. For example, it might be that people who felt like they had managed to maintain a healthy diet were more likely to respond to the questionnaire than those who felt unsuccessful with regards to dietary maintenance. This is just a speculation, as it is not easy to assess the characteristics of the people who have chosen to participate and of those who have chosen not to participate (Ringdal, 2007). However, it is well known that the people who partake in health- and nutrition related studies are often more health conscious than the general population, which is considered a selection bias (Mosdøl & Brunner, 2005). If this was in fact the case, the results would not reflect the true picture of successful maintenance of a healthy diet.

This suspicion was strengthened when looking at the sample distribution within the different maintenance degrees, where 60 percent of the sample showed a high maintenance degree of a healthy diet. Considering that successful maintenance of a healthy diet is a key component of successful weight loss maintenance, one can infer that there most likely is a strong positive correlation between the two. Hence, if one compare the percentage of high maintenance degree participants to that of the success rates of weight loss maintenance identified, assuming that the degree of maintenance of a healthy diet directly reflect the degree of weight loss maintenance, while keeping in mind that successful weight loss maintenance is much less common than weight regain, the characteristics of the sample in this

study does most likely not reflect the true maintenance degree rates as it were for the whole target population.

### *5.1.3 Distribution of questionnaire*

As the questionnaire was distributed electronically, there were limited restrictions with regards to where and when the study sample might have answered the questionnaire, hence they could have done so when they saw fit. However, there were many disadvantages with this type of distribution method. Firstly, even though the email addresses which the questionnaire was sent to were valid, this did not guarantee that the email recipients would open the email, nor read it. With this in mind, the email subject heading was carefully considered as to ensure that as many as possible would open the email and subsequently answer the questionnaire. It was also believed that people would be more likely to respond if the questionnaire would come from a “trusted source”, i.e. the same distributor as for the newsletter, however it is unclear whether this influenced the response rate at all.

Several reasons for why people might have chosen not to answer the questionnaire were evaluated. Firstly, as mentioned in Chapter 5.1.2, perhaps many of those who considered themselves as unsuccessful with regards to maintenance of a healthy diet chose not to answer, as they might have thought that the questionnaire were directed towards the successful weight maintainers or that they were ashamed of not being able to maintain the dietary recommendations. Another reason for why people refrained from answering might be related to the length of the questionnaire. It consisted of over 140 questions in total, and the miniscule pilot test of the questionnaire, which was sent to three program leaders who had at some point in time attended one or more weight reduction programs, revealed a response time of between 13 and 20 minutes, which was considered as quite lengthy. This was confirmed by an email from a possible respondent to the questionnaire distributor, saying that she started to answer the questionnaire, but midway she discontinued, as it became too lengthy and detailed. Hence, in the future, efforts should be made to make questionnaires as short as possible to increase the chances of a satisfactory response rate as well as to avoid selection bias.

Another aspect which was considered and carefully planned in relation to the distribution of the questionnaire was the time. The initial questionnaire was sent out in the end of November, before people generally become very busy with Christmas preparations. The first reminder was sent out about a week after that. The second reminder was sent out during Christmas break, aimed at recruiting people who worked during that time period, as it is

generally characterized by small workloads. The third reminder was sent out in the second week of January. The intention behind these last two reminders was that around Christmas, many people, especially people who try to lose weight or maintain weight loss, are confronted with temptations and other diet related high risk situations in relation to maintaining a healthy diet. Due to this, it was believed that they probably would reflect a great deal about their dietary situation as well planning how to respond to high risk situations. It is also likely that situations in relation to this holiday are the direct cause of lapses and relapses back to old dietary habits, hence it was believed to be an ideal time to send out the questionnaire. This is because the results might more likely represent the study samples true degree of coping- and recovery self-efficacy, as it might be considered a less hypothetical situation than during a time period where one encounters less high risk situations.

#### *5.1.4 Choice of lifestyle variables*

The so-called lifestyle variables were chosen based on previous research on what factors which seem to be significant with regards to weight loss maintenance (Carraca et al., 2011; McGuire et al., 1999; Pasmaan et al., 1999; Teixeira et al., 2004a; Teixeira et al., 2004b). These types of studies do not investigate the maintenance of a healthy diet as a part of weight loss maintenance per se, even though these two aspects are believed to be highly related, which is recognized by most researchers investigating weight loss maintenance (Thomas et al., 2011; Wing & Phelan, 2005). Hence, it was believed that these lifestyle variables most likely were relevant with regards to maintaining a healthy diet and they were therefore included as lifestyle variables in the questionnaire.

#### *5.1.5 Choice of construct variables*

All items included in the questionnaire, except the ones included in the dependent variable, *maintenance degree of a healthy diet*, *emotional informal support* and *dietary informal support* had already been developed and utilized in different studies by experienced researchers. Some of the measuring tools had been used with a target group similar to that of this study, while others had not, hence the comparability with previous research might vary.

In the following subchapters the analyses used to establish the different construct variables, as well used to investigate the variables in relation to each other, are discussed.

#### 5.1.5.1 Factor- and reliability analysis

Ahead of the factor- and reliability analysis, in addition to reversing the statements which were subjectively considered to be negative, a missing analysis was performed via the regression method on each of the continuous items. None of the variables had more than 5 percent missing, hence conducting analysis with this data would probably not have posed any reliability issues (Stevens, 2009; Tabachnick & Fidell, 2007) All constructs proved well suited for factor analysis, with all but the *emotional informal support* construct displaying a satisfactorily high KMO value ( $>0.6$ ), and all showing a significant Bartlett's Test of Sphericity at a 0.01 level. Initially, a KMO-value of 0.6 was set as the minimum value for factorial suitability, which would deem the *emotional informal support* construct inappropriate for use in factor analysis. However, there has been some disagreement in the literature with regards to what value which should be considered an acceptable minimum, where some suggests a minimum value of 0.5 (Christophersen, 2009; Clausen, 2009), and others advocate a minimum value of 0.6 (Pallant, 2010; Tabachnick & Fidell, 2007). Since *emotional informal support* had a KMO value of 0.5, as well as the lowest possible amount of items included in the factor (KMO value tend to increase with increasing amount of items (Clausen, 2009)), it was decided to retain that factor and include it in further analysis.

As most of the constructs included in the questionnaire had been previously developed, there was some idea of how the items would arrange themselves within the factors. As a result, the items believed to belong to one factor were entered into the factor analysis together, utilizing the Kaiser's criterion as the basis for factor extraction. For the nutrition literacy items however, the factor analysis was performed in a slightly different manner. As the nutrition literacy items were intended to measure different levels of the same phenomena, i.e. nutrition literacy, all items were entered into the factor analysis together in a semi-confirmatory manner. This was done because they together should measure at least three different levels of nutrition literacy, hence three factors or more were expected to emerge from the analysis.

In the following subchapters, the results of the factor- and reliability analysis will be discussed in relation to each construct. For the constructs where already developed measuring instruments had been used, the results of these two analyses will also be discussed in light of previous studies employing the same measuring tools as those included in this study.

### *Maintenance degree of a healthy diet*

The dependent variable, *maintenance degree of a healthy diet*, initially included twelve items which intended to collectively measure the degree of maintenance of a healthy diet, and was developed with care, as to capture all aspects of a healthy diet. This was done by carefully and systematically extracting key dietary advice from the diet- and nutrition books provided to each participant by the program organizers, as well as from their web page. Additionally, the final items were revised together with the CEO and founder of the weight reduction program, as to ensure that all dietary aspects which they emphasize in their program were covered. Hence, careful considerations were taken, so that the construct, as accurately as possible, would reflect the degree of maintenance of a healthy diet in the study sample.

There was one item which was excluded from the construct, related to limiting the intake of alcohol, which were the single loading item on a second factor. This item and the items in the first factor were attempted to be forced into one factor, but this resulted in both a decrease in the  $\alpha$ -value, as well as a decrease in the total explained variance by the factor. Hence it was decided to exclude the item related to alcohol permanently.

The factor analysis revealed one factor including eleven of the twelve initial items, where the majority of the items displayed a high factor loading. Additionally, the reliability analysis revealed an  $\alpha$ -value of 0.90, hence, one can assume that the construct aimed at measuring maintenance degree had a satisfactory factor structure and a high level of internal consistency.

### *Motivation*

The TSRQ was applied in this study to measure the samples quality of motivation in relation to maintaining a healthy diet, and to what degree this motivation was autonomous vs. controlled. Factor analysis revealed two constructs; *controlled motivation for healthy eating* and *autonomous motivation for healthy eating*. Two of the items loading on *controlled motivation for healthy eating*, were excluded, as this resulted in a large increase in total explained variance by that factor, without significantly decreasing the KMO- or  $\alpha$ -value. An attempt was made to force the two items into the *autonomous motivation for healthy eating* construct, but this decreased the  $\alpha$ -value significantly, as a result the two items were permanently excluded. A potential reason for why these two items did not fit into either of the factors was that they possibly captured a different aspect of motivation than the two final factors, which measured autonomous and controlled motivation, which are the two “extreme

values” within the continuum of regulation (Teixeira et al., 2011). The two items which were excluded were related to the feeling of guilt, which more likely corresponded to introjected regulation, which involves that having a healthy diet is done so as to avoid negative emotions such as anxiety or guilt (Ryan & Deci, 2008).

The TSRQ has not been used extensively in similar contexts as that of this study, but Williams and colleagues (1996) did use it in their investigation of motivational predictors for weight loss and weight loss maintenance, by assessing participants motivation for continuing in a weight reduction program and following the guidelines of that program. They found six items which represented controlled motivation and three items which represented autonomous motivation, with  $\alpha$ -values of 0.79 and 0.58 respectively, measured on a 5-point Likert-scale. Conversely, a different factor structure was obtained in the present study, where four and six items were found to measure controlled- and autonomous motivation respectively, with corresponding  $\alpha$ -values of 0.79 and 0.87, suggesting that the factor structure obtained in this study displayed higher internal consistency than that by Williams and colleagues.

A more recent study by Levesque and colleagues (2007) aimed at validating the theoretical structure of TSRQ across three different healthy behaviors -smoking, diet and exercise-, with measurements obtained on a 7-point Likert-scale. The factor structure obtained in that study for controlled- and autonomous motivation was identical to that of this study, and the  $\alpha$ -values ranged from 0.85 to 0.93 for autonomous motivation, and from 0.73 to 0.91 for controlled motivation. Those  $\alpha$ -values are within the same ranges as that obtained for the two respective constructs in this study, indicating that the TSRQ provides a good measure of motivation quality across different health behaviors, including dietary behavior.

Nevertheless, it is important to note that it was chosen to use an even numbered Likert-scale (6-point), for all the items in the questionnaire in this study, as to try and prevent the respondents from displaying “neutrality”. As a result of this type of response structure, the  $\alpha$ -value generated for each construct tend to be somewhat higher than when using an odd numbered Likert-scale (Preston & Colman, 2000).

### *Maintenance self-efficacy*

The BSCQ was employed to measure coping- and recovery self-efficacy in the present study. Self-efficacy in relation to dietary behavior has in all probability not been assessed with this measuring tool before, as it was initially developed to evaluate coping self-efficacy in relation to addictive behaviors (Annis, 1986). However, in our study the  $\alpha$ -values obtained were 0.87 and 0.93 for coping- and recovery self-efficacy, respectively, signifying a high level of internal consistency. In addition the factor structure was similar to that obtained by Breslin and colleagues (2000) in their study aimed at assessing validity and reliability of the BSCQ. These results indicate that the BSCQ in all probability is an appropriate and effective in the assessment of coping- and recovery self-efficacy in relation to maintaining a healthy diet among weight reduction program participants.

### *Formal support*

When looking at the instrument used to measure formal support in this study, HCCQ, appropriate comparison material are limited at best. This questionnaire has thus far mainly been used to assess perceived autonomy support in relation to smoking cessation (Williams et al., 2002a; Williams et al., 1999; Williams & Deci, 2001), diabetes self-regulation (Williams, McGregor, Zeldman, Freedman, & Deci, 2004; Williams et al., 1998a) and medical adherence (Williams et al., 1998b). However, one study by Williams and colleagues (1996) applied this instrument in their study of motivational predictors for weight loss and weight loss maintenance. They found that perceived autonomy support predicted the participants autonomous motivation, which again predicted greater weight loss and better maintenance of weight loss at follow-up, hence autonomy motivation was considered a distal predictor.

In the present study, all items intended to measure formal support were included in the final construct, and high factor loading values were observed across all those items, suggesting a satisfactory factor structure. The  $\alpha$ -value obtained in that study was 0.96, which is very similar to the  $\alpha$ -value of 0.94 obtained in this study. Additionally, that study utilized the long 15-item version while this study utilized the short 6-item version, indicating that the present study provides further evidence of the reliability and validity of HCCQ and its effectiveness as an evaluation instrument in similar contexts.



### *Informal support*

The scale aimed at measuring informal support had not been previously developed, but was rather a combination and adaption of two social support scales, namely the BSSS (Schulz & Schwarzer, 2003) and the social support for eating scale (Sallis et al., 1987). Analysis revealed two factors, one which most likely measured dietary informal support and one which probably measured emotional informal support, with  $\alpha$ -values of 0.68 and 0.90 respectively. Thus, the emotional informal support construct displayed a very satisfactory  $\alpha$ -value, indicating high internal consistency, while the dietary informal support construct presented with weaker internal consistency, indicating that it might not measure all aspects of dietary informal support and hence needs further testing and revision if attempted to be used later.

### *Goal attainment*

The indicator intended to measure goal attainment was comprised of one attitude statement, related to the degree of which the respondent felt like they had achieved the goals which they put forward at the initiation of the last weight reduction program they participated in. As this construct consisted of only one statement, factor- and reliability analysis were inapplicable (Pallant, 2010). However, as this attitude statement was a direct measure of goal attainment, rather than an indirect measure of a latent variable or phenomenon, which many composite constructs often are (Hellevik, 2002), it was believed that it measured what it was intended to measure, even though it only was comprised of one item.

It was made sure that participant goal setting at the beginning of a weight reduction program was a part of the strategies incorporated into the program outline. However, the CEO indicated that program leaders might differ somewhat with regards to their teaching methods; hence one cannot be certain of how much emphasis there has been put on goal setting, and whether the degree of emphasis differed between the local program leaders. As such, whether the results for those who have indicated a low degree of goal attainment truly reflects this or merely that those respondents had merely not put forward any specific goals due to little emphasis on this at the initiation and during program participation, was uncertain.

## *Nutrition Literacy*

With regards to the constructs aimed at measuring hierarchical levels of nutrition literacy, former research had identified four different factors (Aarnes, 2009; Dalane, 2011; Kjøllesdal, 2009). However, since the target group of this study had not been previously investigated with the NLQ, the items could have patterned themselves in a different manner; hence several fixed factors were explored during factor extraction, resulting in five factors which were identified as most suitable. The fifth factor, containing three items, had an unsatisfactory  $\alpha$ -value ( $<0.40$ ), indicating low internal consistency. This means that the items in that factor did not display a close relationship with each other as a group, indicating that that factor probably did not measure any level of nutrition literacy. As the items did not fit into any of the other four nutrition literacy factors, they were excluded from further analysis. The items were: "I'm not interested in what is considered to be a healthy diet", "I am not in the habit of getting information on what is considered to be a healthy diet" and "I think my body tells me what it needs with regards to nutrients, regardless of what scientists think about this".

It must also be emphasized that when establishing the different nutrition literacy constructs, the items grouped themselves slightly differently than what has been observed in the other studies. An example is the item: *I know which agencies within the health care system that I should contact for help to change my diet*, which were initially thought to measure *INL* based on the obtained results in previous studies, but in this study it turned out to measure *FNL*. One reason for this might be that this particular study sample were very aware of their diet situation and had already taken measures to change it; hence this item might reflect their fundamental nutritional knowledge, but not necessarily the fundamental nutritional knowledge of other societal groups.

Additionally, the items which were initially thought to measure *CNLscientific* (eleven items), emerged as two separate CNL constructs in this study (*CNLscientific* and *CNLpseudoscientific*). Hence, by obtaining a mean value of the scores on the two CNL constructs obtained in this study might make the comparison with other studies more accurate. However, it was believed that keeping the two constructs separate elucidated the CNL level in the study sample more comprehensively, by measuring both their trust in pseudoscientific nutrition sources, as well as their ability to critically evaluate nutrition information.

Factor analysis revealed four constructs probably measuring hierarchical levels of nutrition literacy, namely *FNL*, *INL*, *CNLscientific* and *CNLpseudoscientific*, with  $\alpha$ -values of 0.78, 0.83, 0.64, and 0.69 respectively. The  $\alpha$ -values for the nutrition literacy constructs

obtained in this study together with those obtained in previous studies<sup>6</sup> are presented in Table 27.

**Table 27: Comparison of  $\alpha$ -values obtained for each nutrition literacy constructs construct in the present study with  $\alpha$ -values obtained in previous studies**

| Nutrition literacy level              | Present study | (Kjøllesdal, 2009) | (Aarnes, 2009) | (Dalane, 2011) | (Hjartåker, 2011) |
|---------------------------------------|---------------|--------------------|----------------|----------------|-------------------|
| <b>FNL</b>                            | 0.78          | 0.80               | 0.80           | -              | 0.57              |
| <b>INL</b>                            | 0.83          | 0.79               | 0.77           | 0.78           | 0.76              |
| <b>CNL<sub>scientific</sub></b>       | 0.64          | 0.68               | 0.52           | 0.68           | 0.69              |
| <b>CNL<sub>pseudoscientific</sub></b> | 0.69          | -                  | -              | -              | -                 |

As seen from Table 27, the  $\alpha$ -value for *FNL* obtained in this study are similar to those obtained in both Kjøllesdal’s (2009) and Aarnes’ (2009) studies, and for *INL* it is slightly higher to that obtained in all the other studies. For *CNL<sub>scientific</sub>* the value is slightly lower than that obtained in all except one of the other studies; however it is worth noting that this construct was comprised of four items in the present study, while ten items were included in most of the other studies, which might be the reason for why the  $\alpha$ -value obtained in this study was lower.

The  $\alpha$ -values attained in this study indicates that the internal consistency for the *FNL* and *INL* construct were satisfactorily high, while the two CNL constructs presented with  $\alpha$ -values slightly below the cut off level of 0.70 which is considered to be appropriate for acceptable internal consistency (Tabachnick & Fidell, 2007). However, these constructs contained fewer items than that of *FNL* and *INL*, in addition to displaying  $\alpha$ -values only slightly below the cut-off level. Additionally, as it is not uncommon for psychological construct, which the nutrition literacy constructs are, to display  $\alpha$ -values of less than 0.70, due to the multifaceted nature of the constructs (Kline, 2000), it was inferred that the CNL constructs could in fact be considered as having satisfactory internal consistency.

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<sup>6</sup> As nutrition literacy most likely has never been investigated in relation to this study’s target behavior and target group, the most recent previous research using the NLQ was included for comparison.

#### 5.1.5.2 Multivariate analysis of variance

There were some reluctance with regards to performing a MANOVA analysis, as the variables could not be put into the analysis as described by SPSS manuals (Pallant, 2010) and experts on this type of analysis (Stevens, 2009). However, as this specific analysis provides a comparison of the differences between means, rather than “cause-effect” type of analysis, this should not have mattered. To assure that this analysis produced non-faulty results, an ANOVA test was performed, between the categorical maintenance degrees variable and the continuous dependent variable, *Maintenance degree of a healthy diet*, in the right way as specified by the literature (Pallant, 2010; Stevens, 2009). This test produced the same mean difference and significance level as in the MANOVA. In addition, the mean differences were also calculated manually, which generated the same difference as that obtained from the analysis. Based on this, it was inferred that the results from the MANOVA were accurate.

