



# Weight cycling and women

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*Final report MSc Thesis Health and Society*

*Which psychological, social and physical environmental factors influence yo-yo dieting in women?*

Eileen van de Pol  
February 2015



# MSc Thesis Report

## Chairgroup Health & Society (HSO)

Weight cycling and women

*Which psychological, social and physical environmental factors influence yo-yo dieting in women?*

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May 2014 – February 2015

MSc Applied Communication Science  
Specialization Health & Society

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## Acknowledgments

After months of hard work, the result is this final report on my master thesis about women and weight cycling. From 2009 until 2012 I attended the bachelor 'Health and Society' at Wageningen University. After that, I chose to do the subsequent master 'Health and Society'. As a part of my masters I went to Australia for my internship from November 2013 until February 2014. I was inspired by the big contrast over there in daily life. On the one hand there were overweight people with an unhealthy lifestyle and on the other hand there were super fit people with a really healthy lifestyle. Also there were a lot of different diets which you could try in order to lose weight, and this same trend could be seen in the Netherlands. So when I came back from my adventure, I had a question in my mind. I remember the first time I had a meeting with Maria Koelen, my supervisor throughout this process, about my topic. I said to her: 'I don't get it, why do women keep on dieting, while they know beforehand it won't work on the long term, why don't they just start eating healthy and exercise more?' Now, at the end of this whole thesis process, I admit I was a little bit naïve back then. Dieting, especially the yo-yo dieting process, is a complex multifactorial process.

I would like to express my gratitude to my supervisor prof. dr. Maria Koelen. I would like to thank her for her useful comments, her positive attitude and her enthusiasm. Every time after a meeting with her, I walked away with renewed energy and inspiration. I also would like to thank all the women whom I interviewed. Because of their personal stories this thesis got in touch with real stories about yo-yo dieting which added to the quality in my opinion. And I would like to thank my loved ones; my boyfriend, family, friends and housemates. They supported me throughout the entire process. Thanks for listening to me and thanks for giving me some space or distraction when needed.

This thesis was a good end of my great time in Wageningen. I learned a lot and I really enjoyed being back in Wageningen to write my thesis after being abroad half a year. Now I am ready for a new challenge; finding a job and applying my knowledge and skills elsewhere. Enjoy reading this thesis!

*Eileen*



## Abstract

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*Introduction* – The prevalence of obesity has increased over the past decades. At the same time, more women want to lose weight and start dieting. Failure of diets often occurs, which leads to regaining weight and restarting a diet. This weight cycling process had negative physical and psychological problems. A lack of knowledge on the influencing factors on the weight cycling process is experienced.

*Goal* – To gain knowledge about psychological, social and physical environmental factors that influence the weight cycling process in women. More knowledge about the weight cycling process in general can be achieved, which will contribute to understanding how to prevent and stop weight cycling amongst women.

*Methods* – The first part of this study covers a systematic literature review. To complement the results of this part, ten semi-structured interviews among yo-yo dieting women are held in the second part of this study.

*Results* – The systematic literature review revealed psychological factors are studied within literature and less focus was on social and physical environmental factors. Therefore, the interviews were focused on social and physical environmental factors. The results of both parts of the study show psychological, social, physical environmental, lifestyle and other factors are influencing the weight cycling process. The interviews show the weight cycling process consists next to the two important points (start of a diet and relapse from a diet) also of two other points (progress of a diet and regaining weight after relapse).

*Discussion and conclusion* – The results are brought into perspective with the aid of the ‘Main determinants of health model’. Start of a diet can be explained by the theory of planned behaviour and relapse from a diet by the attribution theory. The role of the social and physical environment is elaborated by the obesogenic environment. It can be concluded that the weight cycling process is a complicated process in which psychological factors influence this whole process and physical environmental and social factors should not be underestimated.

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# Chapter 1. Introduction

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## 1.1 Background

The prevalence of people with obesity has increased over the past decades. Being overweight and obese is nowadays considered as a public health issue with epidemic sizes (WHO, 2000). The health consequences of obesity and being overweight are numerous. Non-communicable diseases such as cardiovascular diseases, diabetes type II and some cancers are caused by an increased BMI (body mass index) (WHO, 2014). Since 1980, the prevalence of obesity has nearly doubled worldwide. In 2008, 1.4 billion adults of 20 years and older were overweight (WHO, 2014). Of those adults, nearly 300 million women were obese (WHO 2014). Obesity among women is significantly higher than amongst men worldwide, only in high income countries the prevalence of obesity amongst women and men is equal (WHO, 2014b).

At the same time that this obesity problem is increasing, the mass media depicts a slim and fit body as ideal (Putterman and Linden 2004). Slenderness among women is considered as a key factor for being attractive and appealing (Fisher and Voracek 2006). As a result, a lot of women experience a low body satisfaction (Lin and Kulik 2002). The weight and shape of a women's body contributes to how women feel about themselves in general. It even influences happiness, 74,5% of women reported weight and shape was a determining factor in happiness (Reba-Harrelson et al. 2009). BMI and body satisfaction are strongly related to each other, whereas a high BMI predicts high body dissatisfaction (Paxton et al. 1991).

Because of this body dissatisfaction, a lot of women want to lose weight (Putterman and Linden 2004). Amongst women who want to lose weight, 94% uses a dietary practice as a method (Williams et al. 2007). Dietary practices are used more frequently than exercising as a way of losing weight (Williams et al. 2007). At the same time of the increasing obesity prevalence, there is an increase in the prevalence of women who diet. In the study of Williams et al. (2007), 74% of the cohort, which contained 11,589 Australian mid-age women, is actively trying to control their weight (Williams et al. 2007). Overweight and obese women are not the only ones trying to lose weight, women with a normal weight are also dieting (Biener and Heaton 1995). Dieting is a very broad concept and dieting practices can vary highly. Commonly used practices to control weight for women are decrease food quantity, cut down in fats/sugar and exercise (Williams et al. 2007). Next to the regular dieting practices, women also make use of unhealthy dieting practices. Fasting, vomiting after eating, taking diet pills, diuretics, and laxatives are common practices among female dieters (Biener and Heaton 1995). Furthermore, women who use less moderate, unhealthy and dangerous dieting practices are more likely to binge eating (Neumark-Sztainer et al. 1995).

Although a lot of women are dieting and trying to lose weight, they often do not achieve their weight loss goals (Williams et al. 2007). A cause of failing in achieving weight loss goals is that often women quit their diet. In the study of Rytting et al. (1997) it is found that 50% respondents give up dieting within 8 weeks after the starting point of this diet (Rytting et al. 1997). Women also experience difficulty with preventing weight gain after weight loss by themselves (Drenick and Johnson 1977; Sarlio-Lahteenkorva et al. 2000; Hennecke and Freund 2013). Even long term treatment to prevent weight gain, seems to delay weight gain instead of prevent it (Wadden et al. 2007). Despite the fact

that a huge quantity of women are trying to lose weight, they are not able to prevent weight gain in the end (Williams et al. 2007). Weight gain after diet related weight loss is frequently present. A lot of women restart their diet after this event (Drenick and Johnson 1977).

As a result of this repeated dieting, women end up in a weight cycling process (Mason et al. 2013). Weight cycling is also known as yo-yo dieting and defined as a repeated cycle of weight loss and regain (Kajioka et al. 2002). Within this process, women are more prone to regain weight after weight loss than women without a diet history (Doucet et al. 2001). Weight regain prevention is nowadays even considered more important than interventions for losing weight, because of the weight regain after weight loss (Field et al. 2004).

Weight cycling has negative physical and psychological health consequences amongst women. A physical health consequence is, for example, that weight cycling is related to higher risks of morbidity (Lissner et al. 1991). Weight cycling has negative health consequences for body composition, elevated blood pressure and decreased resting energy expenditure. Greater weight gain is also a negative physical health consequence related to weight cycling (Kajioka et al. 2002).

Female weight cyclers may also experience negative psychological health consequences, such as less body satisfaction and lower self-esteem on appearance (Osborn et al. 2011). Women who weight cycle and binge eat experience a higher chance to depression, psychological distress, low self-esteem and use less healthy coping strategies than women who do not weight cycle and binge eat (Kensinger et al. 1998). The weight cycling process which women are in can be assessed as a negative process in general because women experience negative physical and psychological health consequences.

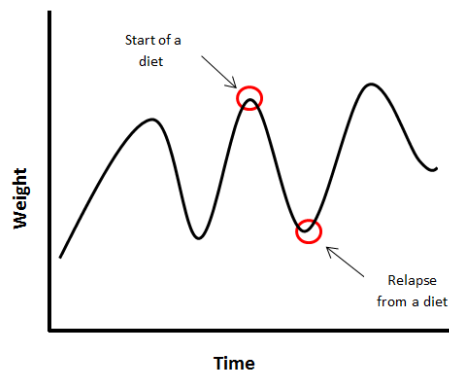
## **1.2 Problem**

The prevalence of obesity and people who are overweight is high and still increasing. Women who are overweight or obese often start dieting in order to lose weight. Failure of this diet and subsequent weight gain often ensures women end up in a weight cycling process. It is known weight cycling can have negative physical and psychological health consequences. The fact that women are in the weight cycling process is considered as negative, so it is important to know the influencing factors of women being in this process. Even though losing and regaining weight can be assessed as unhealthy, it is still important that women lose weight, considering the high levels of obesity and overweight prevalence worldwide and the related negative health consequences. The problem in this thesis is that not much is known about what factors causes that women are in the weight cycling process.

## **1.3 Goal**

The goal of this thesis is to gain knowledge about psychological, social and physical environmental factors that influence the weight cycling process in women. Therefore, more knowledge about the weight cycling process can be attained, which will contribute to a deeper understanding of how to prevent and stop weight cycling amongst women.

## 1.4 Core concepts



**Figure 1.** Two points of attention in the weight cycling process

In this thesis, two points in the weight cycling process are highlighted; (re)start of a diet and relapse from a diet. These points are returning points and refer to a change within the process. By studying the related causal factors of these points, more understanding of the weight cycling process will be achieved. The left red circle addresses start of a diet and the right red circle addresses a relapse from a diet.

### 1.4.1 Start of a diet

When a woman assesses herself as being overweight and experiences this as negative, she will be prone to start a diet in order to lose weight. This starting of a diet will be influenced by several factors, which will be studied in this thesis. After starting a diet and losing weight, relapse can occur and subsequent regain of weight as well. Restarting a diet can follow and is something which is also part of the weight cycling process. This starting a diet over and over again, is an interesting moment in the weight cycling process. Why would a woman restart a diet, while the previous attempt failed? The motivation for (re)starting the diet will vary between time and between dieters, and therefore is a focus point in this thesis.

### 1.4.2. Relapse from a diet

Relapse from a diet is a complicated issue, more elaboration about the nature and process about relapse is of value according to literature (Brownell et al. 1986). Relapse is a problem in the area of interventions for health-related behavior, and remains a significant challenge (Brownell et al. 1986). Relapse is explained in several definitions, but the most appropriate for this thesis is: 'The act or instance of backsliding, worsening or subsiding' (Brownell et al. 1986). This refers to relapse as a concept involved in a process, which is suitable considering relapse in this topic is part of the weight cycling process. As stated by Brownell (1986): 'A lapse is a single event, a reemergence of a previous habit, which may or may not lead to the state of relapse' (Brownell et al. 1986). Lapses and relapses are considered as different concepts, because different determinants appear to play a factor in explaining this behavior. In this thesis a focus will lay on relapse, because this is what characterizes the weight cycling process. The weight cycling process is defined as the repeated cycle of weight loss and regain (Kajioka et al. 2002), so a woman is only a weight cyler until actual relapse has occurred. Relapse is associated with negative psychological health consequences, such as disappointment, frustration and self-condemnation. These emotional effects may occur before, during and/or after relapse (Brownell and Stunkard 1981). A person can change his or her mind about aiming for a specific goal if relapse occurs. Lack of motivation because of the failure can cause the feeling the problem is beyond his or her control (Brownell et al. 1986). On the other hand, several failing

attempts also can impart the individual with knowledge and self-experience on his or her weaknesses. Taking this into account, relapse does not have to be a negative event (Schachter 1982). Understanding relapse from dieting and the ancillary causes of this relapse will provide more knowledge about the weight cycling process.

### **1.5 Research questions**

The main research question of this thesis is:

*What influences the weight cycling process in women between 18 and 64 years?*

The following sub-questions are formulated:

- 1. Which psychological, social and physical environmental factors influence (re)starting a diet in women between 18 and 64 years?*
- 2. Which psychological, social and physical environmental factors influence relapse from a diet in women between 18 and 64 years?*

The different kind of factors (psychological, social, physical environmental) will be further explained in chapter 2.1.

### **1.6 Research methods**

To find answers for this research questions, two research methods were used. First a systematic literature review was conducted to answer both the sub-questions. After that, interviews were conducted. The results of the literature review were used to complement the results of the literature review and used as input to develop the interview questionnaire. The interviews were semi-structured, because it offered room for extra questions which encouraged participants to share thoughts and experiences. The topic yo-yo-dieting can be assessed as sensitive. Qualitative research methods as for example interviews are appropriate for sensitive topics like yo-yo dieting (Boeije 2009). To describe and to explain are two goals which can be achieved by conducting qualitative research (Boeije 2009) and both goals are applicable in this thesis. The research methods will be elaborated in chapter 3 (systematic literature review) and chapter 4 (interviews).

### **1.7 Overview of this thesis**

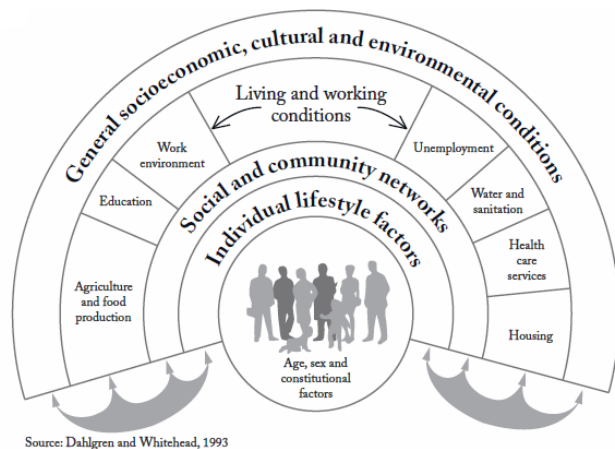
In chapter 2 a framework is presented, in which theories and models related to this topic are discussed. In chapter 3, the systematic literature review is presented in which methods are described and results are presented. In chapter 4 the methods and results of the interviews are discussed. In chapter 5, the results of chapter 3 and 4 are combined and discovered themes are discussed. The discussion and conclusion are described in chapter 6, followed by references and appendices.

## Chapter 2. Theoretical framework

To support the quality of this thesis, a theoretical framework is developed with appropriate models and theories. The 'main determinants of health model' from Dahlgren and Whitehead (1991) is used as a basis for this theoretical framework. This model covers a broad scope of influencing factors, and provides thereby a comprehensive view on the problem in this thesis. To underpin the different parts of this main determinants of health model, the theory of planned behavior, attribution theory and obesogenic environment are used for elaboration.

### 2.1 Main determinants of health model

When looking at a topic related to health, different perspectives are needed to gain a broad scope of a situation. To achieve this, the main determinants of health model of Dahlgren and Whitehead (1991) is used (Dahlgren and Whitehead 1991) (figure 2). This model was developed because different kind of health issues require different kind of interventions (Dahlgren and Whitehead 2006). It is possible to assess and approach a health issue from one way, but this will give a limited representation of reality. Different views are needed to take into account all the determinants and to achieve a comprehensive view. The center of the figure is about personal characteristics; age, sex and constitutional characteristics. These personal factors are mostly fixed and influence an individual (Dahlgren and Whitehead 1991). In the first layer, individual lifestyle factors are reflected in health behavior such as eating habits and physical activity (Dahlgren and Whitehead 2006). This first layer also includes psychological factors, which will be discussed with the theory of planned behavior and the attribution theory. These theories will be elaborated further in this chapter. The second layer of the model, social and community networks, reflects how a women interacts with her social and community network (Dahlgren and Whitehead 2006). Social factors are placed under this layer. Thereafter, living and working conditions can be found in the third layer of the model (Dahlgren and Whitehead 2006), physical environmental factors are placed under this layer. The physical environmental factors that may be found will be discussed with the aid of the obesogenic environment, which will be explained further in this chapter. Each of the layers of this model interacts with the other layers. Each layer can also influence an individual as can be seen in figure 2. Each factor within the layers can influence health positively (protective factor) or negatively (risk factor) (Dahlgren and Whitehead 1991). In Table 1 an overview of the layers and their related factors is presented.



Source: Dahlgren and Whitehead, 1993

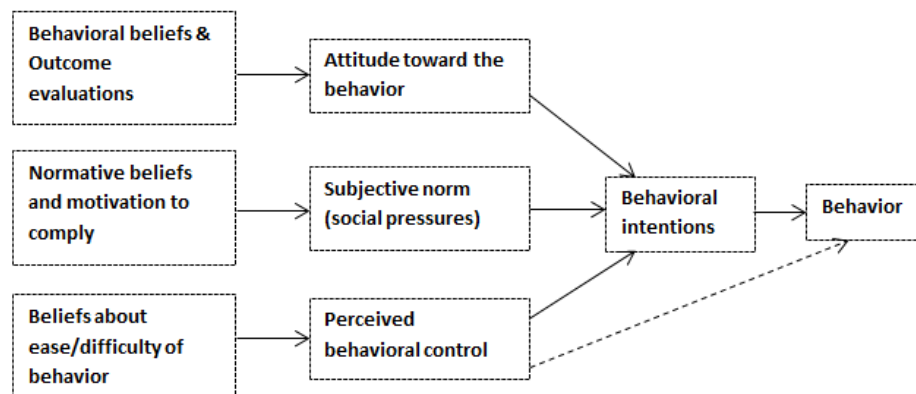
**Figure 2.** Dahlgren and Whitehead 1991. The main determinants of health model

**Table 1.** Overview layers main determinants of health model and related factors within this thesis

Layer model	Factor thesis
Centre – Age, sex and constitutional factors	Biological factors + Personal characteristics
1 <sup>st</sup> layer – Individual lifestyle factors	Health behaviour + Psychological factors
2 <sup>nd</sup> layer – Social and community networks	Social factors
3 <sup>rd</sup> layer – Living and working conditions	Physical environmental factors
4 <sup>th</sup> layer – General socio-economic, cultural and environmental conditions	Excluded because of limited timeframe

### 2.1.1 Theory of planned behavior

Dieting is defined in this thesis as: the change of eating behavior in order to lose weight. Dieting is considered as behaviour, which is confirmed by literature (Reba-Harrelson et al. 2009). Considering the goal of this thesis (to gain knowledge about what factors influence the repeated dieting) the theory of planned behaviour will be consulted.



**Figure 3.** Theory of planned behavior

Attitude towards the behaviour reflects if an individual perceives the behaviour as good or bad. The attitude towards the behaviour will be determined by beliefs about outcomes of behaviour and by evaluation of expected outcomes (Koelen and van den Ban 2004). So if a woman believes she will lose a lot of weight by (re)starting a diet, she will be more prone to have a positive attitude towards repeated dieting. Subjective norm is created by perceived social pressures, norms and values of persons close to the individual. If a women perceives pressure from the social environment that she should lose weight, this may influence her behavioral intentions. The subjective norm is determined by normative beliefs (what the individual thinks an important person think he or she should do) and motivation to comply (individual's tendency to comply to others expectations) (Koelen and van den Ban 2004). The third concept which influences the behavioural intention is perceived behavioural control. This concept shows the individual's belief about the ease/difficulty of the intended behaviour. The perceived behavioural control is comparable to the concept self-efficacy. The perceived behavioural control can also directly influence behaviour (Koelen and van den Ban 2004). For example, if a woman does not believe she can perform a certain behaviour, she maybe doesn't even consider doing it. Every factor that influences the attitude towards behaviour, subjective norms and perceived behavioural control is influenced by beliefs. The attitude towards behaviour, subjective norms and perceived behavioural control influence the behavioural intention and behavioural intention is a predictor of behaviour.



### **2.1.2 Attribution theory**

The attribution theory elaborates on how people explain and understand events. It assumes people want to give meaning and structure to their life. Events can be seen as (re)start diet or relapse from a diet. According to this theory, people are actively present in a situation, instead of just watching. The reason for an event to happen (what is the cause?) plays an important role in how an individual looks at and interprets events and experiences. The cause-effect analysis is done by an individual because of a certain event. Causal attribution means 'Ascribing an effect to a cause' (Koelen and van den Ban 2004). It will provide an individual with meaning and explanations why certain things happen in life. How this cause-effect analysis is conducted, is described as logical reasoning. If the event happens, the present cause will be attributed to this event (Koelen and van den Ban 2004). There are two different kinds of attributions; Internal and external attributions. Internal attributions are causes attributed to the person itself and external attributions are causes attributed to the environment in which an individual lives. Using this theory will contribute understanding the occurring events during the weight cycling process.

### **2.1.3 Obesogenic environment**

The obesogenic environment consists out of social factors and physical environmental factors, therefore it is used within the 2<sup>nd</sup> and the 3<sup>rd</sup> layer of the main determinants of health model. The obesogenic environment can be seen as an environment which constantly encourages people to consume large amounts of food which contains a lot of sugar and fat (Brownell and Horgen 2004). The obesogenic environment also includes aspects of an environment that can limit exercise. In this current time, people come across such environments daily. Giskes (Giskes et al. 2011) explains an obesogenic environment exists out of different concepts, including social condition. Interaction between persons and social support is included in this concept (Giskes et al. 2011). Within the social environment, neighborhood culture (Van Lenthe and Mackenbach 2002) and neighborhood deprivation (Van Lenthe and Mackenbach 2002; van Lenthe et al. 2005) are also important. Accessibility and availability are other concepts, which describe the financial and physical environmental accessibility and availability of shops and food products which are essential for an (un)healthy diet (Giskes et al. 2011). The proximity to food shops is also part of an obesogenic environment (van Lenthe et al. 2005). Material conditions are also part of the obesogenic environment. Neighborhood characteristics, such as availability and quality of pavements and footpaths, enjoyable scenery, presence of garbage, perceptions of safety can be described as the overall enjoy ability to live in the particular neighborhood and contribute to the description of an obesogenic environment (Lake and Townshend 2006; Kirk et al. 2010; Giskes et al. 2011). The obesogenic environment includes factors on multiple levels, socially and physical environmentally. It is interwoven in the current society, and constantly challenging a healthy lifestyle.

