Experiences and outcomes of the intervention Slim Leven Vinkhuizen on health, perceived health, physical activity levels and social cohesion of the participants
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"Experiences and outcomes of the intervention Slim Leven Vinkhuizen on health, perceived health, physical activity levels and social cohesion of the participants"

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Preface

In this master thesis you are going to read about the experiences and outcomes of the lifestyle intervention *Slim Leven*. I have written this thesis to graduate from the European Master of Health and Physical Activity of Foro Italico University of Rome. I have evaluated the lifestyle intervention *Slim Leven* that takes place in Vinkhuizen, a neighbourhood of the city Groningen. I evaluated the intervention by analyzing statistical data and conducting interviews.

My co-supervisor in the Netherlands, Jolanda Tuinstra, helped me a lot in developing a research plan, guided me during my research and she evaluated my thesis. I want to thank Jolanda Tuinstra for helping me during the whole process.

At *Slim Leven* there are also a couple of people who did a lot for me. I want to thank Alice Kok for giving me the opportunity to evaluate the intervention *Slim Leven* and helping me to start up my research by getting to know the intervention itself and the volunteers. First I had some troubles in getting all the evaluation forms, but Femke Handgraaf helped a lot with this. Femke Handgraaf also helped me to find participants willing to be interviewed. So I want to thank Femke Handgraaf a lot for her help. I also want to thank the other coordinators, Ron Kram and Marjan Sloterwijk, of *Slim Leven* and the volunteers, because they were always willing to help me with my research.

I enjoyed it very much to do my research at *Slim Leven*. One of the greatest things about doing my research at *Slim Leven* was that I have met some really great people. I want to wish everyone at *Slim Leven* good luck in the future and hopefully the intervention can continue as long as possible.

Enjoy reading my master thesis.

Kind regards,

Veerle de Vries

Abstract

Introduction: The current study is about the lifestyle intervention *Slim Leven* that takes place in Vinkhuizen, a neighbourhood of the city Groningen. The main goal of the intervention is to increase the health of the inhabitants of the neighbourhood and to increase the social cohesion.

Aim: The aim of this study is to assess the experiences and outcomes of the intervention *Slim Leven* on health, perceived health, physical activity levels and the social cohesion of the participants.

Method: This study uses both a quantitative and qualitative research methods. Every participant has to fill in an intake form when he or she starts with *Slim Leven* and an evaluation form three months later. Data of both forms are used to analyse if there is a change in health, perceived health and social cohesion and if there is an association between these topics. Interviews are used to obtain information about the experiences and the physical activity levels of the participants and about the reasons why they are active at *Slim Leven.*

Results: Data shows no significant changes in health, perceived health and social cohesion three months after starting *Slim Leven*. Besides, there is no significant association between the different topics. Not every participant mentions an increase in physical activity levels. But almost every participant mentions that they are regularly physical active. Reasons most mentioned by the participants to stay active at *Slim Leven* are cosiness and motivated coach.

Conclusion: The experiences of the participants of *Slim Leven* are mainly positive but the results show no improvements in health, perceived health and social cohesion. *Slim Leven* might have influence on the regularity of physical activities.

Summary in Dutch

Introductie: Dit onderzoek gaan over de leefstijlinterventie *Slim Leven* welke plaatsvindt in Vinkhuizen, een wijk in de stad Groningen. *Slim Leven* heeft als belangrijkste doel om de gezondheid van de inwoners uit de wijk Vinkhuizen te verbeteren en om de sociale cohesie te verhogen. Dit wordt gedaan door zo veel mogelijk mensen uit de wijk te betrekken bij de interventie en door inwoners te laten deelnemen aan beweeglessen en voedingsworkshops.

Doel: Het doel van dit onderzoek is om te evalueren wat de ervaringen en uitkomsten zijn van de interventie *Slim Leven* op het gebied van gezondheid, ervaren gezondheid, lichamelijke activiteit en de sociale cohesie van de deelnemers.

Methode: Om de ervaringen en uitkomsten van de interventie te kunnen evalueren, wordt er gebruik gemaakt van zowel kwantitatieve als kwalitatieve onderzoeksmethoden. Aan elke deelnemer wordt gevraagd om een startformulier in te vullen wanneer deze begint met de interventie. Na drie maanden deelname wordt er aan de deelnemer gevraag om een evaluatie formulier in te vullen. De uitkomsten van beide formulieren zijn getoetst op een verandering in gezondheid, ervaren gezondheid en sociale cohesie en is er gekeken of er eventuele samenhang is tussen de verschillende onderwerpen. Tevens zijn er interviews afgenomen bij deelnemers om meer inzicht te krijgen in de lichamelijke activiteit van de deelnemers en de redenen waarom de deelnemers actief zijn bij *Slim Leven*.