#### 5.1.5.3 Multiple regression analysis

Before commencing on this analysis, there were several assumptions which were checked for, as this type of analysis is sensitive to many different data conditions (Pallant, 2010; Tabachnick & Fidell, 2007). However, to minimize the variable load needed to include in the assumption examination, the independent variables which displayed a significant correlation with, and a significant contribution to, the total variance in the dependent variable, *maintenance degree of a healthy diet*, were initially obtained by producing a correlation matrix and performing a preliminary multiple regression analysis. These two analyses revealed three independent variables which were appropriate for use in the final multiple regression analysis, namely *autonomous motivation for healthy eating*, *degree of goal attainment* and *maintenance self-efficacy*. Then these three constructs, together with the dependent variable, *maintenance degree of a healthy diet*, were scrutinized with regards to normality, outliers and multicollinearity. This revealed that all four constructs were normally distributed, did not have any problematic outliers and did not display multicollinearity with each other. Lastly, the minimum appropriate sample size acceptable for entry into multiple regression analysis was calculated, which revealed a minimum sample size which was much lower than that of this study, hence the analysis procedure was commenced.

As the study sample was relatively small, it was decided to use the adjusted  $R^2$ -value as the measure of explained variance in the dependent variable with regards to all multiple

regression analyses. The  $R^2$ -value has a tendency to become overestimated if the sample size is small, hence it was better to use the adjusted  $R^2$ -value in this study, as it would provide a better estimate of the accurate population value (Tabachnick & Fidell, 2007).

### *5.1.6 Reliability and validity of the study*

#### *5.1.6.1 Reliability*

Reliability, also referred to as accuracy, relates to the extent to which repeated measurements with the same measuring instrument provides the same result (Grønmo, 2004; Hellevik, 2002; Ringdal, 2007). For instance, the reliability is considered low if a great deal of the variation in the material is related to the development of the study procedure or the actual data collection (ibid). High reliability indicates that the data to a small extent varies due to such methodological conditions, and that the variation in the data mainly reflects actual differences between the analytical units (ibid). In addition, high reliability requires that the study design is developed explicitly so that it facilitates an unambiguous approach, as well as collection, treatment, coding and interpretation of the data have been conducted in a thorough and systematic manner (Halvorsen, 2002). Failure to handle the data in such a way can produce random measurement errors (ibid). To reduce the risk of making such errors, emphasis was placed on accuracy in the collection, processing and interpretation of the data. In addition, the data was exported directly from Questback to SPSS, which greatly minimized the chances of human errors being made, as the data was not manually entered into SPSS.

Another issue which might affect the reliability, is situations where the actual meaning of the questions / statements are not successfully passed on from the researcher to the respondent, that is, those who answer the questionnaire do not understand the questions in the same manner as the researcher. This will result in responses which do not reflect reality, hence they are not reliable (Haraldsen, 1999). With this in mind, careful consideration was made when the questionnaire was developed, so that the statements were as explicit and unambiguous as possible.

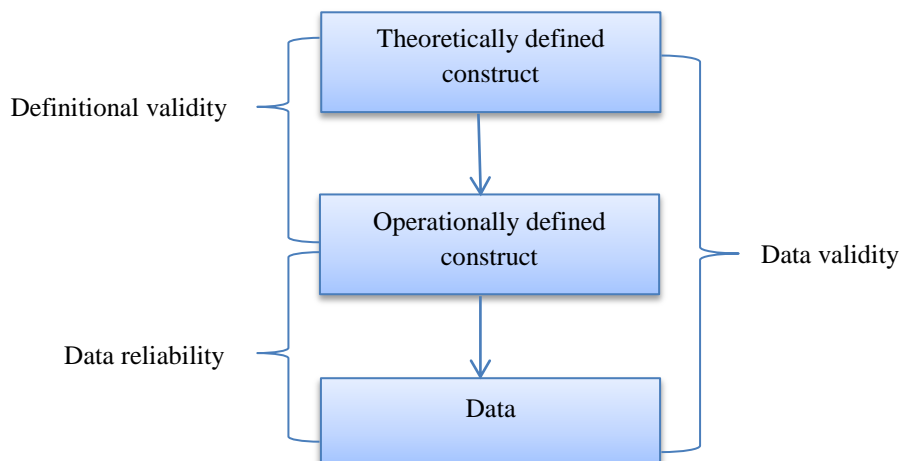
Reliability measurements of the constructs revealed what was believed to be acceptable  $\alpha$ -values across all constructs, indicating that the constructs did display adequate levels of internal consistency (Hellevik, 2002).

### 5.1.6.2 Validity

Validity refers to whether the data obtained is relevant with regards to the aim of the study (Grønmo, 2004). In its most specific meaning, validity refers to the contextual relationship between theoretical and operational definitions of a concept or phenomenon (Hellevik, 2002).

The validity issue arises due to the researcher moving between two cognitive levels; theoretical level and empirical level. The theoretical level is where one formulates the aim of a study and interpret its results, while efforts to collect and process data, on the other hand, take place on the empirical level (Hellevik, 2002). For the researcher's efforts on one level to be relevant to what happens on the other, there must be a correlation between the terminologies used within the two levels. The so-called definitional validity is an expression of how good this correlation is (Hellevik, 2002).

The transition from the theoretically defined variable and operationally defined variable is aided by operationalization of a theoretical concept, to enable the phenomena in question to be measured (ibid). That the operational definition is clear and precise influences greatly whether the collection and treatment of the data can be implemented with a high degree of reliability. These two conditions together determine the data validity, and this relationship is depicted in Figure 10.



**Figure 10: Relationship between reliability and validity (Hellevik, 2002)**

In order to define the validity of a study, one can consider various forms of validity, each distinguished by the criteria which are emphasized in the validity assessment process (Hellevik, 2002). There are two main aspects of validity; measuring validity, which includes content- and construct validity, and criterion validity (Halvorsen, 2002), which refers to whether the used measuring tool corresponds to a previously used method of measurement that is considered to be the “golden standard” (Halvorsen, 2002). As this study did not aim at comparing different measurement methods, only the aspects of construct validity, content validity and external validity were addressed.

### *Content validity*

Content validity refers to the degree to which the selected items of an operational construct are believed to represent all aspects of the theoretical concept that one wants to measure, such as self-efficacy or motivation (Haraldsen, 1999). However, the correspondence between the theoretical- and the operational construct does not often allow for empirical determination, as the theoretically defined phenomena are regularly not measurable (Hellevik, 2002). Hence, to be able to evaluate the quality of this relationship, a researcher has to make a discretionary and subjective qualitative assessment of how well the operational definition corresponds to the theoretical (ibid), which requires professional expertise and careful evaluations.

All the previously developed scales used in this study have been created by people with professional expertise and research experience within their individual areas (self-efficacy, motivation, nutrition literacy), which increases the likelihood of the content validity of this questionnaire being adequately high (Drageset & Ellingsen, 2009).

### *Construct validity*

The construct validity refers to whether the results obtained by using a specific questionnaire coincide with the underlying theoretical framework, hence whether the items chosen for a particular construct actually measures the theoretical concept that construct is aimed at measuring (Drageset & Ellingsen, 2009). To examine the construct validity, a factor analysis was conducted on the data set to see whether there were patterns within the data which formed into constructs, and how well the items within each construct correlated with each other and the construct itself (Sitzia, 1999). Since this study utilized already developed measuring devices, factor analysis had been performed on the various scales. It was also

assumed that if the items within the constructs displayed similar patterns to those obtained in previous studies, one could infer that the constructs did in fact measure the phenomena they were intended to measure.

Overall, factor analysis revealed similar factorial structures as that which was expected, thus the validity of the constructs was estimated to be at a satisfactory level.

### *External validity*

External validity is the extent to which the findings of the study can be generalized to be applied outside of the study sample (Ringdal, 2007). There are some aspects regarding this study which indicate that caution should be exercised when assessing the external validity, and these reasons are explained below.

Initially, a power calculation was made to estimate the minimum number of respondents needed to be able to generalize the results (Grønmo, 2004). Basing the calculation on the number of valid email addresses the questionnaire was sent out to (4184), together with a 5 percent margin of error, 352 participants would comprise a large enough study sample to enable for statistical generalization, provided that the representation of that sample was satisfactory (Ringdal, 2007). However, the study sample should generally be randomly selected to be able to obtain a representative sample (Hellevik, 2002), which was not the case for this study. This suggests that even though the number of participants in this study was somewhat higher than the theoretically calculated minimum sample size, the representativeness of the sample was considered questionable, which would decrease the external validity.

Secondly, as explained in Chapter 5.1.2, the people who decided to participate in the study might have differed significantly in some ways from those who chose not to participate, for example that the study sample were in general more successful with the maintenance of a healthy diet than the target population as a whole. This would provide a distorted image of the actual target group conditions, which decreases the external validity.

Thus, when considering these external validity aspects together with the low response rate, it was inferred that the external validity of this study was most likely unsatisfactory.



#### *5.1.6.3 Reliability vs. validity*

High reliability will ensure that the data are good enough to elucidate a scientific problem (Halvorsen, 2002), and it is a necessary prerequisite for the data having high validity (Hellevik, 2002). As such, it does not matter if one has discovered observable characteristics which provide a valid expression of the theoretical properties one are interested in, if the collection and processing of data is inaccurate and full of errors (ibid). However, high reliability does not ensure high validity, as careful collection and treatment of data by no means guarantee that the data is appropriate to be used to highlight the study's problem (ibid).

Bearing in mind that the reliability analysis revealed what was thought to be satisfactorily high internal consistency, the possibility of high validity of the study could be considered. The construct and content validity was believed to be satisfactory, at least for the constructs which were based on previous developed questionnaires. However, there were many concerns regarding the sample size and the nature of the study sample, which almost certainly decreased this study's generalizability. As such, one could infer that the study displayed an adequately high internal validity, but low external validity.

#### *5.1.6.4 The use of Likert-scale and its influence on validity and reliability*

Using a Likert-scale poses many challenges with regards to validity and reliability. Firstly, respondents may avoid using extreme response categories, called central tendency bias. Secondly, respondents can answer similarly to many questions without properly reading the question, which is called the "agreement syndrome" or consent bias (Ringdal, 2007). Thirdly, respondents may try to portray themselves in a more favorable light, hence they give answers which they think are more "correct" or more accepted by the person who asks, called social desirability bias (Fisher, 1993; Ringdal, 2007).

With regards to central tendency bias the respondents were urged to be as honest as possible and it was emphasized that the answers were anonymous. To avoid a possible display of the agreement syndrome, efforts were made to ensure that the scales were balanced, i.e. that they had a fairly equal number of positive and negative statements, as the consent on positive statements would make up for approval on negative statements. Social desirability bias could have been an issue in this study as it involved self-reporting of dietary behavior to obtain the degree of maintenance of a healthy diet. Hence, some respondents might have indicated a higher degree of maintenance of the different dietary behaviors included in the

measure of maintenance degree of a healthy diet, than what was actually true. Nevertheless, due to the nature of the dietary behaviors reflecting maintenance degree of a healthy diet, it would be difficult to measure it otherwise. To correct for social desirability bias is considered very difficult for analytical purposes. However, according to (Ringdal, 2007), one thing can be considered, which is to construct and include a specific measure of social desirability into the questionnaire. This was not implemented into this study, hence it was hard to infer whether the sample suffered from for social desirability bias or not.

### *5.1.7 Ethical considerations*

When conducting research, there are certain norms which one are expected to follow, both with regards to the handling of the data collected as well the sample from which the data have been collected (Grønmo, 2004).

#### *5.1.7.1 Research ethics*

Research ethics are concerned with seven main topics of interest, namely publicity, organized skepticism, independence, universalism, originality, humility and integrity (Alver & Øyen, 1997; Grønmo, 2004). This entails that all parts of the research process should be explicitly explained; the research should be based on verification and critical discussion and contribute to new knowledge, insight and understanding within the research community; researchers should not plagiarize work of other researchers; the researcher has an obligation to be aware of and explicitly clarify the limitations of their professional expertise and of their research; and researchers need to display honesty and intellectual integrity in relation to their research (Alver & Øyen, 1997; Grønmo, 2004).

As research ethics are important to consider when one performs scientific investigations, it was attempted to comply with the research ethics guidelines above. The research process, specifically the preparation of the questionnaire and the methods used, was as explicitly explained as possible in Chapter 3.0. Careful consideration was taken when previous research and theoretical frameworks included in the study were chosen, as to make the basis of this study as scientifically sound as possible. The motives for conducting this study were purely scientific and based on a genuine interest in exploring this particular research area and context. The aims of the study were chosen as to generate new knowledge

within this area, as it has not yet been investigated before in Norway. Lastly, the limitations of the study are presented in detail in Chapter 5.2.2.

#### *5.1.7.2 Sample ethics*

Sample ethics refers to the laws and regulations which a researcher has to follow, with regards to one's study sample (Grønmo, 2004). The personal data regulation, which is managed by the data inspectorate, is especially important. It postulates that all researchers using personal data in their research, must send an application to the Norwegian Social Science Data Services (NSD), which considers whether the privacy interests are dealt with in a satisfactory manner in the proposed research (Grønmo, 2004). Hence, since this research study was to deal with data collected from individuals, an application was submitted to the NSD, detailing the purpose of the study as well as the target group characteristics and what type of information which would be collected (NSD., 1997). This application was approved before the questionnaire was sent out to the sample.

The questionnaire and the SPSS data files related to this study have all been kept in a safe manner, by means of electronic password protection. The only people who have had access to the data are the student and the two supervisors, and any transmission and correspondence of data between these three people have occurred through password protected college email. According to NSD the information collected from the study sample can be stored until 31.12.2012, whereby it will be discarded.

#### *Informed consent*

Informed consent relates to when a person accept that participation in a study is voluntary, as well as being informed about the specifics of the study and that they are able to withdraw from it at any point in time, should they change their mind regarding participation. For the purpose of this study, a letter which contained information regarding the study topic, the rights of the respondents should they choose to participate, emphasizing that participation was anonymous and that the obtained results were confidential, was included in the email where the link to the questionnaire was located. The sample was then informed that by completing the questionnaire, they indicated that they had given their informed consent.

As the purpose of this study was to investigate the maintenance of a healthy diet, and not the maintenance of weight loss, it was decided that there was no need to ask participants to provide sensitive information, like their weight or BMI, which is normally asked for when studying this particular target group.

## 5.2 Discussion of results

In this section the discussion of the main findings will be presented. Firstly, a review of the main findings will be given, which is followed by a discussion of the results in relation to the aim of the study. Then the limitations of the study will be presented, both regarding this study, as well as in relation to the nature of the previous research included and its comparability to the present study. Lastly, the study's strengths will be highlighted.

### *Main findings of the study:*

1. The total study sample reported values corresponding to a medium maintenance degree of a healthy diet. When comparing the low- and high maintenance degree participants, higher levels of *autonomous motivation for healthy eating, goal attainment, dietary informal support, emotional informal support, coping self-efficacy, recovery self-efficacy, FNL, INL, and CNLscientific*, and lower levels of *controlled motivation for healthy eating and CNLpseudoscientific* was observed for the high maintenance degree participants in comparison the low maintenance degree participants.
2. There was a significant difference between the participants displaying a low- and high maintenance degree with respect to the following phenomena: *autonomous motivation for healthy eating, degree of goal attainment, formal support, emotional informal support, dietary informal support, coping self-efficacy, recovery self-efficacy, FNL, INL, CNLscientific, and CNLpseudoscientific* where the high maintenance degree participants displayed higher levels of all of these constructs, except for *CNLpseudoscientific*, which they displayed a lower level of.
3. The independent variables that displayed a significant prediction of the total variance in the dependent variable, *maintenance degree of a healthy diet*, were; *autonomous motivation for healthy eating, degree of goal attainment and maintenance self-efficacy*. Together they explained 58 percent of the total variance in the dependent variable. Out of those three constructs, *autonomous motivation for healthy eating* was the strongest predictor, followed by *degree of goal attainment* and lastly *maintenance self-efficacy*. Of the background- and lifestyle variables, physical activity level and age contributed significantly to the total variance in the dependent variable, *maintenance degree of a healthy diet*, (16 percent), and when these were controlled for, the three independent variables explained 43 percent of the total variance in the dependent variable.

### *5.2.1 What factors appear important for the maintenance of a healthy diet in weight reduction program participants?*

In this section of the discussion all three research questions will be deliberated simultaneously, as this will enable for a more comprehensive discussion and understanding of the results. Firstly, the main difference between participants with a low- and high maintenance degree will be presented, together with an evaluation of the participant characteristics. Then the results for each construct will be individually discussed<sup>7</sup>, followed by a conceptual clarification of the difference between associations and predictions.

One clarification has to be made before embarking on the following discussion. As there was found very little relevant research specifically related to factors associated with maintenance of an overall healthy diet, it was decided to incorporate research on factors related to maintenance of individual dietary regulatory behaviors (like consumption of fiber and fat). Additionally, research on identified factors important in weight loss and weight loss maintenance related to weight reduction program participation will be included, as it was believed that maintenance of a healthy diet is highly associated with weight loss and weight loss maintenance, particularly with respect to involvement in a weight reduction program. This belief is based on the repeated discoveries showing that maintaining a healthy diet, in addition to engaging in high levels of physical activity, is the most common strategy employed by persons who are successful at weight loss maintenance (Thomas et al., 2011; Wing & Phelan, 2005). Thus, the findings in this study will be compared to the literature specified above, in addition to what little was found on factors associated with maintenance of a healthy diet. The limitations which this entails are described in Chapter 5.2.2.

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<sup>7</sup> The focus of the discussion were mainly on the results for participants with a low- and high maintenance degree of a healthy diet, considering that a comparison between these two degrees is what was most relevant with regards to the aim of the study.

### *5.2.1.1 Main differences between participants with low- and high maintenance degree of a healthy diet*

Looking at the results obtained for each construct for the low- and high maintenance degree participants, they indicate that the participants with a high maintenance degree appeared to have a higher degree of autonomous motivation with regards to having a healthy diet, they felt to a higher degree that they had reached their goals, they perceived their program leaders as more supportive as well as receiving more support from their social network. In addition, the high maintenance degree participants' nutrition literacy levels indicate a greater ability to obtain, read, understand and use nutrition information in a health promoting manner, as well as greater ability to critically evaluate nutrition information.

### *5.2.1.2 Participant characteristics*

With regards to the participant characteristics, the majority of the study sample were middle aged women married with kids, which compares favorably to the characteristics of successful weight loss maintainers identified in previous studies (Thomas et al., 2011; Wing & Phelan, 2005). However, since there were both successful and unsuccessful maintainers in the present study based on the measurements obtained, these background characteristics might not truly reflect the actual characteristics of a weight loss maintainer nor a healthy diet maintainer; it might just be a reflection of the type of people who are most inclined to participate in these types of studies, as discussed previously in Chapter 5.1.2.

With regards to the lifestyle variables, the high maintenance degree participants displayed higher frequency of weight monitoring, breakfast consumption and higher levels of physical activity. These results corroborate what has been found in previous studies when comparing successful and unsuccessful weight loss maintainers. A high level of physical activity has been repeatedly found to be strongly related to long-term weight maintenance (Andrade et al., 2010; Catenacci & Wyatt, 2007; Crawford et al., 2000; Kayman et al., 1990; Miller & Dunstan, 2004; Silva et al., 2011; Turk et al., 2009; Wing & Hill, 2001), and seems to be one of the foundations of weight loss maintenance. The results are also in support of research which has found that daily breakfast consumption is associated with improved weight loss maintenance (Elfhag & Rössner, 2005), along with it being reported as a common weight regain prevention strategy employed by successful weight loss maintainers (Thomas et al., 2011; Wing & Phelan, 2005; Wyatt et al., 2002). Additionally, the findings corroborate

the discoveries on frequent self-monitoring being repeatedly and strongly associated with successful weight loss maintenance (Elfhag & Rössner, 2005; Hindle & Carpenter, 2011; Thomas et al., 2011; Ulen et al., 2008).