## Chapter 3. Systematic literature review

### 3.1 Methods

The first part of this study was a systematic literature review. This means the literature was gained in a systematic way and the quality assessment and analysis of the studies were done through a specific process, which will be explained in this chapter.

#### 3.1.1 Search strategy

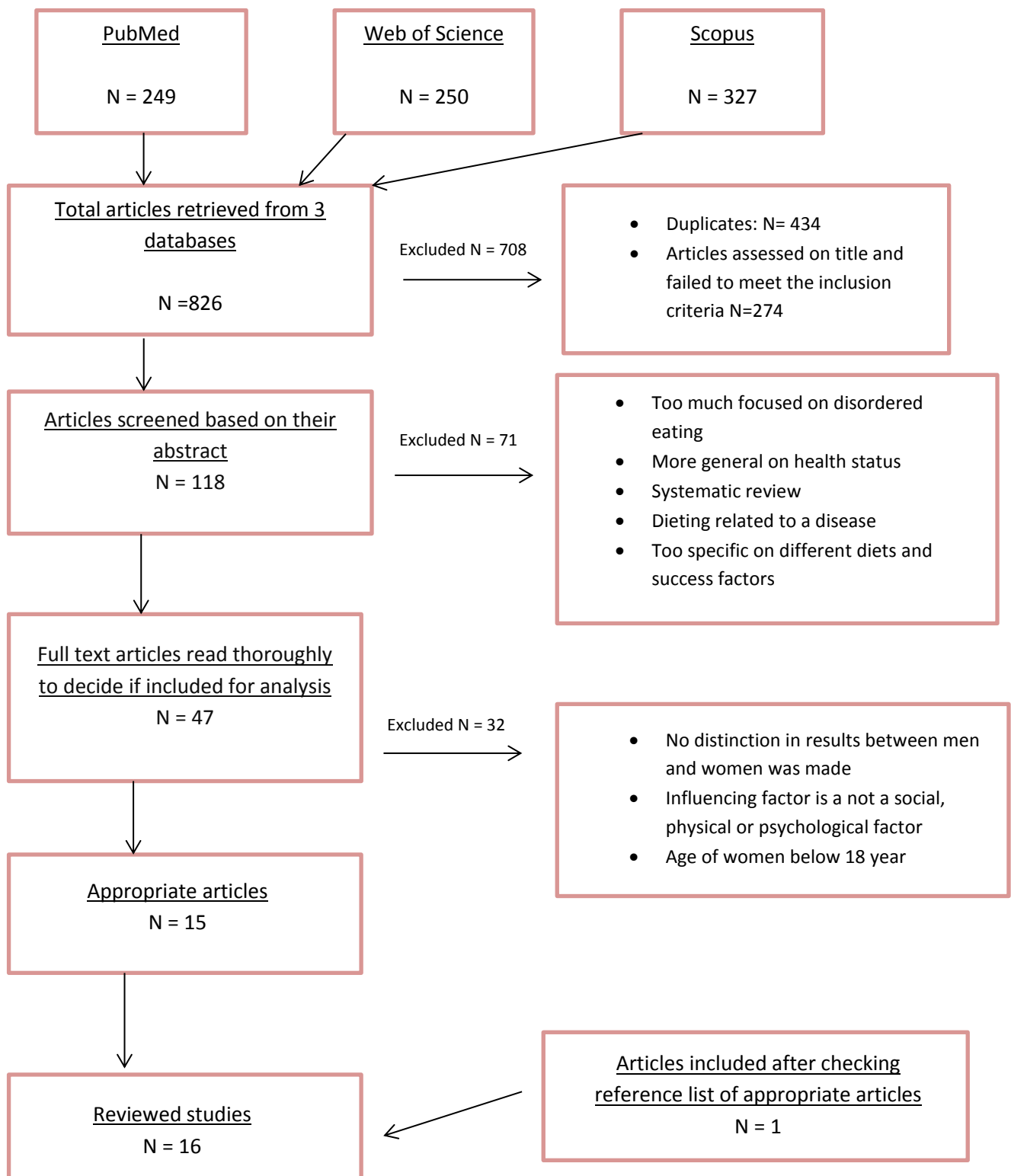
The literature research was conducted in July and August 2014. 6 categories are defined with different of search terms. Category 1 is 'women', because the search criteria is limited to women so men and children are excluded. Category 2 is 'determinant' because factors are searched for in sub-questions 1 and 2. The third category is 'weight cycling', only articles about yo-yo dieting are hereby tried to include. 'Start a diet' is an important point in the weight cycling process, therefore this is category 4. For this same reason 'relapse from a diet' is acknowledged as category 5. 'Lose weight' is set as category 6 to only include studies about women who weight cycle in order to lose weight and therefore to exclude as much as possible studies about women who weight cycle because of medical conditions. Each part of the sub-questions is addressed by the combination of these categories. The 6 categories are combined in different ways to make sure the search is as comprehensive as possible. In Table 2, the 6 categories and the associated search terms are presented. 3 electronic databases are used for this literature study; Pubmed, Scopus and Web Of Science.

**Table 2.** Overview different category and associated search terms used for the search strategy

Category	Search terms
1. Women	"women" OR "woman"
2. Determinant	"Determinant*" OR "predictor*" OR "factor*" OR "reason"
3. Weight cycling	"weight cycl*" OR "yo-yo diet*" OR "weight fluctuation"
4. Start a diet	"predictor* of dieting" OR "reason* for dieting" OR "motivation* for dieting" OR "risk factor* for dieting" OR "determinant* of dieting" OR "dieting onset"
5. Relapse from a diet	"quit* dieting" OR "stop* dieting" OR "fail* dieting" OR "weight regain" OR "weight loss maintenance" OR "relapse diet"
6. Lose weight	PUBMED: "Weight Loss"[Mesh] OR "Diet, Reducing"[Mesh] SCOPUS: "weight loss*" OR "weight reduc*" OR "losing weight" OR "lower body weight" OR "weight loss diets" OR "weight reduc* diet"

Note: Some adjustments were made to the search terms in order to meet the different database criteria

### 3.1.2 Flow chart



**Figure 4.** Flow chart overview of search strategy used for finding relevant articles.

### 3.1.3 Inclusion and exclusion criteria

**Table 3.** Overview inclusion and exclusion criteria of systematic review

An article was <i>included</i> if:	An article was <i>excluded</i> if:
<ul style="list-style-type: none"><li>* It was written in English or Dutch</li><li>* It addressed the topic weight cycling process, or the related points within this weight cycling process</li><li>* The study was an original and official published paper</li><li>* It was about dieting in order to lose weight</li><li>* It was about women between 18 years and 64 years</li></ul>	<ul style="list-style-type: none"><li>* It was a review</li><li>* It made no distinction in results between men and women</li><li>* It was about relapse other than from dieting</li><li>* It described only factors not related to quitting or starting a diet</li><li>* It described dieting in order to reduce the risk on a disease</li></ul>

### 3.1.4 Assessment of the quality of the reviewed studies

Different criteria are defined to assess the quality of the included reviewed studies. These quality criteria are based on the criteria used in another review study (van Dillen et al. 2013) and shaped to the needs of this systematic review.

The different quality criteria used:

- \* *Introduction & Aim:* Clear and adequate explanation why the study has been conducted and consequently what the aim of the study is
- \* *Method:* Clear description of the study design and explanation of the used methods
- \* *Response rate:* Response rate is mentioned, and the reason for this response rate is explained
- \* *Results:* Results are clearly and comprehensible presented
- \* *Data analysis:* The way the data is analysed is clearly explained, inter alia which tool and analyse steps are used
- \* *Discussion:* In the discussion, the contribution of the current study is compared to other similar studies and it is made sure where this study stands in today's research world
- \* *Limitation and weaknesses:* Study limitations and weaknesses are adequate described
- \* *Data collection:* The data collection and related steps are described in a way the data collection can be repeated
- \* *Generalizability:* Clear explained whether and why the results of the study with the specific study population can be generalized beyond the study population
- \* *Sample:* Adequate explanation of the chosen sample, how the sample is recruited and how the selection process of the sample was done and if the sample is representative.

10 plusses in total could be assigned to a reviewed study. If a study met 8-10 criteria, it was assessed as a high quality study. With 5-7 criteria, a study was assessed as a medium quality study, and with 0-4 criteria the study was assessed as a low quality study.

## 3.2 Results

The results of the systematic literature review are discussed in this part of chapter. As can be seen from the flow chart (figure 4), 16 studies recruited from the systematic search were included. First, the main characteristics of the reviewed studies will be described. After that, the results on (re)starting a diet are described; what factors influence this event within the weight cycling process. In the last part of this chapter, the factors that influence relapse from a diet are mentioned.

### 3.2.1 Main characteristics of the reviewed studies

*General characteristics:* 9 out of the 16 studies were conducted in the USA. The other 7 studies are conducted in the following 7 countries; Palestine, Australia, Switzerland, Sweden, Canada, Finland and the Netherlands. The timeframe in which the reviewed studies are published ranged from 1990 until 2013. Most part of the studies (11 out of 16) is published between 2003 and 2013. Out of these 16 studies, 10 studies involved only women as participants. 6 studies involved women and men, of which 4 made a distinction in results between men and women, 2 studies did not because the outcomes were compared across men and women and no significant differences were found, as described in the study. Average age of the respondent within the studies was 41 years and average BMI is 29.9.

*Addressed sub-questions and factors:* 8 studies addressed sub-question 1 (influencing factors on (re)start of a diet), 5 studies sub-question 2 (influencing factors on relapse from a diet) and 3 studies addressed both the sub-questions. Psychological factors are present in 15 studies, social factors in 7 studies and physical factors in 2 studies. Factors that could not be placed under psychological factors, social factors and physical factors were placed under lifestyle factor or under other factors. Lifestyle and other factors were found in 10 studies.

*Quality of the studies:* The studies were assessed on quality according to 10 criteria, described in chapter 3.1.4. Not one study got 4 plusses or less and therefore none of the studies were of low quality. 8 studies were assessed as medium quality and 8 studies as high quality. Most studies clearly described methods, results, data collection, sample, data analysis & discussion. A few studies described the generalizability. Response rate was mentioned in 6 studies. An overview of the quality assessment can be found in appendix II.

### 3.2.2 Factors from literature that influence start of a diet

*Which psychological, social and physical environmental factors influence (re)starting a diet in women between 18 and 64 years?*

In this part, the psychological factors that influence (re)starting a diet will be described firstly, followed by the social and physical environmental factors. Other factors that could not be subdivided among psychological, social or physical environmental factors, were placed under lifestyle factors or other factors. Losing weight was an important reason to start a diet, mentioned in most articles. Why women want to lose weight is influenced by various factors, which are described below.

#### **Psychological factors**

**Internal motivation** – A person could be internally motivated to start dieting. Dieting for oneself was mentioned in one study and associated with a higher usage of healthful eating and caloric restriction (Putterman and Linden 2004).

**Dissatisfaction with weight/body** – Dissatisfaction with body appeared to be a frequent reason to start a diet according to the literature (four studies). Bayyari (Bayyari et al. 2013) discovered that body dissatisfaction is a more reliable predictor of starting a diet than current BMI among women (Bayyari et al. 2013). This result also matched with the findings of Liechty and Lee (2013) (Liechty and Lee 2013) (Liechty and Lee 2013) (Liechty and Lee 2013) (Liechty and Lee 2013) (Liechty and Lee 2013) (Liechty and Lee 2013) (Liechty and Lee 2013), in which body image distortion was discovered as a risk factor that prospectively predicted the onset of dieting (Liechty and Lee 2013). Body dissatisfaction also appeared to be a predictor of unhealthy dieting practices, relapses, disinhibition and using caloric restrictions (Putterman and Linden 2004). Weight dissatisfaction was mentioned among 36.7% of the women, which was mostly caused by being overweight or being obese. Women who experienced weight dissatisfaction were significantly more likely to start a diet (Forrester-Knauss and Stutz 2012).

**Appearance motivation** – Appearance is an important reason for dieting, found in two studies. Young women were more prone to diet with appearance as motivation than middle-aged women, who more often dieting with health as a motivation (Putterman and Linden 2004). This same study displayed that participants who were dieting for appearance motivation also scored higher on disinhibition scores. Disinhibition is defined as: 'The tendency to overeat in response to different stimuli, and can occur in a variety of circumstances such as when an individual is presented with an array of palatable foods or is under emotional distress' (Hays and Roberts 2008). Appearance motivation was associated with higher restraint scores and higher body satisfaction (Putterman and Linden 2004). Restraining is defined as: 'conscious restriction of food intake to prevent weight gain or promote weight loss' (Hays and Roberts 2008).

**Depression** – In one study, being in a depression prospectively predicted dieting (Liechty and Lee 2013).

#### **Social factors**

**Family** – Family is mentioned as a social factor in one study. Dieting young women who participated in the study of Putterman (Putterman and Linden 2004) indicated that their parents had a dieting

past and they encouraged dieting. Also, restrained eaters had a higher chance of having parents who were dieting (Putterman and Linden 2004).

**Influence by others** – Other people than family and friends were also an onset factor of dieting, described in one study. Women were prone to be influenced by others when dieting (Putterman and Linden 2004). If women were motivated by others to start a diet, this was positively associated with unhealthy dieting practices and higher disinhibition scores (Putterman and Linden 2004).

**Perceived media pressure** – Perceived media pressure was mentioned in two studies as an influencing factor in starting a diet. The pressure by the media to be thin has been proved to be a significant predictor of dieting in the study of Bayyari (Bayyari et al. 2013). Weight dissatisfaction appeared to be associated with the perceived media pressure by women to be thin (Forrester-Knauss and Stutz 2012).

### **Physical environmental factors**

No study paid attention to physical environmental factors related to starting a diet within this systematic literature review.

### **Lifestyle factors**

**Relation to other health behavior** – Relation to other behavior as an influencing factor in starting a diet is mentioned in one study. Former smokers are more prone to start a diet; they reported dieting more often than non-smokers (Forrester-Knauss and Stutz 2012).

**Physical activity level** – Partly physically and physically active women reported dieting behavior more often and were more prone to dissatisfaction with their weight than inactive women, which is mentioned in one study (Forrester-Knauss and Stutz 2012). The physical activity levels depended on the times per week a participant was out of breath or had sweat because of practicing sports.

**History dieting behavior** – Starting a diet was also influenced by previous dieting behavior, which is described in two studies. Women who were previously involved in dieting behavior were more likely to diet than women who were not (Bayyari et al. 2013). Also in the study of Liechty and Lee (2013) this was shown to be the case. Dieting earlier in life predicted dieting later in life (Liechty and Lee 2013).

### **Other factors**

**Health** – Health could be a motivation to start a diet in order to lose weight, as stated in two studies. More maintainers of weight loss than relapsers from a diet acquired health concern as a reason to lose weight (Barnes and Kimbro 2012), so it seems health concern is a successful motivation to lose weight. In the study of Putterman and Linden (Putterman and Linden 2004), women who dieted primarily for health reasons were significantly older than the women who dieted not primarily for health reasons (Putterman and Linden 2004).

**Age** – Age is considered as an influencing factor in starting a diet in one study. Enriquez (Enriquez et al. 2013) studied different age categories between twins and their dieting onset behavior. Twins who started dieting at a younger age experienced weight cycling episodes more frequently than twins

who started dieting later in life. This suggests that an earlier age of dieting onset is associated with episodes of weight cycling, regardless genetic or family background (Enriquez et al. 2013).

**Weight** – Weight is found to be an influencing factor in starting a diet in one study. Women with a normal weight were significantly more likely to express dieting behavior than women with underweight (Forrester-Knauss and Stutz 2012).

**Socio-economic status** – Women with a higher education reported more frequently weight dissatisfaction and thus were more likely to diet than women with lower education (one study). (Forrester-Knauss and Stutz 2012).

**Table 4.** Overview factors start of a diet in weight cycling in the literature

Literature review – Start of a diet	
Factor category	Factor
Psychological factors	<ul style="list-style-type: none"> <li>* Internal motivation (1)</li> <li>* Dissatisfaction with weight/body (4)</li> <li>* Appearance motivation (2)</li> <li>* Depression (1)</li> </ul>
Social factors	<ul style="list-style-type: none"> <li>* Family (1)</li> <li>* Influence by others (1)</li> <li>* Perceived media pressure (2)</li> </ul>
Physical environmental factors	-
Lifestyle factors	<ul style="list-style-type: none"> <li>* Relation to other health behavior (1)</li> <li>* Physical activity level (1)</li> <li>* History dieting behavior (2)</li> </ul>
Other factors	<ul style="list-style-type: none"> <li>* Health (2)</li> <li>* Age (1)</li> <li>* Weight (1)</li> <li>* Socio-economic status (1)</li> </ul>

*Note: Number mentioned after the influencing factors represents in how many studies the factor is mentioned*



### 3.2.3 Factors from literature that influence relapse from a diet

*Which psychological, social and physical factors influence relapse from a diet in dieting women between 18 and 64 years?*

First psychological factors will be described. After that, social factors will be described, followed by physical environmental factors. Other factors are also found, which could not be subdivided among the first three categories of factors. These factors are mentioned under category lifestyle factors or other factors.

#### **Relapse and weight maintenance**

Losing weight is achievable for women, but maintaining the weight loss is showed to be rare (Sarlio-Lahteenkorva et al. 2000). Therefore significant amount of research has been done on weight loss maintenance. Since weight loss maintenance can prevent relapse, the influencing factors of weight loss maintenance will be discussed in this part of the literature review. A summarizing sentence is added at the end of every paragraph to ensure clarity on how there is a relation to diet relapse.

#### **Psychological factors**

##### **1a. Self-discipline (High)**

**Personal strategies** – Personal strategies related to health behavior showed to be important for maintainers to be successful and therefore to prevent relapse in two studies. For example, participants in the study of Kayman (1990) adapted strategies that were specific to their own lifestyle which resulted in being a successful weight loss maintainer (Kayman et al. 1990). In this study maintainers personalized a weight-loss plan to make it fit into their lives and they stuck to this plan more often than relapsers. A new lifestyle including reduced sugar, more fruits and vegetables, regular exercise, and smaller portions were all part of this personalized plan (Kayman et al. 1990). In the same study, maintainers also used direct or problem-solving ways to handle problems compared to relapsers. Also maintainers used less emotion-focused or escape-avoidance ways of handling problems, for example sleeping more, eating or wishing for the problem to go away (Kayman et al. 1990). In another study a personal strategy of maintainers was to use a scale to monitor weight (Barnes and Kimbro 2012).

→ *Applying personal strategies made women less prone to relapse*

##### **1b. Self-discipline (low)**

**Lack of psychological awareness** – A lack of psychological awareness was acknowledged as an influencing factor in relapse from a diet in four studies. Maintainers were aware of the fact that consciousness was necessary. Consciousness included the quantity and type of food which was consumed and also the physical activity level to maintain weight loss (Kayman et al. 1990). Unsuccessful maintainers were more prone to slip back into old habits which indicated a lack of psychological awareness, compared to successful maintainers (Befort et al. 2008). Also the priority which women assign to weight control determines the successfulness of weight control. Relapsers reported a lower priority to weight control than maintainers (Byrne et al. 2004). In the study of Byrne (Byrne et al. 2003) the importance of psychological awareness is also acknowledged. In this study it is recognized as vigilance, which almost all weight loss maintainers reported to be. The reason for being vigilant was that the advantages of weight loss maintenance was weighed more than the sacrifices they had to make (Byrne et al. 2003).

→ *A lack of psychological awareness made women more prone to relapse.*

**Coping** – Not coping properly with negative life events, was found to be a reason for dieters to habitually overeat and relapse in four studies. As opposed to maintainers, who are able to sustain their new eating and exercise pattern when facing stressful situations (Byrne et al. 2003). The study of Dohm (2001) suggests that appropriate coping with inevitable dietary relapse can be seen as the most important predictor of weight-loss maintenance (Dohm et al. 2001). Also in this study, maintainers scored higher on coping in general (Dohm et al. 2001), and in the study of Kayman (1990) maintainers assessed themselves as capable of dealing with personal problems and made use of problem-solving competences more frequently than relapsers (Kayman et al. 1990). General well-being of a person determined partly their success in weight loss maintenance. Negative life events for example made it hard to prepare healthy food and to do sports, which contributed to weight regain. This was reported among 77% of the relapsers (Kayman et al. 1990). Not coping well with negative feelings could also be of influence. Feeling lazy and feeling unmotivated was mentioned as a reason for regaining weight (Barnes and Kimbro 2012). High initial weight loss was influenced by faith, which also had an important role for maintaining weight for maintainers (Barnes and Kimbro 2012).

→ *Not coping well with negative experiences can make women more prone to relapse.*

**Disinhibition** – Disinhibition is found to be of influence of relapse from a diet in one study. Relapsers scored high on disinhibition. The higher the disinhibition level, the more weight gain (Karlsson et al. 1994).

→ *Disinhibition behavior can make women more prone to relapse.*

**Cognitive restraint** – Cognitive restraint could positively influence weight loss maintenance, mentioned in two studies. Weight maintenance is positively influenced by an increase in cognitive restraint (Westerterp-Plantenga et al. 1998). In the study of Kayman (1990), too fat or too sweet food was no longer appealing to maintainers after a period of restraining this type of food (Kayman et al. 1990). On the other hand, too much cognitive restraint on eating was negative associated to weight loss maintenance. Maintainers did not restraint themselves completely to food they liked a lot, to avoid feelings of deprivations (Kayman et al. 1990). Additional to that, a result of this study shows relapsers easily fell back into old habits when they felt deprived on restrictive diets (Kayman et al. 1990). This restricted diet was expressed in that they couldn't eat the same food as their family members and they couldn't eat the food they loved, they perceived the food from their diet as special and they didn't permit themselves to eat the food they really wanted (Kayman et al. 1990).