Resultaten: Er is na drie maanden sinds de deelnemers zijn begonnen met *Slim Leven* geen significant verschil gevonden tussen de onderwerpen ervaren gezondheid, gezondheid en sociale cohesie. Ook is er geen samenhang gevonden tussen de onderwerpen ervaren gezondheid, gezondheid, lichamelijke activiteit en sociale cohesie. Uit de interviews komt naar voren dat niet elke deelnemer meer is gaan bewegen sinds deze is begonnen met *Slim Leven*. Elke deelnemer geeft wel aan regelmatiger actief te zijn. Redenen om bij *Slim Leven* actief te zijn, zijn de gemotiveerde coach en de gezelligheid. Redenen als 'ik sport omdat het moet', 'anders zit ik de hele dag thuis' en 'ik voel me steeds gezonder worden' blijken geen belangrijke redenen te zijn om actief te zijn bij *Slim Leven*.

Conclusie: De deelnemers zijn veelal positief over *Slim Leven,* maar resultaten laten geen verbeteringen in gezondheid, ervaren gezondheid en sociale cohesie zien. Niet alle deelnemers zijn meer gaan bewegen. *Slim Leven* blijkt wel een positieve invloed te hebben op de regelmatigheid van het bewegen.

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1. Introduction, overview of the literature and research questions

Overweight and obesity are increasing problems affecting a lot of people from all over the world (Ng et al., 2014). Obesity is beginning to replace infectious diseases and undernutrition as one of the biggest contributor to ill health (Kopelman, 2000). Obesity is associated with a lot of health problems, like diabetes mellitus, coronary heart disease, sleeping-breathing disorders and different types of cancer, altogether known as the metabolic syndrome (Grundy, Brewer, Cleeman, Smith & Lenfant, 2004). This metabolic syndrome is a multiplex risk factor for cardiovascular disease.

Not only does obesity have an influence on the physical health of someone, obesity has influence on the mental well-being too. Jorm et al. (2003) saw a correlation between obesity and the mental well-being of someone. Jorm et al. (2003) found an association between obesity and anxiety, depression and lower well-being (Jorm et al., 2003). Social support can have a positive influence on physical and mental health (Stansfeld, 2005). Social isolation, on the other hand, may lead to ill health. A lower social participation is correlated with a higher risk of coronary heart disease (Sundquist, Lindström, Malmström, Johansson & Sundquist, 2004). So the social environment might have a big influence on the health of someone.

The current study is about a lifestyle intervention in Vinkhuizen, a neighbourhood of the city Groningen, the Netherlands. The social cohesion, socioeconomic status of the neighbourhood and the health of the inhabitants is below the average of the city Groningen (OS-Groningen, 2014). The intervention is called *Slim leven*. The main goal of the intervention is to increase the health of the inhabitants of the neighbourhood by learning them about healthy food and organizing physical activity lessons. Another goal is to increase the social cohesion of the neighbourhood.

This chapter is divided into five paragraphs. The first two paragraphs are giving an overview of the literature about overweight and socioeconomic status in relation to health. The third and fourth paragraph are describing the situation of the neighbourhood Vinkhuizen and the intervention *Slim Leven*. In the last paragraph the aim of the current study is described.

1.1 Overweight, definition and causes

This paragraph describes the definition and causes over overweight. Overweight and obesity are defined by calculating the body mass index (BMI in kg/m^2), an indicator of body density that correlates with body fat ("BMI", 2015). Overweight is defined as a BMI of 25 kg/m^2 or more, but under the 30 kg/m^2. Obesity is defined as a BMI of 30 kg/m^2 or more. The main cause of overweight is a disbalance between energy intake and energy expenditure (Whitney & Rolfes, 2008). But there are a lot of other factors that promote the development of obesity (Wright & Aronne, 2012). Three important factors that directly promote the development of obesity are the current food environment, the decrease of physical activity and the increase of sedentary behaviour. Those three factors are shortly described in this paragraph.

1.1.1 The food environment

The food environment has changed over the last decades into a food environment that promotes overeating by selling big packages in stores, easily available foods in restaurants, fast-food chains, supermarkets and most of those easily available foods are processed foods that are high in non-nutritious calories (Wright & Aronne, 2012). For example, foods from fast-food outlets, restaurants and other places, so foods that are not prepared at home, are up to 65% more energy dense than an average meal cooked at home and the density of healthy nutrients are lower in those fast food meals (Prentice & Jebb, 2003). Those fast-food meals are becoming a more important part of people's diet, this is seen by the fact that there is an increase in meals bought outside home (Nielsen, Siega-Riz & Popkin, 2002).

The importance of the availability of foods as a contributor to overweight and obesity is seen in Greece (Kleanthous, Demitzaki, Papadimitriou, Papaevengelou & Papadimitrou, 2015). There was a decrease of overweight and obesity in Greek schoolchildren from 2009 to 2012 during the early phase of the economic crisis. These changes may be related to the suboptimal conditions in which a lot of Greek families lived during that period. There was less money to buy foods and there were fewer foods in the stores, so the availability of food for consumption was low. But the paradox is that food insecurity not only can lead to undernutrition and hunger, but food insecurity can also lead to overnutrition of cheap, mostly unhealthy food (Tanumihardjo et al., 2007). Overnutrition may cause overweight and even obesity. Researchers Tanumihardjo et al. estimated in 2007 that by the year 2015 the leading cause of death are not diseases associated with undernutrition but are diseases associated with overnutrition in low-income communities.

