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Contributing factors affecting eating self-efficacy in behavioral weight loss treatment: a systematic literature review

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Abstract

One of the major health problems among adults is the increase in the prevalence of obesity. Behavioral weight loss treatment should be the first line of intervention for individuals, who are overweight or obese. The process of achieving a healthy weight is difficult and influenced by a number of factors. Self-efficacy is suggested to be the main and the most proximal predictor and antecedent of health behavior.

The purpose of the thesis was to increase knowledge about which contributing factors affect and how they affect eating self-efficacy in behavioral weight loss treatment. The thesis was conducted as a systematic literature review. The data synthesis was executed using a thematic synthesis method created for qualitative research.

As a result of the thesis, five contributing factors that affect eating self-efficacy in behavioral weight loss treatment were identified. These factors are previous weight loss history, performance attainment, treatment attendance, physical activity, and improved eating. The thesis also identified how factors affect eating self-efficacy. Individuals, who have previous weight loss history, indicate in the baseline of the treatment lower eating self-efficacy than individuals with no previous attempts regardless of whether the weight loss attempts were successful or failed. Performance attainment, which in the context of obesity treatment appears as successful weight loss, fosters the improvement of eating self-efficacy. Treatment attendance is highly positively correlated with changes in eating self-efficacy and the relationship is likely bidirectional. Physical activity contributes positively with changes in eating self-efficacy and the relation of physical activity and eating self-efficacy is powered by improved eating. Changes in improved eating and changes in eating self-efficacy have a reciprocal relationship emanating from changes in volume of physical activity.

The thesis findings have increased knowledge in the area and the emerged knowledge has been connected to the theoretical basement. The results have highlighted potential for future research into the role of the contributing factors and their effects on eating self-efficacy in behavioral weight loss treatment.

Keywords
eating self-efficacy, behavioral weight loss, dietary lapse, social cognitive theory, overweight, obesity

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1 INTRODUCTION

The World Health Organization declared obesity a “global epidemic” already 20 years ago and the prevalence of overweight has continued to rise. In obesity, the Body Mass Index BMI, which is a ratio of weight to height and is used to weight status categorizing, is equal to or greater than 30 kg/m^2. (Jackson et al., 2020.) The rate of obesity in the adult population had a twofold increase between 1976 and 2004 (from 15.0% in 1976–1980 to 32.9% in 2003–2004). 2016 over 650 million people (13%) had obesity and in many countries obesity rates surpassed 50% of the population. The forecast for the increase of obesity shows, that by 2030 obesity prevalence will be 33%. (Jackson et al., 2020.)

Person’s unbalanced food habits, excess energy intake for a longer period or reduced physical activity are major risk factors for obesity. (Jackson et. al., 2020; Perguica et al., 2020; Zhang et al., 2021). Low physical activity is linked to sedentary behavior including sitting, watching television, using a computer or playing video games (Zhang et al., 2021). Obesity is related to metabolic disorders such as metabolic syndrome, prediabetes, diabetes and nonalcoholic fatty liver disease (Perguica et al., 2020) and is linked to increased morbidity and mortality among adults (Zhang et al., 2021). Obesity is the major public health concern and causes undesirable burden to individuals and families as well as to health care systems and society (Zhang et al., 2021).

Despite progresses in health technology, pharmacology and campaigns increasing people’s awareness, worldwide the prevalence of metabolic disorders is still increasing (Perguica et al., 2020). Obesity is a chronic and progressive disease, which demands lifelong treatment (Mauro et al., 2008). Obesity treatment can be interfered by a number of barriers and psychosocial factors (Mauro et al., 2008; Nezami et al., 2017). In order to be able to help individuals suffering from obesity it is essential to identify

and address these barriers (Mauro et al., 2008), and determine which psychosocial variables are reliable predictors in obesity treatment (Nezami et al., 2017).

Lifestyle interventions in obesity treatment usually exhorts an individual to adopt exemplary eating behaviors (Wadden et al., 2020). Most commonly used treatments for obesity are diets, that restrict person's calorie intake (Monnier et al., 2021). Individuals suffering from obesity have often low sense of self-esteem and self-efficacy (Mauro et al., 2008), and failures in controlling eating behavior further undermine these perceptions (Nezami et al., 2017). Increases in self-efficacy can lead to improved eating behavior change. It is important to study and evaluate which factors affect eating self-efficacy and by that determine intervention strategies to help individuals overcome hindering barriers, increase eating self-efficacy and make dietary changes targeted weight-loss. (Nezami et al., 2017.)

2 EATING SELF-EFFICACY

2.1 Self-efficacy in social cognitive theory

Concept of self-efficacy was first introduced by psychologist Albert Bandura in 1977 as a fundamental theoretical component of Social Cognitive Theory. Bandura defines self-efficacy as follows:

> "Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave." (Bandura, 1994.)

Social cognitive theory performs a multifaceted causal structure, which determines human behavior (Bandura, 1998). According to social cognitive theory, individual's behavior is assessed by a combination of three factors, which are behavioral

determinants, personal determinants, and physical and environmental determinants (Bandura, 2001). These factors all interact and constitute a triadic model, which is called reciprocal determinism (Kelder et al., 2015).

Self-efficacy is a core construct in social cognitive theory and represents the confidence in one's ability to overcome obstacles and accomplish goals (Kelder et al., 2015; McKee et al., 2014). Self-efficacy regulates cognitive processes which in the context of behavior development or behavior maintenance either enhance or impede the act (Kelder et al., 2015). Self-efficacy has causal structures with goal setting, outcome expectations, and perceived environmental impediments and facilitators. These causal structures regulate human motivation, action and well-being. (Bandura, 1998.)

Social cognitive theory includes a paradigm of person's engagement in behavior change and consequent outcome. People become willing to execute behavioral change and feel more committed to the decision, if they have the believe to be able to overcome barriers and be successful in the action. Perceived self-efficacy is in the center of the theory, because it pertains to personal action control. The change in behavior is determined by outcome expectations, which are the consequences of person's actions he or she believes to be able to achieve. (Luszczynska and Schwartzer, 2005, p. 128.) The paradigm of person's engagement in behavior and consequent outcomes is illustrated in figure 1.

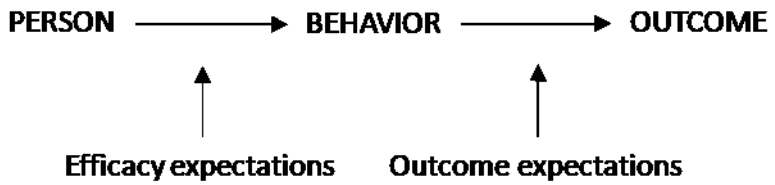

Figure 1. The paradigm of person's engagement in behavior and consequent outcomes (Strecher et al., 1986).

Individual's perceived self-efficacy represents the confidence of employing skills, that are necessary in resisting temptation, coping with stress and mobilizing one's resources requested to meet the situational demands. Self-efficacy has a relationship with motivation in a way, that it can either enhance or impede motivation. (Luszczynska and Schwartzer, 2005, p. 128-130.)

Perceived self-efficacy has a fundamental and relevant role in person's life and it takes shape through periods of living. People vary essentially in how efficaciously they manage their lives, and self-efficacy determines, for its part, how successfully a person can carry out behavioral changes. Self-efficacy is not a stable condition, and it is characteristics of self-efficacy that it develops throughout person's lifetime according to one's experiences and perceptions, and it also shapes itself according to the different situations on the lifespan. (Strecher et al., 1986.)