→ *Too much as well as not enough cognitive restraint can make a woman more prone to relapse.*

**Dichotomous thinking** – Dichotomous thinking style, found in two studies to be of influence, can be expressed in thoughts like; 'My goal weight is 70 kilograms, so if I weigh 75 kilograms I'm still fat' (Byrne et al. 2004). This thinking style was more frequently present among relapsers of weight loss than among maintainers of weight loss (Byrne et al. 2003). Also in the study of Byrne (2004), dichotomous thinking scored significantly higher among relapsers than maintainers (Byrne et al. 2004).

→ *Dichotomous thinking can make women more prone to relapse.*

**Time** – Lack of time to exercise was found as an influencing factor in two studies. Lack of time to exercise were experienced significantly more among unsuccessful maintainers than among successful

maintainers (Befort et al. 2008). In the study of Barnes (Barnes and Kimbro 2012)(Barnes and Kimbro 2012)(Barnes and Kimbro 2012)(Barnes and Kimbro 2012)(Barnes and Kimbro 2012)(Barnes and Kimbro 2012)(2012), lack of time for exercise was established as a reason for regaining weight (Barnes and Kimbro 2012).

→ *No time in daily life to spend on weight loss can make women more prone to relapse.*

## **2. De-motivation**

**Goal setting** – Goal setting, mentioned in three studies, was an influencing factor in maintainers as well as regainers. Setting small, achievable goals was a characteristic of a weight loss maintainer (Kayman et al. 1990). Relapsers were more prone to set unrealistic goals. A greater difference between goal weight and current weight was seen among relapsers than among maintainers (Byrne et al. 2004). Maintainers were more successful in achieving their weight loss goal than relapsers appeared to be and maintainers desired a smaller weight loss than relapsers (Byrne et al. 2003).

→ *Setting unrealistic goals made women more prone to relapse.*

## **3. Emotional status**

**Emotional eating** – Personal strategies appeared as a tool to control mood in one study. Relapsers used eating as a personal strategy to regulate their mood (comfort eating) or as a distraction for negative thoughts (avoidance eating) far more frequently than maintainers (Byrne et al. 2003).

→ *Emotional eating was related to relapse.*

**Stress** – Stress was a reason for regaining weight, found in one study. 53% of the regainers in the study or Barnes (Barnes and Kimbro 2012) mentioned stress as a reason for regaining weight.

→ *Stress made women more prone to relapse.*

## **4. Low self-esteem**

**Dissatisfaction with weight/body** – This psychological factor is mentioned in three studies within this literature review. Relapsers reported to be less satisfied with their weight and shape, compared to maintainers (Byrne et al. 2004). According to Kayman (1990), relapsers were mostly dissatisfied with their bodies (Kayman et al. 1990). The importance of shape and weight is confirmed by the study of Byrne (Byrne et al. 2003). In this study the self-worth of relapsers was influenced by their shape and weight among the majority of participants. Weight and shape preoccupied a big proportion of their daily life and were of high importance. Less importance on weight and shape was measured among maintainers and healthy weight subjects (Byrne et al. 2003). Perception on own body was also of influence. Maintainers' self-image was thin, average weight or a little 'out of shape', while relapsers experienced dissatisfaction with their bodies (Kayman et al. 1990).

→ *Dissatisfaction with their weight and shape made women more prone to relapse.*

**Dissatisfaction with life** – In the study of Sarlio-Lahteenkorva (2000) dissatisfaction with life was more common among maintainers than among relapsers, this factor was only mentioned in one study (Sarlio-Lahteenkorva et al. 2000).

→ *Dissatisfaction with life made women less prone to relapse*

**Perceived task difficulty** – Perception of women on different aspects of dieting appeared to be as an influencing factor in two studies. Weight management was perceived as ‘very difficult’ or ‘impossible’ by unsuccessful maintainers (Befort et al. 2008). Weight regain was predicted by the perceived exercise difficulty after a weight-loss intervention. The more difficult the exercise was perceived, the greater the weight regain (Brock et al. 2010).

→ *If a woman perceived weight loss as difficult, it made her more prone to relapse.*

**Comparison to others** – In one study, perception of others seem to influence the ability to restrict own food intake. If women perceived others as overweight, they were more likely to regain weight and less willing to control food intake. Women who perceived others as overweight also lost weight less quick than women who perceived others to be less overweight (Chandler-Laney et al. 2009). Less cognitive restraint was also measured by women who perceived other women as overweight. In general a perception of others’ body size can influence a women’s’ weight loss (maintenance) behavior (Chandler-Laney et al. 2009).

→ *If a woman compared herself to others it can make her more prone to relapse.*

### **Social factors**

**Family** – Family was detected as an influencing factor in two studies. Family commitments as a barrier of maintaining weight loss were mentioned among respondents, as one of the most commonly perceived barrier (Befort et al. 2008). Family history of obesity was reported by almost all respondents in the study of Byrne (2004) , which was conducted among 54 obese women who have a history of relapse (Byrne et al. 2004).

→ *Family can in some ways make woman more prone to relapse*

**Social support** – Social support encourages people to maintain weight loss; maintainers more often called for social support to family and friends than relapsers did (Kayman et al. 1990). Maintainers scored lower on help seeking in times of need than relapsers (Dohm et al. 2001). The results on social support among maintainers our found in two studies and are in contradiction. This may be explained by the fact that maintainers can better cope with negative experiences themselves and therefore are less in need of social support.

→ *Maintainers make use of social support in the right way, which makes them less prone to relapse*

### **Physical environmental factors**

**Physical environment** – Physical environment is found to be of influence in one study. Home can be of limiting influence in weight loss management. Limitations in home management (a women was not able to manage her household) were a predictable factor of relapse (Karlsson et al. 1994). Limitations in physically oriented areas of function, especially ambulation, were also able to predict relapse (Karlsson et al. 1994), because women had limited possibilities in their environment to exercise.

→ *Non supportive physical environment for exercising could make women more prone to relapse*

### **Lifestyle factors**

**Eating behavior** – Eating behavior is mentioned in three studies as an influencing factor. According to the study of Barnes (2012), limiting fat intake, eating breakfast most days of the week and avoiding fast food restaurant was assigned more often to maintainers than relapsers (Barnes and Kimbro 2012). Also Befort (2008) found differences in eating behavior between maintainers and relapsers (Befort et al. 2008). Maintainers ate 5 or more fruit and vegetables servings per day, used low-calorie pre-packed meals, practiced portion control and counted fat grams or choose low-fat foods significantly more often than relapsers (Befort et al. 2008). Relapsers used more unhealthy weight loss practices than maintainers, such as taking appetite suppressants, fasting, skipping breakfast or going on restrictive unsustainable diets (Kayman et al. 1990). Snack behavior was different between maintainers and relapsers, both ate snacks but relapsers significantly more often than maintainers (Kayman et al. 1990).

→ *Healthy eating behavior can make women less prone to relapse from a diet.*

**Physical activity level** – Physical activity is found to influence relapse from a diet in three studies. 55% of the maintainers could be assigned to high activity category compared to just 32% of the regainers (Barnes and Kimbro 2012). So maintainers had a higher chance to be involved in moderate to high levels of physical activity (Barnes and Kimbro 2012). In the study of Befort (Befort et al. 2008) the activity level of maintainers and relapsers was compared. Maintainers significantly more often: exercised 30-60 minutes per day, kept records for exercising and planned for exercise (Befort et al. 2008). Kayman (Kayman et al. 1990) also compared maintainers and relapsers, and found out that most maintainers exercised on a regular basis compared to regainers (Kayman et al. 1990)

→ *Physical activity can help prevent women from relapsing.*

**Relation to other health behavior** – Smoking seems to facilitate maintenance of weight loss, this appeared from one study. Maintainers started smoking younger than relapsers and maintainers consumed more cigarettes than regainers (Sarlio-Lahteenkorva et al. 2000). Alcohol consumption was more common among relapsers than among maintainers (Kayman et al. 1990).

→ *Smoking and no alcohol consumption can make women less prone to relapse.*

### **Other factors**

**Marital status** – Marital status was shown to be of influence in two studies. The study of Sarlio-Lahteenkorva (2000) showed that regainers were more often married at baseline than maintainers (Sarlio-Lahteenkorva et al. 2000). In more than half of the women, no support related to weight control efforts from husbands was mentioned in the study of Kayman (Kayman et al. 1990).

→ *Being married can make women more prone to relapse.*

**Weight** – Weight can influence relapse from a diet, mentioned in three studies. Women with an higher maximum weight were more prone to regain than women with a lower maximum weight (Byrne et al. 2004). Current weight also influenced weight maintenance. Maintainers weighed significantly less than regainers, maintainers also scored lower on the total amount of weight fluctuations (Dohm et al. 2001). A lower BMI was significantly more often assigned to successful weight loss maintainers than to unsuccessful weight loss maintainers (Sarlio-Lahteenkorva et al.

2000).

→ *A higher maximum weight and a higher BMI can make women more prone to relapse.*

**Socio-economic status** – Socio-economic status appeared as an influencing factor in two studies. A higher percentage of maintainers (30%) than relapsers (20%) completed college (Kayman et al. 1990). The expensiveness of healthy eating was perceived as a barrier to maintain weight loss. This barrier was experienced more often among maintainers than among relapsers (Befort et al. 2008).  
→ *Lower socio-economic status can make women more prone to relapse.*

**Durance of weight loss maintenance**- One study found that the time after losing weight also appeared to be an influencing factor in relapse. The longer ago the weight loss period was for women, the greater the weight loss maintenance. 0-6 months and 6-12 months were compared (Befort et al. 2008) and women which had lost weight 0-6 months ago had more difficulty with weight loss maintenance than women who had lost weight 6-12 months ago (Befort et al. 2008).  
→ *More time after weight loss can make women less prone to relapse.*

**Table 5.** Overview of the factors found related to relapse in weight cycling in the literature

Literature review – Relapse from a diet	
Factor category	Factor
Psychological factors	<b>1a. Self-discipline (High)</b> * Personal strategies (2) <b>1b. Self-discipline (low)</b> * Lack of psychological awareness (4) * Coping (4) * Disinhibition (1) * Cognitive restraint (2) * Dichotomous thinking (2) * Time (2) <b>2. De-motivation</b> * Goal setting (3) <b>3. Emotional status</b> * Emotional eating (1) * Stress (1) <b>4. Low self-esteem</b> * Dissatisfaction with weight/body (3) * Dissatisfaction with life (1) * Perceived task difficulty (2) * Comparison to others (1)
Social factors	* Family (2) * Social support (2)
Physical environmental factors	* Physical environment (1)
Lifestyle factors	* Eating behavior (3) * Physical activity level (3) * Relation to other health behavior (1)
Other factors	* Marital status (2) * Weight (3) * Socio-economic status (2) * Durance of weight loss maintenance (1)

*Note: Number mentioned after the influencing factors represents in how many studies the factor is mentioned*

### 3.3 Summary systematic literature review

As summarized in table 5, psychological factors are found to be of influence in the yo-yo dieting process. Fewer studies have had a focus on social and physical environmental factors. Therefore, a focus will be on social and physical factors within the interviews to bridge the gap between the already gained information and the missing information. The results of the interviews can be found in the next chapter.

## Chapter 4. Interviews

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### 4.1 Methods

The interview guide was developed with the input of the systematic literature review and can be found in appendix III. Within the interviews there was focus on social and physical environmental factors, during the interviews, room for other factors like psychological factors was present.

#### 4.1.1 Semi-structured interviews

*Semi structured interviews* – Semi-structured interviews were conducted as a complementary research method to answer the research questions. To give structure to the qualitative interviews, a question list was developed containing a mix of open and closed questions. This was to make sure the content of the interview was partly fixed; and in the same way it gave opportunity for flexibility.

*Criteria respondents* – Women aged between 18 and 64 were suitable to be interviewed. Respondents were recruited through own social network and snowball-effect. A condition for the respondents was they have experienced a process of mild weight cycling in the past, because this was common among yo-yo dieting women (Osborn et al. 2011, Mason et al. 2013). Not one clear definition of mild cyclers is found (Osborn et al. 2011), but mild weight cycling in this thesis uses a common definition and means that respondents have lost and regained 5 kilo for at least 2 times in the past 15 years, because of a diet. To know if the potential interviewee met this specific criterion, this was questioned during a phone call before the interview appointment was made. 10 interviews were held within a time frame of four weeks. Saturation was achieved if no outstanding new things were mentioned by the respondents. After 10 interviews, saturation was reached in this study.

*Informed consent* – The interviewer made sure the interviewee had informed consent by informing the interviewee before the actual interview started about several things; Interviews were recorded with permission of the interviewee. Information was given to the interviewee about what would happen with the collected data; this was saved only on the secured database of the Wageningen University, chair group Health and Society. A small gift was handed to the interviewee, to express gratitude for giving up their time and personal stories for the research project.

#### 4.1.2 Interview technique

The aim of the data collection of the interviews is to provide information about the past 15 years of the interviewees' life. Recall bias is therefore something which needs to be taken into account. To reduce the chances of recall bias, an interview technique is applied which stimulates memory recall and 'thinking outside the box'. The idea was that respondents drew their own yo-yo-process on a specially developed time line (appendix III). The use of a time line as visual aspect provides interviewees a practical grip to range biographical events related to yo-yo dieting. It also makes it possible to point out a specific moment in history to facilitate and investigate layers of experience (Bagnoli 2009). A focus on the visual aspect allows interviewees to think further than the verbal way of thinking, which helps to include multiple dimensions of experience (Bagnoli 2009). It also prevents cliché and 'ready-made' answers (Bagnoli 2009). These kinds of visual evocation techniques can



provide great success in qualitative research studies considering data collection (Copeland and Agosto 2012).

The drawings which respondents made at the beginning of the interviews were used as a tool during the interviews, for example to ask for more explanation about a certain point in the drawn yo-yo process. It encouraged interviewees to explain more about the experience with yo-yo dieting instead of telling just facts, which was very helpful to meet the purpose of this interview. The drawings can be found in appendix IV.

#### 4.1.3 Data analysis

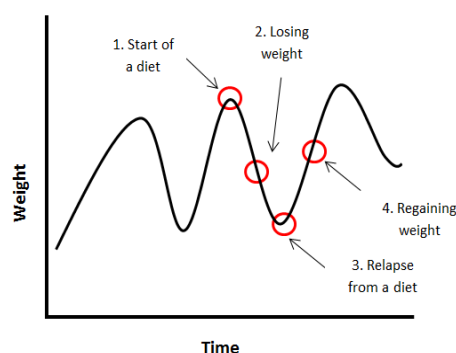
The recorded interviews were transcribed literally and imported to the software program MaxQDA. This software provided a useful tool for analyzing qualitative data more easily. The transcripts were coded through this software. The first set of codes was roughly coded, this means almost every comment from an interviewee became a code. This set of codes and the belonging comments were exported into an Excel document which gave a useful overview. This was read thoroughly. After that, a first mind map was made to organize the codes under categories, which were constituted beforehand:

1. Factors that influence starting a diet
2. Factors that influence relapse from a diet
3. Other

It turned out, certain codes from the first set of codes could not be categorized under these three categories. Therefore, category 4: 'Factors that influence maintaining the yo-yo process' was added. After another set of analyzing, it was clear that if category 4 was split into two categories: (facilitating/limiting factors that influence losing weight & factors that influence regaining weight after relapse), every single code could be categorized including the factors under category 3 ('Other'). Four final categories were defined:

1. Factors that influence starting a diet
2. Facilitating and limiting factors that influence losing weight during a diet
3. Factors that influence relapse from a diet
4. Factors that influence regaining weight after relapse

From the beginning, a distinction was made between psychological, social, physical environmental factors, lifestyle and other factors within the categories. The results of this analysis can be found in the next part of this chapter.



**Figure 5.** Four detected points from the interviews within the weight cycling process

## 4.2. Results interviews

This chapter will be about the results of the ten interviews, conducted within a timeframe of four weeks. First, the main characteristics of the respondents will be described. After this, the factors that influenced the (re)start of a diet will be described, followed by what factors facilitated and limited this process of losing weight. Then the reason for relapse from a diet and the factors that influence the subsequent weight regain will be discussed.

### 4.2.1 Main characteristics

The average age of the 10 respondents was 52 year, ranging from 45 years to 58 years. The average BMI of the respondents was 31.3. The respondents had similarities in how they thought about their weight and dieting. Weight was assessed as important (Box 1), nine respondents did not say their weight in once but added an explanation. Respondents were very conscious about the importance of practicing sports in order to increase weight loss during a diet. Because dieting was part of their life, dieting became almost a habit. It was considered convenient being on a diet, it is easy and it works, as long as you keep holding on to it. Four main different methods to lose weight were applied; specific diets, professional help, weight loss associations and by themselves. Specific diets were mentioned as a way to lose weight by seven respondents. These diets were mostly a trend which were hyped by the media and included specific diets such as Montignac, Sonja Bakker, shakes, HCG, Dokter Frank and Atkins. Professional help was used for assistance among eight respondents, like a nutritionist or the clinic for obesity. Several weight loss associations were joined, like Weight Watchers, Dreamline and EGA (EersteGoudseAflankclub). Those weight loss associations were joined by six respondents. Also respondents tried to lose weight on their own, by adjusting their eating habits and/or exercising more. This was mentioned by five respondents as a method to lose weight. As can be seen from these numbers, most respondents consulted more than one method to lose weight.

**Box 1.** *“My weight? That’s a very sensitive question. (...). I don’t like to say it, but I want to contribute to your research. Even my partner doesn’t know how much I weigh.” (Resp. 4)*

#### 4.2.2 Factors that influence start of a diet

##### Personal history

Respondents started dieting relatively young. A reason for this, as mentioned by nine respondents, is that they were already overweight when they were younger. Three respondents gained weight during their pregnancies in the past.



Figure 6. Point in weight cycle process: start of a diet.

##### Psychological factors

**Internal motivation** – Low self-esteem, because of being overweight, was often an influencing factor in starting with a diet. Self-image was also related to this. This all together became internal motivation to start a diet in order to lose weight, because by losing weight they hoped to increase their self-esteem. All ten respondents mentioned they were internally motivated to start a diet, they wanted it themselves.

**Appearance motivation** – Respondents were not happy with their body, which was an influencing factor in starting a diet among eight respondents. They assessed themselves as too heavy and wanted to be slimmer. Size of clothes was an issue among two respondents (Box 2). A life event like getting married was an important moment in the life of two respondents; getting slimmer to fit in a nicer dress and look better on the wedding day was a reason to start losing weight.

**Box 2.** *“On a certain moment I also had to go to a size 48. That’s eh, yes, I don’t know if you call that social or physical environment, but if you go to a shop and they don’t have your size anymore, that’s the worst. Then you go outside, crying. It will knock you down.” (Resp. 6)*

**Comparison to others** – Comparison to others on several topics also was of influence and mentioned by five respondents. Comparing their own weight to the weight of people around them was experienced (Box 3). One respondent mentioned that she noticed overweight people are stigmatized in the way that they all eat too much and don’t exercise. The comparison to other people around them and the perceived negative feeling was an influencing factor in starting a diet.

**Box 3.** *“The only thing is, my sisters are a lot slimmer than me, so I always have looked up to that. I regretted that I wasn’t slim as them, may be childish, but yes.” (Resp. 9).*

**Quick fix** – A psychological factor that influences starting a specific diet is the quick fix by a crash diet, mentioned by five respondents. A specific diet like a crash diet promised (in the media) to make sure weight loss happened in a short amount of time, which was exactly what the respondents wanted. The way respondents thought about it was: you have a problem now, and you want to get rid of it as soon as possible. The quick fix was the reason why they chose a crash diet that was popular in the media.

## **Social factors**

**Family** – Family was acknowledged as an influencing factor in starting a diet among four respondents. This was expressed in for example a sister who recommended a specific diet or by comments from the mother about being overweight. Mothers made comments about the respondents' overweight, already at a very young age, or mentioned that they should go on a diet.

**Friends** – Friends were of influence in starting a diet among five respondents. If a friend recommended a certain diet, the respondent were willing to try this. The prospective of dieting together was attractive for respondents. If friends were losing weight, the respondent also felt like losing weight. They didn't want to be the only overweight person among friends. If success from a specific diet was seen with a friend, the respondent was more prone to also try this diet because the respondents thought if she can do it I can do it as well.

**Influence by others** – Comments by others people influenced the way respondents thought about themselves and therefore influenced them to start dieting, mentioned by two respondents. Signs and comments about the respondents' weight made them more aware of their weight. The respondents also experienced a specific perception of how others thought about them as an overweight person (Box 4).

**Box. 4** *"I got tired of always the thing with eating and people who, yes, who, if you go to a party and you take something to snack, you see someone looking like: 'Oh that one with the fat ass also takes a piece of cake'. That kind of stuff."* (Resp. 4).

**Social environment low influence in interviewee's perception** – Even though the social environment has influence in some way, four respondents commented that in the end the social environment has a low influence in starting a diet. Almost all of the respondents stated they were internally motivated to start a diet in order to lose weight.

## **Physical environmental factors**

No interviewee mentioned any physical factors that influenced their motivation to start a diet.

## **Other factors**

**Health** – Health was a reason to start dieting among six respondents. Problems with the joints could be a burden, and losing some weight could help to improve this. Also being physically less fit came up in the interviews as a reason to start a diet and lose weight, as well as the prevention of dementia on a later stage in life.

**BMI** – Respondents started to notice that their Body Mass Index (BMI) went up (Box 5). When BMI became too high, this was a influencing factor for three respondents to start dieting.