1.1.2 Physical activity and sedentary behaviour

Energy expenditure plays an important role in the development and the prevention of overweight (Whitney & Rolfes, 2008). Daily moderate- to vigorous-intensity physical activity is associated with a lot of health benefits, like the prevention of several chronic diseases and premature death (Warburton, Nicol & Bredin, 2006). A person should be moderate to vigorous active about 30 minutes per day for at least five days a week, to meet the Dutch guidelines for physical activity called 'de Nederlandse Norm voor Gezond Bewegen' (Kemper, Ooijendijk & Stiggelbout, 2007). About two third of the adult population in the Netherlands meet those guidelines (Brink & Savelkoul, 2012). So there are about 33% of the Dutch adult population that do not meet those guidelines. From these 33% of the Dutch population that do not meet those guidelines is 15% inactive on every day of the week. That means that about 5% of the total Dutch population is inactive on every day of the week.

Time spent sedentary is an important contributor in the development of overweight and obesity. Due to the increasing pace of technological change in domestic, community and workplace environment, people often have to sit more and move less (Owen, Leslie, Salmon & Fotheringham, 2000). Observational epidemiological studies strongly suggest that daily sitting time or low non-exercise activity levels may have a significant relationship with mortality, cardiovascular disease, type II diabetes, metabolic syndrome and obesity (Hamilton, Hamilton & Zderic, 2007; Healy et al., 2008). Matthews et al. did research about the amount of time spent in sedentary behaviour in the United States (2008). They found that the participants spent more than half of the waking time sedentary. From the average time of 13.9 hours that they were awake and wore an active monitor, the average time spent on sedentary behaviour was 7.7 hours. Breaks in sedentary time were shown to have beneficial associations with metabolic markers (Healy et al., 2008). Sedentary time is considered to be interrupted, with activities as light in intensity as standing from a sitting position or walking a step. The more time someone spends in light-intense activities, the less someone spends in sedentary time (Healy et al., 2007).

1.2 Socioeconomic status and overweight

There is a relationship between people with a low socioeconomic status (SES) and the prevalence of overweight (Wardle, Waller & Jarvis, 2001). Due to a lot of different causes, people with a low SES have often an unhealthier lifestyle, they have a more unhealthy diet and are less physically active than people with a higher SES (Banks, Marmot, Oldfield & Smith, 2009; Smith, 2004). The following paragraph describes the relation or the influence of

socioeconomic status on nutrition, neighbourhood, physical activity, social cohesion and well-being.

1.2.1 Socioeconomic status and nutrition

People with a low SES often have a more unhealthy diet than people with a higher SES (Janssen, Boyce, Simpson & Pickett, 2006). A Dutch study (Hulshof et al, 1991) shows that people with a high SES often have a dietary intake that is closer to the recommendations set for a healthy diet. Also the fat consumption is lower in people with a high SES. They concluded that a low SES is accompanied by a higher prevalence of an unhealthy lifestyle (Hulshof et al, 1991).

An explanation might be that a low SES is associated with less health consciousness, people tend to believe less in a relationship between diet and health and the influence they can have on both, and they are less thinking about the future (Wardle & Steptoe, 2003). Also the educational level, often related to the SES, might be related with the nutrition habits. Looking at takeaway foods, people with a bachelor degree or higher, tend to consume more healthy takeaway foods than people with only a high school degree (Miura & Turrell, 2014). Those with only a high school degree were more likely to consume unhealthy takeaway food. People with only a high school degree were more likely to have lower nutritional knowledge.

1.2.2 Socioeconomic status, neighbourhood and physical activity

Several studies have shown results that people with a higher SES are likely to be more physically active than people with a lower SES (Sabia et al., 2014; Chen et al., 2015). One of the known causes that people with a low SES are less physical active is that low SES neighbourhoods are less likely to have facilities where people can be physical active (Duncan, Duncan, Strycker & Chaumenton, 2002). These facilities are for example parks, playgrounds or sidewalks, but also facilities like gyms, sport clubs or sport groups. And if people perceive a lot of opportunities in the neighbourhood to be physical active, the physical activity levels will increase. The perceived opportunities are significantly related to physical activity levels (Duncan et al., 2002).

Another important aspect that may limit people to be physical active in lower SES neighbourhoods is safety. In a research about physical activity, safety and neighbourhoods, people living in low SES neighbourhoods reported higher perceptions of crime, unattended dogs, unpleasantness of neighbourhood and less trust in some neighbours (Wilson, Kirtland, Ainsworth & Addy, 2004). These factors might have a limiting effect on the physical activity

levels of people living in a low SES neighbourhood. In a research about the sedentary time of children and their home environment, showed that low SES home environments provided more opportunities for sedentary behaviour than high SES home environments (Tandon et al., 2012). Children living in low SES home environment had more access to media devices, they had more rules about playing outside and did more non-physical related activities, like watching TV, with their parents than children living in high SES home environments.