2.2 Formation of self-efficacy

According to social cognitive theory, self-efficacy is formed by four sources of influence, which are previous mastery experiences, vicarious experience, social persuasion, and emotional arousal (Bandura, 1994; Bandura, 1998).

Previous mastery experiences are the most effective sources, which affect the sense of self-efficacy. They play a mastery role in determining whether a person is engaging or re-engaging in a particular task and behavior. Successful experiences in the past will increase self-efficacy, because successes build a strong belief in one's personal efficacy, whereas past failures undermine the sense of self-efficacy. (Bandura, 1994.) For the present task, the person projects the behavioral skills, presumed outcomes and his or her mental representation of self-efficacy and evaluates the possibilities of performance and the successes or failures of previous similar experiences (Kelder et al., 2015). The pursuit of resilient sense of self-efficacy requires also experiences of failures to make the person understand, that success in most cases requires continuous efforts. Easily achieved success can lead to a misconception of quickly goal accomplishment. (Bandura, 1994.)

Vicarious experience provided by social models comprises of methods in which a person's self-efficacy is formed through observing the behavior of others. When a person sees people similar to oneself outperforming the present task, the observer's beliefs of the ability to overcome a similar task raises. (Bandura, 1994.) It is possible, that the success of a distinguished role model or influencer can be as well used to strengthen one's self-efficacy as he or she perceives, that the agent is capable in performing the task (Kelder et al., 2015). However, a person must experience the model as his or her peer in order to be able to identify with it, because otherwise perceived self-efficacy is not influenced by the model or resulting any relevant progress. Competent models spread knowledge and show effective behavior and skills for managing relevant demands. (Bandura, 1994.) Vicarious experience methods can also increase person's self-efficacy in the case, when a person does not have previous experience of the task expected to perform (Kelder et al., 2015).

Social persuasion, which is usually presented as direct verbally encouragement, makes the person likely to mobilize greater effort and sustain it when problems arise. In order to increase self-efficacy, persuasion should be carried out by someone or an agent the person values or trusts on. Valued agent may persuade a person to notice the negative effects of the current behavior, support the change in behavior and reinforce the person's perception of the potential positive factors of the change. Persuasive encouragement makes the person try hard enough and promote development of the sense of personal efficacy. (Bandura, 1994; Kelder et al., 2015.)

Emotional arousal is related to somatic and emotional states, as well as mood, which all affect person's judgements of the perceived self-efficacy. Stress, tension and physical stamina can be interpreted as signs of vulnerability, which leads to poor performance. Positive mood improves perceived self-efficacy. By reducing person's stress reactions, it is possible to alter his or her misinterpretations of the emotional limits and physical states, and generate emotional arousal, which is an energizing facilitator of performance. (Bandura, 1994.) By the level of the emotional arousal it is possible to predict whether a person will either success or fail in the behavior change required to the task. Positive attitude and optimistic position are related to positive emotional state

and higher self-efficacy, which predict higher task performance. Negative attitude is related to lower self-efficacy, which predicts lower task performance. (Kelder et al., 2015.)

2.3 Definition of eating self-efficacy

The process of achieving a healthy weight is difficult and influenced by a number of factors (Byrne et al., 2012). Successful weight loss requires change in behavior and the outcomes of the weight loss treatment will be depended on the characteristics of the changes and the degree of the engagement a person executes in the treatment. The outcome expectations comprehend on the beliefs of the probability that the designated behavior will lead to the expected outcomes. The efficacy expectations comprehend on the person's beliefs of his or her capability in performing the behavior that leads to the expected outcomes. (Strecher et al., 1986.)

Eating self-efficacy is defined as the belief of one's ability to self-regulate eating. Eating self-efficacy affects one's ability to restrain eating. Depending on individual's eating habits, body mass index and state of affects, social and emotional situations may be differently challenging in the context of eating behavior. (Lombardo et al., 2021.) Self-efficacy has an impact on the confidence of one's ability to overcome obstacles in social and emotional situations related to eating and accomplish goals, that have been set for the weight loss (Lombardo et al., 2021; McKee et al., 2014). It is notable, that the parameters of outcome expectations and efficacy expectations both reflect person's beliefs about his or her capabilities and behavior, and are not necessarily "true" capabilities (Strecher et al., 1986).

Several different terms have been used for eating self-efficacy in the existing research. The terms, that have been observed are dieting self-efficacy (Stotland and Zuroff, 1991), self-efficacy for weight management (Cargill et al., 1999), eating related self-efficacy (Annesi, 2012), self-efficacy for controlled eating (Annesi and burke, 2017; Annesi and Tennant, 2013), weight-loss self-efficacy (McKee and Ntoumanis, 2013), dietary self-efficacy (Kelder et al., 2015), self-efficacy for weight loss (Burke et al.,

2015), self-efficacy for eating (Annesi and Mareno, 2017), and self-efficacy for weight control (Kerrigan et al., 2018).

Eating self-efficacy can be assessed by several scales or questionnaires, which focus on weight management and dieting or healthy eating, and are allocated on situations in which people face social or emotional pressures for excessive food intake (Lombardo et al., 2021). The most commonly used scales for measuring eating self-efficacy are the Eating self efficacy scale, the Situation-based dieting self-efficacy scale and the Weight efficacy lifestyle scale (Stich et al., 2009).

2.4 Eating self-efficacy and behavioral weight loss

Behavioral weight loss treatment is targeted to obese individuals who need lifestyle modification aiming to lose weight (Butryn et al., 2011). Behavioral weight loss treatment should be the first line of intervention for individuals, who are overweight or obese (Bates et al., 2021). Weight loss is expected to be achieved by changing one's behavior usually in the domain of eating and physical activity, and the treatment in many cases includes behavioral and dietary counseling. The period of the treatment varies from a few active months to a longer period of counseling, which targets to improve one's weight management skills. Characteristics of the behavioral weight loss treatment is the determination of weight loss goals. (Butryn et al., 2011.)

The person who is participating a behavioral weight loss treatment in order to lose weight is called dieter (Bates et al., 2021). Dieters are engaged to restricted calorie intake and enhanced physical activity which target reaching the assessed goals. The achievement of the milestones is recorded and monitored by various methods over the treatment period. Usually monitoring is executed by self-monitoring, which provides regular feedback of the progress and the feasibility of the executed behavior change. (Butryn et al., 2011.)

Behavioral weight loss treatment consists of behavior change techniques that target dietary restraint, habit strength, and autonomous diet self-regulation. Potential mechanisms of action for weight loss, which are often referred as dietary restraint, are

the restriction of the amount and type of food and drinks consumed and thereby create healthy eating behaviors, the prevention of overeating by portion control or avoiding unhealthy food, the adjustment of eating behavior after over consuming, and the consciousness of food choices in order to control weight. (Bates et al., 2021.)

The success of weight loss depends heavily on dieter's motivation. Good results are gained in weight loss programs, when the behavior executed is perceived as valued and can be seen important to the individual, is consistent with intrinsic goals or outcomes, and is perceived as an important part of the dieter's identity. Besides of the weight loss, the further aim of the behavioral weight loss management is, that the healthy dietary behaviors become habitual and may after the initial weight loss program aid in the maintenance of weight loss. (Bates et al., 2021.)