**Box 5.** *"On a certain moment I reached the boundary of 90 kilos, and I didn't want to weigh over 90 kilos, well I crossed that boundary. So that was kind of a disaster, and then I discovered that I had an BMI of 29.7 or 29.9, and I thought: 'Shit, I will cross that obesity boundary', and I didn't want to be obese, overweight was something I could live with, but obesity.. I felt so bad. So that's when I thought: I just don't want this anymore."* (Resp. 6)

**Trends in dieting** – Six respondents mentioned they joined almost every diet trend there was and therefore they were very sensitive to the trends in diets (Box 6), they believed that the diet which was popular on that moment, would also work for them. Diets were made commercially attractive in media and became a hype. Every diet claimed to be the best and most effective and therefore respondents were prone to try this diet.

**Box 6.** *“I started those specific diets because it was a hype in the media, so when the book of Montignac was out, I bought it immediately. When the book of Sonja Bakker was out I bought it immediately. When the breaddiet was in the news, I did the breaddiet immediately.” (Resp. 6)*

Table 6. Overview factors start of a diet

Interviews – Start of a diet	
Factor category	Factor
Psychological factors	<ul style="list-style-type: none"> <li>* Internal motivation (10)</li> <li>* Appearance motivation (8)</li> <li>* Comparison to others (5)</li> <li>* Quick fix (5)</li> </ul>
Social factors	<ul style="list-style-type: none"> <li>* Family (4)</li> <li>* Friends (5)</li> <li>* Influence by others (2)</li> <li>* Social environment low influence in interviewee’s perception (4)</li> </ul>
Physical environmental factors	-
Other factors	<ul style="list-style-type: none"> <li>* Health (6)</li> <li>* BMI (3)</li> <li>* Trends in dieting (6)</li> </ul>

*Note: Number mentioned after the influencing factors represents by how many respondents the factor is mentioned*

### 4.2.3 Factors that influence the progress of a diet

Once a respondent started a diet and tried to lose weight, several factors were influencing the process of dieting. Facilitating and limiting factors of this process were detected from the interviews and will be described below.

#### Facilitating factors

Facilitating factors are factors that helped the respondents to stick to their diet and continuing losing weight.

#### Psychological factors

**Time** – Spending time on health was a facilitating factor that helped weight loss among two respondents. For example, time spent on cooking healthy meals and time spend on practicing sports. Allowing taking this time for themselves helped the respondents to lose weight.

**Compliments slimmer body** – Three respondents experienced and increased motivation because of the compliments they got. The compliments were about that they got slimmer, which stimulated their weight loss progress positively. The confirmation from the compliments that their input got rewarded was important.

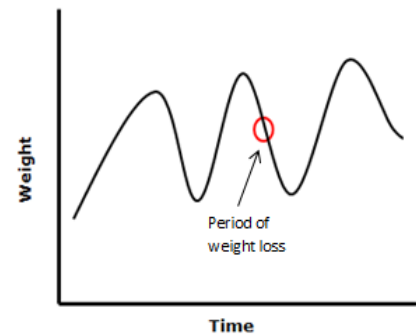
#### Social factors

**Family** – Family was experienced as a facilitating factor in losing weight among three respondents. The partner of two respondents encouraged the respondent to continue with her diet, which the respondents experienced as a facilitating factor. This support could be expressed in eating the same as the respondent for dinner, or gave rewards for certain amounts of lost kilos. Children could also be supportive, if they also participated in eating healthy it made it easier for the respondent to stay focused. In general, if the family was supportive and encouraging considering the diet of the respondent, this was a facilitating factor to the weight loss process. Three respondents used a dog to walk more often and thereby got more exercise than before they got the dog (Box 7).

**Box 7.** “I thought, I was already looking for years for someone who wanted to walk with me several times a week, 3 times a week an hour walk in the evenings. But nobody wanted to walk with me 3 times a week, everybody is busy and yes, when I turned 50 I got a dog for my birthday from my husband.” (Reps. 6)

Children could also be supportive, if they also participated in eating healthy it made it easier for the respondent to stay focused. In general, if the family was supportive and encouraging considering the diet of the respondent, this was a facilitating factor to the weight loss process. Three respondents used a dog to walk more often and thereby got more exercise than before they got the dog (Box 7).

**Friends** – Friends positively stimulated dieting in several ways, mentioned by five respondents. For example, dieting with a friend helped to keep up with the diet. The respondents stayed in contact during the dieting by emailing, texting or calling. Also working out together was a way to lose weight more easy. Go for a run or walk became nicer and easier with a friend. Also working out in a group with a high social cohesion was supporting (Box 8).



**Figure 7.** Point in weight cycle process: progress of a diet.

**Box 8.** *"I consider myself as lucky because I am in a group now, and we are joining those kind of obstacle runs together, we did the Mud Masters with that group, and on Sunday we work out in the forest, if you see those pictures, how much fun and how happy these people look on those photo's, well it's just, yes, if you don't know the story behind it you think: well, fun. Nice, a group of people. But if you know the story of those people, and you know what kind of battle they were into, you think: wow, respect. People in their 40's, 50's, who lost weight and did a run like that. And running in the forest, you should see it you won't believe it, if I tell you that those people only a year, two years ago did not do anything, couldn't do anything, it's insane. But yes, how do you find a group like that? And where? I was lucky."* (Reps. 6).

### **Physical environmental factors**

**Gardening as distraction** – Working in the garden was seen as a distraction during dieting by one respondent. Literally making hands dirty avoided a respondent from getting tempted to snack.

**Neighborhood stimulates exercise** – If the neighborhood was assessed as inviting to go for a walk or run, this supported the likelihood of a respondent to actually go for a walk or run. This physical environmental factor was mentioned by six respondents as a facilitating factor during dieting.

**Availability products supermarket** – The supermarket supported the diet in such a way, that the appropriate products for the diet were available. Sometimes the respondents (four respondents mentioned this) had to follow a specific grocery list according to the diet, and the supermarket made it easy to gain these healthy products.

**Work** – Work could facilitate weight loss during a diet. One respondent mentioned work offered her to go to the gym which she used. Work also offered her routine in daily life during the week, which made it easier for her to stick to the diet. Another respondents mentioned she biked to her work for already many years, which helped her in losing weight.

### **Lifestyle factors**

**Sports** – Practicing sports in general facilitated losing weight, which was agreed upon by six respondents. Respondents mentioned that working out on top of the current diet, helped them to lose extra weight and lose the weight more easily. They exercised more to lose more weight, and exercising made them feel good.

**Lifestyle** – Seeing the diet more as a healthy lifestyle helped by losing weight by two respondents. One respondent mentioned that previously she was always dieting, but now she didn't do that anymore; she has a healthy lifestyle. This also included involving family and friends. She finally lost a significant amount of weight and succeeded in maintaining this weight loss.

### **Limiting factors**

Limiting factors are factors that limited the respondents to stick to their diet and continuing losing weight.

### **Psychological factors**

**Time** – Not allowing themselves to make time for their health, is experienced as a limiting factor by two respondents. Dieting, eating healthy and exercising costs time and often this is hard to combine with their busy lives.

**Stress** – Stress is mentioned as a limiting factor to lose weight by one respondent. Getting distracted from goals because of stress is a reason for getting limited in losing weight.

**Emotional eating** – Within the weight loss process, emotional eating is experienced as a limiting factor. If a respondent is prone to emotional eating, she will over eat when feelings of sadness come up. The result will be that the energy balance will be on the negative site, and the respondent feels frustrated because the dieting doesn't work out the way she wanted. This emotional eating was experienced among five respondents as a limiting factor during a diet.

**Dichotomous thinking** – Dichotomous thinking was an important factor that influenced relapse from a diet, experienced among five respondents. For example, if the dieter consumed one candy, there was a chance that she would empty the whole bag of candies. Or if something went wrong with dieting in the morning, the whole day was perceived as ruined and not worth to diet anymore. If nothing went wrong, it stayed like that. But if a small thing went wrong, everything went wrong. Success or failure was the only option; there was no way in the middle.

### **Social factors**

**Family** – Family was experienced as a limiting factor in losing weight by four respondents. A respondent mentioned she experienced a lack of affection from her parents in her youth, which made her searching for that kind of sweetness in food now, which made it harder to stick to a diet. Children can be a limiting factor as well. They demand a lot of time and attention of respondents, which leave them with less time for themselves. Also, if they join for doing the groceries, they often decide what will be bought. One respondent experienced her child loving her overweight body, because of the softness (Box 9).

**Box 9.** *"My children always loved to cuddle with me, because I was really soft. And if you are a mom, if your child says to you: Mom I want to cuddle with you because you are really soft, you don't want to lose weight, you just don't. Because you want to give your child what he wants." (Resp. 6)*

### **Physical environmental factors**

**Supermarket** – Seduction of products in supermarket while dieting was experienced among eight respondents. When respondents did their groceries in the supermarket, all the offers and unhealthy food made it harder for them to stick to their diet, because of the constantly presence of distraction in the supermarket.



### **Lifestyle factors**

**Sports** – Working out did not always facilitate weight loss, two respondents also assessed it as a limiting factor. If sporting had no effect at all on losing weight, this demotivated. If a respondent was physically limited in sporting this was also a limiting factor.

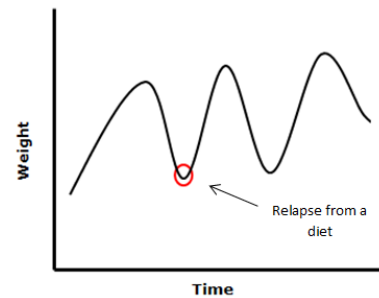
**Table 7.** Overview factors influencing progress of a diet

<b>Interviews –Progress of losing weight during a diet</b>	
<b>Facilitating factors</b>	<b>factor</b>
<b>Psychological factors</b>	* Time (2) * Compliments slimmer body (3)
<b>Social factors</b>	* Family (3) * Friends (5)
<b>Physical environmental factors</b>	* Gardening as distraction (1) * Neighborhood stimulates exercise (6) * Availability products supermarket (4) * Work (2)
<b>Lifestyle factors</b>	* Sports (6) * Lifestyle (2)
<b>Limiting factors</b>	<b>Factor</b>
<b>Psychological factors</b>	* Time (2) * Stress (1) * Emotional eating (5) * Dichotomous thinking (5)
<b>Social factors</b>	* Family (4)
<b>Physical environmental factors</b>	* Supermarket (8)
<b>Lifestyle factors</b>	* Sports (2)

*Note: Number mentioned after the influencing factors represents by how many respondents the factor is mentioned*

#### 4.2.4 Factors that influence relapse from a diet

The results of this interview about relapse from a diet show that relapse from a diet does not happen suddenly. It is a process of a certain period which happens almost every time gradually, mostly indirectly influenced by several factors.



**Figure 8.** Point in weight cycle process: Relapse from a diet

#### Psychological factors

##### **1. Low self-discipline**

**Drop out of stimulants** – When certain weight loss stimulating factors dropped out, such as professional help or a dieting friend, the weight loss was not continued. The dieter was not able to continue the diet by herself, according to two respondents.

**Lack of psychological awareness** – Lack of psychological awareness was found to influence relapse among all ten respondents. This lack of awareness was expressed in different ways. Eating normally after dieting started with small things. Slowly, old eating habits slipped back into their life, like a cookie with their coffee or a wine in the evenings. Thoughts like: “for this one time it is allowed”, and “I can do it myself now, I don’t have to do the diet anymore” were common. They just couldn’t keep up with the strict diet, which resulted in old habits slipping back in. Having weekend is also a reason for relapse from a diet, especially for respondents who started their diet almost every week and preferably on a Monday. During the week, it was easier to be strict and sustain the routine of eating healthy. However when the weekend was there, respondents allowed themselves to lose the restrains because they felt sorry for themselves because of the strict diet during the week (Box 10).

**Box 10.** “In the weekend, you allow yourself again, because you were very strict during the week. But anyway, what you did during the week, eating less in calories, you eat it all back in the weekend”. (Resp. 3)

**Internal attribution** – Nine respondents considered the relapse of the diet mostly their own fault. They felt back into old habits themselves, and considered this as their own weakness and attributed the relapse to themselves. They acknowledged temptations were there, like pie on a birthday, but they ate this pie themselves and therefore blamed themselves.

**Sugar addicted** – One respondent considered herself as sugar addicted. This sugar addiction made dieting harder, and especially keeping up with the diet (Box11).

**Box 11.** “I am actually someone who is very sugar addicted. I was dieting, but if I got cake from someone, I just found that so delicious”. (Resp. 2)

##### **2. Demotivation**

Respondents sometimes experienced demotivation during their diet. This demotivation is influenced by the following factors:

**Not losing weight anymore** – When respondents were dieting, at a certain point they stopped losing weight. If input was shown and there was no output as a result, demotivation was the consequence. This demotivation influenced relapse among four respondents (Box 12).

**Box 12.** *“Then it (diet) didn’t work anymore, you kept on stagnating. (...) On a certain point, after a couple of weeks, you don’t lose any more weight, and that frustrates me. And after that, you fall back into your old habits really fast.” (Resp. 7)*

**Achieved goal weight** – Respondents often had a certain weight loss goal. On a certain moment in the weight loss process, three respondents had reached their weight loss goal. They were satisfied with that, and therefore demotivated to continue the diet. This resulted in gaining weight again and preventing them from weight loss maintenance.

**Goal setting** – Unrealistic goal setting was acknowledged as an influencing factor in relapse among one respondent. If this was the matter and the weight loss goal was not achieved, this caused demotivation.

**New weight does not feel right** – If a new weight achieved by a diet didn’t felt right, this could be a reason for relapse. If the weight was perceived too low for the height, which made respondent feel uncomfortable with their body because they felt weaker. This was assessed as an influencing factor by four respondents.

### **3. Emotional status**

**Depression** – Depression was related to relapse from a diet in one respondents. If she was in depression and at the same time on a diet, she stopped dieting. When in a depression, there was no room in daily life anymore for losing weight. The focus was on getting out of the depression and after that, time could be invested in losing weight again.

**Emotional eating** – Among the five respondents who mentioned they were emotional eaters, one stated this directly influenced relapse from a diet. So she was on a diet and something bad happened, she began to eat because she was sensitive to emotional eating and quit her diet. Food provided comfort, therefore a relation between eating and mood can be detected (Box 13).

**Box 13.** *“I am an emotional eater. So if I feel sad, I just urge for sweetness. And I don’t only want it, I also take it.”(Resp. 10)*

**Stress** – If a respondent experienced stress, she was more prone to relapse because of the stress. Stress asked a lot from the psychological condition of the dieter and made it harder to continue dieting among one respondent.

### **Social factors**

Some respondents did not perceive their social environment as an influence of a relapse. However, out of the same interviews, other fragments of comments made it clear that social environment had certain influence on relapse. An example can be found in box 14. Respondents thought of

themselves as weak, even if their social environment was responsible for offering temptations related to food.

**Box 14.** *“How I assess the influence of the people in my social environment? I think there is no influence. But I have to say; if you are on a party then there are snacks available. But still, I am the one who eats it.” (Resp. 3)*

### **1. Non-supportive social environment**

A non-supportive social environment could influence relapse. Several comments of the respondents gave directions to this influence, directly and indirectly.

**Family** – When respondents thought dieting was a battle on their own, people around them were allowed to eat unhealthy snacks near them. Even though they found this alright, they found it hard to resist the temptation of seeing people snacking next to them. Just the look, smell and sound of it made it very tempting, mentioned by two respondents. A partner could influence the way respondents handled their diet. One respondent mentioned she didn’t like the way her partner kept an eye on her during a party, to see whether or not she ate snacks. Her reaction to that was that she got rebellious, so she took snacks on purpose to annoy him. Also, some partners said that the respondents did not need to diet, because they didn’t care about them being skinny. Having to cook separately from the family because of the diet didn’t contribute to the ease of holding on to the diet, as stated by one respondent. It was not perceived as nice and sociable to have to eat different by the respondent, and also the extra effort it cost made it more difficult.

**Friends** – Friends were of influence among four respondents. Two respondents mentioned they dieted together with a friend. This made it nicer and increased motivation to start and continue a diet. But if the friend quitted the diet first, the respondent was more prone to quit as well because it was less attractive and harder to diet alone. Eating and being together with friends is considered as very important. It could happen that friends could be very pushy to eat along with the rest of the group, while being on a diet (Box 15). Negative comments about the respondents’ diet and that it is sociable (typical Dutch: ‘gezellig’) to join for a snack, cake or wine, were common and mentioned by four respondents as an influencing factor in relapse from a diet. Not being honest about how the dieter felt about these comments, and wanting to please friends, contributed to failure of a diet and could indirectly cause relapse.

**Box 15.** *“That is also of influence, because your social environment does not make it easy to keep up or to make the right choices. Yes, and people who say: ‘Ah, nice, join us, take a piece of cake’ like that. That happens a lot.” (Resp. 8)*

### **2. Negative experience in social environment**

Negative experiences in the social environment made respondents feel depressed and sad. It contributed to eventually quitting their diet and starting to eat normally again, or even slipping into emotional eating.

**Family** – From three respondents a family member died while were dieting. This caused a relapse, because of the emotional condition of the dieter. Also a perspective of the severity of their problems was seen in that period; losing weight is less important than the loss and grief they experienced due

to the death of their beloved. Two respondents experienced problems with their partner while dieting, this could contribute to relapse. Problems within relationships with their partner was seen as a negative experience.

**Friends** – A friend of one of the respondents got cancer, and didn't want to stay in touch anymore. This was also the friend whom the dieter did sports with four times a week. This negative experience resulted in relapse.

The negative experience in social environment made sure the respondent lost motivation to diet and believed her diet was less important than her other problems. Negative experiences also could cause emotional eating, which could cause relapse directly or indirectly, as discussed before.

### **Physical environmental factors**

**Work** – Work was a factor that turned out to be of influence among two respondents. If a diet went well because a respondent ate healthy and exercised a lot, this could change because of a change in work routine. If something work related changed, like working hours, the diet routine could get mixed up which could result in relapse from a diet. In another work environment, a lot of treats were handed out because the respondent worked on a primary school (Box 16). Because the availability of the snacks, it makes it harder to stick to the diet and makes the respondent more prone to relapse.

**Box 16.** *"Almost every day there is a treat from a child whose birthday it is. (...) We have to take something; otherwise the child will be confused and upset. (...) You don't actually have to eat it, but the temptation is just too big." (Resp. 8)*

### **Other factors**

**Diet** – Diet was mentioned by three respondents as an influencing factor. If the diet was too strict, it was harder to keep up with the diet according to two respondents, for example if no alcoholic drinks were allowed during the diet. Quitting the diet also was stimulated by the feeling there was no freedom within the diet. If an employee of the diet association was too pushy, or too nanny like, it could lead to quitting the diet. Another way how diet could influence was if the dieter started eating normally again because the diet was ended after a specific period. This was the case among two respondents.

**Health** – Negative health occurrences played an important role in relapse among four respondents. Especially experiencing a hernia could immediately lead to relapse, which happened among three respondents. The feeling of being powerless in the situation, because of the incapability of continuing the diet and exercising, caused emotional eating and influenced relapse.

**Table 8.** Overview factors relapse from a diet

Interviews – Relapse from a diet			
Factor category	Factor		
Psychological factors	<b>1. Low self-discipline</b> - Drop out of stimulants (2) - Lack of psychological awareness (10) - Internal attribution (9) - Sugar addicted (1)	<b>2. Demotivation</b> - Not losing weight anymore (4) - Achieved goal weight (3) - Goal setting (1) - New weight does not feel right (4)	<b>3. Emotional status</b> - Depression (1) - Emotional eating (1) - Stress (1)
Social factors	<b>1. Non-supportive environment</b> - Family (2) - Friends (4)	<b>2. Negative experience in social environment</b> - Family (3) - Friends (1)	
Physical environmental factors	- Work (2)		
Other factors	- Diet (3) - Health (4)		

*Note: Number mentioned after the influencing factors represents by how many respondents the factor is mentioned*

#### 4.2.5 Factors that influence regaining weight after relapse from a diet

After quitting the diet, which happened gradually in most of the relapses, there was a period of regaining weight again. This weight regaining was stimulated by several factors, as apparent from the interviews. It is also important to take into account that several factors that caused relapse (like emotional eating), also contributed later on in the process in regaining weight.

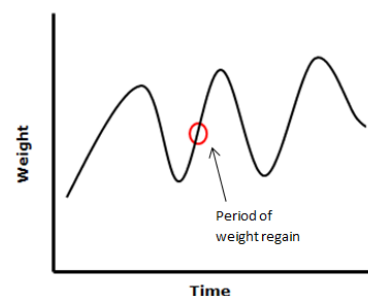


Figure 9. Point in weight cycle process: Regaining weight

##### Psychological factors

**Emotional eating** – Emotional eating was mentioned as an influencing factor in regaining weight among three respondents. Overeating when emotional unstable caused weight gain after relapse.

##### Social factors

**Overweight people around** – Being part of a group which consists out of people who are also overweight, will not create the motivation to start losing weight again. When a respondent perceived herself as one of the slimmest compared to her friends, she felt thin. Overweight friends around made dieters feel more comfortable with their own overweight, mentioned by two respondents.

**Ill daughter** – One respondent has a daughter who is mentally ill. This illness causes a lot of stress within the family situation, because the daughter is in a depression and refused to eat. When she did eat, the family ate along to stimulate this (Box 17). Eating in the middle of the night is not a thing that the respondents would do normally, but because of her daughter's situation this did happen.

**Box 17.** *"She also had a period that she ate very badly, and that she threw up and within a very short time frame she lost 12 kilo's, of course we saw that, and ehm, then you just want her to eat and you want to be a good role model. And if she finally ate, you eat along with her. These are all things which were very important in that time, and caused a lot of stress." (Resp. 9)*

**Social norm on eating** – The general perceived social norm on eating is that it is fun to eat together and celebrate life events with unhealthy food. This was experienced by three respondents.

**Neighbors** – The social dimension of the neighborhood had influence on one respondent; she often had drinks and snacks with neighbors which influenced unhealthy eating behavior (Box 18).