Contrary to the evidence that previous dietary attempts are inversely related to successful weight loss maintenance (Thomas et al., 2011), the high maintenance degree participants showed higher frequency of participation in weight reduction programs than the low maintenance degree participants. This might indicate that by attending more weight reduction programs they have acquired a better grasp on the aspects of their diet as well as gained more knowledge and skills relative to maintaining their diet, for example through additional relapse prevention training (Perri et al., 2001), focusing on how to cope with high risk situations, like temptations and negative emotions. Relapse prevention training is a well-known technique often incorporated into weight reduction programs aimed at increasing the likelihood of long term maintenance, even though it has proved to only modestly improve maintenance (Jeffery et al., 2000), mainly by merely postponing weight regain (Rothman, 2000). However, it might be effective in increasing maintenance self-efficacy, which is important for successful long term health behavior maintenance (Luszczynska, Mazurkiewicz, Ziegelmann, & Schwarzer, 2007).

All things considered, the high maintenance degree participants seemed to be displaying characteristics which were typical for that of successful weight loss maintainers. This indicates that in all probability there are very similar factors associated with maintenance of a healthy diet and maintenance of weight loss, which is not surprising at all, considering the fundamental role a healthy diet has in the maintenance of weight loss.

Concentrating on the predictive power of the background- and lifestyle variables, it was found that only physical activity level and age significantly contributed to the prediction of the total variance in the dependent variable. Age has not largely been investigated for its predictiveness in the weight loss domain (Teixeira et al., 2005), probably since it is not a modifiable factor, and therefore studying it in that manner involves no practical implications, only informative. As a result, age will not be discussed further. In relation to physical activity, the results indicate that if someone in the study sample displayed a higher physical activity level, they also exhibited a higher degree of maintenance of a healthy diet. These findings compare favorably to the discoveries of Elfhag and Rössner (2005) where higher levels of physical activity were repeatedly associated with successful weight loss maintenance. This is not at all surprising, bearing in mind the significant role physical activity has been found to have in successful maintenance of weight loss, both according to successful weight loss



maintainers themselves (Thomas et al., 2011) and researchers investigating physical activity in relation to weight loss maintenance (Donnelly et al., 2004).

### *5.2.1.3 Motivation for healthy eating*

Motivation for healthy eating relates to the extent to which the study samples motivation for having a healthy diet is autonomous vs. controlled. There were two constructs aimed at measuring motivation, namely autonomous- and controlled motivation in relation to maintenance of a healthy diet. For the construct which aimed at measuring autonomous motivation, the high maintenance degree participants displayed a significantly higher degree of autonomous motivation than the low maintenance degree participants. This indicates that the participants with a high maintenance degree most likely feel greater ownership with regards to their healthy diet, as they consider it as being an important part of their lives, and that the reason for performing it are truly their own (Teixeira et al., 2011). These results are in accordance with findings showing that autonomous motivation is associated with healthier eating habits (Pelletier & Dion, 2007; Pelletier et al., 2004). The results also support the notion that successful maintenance of a healthy diet is theorized to result from people truly valuing having a healthy diet and the health benefits which arises from healthy dietary behavior (Williams et al., 2002b). Overall, the sample reported a relatively low degree of controlled motivation, with no significant difference between participants in the three maintenance degrees, indicating that the sample as a whole generally experienced little external pressure with regards to maintaining a healthy diet.

The results also indicate that autonomous motivation for healthy eating was a significant predictor of maintenance of a healthy diet. These findings compare favorably to the evidence which have found autonomous motivation as a significant predictor of healthful eating behaviors (Guillaumie et al., 2010; Pelletier & Dion, 2007; Pelletier et al., 2004) and weight loss maintenance (Elfhag & Rössner, 2005; Pelletier & Dion, 2007; Pelletier et al., 2004; Teixeira et al., 2005), indicating that it is an important factor for the maintenance of eating behaviors related to weight loss maintenance, as well as for weight loss maintenance itself.

Additionally, the results seem to be in support of the notion made by Pelletier and Dion (2007) where they suggest that the concept of autonomous motivation could be useful to better understand the mechanisms underlying the regulation of healthy eating behavior.

However, it is important to note that this study did not measure the quantity of motivation, but rather the quality, and the differences in quality between the low- and high maintenance degree participants. Hence, no suggestions can be made regarding whether how high a level of autonomous motivation the different maintenance degrees had per se, but the results allows us to make a comparison of motivation between the maintenance degrees and through this comparison one can characterize the extent to which the motivation for having a healthy diet among the participants are autonomous (Ryan et al., 2008).

#### *5.2.1.4 Maintenance self-efficacy*

Coping self-efficacy relates to a person's confidence in their capability to deal with high risk situations which arises during the maintenance period of an adopted health behavior, while recovery self-efficacy addresses the experience of failure, lapses, and setbacks, by referring to a person's ability to get "back on track" after a single dietary lapse (Luszczynska et al., 2007; Luszczynska & Sutton, 2006).

The high maintenance degree participants presented with a significantly higher level of both coping- and recovery self-efficacy, which indicates that they are both more confident in their ability to avoid an initial lapse, as well as to recover from a lapse, by regaining control over their eating behavior and continue on a path of maintenance (Schwarzer & Renner, 2000), more so than the low maintenance degree participants. Fascinatingly, the high maintenance degree participants displayed a significantly higher level of recovery self-efficacy than coping self-efficacy. As recovery self-efficacy relates to the participants believed ability to recover from an initial lapse (Marlatt et al., 1995), the high maintenance degree participants displayed more confidence in their ability to recover from a lapse than avoiding an initial lapse, which is not evident for the participants displaying a low degree of maintenance. This indicates that the low- and high maintenance degree participants might react in a different manner in response to an initial lapse. For example, the high maintenance degree participants might interpret an initial lapse as a learning experience and because of that become even more certain on maintaining their healthy diet than before the lapse had occurred, which has been found to be a recovery strategy amongst people with high recovery self-efficacy in relation to other health relevant behavior (Elfeddali, Bolman, Candel, Wiers, & De Vries, 2011; Luszczynska et al., 2007). This may have several implications with regards to the actual maintenance of a healthy diet. As a display of a high degree of recovery self-efficacy after an initial lapse has been found to increase the levels of recovery self-efficacy

even further (Luszczynska & Sutton, 2006), as well as promoting long term behavior maintenance (Luszczynska et al., 2007; Marlatt et al., 1995; Schwarzer & Fuchs, 1996), one can infer that it is also a key feature in maintenance of a healthy diet. This may similarly indicate that having a high level of recovery self-efficacy plays a more crucial part in the long-term behavior maintenance process, than coping self-efficacy. On the other hand, having a very high level of coping self-efficacy might decrease the need for having a high level of recovery self-efficacy, but as these two maintenance self-efficacies are highly correlated, it would most likely be rare to present with greatly differing levels of these two phenomena.

With regards to the importance of self-efficacy in the different phases of health behavior change, Baldwin and colleagues (2006) and Rothman and colleagues (2008) have argued that it possibly plays a diminished role in decisions regarding behavioral maintenance in comparison to behavior initiation. Another study by Linde and colleagues (2006) found evidence supporting this idea, as self-efficacy was a significant predictor of behavior, and consecutively weight loss, during a weight loss trial, but not during follow-up.

Conversely, the results obtained in this study contradict this notion, as maintenance self-efficacy was found as being a significant predictor of maintenance degree of a healthy diet. This is in support the evidence which have found self-efficacy as an important predictor of fruit and vegetable consumption (Shaikh et al., 2008; Van Duyn et al., 2001), fat intake (Renner et al., 2008), as well as an identified contributing factor to the maintenance of weight loss (Byrne, Cooper, & Fairburn, 2004; Byrne, 2002; Elfhag & Rössner, 2005; Linde et al., 2006). However, it is important to note that the majority of these studies were concerned with self-efficacy measured at an earlier stage of the behavior change process than that of this study, e, hence, whether the importance of self-efficacy might have decreased at later stages is uncertain. In relation to the present study, as self-efficacy was not measured before initiation of the dietary change, one were unable to see whether self-efficacy possibly would have contributed more to the prediction of initiation of a dietary change than to that of dietary maintenance, or if self-efficacy levels changed during the course of weight reduction program participation. Nonetheless, the results obtained are indicative of that maintenance self-efficacy seems to have a more important role in maintenance of a healthy diet than that which have been previously suggested by some researchers.

Still, one caution must be made when interpreting these results. The two constructs measured the participants' perceived levels of self-efficacy, by asking them to imagine themselves in different situations and indicating their degree of perceived self-efficacy in correspondence with each of those situations. Hence, these situations represented hypothetical

scenarios, which might not enable for the reflection of their true levels of self-efficacy. However Bandura (1977) has argued that even though it is the perceived, rather than actual, capabilities to perform a certain behavior which are measured, it is these perceptions and not a person's true abilities which often influence behavior. Something which might improve the accuracy of self-efficacy measurements in relation to future studies, particularly that of coping- and recovery self-efficacy, might be to include a measure of how many times the participants had actually lapsed/relapsed after changing their diet, to get a better image of the correspondence between perceived and actual maintenance self-efficacy.

#### *5.2.1.5 Formal support*

Formal support relates to the perceived autonomy support received by the study sample from the program leaders during weight reduction program participation. The participants with a high maintenance degree indicated that they received a significantly higher level of formal support than the participants with a low maintenance degree, indicating that they felt like their program leaders were more autonomy supportive with regards to their dietary change. Being autonomy supportive relates to recognizing and supporting the participants perspectives and initiatives, while providing positive reinforcements, many options and relevant information regarding changing ones diet, in addition to minimizing force, control and avoiding a "top-down" approach (Silva et al., 2008).

Current relevant research on formal support in relation to weight loss behaviors is very scarce. However, one recent study by Silva and colleagues (2010) found that persons who had participated in the experimental group of an intervention which focused on creating an autonomous perceived treatment climate, reported significantly greater weight loss and higher intensity of physical activity as well as higher levels of self-efficacy compared to the controls. This study did not investigate the influence of formal support on any of the other factors, but as the high maintenance degree participants displayed higher levels of perceived formal support, of maintenance self- efficacy and higher levels of physical activity, one can assume that the results of this study are in accordance with the findings by Silva and colleagues, or at least that these factors appear to display a reciprocal relationship.

Considering that the high maintenance degree participants also displayed a higher level of autonomous motivation for healthy eating, the results appear supportive of study which found that participants in a weight reduction program who perceived their program provider to be autonomy supportive reported more autonomous reasons for participating in a

weight loss program, which was associated with better exercise and weight loss over the subsequent two years (Williams et al., 1996).

#### *5.2.1.6 Informal support*

There were two constructs aimed at measuring informal support, where one related to the participants perception of having people around which provided love and care (emotional informal support), and the other related to perceived undermining of the participants healthy diet by people within their social network (dietary informal support), for example by offering them food they tried to limit the intake of. When comparing the low- and high maintenance degree participants, the high maintenance degree participants reported higher levels of both emotional and dietary informal support, which also were significantly different from the levels reported by the low maintenance degree participants. This indicates that the participants with a high maintenance degree of a healthy diet felt to a greater extent that they had people around them which provided them with love and affection, as well as perceiving less dietary undermining by people in their social network. One cannot conclusively say that informal support is an important factor in relation to maintaining a healthy diet for the participants in this study, but the fact that there was a significant difference between the high and low maintenance degree, particularly with regards to emotional informal support which was significant on a more stringent level than for dietary informal support, opens up for the possibility that it is in fact an important aspect with regards to maintaining a healthy diet.

These findings are in corroboration with the discoveries made by Anderson and colleagues (2007), where social support were highly associated to eating a low fat, high fiber and high fruit and vegetable diet. The results are also in support of the findings by Powers and colleagues (2008) where participants in their study reported significantly greater weight loss when they perceived their family and friends as being autonomy supportive of their weight loss efforts. Furthermore, the results favorably compare to findings by Hindle and Carpenter (2011), who qualitatively investigated the experiences of successful weight maintainers, and found that the availability of social support was considered as a key feature for the participants who were able to lose weight and maintain that weight loss. Lastly, Phelan, Wing, Loria, Kim, and Lewis (2010) investigated predictors of weight loss maintenance in a biracial cohort of young adults and found that increase of received emotional support during the maintenance period were subsequently associated with higher degree of successful weight loss maintenance. This is also in support of the findings made by Elfhag and Rössner (2005)

from their extensive review, which revealed informal support as a significant predictor of both initial weight loss attempts as well as long term maintenance.

This notion is in further corroboration of the findings by Rothman and associates (2008), stating that the absence of social support or the presence of unsupportive others greatly hinder a person's ability to sustain a behavior change over time, hence social support seems to be essential in maintaining a healthy diet.

#### *5.2.1.7 Degree of goal attainment*

The indicator intended to measure degree of goal attainment was comprised of one attitude statement, where the respondents were to specify on a 6-point Likert-scale to what degree they felt like they had achieved the goals which they put forward at the initiation of the last weight reduction program they participated in.

The high maintenance degree participants displayed a significantly higher degree of goal attainment than the low maintenance degree participants. This might indicate that the high maintenance degree participants had more realistic outcome expectancies and put forward more realistic goals at the initiation of the weight reduction program, as this seems to be important in relation to successfully maintaining a health behavior, like maintenance of a healthy diet (Rothman, 2000). It might also suggest that they have worked harder and put more effort into reaching their goals than the participants with a low maintenance degree.

These findings are in support of the evidence which suggests that people who have realistic outcome expectancies or goals, are more likely to be successful at weight loss maintenance, since they are more likely to reach their goal, which in turn will warrant sustained maintenance of a new pattern of behavior (Baumeister & Vohs, 2011; Byrne et al., 2003; Elfhag & Rössner, 2005; Jeffrey et al., 1998; Linde et al., 2005). Degree of goal attainment was also found to be a significant predictor of maintenance degree of a healthy diet, which is in line with previous findings on degree of goal attainments contribution to weight loss maintenance (Byrne et al., 2003; Linde et al., 2005), indicating that it is also an important factor in maintaining a healthy diet.

#### 5.2.1.8 Nutrition Literacy

A systematic research of the literature revealed that nutrition literacy amongst weight reduction program participants has most likely never been investigated. Still, the fact that low levels of nutrition literacy has been associated with having an unhealthy diet (Zoellner et al., 2009), strongly indicate that investigations of whether levels of nutrition literacy are associated with successful maintenance of a healthy diet could be of significant importance, particularly with regards to weight reduction program participants.

All maintenance degrees displayed a similar pattern with regards to the *FNL*, *INL* and *CNL<sub>scientific</sub>* construct, where the participants scored highest on the *FNL* construct with slightly lower values for *INL*, and lower still for *CNL<sub>scientific</sub>*. For *CNL<sub>pseudoscientific</sub>*, the pattern differed between maintenance degrees.

#### *Functional nutrition literacy*

Functional nutrition literacy refers to a person's ability to read and understand basic nutrition information. The total study sample had the highest score on *FNL* out of all the nutrition literacy constructs, which is not surprising as this is considered the lowest level within the nutrition literacy hierarchy, requiring only basic cognitive and social skills related to comprehension of nutrition information (Nutbeam, 2009). When comparing the low- and high maintenance degree participants, there was a significant difference between the levels, with the high maintenance degree participants displaying a higher level of *FNL*, indicating that they had a greater ability to receive and internalize nutrition information.

#### *Interactive nutrition literacy*

Interactive nutrition literacy refers to a person's ability to obtain and use nutrition information in a health promoting manner. Looking at the total sample score on *INL*, it is lower than that of *FNL*, which is not unexpected, as this level involves more advanced skills and reasoning ability than *FNL*. Comparing the low- and high maintenance degree participants, the high maintenance degree participants displayed a significantly higher level of *INL* than the low maintenance degree, indicating that the high maintenance degree participants had greater

ability to perform independent and informed decisions based on obtained nutritional knowledge, as well as to use that knowledge actively to maintain and benefit their own health.

### *Critical nutrition literacy*

*CNLscientific* refers to a person's ability to critically evaluate nutrition information. The total sample score for *CNLscientific* represented the lowest mean score out of all nutrition literacy constructs, which was expected, as this level of nutrition literacy requires the greatest amount of cognitive and social skills as well as the greatest degree of empowerment and autonomy according to Nutbeam (2009). When comparing the low- and high maintenance degree participants there was a significant difference between their scores, indicating that the high maintenance degree participants has a greater ability to use critical thinking when seeking, analyzing and evaluating nutritional information.

*CNLpseudoscientific* was aimed at measuring the participant's degree of trust in pseudoscientific nutrition information sources. This was actually the construct that the low maintenance degree participants scored highest on out of all the nutrition literacy constructs, even *FNL*. The *FNL* construct measures a person's ability to read and understand nutrition information, while the *CNLpseudoscientific* construct relates to the trust one places in pseudoscientific nutrition information sources, like the media and alternative medicine therapists (Goldacre, 2008; Park, 2000). Hence, these results indicate that the participants who displayed a low degree of maintenance of a healthy diet had a relatively higher trust in pseudoscientific information sources than the high maintenance degree participants, but more importantly, the results suggests that this trust exceeds their capacity to read and comprehend nutrition information. In comparison, for the high maintenance degree participants, the score on *CNLpseudoscientific* was the second lowest with regards to all the nutrition literacy constructs, in addition to being significantly different from the score displayed by the low maintenance degree participants. Hence, the high maintenance degree participants were generally less trustworthy of these pseudoscientific nutrition information sources, in addition to scoring higher on *CNLscientific*, than the low maintenance degree participants, indicating that they might be more critical when evaluating sources of information. This might be valuable with regards to maintaining a healthy diet, as they might be less likely to try fad diets or extreme eating regimens if they were to try a different dietary approach than that taught in the weight reduction program. These types of dietary regimens are often presented and



advertised for in the media, and they often prove too restrictive to be successfully maintained in the long run, like very low calorie diets (Franz et al., 2007).

Dalane (2011) investigated nutrition literacy amongst nursing student and Hjartåker (2011) looked at nutrition literacy levels amongst senior year high school students. Kjøllesdal (2009) aimed at investigating nutrition literacy in a sample representative of the general population. Keeping this in mind when looking at previously obtained results from utilization of the NLQ in Norway, the sample of this study generally displayed a higher level of *FNL*, *INL* and *CNL<sub>scientific</sub>* than the samples of the other studies (Dalane, 2011; Hjartåker, 2011; Kjøllesdal, 2009), which indicates that the sample of this study had a higher level of mental and social skills related to ,as well as greater ability to, access, understand and use nutrition information in a way which would benefit their own health. This is not surprising in relation to the general population and the high school students, as the sample in this study had undergone at least one weight reduction program where the emphasis was on enabling the participants to sensibly change their diet, by providing them with nutritional knowledge, sensible eating strategies and food preparation skills. Nursing students do have compulsory food and nutrition courses; as such it is not surprising that their nutrition literacy levels are closest to that of this study in relation to the other studies. With regards to *CNL<sub>pseudoscientific</sub>*, this was a new construct which emerged in this study; hence there exists no comparable results for these phenomena.