Several behavioral and psychological factors are related to weight loss. Eating self-efficacy has been studied as a predictor of weight loss in many trials. (Björkman et al., 2022). A number of studies have been examining self-efficacy in the context of behavioral weight loss treatment. In the context of dietary restraint, the research focuses on eating self-efficacy. The aim of the research has frequently been examining the effect of eating self-efficacy related to the perceived weight loss. It is to be noted, that the importance of self-efficacy as a predictive factor of weight loss in a behavioral weight loss treatment has had inconsistent results in research and even opposing results have been expressed. (Edell et al., 1987; Jeffery, 2004; Prochaska et al., 1992; Teixeira et al., 2002.)

2.5 Self-efficacy and dietary lapse

Weight loss is typically achieved through a diet program with dietary guidelines. Those who are able to adhere to the prescriptive guidelines and thus achieve a negative energy balance lose weight. When individual violates dietary recommendations i.e. indulges to a dietary lapse, the weight loss can be much less than expected. (Goldstein, 2016.) Fundamentally, failure in weight loss is a problem of lapses, because unexpected eating increases calorie intake and leads to weight regain (Goldstein et al., 2018).

Temptation from palatable food causes nonadherence to diet and dietary guidelines causing dietary lapses (McKee et al., 2014). Dietary lapses are an important intervention target, because frequent lapsing predicts failure in weight loss (Goldstein et al., 2018) and lapses indicate later relapses (Goldstein, 2016). The stronger the food temptation, the more likely the dieter is to lapse (McKee et al., 2014).

Dietary lapses are driven by powerful physiological and psychological reinforcement processes (Goldstein et al., 2018). In the research, dietary lapses have been divided into six behavioral lapse types. These lapse types are eating a larger portion, eating an off-plan food, eating when not intended, being unaware of caloric content, executing a planned lapse or a combination of multiple types of lapses. (Goldstein et al., 2020.)

Dietary lapses are predictable by several internal and external factors, which are called lapse triggers. Lapse triggers can be divided into three different categories, which are specific environmental triggers (e.g., watching television, the presence of food cues in the environment), internal context triggers (e.g., hunger, negative or positive mood, stress, boredom and feeling of deprivation), and associated triggers (e.g., sleep deprivation, alcohol intake, cognitive loads). (Forman et al., 2016.) Many trait-like factors can affect eating behavior and therefore a number of trait-like factors can be used in predicting dietary lapses. Trait-like factors are (1) weight and height, (2) age, sex and ethnicity, (3) dieting and weight history, (4) restraint and overeating, (5) responsivity to food, and (6) propensity for food cravings. (Goldstein et al., 2018.)

Resisting temptations and adjusting performance in demands of high risk situations have specific relationships with self-efficacy (Luszczynska and Schwartzer, 2005, p. 128-130). Low eating self-efficacy is associated with greater dietary lapse frequency (Latner et al., 2013). The greater eating self-efficacy perceived by a person, the less chance there is of dietary lapse (Schumacher et al., 2018). Future success in dietary adherence can be predicted based on the past performance, because dietary lapse occurrence negatively predicts eating self-efficacy to resist dietary temptations in the future (McKee et al., 2014).

Eating self-efficacy is also associated with greater perceived lapse severity (Latner et al., 2013). Successful and unsuccessful weight-loss maintainers may differ from each other on how they react and respond to dietary lapses (Dohm et al., 2001). When a dieter sees lapses as positive temporary and reinforcing coping responses, it can predict optimistic perceptions of future eating self-efficacy following a lapse (McKee et al., 2014).

3 PURPOSE, AIMS AND RESEARCH QUESTIONS OF THE THESIS

It is important to determine which psychosocial variables are reliable predictors in behavioral weight loss programs, in order to achieve successful behavior and weight change (Nezami et al., 2017). The purpose of the thesis is to increase knowledge about what contributing factors affect and how they affect eating self-efficacy in behavioral weight loss treatment in the context of adults, that have no affiliated diseases or disorders per se.

A tentative literature review was conducted in three electronic databases to determine and delineate the research topic as more precise. The review indicated, that eating self-efficacy has been studied in the context of behavioral weight loss treatment in many different trials. Although extensive research has been carried out on the area, no single study exists which adequately covers and brings together research findings of the contributing factors and their effects on eating self-efficacy in behavioral weight loss treatment. The thesis aims to identify existing research findings of the contributing factors and their effects on eating self- efficacy in behavioral weight loss treatment. The research questions of the thesis are:

What are the contributing factors that affect eating self-efficacy during a behavioral weight loss treatment?

How do the contributing factors affect eating self-efficacy?

4 RESEARCH METHODOLOGY

4.1 Systematic literature review

Systematic literature reviews are usually executed to summarize existing evidence of an issue, identify gaps in current research, or provide framework or a background to new research. The synthesis executed in a systematic literature review must be fair and invisible. Prominent to systematic reviews is a predefined and complete search strategy, which has to be made invisible for the reader. Identifying and reporting of research, that does not support the research question is utterly important. The advantages of systematic literature reviews are, that well-defined methodology decreases bias, evidence of the phenomenon is robust and transferable, and in qualitative studies, the opportunity for using meta-analysis. (Kitchenham and Charters, 2007.)

For the completion of a qualitative data analysis, it is necessary to be aware of some key factors. The analytical steps of the study must be invisible and they have to be fully understandable by the reader. The research methodology and analysis selected should be appropriate for the topic. It is also important to justify the analysis process used in the study. (Lester et al., 2020.)

Qualitative research method provides the researcher to obtain a deep and multifaceted understanding of the existing phenomena. More specifically, since the study design and the implementation phase constitute of an iterative process, the thesis process is conducted following a thematic analysis. (Lester et al., 2020.)

The thesis focuses on findings that are represented as primary outcomes of the original studies, as well as on factors that are observed as secondary outcomes or are otherwise mentioned as results of the research. The examination will be executed by a systematic literature review of the evidence base of research articles in the topic area, looking at the design of the studies and identifying any other factors that are thought to be involved in the topic.

4.2 Search strategy

The search for literature was executed in electronic databases Google Scholar, CINALH (Ebsco), PubMed and Science Direct, with keywords (“self-efficacy OR self efficacy”) AND (“behavioral weight loss” OR “obesity treatment”) AND (study OR trial) NOT (children OR adolescent OR cancer OR diabetes OR anorexia OR bulimia OR bariatric OR stroke OR hyperlipidemia). The databases and keywords were selected on the basis of a tentative literature search. The search showed that obesity treatment and term self-efficacy were often linked to a treatment of a disease or disorder. Because the focus of the thesis is in adults, that have no affiliated diseases or disorders per se, excluding keywords were added according to the remarks made in the tentative search. Keywords, that exclude reviews were also added according to the remarks made in the tentative search. The utilization of the excluding terms was processed carefully to minimize the number of excluded records that would have been relevant for the thesis.