##### Physical factors

**Garden** – In general, the garden was said not to be of influence in regaining weight. There were, for example, no extra barbecues or extra dinners. One respondent mentioned that she had a community garden, in which she had more often dinners than that she worked in her garden. This could have influenced regaining weight.

**Supermarket** – The supermarket did influence regaining weight, as mentioned by all ten respondents. The distance to the supermarket played a role in how often one respondent made use of the supermarket, especially when she urged for a snack (Box 18). Because she lived really close to the supermarket, she could easily go there and buy something to snack; therefore the temptation was even bigger. The temptation of unhealthy food in the supermarket was something almost all respondents mentioned as a cause of gaining weight. Respondents were sensitive for cheap offers, small snacks at the checkout, buying more around dinner time when they were hungry and the smell of food inside the supermarket. Also they mentioned they know psychology of the supermarket, for example the way the supermarket presents certain products, but even they admitted they had this knowledge, temptation was major. If they saw unhealthy food, they wanted to buy it. The supermarket was seen as the starting point of their eating habits, whether healthy or unhealthy.

**Box 18.** *“When I lived in my previous hometown, I lived near to a shopping center, and then it was really like: Almost 9 O’clock thank god, the shop almost closes and then I can’t buy anything anymore! Or; should I go to the supermarket really quick? Then at least I will have some chocolate tonight!” (Resp. 10)*

**Takeaways** – Takeaways did not cause relapse, but did influence the process of regaining weight among three respondents. Take away was an easy alternative for cooking and often nearby.

### Lifestyle factors

**Eating behavior** – Eating behavior could influence regaining weight, mentioned by five respondents. Eating unhealthy in general, too much snacking behavior and eating too much was assessed as an influencing factor in regaining weight.

### Other factors

**Prone to gain weight** – One respondents rated herself as more prone to gaining weight in general. If she ate as much as others would, she would gain weight while others would not. Also she believed her metabolism is slower than the metabolism of others.

**Table 9.** Overview factors gaining weight after relapse from a diet

Interviews – Regaining weight after relapse from a diet	
Factor category	Factor
Psychological factors	* Emotional eating (3)
Social factors	* Overweight people around (2) * Ill daughter (1) * Social norm on eating (3) * Neighbors (1)
Physical factors	* Garden (1) * Supermarket (10) * Takeaways (3)
Lifestyle factors	* Eating behavior (5)
Other factors	* Prone to gain weight (1)

*Note: Number mentioned after the influencing factors represents by how many respondents the factor is mentioned*



## Chapter 5. Results literature review and interview in a new perspective

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### 5.1 Summary of total results of the four points in yo-yo process.

#### 5.1.1. Factors that influence starting a diet | Interviews and systematic literature review

Starting a diet is influenced by several psychological factors. Internal motivation to start a diet was an important factor. This internal motivation could be influenced by dissatisfaction with weight and/or body. If women wanted to be slimmer and look more beautiful, appearance motivation was of influence. Depression is related to start a diet. Depressed women are more prone to start a diet. Wanting to see a result quickly was a motivation to start dieting, as well as comparison with others. Social factors also influenced starting a diet. Family, friends, others and perceived media pressure contribute to the consideration of a woman to start a diet. This influence for example consists out of recommendations about a certain diet, or by comments the women should lose weight. The results of the interviews showed some women were convinced they did not perceive social influence in starting a diet. There were no physical environmentally factors that influenced a woman to start a diet within the results of this study. Lifestyle factors were expressed in relation to other health behavior, physical activity level and history of dieting behavior. Other factors were also found. Women with a lower age, higher BMI, higher weight, higher education were more prone to start a diet, as well as women who wanted to improve their health.

#### 5.1.2. Facilitating and limiting factors that influence losing weight during a diet | Interviews

Different factors are influencing the weight loss progress after a diet is started. These factors facilitated or limited the diet. Psychological factors that facilitated losing weight were: Making time for your diet and receiving compliments on the new slimmer body. Supporting family and friends (e.g. by joining the diet or exercising together) helped the dieter and are considered as social factors. Physical factors were present: gardening as distraction, a neighborhood which stimulated exercise, work and the availability of diet products in supermarkets as a stimulation for women to keep holding on to their diet. Lifestyle factors like practicing sports and adapting a healthy lifestyle facilitated the weight loss process during a diet.

Limiting factors: Mostly psychological factors were detected as limiting factors. Dieters perceived stress and not enough time to spend on their diet. Emotional eating was also a psychological factor that limited the weight loss, as well as dichotomous thinking. Family, especially children, were experienced as a limiting factor. Children could for example decide what will be bought in the supermarket, which mostly were unhealthy products. One physical environmental factor has been mentioned: the supermarket was important because of its seducing unhealthy products. A lifestyle factor that limits weight loss was that not being able to practice sports (for multiple reasons) caused demotivation and was experienced as negative.

#### 5.1.3. Factors that influence relapse from a diet | Interviews and systematic literature review

Psychological factors that influence relapse from a diet are numerous and can be placed under self-discipline, demotivation, emotional status and low self-esteem. Social factors are friends, family and others. The social environment could be non-supportive (others are snacking next to dieter, a diet friend who stopped, negative vision of the partner on diet, comments by others) or a negative experience was present (death of a family member, an ill daughter, relational problems). Work was

experienced as a physical environmental factor that influenced relapse. Work influences relapse because work could provide seduction of unhealthy food or influence relapse when something within the working hours changed which made sure structure in a diet disappeared. Lifestyle factors were detected as eating behavior, physical activity level and relation to other health behavior. Other factors are diet related such as; diet does not fit the dieter and diet was finished. Marital status, weight, socio-economic status and duration of weight loss maintenance were also other factors that could influence relapse.

#### **5.1.4. Factors that influence regaining weight after relapse | Interviews**

Emotional eating is detected as an influencing psychological factor in regaining weight after relapse. Physical environmental factors that were found were: overweight people around, ill daughter, neighbors and social norm on eating. Physical environmental factors were eating and drinking in the garden, being seduced by the supermarket and getting takeaways. A lifestyle factor that influenced regaining weight was eating behavior, which involved eating unhealthy, too much snacks and eating too much. Other factor was that a dieter assessed herself as prone to gain weight, which stimulated the weight regain after relapse.

### **5.2 Returning themes within total results**

Within the results of the systematic literature review and the interviews, factors that influence and maintain the yo-yo process are presented. Certain factors do not only influence one point of the yo-yo process but often more than one part. Factors described in chapter 4.2.2 until 4.2.5) could be under divided in specific themes, which makes the analysis of the results more abstract. The discovered themes are described below.

#### **Personal characteristics and dieting history**

This theme effects both starting and relapse from a diet. Starting a diet is influenced by personal characteristics as age, education and BMI. The age on which women start to diet is of influence in their further life because after dieting on a young age, women are more prone to experience weight cycles later in life. Women with a higher education were more likely to start a diet. Not completing college was of influence in being more prone to relapse a diet. A higher percentage of maintainers than relapsers completed college. Women who assessed their BMI as too high were more likely to start a diet. BMI also worked the other way around. Lower BMI was more often assigned to successfully weight loss maintainers than to unsuccessful weight loss maintainers. A high BMI could be a stimulating factor to start a diet, but also a limiting factor in weight loss maintenance.

#### **Health status**

##### *Lifestyle*

Lifestyle in general could lead to relapse or to facilitate the progress of a diet. Relapse because, if a dieter has an unhealthy lifestyle and because of that falls back into old habits after a diet, this influences relapse. Lifestyle could be a stimulating factor in the way that when a diet was seen as a healthy lifestyle, maintenance of the diet was facilitated. This increases further weight loss and decreases the chance on relapse.

##### *Health*

Health was present within the yo-yo process in the two core concepts points. Improving health by

losing weight could be an important reason to start a diet. Improving function of the joint and prevention of dementia on a later stage in life were health related motivations mentioned in the interviews to start a diet. Health could also cause relapse, for example when a hernia was experienced and continuing the diet was impossible.

### *Body*

Dissatisfaction with body appeared to be a frequent reason to start a diet. Body image distortion was discovered as an influencing factor for the onset of dieting. Women thought of themselves as too heavy and wanted to be slimmer, which contributed to the motivation to lose weight and start a diet. So appearance is a reason for dieting. Being dissatisfied with their bodies made women also more prone to relapse. If women thought negative about their body it could contribute starting a diet and also could make women more prone to relapse.

### *Weight*

Weight was also a concept which returned in several points within the yo-yo process, and can therefore be assessed as a theme. For starting a diet, weight played an important role. If women were not satisfied with their weight, it could lead to start with a diet. Losing weight was the reason for starting a diet in more than half of the dieting women, according to the literature (Forrester-Knauss and Zemp Stutz 2012). Weight could also be a cause of relapse. If women did not see any change on the scale any more, this could cause demotivation and eventually relapse from a diet. If a weight loss goal was achieved, it could lead to relapse from a diet because then satisfaction was present and no further dieting was needed. Relapse was influenced by a high maximum weight. Women with an higher maximum weight were more prone to regain weight after relapse than women with a lower maximum weight.

## **Psychological factors**

### *Self-discipline*

#### High self-discipline

High self-discipline was expressed in factors that helped dieters to keep up with their diet, like making time for their weight loss process. Also personal strategies that facilitated weight loss or that protected weight loss maintenance were influenced by high self-discipline. The right amount of cognitive restraint appeared to be important in succeeding in a diet, restriction of unhealthy food while dieting was important for relapse prevention. Being internally motivated to start a diet was also a sign of high self-discipline. Internally motivated women used more healthy dieting practices.

#### Low self-discipline

Low self-discipline was related to factors that mostly influenced relapse. Being a sugar addict, lack of psychological awareness, dichotomous thinking, disinhibition, low cognitive restraint and not coping well with difficulties were all factors that influenced relapse and were a sign of low self-discipline. Choosing a crash diet because a quick fix is needed and not finding time to spend on losing weight also influenced this, as well as quitting a diet when certain dieting stimulants dropped out.

### *De-motivation*

De-motivation was a psychological factor that influenced relapse from a diet. It included goal setting, because setting non achievable goals de-motivated the dieter. A dieter also became de-motivated

when she did not lose weight anymore or when she reached her weight loss goal. Another reason for de-motivation was when the new weight did not feel right anymore.

#### *Emotional status*

The emotional status of a yo-yo dieter is of important influence, no matter on which point in the weight cycling process a woman is located. Being in a depression prospectively predicted the start of a diet. It also was related to relapse from a diet. Stress was found to limit the progress of a diet and to influence relapse from a diet. Emotional eating was an influencing factor throughout the yo-yo process. It limited the progress of a diet, it influenced relapse from a diet and it increased regaining weight after relapse.

#### *Low self-esteem*

Several factors that expressed low self-esteem were detected. Dissatisfaction with weight and body was a reason to start a diet, which is related to appearance motivation. Women got motivated by compliments on their slimmer body and compared themselves to others, which shows low self-esteem was present. When a woman perceived losing weight as difficult, this was a sign of low self-esteem, as well as attribution of relapse internally.

#### **Social environment**

Social environment appears to be an influencing factor throughout the whole yo-yo process. The general social norm about eating within a social environment stimulates a relapse and regaining weight after relapse. Eating together, celebrating birthdays with unhealthy food and drinking wines together makes it hard to stick to a diet or even trying not to gain any more weight while not being on a diet.

#### *Family*

Family is an important theme according to the results, because it is detected as an influencing factor throughout the whole weight cycling process. Women were influenced by their mother to start a diet because of her overweight related comments. If a family member recommends a certain diet, women listen to this and try the diet themselves. If the family environment in which the dieter lived was encouraging and supporting, the dieter was more likely to have success in the weight loss process. Children were a limiting factor in such a way the parent wants to comply to the needs of the child (e.g. the child decides what is bought in supermarkets). A partner was a limiting factor in losing weight if he had the opinion the woman did not have to lose weight. Seeing other people snack while the dieter is at home made it harder to stick to the diet and could cause relapse. Join for a takeaway or eating chips is assessed as tempting when family members were going for that. The vision of the partner could be seen as a cause of relapse. If the partner was checking the dieter while being on a party, the dieter could become rebellious and fall into relapse. Having to cook separately also made it harder to stick to the diet. Decease in the family could cause relapse, as well as relational problems within the family.

#### *Friends*

Friends also were interweaved in the yo-yo process, from the beginning until the end. Maintainers more often made use of social support from friends than relapsers did. A woman's friend could recommend a certain diet to try it. Often dieting together with a friend occurred. Friends being overweight or not influenced the motivation of a dieter to start a new diet or not feeling like start a

new diet. A dieter wants to comply to the social norm and does not want to be the only overweight person within a group of friends. To keep holding on to a diet friendship was also of influence. Being in a diet together enhanced the success of the diet because it became nicer. On the other hand, if a friend stopped dieting, this was a negative example for the women and could be followed by a relapse. An ill friend caused relapse, because of the emotional problems brought with this. Friends also caused regaining weight. Being surrounded by a group of overweight people with an unhealthy lifestyle increased weight gain.

#### *Other people within social environment*

Social environment consist out of family and friends, but also other people like acquaintances. Other people in general were also seen as an influencing factor in starting a diet. If women were motivated by others to start a diet, this was associated with unhealthy dieting and disinhibition. When a dieter compared herself to others, this influenced starting a diet. If the dieter noticed she was less slim than another person, it made that the dieter saw herself as overweight. Not only starting a diet, also relapse from a diet was influenced by others. If women thought of other people's body as overweight, they were more likely to regain weight and less willing to control food intake. Also weight loss takes more time than women who perceived others to be less overweight.

#### *Media*

Media influenced starting a diet in several ways. It was a significant predictor of dieting, because of the perceived media pressure to be thin. Specific diets were also promoted in the media as a hype, which made it more attractive for women to start a specific (often crash) diet.

#### **Physical environment**

No physical environmental factors appeared to influence starting a diet. Progress of a diet, relapse from a diet and gaining weight after relapse from a diet are influenced by the physical environment. The supermarket facilitated the weight loss process, by the availability of healthy, specific diet-proof food products. It also influenced regaining weight after relapse, because of all the temptations of unhealthy food in the supermarket. A garden often was assessed as not of influence in the yo-yo process. However, the garden could be a distraction during the progress of a diet, in such a way that gardening prevented a dieter from eating because of the distraction. The garden was a source of quality time for a dieter, so this influenced regaining weight after relapse. The neighborhood only influences the yo-yo process by facilitating the weight loss period, if the neighborhood was assessed and used to exercise more. Work appeared to influence the yo-yo process. In several ways it facilitated losing weight; going on your bike to work gave the dieter extra minutes exercise per day, free gym at work and giving structure to daily life was also helpful in holding on to the diet. On the other hand, treats from people at work were a hard to resist temptation. Also, takeaways during work time did not facilitate the weight loss. Takeaways in general did not influence the yo-yo process. Gaining weight after relapse was influenced by going to takeaways, because the frequency of takeaways increased.

## Chapter 6. Discussion & conclusion

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In this chapter the results are reflected with the used theoretical framework and placed within the current literature about this topic. Thereafter, the possibilities for a healthy lifestyle for weight cycling women are discussed. This chapter ends with mentioning limitations of this thesis and further research needed.

### 6.1 Answering the sub-questions

The two sub-questions of this thesis are:

1. *Which psychological, social and physical environmental factors influence (re)starting a diet in women between 18 and 64 years?*
2. *Which psychological, social and physical environmental factors influence relapse from a diet in women between 18 and 64 years?*

These questions have been addressed by the systematic literature review and the complementary interviews. In general, more factors for relapse from a diet than for (re)start of a diet were found.

#### Sub-question 1

Several psychological, social, lifestyle and other factors are found to be of influence in starting a diet among weight cycling women which are summarized in Table 10. No physical environmental factors are found as a result. Psychological factors that influence the start of a diet are because a woman wants to lose weight herself, so internal motivation is an underlying factor. Lose weight in order to increase satisfaction with oneself because the woman wants to be slimmer and increase appearance. This reason to start a diet is confirmed by literature (Brink and Ferguson 1998). The start with a specific diet happens because women want to see result as quickly as possible. Factors mentioned in both the literature review and interviews are internal motivation and appearance motivation. This suggests that if the woman wants to increase appearance and is internally motivated, it increased the chance a woman will start with a diet. Several social factors are detected to influence the start of a diet. Family and other people are mentioned in both parts of the study. Media pressure is mentioned by the literature and friends within the interviews. These results suggest women are influenced by their social environment on different levels within their social environment. Within the interviews dieters stated their social environment did not influence their choice on starting a diet. Lifestyle factors were only detected within the systematic literature review. These factors comprise relation to other health behaviour, physical activity level and history of dieting behaviour. Other factors which are found mostly describe personal characteristics like health, age, weight and education. Start a diet in order to improve health was mentioned in both parts of the studies. This factor is acknowledged as motivation to lose weight in literature (Brink and Ferguson 1998; Biener and Heaton 1995). Also trends in dieting seem to influence the start of a diet. Women seem vulnerable to trends which are hyped in media. These results show that start of a diet is influenced by psychological and social factors and that physical environmental factors are never mentioned. Psychological factors to start a diet are factors that indicate a dieter has a low self-esteem and is influenced by her emotional status. Social environmental factors comprise factors throughout the different levels of the social environment. People close by (family) but also further away (acquaintances and perceived media pressure) can play a role in a woman's decision on starting a diet. Physical environment does not seem to play a role in starting a diet among yo-yo dieters, according to the results of both the

literature review and interviews. Also lifestyle factors and other factors are shown to be of influence in starting a diet among yo-yo dieters.

**Table 10.** Overview results from systematic literature review and interviews on start of a diet

	Factor	Systematic literature review	Interviews
<b>Psychological</b>	Internal motivation	X	X
	Appearance motivation	X	X
	Dissatisfaction with weight/body	X	
	Depression	X	
	Comparison to others		X
	Quick fix		X
<b>Social factors</b>	Family	X	X
	Influence by others	X	X
	Perceived media pressure	X	
	Social environment low influence		X
	Friends		X
<b>Physical environmental factors</b>	No results	-	-
<b>Lifestyle factors</b>	Relation to other health behavior	X	
	Physical activity level	X	
	History dieting behavior	X	
<b>Other factors</b>	Health	X	X
	Age	X	
	Weight	X	
	Education	X	
	BMI		X
	Trends in dieting		X

## Sub-question 2

The results on this topic show several psychological factors play a role in relapse from a diet, as well as social, physical environmental, lifestyle and other factors. The psychological factors are categorized in different concepts; self-discipline (high and low), de-motivation, emotional status and low self-esteem. Those concepts explain the psychological side of this complicated event. As can be seen, several psychological concepts can explain the cause of a relapse, often characterized by a moment of psychological weakness. This is also confirmed by Brownell and Stunkard (1981), who discovered relapse is related to disappointment, frustration and self-condemnation (Brownell and Stunkard 1981). Social factors include factors on different layers, as is also the case with sub question 1. Family, friends and others comprise the social environment within this sub-question. A non-supportive environment can make women prone to relapse. Family is found to be an influencing factor on relapse through several ways, this may be explained because family is closely related to the dieter. Physical environmental factors can shape a non-supportive environment which can enhance the chance on relapse. Lifestyle factors are eating behaviour, physical activity level and relation to other health behaviour. Other factors are found which could not be categorized, like marital status, weight, socio-economic status, duration of weight loss maintenance, health and diet. Relapse from a

diet is a concept which can be explained well now by all the before mentioned psychological factors and be further explained by social, physical environmental, lifestyle and other factors, although these are less notably present.

**Table 11.** Overview results from systematic literature review and interviews on relapse from a diet

	Factor	Systematic literature review	Interviews
<b>Psychological factors</b>	Self-discipline – High		
	Personal strategies	X	
	Self-discipline – Low		
	Lack of psychological awareness	X	X
	Coping	X	
	Disinhibition	X	
	Cognitive restraint	X	
	Dichotomous thinking	X	
	Time	X	
	Drop out of stimulants		X
	Internal attribution		X
	Sugar addicted		X
	De-motivation		
	Goal setting	X	X
	Not losing weight anymore		X
	Achieved goal weight		X
	New weight does not feel right		X
	Emotional status		
	Emotional eating	X	X
	Stress	X	X
	Depression		X
	Low self-esteem		
	Dissatisfaction with weight/body	X	
	Dissatisfaction with life	X	
	Perceived task difficulty	X	
	Comparison to others	X	
<b>Social factors</b>	Family	X	X
	Social support	X	
	Friends		X
<b>Physical environmental factors</b>	Physical environment	X	
	Work		X
<b>Lifestyle factors</b>	Eating behaviour	X	
	Physical activity level	X	
	Relation to other health behavior	X	
<b>Other factors</b>	Marital status	X	
	Weight	X	
	Socio-economic status	X	
	Durance of weight loss maintenance	X	
	Health		X
	Diet		X



## 6.2 Reflecting the results back to the theoretical framework

### Determinants of health model as a base

As a base for the theoretical framework, the Determinants of Health Model (Dahlgren and Whitehead, 1993) is consulted. The results will now be discussed through following the different layers of the determinants of health model.