#### *5.2.1.9 Associations vs. predictions*

Even though motivation, goal attainment and maintenance self-efficacy were the only variables found to significantly predict maintenance degree of a healthy diet, this does not exclude the possibility of the other variables substantially influencing maintenance of a healthy diet indirectly. The fact that the high maintenance degree participants displayed significantly higher levels of almost all of the independent variable measures as well as for physical activity, provides us with an indication that other factors than the predictors revealed might be of significant importance in relation to maintaining a healthy diet, e.g. by indirectly influencing maintenance degree of a healthy diet through the predictor variables.

For example, it has been suggested that an autonomy supportive environment is linked to and influences self-efficacy beliefs as well as autonomous motivation (Teixeira et al., 2011). Bearing in mind that the high maintenance degree participants displayed a higher

degree of formal- and informal support, as well as autonomous motivation and maintenance self-efficacy, these variable associations might absolutely exist in the present study.

It is also worth mentioning that having higher levels of self-efficacy have been linked to increased goal focus (Luszczynska & Schwarzer, 2008), by increasing the efforts put into reaching the goal (Elfhag & Rössner, 2005). Furthermore, a study by Schwarzer and Renner (2000) investigated coping self-efficacy in relation to different dietary behaviors, and discovered that it did not predict any dietary behaviors directly, but was positively associated with a high fiber intake by being a significant predictor of intention. In addition, Baker and Brownell (2000) have theorized that motivation and self-efficacy levels could facilitate the relationship between exercise behaviors and continued commitment and compliance with ones dietary regimen, a suggestion which has received empirical support (Annesi & Unruh, 2008).

Lastly, Nutbeam (2009) argues that autonomy is related to nutrition literacy, where each subsequent level of nutrition literacy require additional skills and knowledge, in addition to a greater degree of empowerment and autonomy. Autonomous motivation for a particular behavior or set of behaviors directly promotes autonomy in relation to that/those behaviors, and considering that the high maintenance degree participants displayed significantly higher levels of *FNL*, *INL* and *CNL<sub>scientific</sub>* as well as *autonomous motivation for healthy eating*, indicates that perhaps one or more nutrition literacy construct influences the levels of autonomous motivation.

As a result of these discoveries, thoughts were made on how the relationship between the factors investigated could have been done so in a different and more comprehensive manner, to be able to elucidate the possible associations between all of the variables. Consequently, it was believed that structural equation modeling could have been very appropriate to use in this type of study, as it would enable for investigations of the reciprocal and bidirectional influences among the different factors, and not just the contribution of a set of independent variables to a dependent variable (Tabachnick & Fidell, 2007). This type of analysis would be more beneficial than some of the methods used in this study, as it would provide a more correct image of the web of influences between these factors, as well as identification of factors which would be most valuable in addressing to improve maintenance levels of behaviors associated with weight loss and weight loss maintenance. However, the analysis tool used in this study required a separate add-on program to be able to perform structural equation modeling, and this was not available for student to utilize.

### *5.2.2 Limitations of the study*

There are several limitations related to this study; some associated with the study itself and some with the previous research used as a basis of comparison, and each will be explained in this section of the thesis.

One of this study's limitations was the nature of the sample similarities. The study sample is relatively heterogeneous with regards to age, but regarding other sociodemographic factors, like sex, income and education, the study sample were very homogeneous. Furthermore, they were all current or former weight reduction program participants, which emphasize the fact that the results of this study most likely are not appropriate for generalization. Additionally, the very low response rate increases the chances of the results displaying a distorted picture of the actual target population, and as such decrease the strength of the results.

An important aspect to underline with regards to the cited studies is that they vary greatly in their study design, which might decrease the strength of comparability. For example, some studies estimate predictions based on only pre-treatment measurements (Teixeira et al., 2004a; Teixeira et al., 2004b; Teixeira et al., 2005), comparison of pre- and post-treatment measurements (Palmeira et al., 2007; Steptoe, Perkins-Porras, Rink, Hilton, & Cappuccio, 2004; Teixeira et al., 2010), baseline, post treatment and follow up measurements (Pasman et al., 1999; Shannon, Bagby, Wang, & Trenkner, 1990) or cross-sectional measurements (Sporny & Contento, 1995; Watters & Satia, 2009). Most likely, the longitudinal studies, with measurements taken at several points in time during the behavior change phase (e.g. initiation-, action- and maintenance phases) provide more solid evidence regarding predictors and associations, as the same measures have been taken at several points in time and can therefore also give an estimation of changes in these factors, as well as the establish the direction of causality of the variables, in addition to revealing pretreatment and post treatment predicting factors.

With regards to the previous research which the results have been compared to, there were very few studies which were identical to this study in relation to the end measure; a composite measure of maintenance of a healthy diet. Therefore, it was decided to include studies aimed at investigating similar factors as that in this study, but associated with a) specific components of a healthy diet (like fruit and vegetable consumption and lower fat intake) or b) weight loss maintenance. The reasons for this are explained in the following three subchapters.

### *5.2.2.1 Dietary behavior studies*

It is important to note that none of the studies explored in relation to psychosocial factors and dietary behavior, specified that they had been conducted with people enrolled in a weight reduction program, but rather chiefly in the general adult population. Hence, there might be different predictors related to maintenance of a healthy diet after initiation of a weight reduction program than for that of adults not having participated in such programs. However, as the dependent variable, *maintenance degree of a healthy diet*, is a composite measure of maintenance of a healthy diet, including measures like eating the recommended fruit and vegetable serving, and limiting intake of fatty foods, it was believed that the results could be comparable to these previous studies, even though they were not conducted within the same context as this study. Still, these studies have only looked at individual dietary behaviors associated with having a healthy diet, e.g. consumption of fruit, vegetables, fruit and fat, rather than maintaining an overall healthy diet as in this study. Nevertheless, as items measuring similar dietary behaviors as that of those studies were included in this study's dependent variable, it was believed that they were adequately comparable.

### *5.2.2.2 Weight loss maintenance studies*

Considering comparison with weight loss maintenance studies as relevant for this study was due to the fact that most studies which have aimed at investigating similar factors to that of this study in relation to weight reduction program attendance, have been done so with maintenance of weight loss as the end measure (Byrne et al., 2004; Carraca et al., 2011; Edell, Edington, Herd, O'Brien, & Witkin, 1987; McGuire et al., 1999; Palmeira et al., 2007; Teixeira et al., 2004a; Teixeira et al., 2004b; Teixeira et al., 2005; Williams et al., 1996), rather than maintenance of a healthy diet. Hence, their dependent variable is the result of a series of enacted behaviors, rather than a specific behavior in itself which is the case for this study. However, it was believed that they could be compared to the results of this study, assuming that their assessment of the factors similar to those in this study involved some investigation of eating behavior in relation to those factors and that the weight loss mirrored some degree of dietary behavior modification.

### *5.2.2.3 Weight loss maintenance vs. maintenance of a healthy diet*

An additional consideration which is important to make is the time definition discrepancy between maintenance of a healthy diet and weight loss maintenance. For the purpose of this study, the maintenance phase of continuing with a healthy diet was defined as initiated after commencement of the weight reduction program, hence participants who were still participating in the program were considered to be in the healthy diet maintenance phase, whereby this would not be the case in the studies investigating weight loss maintenance. The time aspect definition of the weight loss maintenance phase is somewhat illusive, as some researchers indicate that it begins at around the six month mark after initiating weight loss efforts (James et al., 2000; Ulen et al., 2008), while others define it as commencing twelve months after weight loss initiation (Douketis, Macie, Thabane, & Williamson, 2005). However, independent of this somewhat vague definition, it is clear that weight loss maintenance is not begun immediately after weight loss initiation.

### *5.2.3 Strengths of the study*

The strengths of this study are believed to be embedded in the theoretical framework and measurement tools utilized. Several components from different dominant theories were used in this study, based on research on what theoretical concepts which seem to be associated with successful weight loss maintenance and its related behaviors. This is in support of the suggestions by Baranowski and colleagues (2003) and Eccles and Wigfield (2002) who have argued that integration of essential concepts from different theoretical frameworks to create overarching models for use in dietary behavioral research with specific populations, could be very useful. In addition, for most theoretical concept measurements included in this study, previously developed and theoretically derived questionnaires were utilized, which increases the chance of measuring what one actually wants to measure, as well as measuring all aspects of it. Another feature that might positively influence the strength of the study was that the factor- and reliability measurements generally revealed what was estimated as satisfactory factor structures and  $\alpha$ -values.

## **6.0 Conclusion and implications**

### **6.1 Conclusion**

The purpose of the present study was to identify factors which may be important in successfully maintaining a healthy diet after weight reduction program participation.

In conclusion, the findings indicate that degree of goal attainment, autonomous motivation for healthy eating and maintenance self-efficacy were possible important determinants for successful maintenance of a healthy diet, as exhibiting higher levels of these phenomena predicted a higher maintenance degree of a healthy diet. This suggests that if the dietary behaviors related to having a healthy diet were not autonomously motivated, if one felt incapable of controlling one's eating in response to high risk situations, if one felt unable to get back on track after a lapse, and if one felt unsatisfied with the results obtained in relation to one's goals, it would almost certainly impede a person's ability to maintain a healthy diet.

Additionally, in comparison to the participants who exhibited a low degree of maintenance of a healthy diet, the high maintenance degree participants, perceived their program leaders as more autonomy supportive; they received more support from their close social network; and they reported a greater ability to obtain, read, understand and use nutrition information in a health promoting manner, as well as greater ability to critically evaluate nutrition information.

This may indicate that there exist many factors which are important for the maintenance of a healthy diet, and that the majority of these factors most likely exhibit a web of relationship with each other. Additionally, there appears to be very similar psychosocial factors which can be considered important for maintenance of a healthy diet as that of weight loss maintenance, probably due to the significant role of having a healthy diet plays in successfully maintaining weight loss.

In some manner these findings are encouraging, as the factors which differ are in fact modifiable, and can thus be specifically targeted in weight reduction programs. As such, emphasis should be placed on enabling enhancement of the psychosocial factors which seems to be important in maintaining healthy dietary behaviors associated with successful weight loss and weight loss maintenance. This will facilitate the optimization of weight reduction programs efficacy for each participant through a better correspondence between program content and participants' measured psychosocial characteristics, which have been called for by previous researchers (Teixeira et al., 2005; Wadden, Brownell, & Foster, 2002).

## **6.2 Implications**

Despite the limitations presented in Chapter 5.2.2, it is believed that the results from the present study do provide new and valuable insight into possible factors important in maintaining a healthy diet during and after weight reduction program participation.

Firstly, the findings indicate that degree of goal attainment; autonomous motivation and maintenance self-efficacy were possible important determinants of successful maintenance of a healthy diet. This can have several valuable implications, which are clarified below.

Considering that degree of goal attainment appeared to be a significant determinant for the ability to maintain a healthy diet, the benefits of having realistic outcome expectancies and goals should be emphasized during weight reduction program participation. Additionally, as these goals are often a manifestation of desired weight loss, focus should be placed on increasing participants' satisfaction with their body weight at treatment completion. This could perhaps increase the satisfaction with the achieved results from a weight reduction program, which may possibly increase the chances of maintenance of weight loss behaviors, like having a healthy diet.

With regards to the apparent importance of autonomous motivation in relation to maintenance of a healthy diet, emphasis should be made on training and encouraging weight reduction program leaders to have an autonomy promoting teaching style to aid in the development of autonomously motivated healthy dietary behaviors among the participants.

Additionally, concerning the observable significance of maintenance self-efficacy, emphasis should be placed on teaching weight reduction program participants' effective coping strategies to enable them to successfully deal with high risk situations, as well as how to handle a lapse if it occurs and how to avoid a dichotomous thinking pattern in relation to that lapse. If the participants manage to interpret a lapse as a learning experience instead of a full blown relapse, it will almost certainly increase the chances of them successfully managing to maintain their healthy diet.

Moreover, some valuable implications can be drawn based on the obtained nutrition literacy findings. The differences in nutrition literacy levels between low- and high maintenance degree participants indicate that the high maintenance degree participants in all likelihood might comprehend the nutrition information provided during the course of a weight reduction program better, which possibly may be significantly associated with the ability to maintain a healthy diet. The fact that written nutrition information is the main source of

dietary guidelines and recommendations the participants have to rely on outside of the programs group sessions, emphasizes the importance of adequate levels of nutrition literacy among the participants to have the ability to understand and internalize the nutrition information, as well as using that obtained knowledge actively to maintain a healthy diet. This may imply that one size might definitely not fit all, and that particularly written nutrition information provided during course participation should be adapted to the nutrition literacy levels of the participants. To facilitate this type of program tailoring one could possibly implement nutrition literacy assessment of all new participants at the initiation of a weight reduction program to be able to subsequently provide them with written dietary information corresponding to their individual level of nutrition literacy.

A thorough investigation of relevant literature led to the belief that maintenance of dietary behavior among weight reduction program participants rarely has been investigated in the same manner as that which has been done in this study. Considering that the majority of the literature is in agreement on weight reduction program outcomes being modest at best, particularly in relation to maintenance of weight loss, indicates that studies similar to the present study, investigating factors associated with specific weight loss- and weight loss maintenance behaviors, should be a research priority. This can be done by further investigations of psychosocial variables which enable for prediction of behaviors associated with weight loss and weight loss maintenance, as it can facilitate the development of more effective and target-specific weight reduction programs.

The results also suggest that nutrition literacy potentially could be a very important factor to study within the weight loss domain, and that it should be considered in the development of weight reduction programs and its corresponding nutritional material. The present study is believed to be the first of its kind to investigate nutrition literacy levels in weight reduction program participants. This, and the fact that the results obtained were very interesting, warrants the need for more research on nutrition literacy with this target group and within this context, as nutrition literacy in all probability might be one of the many factors important in successful maintenance of a healthy diet.

With regards to how future research should be analyzed, structural equation modeling presents itself as one of the most appropriate and sophisticated analysis techniques for these types of investigations (Tabachnick & Fidell, 2007). Baranowski and colleagues (1999) strongly advocate the use of this type of analysis within dietary behavior research, as it will probably result in better models of predictability of dietary behaviors. This notion was based on their findings that whole models of dietary behavior predictability, developed from many



of the dominant health behavior theories, like SCT, HBM, TTM, generally displayed low predictiveness, with  $R^2 < 0.30$  (ibid). This limited predictiveness which the models displayed suggested that there is a need for new and improved models to be assessed for predictability in relation to dietary behavior (ibid). As the  $R^2$ -value obtained in this study was almost twice that obtained in Baranowski's review, even though the  $R^2$ -value does not reflect the predictiveness of the whole model, only parts of it, it was believed that the construct variables in this study could enable for a better predictive model than those tested by Baranowski and colleagues.



## 7.0 References

- Aarnes, S. B. (2009). *Utvikling og utprøving av et spørreskjema for å kartlegge nutrition literacy: assosiasjon til kjønn, utdanning og fysisk aktivitetsnivå*. Master, Akershus University College, Lillestrøm.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Alver, B. G., & Øyen, Ø. (1997). *Forskningsetikk i forskerhverdag: vurderinger og praksis*. Oslo: Tano Aschehoug.
- Anderson, E., Winett, R., & Wojcik, J. (2007). Self-regulation, self-efficacy, outcome expectations, and social support: Social cognitive theory and nutrition behavior. *Annals of Behavioral Medicine*, 34(3), 304-312.
- Anderson, J. W., Vichitbandra, S., Qian, W., & Kryscio, R., J. (1999). Long-Term Weight Maintenance after an Intensive Weight-Loss Program. *Journal of the American College of Nutrition*, 18(6), 620-627.
- Andrade, A. M., Coutinho, S. R., Silva, M. N., Mata, J., Vieira, P. N., Minderico, C. S., . . . Teixeira, P. J. (2010). The effect of physical activity on weight loss is mediated by eating self-regulation. *Patient Education and Counseling*, 79(3), 320-326.
- Annesi, J. J., & Unruh, J. L. (2008). Relations of Exercise, Self-Appraisal, Mood Changes and Weight Loss in Obese Women: Testing Propositions Based on Baker and Brownell's (2000) Model. *The American Journal of the Medical Sciences*, 335(3), 198-204.
- Annis, H. M. (1986). A relapse prevention model for treatment of alcoholics. In W. R. & N. Heather (Eds.), *Treating addictive behaviors: Processes of change*. (pp. 407-433). New York, NY, US: Plenum PressMiller.
- Baker, C. W., & Brownell, K. D. (2000). Physical activity and maintenance of weight loss: physiological and psychological mechanisms. In C. Bouchard (Ed.), *Physical activity and obesity* (pp. 311-328). Champaign, Ill.: Human Kinetics.
- Baldwin, A. S., Rothman, A. J., Hertel, A. W., Linde, J. A., Jeffery, R. W., Finch, E. A., & Lando, H. A. (2006). Specifying the determinants of the initiation and maintenance of behavior change: An examination of self-efficacy, satisfaction, and smoking cessation. *Health Psychology*, 25(5), 626-634.

- Ball, G. D. C., Gingras, J. R., Fimrite, A., Villettard, K., Kayman, S., & McCargar, L. J. (1999). Weight Relapsers, Maintainers, and Controls: Metabolic and Behavioural Differences. *Canadian Journal of Applied Physiology*, 24(6), 548-558.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, 191 - 215.
- Bandura, A. (1989). Human Agency in Social Cognitive Theory. *American Psychologist*, 44(9), 1175-1184.
- Bandura, A. (2000). Cultivate self-efficacy for personal and organizational effectiveness. In E. A. Locke (Ed.), *The Blackwell handbook of principles of organizational behavior*. Malden, Mass.: Blackwell.
- Baranowski, T., Cullen, K. W., & Baranowski, J. (1999). Psychosocial correlates of dietary intake: Advancing dietary intervention. *Annual Review of Nutrition*, 19(1), 17-40.
- Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., & Baranowski, J. (2003). Are Current Health Behavioral Change Models Helpful in Guiding Prevention of Weight Gain Efforts? *Obesity*, 11(10S), 23S-43S.
- Barte, J. C. M., Ter Bogt, N. C. W., Bogers, R. P., Teixeira, P. J., Blissimer, B., Mori, T. A., & Bemelmans, W. J. (2010). Maintenance of weight loss after lifestyle interventions for overweight and obesity, a systematic review. *Obesity Reviews*, 11(12), 899-906.
- Baumeister, R. F., Gailliot, M., DeWall, C. N., & Oaten, M. (2006). Self-Regulation and Personality: How Interventions Increase Regulatory Success, and How Depletion Moderates the Effects of Traits on Behavior. *Journal of Personality*, 74(6), 1773-1802.
- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: how and why people fail at self-regulation*. San Diego, California: Academic Press.
- Baumeister, R. F., & Vohs, K. D. (2011). *Handbook of self-regulation: research, theory, and applications*. New York: Guilford Press.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
- Birch, C. D., Stewart, S. H., & Brown, C. G. (2007). Exploring differential patterns of situational risk for binge eating and heavy drinking. *Addictive Behaviors*, 32(3), 433-448.
- Black, D. R., Gleser, L. J., & Kooyers, K. J. (1990). A meta-analytic evaluation of couples weight-loss programs. *Health Psychology*, 9(3), 330-347.