On 9 April 2022 the final search was executed in Google Scholar and CINALH (Ebsco) databases. The search in Google Scholar database was executed with keywords (“self-efficacy” OR “self efficacy”) AND (trial OR study) AND (“behavioral weight loss” OR “obesity treatment”) -children -adolescent -cancer -diabetes -anorexia -bulimia -bariatric -stroke -hyperlipidemia. The search in CINALH (Ebsco) database was executed with keywords (“self-efficacy” OR “self efficacy”) AND (trial OR study) AND (“behavioral weight loss” OR “obesity treatment”) NOT (children OR adolescent OR cancer OR diabetes OR anorexia OR bulimia OR bariatric OR stroke OR hyperlipidemia). On 10 April 2022 the final search was executed in Science Direct database with keywords (“self-efficacy” OR “self efficacy”) AND (“behavioral weight loss” OR “obesity treatment”) AND (trial OR study) -children -adolescent -cancer -diabetes -anorexia -bulimia -bariatric -stroke -hyperlipidemia. The search was limited to access type “Open access and Open archive”. On 23 April 2022 the final search was executed in PubMed database with keywords (“self-efficacy” OR “self efficacy”) AND (“behavioral weight loss” OR “obesity treatment”) NOT (children OR adolescent OR cancer OR diabetes OR anorexia OR bulimia OR bariatric OR stroke OR hyperlipidemia). The search was limited with filters “Case Reports”,

“Classical articles”, “Clinical Study”, “Clinical Trial Protocol”, “Introductory Journal Article” and “Observational Study”. Also filter “Free full text” was assessed.

To the systematic literature review included were research articles

1. that are written in English;
2. that are published in 1995 or later;
3. that perform an experimental intervention involving humans or use secondary data from an intervention performed involving humans;
4. in which eating self-efficacy is measured;
5. that provide relevant information regarding the research design and research question, and relate to the contributing factors that affect changes in eating self-efficacy during a behavioral weight loss treatment;
6. that are available in a full text mode in the database and have open access;
7. that are published in an Impact Factor rated journal; and
8. that are examined to be trustworthy, valued and relevant by the Quality Criteria Checklist of the Academy of Nutrition and Dietetics.

From the systematic literature review excluded were records, that

1. are literature reviews or systematic literature reviews;
2. concentrate primarily on socioeconomic, racial, ethnic or similar aspects in obesity treatment; and
3. don’t provide relevant information regarding the research design and research question.

The flowchart for the search process is presented in Figure 2.

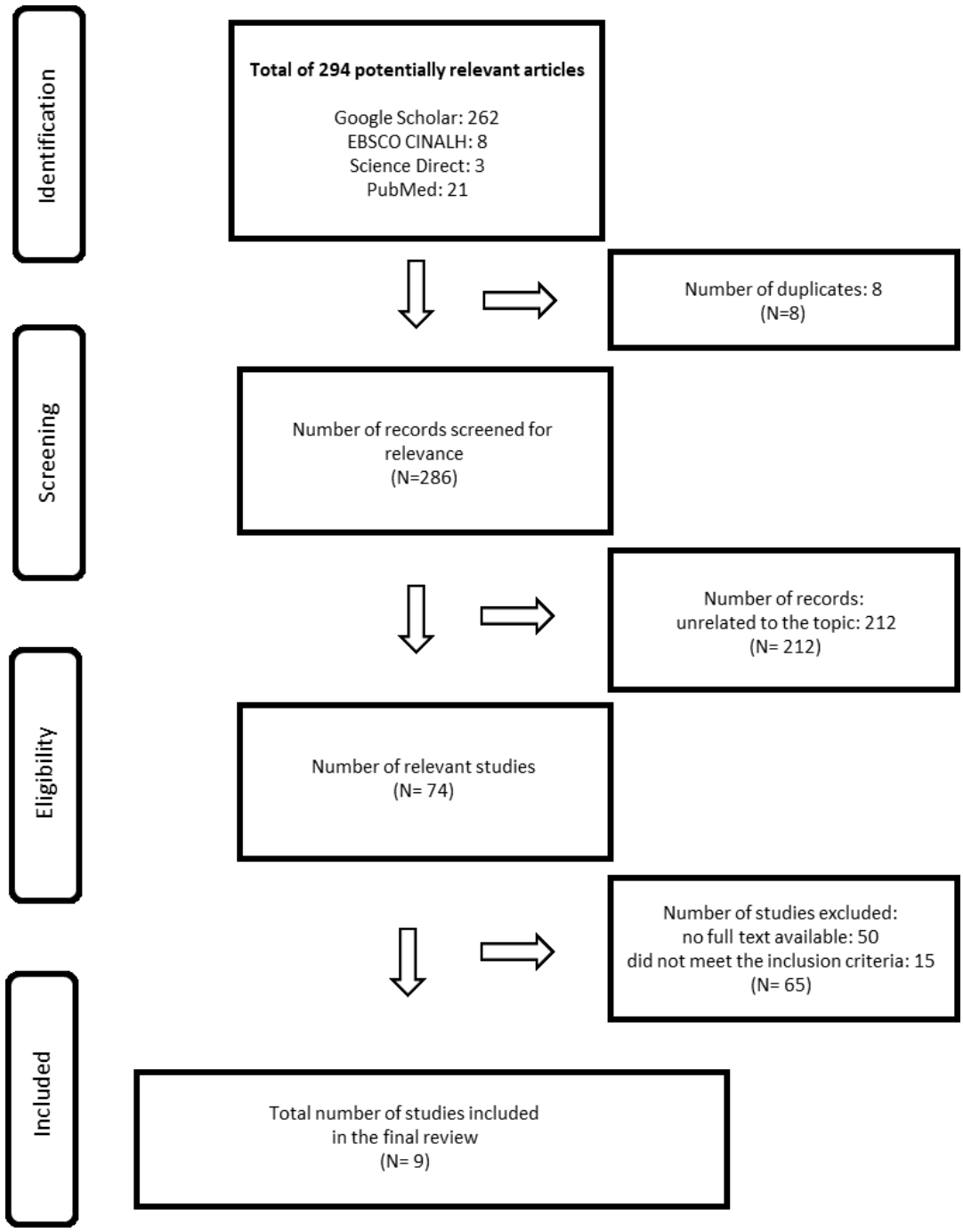

Figure 2. Flowchart of database search.

The search process was executed by the author with the contribution of the information service desk of Satakunta University of Applied Sciences. The identification phase was made in electronic databases only. The screening process was proceeded by first observing every topic of a record and along dividing the records into three classes

according to the including/ excluding criteria. The classes were (1) included by topic, (2) excluded by the topic, and (3) included/ excluded after reading the abstract. After the process, articles that were supposed to meet the including criteria, i.e. relevant studies, were present. In the eligibility phase, all the relevant studies were read in order identify articles, that fulfill the inclusion criteria. For example, an article by Björkman et al. (2022) was excluded, because even though the study aimed to evaluate eating related factors and self-efficacy in behavioral weight loss treatment, the self-efficacy was addressed using a question, that did not measure eating self-efficacy. In the same process the records, that were not available in full text mode were abandoned.

As a result of the search protocol, 18 studies were considered as relevant for the systematic literature review. The included studies were evaluated and the quality of the studies was assessed by using the Quality Criteria Checklist of the Academy of Nutrition and Dietetics. However, after that, along with the analytical framework, was noticed, that even though all of the included studies measured the score and the changes in scores of eating self-efficacy, nine of the included studies did not answer clearly to the research question. One of the cornerstones in executing a systematic literature review is the request to identify and report of research, that does not support the research question (Kitchenham and Charters, 2007). According to this request, these nine unrelated studies were excluded from the review.