**Table 12.** Overview layers main determinants of health model and related factors within this thesis

Layer model	Factor thesis
Center – Age, sex and constitutional factors	Biological factors + Personal characteristics
1 <sup>st</sup> layer – Individual lifestyle factors	Health behavior + Psychological factors
2 <sup>nd</sup> layer – Social and community networks	Social factors
3 <sup>rd</sup> layer – Living and working conditions	Physical environmental factors
4 <sup>th</sup> layer – General socio-economic, cultural and environmental conditions	Excluded because of limited timeframe

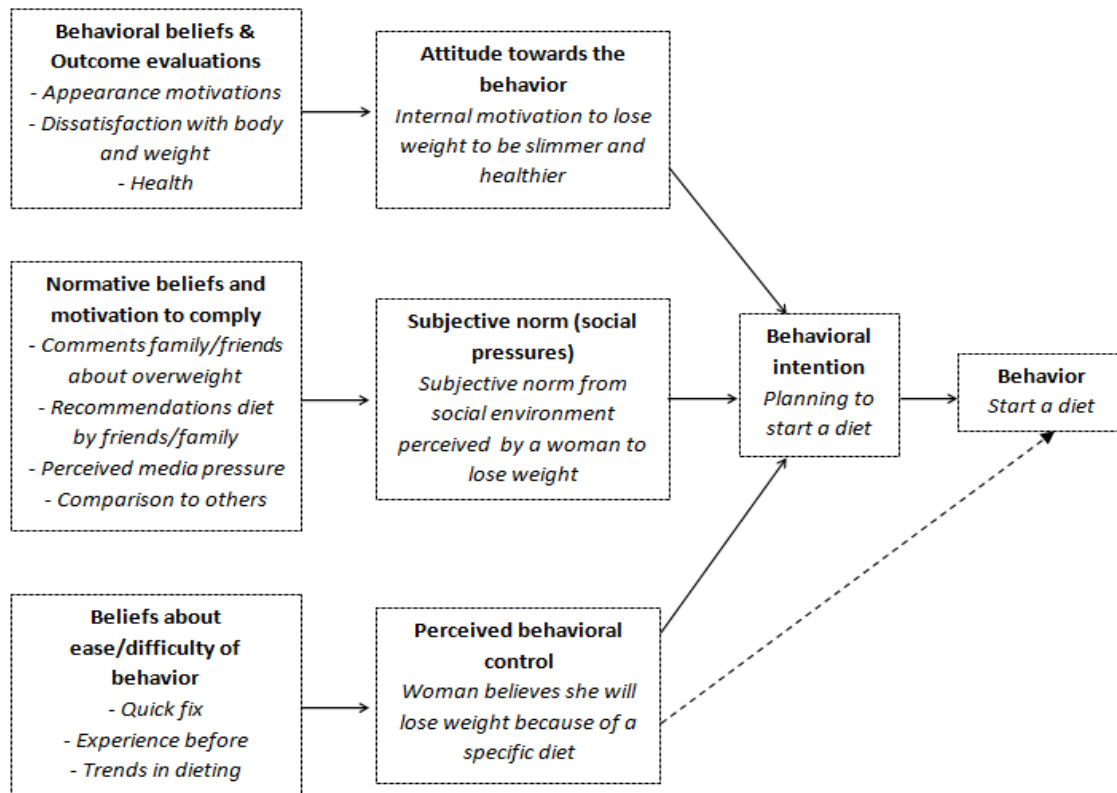
### Center

Within the center the biological factors and personal characteristics are discussed. The factors of this layer are mostly fixed. Age played a role for the motivations to start a diet. Appearance motivation was more common among young women and health motivation to lose weight was more common among older women. Weight of a woman also influenced the weight cycling process. Women with a normal weight were more prone to dieting behavior than women without a normal weight. Women with a higher maximum weight were more prone to regain weight after losing weight than women with a lower maximum weight. Health was interweaved within the weight cycling process. It was an important stimulating factor to start a diet in order to lose weight, but it also was a cause of relapse when a hernia took place. The above described factors shows that personal characteristics are influencing the weight cycling process in multiple ways. A reason what may explain the maintenance in yo-yo dieting which is not found in this thesis, is that after a period of energy restriction because of a diet, the human body will work as a an extra energy storage machine. After relapse, the consumed food will be stored because the human body will react on it as it is on restriction and wants to survive. This is not found as a result in this study because this thesis was not focussed on the biological factors behind yo-yo-dieting, but in several other studies underpinned (Korkeila et al. 1998; Kroke et al. 2002).

### First layer

#### **Theory of planned behavior**

The first sub-question of this thesis touches upon the factors that influence women to (re)start a diet. This question is tried to be answered by the systematic literature review and by the interviews. It will now be brought into perspective through the theory of planned behavior, which elaborates on the factors that influence behavior. The theory is applied on the results from sub-question 1 in figure 10, in this way enabling to understand why women (re)start a diet.



**Figure 10.** Theory of planned behavior combined with results

As can be seen from this figure, to start a diet is influenced by three factors; the internal motivation to lose weight to be slimmer and healthier, the perceived subjective norm from social environment to lose weight and the believe of a woman she will lose weight because of a diet.

*Attitude towards the behavior* → The internal motivation to be slimmer and healthier is influenced by appearance motivation; a women wants to improve her looks by losing weight and starting a diet. The thin-ideal internalization is acknowledged as influencing factor in starting a diet in several other studies (Stice 2002; Putterman and Linden 2004; Grigg et al. 1996). Dissatisfaction with body and weight also plays a role for influencing the internal motivation to be slimmer and healthier, as well as improving health and preventing health problems. Being dissatisfied with body and weights is confirmed by literature (Reba-Harrelson et al. 2009). Body dissatisfaction starts on a young age and is very common among females (Paxton et al. 1991). This all changes the attitude towards dieting; the internal motivation to be slimmer and healthier.

*Subjective norm* → The subjective norm which a woman perceives from her social environment is that she should lose weight. This norm is built upon several factors. Comments from family and friends about overweight and recommendations about a certain diet from family or friends will increase the belief it is the norm to lose weight and be slim. This is also the case with perceived media pressure, which is confirmed by literature (Grigg et al. 1996). Comparing oneself to others could make a women give the feeling she is ought to be slim too. In the study of Grigg (1996), peer pressure is discovered as an influencing factor in starting a diet (Grigg et al. 1996). This all will contribute to the perceived subjective norm, which means perceived pressure from social environment to lose weight. The influence in starting a diet by social environment in general is also acknowledged by literature (Stice 2002).

*Perceived behavioral control* → The third factor that influences the behavioral intention includes the perceived behavioral control. This is influenced by beliefs about the ease/difficulty of behavior, which exists out of the need for a quick fix, the experience of a crash diet before and the trends in dieting. These factors influence the belief of a woman that she will lose weight for sure with the diet. This is also confirmed in a study of Leske (2012), which shows women are vulnerable for different trends in dieting because a believe that crash diets will work is present (Leske et al. 2012).

The theory of planned behavior is applied to dieting in another study, in which this theory is also applied in gaining more understanding in the motivations to start a diet (Nejad et al. 2004). Even though this study was done among female undergraduates, it shows similarities. Descriptive norm, dissatisfaction with weight, high BMI and prior dieting predicted starting a diet (Nejad et al. 2004), these factors were also found in the results of this thesis.

### **Attribution theory**

The attribution theory is used to provide more elaboration on relapse from a diet, which was the main topic of sub-question two. Relapse could be internally or externally attributed. If a woman blamed her social or physical environment for relapse, external attribution was the case. Non-supportive environment, negative experiences in social environment and work are examples of external attributions which appeared in the results. If a women blamed herself for relapse, it shows she internally attributed relapse. This was found as a result in nine out of ten respondents from the interviews. This was not found as a result within the literature review. This may be due to the fact more studies on success and failure factors on maintaining weight loss were found and studied and little research on actual relapse from a diet among women was done.

The fact that women attribute failure internally is also confirmed by literature (Frieze et al. 1982). The same result can be found among women with an eating disorder; it appears they were more prone to attribute negative situations internally then their healthy counterparts would do (Morrison et al. 2006). If internal attribution was the case, often more knowledge and self-experience related to the relapse is gained according to literature, which will increase the self-efficacy to prevent relapse in the future (Schachter 1982). This may be an interesting insight into explaining the repeated cycle of yo-yo dieting. The increased self-efficacy because of internal attribution by previous relapse may predict future start of a diet and will provide the feeling a woman can prevent relapse next time. The reason of relapse is within their own reach because they assess relapse as their 'own fault' and therefore may experience more feeling of control regarding relapse for the next time (Schachter 1982). Because women can assess relapse as their 'own fault' and a lot of psychological factors are related to relapse, this may be a reason for women to restart their diet again. This internal attribution, especially specified by poor self-discipline, is confirmed by literature (Leske et al. 2012). Through this way, the attribution theory can provide understanding about relapse and restarting a diet, and therefore more understanding about maintenance of the weight cycling process.

### **Second layer**

#### *Supportive social environment*

Friends and family could play a supportive role considering the progress of weight loss by stimulating exercise or encouraging healthy eating.

### *Non-supportive social environment → Obesogenic environment*

The social environment could also play a non-supportive role. The social norm to relate unhealthy eating and social occasions to each other challenges a diet. Social environment could be a limiting factor because it increased the chance of relapse. For example, seeing other people snack or a dieting friend stopped led to relapse. The social part of the obesogenic environment can also be seen in neighborhood culture (Lake and Townshend 2006). Within the results of this thesis, neighborhood culture is showed to be an environment in which having drinks and unhealthy diners together are common. Especially the social norm to always join for (unhealthy) meals and to celebrate life events like birthdays with unhealthy food are contributing to the social factors within the obesogenic environment.

In general, the social environment encourages a woman to stay in the weight cycling process. Social environment influences start of a diet and relapse from a diet, both important points which increase maintenance of the weight cycling process. The influence of the social environment should not be underestimated, people are highly influenced on their behavior by their social environment (Morrison et al. 2010).

### **Third layer**

#### *Supportive physical environment*

The physical environment could in several ways play a supportive role to lose weight. The attractiveness of a neighborhood to exercise, the availability of healthy products in a supermarket and work related facilitating aspects were physical environmental factors which supported a yo-yo dieter during a diet. Eating healthy and exercising is influenced positively by the physical environment.

#### *Non-supportive physical environment → Obesogenic environment*

The physical environmental factors that are found are compared to the characteristics of an obesogenic environment, to see which role the obesogenic environment fulfills within the weight cycling process. Within this thesis, several physical environmental factors can be placed under the obesogenic environment in which a yo-yo dieter is situated. Supermarkets make it harder for a yo-yo dieter to lose weight. As mentioned before, supermarkets influence the weight cycling process because of their proximity and availability of unhealthy products. Also work could form a threat and be a part of an obesogenic environment. As can be seen from this analysis, the physical environment, in some ways obesogenic, is present within the life of women who are weight cycling.

## Reflection on the Main determinant of health model by themes from chapter 5

**Table 13.** Overview layers main determinants of health model and related themes within this thesis

Layer model	Theme chapter 5
Center – Age, sex and constitutional factors	Personal characteristics; self-discipline; de-motivation; emotional status; low self-esteem
1 <sup>st</sup> layer – Individual lifestyle factors	Lifestyle; health; body; weight
2 <sup>nd</sup> layer – Social and community networks	Family; friends; other people; media
3 <sup>rd</sup> layer – Living and working conditions	Physical environment
4 <sup>th</sup> layer – General socio-economic, cultural and environmental conditions	Excluded because of limited timeframe

All themes can be placed within the discussed layers of this model, in this way the model provides a comprehensive view on the weight cycling process, together with the elaboration by the theoretical framework. It shows this process is multifactorial, complicated and gives a broad scope of this issue. Furthermore, the layers are interacting and influencing each other. Several examples show how this is happening within the weight cycling process. Psychological factors (1<sup>st</sup> layer) are influenced by social factors (2<sup>nd</sup> layer), because for example the emotional status of a women within the weight cycling process can be influenced by social environment. Emotional eating could be triggered by the decease of a family member, which are two components from two different parts of the model. Physical environment included neighborhood culture, in which social environment played a role in encouraging unhealthy eating behavior. On the other hand, having a dog (social environment, 2<sup>nd</sup> layer) and going for a walk was facilitated by a supporting physical environment (3<sup>rd</sup> layer). This example also shows that within different layers, factors could be experienced as risk factors or protective factors, which is also a characteristic of the determinants of health model. This is another example different layers of the determinants of health model are interweaved.

### 6.3 Explanation of maintenance weight cycling process

Previously, the different stages of the weight cycling process are tried to be understood by applying the results on the theoretical framework. In this part of chapter 6, the whole weight cycling process is now tried to be explained by combining the results of the analysis and illustrated in figure 11 on the next page. The lower part of figure 11 illustrates that psychological factors influence every stage of the weight cycling process. In the study of Amigo and Fernández (2007), the importance of psychological factors within the weight cycling process is also acknowledged (Amigo and Fernández 2007). The arrow from psychological factors to the stage ‘regaining weight after relapse’ is made less bold because of less influence of psychological factors found compared to the other stages. The circle that illustrates the weight cycling process is made more ‘pointy’ on top, because the results showed start of a diet was more a moment, and the other three stages more a gradual change. This all is influenced by social factors, physical environmental factors, lifestyle factors and other factors. The social factors arrow is made more bold because a greater amount of social factors are found to be of influence in this process than physical environmental, lifestyle and other factors. Moreover social factors influenced all four detected points in weight cycling process, while physical environmental, lifestyle and other factors did not.

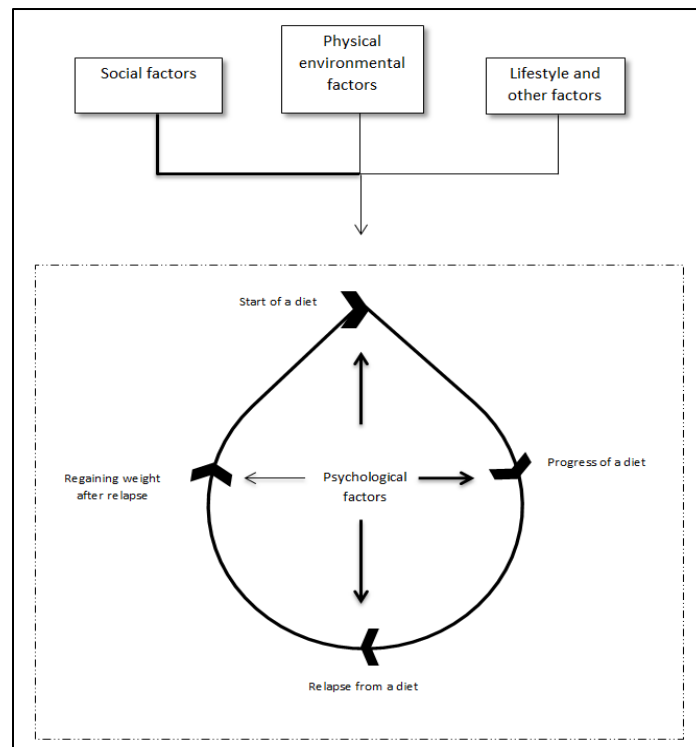


Figure 11. Explanation model of weight cycling process

## 6.4 Strengths, limitations & further research

### Strengths

The recall bias is minimized as much as possible by using the visual interview technique. This interview technique facilitated women to talk about their yo-yo-dieting history, which is a strength of this study. Within the literature study only a distinction between two points in the yo-yo process is made (start of a diet and relapse from a diet). Later, during the analysis of the interviews, four points in the yo-yo process are discovered, which gives a better view of the yo-yo process

### Limitations

Several limitations of this study bear noting. Recruiting the respondents for the interviews was done through the social network of the researcher and the subsequent snowball effect. This resulted in 10 respondents with the average age of 52 years, within a range of 45 years and 58 years. These women are located within the same age category, and therefore do not give a presentation for women of other ages. Furthermore the number of respondents for the interviews is small. Recruiting respondents for the interviews was firstly done through a phone call. Having first contact through phone was important to determine whether or not an interviewee met the conditions. The condition was that the respondent has experienced a weight cycling process of losing and regaining 5 kilos for at least two times in the past 15 years. To recall this through telephone asked a lot from the interviewee's memory and this could lead to recall bias. Recall bias could also appear because a lot of questions and topics mentioned during the interview were based on recalling memory.

### **Further research**

Still not much is known what psychical environmental factors are influencing weight cycling in women, more research is needed upon that subject. A lot is known about the consequences of the weight cycling process, but still little is known about the causes. Further research about this is needed in order to help women out of the weight cycling process, or to prevent them from being in it. Considering the multifactorial character of this process, research about multidisciplinary solutions is needed. It would also be interesting to study positive deviances; women who succeeded in getting themselves out of the weight cycling process, lost weight and maintained this weight loss.

### **6.5 Conclusion**

In literature focus related to the weight cycling process is on two points; start of a diet and relapse from a diet. After analysing the results of the interviews, it turned out the weight cycling process is characterized by four points. Start of a diet, progress of losing weight, relapse from a diet and regaining weight after relapse are the points which give a comprehensive view on the weight cycling process. Those four points are influenced by psychological, social, physical environmental, lifestyle and other factors which influences maintenance of the weight cycling process. Psychological factors are studied thoroughly, according to the systematic literature review on yo-yo dieting. Psychological factors are also found to be present according to the results of the interviews. Social and physical environmental factors are hardly studied in literature but are present as influencing factors within the weight cycling process, according to the results from the interviews. A yo-yo dieting women is constantly challenged during the weight cycling process, by herself as well as by her social environment and physical environment. This all shows the weight cycling process is a very complex problem and needs further research.

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## Appendices

### Appendix I Table overview characteristics of the reviewed studies

Table 14. Overview characteristics of the reviewed studies

Author, Year, Country, Reference	Study design, sample, response rate	Factors on relapse from a diet	Factors on start a diet	Main outcomes + Addressing factors and addressing sub question	Quality of the study
<b>Barnes, 2012, USA,</b>	<b>SD:</b> Cross-sectional data analysis <b>S:</b> 1110 <b>RR:</b> 1110/3414	X	X	<ul style="list-style-type: none"> <li>* Maintainers were more likely to limit their fat intake, eat breakfast most days of the week, avoid fast food restaurants, engage in moderate to high levels of physical activity, and use a scale to monitor their weight.</li> <li>* Significantly more maintainers than regainers identified health concerns as their trigger to lose weight</li> <li>* Reasons for regaining weight: eating due to stress (53%), being unable to find time for exercise (47%), feeling lazy and unmotivated (52%), were most cited reasons.</li> <li>* Maintainers were most likely to score in the High activity category: 55% compared to just 32% of regainers.</li> <li>* There are significant differences in motivations and practices between African American women who lose weight and keep it off and individuals who lose weight and regain it.</li> </ul> <b>Factors:</b> Psychological, Other	High
<b>Bayyari, 2013, Palestina</b>	<b>SD:</b> Explorative prospective study <b>S:</b> 410 <b>RR:</b> 85%	X	X	<ul style="list-style-type: none"> <li>* Unhealthy dieting behavior: skipping breakfast (16,1% often or always), skipping other meals during the day (10% often or always).</li> <li>* Healthy dieting behavior: increasing consumption of fruit and vegetables(47,7% often or always). Increasing exercise (26,1% always of often)</li> <li>* The majority of the study population (52,8%) wanted to lose weight no matter what their weight category was.</li> <li>* There was no statistically significant difference in the dieting behaviors among participants</li> </ul>	Medium

				<p>in regard to residence (city,village,refugee camp).</p> <p>* Our results indicate that body dissatisfaction, rather than actual BMI, is a better predictor of dieting.</p> <p>* Those who had previously engaged in dieting, mainly during adolescence, were more likely to continue practicing some dieting behaviors as young adults.</p> <p>* Social cultural factors: perceived media pressure was a significant predictor of dieting. Perceived family pressure to lose weight did not emerge as a significant predictor of dieting.</p> <p>* Significant predictors of dieting were low body satisfaction, number of previous dieting times, perceived media pressure, regular exercising, BMI, and perceived impact of weight on social interaction.</p> <p><b>Factors:</b> Physical, Social, Psychological</p>	
<b>Befort, 2008, USA</b>	<p><b>SD:</b> Mailed surveys completion</p> <p><b>S:</b> 384</p> <p><b>RR:</b> 46.6%</p>	X		<p>* Successful maintainers report practicing seven behaviors significantly more often:</p> <ul style="list-style-type: none"> <li>- eating 5 or more FV per day</li> <li>- Using low-calorie prepacked meals</li> <li>- Practicing portion control</li> <li>- counting fat grams/choosing low-fat foods</li> <li>- Exercising 30-60 min. per day</li> <li>- Keeping records for exercise</li> <li>- Planning for exercise</li> </ul> <p>* For all respondents: most commonly reported barrier was ease of slipping back into old habits, job commitments, family commitments</p> <p>* Unsuccessful maintainers also reported higher perceived difficulty of maintaining weight, weight management was either 'very difficult' or 'impossible'.</p> <p><b>Factors:</b> Psychological, Social, Other</p>	Medium
<b>Brock, 2010, USA</b>	<p><b>SD:</b> 1-year follow up free living period.</p> <p><b>S:</b> 113</p> <p><b>RR:</b> NM</p>	X		<p>* <b>Perception of exercise</b> difficulty during a standardized submaximal aerobic exercise task is an important predictor of weight regain following a weight-loss intervention.</p> <p>* Those who took a longer time to achieve the initial weight-loss goal gained more weight back in the follow up, independent on initial BMI.</p> <p>* Average weight regain was 5.46 KG.</p> <p><b>Factors:</b> Psychological</p>	Medium
<b>Byrne, 2003, Australia</b>	<p><b>SD:</b> Qualitative research methods</p> <p><b>S:</b> 76</p>	X		<p>* The factors that clearly discriminated between maintainers and regainers fell into three broad categories; behavioral factors, cognitive factors and affective factors</p> <p>* Maintainers reported continued adherence to a relatively low-fat diet, regular exercise</p>	Medium