- Blanchard, C. G., Albrecht, T. L., Ruckdeschel, J. C., Grant, C. H., & Hemmick, R. M. (1995). The Role of Social Support in Adaptation to Cancer and to Survival. *Journal of Psychosocial Oncology*, 13(1-2), 75-95.
- Breslin, F., Sobell, L. C., Sobell, M. B., & Agrawal, S. (2000). A comparison of a brief and long version of the Situational Confidence Questionnaire. *Behaviour Research and Therapy*, 38(12), 1211-1220.
- Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality*, 54(1), 106-148.
- Brownell, K. D. (1999). The central role of lifestyle change in long-term weight management. *Clinical Cornerstone*, 2(3), 43-51.
- Brownell, K. D., & Stunkard, A. (2002). Goals of Obesity Treatment. In C. G. Fairburn & K. D. Brownell (Eds.), *Eating disorders and obesity: a comprehensive handbook* (pp. 507-511). New York: Guilford Press.
- Butryn, M. L., Phelan, S., Hill, J. O., & Wing, R. R. (2007). Consistent Self-monitoring of Weight: A Key Component of Successful Weight Loss Maintenance. *Obesity*, 15(12), 3091-3096.
- Byrne, S., Cooper, Z., & Fairburn, C. (2003). Weight maintenance and relapse in obesity: a qualitative study. *International Journal of Obesity and Related Metabolic Disorders*, 27(8), 955-962.
- Byrne, S., Cooper, Z., & Fairburn, C. (2004). Psychological predictors of weight regain in obesity. *Behavior Research Therapy*, 42, 1341 - 1356.
- Byrne, S. M. (2002). Psychological aspects of weight maintenance and relapse in obesity. *Journal of Psychosomatic Research*, 53(5), 1029-1036.
- Carraca, E. V., Tomas, R., Silva, M. N., Vieira, P. N., Sardinha, L. B., & Teixeira, P. J. (2011). Baseline behavioral and psychosocial predictors of attrition and long-term weight loss in a weight management program for overweight and obese women. *Obesity Reviews*, 12 Suppl.(1), 240.
- Catenacci, V. A., & Wyatt, H. R. (2007). The role of physical activity in producing and maintaining weight loss. *Nature Clinical Practice Endocrinology & Metabolism*, 3(7), 518-529.
- Christophersen, K.-A. (2009). *Databehandling og statistisk analyse med SPSS*. Oslo: Unipub.
- Clark, M. M., Abrams, D. B., Niaura, R. S., Eaton, C. A., & Rossi, J. S. (1991). Self-efficacy in weight management. *Journal of Consulting and Clinical Psychology*, 59(5), 739-744.

- Clausen, S.-E. (2009). *Multivariate analysemetoder for samfunnsvitere: med eksempler i SPSS*. Oslo: Universitetsforlaget.
- Cogan, J. C., & Ernsberger, P. (1999). Dieting, Weight, and Health: Reconceptualizing Research and Policy. *Journal of Social Issues*, 55(2), 187-205.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, N. J.: Laurence Erlbaum.
- Conner, M., & Norman, P. (2005). *Predicting health behaviour: research and practice with social cognition models*. Maidenhead: Open University Press.
- Constantino, M. J., Arnkoff, D. B., Glass, C. R., Ametrano, R. M., & Smith, J. Z. (2011). Expectations. *Journal of Clinical Psychology*, 67(2), 184-192.
- Corwin, R. L., & Grigson, P. S. (2009). Symposium Overview—Food Addiction: Fact or Fiction? *The Journal of Nutrition*, 139(3), 617-619.
- Crawford, D., Jeffery, R. W., & French, S. A. (2000). Can anyone successfully control their weight? Findings of a three year community-based study of men and women. *International Journal of Obesity and Related Metabolic Disorders*, 24(9), 1107-1110.
- Curioni, C. C., & Lourenco, P. M. (2005). Long-term weight loss after diet and exercise: a systematic review. *International Journal of Obesity and Related Metabolic Disorders*, 29(10), 1168-1174.
- Dalane, J. Ø. (2011). *Nutrition literacy hos sykepleierstudenter*. Master, Høgskolen i Akershus, Lillestrøm.
- Dalle Grave, R., Calugi, S., Magri, F., Cuzzolaro, M., Dall'Aglio, E., Lucchin, L., . . . Marchesini, G. (2004). Weight Loss Expectations in Obese Patients Seeking Treatment at Medical Centers. *Obesity*, 12(12), 2005-2012.
- de Ridder, D. T. D., & de Wit, J. B. F. (2008). Self-Regulation in Health Behavior: Concepts, Theories, and Central Issues. In D. T. D. de Ridder & J. B. F. de Wit (Eds.), *Self-Regulation in Health Behavior* (pp. 1-23): John Wiley & Sons, Ltd.
- Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125(6), 627-668.
- Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, 53(6), 1024-1037.

- Deci, E. L., & Ryan, R. M. (2008). Self-Determination Theory: A Macrotheory of Human Motivation, Development, and Health. *Canadian Psychology*, 49(3), 182-185.
- DeVellis, R. F. (2012). *Scale development: theory and applications*. Thousand Oaks, California: Sage.
- DeWalt, D. A., Berkman, N. D., Sheridan, S., Lohr, K. N., & Pignone, M. P. (2004). Literacy and Health Outcomes. *Journal of General Internal Medicine*, 19(12), 1228-1239.
- Diamond, J. J. (2007). Development of a reliable and construct valid measure of nutritional literacy in adults. *Nutrition Journal*, 6(1), 5.
- DiClemente, C. C., Carbonari, J. P., Montgomery, R. P., & Hughes, S. O. (1994). The Alcohol Abstinence Self-Efficacy scale. *Journal of studies on alcohol*, 55(2), 141-148.
- Donnelly, J. E., Smith, B., Jacobsen, D. J., Kirk, E., DuBose, K., Hyder, M., . . . Washburn, R. (2004). The role of exercise for weight loss and maintenance. *Best Practice & Research Clinical Gastroenterology*, 18(6), 1009-1029.
- Douketis, J. D., Macie, C., Thabane, L., & Williamson, D. F. (2005). Systematic review of long-term weight loss studies in obese adults: clinical significance and applicability to clinical practice. *International Journal of Obesity*, 29(10), 1153-1167.
- Drageset, S., & Ellingsen, S. (2009). Forståelse av kvantitativ helseforskning - en introduksjon og oversikt. *Nordisk Tidsskrift for Helseforskning*, 5(2), 100-113.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals *Annual Review of Psychology*, 53(1), 109-132.
- Edell, B. H., Edington, S., Herd, B., O'Brien, R. M., & Witkin, G. (1987). Self-efficacy and self-motivation as predictors of weight loss. *Addictive Behaviors*, 12(1), 63-66.
- Eikemo, T. A., & Clausen, T. H. (2007). *Kvantitativ analyse med SPSS: en praktisk innføring i kvantitative analyseteknikker*. Trondheim: Tapir akademisk forlag.
- Elfeddali, I., Bolman, C., Candel, M. J. J. M., Wiers, R. W., & De Vries, H. (2011). The role of self-efficacy, recovery self-efficacy, and preparatory planning in predicting short-term smoking relapse. *British Journal of Health Psychology*, no-no.
- Elfhag, K., & Rössner, S. (2005). Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obesity Reviews*, 6, 67-85.
- Fairburn, C. G., Hay, P. J., & Welch, S. L. (1993). Binge eating and bulimia nervosa: distribution and determinants. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: nature, assessment and treatment* (pp. 123-143). New York: Guilford Press.
- Finbråten, H., & Pettersen, K. S. (2009). Kunnskap er egenmakt. *Sykepleien*, 97(5), 60-63.

- Fisher, R. J. (1993). Social Desirability Bias and the Validity of Indirect Questioning. *Journal of Consumer Research*, 20(2), 303-315.
- Fortier, M. S., Sweet, S. N., O'Sullivan, T. L., & Williams, G. C. (2007). A self-determination process model of physical activity adoption in the context of a randomized controlled trial. *Psychology of Sport and Exercise*, 8(5), 741-757.
- Foster, G. D. (2002). Goals and strategies to improve behavior-change effectiveness. In D. H. Bessesen & R. F. Kushner (Eds.), *Evaluation and management of obesity* (pp. 29-32). Philadelphia: Hanley & Belfus.
- Foster, G. D., Makris, A. P., & Bailer, B. A. (2005). Behavioral treatment of obesity. *The American Journal of Clinical Nutrition*, 82(1), 230S-235S.
- Foster, G. D., Phelan, S., Wadden, T. A., Gill, D., Ermold, J., & Didie, E. (2004). Promoting More Modest Weight Losses: A Pilot Study. *Obesity*, 12(8), 1271-1277.
- Franz, M. J., VanWormer, J. J., Crain, A. L., Boucher, J. L., Histon, T., Caplan, W., . . . Pronk, N. P. (2007). Weight-Loss Outcomes: A Systematic Review and Meta-Analysis of Weight-Loss Clinical Trials with a Minimum 1-Year Follow-Up. *Journal of the American Dietetic Association*, 107(10), 1755-1767.
- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health behavior and health education: theory, research, and practice*. San Francisco, California.: Jossey-Bass.
- Goldacre, B. (2008). *Bad science*. London: Fourth Estate.
- Gollwitzer, P. M., & Oettingen, G. (1998). The emergence and implementation of health goals. *Psychology & Health*, 13(4), 687-715.
- Grønmo, S. (2004). *Samfunnsvitenskapelige metoder*. Bergen: Fagbokforlaget.
- Guillaumie, L., Godin, G., & Vezina-Im, L.-A. (2010). Psychosocial determinants of fruit and vegetable intake in adult population: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 12.
- Halvorsen, K. (2002). *Forskningsmetode for helse- og sosialfag: en innføring i samfunnsvitenskapelig metode*. Oslo: Cappelen akademisk forlag.
- Haraldsen, G. (1999). *Spørreskjemametodikk: etter kokebokmetoden*. Oslo: Ad Notam Gyldendal.
- Haslam, D. W., & James, W. P. T. (2005). Obesity. *The Lancet*, 366(9492), 1197-1209.
- Haus, G., Hoerr, S. L., Mavis, B., & Robison, J. (1994). Key modifiable factors in weight maintenance: Fat intake, exercise, and weight cycling. *Journal of the American Dietetic Association*, 94(4), 409-413.



- Heaney, C. A., & Israel, B. A. (2008). Social Networks and Social Support. In K. Glanz, B. K. Rimer & K. Viswanath (Eds.), *Health behavior and health education: theory, research, and practice* (4 ed., pp. 189-210). San Francisco, California: Jossey-Bass.
- Hellevik, O. (2002). *Forskningsmetode i sosiologi og statsvitenskap*. Oslo: Universitetsforlag.
- Hendershot, C., Witkiewitz, K., George, W., & Marlatt, G. A. (2011). Relapse Prevention for Addictive Behaviors. *Substance Abuse Treatment, Prevention, and Policy*, 6(1), 17.
- Hindle, L., & Carpenter, C. (2011). An exploration of the experiences and perceptions of people who have maintained weight loss. *Journal of Human Nutrition & Dietetics*, 24(4), 342-350.
- Hjartåker, H. B. (2011). *Nutrition literacy hos 10. klasseelever i en østlandskommune*. Master, Høgskolen i Oslo og Akershus, Kjeller.
- Huizinga, M. M., Beech, B. M., Cavanaugh, K. L., Elasy, T. A., & Rothman, R. L. (2008). Low Numeracy Skills Are Associated With Higher BMI. *Obesity*, 16(8), 1966-1968.
- Huizinga, M. M., Carlisle, A. J., Cavanaugh, K. L., Davis, D. L., Gregory, R. P., Schlundt, D. G., & Rothman, R. L. (2009). Literacy, numeracy, and portion-size estimation skills. *American journal of preventive medicine*, 36(4), 324-328.
- James, W. P. T., Astrup, A., Finer, N., Hilsted, J., Kopelman, P., Rössner, S., . . . Gaal, L. F. V. (2000). Effect of sibutramine on weight maintenance after weight loss: a randomised trial. *The Lancet*, 356(9248), 2119-2125.
- Jeffery, R. W., Epstein, L. H., Wilson, G. T., Drewnowski, A., Stunkard, A. J., & Wing, R. R. (2000). Long-term maintenance of weight loss: Current status. *Health Psychology*, 19(1, Suppl), 5-16.
- Jeffery, R. W., Forster, J. L., French, S. A., Kelder, S. H., Lando, H. A., McGovern, P. G., . . . Baxter, J. E. (1993a). The Healthy Worker Project: a work-site intervention for weight control and smoking cessation. *American Journal of Public Health*, 83(3), 395-401.
- Jeffery, R. W., Wing, R. R., Thorson, C., Burton, L. R., Raether, C., Harvey, J., & Mullen, M. (1993b). Strengthening behavioral interventions for weight loss: A randomized trial of food provision and monetary incentives. *Journal of Consulting and Clinical Psychology*, 61(6), 1038-1045.
- Jeffrey, R. W., Wing, R. R., & Mayer, R. R. (1998). Are smaller weight losses or more achievable weight loss goals better in the long term for obese patients? *Journal of Consulting and Clinical Psychology*; *Journal of Consulting and Clinical Psychology*, 66(4), 641-645.
- Johannessen, A. (2009). *Introduksjon til SPSS: versjon 17*. Oslo: Abstrakt forlag.

- Johnson, F., Pratt, M., & Wardle, J. (2011). Dietary restraint and self-regulation in eating behavior. *International Journal of Obesity*.
- Kahn, J. H. (2006). Factor Analysis in Counseling Psychology Research, Training, and Practice. *The Counseling Psychologist*, 34(5), 684-718.
- Karlsson, J., Persson, L. O., Sjostrom, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *International Journal of Obesity and Related Metabolic Disorders*, 24(12), 1715-1725.
- Kayman, S., Bruvold, W., & Stern, J. (1990). Maintenance and relapse after weight loss in women: behavioral aspects. *The American Journal of Clinical Nutrition*, 52(5), 800-807.
- Kirisci, L., Moss, H. B., & Tarter, R. E. (1996). Psychometric evaluation of the Situational Confidence Questionnaire in adolescents: Fitting a graded item response model. *Addictive Behaviors*, 21(3), 303-317.
- Kirk, S. F. L., Penney, T. L., McHugh, T. L., & Sharma, A. M. (2011). Effective weight management practice: a review of the lifestyle intervention evidence. *International Journal of Obesity*.
- Kirsch, I. S. (2001). *The International Adult Literacy Survey (IALS): Understanding What Was Measured*. Princeton, NJ: Educational Testing Service.
- Kjøllestad, J. G. (2009). *Utvikling og utprøving av et spørreskjema som måler grader av nutrition literacy*. Master, Høgskolen i Akershus, Lillestrøm.
- Klem, M. L., Wing, R. R., McGuire, M. T., Seagle, H. M., & Hill, J. O. (1997). A descriptive study of individuals successful at long-term maintenance of substantial weight loss. *American Journal of Clinical Nutrition*, 66(2), 239-246.
- Kline, P. (2000). *The handbook of psychological testing*. London: Routledge.
- Levesque, C. S., Williams, G. C., Elliot, D., Pickering, M. A., Bodenhamer, B., & Finley, P. J. (2007). Validating the theoretical structure of the Treatment Self-Regulation Questionnaire (TSRQ) across three different health behaviors. *Health Education Research*, 22(5), 691-702.
- Lichtman, S. W., Pisarska, K., Berman, E. R., Pestone, M., Dowling, H., Offenbacher, E., . . . Heymsfield, S. B. (1992). Discrepancy between Self-Reported and Actual Caloric Intake and Exercise in Obese Subjects. *New England Journal of Medicine*, 327(27), 1893-1898.

- Linde, J. A., Jeffery, R. W., Levy, R. L., Pronk, N. P., & Boyle, R. G. (2005). Weight loss goals and treatment outcomes among overweight men and women enrolled in a weight loss trial. *International Journal of Obesity and Related Metabolic Disorders*, 29(8), 1002-1005.
- Linde, J. A., Jeffery, R. W., Levy, R. L., Sherwood, N. E., Utter, J., Pronk, N. P., & Boyle, R. G. (2004). Binge eating disorder, weight control self-efficacy, and depression in overweight men and women. *International Journal of Obesity and Related Metabolic Disorders*, 28(3), 418-425.
- Linde, J. A., Rothman, A. J., Baldwin, A. S., & Jeffery, R. W. (2006). The impact of self-efficacy on behavior change and weight change among overweight participants in a weight loss trial. *Health Psychology*, 25(3), 282-291.
- Linné, Y., Hemmingsson, E., Adolfsson, B., Ramsten, J., & Rössner, S. (2002). Patient expectations of obesity treatment-the experience from a day-care unit. *International Journal of Obesity*, 26(5), 739-741.
- Luszczynska, A., Mazurkiewicz, M., Ziegelmann, J. P., & Schwarzer, R. (2007). Recovery self-efficacy and intention as predictors of running or jogging behavior: A cross-lagged panel analysis over a two-year period. *Psychology of Sport and Exercise*, 8(2), 247-260.
- Luszczynska, A., & Schwarzer, R. (2008). Social cognitive theory. In M. Conner & P. Norman (Eds.), *Predicting health behaviour: research and practice with social cognition models* (2 ed., pp. 127-169). Maidenhead: Open University Press.
- Luszczynska, A., & Sutton, S. (2006). Physical activity after cardiac rehabilitation: Evidence that different types of self-efficacy are important in maintainers and relapsers. *Rehabilitation Psychology*, 51(4), 314-321.
- Manger, T., Nordahl, T., & Hansen, O. (2012). *Motivasjon og mestring*. Oslo: Gyldendal akademisk.
- Margetts, B. M., Vorster, H. H., & Venter, C. S. (2003). Evidence-based nutrition - the impact of information and selection bias on the interpretation of individual studies. *South African Journal of Clinical Nutrition*, 16(3).
- Marlatt, G. A. (1996). Taxonomy of high-risk situations for alcohol relapse: evolution and development of a cognitive-behavioral model. *Addiction*, 91(12s1), 37-50.
- Marlatt, G. A., Baer, J. S., & Quigley, L. A. (1995). Self-efficacy and addictive behavior. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 289-315). New York, NY: Cambridge University Press; US.

- Marlatt, G. A., & George, W. H. (1984). Relapse Prevention: Introduction and Overview of the Model. *British Journal of Addiction*, 79(3), 261-273.
- McGuire, M. T., Wing, R. R., Klem, M. L., Lang, W., & Hill, J. O. (1999). What predicts weight regain in a group of successful weight losers? *Journal of Consulting and Clinical Psychology*, 67(2), 177-185.
- McLeroy, K. R., Gottlieb, N. H., & Heaney, C. A. (2001). Social Health. In M. P. O'Donnell & J. S. Harris (Eds.), *Health promotion in the workplace* (3 ed.). Albany, N.Y.: Delmar.
- Miller, P. J., Ross, S. M., Emmerson, R. Y., & Todt, E. H. (1989). Self-efficacy in alcoholics: Clinical validation of the situational confidence questionnaire. *Addictive Behaviors*, 14(2), 217-224.
- Miller, Y., & Dunstan, D. (2004). The effectiveness of physical activity interventions for the treatment of overweight and obesity and type 2 diabetes. *Journal of Science and Medicine in Sport*, 7(1 Supp), 52-59.
- Mosdøl, A., & Brunner, E. (2005). The science of epidemiology. In C. Geissler, H. J. Powers & J. S. Garrow (Eds.), *Human Nutrition* (pp. 553-572). Edinburgh: Elsevier Churchill Livingstone.
- Norwegian Institute of Public Health. (2011). Helsetilstanden i Norge: Overvekt og fedme Retrieved 17.04, 2012, from <http://www.fhi.no/artikler/?id=70834>
- NSD. (1997). *Forskning og personvern: orientering om sentrale lovbestemmelser for forskeres bruk av persondata*. Bergen: Norsk samfunnsvitenskaplig datatjeneste.
- Nutbeam, D. (2000). Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 259-267.
- Nutbeam, D. (2009). Defining and measuring health literacy: what can we learn from literacy studies? *International Journal of Public Health*, 54(5), 303-305.
- Nutbeam, D., Harris, E., & Wise, M. (2010). *Theory in a nutshell: a practical guide to health promotion theories*. Sydney: McGraw-Hill.
- Pallant, J. (2010). *SPSS survival manual: a step by step guide to data analysis using SPSS*. Maidenhead: McGraw-Hill.
- Palmeira, A., Teixeira, P., Branco, T., Martins, S., Minderico, C., Barata, J., . . . Sardinha, L. (2007). Predicting short-term weight loss using four leading health behavior change theories. *International Journal of Behavioral Nutrition and Physical Activity*, 4(1), 14.