Also the costs for physical activity play an important role in joining physical activities (Clarke, 2008). Someone has to spend some money to join sport activities, for example on sport clothes, comfortable shoes, access to a sport facility or joining a sport group. People with a low socioeconomic status might not have that extra money to spend on physical activity. Also the costs for sports participation often rise when getting older, this might negatively affect the physical activity levels in adolescents and adults with a lower SES (Kruger, Kohl III & Miles, 2007).

1.2.3 Socioeconomic status, neighbourhood, social cohesion, well-being, health and overweight

Another factor that plays a role in the relationship between socioeconomic status and overweight is social cohesion. Social cohesion within a neighbourhood is important for the well being of people (Cramm, van Dijk & Nieboer, 2013). Because higher levels of neighbourhood cohesion result in higher degrees of social organization, which results in a better well-being of the people. Cramm et al. (2013) found that social cohesion might influence through psychosocial process the mental well being of someone. There also is a relation between neighbourhood social cohesion and physical health. An example of this is a study from Kim, Hawes & Smith (2014). Kim et al. found that neighbourhood social cohesion is associated with cardiovascular health. A higher perceived neighbourhood social cohesion is associated with a lower risk of myocardial infarction.

Socioeconomic status and social cohesion measured at small-area level, for example a neighbourhood, have influence on the mental health status (Fone et al., 2007). A small-area with income deprivation and a low social cohesion is associated with poor mental health status. The effect of deprivation on the mental health status is reduced when there is more social cohesion (Fone et al., 2007). An explanation might be that social cohesion may lead to better health by influencing health-related behaviours (Kawachi & Berkman, 2000). Another explanation might be that higher levels of social cohesion lead to higher degrees of social organization. Individual-level subjective well-being is influenced by the socioeconomic status

of a neighbourhood (Cramm, Møller & Nieboer, 2012). There are higher levels of subjective well-being in less deprived neighbourhoods.

Neighbourhoods also have an effect on the weight of someone. Low SES neighbourhoods have direct influence on the odds of being overweight (Oliver & Hayes, 2005). Lower income neighbourhoods may be less conductive to maintain a healthy body weight than high SES neighbourhoods, because of the lack of facilities, the lack of resources and the lack of awareness. Another research about the influence of neighbourhoods on body size and shape, found that people living in a lower SES neighbourhood tend to be smaller in height, have a bigger hip-waist ratio, a bigger waist circumference and a higher BMI than people living in a higher SES neighbourhood (Ellaway, Anderson & Macintyre, 1997).

1.3 Groningen

In the Netherlands there is a difference between the level of education and the welfare of the inhabitants (CBS, 2015). People with a high education level score higher on the scale of welfare and well-being, than people with a lower education. Higher educated people have better access to well-paid jobs and with this comes a higher income. People with a higher education are less often jobless and have most of the times a less flexible employment relationship. They have a more positive view of the future and are more content with life in general. People who are low educated have more job- and materialistic uncertainties, what may influence the satisfaction with life in general and the perceived health (CBS, 2015).

A neighbourhood in the city Groningen is Vinkhuizen. In this neighbourhood more than half of the people, 68%, are low educated (Gemeente Groningen, 2015). In the city Groningen as a whole, 47.8% of the people are low educated. So in the neighbourhood Vinkhuizen this is about 20% more than the average of the city Groningen. A lot of people living in Vinkhuizen have a low SES: 30-40% of households in Vinkhuizen belong to the bottom 20% of lowest incomes (OS-Groningen, 2014). Almost 50% of the inhabitants of Vinkhuizen are overweight (GGD, 2007). Also a lot of inhabitants of Vinkhuizen are not positive about the liveability and safety of their neighbourhood (OS-Groningen, 2014). In a survey concerning the liveability and safety of the neighbourhood, the inhabitants of Vinkhuizen think there will be less attention to their neighbourhood from the municipality in the future. About 32% of the inhabitants of Vinkhuizen think their neighbourhood is unsafe, this is 11% more than the average of 21% of the city Groningen. The social cohesion of the neighbourhood Vinkhuizen is one of the lowest in the city Groningen (OS-Groningen, 2014). The social cohesion of Vinkhuizen gets a 5.2. There is only one neighbourhood of the 28

neighbourhoods that scores lower than Vinkhuizen. The average of the city Groningen is a 5.9.

Due to the reason that a lot of people living in Vinkhuizen have an unhealthy lifestyle, the lifestyle intervention *Slim Leven* takes place in this particular neighbourhood. The neighbourhood Vinkhuizen can be seen as a disadvantaged or deprived neighbourhood. Looking at a ranking for neighbourhoods in the Netherlands, the neighbourhood Vinkhuizen is on the 269th place (Verwey-Jonker Instituut, 2014). A high rank means that the neighbourhood is not a good place for a child to grow up according to the convention on the rights of the child of the United Nations. There are in total 4038 neighbourhoods on the list, so a raking at the 269th place can be seen as a rank of the upper part. The main goal of the intervention *Slim Leven* is to increase the lifestyle and health of the people living in this neighbourhood and to enhance the social cohesion. The intervention focuses on physical activity and nutrition. The participants can choose between different physical activity groups and they can join food lessons.