	RR: Not mentioned			<p>and frequent weight and/or shape monitoring.</p> <ul style="list-style-type: none"> <li>* More maintainers than regainers had achieved their weight goal. majority of the regainers remained dissatisfied with their weight following weight loss.</li> <li>* The majority of regainers reported that their weight and shape unduly influenced their self-worth and they described a high degree of preoccupation with weight and shape.</li> <li>* Almost all maintainers, but only one regainer, reported that following successful weight loss they remained vigilant about their weight, particularly with regard to dietary intake</li> <li>* Dichotomous thinking style was more commonly observed among the regainers</li> </ul> <p>When faced with a stressful situation, regainers reported that they habitually overate</p> <ul style="list-style-type: none"> <li>* Regainers were far more likely than maintainers and healthy weight participants to report using eating to regulate their mood ('comfort eating') or to distract themselves from unpleasant thoughts and moods ('avoidance eating').</li> </ul> <p><b>Factors:</b> Psychological, other,</p>	
Byrne, 2004, Australia	SD: Prospective cohort study S: 53 RR: 43%	X		<ul style="list-style-type: none"> <li>* Regainers reported that they felt less satisfied with their weight and shape than maintainers, and there was a trend toward a greater discrepancy between goal weight and current weight for regainers than for maintainers.</li> <li>* Over the 8 week immediately prior to weight regain, regainers reported having assigned a lower priority to weight control than had the maintainers.</li> <li>* Most powerful predictor of weight regain was dichotomous thinking</li> <li>* Regainers were less satisfied with their weight.</li> <li>* The results suggest that psychological factors may, at least partly, account for some individuals' lack of persistence with weight maintenance behaviors following successful weight loss.</li> </ul> <p><b>Factors:</b> Psychological, Other, Social</p>	High
Chandler-Laney, 2009, USA	SD: Prospective study, 1 year follow up period. Questionnaires S: 120 RR: Not mentioned	X		<ul style="list-style-type: none"> <li>*The perception of the body size of others was inversely associated with rate of weight loss and positively associated with percent fat gain, and total percent body fat in the year following the intervention, for European Women only.</li> <li>*EA women who perceived others as overweight lost weight more slowly and gained more percent body fat during the year following the intervention, resulting in greater percent body fat at follow-up than EA women who perceived others to be less overweight.</li> <li>*EA women who perceived other women as overweight reported less cognitive restraint.</li> </ul> <p>Individual's general perception of others' body size may influence progress and success in a structured weight loss and weight loss maintenance program.</p>	High

				<p>*Women who perceived other as overweight may have been less willing or able to restrict their own food intake, and thus were more likely to regain body fat.</p> <p><b>Factors:</b> Social, psychological</p>	
<b>Dohm, 2001, USA</b>	<p><b>SD:</b> Large community based survey retrospectively</p> <p><b>S:</b> (277+329)= 606</p> <p><b>RR:</b> Not mentioned</p>	X		<p>* Independent of gender, maintainers reported currently weighing significantly less than regainers.</p> <p>*Maintainers total weight-fluctuations score was significantly lower than that of regainers.</p> <p>*Maintainers had higher score on direct coping and lower scores on help seeking.</p> <p>*Maintainers did not differ from regainers on skip meals or fast, attribution to traits, attribution to biology, attribution to negative affect, attribution to lack of exercise, current negative effect, exercise, gender or any of the interaction effects.</p> <p>*Unsuccessful weight-loss maintainers in this study weighed significantly more than the successful weight-loss maintainers.</p> <p>*Results suggest that the way dieters cope with inevitable dietary lapses may be the best predictor of weight-loss maintenance.</p> <p><b>Factors:</b> Psychological, Other</p>	Medium
<b>Enriquez, 2013, USA</b>	<p><b>SD:</b> Twin study design</p> <p><b>S:</b>950</p> <p><b>RR:</b> Not mentioned</p>		X	<p>* Individuals who began dieting at age 18 or older tend to have lower BMI's than individuals who began dieting prior to age 15.</p> <p>*Twins who began dieting at an earlier age report more weight cycling episodes in their lifetime than their twin who began dieting at a later age.</p> <p>*An earlier age at dieting onset was associated with a greater BMI.</p> <p>*Early dieting was also associated with higher restraint scale scores, greater use of risky dieting behaviors and a greater number of weight cycling episodes.</p> <p>*These findings suggest that women who begin dieting at earlier ages, regardless of their genetic or family background, experience more episodes of weight cycling in their lifetime.</p> <p><b>Factors:</b> Psychological, Other</p>	High
<b>Forrester-Knaus, 2012, Switzerland</b>	<p><b>SD:</b> Cross sectional Data analysis</p> <p><b>S:</b></p> <p><b>RR:</b> 66% telephone interview, 77% written</p>		X	<p>*11.2% reported that they had dieted in the last 12 months. Losing weight was reported as the reason for dieting in over half of the women who reported dieting.</p> <p>*Irregular eating was the most prevalent disordered eating behavior, followed by dieting, binge eating and self-induced vomiting. Self-induced was a rarely reported disordered eating behavior .</p> <p>*While underweight women were less likely to report weight dissatisfaction, overweight and obese women had significantly higher odds of begin dissatisfied with their weight than normal weight women.</p>	High

	questionnaire			<ul style="list-style-type: none"> <li>* Smokers and former smokers, as well as women with a higher education, were also more likely to report weight dissatisfaction. Partly physically active and physically active women had higher odds of being dissatisfied with their weight. Reported disordered eating behavior was significantly more likely in women and men with higher weight dissatisfaction.</li> <li>* Individuals with higher levels of education reported more weight dissatisfaction than individuals with lower education</li> <li>* Former smokers were more likely to report dieting than non-smokers</li> <li>* Women with secondary education compared to only compulsory education, and partly physically active, and physically active women compared to inactive women were more likely to diet</li> </ul> <p>Being overweight and being obese were the strongest predictors of weight dissatisfaction in both men and women.</p> <p><b>Factors:</b> Other</p>	
<b>Karlsson, 1994, Sweden</b>	<p><b>SD:</b> randomized 2 year follow up</p> <p><b>S:</b> 60</p> <p><b>RR:</b> Not mentioned</p>	X	X	<ul style="list-style-type: none"> <li>* General mood improvements were reported during early weight loss. The positive changes in mood were generally maintained at weight stability.</li> <li>* Subjects ascribed their elevated mood and rise in self-confidence during weight loss to the feeling of control in eating behavior and the accompanying weight reduction.</li> <li>* Interviews revealed that more frequent relapse crises and insufficient coping during weight stability and relapse had negative effects on mood.</li> <li>* The greater the motivation, the larger the decrease in mental well-being at the end of study.</li> <li>* Benefits in sexual activity and pastimes involving physical activity were noted.</li> <li>* The more restriction in eating behavior, the greater the weight reduction.</li> <li>* Disinhibition was the strongest correlate of absolute weight gain.</li> </ul> <p><b>Factors:</b> Psychological, Physical Other</p>	Medium
<b>Liechty, 2013, USA</b>	<p><b>SD:</b> Longitudinal study</p> <p><b>S:</b> 14,322</p> <p><b>RR:</b> Not mentioned</p>		X	<ul style="list-style-type: none"> <li>* Rates of dieting increased over time in this sample.</li> <li>* Body Image Distortion was a risk factor for onset of dieting. BID predicted higher odds of dieting onset by W3 among both men and women.</li> <li>* Early dieting, depression and body image distortion prospectively predicted dieting or EWLB at wave 3.</li> <li>* Depression and dieting were risk factors for the onset of extreme weight loss behaviors among women.</li> <li>* Early dieting was associated with later binge eating.</li> </ul>	High



				<b>Factors:</b> Psychological	
<b>Putterman, 2004, Canada</b>	<b>SD:</b> 2 sample questionnaire retrospective design <b>S:</b> 206 <b>RR:</b> Not mentioned		X	<p>* Community women were more likely to be dieting for others. Student participants were more likely to be dieting for appearance reasons, and less likely to be dieting for health reasons.</p> <p>*There were no differences between the two groups in terms of dieting strategies used. Women with higher levels pf body satisfaction were more likely to be using caloric restriction, and unhealthy dieting strategies. Body dissatisfaction was also associated with greater levels of disinhibition</p> <p>*The more people indicated that dieting was for oneself, the more they reported used strategies such as healthful eating and caloric restriction.</p> <p>* The more participants indicated that their dieting was motivated by other, the more they reported using unhealthy dieting measures and the higher they scored in disinhibition.</p> <p>* The more a participant's dieting was motivated by appearance, or body dissatisfaction, the more likely she was to report using unhealthy dieting strategies and to have experienced lapses in restraint.</p> <p>* Those participants who reported dieting out of concern for their health were older and heavier than their counterparts, and did not use drastic dieting strategies like fasting or excluding a whole food group. They were also higher in self-esteem, their eating was less restrained and they were not as prone to disinhibited eating than the younger, more appearance-conscious participants.</p> <p><b>Factors:</b> Psychological, social</p>	Medium
<b>Sarlio-lahteenkorva, 2000, Finland</b>	<b>SD:</b> Prospective, population-based study <b>S:</b> 332 (only the women, in total 332+579) <b>RR:</b> Not mentioned		X	<p>* Subjects who were successful in weight loss maintenance had significantly lower BMIs than the comparison groups.</p> <p>*Weight loss was accompanied by positive behavioural changes such as increased physical activity and fewer cigarettes, and by less loneliness, improved life satisfaction and better physical condition.</p> <p>*Maintainers were often living without a partner, suffered from loneliness and were less satisfied with life than the other women. They also seemed to have slightly more medical problems and reported poor physical condition, low level of exercise, a long smoking history and poor sleep.</p> <p>*The women who maintained weight loss were less often married at baseline than the re-gainers, but there were no other differences between the maintainers and the comparison groups in the background variables.</p>	High

				<p>*Predictors of successful weight loss maintenance appear to be gender-specific. In women, psycho-social issues appear to be important for weight loss maintenance.</p> <p>In women, weight loss maintenance was associated with low initial well-being and health-compromising behaviors that improved after weight loss.</p> <p><b>Factors:</b> Psychological, Social, Other</p>	
<b>Westerp-plantenga, 1998, The Netherlands</b>	SD: Non-controlled follow up S: 27 RR: Not mentioned	X		<p>*Body fat percentage, fat mass, fat-free mass, and sagittal diameter decreased in response to the two diets.</p> <p>* An increase in cognitive restraint, from before to during the diet, is one of the determinants of weight maintenance in subjects who do not drop out half way.</p> <p>* A positive correlation between cognitive restraint and disinhibition contributes to a more flexible attitude towards food consumption, which also turns out to be relatively more successful.</p> <p>* The effect of weight cycling appeared as a weight regain of 6 kg the first time and 6.2 the second time. The mean value of body weight was significantly lower at week 120 compared to week 0.</p> <p>* In the three groups, cognitive restraint scores were relatively high being the lowest in the successful group. Also, disinhibition scores were high in the three group.</p> <p>* In the successful group, cognitive restraint and disinhibition score before the diet were positively correlated, as well as during the diet</p> <p><b>Factors:</b> Psychological</p>	Medium
<b>Kayman, 1990, USA</b>	SD: Experimental design S: N = 108 RR: Not mentioned	X		<p>* Most maintainers and control subjects exercised regularly, were conscious of their behaviors, used available social support, confronted problems directly and used personally developed strategies to help themselves.</p> <p>* Few relapses exercised, most ate unconsciously in response to emotions, few used available social support and few confronted problems directly.</p> <p><b>Factors:</b> Psychological, Social, Other</p>	High

## Appendix II Overview quality assessment of the reviewed studies

Table 15. Overview quality of studies; criteria assessment.

x = Plus o= Minus

Article	Introduction & Aim	Methods	Sample	Data collection	Response rate	Data analysis	Results	Discussion	Limitation and weaknesses	Generalizability	Total Plusses
Barnes, 2012	o	x	x	x	x	x	x	x	x	x	9
Bayyari, 2013	o	o	x	x	x	x	o	x	x	o	6
Befort, 2008	x	o	x	o	x	x	x	x	o	o	6
Brock, 2010	o	x	x	x	o	x	x	x	o	o	6
Byrne, 2003	o	x	x	x	o	x	x	x	o	o	6
Byrne, 2004	x	x	x	x	x	x	x	x	x	o	9
Chandler-laney, 2009	x	x	x	x	o	x	x	x	x	o	8
Dohm, 2001	o	x	x	x	o	x	o	o	x	o	5
Enriquez, 2013	x	x	x	x	o	x	x	x	x	o	8
Forrester-knaus, 2012	x	o	x	x	x	x	x	x	x	o	8
Karlsson, 1994	o	x	x	x	o	x	x	x	o	o	6
Liechty, 2013	x	x	x	x	o	x	x	x	x	x	9
Putterman, 2004	x	x	x	x	o	x	x	x	o	o	7
Sarlio-Lahteenkorva, 2000	x	x	x	x	o	x	x	x	x	o	8
Westerp-latenga, 1998	x	x	x	x	o	x	x	x	o	o	7
Kayman, 1990	x	x	x	x	x	x	x	x	o	o	8

## Appendix III Interview questionnaire

### Interview

#### 1. Introductie

- Dank + Korte uitleg van het onderzoek
- Geen goede of foute antwoorden; ervaringen staan centraal
- Mag het gesprek worden opgenomen? (Dit is alleen zodat het interview letterlijk kan worden overgenomen, vervolgens zal de opname worden verwijderd)
- De gegevens worden anoniem behandeld
- Opgeslagen op beveiligd netwerk van de Wageningen Universiteit

#### 2. Algemene vragen over de respondent

- Wat is uw leeftijd?
- Wat is uw lengte?
- Wat is uw gewicht?

#### 3. Persoonlijk verloop yo-yo proces

Hier ziet uw een voorbeeld van hoe een yo-yo process kan verlopen (*laat bijlage 1 zien*). Ik wil u nu vragen om uw eigen yo-yo process van de afgelopen 15 jaar globaal weer te geven op dit vel papier. (*laat bijlage 2 zien*).

#### 4. Algemene vragen over het verloop van het yo yo diëten

- Wat was de reden dat u voor de eerste keer begon met diëten?
- Hoe pakte u dit aan?
- Heeft u enig idee waarom u weer bent aangekomen daarna?
- Daarna bent u weer gaan diëten, wat was hier de reden voor?

#### 5. Vragen over de sociale omgeving in de periode van het yo-yo dieëten

- \* Welke personen in uw leven hebben invloed op diëten?
  - In welke zin hebben zij invloed?
  - Ervaart u deze invloed als positief of negatief?
  - Waarom?
- \* Welke personen in uw leven hebben in het verleden invloed gehad op diëten?
  - In welke zin hebben zij invloed gehad?
  - Ervaart u deze invloed als positief of negatief?
  - Waarom?
- \* Welk cijfer zou u geven aan de invloed van uw sociale omgeving op het diëten? (*wijs punt aan op de grafiek*)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
--------------	---	---	---	---	---	---	---	---	---	----	------------------

- Kunt u dit cijfer toelichten?

\* Welke personen in uw leven hebben invloed gehad op het stoppen met diëten met als gevolg dat u weer aankwam? (wijs punt aan op de grafiek)

- In welke zin hebben zij invloed gehad?
- Ervaart u deze invloed als positief of negatief?
- Waarom?

\* Welk cijfer zou u geven aan de invloed van uw sociale omgeving op het stoppen met diëten?

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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- Kunt u dit cijfer toelichten?

## 6. Vragen over de fysieke omgeving in de periode van het yo-yo diëten

Ik ga nu een aantal vragen stellen over uw fysieke omgeving en welke invloed deze gehad zou kunnen hebben op uw dieet verleden.

### TUIN

\* Heeft u de afgelopen 15 jaar in een huis gewoond met een tuin?

\* Welk cijfer geeft u de invloed van uw tuin op het diëten? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u in de tijd dat u af wilde vallen gebruik van uw tuin?

\* Welk cijfer geeft u de invloed van uw tuin op het weer aankomen? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u op in de tijd dat u weer aankwam gebruik van uw tuin?

### BUURT

\* In welke zin ervaart u uw buurt als prettig om in te wonen?

\* Welk cijfer geeft u de invloed van uw buurt op het diëten? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u in de tijd dat u af wilde vallen gebruik van uw buurt?

---

\* Welk cijfer geeft u de invloed van uw buurt op het weer aankomen? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u op in de tijd dat u weer aankwam gebruik van uw buurt?

### **SUPERMARKT**

\* Welk cijfer geeft u de invloed van de supermarkt op het diëten? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u in de tijd dat u af wilde vallen gebruik van de supermarkt?

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\* Welk cijfer geeft u de invloed van de supermarkt op het weer aankomen? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
--------------	---	---	---	---	---	---	---	---	---	----	------------------

\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u op in de tijd dat u weer aankwam gebruik van de supermarkt?

### **AFHAALGELEGENHEDEN**

\* Wat voor soort afhaalgelegenheden zijn er bij u in de buurt?

\* Maakt u daar gebruik van?

\* Welk cijfer geeft u de invloed van afhaalgelegenheden op het diëten? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u in de tijd dat u af wilde vallen gebruik van afhaalgelegenheden?

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\* Welk cijfer geeft u de invloed van afhaalgelegenheden op het weer aankomen? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u op in de tijd dat u weer aankwam gebruik van afhaalgelegenheden?

## SPORTFACILITEIT

\* Maakte u gebruik van sportfaciliteiten zoals een sportschool of zwembad?

\* Zo ja, wat voor sportfaciliteit?

\* Welk cijfer geeft u de invloed van uw sportfaciliteit tijdens het diëten? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u in de tijd dat u af wilde vallen gebruik van sportfaciliteiten?

\* Welk cijfer geeft u de invloed van de sportfaciliteit op het weer aankomen? (wijs punt aan op de grafiek)

Geen invloed	1	2	3	4	5	6	7	8	9	10	Erg veel invloed
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\* Kunt u dit cijfer toelichten?

\* Op welke manier maakte u op in de tijd dat u weer aankwam gebruik van sportfaciliteiten?

## 7. Tot slot

\* Wat voor andere factoren in uw fysieke omgeving hebben volgens u invloed gehad op het diëten?

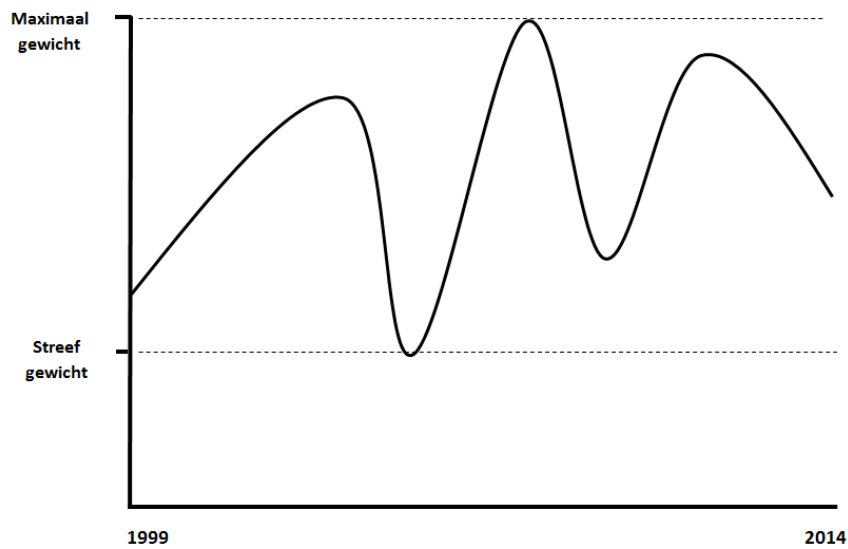
\* Wat voor andere factoren in uw fysieke omgeving hebben volgens u invloed gehad op het weer aankomen?

## 8. Afronding

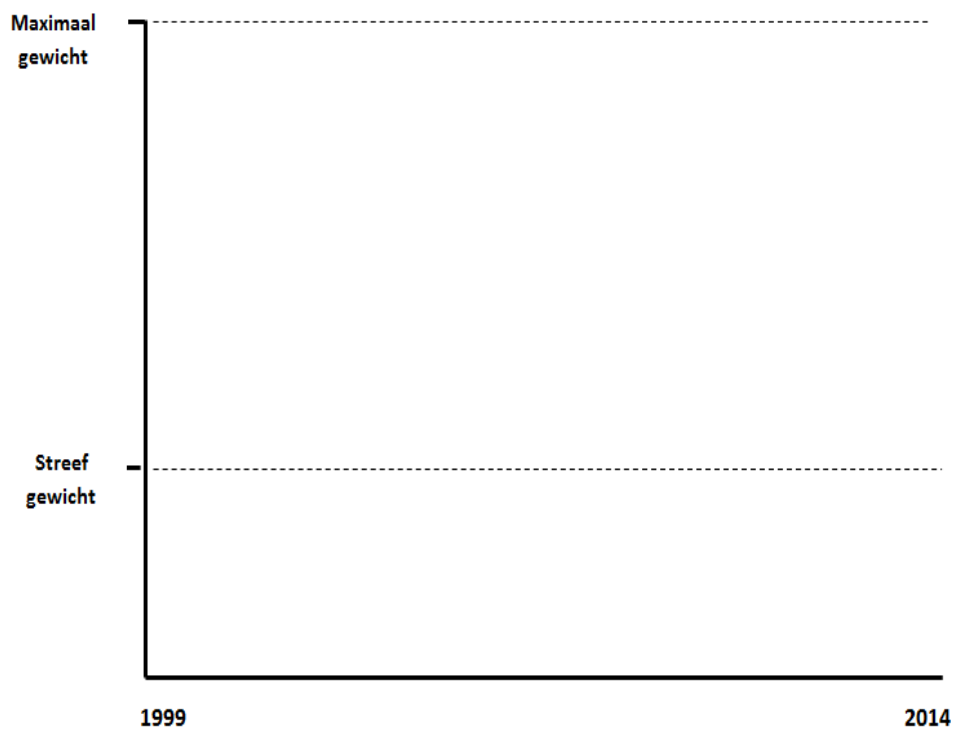
Heeft u nog vragen of opmerkingen?

Bedankt voor uw tijd!