- Park, R. L. (2000). *Voodoo science: the road from foolishness to fraud*. Oxford: Oxford University Press.
- Pasman, W. J., Saris, W. H., & Westerp-Plantenga, M. S. (1999). Predictors of Weight Maintenance. *Obesity Research*, 7, 43-50.
- Peeters, A., Barendregt, J. J., Willekens, F., Mackenbach, J. P., Mamun, A. A., Bonneux, L., . . . Group\*, D. C. o. M. R. (2003). Obesity in Adulthood and Its Consequences for Life Expectancy: A Life-Table Analysis. *Annals of Internal Medicine*, 138(1), 24-32.
- Pelchat, M. L. (2009). Food Addiction in Humans. *The Journal of Nutrition*, 139(3), 620-622.
- Pelletier, L. G., & Dion, S. C. (2007). An Examination of General and Specific Motivational Mechanisms for the Relations Between Body Dissatisfaction and Eating Behaviors. *Journal of Social and Clinical Psychology*, 26(3), 303-333.
- Pelletier, L. G., Dion, S. C., Slovinec-D'Angelo, M., & Reid, R. (2004). Why Do You Regulate What You Eat? Relationships Between Forms of Regulation, Eating Behaviors, Sustained Dietary Behavior Change, and Psychological Adjustment. *Motivation and Emotion*, 28(3), 245-277. doi: 10.1023/b:moem.0000040154.40922.14
- Perri, M. G., Nezu, A. M., McKelvey, W. F., Shermer, R. L., Renjilian, D. A., & Viegner, B. J. (2001). Relapse prevention training and problem-solving therapy in the long-term management of obesity. *Journal of Consulting and Clinical Psychology*, 69(4), 722-726.
- Perri, M. G., Nezu, A. M., Patti, E. T., & McCann, K. L. (1989). Effect of length of treatment on weight loss. *Journal of Consulting and Clinical Psychology; Journal of Consulting and Clinical Psychology*, 57(3), 450-452. doi: 10.1037/0022-006x.57.3.450
- Perri, M. G., Sears, S. F., & Clark, J. E. (1993). Strategies for Improving Maintenance of Weight Loss: Toward a continuous care model of obesity management. *Diabetes Care*, 16(1), 200-209.
- Pettersen, S. (2009). Kostholdsinformasjon og annen helseinformasjon. In A. Holthe & B. U. Wilhelmsen (Eds.), *Mat og helse i skolen. En fagdidaktisk innføring* (pp. 87-100). Bergen: Fagbokforlaget.
- Phelan, S., Wing, R. R., Loria, C. M., Kim, Y., & Lewis, C. E. (2010). Prevalence and Predictors of Weight-Loss Maintenance in a Biracial Cohort: Results from the Coronary Artery Risk Development in Young Adults Study. *American journal of preventive medicine*, 39(6), 546-554.
- Polivy, J., & Herman, C. P. (2000). The False-Hope Syndrome. *Current Directions in Psychological Science*, 9(4), 128-131.

- Powers, T. A., Koestner, R., & Gorin, A. A. (2008). Autonomy support from family and friends and weight loss in college women. *Families, Systems, & Health, 26*(4), 404-416.
- Preston, C. C., & Colman, A. M. (2000). Optimal number of response categories in rating scales: reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica, 104*(1), 1-15.
- Prochaska, J. O., Norcross, J. C., & DiClemente, C. C. (1994). *Changing for good*. New York: William Morrow and Company, Inc.
- Raymond, N. C., de Zwaan, M., Mitchell, J. E., Ackard, D., & Thuras, P. (2002). Effect of a very low calorie diet on the diagnostic category of individuals with binge eating disorder. *International Journal of Eating Disorders, 31*(1), 49-56.
- Renner, B., Kwon, S., Yang, B.-H., Paik, K.-C., Kim, S., Roh, S., . . . Schwarzer, R. (2008). Social-cognitive predictors of dietary behaviors in South Korean men and women. *International Journal of Behavioral Medicine, 15*(1), 4-13.
- Ringdal, K. (2007). *Enhet og mangfold: samfunnsvitenskapelig forskning og kvantitativ metode*. Bergen: Fagbokforlaget.
- Robertson, D. N., & Palmer, R. L. (1997). The prevalence and correlates of binge eating in a British community sample of women with a history of obesity. *International Journal of Eating Disorders, 22*(3), 323-327.
- Rogers, R. W. (1975). A Protection Motivation Theory of Fear Appeals and Attitude Change. *The Journal of Psychology, 91*(1), 93-114.
- Roos, G. (2006). Kropp, slanking og forbruk. SIFO-survey hurtigstatistikk 2006. Lysaker: Statens institutt for forbruksforskning.
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education & Behavior, 15*(2), 175-183.
- Rothman, A. J. (2000). Toward a theory-based analysis of behavioral maintenance. *Health Psychology, 19*(1, Suppl), 64-69.
- Rothman, A. J., Hertel, A. W., & Baldwin, A. S. (2008). Understanding the determinants of health behavior change: Integrating theory and practice. In J. Y. Shah & W. L. Gardner (Eds.), *Handbook of motivation science* (pp. 130-148). New York: Guilford Press.
- Rothman, R. L., Housam, R., Weiss, H., Davis, D., Gregory, R., Gebretsadik, T., . . . Elasy, T. A. (2006). Patient Understanding of Food Labels: The Role of Literacy and Numeracy. *American journal of preventive medicine, 31*(5), 391-398.

- Ryan, R., & Connell, J. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, 57, 749 - 761.
- Ryan, R., Frederick, C., Lepes, D., Rubio, N., & Sheldon, K. (1997). Intrinsic Motivation and Exercise Adherence. *International Journal of Psychology*, 28, 335 - 354.
- Ryan, R., Plant, R., & O'Malley, S. (1995). Initial motivations for alcohol treatment: relations with patient characteristics, treatment involvement and dropout. *Addictive Behaviors*, 20(3), 279 - 297.
- Ryan, R. M., & Deci, E. L. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55(1), 68-78.
- Ryan, R. M., & Deci, E. L. (2008). A Self-Determination Theory Approach to Psychotherapy: The Motivational Basis for Effective Change. *Canadian Psychology*, 49(3), 186-193.
- Ryan, R. M., & Grolnick, W. S. (1986). Origins and pawns in the classroom: Self-report and projective assessments of individual differences in children's perceptions. *Journal of Personality and Social Psychology*, 50(3), 550-558.
- Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2008). Facilitating health behaviour change and its maintenance: Interventions based on Self-Determination Theory. *The European Health Psychologist*, 10, 2-5.
- Sallis, J., Pinski, M., Grossman, R., Patterson, T., & Nader, P. (1988). The development of self-efficacy scales for health-related diet and exercise behaviours. *Health and Education Research*, 3.
- Sallis, J. F., Grossman, R. M., Pinski, R. B., Patterson, T. L., & Nader, P. R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine*, 16(6), 825-836.
- Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., . . . Bindman, A. B. (2002). Association of Health Literacy With Diabetes Outcomes. *The Journal of the American Medical Association*, 288(4), 475-482.
- Schulz, U., & Schwarzer, R. (2003). Social Support in Coping with Illness: The Berlin Social Support Scales (BSSS). *Diagnostica*, 49(2), 73-82.
- Schulz, U., & Schwarzer, R. (2004). Long-Term Effects of Spousal Support on Coping with Cancer After Surgery. *Journal of Social and Clinical Psychology*, 23(5), 716-732.

- Schwarzer, R. (1992). Self-efficacy in the adoption and maintenance of health behaviors: Theoretical approaches and a new model. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action*. (pp. 217-243). Washington, DC, US: Hemisphere Publishing Corp.
- Schwarzer, R., & Fuchs, R. (1996). Self-Efficacy and Health Behaviours. In M. Conner & P. Norman (Eds.), *Predicting health behaviour: Research and practice with social cognition models* (pp. 163-196). Maidenhead, BRK, England: Open University Press; England.
- Schwarzer, R., & Renner, B. (2000). Social-cognitive predictors of health behavior: Action self-efficacy and coping self-efficacy. *Health Psychology, 19*(5), 487-495.
- Schwarzer, R., & Renner, B. (2009). Health-Specific Self-Efficacy Scales. *Statistics, 5*, 1-21.
- Shaikh, A. R., Yaroch, A. L., Nebeling, L., Yeh, M.-C., & Resnicow, K. (2008). Psychosocial Predictors of Fruit and Vegetable Consumption in Adults: A Review of the Literature. *American journal of preventive medicine, 34*(6), 535-543.
- Shannon, B., Bagby, R., Wang, M. Q., & Trenkner, L. (1990). Self-efficacy: a contributor to the explanation of eating behavior. *Health Education Research, 5*(4), 395-407.
- Shaw, K. A., O'Rourke, P., Del Mar, C., & Kenardy, J. (2009). Psychological interventions for overweight or obesity. *Cochrane Database of Systematic Reviews 2009*(1).
- Shermer, M. (2002). *Why people believe weird things: pseudoscience, superstition, and other confusions of our time*. New York: Henry Holt.
- Sherwood, N. E., Jeffery, R. W., & Wing, R. R. (1999). Binge status as a predictor of weight loss treatment outcome. *International Journal of Obesity and Related Metabolic Disorders, 23*(5), 485-493.
- Silva, M., Markland, D., Minderico, C., Vieira, P., Castro, M., Coutinho, S., . . . Teixeira, P. (2008). A randomized controlled trial to evaluate self-determination theory for exercise adherence and weight control: rationale and intervention description. *BMC Public Health, 8*(1), 234.
- Silva, M., Vieira, P., Coutinho, S., Minderico, C., Matos, M., Sardinha, L., & Teixeira, P. (2010). Using self-determination theory to promote physical activity and weight control: a randomized controlled trial in women. *Journal of Behavioral Medicine, 33*(2), 110-122.
- Silva, M. N., Markland, D., Carraça, E. V., Vieira, P. N., Coutinho, S. R., Minderico, C. S., . . . Teixeira, P. J. (2011). Exercise Autonomous Motivation Predicts 3-yr Weight Loss in Women. *Medicine & Science in Sports & Exercise, 43*(4), 728-737.



- Sitzia, J. (1999). How valid and reliable are patient satisfaction data? An analysis of 195 studies. *International Journal for Quality in Health Care*, 11(4), 319-328.
- Spitzer, R. L., Devlin, M., Walsh, B. T., Hasin, D., Wing, R., Marcus, M., . . . Nonas, C. (1992). Binge eating disorder: A multisite field trial of the diagnostic criteria. *International Journal of Eating Disorders*, 11(3), 191-203.
- Sporny, L. A., & Contento, I. R. (1995). Stages of change in dietary fat reduction: Social psychological correlates. *Journal of Nutrition Education*, 27(4), 191-199.
- SSB. (2008). Levekårsundersøkelsen - Helse, omsorg og sosial kontakt. Retrieved 10.04.2011 <http://www.ssb.no/helseforhold/>
- Stephoe, A., Perkins-Porras, L., Rink, E., Hilton, S., & Cappuccio, F. P. (2004). Psychological and Social Predictors of Changes in Fruit and Vegetable Consumption Over 12 Months Following Behavioral and Nutrition Education Counseling. *Health Psychology*, 23(6), 574-581.
- Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences*. New York: Routledge.
- Stotland, S., Zuroff, D. C., & Roy, M. (1991). Situational dieting self-efficacy and short-term regulation of eating. *Appetite*, 17(2), 81-90.
- Strecher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*, 13(1), 73-92.
- Strychar, I. (2006). Diet in the management of weight loss. *Canadian Medical Association Journal*, 174(1), 56-63.
- Stunkard, A. J., & Wadden, T. A. (2002). *Handbook of obesity treatment*. New York: Guilford Press.
- Swinburn, B., & Bell, B. (2007). Obesity prevention. In M. Lawrence & T. Worsley (Eds.), *Public Health Nutrition: From principles to practice* (2nd ed., pp. 201-222). Maidenhead: Open University Press.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston: Pearson/Allyn and Bacon.
- Teixeira, P., Palmeira, A., Branco, T., Martins, S., Minderico, C., Barata, J., . . . Sardinha, L. (2004a). Who will lose weight? A reexamination of predictors of weight loss in women. *International Journal of Behavioral Nutrition and Physical Activity*, 1(1), 12.

- Teixeira, P., Silva, M., Mata, J., Palmeira, A., & Markland, D. (2012). Motivation, self-determination, and long-term weight control. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 22.
- Teixeira, P. J., Going, S. B., Houtkooper, L. B., Cussler, E. C., Metcalfe, L. L., Blew, R. M., . . . Lohman, T. G. (2004b). Pretreatment predictors of attrition and successful weight management in women. *International Journal of Obesity and Related Metabolic Disorders*, 28(9), 1124-1133.
- Teixeira, P. J., Going, S. B., Sardinha, L. B., & Lohman, T. G. (2005). A review of psychosocial pre-treatment predictors of weight control. *Obesity Reviews*, 6(1), 43-65.
- Teixeira, P. J., Patrick, H., & Mata, J. (2011). Why we eat what we eat: the role of autonomous motivation in eating behaviour regulation. *Nutrition Bulletin*, 36(1), 102-107.
- Teixeira, P. J., Silva, M. N., Coutinho, S. R., Palmeira, A. L., Mata, J., Vieira, P. N., . . . Sardinha, L. B. (2010). Mediators of Weight Loss and Weight Loss Maintenance in Middle-aged Women. *Obesity*, 18(4), 725-735.
- Thomas, J. G., Bond, D. S., Hill, J. O., & Wing, R. R. (2011). The National Weight Control Registry: A Study of "Successful Losers". *ACSM'S Health & Fitness Journal* 15(2), 8-12.
- Tones, K. (2002). Health literacy: new wine in old bottles? *Health Education Research*, 17(3), 287-290.
- Turk, M. W., Yang, K., Hravnak, M., Sereika, S. M., Ewing, L. J., & Burke, L. E. (2009). Randomized Clinical Trials of Weight Loss Maintenance: A Review. *Journal of Cardiovascular Nursing*, 24(1), 58-80.
- Ulen, C. G., Huizinga, M. M., Beech, B., & Elasy, T. A. (2008). Weight Regain Prevention. *Clinical Diabetes*, 26(3), 100-113.
- Van Duyn, M. A., Kristal, A. R., Dodd, K., Campbell, M. K., Subar, A. F., Stables, G., . . . Glanz, K. (2001). Association of awareness, intrapersonal and interpersonal factors, and stage of dietary change with fruit and vegetable consumption: a national survey. *American Journal of Health Promotion*, 16, 69-78.
- Wadden, T., Brownell, K., & Foster, G. (2002). Obesity: responding to the global epidemic. *Journal of Consulting Clinical Psychology*, 70, 510 - 525.
- Wadden, T. A., Butryn, M. L., & Byrne, K. J. (2004). Efficacy of Lifestyle Modification for Long-Term Weight Control. *Obesity*, 12(s12), 151S-162S.

- Wadden, T. A., & Foster, G. D. (2000). Behavioural Treatment For Obesity. *Medical Clinics of North America*, 84(2), 441-461.
- Wadden, T. A., Foster, G. D., & Letizia, K. A. (1992). Response of obese binge eaters to treatment by behavior therapy combined with very low calorie diet. *Journal of Consulting and Clinical Psychology*, 60(5), 808-811.
- Wadden, T. A., Foster, G. D., & Letizia, K. A. (1994). One-Year Behavioral Treatment of Obesity: Comparison of Moderate and Severe Caloric Restriction and the Effects of Weight Maintenance Therapy. *Journal of Consulting and Clinical Psychology*, 62(1), 165-171.
- Watters, J., & Satia, J. (2009). Psychosocial correlates of dietary fat intake in African-American adults: a cross-sectional study. *Nutrition Journal*, 8(1), 15.
- Weinstein, N. (2007). Misleading tests of health behavior theories. *Annals of Behavioral Medicine*, 33(1), 1-10.
- WHO. (2000). Obesity: Preventing and Managing the Global Epidemic *Technical Report Series*. Geneva: World Health Organization.
- WHO. (2006). Obesity and overweight Retrieved 10.04.2011, from [www.who.int/mediacentre/factsheets/fs311/en/index.html](http://www.who.int/mediacentre/factsheets/fs311/en/index.html)
- WHO/FAO. (2003). Diet, nutrition and the prevention of chronic diseases. Technical Report 916. . Geneva: World Health Organization.
- Williams, G., Gagne, M., Ryan, R., & Deci, E. (2002a). Facilitating autonomous motivation for smoking cessation. *Health Psychology*, 21, 40 - 50.
- Williams, G., McGregor, H., Zeldman, A., Freedman, Z., & Deci, E. (2004). Testing a self-determination theory process model for promoting glycemic control through diabetes self-management. *Health Psychology*, 23, 58 - 66.
- Williams, G., Niemiec, C., Patrick, H., Ryan, R., & Deci, E. (2009). The Importance of Supporting Autonomy and Perceived Competence in Facilitating Long-Term Tobacco Abstinence. *Annals of Behavioral Medicine*, 37(3), 315-324.
- Williams, G. C., Cox, E. M., Kouides, R., & Deci, E. L. (1999). Presenting the Facts About Smoking to Adolescents: Effects of an Autonomy-Supportive Style. *Archives of Pediatrics & Adolescent Medicine*, 153(9), 959-964.
- Williams, G. C., & Deci, E. L. (2001). Activating Patients for Smoking Cessation Through Physician Autonomy Support. *Medical Care*, 39(8), 813-823.
- Williams, G. C., Freedman, Z. R., & Deci, E. L. (1998a). Supporting Autonomy to Motivate Patients With Diabetes for Glucose Control. *Diabetes Care*, 21(10), 1644-1651.

- Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology*, 70(1), 115-126.
- Williams, G. C., Minicucci, D. S., Kouides, R. W., Levesque, C. S., Chirkov, V. I., Ryan, R. M., & Deci, E. L. (2002b). Self-determination, smoking, diet and health. *Health Education Research*, 17(5), 512-521.
- Williams, G. C., Rodin, G. C., Ryan, R. M., Grolnick, W. S., & Deci, E. L. (1998b). Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology*, 17(3), 269-276.
- Wilson, P. M., & Rodgers, W. M. (2004). The relationship between perceived autonomy support, exercise regulations and behavioral intentions in women. *Psychology of Sport and Exercise*, 5(3), 229-242.
- Wing, R. R. (2002). Behavioral weight control. In T. A. Wadden & A. J. Stunkard (Eds.), *Handbook of obesity treatment* (pp. 301-316). New York: Guilford Press.
- Wing, R. R., & Hill, J. O. (2001). Successful weight loss maintenance. *Annual Review of Nutrition*, 21(1), 323-341.
- Wing, R. R., & Jeffery, R. W. (1999). Benefits of recruiting participants with friends and increasing social support for weight loss and maintenance. *Journal of Consulting and Clinical Psychology*, 67(1), 132-138.
- Wing, R. R., Marcus, M. D., Epstein, L. H., & Jawad, A. (1991). A "family-based" approach to the treatment of obese Type II diabetic patients. *Journal of Consulting and Clinical Psychology*, 59, 156-162.
- Wing, R. R., & Phelan, S. (2005). Long-term weight loss maintenance. *The American Journal of Clinical Nutrition*, 82(1), 222S-225S.
- Wu, T., Gao, X., Chen, M., & Van Dam, R. M. (2009). Long-term effectiveness of diet-plus-exercise interventions vs. diet-only interventions for weight loss: a meta-analysis. *Obesity Reviews*, 10(3), 313-323.
- Wyatt, H. R., Grunwald, G. K., Mosca, C. L., Klem, M. L., Wing, R. R., & Hill, J. O. (2002). Long-Term Weight Loss and Breakfast in Subjects in the National Weight Control Registry. *Obesity*, 10(2), 78-82.
- Yanovski, S. Z. (2003). Binge eating disorder and obesity in 2003: Could treating an eating disorder have a positive effect on the obesity epidemic? *International Journal of Eating Disorders*, 34(S1), S117-S120.