4.3 Analytical framework

The systematic literature review that will be presented in the thesis follows a protocol established by Thomas and Harden (2008). The authors have created a three-stage thematic synthesis method for qualitative research. The aim of the synthesis method is to look beyond the descriptive content of the original studies. By that it is possible to express more meaningful insights, new interpretive constructs and explanations to the item. Stage one includes line-by-line coding. In this stage the texts taken from the original studies are coded inductively to capture the meaning and the content of each sentence. Stage two includes the development of descriptive themes. In this stage the similarities and differences between the first stage codes are looked and grouped into a hierarchical tree structure. Stage three includes generation of analytical themes,

which form the actual synthesis product and offers insights beyond the content of the original studies. The protocol offers a transparent, rigor and clear way to execute the data synthesis for the intended purpose. (Thomas and Harden, 2008.) An example of the three-stage thematic synthesis is illustrated in figure 3.

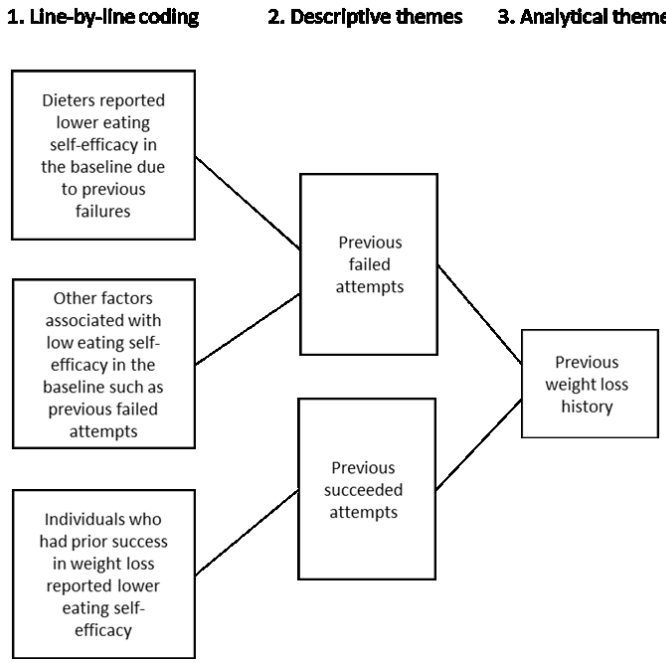

Figure 3. An example of the three-stage thematic synthesis.

The authors argue, that the three-stage thematic synthesis provides a transparent manner to synthesize qualitative research. In the synthesis of qualitative data the reviewer translates themes and concepts of the original studies, which are more often executed using different designs, methods and frameworks, according to the needs of the present study. It is extremely important to check that each transfer is valid and that research findings are not de-contextualized and transferred to another context. The context of the original studies (aims, methods, settings and samples) are listed in table 1 to provide a structured summary of each design. (Thomas and Harden, 2008.)

Table 1. Studies included in the systematic literature review.

Authors	Aim/objective	Context of obesity	Age	Methods	Self-efficacy scale used
Annesi, (2012)	To synthesize research on associations of changes in exercise behaviors, psychosocial factors, eating behaviors, and weight; and then conduct further direct testing to inform the development on and improved treatment approach.	BMI $\geq$ 35 kg/m^2	21 years or older	A systematic program review and a field-based study	Weight Efficacy Lifestyle Scale
Annesi, (2021)	To examine if tailored obesity treatments concerning individual psychological characteristiscs predict improved outcomes.	BMI $\geq$ 30 kg/m^2	18 - 60 years, only women	Weight-loss trial	Weight Efficacy Lifestyle Scale
Annesi and Mareno, (2017)	To evaluate mediation of the prediction of nutritional changes by changes in physical activity, through social cognitive theory variables.	BMI 30 - 40 kg/m^2	21 years or older	Secondary data analysis	Weight Efficacy Lifestyle Scale
Annesi and Porter, (2013)	To provide better understanding of how psychological variables may affect relationships between increased exercise and improved eating	Severe obesity	Adults	Weight loss trial, randomly assigned participants	Weight Efficacy Lifestyle Scale
Annesi and Tennant, (2013)	To test relationships between exercise and changes in self-regulation, mood, and self-efficacy transfers to improved eating.	BMI 40 - 55 kg/m^2	21 years or older	Weight-loss trial	Weight Efficacy Lifestyle Scale
Kerrigan et al., (2018)	To evaluate differences in baseline psychosocial processes, changes in these over time, and weight losss between individuals who have and have not previously been successful loosing weight through self-regulating dietary intake.	BMI 27 - 45 kg/m^2	18 - 70 years	Randomized trial	Weight Efficacy Lifestyle Scale
Nezami et al., (2017)	To determine whether eating self-efficacy and physical activity self-efficacy are predictive on dietary intake, physical activity, and weight change within a behavioral weight loss intervention, and whether dietary intake and physical activity mediate relationships between self-efficacy and weight change.	BMI 24 - 40 kg/m^2	18 - 55 years	Randomized controlled trial	Weight Efficacy Lifestyle Scale
Ogden, (1995)	To examine the cognitive and motivational consequences of dieting behavior.	Unknown	Adults, only women	Weight loss trial	Eating Self Efficacy Scale
Warziski et al., (2007)	To determine if self-efficacy and dietary adherence is associated with weight change, and what impact self-efficacy has on weight change after controlling for adherence.	BMI 27 - 43 kg/m^2	18 - 55 years	Secondary data analysis from randomized behavioral weight-loss treatment study	Weight Efficacy Lifestyle Scale

4.4 Quality assurance

The scientific position of the included original studies was ensured by the revisioning of the publishing in Impact Factor rated journal. In addition, to reduce the risk of bias, each of the included study was evaluated based on the appropriateness of the study design and the quality of the method and procedure by using the Quality Criteria Checklist of the Academy of Nutrition and Dietetics. The checklist includes ten validity questions to address the scientific soundness of the original studies. (Handu et al., 2016.) The results of the survey of Quality Criteria Checklist are expressed in table 2.

Table 2. Results of the survey of Quality Criteria Checklist.

	Quality Criteria Checklist										**Validity**
Study	1. Was the research question clearly stated?	2. Was the selection of study subjects/ patients free from bias?	3. Were study groups comparable?	4. Was method of handling withdrawals described?	5. Was blinding used to prevent introduction of bias?	6. Were intervention/ therapeutic regimens/ exposure factor or procedure and any comparison(s described in detail? Were interventing factors described?	7. Were outcomes clearly defined and the measurements valid and reliable?	8. Was the statistical analysis appropriate for the study design and type of outcome indicators?	9. Are conclusions supported by results with biases and limitations taken into consideration?	10. Is bias due to study's funding or sponsorship unlikely?	
Annesi (2012)	Yes	Yes	Yes	No	Can't tell	Yes	Yes	Yes	Can't tell	No	Neutral
Annesi (2021)	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Neutral
Annesi and Mareno (2017)	Yes	Yes	Yes	Can't tell [1]	Can't tell [1]	Yes	Yes	Yes	Yes	No	Neutral
Annesi and Porter (2013)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Positive
Annesi and Tennant (2013)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Postive
Kerrigan et al. (2018)	Yes	Yes	Yes	Can't tell	Can't tell	Yes	Yes	Yes	Yes	No	Neutral
Nezami et al. (2017)	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	No	Neutral
Ogden (1995)	Yes	Yes	Yes	No	Can't tell	Yes	Yes	Yes	Yes	No	Neutral
Warziski et al. (2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Positive
1) Secondary data analysis, no access to the original study											

As a result, the Quality Criteria Checklist divides the studies in three ranks: positive, neutral and negative. Xiao and Watson (2019) suggest, that high-quality studies should be used in major arguments and synthesis before medium-quality studies. Low-quality studies cannot be used as foundation literature, but only as supplements. According to this, studies with ranks “positive” and “neutral” were included in the thesis. All of the evaluated studies fulfilled these criteria.