1.4 Slim Leven

The intervention *Slim Leven* is based on an interdisciplinary approach, making use of the knowledge, experiences and skills of a variety of specialists. Volunteers are crucial for the intervention, because they are guiding and helping the participants to perceive their goals. These goals will be discussed by the participants at the intake. By involving a lot of people from the neighbourhood Vinkhuizen, the intervention aims to enhance the social cohesion. The intervention wants to make a healthy lifestyle available for everyone, also for those who have not that much money.

The intervention exists of two types of activities a participant can join: physical activity lessons and nutrition lessons. It is possible for a participant to join both types of activities. There are weekly several different physical activity lessons, like running lessons, easy bootcamp, walking groups, yoga and fight4yourbody. Every two weeks there is a nutrition lesson where the participants learn about how to eat healthy and the importance of healthy nutrition. Participants are recruited by spreading flyers through the neighbourhood, promoting the intervention on special organized days, mouth-through-mouth advertisement and information on diverse websites. Someone who wants to join the intervention can easily contact the intervention by mail, telephone or a contact form on the internet. When a participant joins the intervention, a volunteer is assigned to the participant. The participant discusses with his volunteer which activities he wants to join. The participant will go to those

activities and will keep in touch with his volunteer at least one time per month. A participant can join *Slim Leven* for as long as the intervention exists. The intervention is running until at least October 2016.

1.4.1 Health related behaviour change, lifestyle interventions and the strategy of Slim Leven
The main goal of the intervention *Slim Leven* is to increase the health of the people living in this neighbourhood and to enhance the social participation. To do so, the inhabitants of the neighbourhood have to change their behaviour. The intervention plays a crucial role in this process, because an intervention is a promoter for behaviour change (Jepson, Harris, Platt & Tannahill, 2010). This following paragraph describes theories of health related behaviour change and existing interventions with their goal to change health related behaviour. The theories and existing interventions are compared with the strategy of *Slim Leven.*

One of the goals of the intervention *Slim Leven* is to enhance the physical activity levels of the participants. There are a lot of different interventions that tend to enhance the physical activity levels. Interventions focusing on the enhancement of the physical activity levels of younger adults show positive outcomes, although the outcomes have moderate effects overall (Marcus et al., 2006). In a review of seventeen interventions tending to enhance the physical activity levels of older adults, ten of the seventeen interventions found greater physical activity levels in the intervention group (Conn, Minor, Burks, Ranz & Pomeroy, 2003). There was no common factor that causes this success, the interventions had different strategies to enhance the physical activity. The review recommends that it would be useful to combine theoretical frameworks to design effective interventions.

Slim Leven uses a positive perspective to enhance the health of the participants. Research has shown that different mechanisms for positive and negative support may play a role in how they influence health (Croezen et al., 2012). Croezen et al. found that negative support is more of influence on smoking, physical inactivity, overweight and self-perceived health than positive experiences of support. Positive support was only related to well-being, where negative support was related to psychological distress. This might indicate that there are different mechanisms in the influence of positive and negative support on health. Another research (Newsome, Rook, Nishishiba, Sorkin & Mahan, 2005) concluded that positive support is only related to well-being. Although positive support is not in every study proven to be effective on health, social support may facilitate health promoting behaviours like physical activity (Lawman, Wilson, van Horn & Zarrett, 2012) and may also influence

positively some biological processes like lower blood pressure during everyday life (Spitzer, Llabre, Ironson, Gellman & Schneiderman, 1992).

The intervention *Slim Leven* tends to enhance the social cohesion in the neighbourhood by involving a lot of different people from this neighbourhood. The human is a social being (Bandura, 1986). It learns by observing other people. The effect of this group can stimulate people to join and keep up with the intervention. A lot of people in the neighbourhood Vinkhuizen are involved in the build up/construction and implementation of the intervention as a participant or as a volunteer. This gives social support and makes it easier to overcome possible negative subjective norms (Heaney & Isreal, 1997).

Slim Leven wants motivated people to join their intervention. Research (Lakerveld et al., 2008) shows that people who are joining interventions are mostly already aware of their unhealthy lifestyle and are willing to change their lifestyle. It is easier to help people with a lifestyle change when they are motivated than when they are not motivated (Weinberg & Gould, 2011). But it is important to continue to monitor the intentions for participation of the intervention *Slim Leven,* because intentions change over time (Weinberg & Gould, 2011). A volunteer is selected to each of the participants of the intervention *Slim Leven* to monitor the commitment of the participant to the intervention and the intentions of the participant to join the intervention.

Physical activity enhances the health of someone, but also enhances the perceived health (Thorlindsson, Vilhjalmsson & Valgeirsson, 1990). The enhancement of physical activity levels has a direct effect on perceived health, leading to other health related behaviours. A simple example is people who ate something healthy before going to the supermarket. Those people made healthier choices in the supermarket than people who had something unhealthy to eat before going to the supermarket (Tal & Wansink, 2015). By enhancing the physical activity levels and thereby the perceived health, the intervention *Slim Leven* stimulates a healthy way of life.