- Young, R. M., Oei, T. P. S., & Crook, G. M. (1991). Development of a drinking self-efficacy questionnaire. *Journal of Psychopathology and Behavioral Assessment*, 13(1), 1-15.
- Zoellner, J., Connell, C., Bounds, W., Crook, L., & Yadrick, K. (2009). Nutrition literacy status and preferred nutrition communication channels among adults in the Lower Mississippi Delta. *Preventing Chronic Disease*, 6(4). Retrieved from [http://www.cdc.gov/pcd/issues/2009/oct/08\\_0016.htm](http://www.cdc.gov/pcd/issues/2009/oct/08_0016.htm)



# Appendix

## NSD study approval

Norsk samfunnsvitenskapelig datatjeneste AS  
NORWEGIAN SOCIAL SCIENCE DATA SERVICES



Harald Hårfagres gate 29  
N-5007 Bergen  
Norway  
Tel: +47-55 58 21 17  
Fax: +47-55 58 96 50  
nsd@nsd.uib.no  
www.nsd.uib.no  
Org nr. 985 321 884

Lisa Garnweidner  
Institutt for helse, ernæring og ledelse  
Høgskolen i Oslo og Akershus  
Postboks 423  
2001 LILLESTRØM

Vår dato: 04.10.2011

Vår ref: 27910 / 3 / LT

Deres dato:

Deres ref:

### TILRÅDING AV BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 06.09.2011. All nødvendig informasjon om prosjektet forelå i sin helhet 03.12.2011. Meldingen gjelder prosjektet:

|                      |   |
|----------------------|---|
| 27910                | <i>Kartlegging av faktorer som bidrar til vedlikehold av et sunt kosthold hos personer som har gjennomført vektreduksjonskurs</i> |
| Behandlingsansvarlig | <i>Høgskolen i Oslo og Akershus, ved institusjonens øverste leder</i>   |
| Daglig ansvarlig     | <i>Lisa Garnweidner</i>   |
| Student              | <i>Tiril Borge</i>  |

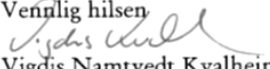
Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, eventuelle kommentarer samt personopplysningsloven/-helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, [http://www.nsd.uib.no/personvern/forsk\\_stud/skjema.html](http://www.nsd.uib.no/personvern/forsk_stud/skjema.html). Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, <http://www.nsd.uib.no/personvern/prosjektoversikt.jsp>.

Personvernombudet vil ved prosjektets avslutning, 31.12.2012, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen  
  
Vigdis Namtvedt Kvalheim

  
Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77  
Vedlegg: Prosjektvurdering  
Kopi: Tiril Borge, Skanseveien 14 B, 1086 OSLO

STUDIESTED KJELLER



## AVTALE

Avtalen inngås mellom:

Student Tiril C. Borge Studentnummer: 292941

og Høgskolen i Oslo og Akershus, heretter kalt HiOA, ved

Veileder Lisa Garmweidner & Sverre Pettersen

og Bedrift Libra Helse & Kosthold

ved Laila Høgh

om benyttelse av kundekartotek og distribusjon av et spørreskjema i forbindelse med masteroppgave

Prosjektet utføres i forbindelse med utdannelsen

Master i mat, ernæring & helse

### Hensikt med oppgaven

Masteroppgaven har som mål å kartlegge faktorer som kan være bidragsgivende for vedlikehold av ett sunt kosthold etter deltagelse på ett vektreduksjonskurs.

### Formål

Samarbeidet går ut på at bedriftens kundekartotek vil representere utvalget for prosjektet, og ett spørreskjema skal distribueres til samtlige via bedriften. Respondentenes svar vil samles inn via Questback. Innhentet informasjon fra det distribuerte spørreskjemaet vil danne grunnlaget for studentens oppgave, og vil ikke bli benyttet til andre formål enn de spesifisert i avtalen.

### Rettigheter og plikter

Studenten har et selvstendig ansvar for at forskningen utføres i samsvar med god forskningsikk og anerkjente vitenskapelige og etiske prinsipper innenfor feltet, samtidig som etisk respekt skal vises ovenfor bedriftens virksomhet. Masterstudien skal ikke kritisk påpeke sider ved bedriftens kurs, ledelsesfilosofi og ideer, eller fremheve uteblitte effekter som deres kursing av deltakere eventuelt kan ha hatt.



## STUDIESTED KJELLER

HiOA, ved Fakultet for helse, ernæring og ledelse samt masterstudenten eier de innsamlede undersøkelsesdata og de analyserte resultatene som fremkommer av disse.

Studenten har rett til å presentere data/prosjektets resultater som en masteroppgave internt ved HiOA (etter de kvalitetskrav som stilles for denne typen vitenskapelige og skriftlige presentasjoner).

Bedriften har rett til å benytte masterstudiens innsamlede rådata i sin virksomhet på lik linje med studenten.

### Publisering

Studenten har rett til å inngå avtale med HiOA om publisering av sin oppgave i HiOA's institusjonelle arkiv på internett. Studenten har også rett til å publisere oppgaven eller deler av den i andre sammenhenger.

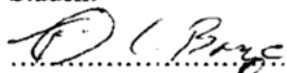
Ved etterfølgende publikasjon av masteroppgaven, for eksempel som en vitenskapelig artikkel i et tidsskrift, skal bedriften, dersom den ønsker det, få anerkjennelse i publikasjonen i form av navngivelse. Åndsverksloven og etiske regler og retningslinjer for vitenskapelige publisering innenfor fagfeltet skal følges.

### Presentasjon

Når avtalen er underskrevet, bør både bedriften, studenten og HiOA legge til rette for at masterstudiens datainnsamling foregår på en slik måte at studenten kan legge frem preliminaire funn fra sin masteroppgave for veiledere og medstudenter. Til denne presentasjonen er bedriftsrepresentanter velkommen til å delta. Studenten gir bedriftsrepresentanten informasjon om tid og sted for presentasjon.

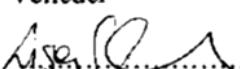
Denne avtalen er underskrevet i 3 - tre - eksemplarer, hvorav partene skal ha hvert sitt eksemplar.

Student

  
.....  
(underskrift)

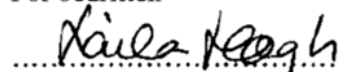
15/11 - 11  
.....  
(sted/dato)

Veileder

  
.....  
(underskrift)

DSLO, 15. 11. 11  
.....  
(sted/dato)

For bedriften

  
.....  
(underskrift)

22/11 - 2011  
.....  
(sted/dato)

### Faktorer som korrelerer med opprettholdelse av et sunt kosthold.

Dette er en spørreundersøkelse som ønsker å kartlegge aspekter ved din motivasjon for å fortsette å ha det sunne kostholdet som du lærte å følge under din kursdeltagelse hos Libra. Dette gjør du ved å indikere i hvilken grad du er enig i utsagnene som preger spørreskjemaet. På slutten av skjemaet har du også mulighet til å gi din personlige vurdering av opplegget for de Libra Helse- og kostholds kurs som du har deltatt på. Slike tilbakemeldinger er meget nyttig for Libra's videre arbeid med å hjelpe mennesker til å forbedre sitt kosthold og sin helse.

Vi håper at du tar deg tid til å fylle ut hele spørreskjemaet.

Svarene er anonyme og vi ber om at du er så ærlig som mulig når du svarer.

Din identitet vil holdes skjult

Les om [retningslinjer for personvern](#). (Åpnes i nytt vindu)

---

**1) Indiker på skalaen i hvilken grad du er enig i følgende utsagn, hvor 1 representerer " i svært liten grad" og 6 representerer " i svært stor grad".**

|   | I svært liten grad    |                       |                       |                       | I svært stor grad     |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Jeg føler at jeg har lykkes med å nå de mål som jeg satte meg i starten av det siste Librakurset jeg deltok på. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

**2) Hvor lenge er det siden du deltok på ditt siste Libra Helse- og kostholds kurs?**

- Deltar på kurs for øyeblikket
- 0 – 6 måneder
- 6 – 12 måneder
- Under 2 år siden
- Under 5 år siden
- Mer enn 5 år siden

**3) Hvilke Libra Helse- og kostholds kurs har du deltatt på (kryss av for alle de kursene du har deltatt på)?**

- Ned i vekt – grunnkurs
- Ned i vekt – maxikurs
- Ned i vekt med personlig veiledning
- Videregående kurs 1
- Videregående kurs 2
- Videregående kurs 3
- Stabiliseringskurs
- Annet kurs

**4) Hvor mange ganger har du prøvd å gå ned i vekt før du meldte deg på Libra Helse- og kostholds kurs?**

- Ingen
- 1-2 ganger
- 3-4 ganger
- 5-8 ganger
- 8-10 ganger
- mer en 10 ganger

---

**5) Hvor ofte veier du deg?**

- Flere ganger om dagen
- Daglig
- Annenhver dag
- Noen ganger i uka

- En gang i uka
- Ett par ganger i måneden
- Noen ganger i året
- Veier meg ikke



Indiker på skalaen i hvilken grad du er enig i utsagnene nedenfor, hvor 1 representerer "i svært liten grad" og 6 representerer "i svært stor grad":

**6) Jeg føler at jeg har klart å vedlikeholde det sunne kostholdet jeg lærte å følge ved kursdeltagelse hos Libra, ved å:**

|   | I svært liten grad    |                       |                       |                       | I svært stor grad     |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| spise fire-fem regelmessige måltider om dagen.                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Ha ett variert og balansert kosthold.                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Legge vekt på å få nok fiber i kosten.                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Drikke tilstrekkelig med vann.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| spise de anbefalte daglige brød-, frukt-, og påleggsporsjonene. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Spise grønnsaker til alle måltider.                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| følge Libra's råd under tilberedelse av sunne middager.         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Begrense inntak av alkohol.                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Begrense inntak av matvarer med mye sukker og hvitt mel.        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Begrense inntak av sukkerholdig drikke.                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Begrense inntak av mat med mye mettet fett.                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Planlegge hva jeg skal spise på forhånd av måltidene. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

**7) Grunnen til at jeg har et sunt kosthold er:**

|  | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Fordi jeg føler at jeg ønsker å ta ansvar for min egen helse.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg ville føle meg skyldig eller skamfull over meg selv hvis jeg ikke spiser et sunt kosthold. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg personlig tror det er det beste for helsen min.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi andre ville bli opprørt over meg hvis jeg ikke gjorde det.                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg har nøye tenkt på det og tror det er svært viktig for mange aspekter av livet mitt.        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg ville få dårlig selvfølelse hvis jeg ikke spiser et sunt kosthold.                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi det er et viktig valg jeg virkelig ønsker å gjøre.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg føler press fra andre for å gjøre det.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi det er i overensstemmelse med mine mål i livet.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg vil at andre skal godta meg.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi det er svært viktig for meg å være så sunn som mulig.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fordi jeg vil at andre skal se at jeg kan gjøre det.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

**8) Tenk tilbake på den gangen da du deltok på kurs hos Libra. Angi på skalaen i hvilken grad du er enig i følgende påstander, hvor 1 representerer " i svært liten grad" og 6 representerer " i svært stor grad":**

|  | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Jeg føler at min kursleder ga meg valg og alternativer vedrørende å endre kostholdet mitt.                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg føler at min kursleder forsto hvordan jeg ser ting med hensyn til kostholdet mitt.                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg føler at min kursleder formidlet tillit til min evne til å gjøre endringer vedrørende mitt kosthold.           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg føler at min kursleder lyttet til hvordan jeg ønsket å gjøre ting vedrørende mitt kosthold.                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg føler at min kursleder oppfordret meg til å stille spørsmål vedrørende endring av kostholdet mitt.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg føler at min kursleder prøvde å forstå hvordan jeg ser mitt kosthold før hun/han foreslo eventuelle endringer. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



Utsagnene nedenfor omhandler hvordan du opplever sosial støtte i din hverdag, særlig i forbindelse med å opprettholde et sunt kosthold. Indiker på skalaen i hvilken grad du er enig i følgende utsagn, hvor 1 representerer " i svært liten grad" og 6 representerer " i svært stor grad":

**9) Jeg føler at jeg har mennesker i mitt liv som:**

|  | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Viser at de er glade i meg.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Aksepterer meg for den jeg er.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Ikke gir meg støtte vedrørende vedlikeholdet av mitt sunne kosthold. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Spiser mat i mitt nærvær som jeg prøver å begrense inntaket av.      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Gir meg komplementer for at jeg klarer å opprettholde ett sunt kosthold. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Tilbyr meg mat jeg prøver å begrense inntaket av.                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

**10) Hvem gir deg mest støtte i forhold til å opprettholde et sunt kosthold?**

- Ektefelle/kjæreste
- Familie
- Kollegaer
- Venner
- Tidligere kursdeltagere hos Libra
- Kursleder hos Libra
- Ingen av de overnevnte



Forestill deg selv slik du er akkurat nå i hver av situasjonene nedenfor. Angi på skalaen i hvor stor grad du er trygg på at du klarer å utøve kontroll over hva du spiser i hver situasjon, hvor 1 representerer "i svært liten grad" og 6 representerer "i svært stor grad":

**11) Akkurat nå ville jeg være i stand til å utøve kontroll over hva jeg spiser i situasjoner som involverer:**

|  | I svært liten grad    |                       |                       |                       | I svært stor grad     |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| UBEHAGELIGE FØLELSER --- (feks, hvis jeg var deprimert eller hvis alt gikk dårlig for meg).  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| FYSISK UBEHAG --- (feks, hvis jeg hadde smerter, følte meg urolig eller fysisk spent).   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| BEHAGELIGE FØLELSER --- (feks, dersom noe fint ville skje, og jeg ville føle for å feire).   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TESTE KONTROLL OVER MITT KOSTHOLD --- (feks, hvis jeg ville være sikker på at jeg kunne håndtere og spise usunn mat i ny og ne).                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| FRISTELSER --- (feks, hvis jeg var i en situasjon hvor jeg tidligere ofte hadde spist usunt, hvis jeg begynte å tenke på hvor godt usunn mat hadde smakt). | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| KONFLIKT MED ANDRE --- (feks, hvis jeg hadde en krangel med en venn, partner eller kollega).   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SOSIALT PRESS --- (feks hvis noen hadde presset meg til å spise usunt med dem eller noen ville tilby meg usunn mat).                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| FESTLIGE BEGIVENHETER --- (feks, hvis jeg ønsket å feire noe, hvis jeg skulle nyte meg og kost meg på en fest).  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Anta at du nylig har opplevd en situasjon hvor du ikke har klart å kontrollere hva du spiser. Angi på skalaen i hvor stor grad du er trygg på at du klarer å utøve kontroll over hva du spiser i hver situasjon nedenfor ETTER dette tilbakefallet hadde skjedd, hvor 1 representerer "i svært liten grad" og 6 representerer "i svært stor grad":

**12) Etter tilbakefallet ville jeg være i stand til å utøve kontroll over hva jeg spiser i situasjoner som involverer:**



|  | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |  |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |  |
| UBEHAGELIGE FØLELSER --- (feks, hvis jeg var deprimert eller hvis alt gikk dårlig for meg).  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| FYSISK UBEHAG --- (feks, hvis jeg hadde smerter, følte meg urolig eller fysisk spent).   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| BEHAGELIGE FØLELSER --- (feks, dersom noe fint ville skje, og jeg ville føle for å feire).   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| TESTE KONTROLL OVER MITT KOSTHOLD --- (feks, hvis jeg ville være sikker på at jeg kunne håndtere og spise usunn mat i ny og ne).                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| FRISTELSER --- (feks, hvis jeg var i en situasjon hvor jeg tidligere ofte hadde spist usunt, hvis jeg begynte å tenke på hvor godt usunn mat hadde smakt). | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| KONFLIKT MED ANDRE --- (feks, hvis jeg hadde en krangel med en venn, partner eller kollega).   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| SOSIALT PRESS --- (feks hvis noen hadde presset meg til å spise usunt med dem eller noen ville tilby meg usunn mat).                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |
| FESTLIGE BEGIVENHETER --- (feks, hvis jeg ønsket å feire noe, hvis jeg skulle nyte meg og kost meg på en fest).  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |




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### 13) Hvor ofte søker du informasjon om kostholds relaterte tema?