5 RESULTS

Answers to the research questions were found in nine studies. In the thematic analysis procedure, five contributing factors and their effects on eating self-efficacy were identified. The contributing factors are previous weight loss history, performance attainment, treatment attendance, physical activity, and improved eating. The three-stage thematic analysis work processes for previous weight loss history and performance attainment is shown in table 3 and for treatment attendance, physical activity and improved eating in table 4.

Table 3. The three-stage thematic analysis processes for previous weight loss history and performance attainment.

1. Line-by-line coding	2. Descriptive themes	3. Analytical themes
Dieters reported lower eating self-efficacy in the baseline due to previous failures.	Previous failed attempts in weight loss	**Previous weight loss history**
Other factors are associated with low eating self-efficacy in the baseline such as previous failed attempts.		
Individuals who had prior success in weight loss reported lower eating self-efficacy.	Previous succeeded attempts in weight loss	
Self-efficacy can be nurtured through new-found feelings of ability.	Positive outcomes along the treatment	**Performance attainment**
Performance attainment is the most powerful source of self-efficacy enhancement.		
After repeated failures and no real weight loss the negative effects accumulate resulting in differences in eating self-efficacy.	Negative outcomes along the treatment	

Table 4. The three-stage thematic analysis processes for treatment attendance, physical activity and improved eating.

1. Line-by-line coding	2. Descriptive themes	3. Analytical themes
Participants with complete dietary data had a greater increase in eating self-efficacy than participants without.	Engagement in treatement	**Treatment attendance**
Attendance was highly positively correlated with change in self-efficacy for weight control. It is likely that this relationship is bidirectional.	Positive correlation with attendance	
It is possible that individuals with prior success experienced larger improvements in self-efficacy over the tratment, they felt more engagement in treatment, yielding higher attendance. It is also possible that greater increases in self-efficacy is due to higher levels of attendance.		
Eating self-efficacy was significantly related to both increased exercise and improved eating.	Exercise improves, emanates and predicts.	**Physical activity**
Improvements in self-efficacy for exercise predicted greater changes in self-efficacy to control one's eating.		
Minimal volume of exercise is associated with as much improvement in eating self-efficacy as with greater volumes.		
Emanating from exercise changes, eating changes suggested reciprocal relationships with improvements in eating self-efficacy.		
For eating self-efficacy, increased exercise fosters feelings of ability to control eating, while improved eating is also associated with an increase in self-efficacy to eat better.	Exercise impacts positively and fosters feelings of ability	
Physical activity positively impacts eating behaviors through improvements in self-efficacy to exert control over eating.		
Adding a nutrition component that targets increases in eating self-efficacy to behaviorally supported exercise appeared to be useful.	Added nutrition component	**Improved eating**
Exercise program-induced improvements in eating self-efficacy predicts increased fruit and vegetable consumption.	Changes in fruit and vegetable intake	
There are reciprocal effects between change in fruit and vegetable intake and changes eating self-efficacy.		

5.1 Previous weight loss history

Previous weight history has impact on eating self-efficacy in the baseline of the behavioral weight loss treatment. Individuals, who had previous attempts of losing weight, reported lower eating self-efficacy compared to those, who did not have previous weight loss history. It is possible, that individuals who have previous attempts of losing weight feel they are less able to cope with high risk situations related to eating. (Ogden, 1995.) It is also possible, that dieting increases feelings of low control and restrained eaters' motivation for changes and dieting (Ogden, 1995; Nezami et al., 2017).

In the comparison of successful and unsuccessful previous weight loss, the situation seems to be two-folded. According to Kerrigan et al. (2018), individuals with prior success in weight loss reported lower self-efficacy compared to those, who did not have previous weight loss history. It is also possible that low eating self-efficacy in the baseline could be related to previous attempts in making dietary changes to lose weight. Individuals who have been unsuccessful in the past weight loss attempts, are possibly not able to make required changes in behavior during the treatment. (Nezami et al., 2017.)

5.2 Performance attainment

Self-efficacy could be nurtured through new-found feelings of ability (Annesi, 2021). The power of performance attainment, which in the context of obesity treatment is usually perceived successful weight loss, fosters the enhancement of self-efficacy (Warziski et al., 2007).

In the long term, after repeated unsuccessful attempts to lose weight and no substantial weight loss, the negative effects accumulate and result differences in eating self-efficacy. This may increase the tendency to overeat and exacerbate trait differences (Ogden, 1995).

5.3 Treatment attendance

Greater increase in eating self-efficacy during the first month of the treatment had individuals with complete dietary data (Nezami et al., 2017). Treatment attendance is highly positively correlated with changes in eating self-efficacy. The relationship is likely bidirectional. Therefore, it is possible that individuals who experience larger improvements in eating self-efficacy, yield higher attendance, because they are more engaged in the treatment. It is also possible that individuals' experience of grater increases in self-efficacy is due to higher levels of attendance. (Kerrigan et al., 2018.)

5.4 Physical activity

Changes in eating self-efficacy in behavioral weight loss treatment are significantly related to both improved eating and increased physical activity. Greater changes in eating self-efficacy were predicted by the changes in exercise self-efficacy, the role of efficacy beliefs in maintaining adherence to physical activity. (Annesi, 2012.) It is likely, that eating changes have a reciprocal relationship with eating self-efficacy emanating from the changes in exercise. Improved eating self-efficacy and improved eating enhance individual's confidence to the ability to prolog himself or herself in the area of physical activity in further efforts. (Annesi and Porter, 2013.)

Increased physical activity precipitates feeling of ability to control eating and exerts control over eating, which result improvements in eating self-efficacy (Annesi and Mareno, 2017). Meaningful improvement in self-efficacy is possible to achieve by a comparatively low volume of exercise, which contains two physical activity sessions for 15 to 30 min of moderate-intensity exercise per week. Physical activity affects significantly mood and the volume of the mood is promoted by eating self-efficacy. (Annesi and Tennant, 2013.)

5.5 Improved eating

Improved eating is examined through fruit and vegetable intake, which is the present measure for the quality of eating (Annesi and Porter, 2013). Increase in fruit and vegetable consumption can be predicted by exercise program-induced improvements in self-efficacy (Annesi and Tennant, 2013). There is a reciprocal effect between change in fruit and vegetable intake and change in eating self-efficacy, and the effect is resulting from the change in volume of exercise. With the reciprocal relationship between eating self-efficacy and fruit and vegetable intake, increased exercise appears to have a positive association with improvements in eating self-efficacy. (Annesi and Porter, 2013.) When tackling obesity with behavioral weight loss treatment, it appears to be useful to combine behaviorally supported physical activity and nutrition component which targets increases in eating self-efficacy (Annesi and Tennant, 2013).