1.5 Aim of this study

At this moment, the intervention is running for a couple of months and the staff of *Slim Leven* wants to know the experiences of the participants and the outcomes of the intervention on the health and lifestyle of the participants and in what way the intervention can be more effective to meet the goals of the intervention set at the beginning of the intervention. Due to the fact that most of the participants are joining the physical activity part of the intervention, this

research will mainly focus on the physical activity participants of the intervention. The main question will be:

- What are the experiences and outcomes of the intervention *Slim Leven* on health, perceived health, physical activity levels and the perceived social cohesion of the participants?

The main question can be divided into a couple of sub que*stions.*

-1. Are the participants more healthy and feeling more healthy since they started the intervention?

-2. Is there a change in the perceived social cohesion since the participants started the intervention?

-3. Are health, perceived health, physical activity levels and social cohesion related to each other?

-4. Are the physical activity levels of the participants increased since they started the intervention?

-5. What are the reasons that the participants are more or less physical active since they started the intervention?

The overall hypothesis is that there is an increase in the physical activity levels and the perceived health of the participants of the intervention *Slim Leven.* This is mainly due to the fact that they are regularly physical active and this can lead to a higher perceived health. It is expected that the neighbourhood social cohesion is slightly increased due to the intervention, because the participants will meet new people from the neighbourhood, like other participants but also the volunteers, and this might change their opinion of the other people living in the neighbourhood.

2. Methods

To answer the main question and the sub questions, different sources of data will be used. This chapter describes the research design, research population and the research method.

2.1 Research design

To answer the main question and the sub questions, a quantitative and qualitative research was needed. Quantitative data were assessed in order to obtain some self-reported information of the participants joining *Slim Leven*. The participants had to answer the same questions at two different times: T1 before they started joining *Slim Leven* and T2 at least after three months since they started *Slim Leven*. This research method was used to give some insight about the health, perceived health, physical activity levels and the perceived social cohesion of the participants. These data were used to study changes and relationships between the topics.

A qualitative method of research also has been used. This research method is used to obtain more information about the motivations of the participants to join *Slim Leven* and about their physical activity levels. Besides, we collected qualitative data to study the aspects of *Slim Leven* that are important for the participants or are motivating the participants to keep joining *Slim Leven* and keeping up an active lifestyle.

All participants signed an informed consent where they gave permission for using anonymously their data for research. The participants who were interviewed gave oral consent to record the interview. The records have been deleted after the interviews were transcribed.

2.2 Research population and follow-up

From the start of the intervention 62 participants have signed in for the intervention and had an intake interview. Every participant can start joining *Slim Leven* at the moment he wants to start. So the date of the T1 measurement is different for each participant. At T1, 62 participants gave informed consent and filled in the start form, i.c. the T1 questionnaire. The participants who said they were going to join at least the physical activity part of the intervention, are included in the current research: 59 participants. This group is coloured purple in figure 1.

After at least three months since the participants started joining *Slim Leven*, they were asked to fill in an evaluation form, i.c. the T2 questionnaire. The participant fills in the T2 questionnaire at a meeting with his volunteer. The T2 questionnaire is filled in by 17

participants (see figure 1). This group of seventeen participants with both T1 and T2 measurements are called the research group and are coloured yellow in figure 1. From 42 participants the T2 questionnaire is not available. From these 42 participants, 19 participants started to join *Slim Leven* less than three months ago. From those 19 participants there is no evaluation form yet, because participants have to fill in an evaluation form after three months since they started with the intervention. So they are not joining *Slim Leven* long enough. Another 16 participants, from the total of 42 participants with not a T2 questionnaire, quit the intervention before filling in the evaluation form. These 16 participants are called the drop out group.

There are 16 participants that quit before filling in the evaluation form and there are another 3 participants that quit the intervention after the T2 measurement. For most participants it is unknown why they stopped (n=9). Two participants stopped because they had some health problems. Another two participants stopped because they did not join any activity. One participant did not have enough time to join any activity. One participant got a baby and stopped after giving birth. Another participant moved to another city. And three participants only joined *Slim Leven* for a special child-parent clinic and did not want to continue at *Slim Leven.*

From 7 participants there is, without any reason, no evaluation form. The 42 participants with no T2 measurement are excluded from the data analysis at T2. The T1 data of these 42 participants are used for T1 data analysis. From 17 participants the data are complete at T1 and T2, those participants are included in the T2 data analysis of this current study. This group is called the research group (yellow).