### Visual technique tool during interview – Example drawing yo-yo process to show respondent

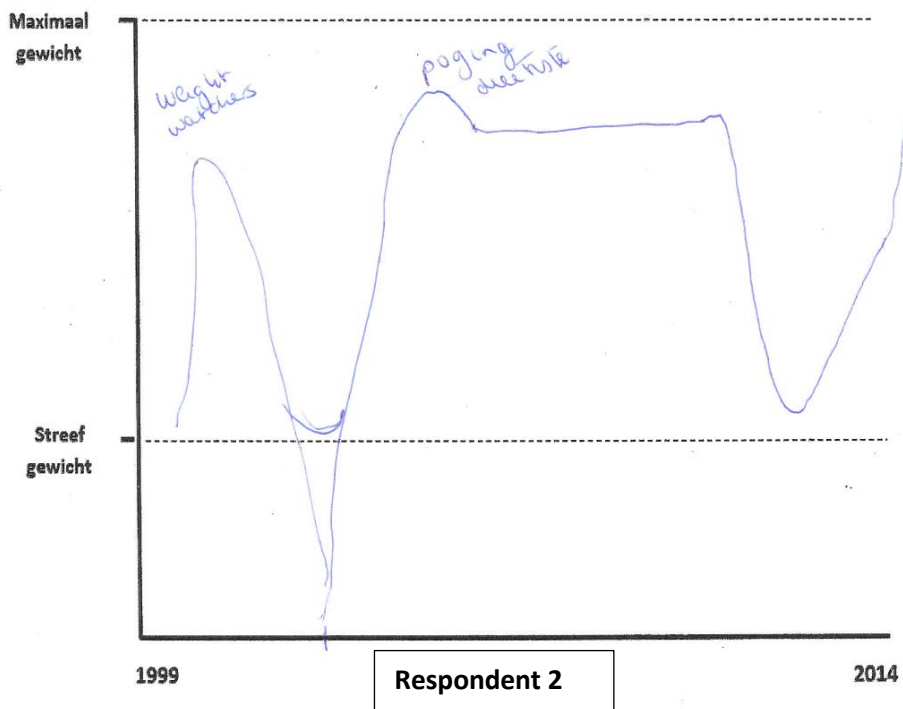
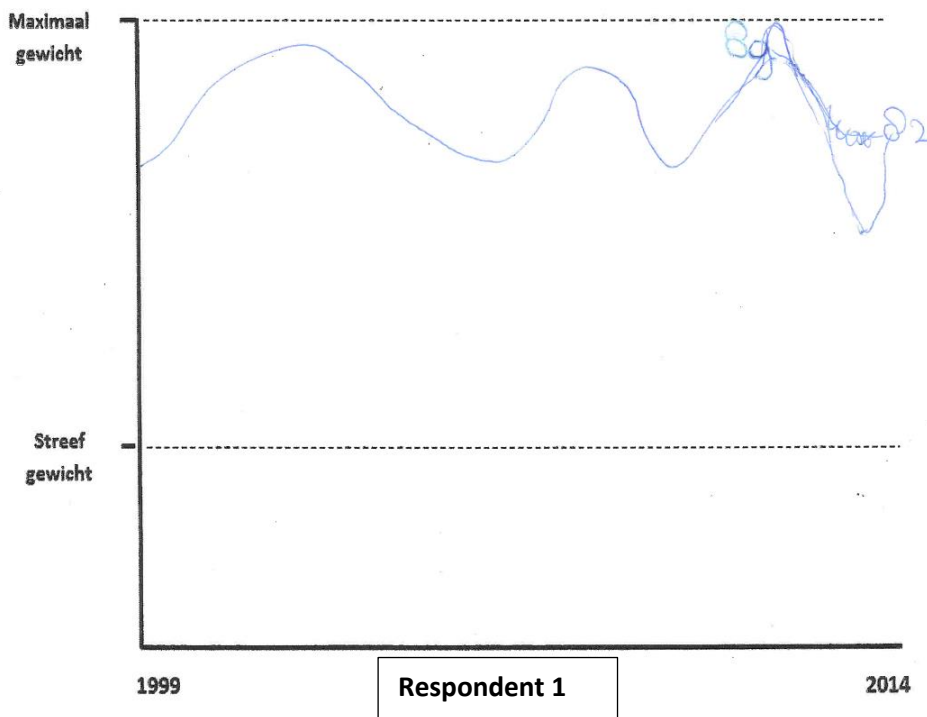


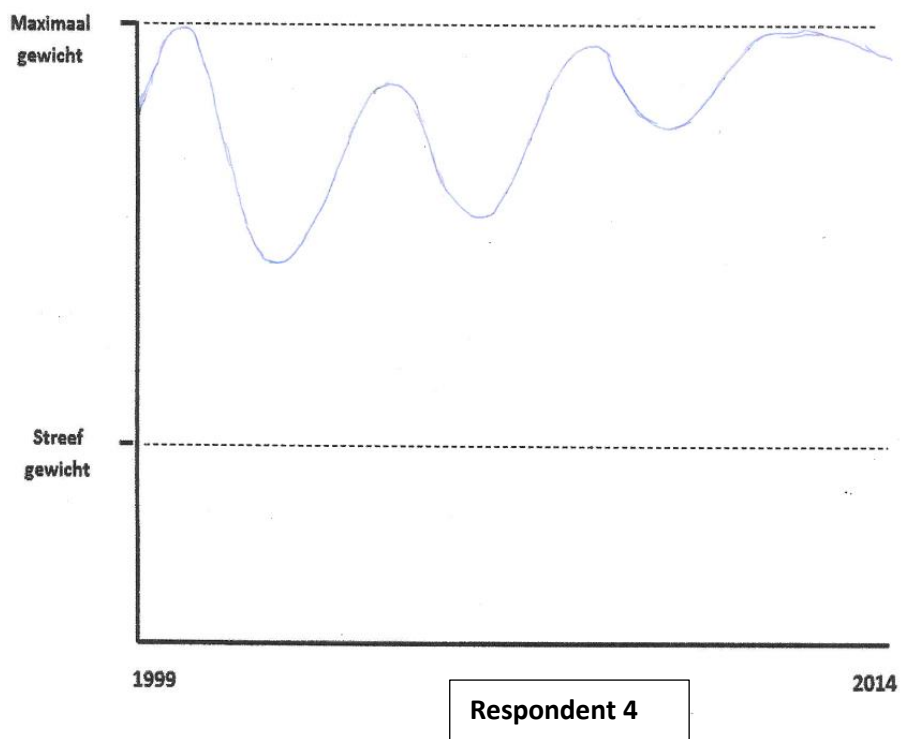
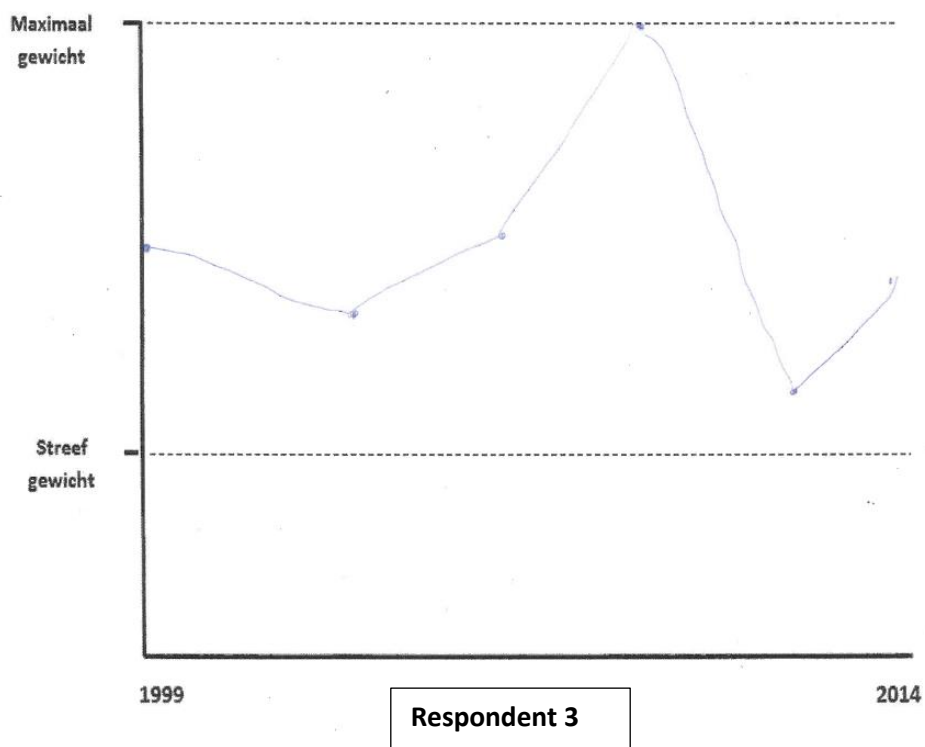
### Visual technique tool during interview – Fill out graphic personal yo-yo process for respondents

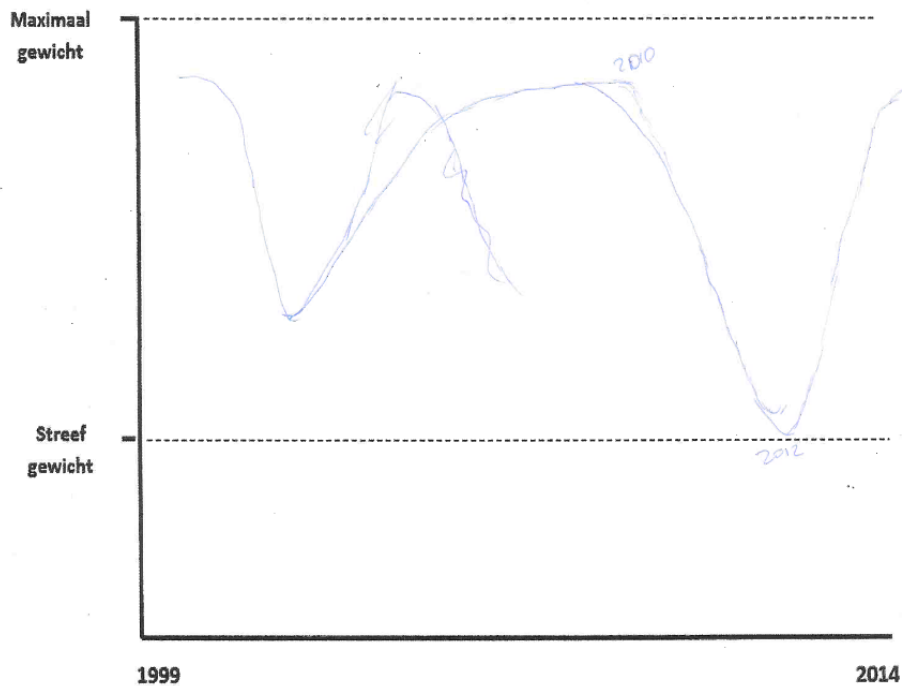




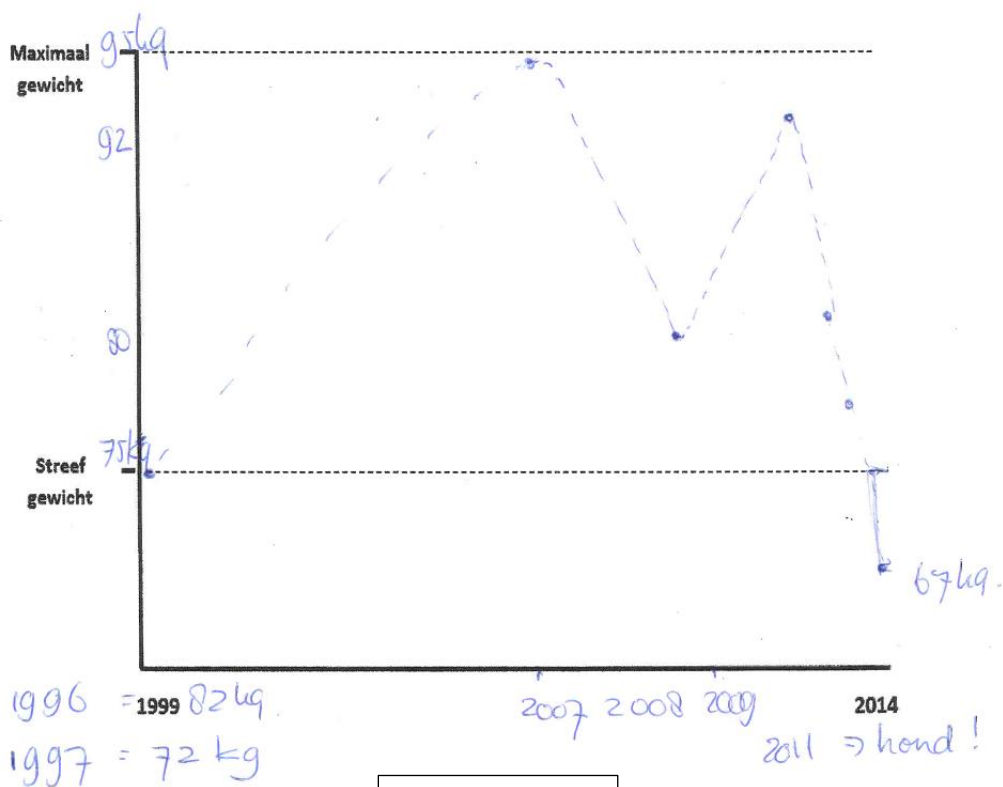
## Appendix IV Interview visual technique results



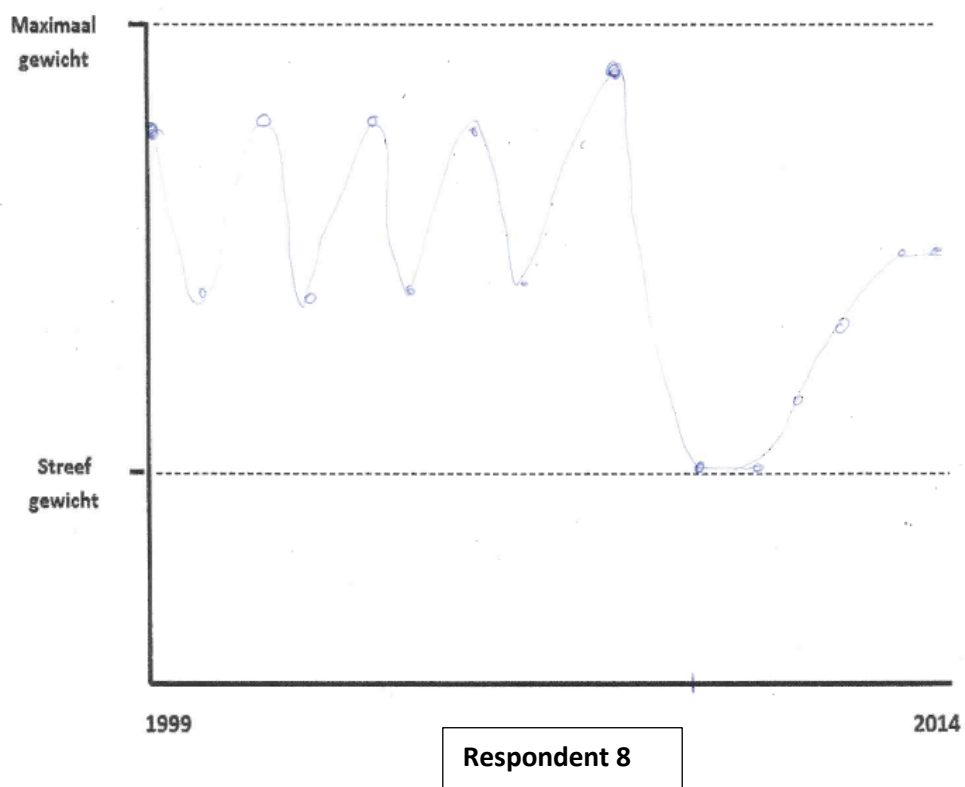
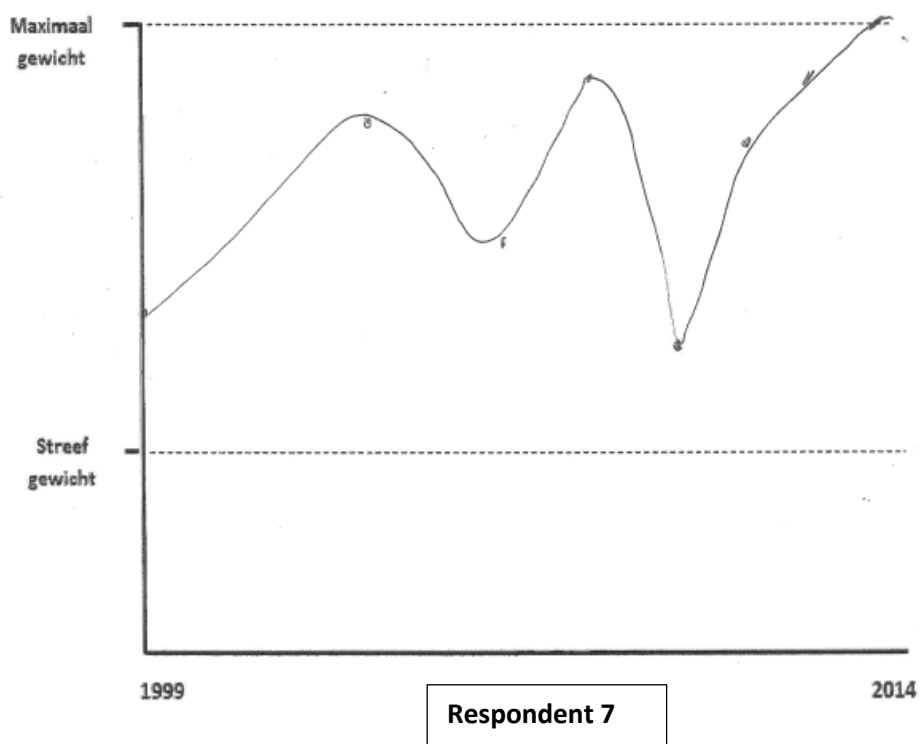


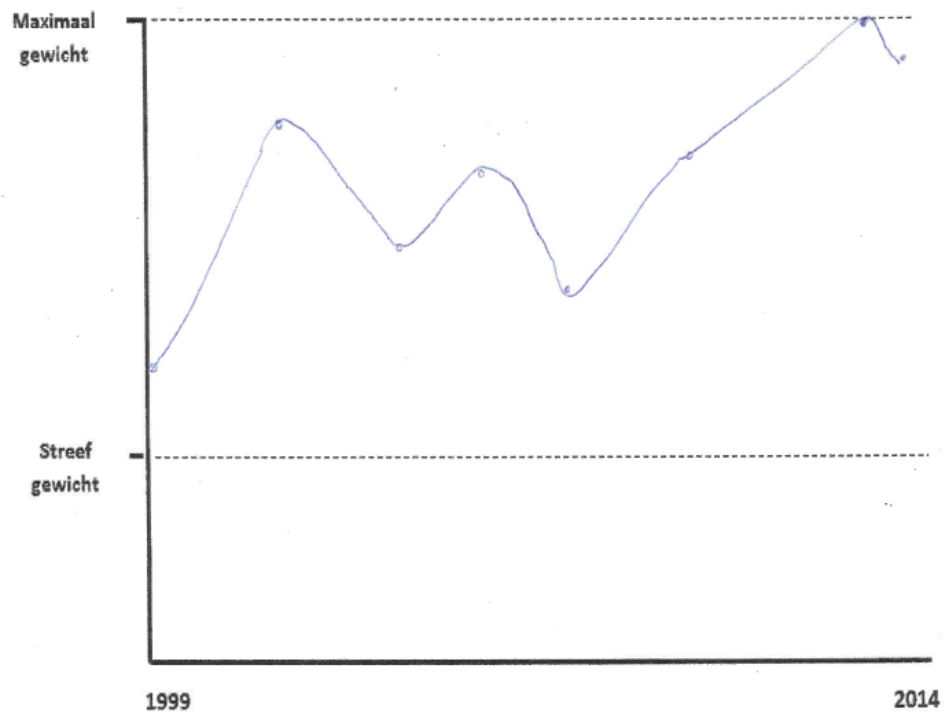


Respondent 5

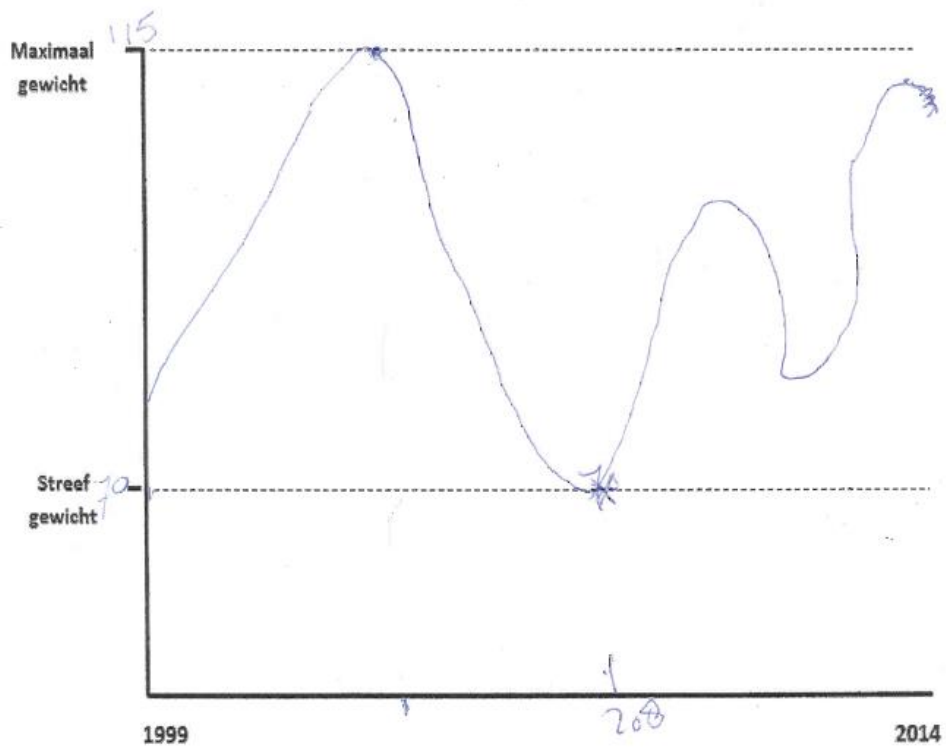


Respondent 6





Respondent 9



Respondent 10