- Aldri
- 1-3 ganger i året
- 1-3 ganger i halvåret
- 1-3 ganger i måneden
- 1-3 ganger i uken

- 4-6 ganger i uken
  - Hver dag
- 

**14) Hvilke av disse kildene benytter du deg av for å få informasjon om kosthold (flere kryss er mulig)?**

- Søkefunksjoner på internett (feks Google, Kvasir)
  - Helsesider på internett (Lommelegen, Libra sine nettsider)
  - TV-programmer (for eksempel Puls)
  - Ukeblader/magasiner (feks KK, Iform, Hjemmet)
  - Aviser
  - Fagtidsskrifter (feks Tidsskrift for den Norske legeforening)
  - Brosjyrer fra feks helsestasjon, legesenter, helsedirektoratet
  - Fagbøker
  - Libra Helse- og kostholds kursbøker
  - Autorisert helsepersonell (feks lege, ernæringsfysiolog)
  - Terapeuter innen alternativ helse og medisin (feks homeopat)
  - Familie, venner og bekjente
  - Jeg benytter meg ikke av kostholdsinformasjon
- 

**15) Utsagnene nedenfor omhandler din oppfatning av kostholdsinformasjonskilder. Indiker på skalaen i hvilken grad du er enig i hver enkelt påstand, hvor 1 representerer " i svært liten grad" og 6 representerer " i svært stor grad":**

|   | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Jeg synes det er vanskelig å forstå skriftlig informasjon om kosthold.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg synes brosjyrer om kosthold bruker ett språk som er lett å forstå.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg synes at kostholdseksperter bruker ett språk som er vanskelig å forstå.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har god kunnskap til hva som er de offisielle norske anbefalingene for ett sunt kosthold.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har problemer med å forstå de faguttrykkene som kostholdseksperter bruker.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg synes det er vanskelig å vite hvordan jeg skal endre kostholdet mitt dersom jeg får råd fra fastlegen, helsesøster eller liknende.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har for vane å lese om hva som regnes for å være et sunt kosthold.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg vet hvilke instanser innen helsevesenet som jeg skal henvende meg til for å få hjelp til å endre kostholdet.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg er lite interessert i hva som regnes for å være et sunt kosthold.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg tar gjerne initiativ til å innhente kunnskap om kosthold som er relevant for meg.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har ikke for vane å skaffe meg informasjon om hva som regnes for å være et sunt kosthold.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg diskuterer gjerne med min omgangskrets (for eksempel familie, venner, kollegaer) hva som regnes for å være et sunt kosthold.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg følger gjerne med i den aktuelle debatten (for eksempel på TV) om hva som regnes for å være et sunt kosthold.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg ville gjerne tatt initiativ til samtale om hva som er et sunt kosthold med kostholdseksperter (for eksempel fastlegen min, helsesøster eller lignende) dersom dette | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   | I svært liten grad    |                       |                       |                       | I svært stor grad     |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| var aktuelt for meg.  |                       |                       |                       |                       |                       |                       |
| Jeg har fått et sunnere kosthold på bakgrunn av kostholdsinformasjon som jeg har skaffet meg.                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg bruker internett når jeg søker mer informasjon om kosthold.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dersom jeg leser om kosthold som angår min helse, synes jeg det er vanskelig å få noe ut av informasjonen.            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg er opptatt av at kostholdsinformasjonen som jeg leser skal være vitenskapelig basert.                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg er kritisk til den kostholdsinformasjonen som jeg mottar fra ulike kilder i samfunnet.                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg henviser gjerne til aviser og ukebladets oppslag dersom jeg diskuterer kosthold med andre.                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg kjenner til hva som er kriteriene for at en helsepåstand er vitenskapelig.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har tiltro til ulike dietter som jeg leser om i aviser, ukeblader osv.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg tror kroppen min sier i fra om hva den trenger av næringsstoffer, uavhengig av hva forskere mener om dette.       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg lar meg påvirke av kostholdsråd som jeg leser om i aviser, ukeblader osv.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har tiltro til at noen metoder innen alternativ medisin (for eksempel helsekost) gir meg troverdige kostholdsråd. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg synes det er vanskelig å skille vitenskapelig kostholdsinformasjon fra ikke-vitenskapelig kostholdsinformasjon.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg har tiltro til at medias presentasjon av nye vitenskapelige funn omkring sunt kosthold er riktige.                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|   | I svært liten grad    |                       |                       |                       |                       | I svært stor grad     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Jeg baserer mitt kosthold på informasjon jeg får fra vitenskapelig anerkjent faglitteratur (for eksempel Helsedirektoratets informasjonsmateriell). | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Jeg forsøker å påvirke andre (for eksempel familie, venner) til å spise sunt.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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**16) Hvordan vil du karakterisere ditt gjennomsnittlige aktivitetsnivå (Velg det aktivitetsnivået som passer best for deg akkurat nå)?**

- Lavt aktivitetsnivå --- (leser, ser på tv; lite eller ingen organisert trening eller hverdagsmosjon).
- Moderat aktivitetsnivå --- (går, sykler eller driver annen form for lett bevegelse minst 4 timer i uka).
- Dynamisk aktivitetsnivå --- (Driver med idrett, trener aktivt på treningssenter, bedriver tyngre hage- og husarbeid eller liknende minst 4 timer i uka).
- Høyt aktivitetsnivå --- (Trener relativt hardt, regelmessig og flere ganger i uka).
- Svært høyt aktivitetsnivå --- (Trener hardt og ofte eller driver konkurranseidrett på høyt nivå).

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**17) Hvor ofte spiser du frokost?**

- Aldri
- Av og til
- Ett par ganger i uka
- Mer enn 3 ganger i uka
- Daglig

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**18) Røyker du?**

- Aldri
  - Av og til
  - Har sluttet
  - Ja
- 

**19) Snuser du?**

- Aldri
  - Av og til
  - Har sluttet
  - Ja
- 

**20) Antall barn**

- Ingen
  - 1
  - 2
  - 3
  - 4 eller flere
- 

**21) Hvilken utdanning er den høyeste du har fullført?**

- Grunnskole
- Allmennfaglig videregående
- Yrkesfaglig videregående
- Teknisk fagskole

- Bachelor grad eller tilsvarende
  - Master grad eller tilsvarende
  - Doktorgrad eller tilsvarende
- 

**22) Hvor høy var husstandens samlede bruttoinntekt det siste året (inkl trygd og pensjon)?**

- Ingen inntekt
  - Mindre enn 100 000 kr
  - 100 000 kr – 299 999 kr
  - 300 000 kr - 499 999 kr
  - 500 000 kr – 699 999 kr
  - 700 000 kr – 999 999 kr
  - 1 000 000 kr – 1 999 999 kr
  - Mer enn 2 000 000 kr
- 

**23) Hvor i landet bor du?**

- Østlandet
  - Sørlandet
  - Vestlandet
  - Midt-Norge
  - Nord-Norge
- 

**24) Sivilstatus**

- Ugift

- Samboer
  - Gift/registrert partner
  - Skilt/separeert
  - Enke/enkemann
- 

**25) Alder**

- 18-30
  - 31-40
  - 41-50
  - 51-60
  - 60+
- 

**26) Kjønn**

- Kvinne
  - Mann
- 

**27) Her kan du gi din personlige vurdering av de Librakursene du har deltatt på. Bruk dine egne ord**



## Questionnaire in English

### Factors associated with the maintenance of a healthy diet

This is a survey seeking to identify aspects of your motivation to continue to have a healthy diet, which you learned to follow during your Libra program participation. To do so, indicate to what extent you agree with the statements that characterize the questionnaire. At the end of the questionnaire, you also have the opportunity to give your personal evaluation of the Libra health- and nutrition programs you have attended. Such feedback is very useful for Libra's continued efforts to help people improve their diet and their health.

We hope that you take the time to fill out the entire questionnaire.

The answers are anonymous and we ask that you are as honest as possible when you answer.

Your identity will be kept hidden

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**1) Indicate on the scale to what extent you agree with the following statements, where 1 represents “to a very low degree” and 6 represent “to a very high degree”.**

|  | To a<br>very<br>low<br>degree |                       |                       |                       | To a<br>very<br>high<br>degree |                       |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|--------------------------------|-----------------------|
|  | 1                             | 2                     | 3                     | 4                     | 5                              | 6                     |
| I feel that I have succeeded in achieving the goals I put forward at the initiation of the last Libra program I participated in. | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |

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**2) How long has it been since you participated in a Libra health- and nutrition program?**

- Currently participating
- 0 – 6 months
- 6 – 12 months
- Less than 2 years ago
- Less than 5 years ago
- More than 5 years ago

**3) What Libra health and nutrition programs have you participated in (indicate all the programs you have participated in)?**

- Ned i vekt – grunnkurs
- Ned i vekt – maxikurs
- Ned i vekt med personlig veiledning
- Videregående kurs 1
- Videregående kurs 2
- Videregående kurs 3
- Stabiliseringskurs
- Annet kurs

**4) How many times have you tried to lose weight before you signed up for a Libra health- and nutrition program?**

- None
  - 1-2 times
  - 3-4 times
  - 5-8 times
  - 8-10 times
  - More than 10 times
- 

**5) How often do you weight yourselves?**

- Several times a day
- Daily
- Every other day

- Few times a week
  - Once a week
  - Couple of times a month
  - Couple of times a year
  - I don't weigh myself
- 

Indicate on the scale to what extent you agree with the following statements, where 1 represents “to a very low degree” and 6 represent “to a very high degree”.

**6) I feel that I have managed to maintain the healthy diet I learned to follow during the Libra program participation, by:**

|   | To a<br>very<br>low<br>degree |                       |                       |                       | To a<br>very<br>high<br>degree |                       |
|---|-------------------------------|-----------------------|-----------------------|-----------------------|--------------------------------|-----------------------|
|   | 1                             | 2                     | 3                     | 4                     | 5                              | 6                     |
| Eating four to five regular meals a day.                                | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Having a varied and balanced diet.                                      | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Emphasizing the inclusion of enough fiber in my diet.                   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Drinking adequate amounts of water.                                     | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Eating the recommended bread, fruit and condiment portions.             | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Eating vegetables with all meals.                                       | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Following Libra's advice when preparing healthy dinners                 | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Limiting the intake of alcohol.   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Limiting the intake of foodstuff containing much sugar and white flour. | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Limiting the intake of sugary drinks.                                   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |

|  | To a very low degree  |                       |                       |                       |                       | To a very high degree |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Limiting the intake of food containing much saturated fat. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Planning what to eat in advance of the meals               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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**7) The reason for why I have a healthy diet is:**

|   | To a very low degree  |                       |                       |                       |                       | To a very high degree |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     |
| Because I feel that I want to take responsibility for my own health.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because I would feel guilty or ashamed of myself if I did not eat a healthy diet.                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because I personally believe it is the best thing for my health.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because others would be upset with me if I did not.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because I have carefully thought about it and believe it is very important for many aspects of my life. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because I would feel bad about myself if I did not eat a healthy diet.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because it is an important choice I really want to make.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because I feel pressure from others to do so.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because it is consistent with my life goals.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Because I want others to approve of me.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|  | To a<br>very<br>low<br>degree |                       |                       |                       |                       | To a<br>very<br>high<br>degree |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|
|  | 1                             | 2                     | 3                     | 4                     | 5                     | 6                              |
| Because it is very important for being as healthy as possible. | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| Because I want others to see I can do it.                      | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |

**8) Think back to the time when you participated in a Libra program. Indicate on the scale to what extent you agree with the following statements, where 1 represents “to a very low degree” and 6 represent “to a very high degree”.**

|   | To a<br>very<br>low<br>degree |                       |                       |                       |                       | To a<br>very<br>high<br>degree |
|---|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|
|   | 1                             | 2                     | 3                     | 4                     | 5                     | 6                              |
| I feel like my program leader provided me with options and alternatives with regards to my dietary change.    | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I feel like my program leader understood how I see things in relation to my diet.                             | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I feel like my program leader conveyed confidence in my ability to change my diet.                            | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I feel like my program leader listened to how I wanted to do things in relation to my diet.                   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I feel like my program leader encouraged me to ask questions regarding my dietary change.                     | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I feel like my program leader tried to understand how I perceive my diet before he/she suggested any changes. | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |



The statements below relates to how you perceive social support in your everyday life, particularly in relation to maintaining a healthy diet. Indicate on the scale to what extent you agree with the following statements, where 1 represents “to a very low degree” and 6 represent “to a very high degree”.

**9) I feel that I have people in my life who:**

|  | To a<br>very<br>low<br>degree |                       |                       |                       | To a<br>very<br>high<br>degree |                       |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|--------------------------------|-----------------------|
|  | 1                             | 2                     | 3                     | 4                     | 5                              | 6                     |
| Show that they care about me.                                      | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Accept me for who I am.  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Dont'give me support regarding maintenance of my healthy diet.     | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Eat food in my presence which I try to limit the intake of.        | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Gives me complements for me being able to maintain a healthy diet. | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |
| Offers me food I try to limit the intake of.                       | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          | <input type="radio"/> |

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**10) Who provides you with the most support in relation to maintaining your healthy diet?**

- Spouse
- Family
- Coworkers
- Friends
- Former Libra program participants
- Libra program leader
- None of the above



Imagine yourself as you are right now in each of the situations below. Indicate on the scale to what extent you agree with the following statements, where 1 represents “to a very low degree” and 6 represent “to a very high degree”.

**11) Right now I would be able to exercise control over what I eat in situations involving:**

|  | To a<br>very<br>low<br>degree |                       |                       |                       |                       | To a<br>very<br>high<br>degree |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|
|  | 1                             | 2                     | 3                     | 4                     | 5                     | 6                              |
| UNPLEASANT FEELINGS --- (E.g. if I was depressed or when things went bad for me.)  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| PHYSICAL DISCOMFORT --- (E.g. if I were in pain, felt restless or physically tense.)   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| PLEASANT FEELINGS --- (E.g. if something good happened, and I would feel like celebrating.)  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| TESTING CONTROL WITH REGARDS TO MY DIET --- (E.g. if I wanted to be sure I could handle eating unhealthy foods now and then.)                                  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| TEMPTATION --- (E.g. if I were in a situation where I previously had often eaten unhealthy, if I started thinking about how good junk food would have tasted.) | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| CONFLICT WITH OTHERS --- (E.g. if I had an argument with a friend, partner or colleague.)  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| SOCIAL PRESSURE --- (E.g. if someone had pushed me to unhealthy eating with them or someone would offer me junk food.)   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| FESTIVE EVENTS --- (E.g. if I wanted to celebrate something, if I was enjoying myself at a party.)   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |

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Assume that you recently have experienced a situation where you have not managed to control what you eat. Indicate on the scale to what extent you are confident that you can manage to control what you eat in each of the situations below AFTER this lapse had occurred, where 1 represents “to a very low degree” and 6 represent “to a very high degree”.

**12) After the lapse I would be able to exercise control over what I eat in situations involving:**

|  | To a<br>very<br>low<br>degree |                       |                       |                       |                       | To a<br>very<br>high<br>degree |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|
|  | 1                             | 2                     | 3                     | 4                     | 5                     | 6                              |
| UNPLEASANT FEELINGS --- (E.g. if I was depressed or when things went bad for me.)  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| PHYSICAL DISCOMFORT --- (E.g. if I were in pain, felt restless or physically tense.)   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| PLEASANT FEELINGS --- (E.g. if something good happened, and I would feel like celebrating.)  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| TESTING CONTROL WITH REGARDS TO MY DIET --- (E.g. if I wanted to be sure I could handle eating unhealthy foods now and then.)                                  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| TEMPTATION --- (E.g. if I were in a situation where I previously had often eaten unhealthy, if I started thinking about how good junk food would have tasted.) | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| CONFLICT WITH OTHERS --- (E.g. if I had an argument with a friend, partner or colleague.)  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| SOCIAL PRESSURE --- (E.g. if someone had pushed me to unhealthy eating with them or someone would offer me junk food.)   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| FESTIVE EVENTS --- (E.g. if I wanted to celebrate something, if I was enjoying myself at a party.)   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |




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**13) How often do you seek information on diet- and nutrition related issues?**

- Never
- 1-3 times a year



- 1-3 times every 6 months
  - 1-3 times a month
  - 1-3 times a week
  - 4-6 times a week
  - Every day
- 

**14) Which ones of these sources do you use to get diet- and nutrition information (multiple selections are possible)?**

- Internet (e.g. Google, Kvasir)
  - Health pages on internet (e.g. Libra's web page, the Health doctor)
  - TV-shows (e.g. Puls)
  - Magazines (e.g. KK, Iform, Hjemmet)
  - Newspapers
  - Journals (e.g. Norwegian medical journal)
  - Pamphlets from the health directorate, doctor, health station)
  - Books
  - Libra health- and dietary books
  - Authorized health personnel (e.g. doctor, clinical nutritionist)
  - Alternative medicine therapists (e.g. homeopath)
  - Family, friends and acquaintances
  - I don't use diet- and nutrition information
-

15) The statements below relate to your perception of nutrition information sources. Indicate on the scale to what extent you agree with the following statements, where 1 represents “to a very low degree” and 6 represent “to a very high degree”:

|  | To a<br>very<br>low<br>degree |                       |                       |                       |                       | To a<br>very<br>high<br>degree |
|--|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|
|  | 1                             | 2                     | 3                     | 4                     | 5                     | 6                              |
| I find it hard to understand written dietary information.  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I find that dietary brochures use a language that is easy to understand  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I am having trouble understanding the technical terms that dietitians use.   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I have good knowledge of what the official Norwegian recommendations for a healthy diet are.                           | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I think that dietitians use a language that is difficult to understand.  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I find it difficult to know how to change my diet if I get advice from my doctor, nurse or other health care personnel | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I tend to read about what is considered to be a healthy diet   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I know which agencies within the health care system that I should contact for help to change my diet.                  | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I'm not interested in what is considered to be a healthy diet.   | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I welcome any initiative to gather information about diets which are relevant to me                                    | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I have not the habit of retrieving information on what is considered to be a healthy diet.                             | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I am happy to discuss with my peer group (e.g. family, friends, and colleagues) what is considered a healthy diet.     | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |
| I gladly follow the current debate (e.g. on TV) about what is considered a healthy diet.                               | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>          |

|   | To a<br>very<br>low<br>degree<br>1 | 2                     | 3                     | 4                     | 5                     | To a<br>very<br>high<br>degree<br>6 |
|---|------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------------------|
| I would take the initiative to talk about what constitutes a healthy diet with nutritional experts (such as my family doctor, nurse, etc.) if this was relevant for me. | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I have a healthier diet based on dietary information I have made available to me.   | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I use the internet when I am seeking more dietary information.  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| If I read about dietary information affecting my health, I find it hard to get anything out of the information  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| Diet information that I read should be scientifically based   | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I am critical regarding the diet information that I receive from various sources in the society.  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I often refer to newspapers and magazines when I discuss diet with others.  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I know what the criteria are for a health claim to be characterized as scientifically sound.  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I have confidence in the different diets that I read about in newspapers, magazines, etc.   | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I think that my body lets me know what it needs with respects to nutrients, regardless of what scientists think about this.   | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I let myself be influenced by dietary advice that I read about in newspapers, magazines, etc.   | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I have confidence in that some alternative medicine methods (such as health food) provide me credible dietary advice  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I find it difficult to separate scientific nutrition information from non-scientific diet information.  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I have confidence in that the media's presentation of new scientific findings about healthy diets is correct.   | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |

|   | To a<br>very<br>low<br>degree<br>1 | 2                     | 3                     | 4                     | 5                     | To a<br>very<br>high<br>degree<br>6 |
|---|------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------------------|
| I base my diet on the information I receive from scientifically based literature (e.g., the Health Directorate information material). | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |
| I try to influence others (e.g. family, friends) to eat healthy.  | <input type="radio"/>              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>               |

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**16) How will you characterize your average activity level (Choose the level which is most appropriate for you at the moment)?**

- Low activity level --- (read, watch TV, little or no organized exercise or everyday exercise).
  - Moderate activity level --- (walks, bicycles, or performs other types of light exercise at least four times a week).
  - Dynamic activity level --- (Playing sports, working out actively in the gym, doing heavy gardening and housework or similar activities at least four hours a week).
  - High activity level --- (Train relatively hard, regularly and several times a week)
  - Very high activity level --- (Train hard and often, or perform competitive sports at a high level).
- 

**17) How often do you eat breakfast?**

- Never
  - Occasionally
  - Couple of times a week
  - More than three times a week
  - Daily
-

**18) Do you smoke?**

- Never
  - Occasionally
  - Have quit
  - Yes
- 

**19) Do you use scruff?**

- Never
  - Occasionally
  - Have quit
  - Yes
- 

**20) Number of kids**

- None
  - 1
  - 2
  - 3
  - 4 or more
- 

**21) What is the highest education level you have finished?**

- Elementary
- High school
- Vocational secondary school
- Technical college

- Bachelor or equivalent
  - Master degree or equivalent
  - PhD or equivalent
- 

**22) How high was the household's total gross income in the past year (including social security and pension)?**

- No income
  - Less than 100 000 kr
  - 100 000 kr – 299 999 kr
  - 300 000 kr - 499 999 kr
  - 500 000 kr – 699 999 kr
  - 700 000 kr – 999 999 kr
  - 1 000 000 kr – 1 999 999 kr
  - more than 2 000 000 kr
- 

**23) Where in the country do you live?**

- Eastern Norway
  - Southern Norway
  - Western Norway
  - Mid-Norway
  - Northern Norway
- 

**24) Relationship status**

- Unmarried

- Cohabitation
  - Married/registered partner
  - Divorced/separated
  - Widow/widower
- 

**25) Age**

- 18-30
  - 31-40
  - 41-50
  - 51-60
  - 60+
- 

**26) Gender**

- Female
  - Male
- 

**27) Here you can give your personal evaluation of the Libra programs you participated in. Use your own words.**