From the 59 participants who started with the physical activity part of the intervention, 40 are still joining the intervention at this moment. A selection of those 40 participants can be interviewed about their experiences with their physical activity levels. This group is coloured green in figure 1. The volunteers who are guiding and helping the participants were asked to sign up one of their participants who is willing to give an interview. There were two participants signed up, but only one could be reached for an interview. Another eight participants were randomly picked out of the list of participants who signed an informed consent that they could be reached for additionally research. One of those seven participants could not be reached by telephone or email, so could not be interviewed. Those other six participants were reached and they were willing to be interviewed. In total 7 participants are interviewed.
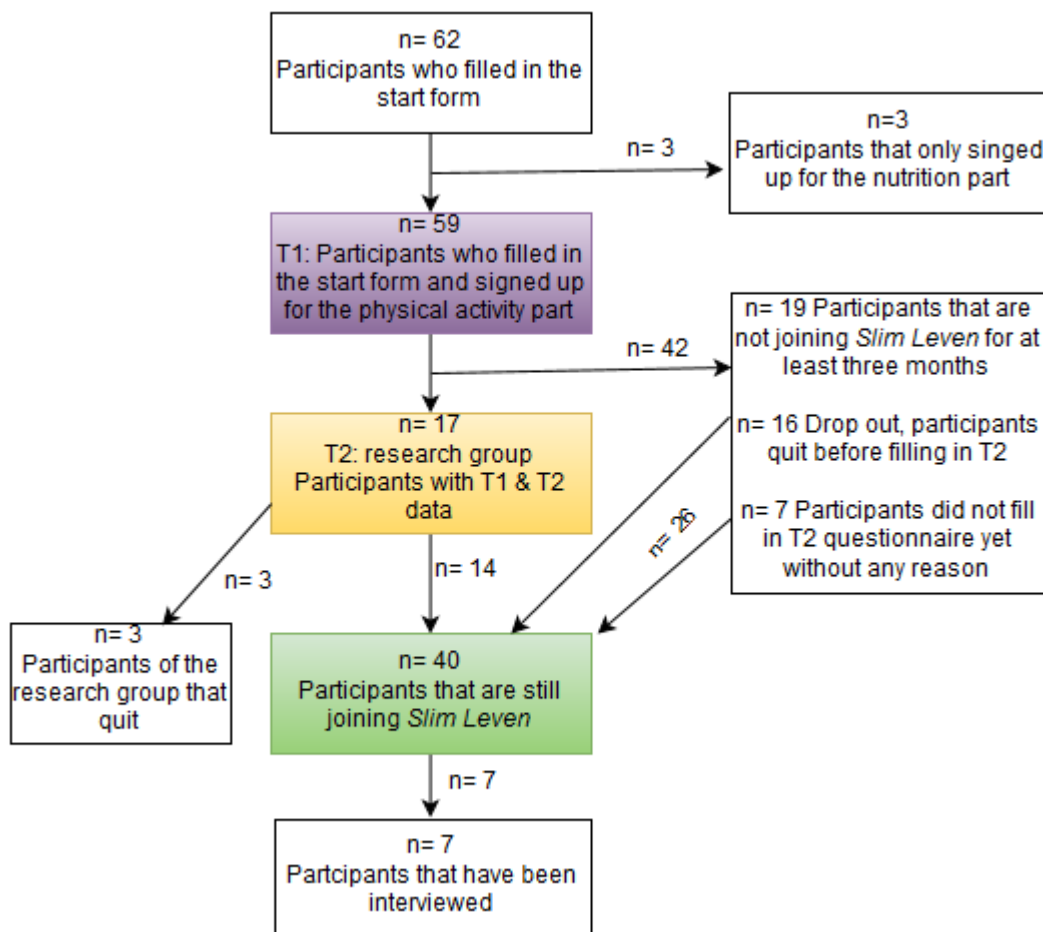
Figure 1. Flowchart inclusion/exclusion participants for data analysis and interview

2.3 Intake/evaluation forms

The intake form and the evaluation form are used to obtain data about the participants. Some general questions are asked to know something about the personal characteristics, like age and gender. In the intake form and the evaluation form self-reported questions have been asked in order to asses:

- *Health and perceived health* (questions 6b-6d, see appendix A). The questions about health and perceived health are asked at T1 and T2. The questions 6b-6c at T1 and T2 are identical.

   • *Health* is estimated by calculating the body mass index in kg/m^2 (BMI). BMI is defined as the body mass (question 6c at T1 & T2) divided by the square of the height (question 6d at T1).Question 6d at T1 asked the participants about their height. It was assumed that the height of the participants is equal at T1 and T2.

   • *Perceived health* is assessed by an one item question about perceived health: the participants were asked to give a grade on a scale from 1 till 10 for their own health

(question 6b). A higher grade stands for a higher perceived health. The question asked is: "*What kind of mark will you give yourself for your own health?*"

- *Physical activity levels* before the intervention (question 5a of the start form). This question asks the participant about their physical activity levels before they started with the intervention (T1). The question asked is: "*Are you physical active?*". The physical activity levels are divided into: "Yes, I am physical active" and "No, I am not physical active". More information about the physical activity levels are not used for statistical analysis. Additional data about physical activity levels are questioned in the interview.