6 DISCUSSION

6.1 Contributing factors and effects for eating self-efficacy in behavioral weight loss treatment

Self-efficacy is a theoretical fundamental component of social cognitive theory. According to social cognitive theory, self-efficacy is formed by four sources of influence, which are previous mastery experiences, vicarious experience, social persuasion, and emotional arousal. (Bandura, 1994; Bandura, 1998.) Eating self-efficacy is defined as the belief of one's ability to self-regulate eating (Lombardo et al., 2021).

Eating self-efficacy has been studied in the context of weight loss in many different trials. Although extensive research has been carried out on the area, no single study exists which adequately covers and brings together research findings of the contributing factors and their effects on eating self-efficacy in behavioral weight loss

treatment. The purpose of the thesis was to increase knowledge about which contributing factors affect eating self-efficacy with the research question *What are the contributing factors that affect eating self-efficacy during a behavioral weight loss treatment?* The purpose of the thesis was also to find out the effects of the contributing factors with the research question *How do the contributing factors affect eating self-efficacy?*

In the systematic literature review, which was based on search protocol conducted in three electronic databases, the thesis aimed to identify existing research findings of the contributing factors and their effects on eating self-efficacy in behavioral weight loss treatment. The thesis focused on findings that are represented as primary outcomes of the original studies, as well as on factors that are observed as secondary outcomes or are otherwise mentioned as results of the research.

The scope was to identify contributing factors, that are either actually measured as variables in the study design or are otherwise expressed to be related to the changes in eating self-efficacy. The study aimed to look beyond the findings of the existing research in order to be able to contribute new ideas in the context of eating self-efficacy in behavioral weight loss treatment. The results are assumed to be relevant in developing intervention methods in the area of behavioral weight loss treatment.

In the thesis, five different contributing factors that affect eating self-efficacy in behavioral weight loss treatment were recognized. The recognized contributing factors are previous weight loss history, performance attainment, treatment attendance, physical activity, and improved eating. The thesis also found answers to how these contributing factors affect eating self-efficacy.

6.2 Previous weight loss history: contribution and effect for eating self-efficacy

Self-efficacy develops through person's life according to his or her experience and perception (Strecher et al., 1986). Previous weight loss experiences seem to have much impact on the eating self-efficacy especially in the baseline of the weight loss treatment. Dieters, who had previous attempts of dieting, esteemed lower eating self-

efficacy compared to those who did not have previous attempts of losing weight, despite whether they had been experiencing success or failure. This finding is compatible with Bandura's self-efficacy theory which stresses that previous mastery experiences have influence on self-efficacy (Kelder et al., 2015). According to Bandura (1994) low sense of self-efficacy visualizes failure scenarios and things that can go wrong. Remarkable finding is, that individuals, who have been successful in previous weight loss attempts, scored lower eating self-efficacy than individuals with no previous attempts. According to self-efficacy theory, high sense of self-efficacy provides positive guides and supports for performance (Bandura, 1994). This suggests that there must be other impacting factors than the previous perceived success. An example of this could be a situation, where weight has started to regain after successful weight loss attempt, and the circle of weight loss and repetitive weight regain is believed to be initiated all over. According to Latner et al. (2013) it is likely, that persons with weight regain perceive lower self-efficacy, because of the regained weight. Based on the results of the thesis, another explanation for the lower eating self-efficacy could be the idea, that the higher success perceived in previous weight loss attempts, the less eating self-efficacy is needed for the upcoming weight loss treatment.

6.3 Performance attainment: contribution and effect for eating self-efficacy

Performance attainment seems to be related to changes in eating self-efficacy. According to Nezami et al. (2017), it is possible, that successful weight loss leads to an increase in eating self-efficacy and self-efficacy actually acts as a promotor in the weight loss treatment. However, it is not known which of the factors, successful weight loss or enhanced eating self-efficacy, is the first to come. It is possible that the relationship is reciprocal, which means that self-efficacy can be both a predictor of weight-loss or an effect of successful behavior change. (Nezami et al., 2017.) According to self-efficacy theory, individuals are ready to engage activities or situations they believe they are able to handle (Bandura, 1994). Positive emotional arousal is occurred, when the dieter perceives success, which leads closer to the desired weight loss goal (Kelder et al., 2015). Intended and successful weight loss can enhance the feeling of ability as part of the weight loss goal is already achieved. This can foster

the perception of being capable to lose weight in the future, which encourages to continue the weight loss treatment.

6.4 Treatment attendance: contribution and effect for eating self-efficacy

The relationship between treatment attendance and eating self-efficacy is likely bidirectional (Kerrigan et al., 2018). In this thesis, the existence of a complete dietary data has been interpreted as a proof of individual's significant commitment to the treatment and thus, the conclusion is that eating self-efficacy increased greater among individuals, who were committed to the treatment. Completers of treatment reported higher scores on eating self-efficacy compared to non-completers (Björkman et al., 2022). This can also be interpreted to be a mark of high attendance, as the drop-outs are considered not to be severe attendances. The findings in the original studies give just a slight mark, that attendance is a contributing factor. However, Warziski et al. (2007) remark, that after decreasing frequency of group sessions the dieters experienced weightregain and decreasing eating self-efficacy. This result can be partly due to the decrease in attendance, but there are also likely other influencing factors. It is characteristics of behavioral weight loss treatments to use group session strategies (Butryn et al., 2011). According to social cognitive theory, self-efficacy can be formed by vicarious experience and social persuasion (Kelder et al., 2015), which both can be promoted during the group sessions.

6.5 Physical activity: contribution and effect for eating self-efficacy

Physical activity and exercise provide plentiful health benefits especially for overweight and obese individuals, regardless of weight loss (Swift et al., 2014). Physical activity seems to be one of the prominent contributing factors affecting changes in eating self-efficacy (Annesi and Porter, 2013). The increasing effect of physical activity on eating self-efficacy may be based on the hypothesis of emotional arousal of social cognitive theory, which states, according to Kelder et al. (2015), that positive emotional state is related to higher self-efficacy. Physical activity also affects positively on mood (Kanning and Schlicht, 2010). In addition, social cognitive theory

states, that positive emotional state and higher self-efficacy predict higher task performance (Kelder et al., 2015). It is possible that physical activity fostered by positive emotional state ja enhanced eating self-efficacy create a condition, in which the higher task performance is seen as improved eating behavior and enhanced ability to control eating. However, the process may not be that coarse, because Annesi and Porter (2013) suggest, that there is a reciprocal relationship with eating changes and eating self-efficacy when these factors are induced in the field of physical activity.

6.6 Improved eating: contribution and effect for eating self-efficacy

Fruit and vegetable consumption has been used as a measure for the quality of eating. (Annesi and Tennant, 2013). The relationship between improved eating (i.e. fruit and vegetable consumption) and eating self-efficacy is in many research designs connected to actions of physical activity. According to Annesi and Tennant (2013), physical activity increases fruit and vegetable intake via improved eating self-efficacy induced by exercise, and they also suggest, that there is a reciprocal relationship with eating changes and eating self-efficacy emanating from physical activity, but the mechanism of reciprocity remains unclear based on the original studies. Dieters are engaged in restricted calorie intake (Butryn et al., 2011) because if weight loss is desired, the number of calories consumed must be less than the number burned (Umaru et al., 2021). Restricted calorie intake is not necessarily achieved by increasing fruit and vegetable consumption, but as plant-derived foods have an essential role on the prevention of lifestyle diseases, such as obesity (Dragsted et al., 2005), it is assumable, that many dieters are intended to eat healthier food, which in one's part means preferring to eat fruit and vegetables. In behavioral weight loss treatments dieters are often provided with education of healthy lifestyle and food (Annesi and Porter, 2013), but the mechanism of the formation of eating self-efficacy affected by improved eating in the context of social cognitive theory stays indefinite. However, when tackling obesity by behavioral weight loss treatment, it appears to be useful to combine behaviorally supported physical activity and nutrition component which target increases in eating self-efficacy (Annesi and Tennant, 2013).

6.7 Discussion of research

The material of the systematic literature review consisted of original studies with various research designs, objectives and samples. Many of the studies concentrated primarily on examining other variables than variables that contribute to eating self-efficacy. The aim of the thesis was to increase knowledge about what contributing factors affect and how they affect eating self-efficacy in behavioral weight loss treatment. The intention was to broaden understanding of allocated meanings rather than execute an exhaustive coverage of the subject.

Many of the behavioral weight loss interventions are designed to target increase in eating self-efficacy among participants. The increase is suggested to be achieved by integrated strategies, such as goal setting, problem solving and personalized feedback aspiring to increase participants' confidence in making behavior change. The perceived increase of self-efficacy in weight loss interventions is considered to be due to the executed intervention strategies. However, it is not clear if the use of these strategies actually is the reason for the increase in self-efficacy. (Nezami et al., 2017.) Even though eating self-efficacy was measured over the behavioral weight loss treatment in many of the original studies, the reason for the change in eating self-efficacy was only assumed to be caused by the treatment itself. For this reason, the thesis focused on factors, that were examined as variables in the original studies or otherwise mentioned as outcomes of the research.

The thesis has highlighted the large number of terms used for eating self-efficacy and noticed a variability of scales used to measure eating self-efficacy. There is a lack of consensus over the term used and the optimal regime for measuring eating self-efficacy, of which the latter is supported by Singer et al. (2017). It is possible, that for its part, the different scales used in studies of different research designs cause divergent outcomes between the studies (Singer et al., 2017). For the systematic literature review of the thesis, included were studies that used either Weight efficacy lifestyle scale or Eating self efficacy scale. As no quantitative analysis was executed in the thesis and the eligibility of each original study was examined as its own entity, the results and

findings of the original studies were judged to be suitable for conducting a thematic synthesis using a qualitative research method.

6.8 Recommendations for future research

The thesis highlighted several areas where research is proposed to be focused on in the future. First of all, as results of the thesis, some indication of which factors affect and how they affect eating self-efficacy in behavioral weight loss treatment were obtained. Only minor number of the original studies examined contributing factors as primary variables and the outcomes of these studies were also limited. However, the thesis gives indications, which can be used as signposts for the future research of the factors affecting eating self-efficacy. Because the research in this field is still fragmented and inadequate, more effort should be allocated to this topic with consensus of regimes. It is important to notice, that because the thesis focused on eating self-efficacy during a weight loss treatment, the contributing factors and their effects on eating self-efficacy in weight maintenance should also be highlighted.

The perceived increase of self-efficacy in weight loss interventions is considered to be due to the executed intervention strategies, such as goal setting, problem solving and personalized feedback aspiring to increase participants confidence in making behavior change. Because it is not clear if the use of these strategies actually is the reason for the increase in self-efficacy, it is suggested to find out whether these employed strategies actually are associated with these increases. This claim is supported by Nezami et al. (2017), who state, that it would be an important topic to be examined in the future.

There does not seem to be consensus over the optimal regime for measuring eating self-efficacy, which is reflected in the large number of scales. There is considered to be a need of development and validation for a unique and effective scale for measuring eating self-efficacy, which measures and generates data, that could be assessed as comparable for the use of research in the area.

Nordgren et al. (2008) bring out an interesting viewpoint on the effect of visceral states in health behavior. Research show, that there are differences in the baseline measurements depending on how hungry or satiated the dieter is. The rate of the satisfaction with the weight loss efforts was dependent on the rate of the satiety. The more hungry dieters, the satisfied were they with the weight loss efforts, the less they intended to lose and the less certain they were with the weight loss goals. This finding suggests, that heath cognition changes through day, and thus, it is possible, that health cognitions are dynamic constructs. Based on these facts, it should be considered, that visceral states should be included to the research assessments. (Nordgren et al., 2008.)

6.9 Research ethics and validity

The study was conducted under principles of good scientific practice. According to Whittemore et al. (2001), the validity of a qualitative research concerns both the research process and the research product. It is highly important to specify the criteria for validity for the study, utilize methodological techniques that are optimal for the study design and display the research process in detail critically. Presentation of research findings must be available for critical reflection by the reviewers. (Whittemore et al., 2001.)

The purpose of the thesis was to examine contributing factors affecting eating self-efficacy in a behavioral weight loss treatment. Another purpose was to find out how these factors affect eating self-efficacy. The data collecting phase was conducted by the author in electronic databases, which are commonly used for research data retrieval. The search protocol is made visible in the flowchart of the database search.

The scientific position of the included original studies was ensured by the revisioning of the publishing in Impact Factor rated journal. In addition, the quality, trustworthy, value and relevancy were ensured by the Quality Criteria Checklist of the Academy of Nutrition and Dietetics procedure. The study designs had to employ appropriate methods to be able to answer the research question. The data extraction phase was laborious, because the material included different study designs with different scales

and samples. Identifying the key concepts and deciding relevant information was demanding.

The workflow of the thematic synthesis was executed following a protocol, which provides the author to synthesize qualitative data in a transparent manner. The idea of going beyond the original research data is vulnerable and exposes to bias, which according to Pannucci and Wilkins (2011) can occur in every phase of the research. To make the data synthesis phase visible, the processes of the thematic synthesis are displayed in table 3 and 4.

This thesis has several limitations. The first limitation is, that the author was not familiar with the qualitative research method and she was not acquainted executing a systematic literature review. This lack of prior experience was replenished with the help of the supervisors and open source data. The second limitation is formed around the included research designs of the original studies. Studies had various kinds of designs, samples, scales and variables. Additionally, most studies did not measure variables, that were under the consideration of the thesis. Therefore, for reliable results, the accomplishment of the thematic synthesis following the decided method was executed using a valid procedure. The third limitation concerns the variety of terms used for eating self-efficacy. The equality of the used term had to be ensured under each study. The fourth limitation is the low number of the original studies that answered the research questions.

7 CONCLUSIONS

The thesis has highlighted five contributing factors that affect eating self-efficacy in behavioral weight loss treatment and extracted information how these factors affect eating self-efficacy. The thesis findings have increased knowledge in the area and the emerged knowledge has been connected to the theoretical basement. The intention was to broaden understanding of allocated meanings rather than execute an exhaustive

coverage of the subject. The findings of the thesis were not readily found within the original studies, but the results were made visible through thematic synthesis. The synthesis process necessitates interpretations and the meaning is removed from the original study design, which is why it is important to be aware of the limitations of the qualitative study.

The results have highlighted potential for future research into the role of the contributing factors and their effects on eating self-efficacy in behavioral weight loss treatment. The results have suggested that contributing factors that affect eating self-efficacy should be minded when developing behavioral weight loss treatments and interventions. Overall it can be conducted that the findings of the thesis provide a new lens through which eating self-efficacy can be viewed, and offer a range of area for future research.

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