- *Social cohesion* is assessed by 6 items (questions 7a-7f). Three of those items are used in another research to assess the perceived social cohesion (Kim, Hawes & Smith, 2014). The other three questions are added by *Slim Leven.* The answers of the questions 7a-7f are converted into a scale from 1-5, were 5 is linked to a higher perceived social cohesion. If there was one missing value at the form, this missing value was filled in by taking the mean score of the other five values. If there were two or more missing values, this data was not used in the analysis. All items are tested using Cronbach's Alpha. The Cronbach's Alpha of the six questions at T1 is 0.84. At T2 the Cronbach's Alpha is 0.91 of all six questions. Both scores on the Cronbach's Alpha test are high, because they are close to 1 (Tavakol & Dennick, 2011). All grades of the questions 7a-7f were calculated for each participant into one sum score. A higher total score means a higher perceived social cohesion. The range of the perceived social cohesion is from 6 till 30.

The translated questions can be found in appendix A.

2.4 Interviews

Semi-structured interviews were held to obtain data about the experiences of the participants and their physical activity levels before they started with the intervention and the activity levels they had at the moment of the interview. The participants also were asked about the reasons of possible changes in physical activity and social participation. The interview is used to give some additional data about the physical activity levels of the participants.

The interview was tested with a person in the same age group as the participants of *Slim Leven*, but who does not join *Slim Leven*. Due to this test, the interview plan has not been changed.

All of the interviews were recorded with permission of the participants. The records of the interviews were summarized with a transcript. After this transcript, the voice records were deleted.

At one question of the interview the participants had to give a grade for their physical activity level before they started with the intervention and a grade for their physical activity level at the moment. The differences of these grades were calculated.

The last question of the interview is a closed question. The participants were asked to give a grade from 1 till 5 for a couple of possible reasons to join *Slim Leven* or stay active at *Slim Leven*. The possible reasons questioned in the interview are: the volunteer, cosiness, get to learn new people/the neighbourhood, I signed in because I have to go, to be active with a group of people, good lessons, motivated participants, so I won't sit at home the whole day, my health is important, I feel healthier every day, I am active because I have to be active and motivated trainer. A higher grade on a reason means that the reason is important for the participant.

The translated interview plan can be found in appendix B.

2.5 Data analysis

SPSS Statistics version 17.0 is used for data analysis of the intake- and evaluation forms. This paragraph describes for each question the different analysis.

The data used for statistical analysis was checked first for normality. The Shapiro-Wilk Test is used to check if the data was normal distributed. This test is used because it is more reliable with smaller sample sizes (Ghasemi & Zahediasl, 2012). The results of the Shapiro-Wilk Test can be found in appendix C.

Question 1: Are the participants more healthy and feeling more healthy since they started with the intervention?

BMI is used to analyse if there is an increase in health. BMI is calculated at T1 and T2. BMI is not normal distributed (see appendix C). A Wilcoxon Signed Rank test is used to calculate if there is a significant difference between the mean scores of BMI at T1 and T2.

To analyse if there is an increase in the perceived health, a paired t-test is used. A paired t-test is used to see if there is a significant difference in mean scores between T1 and T2.

Question 2: Is there any change in the perceived social cohesion of the participants since they started with the intervention?

A sum score is computed of the answers of the questions about social cohesion. A paired t-test will compare the mean scores at T1 and at T2 of social cohesion.

Question 3: Are health, perceived health, physical activity levels and social cohesion related to each other?

A Spearman's Rho correlation is used to analyse the association between the different topics. A spearman's Rho correlation is used because this test is less sensible for outliers (Mukaka, 2012). The correlations are calculated cross-sectional at T1 between each topic. There are two separate analyses for each topic: one for all of the participants at T1 (n=59) and one for the included participants (n=17). At T2 only data are available for health, perceived health and social cohesion available. At T2 a Spearman's Rho correlation is used to analyse the correlation between health, perceived health and social cohesion.

Question 4: Are the physical activity levels of the participants increased since they started with the intervention?

The information obtained from the interviews are used to answer this question. Also the grades the participants gave during the interview for their physical activity levels before the intervention and at the moment of the interview, are used to answer this question. The differences between the grades are calculated. Descriptive statistics is used to analyse these differences.

Question 5: What are the reasons that the participants are more/less physical active since they started with the intervention?

The information obtained from the interviews are used to answer this question. Two questions are asked to assess the reasons join *Slim Leven* or stay active at *Slim Leven.* The first question was an open question in which the participants had to make up reasons themselves. The second and last question was a closed question. At the last question of the interview the participants had to give a grade from 1 till 5 for a couple of given reasons to join *Slim Leven* or stay active at *Slim Leven*. A higher grade means that the reason is important for the participant. The mean scores for each reason are calculated. A higher mean score means that a reason is more important for the participant.

3. Results

This chapter shows the results of the data analysis. First descriptive statistics are given about all the participants (n=59), about the research group (n=17) who have complete data of both T1 and T2, about participants with only T1 data (n=42) and about the drop out group with only T1 data (n=16). Next, results are presented that are needed to answer the sub questions and the main question.

3.1 Descriptive statistics: characteristics of participants of Slim Leven
Table 1 shows some characteristics and means of the questions of all participants (n=59), of the research group (n=17) and of the participants with only T1 data (n=42). From the 42 participants with only T1 data, 16 dropped out before the T2 measurement. The characteristics of this specific group of 16 participants are also presented in table 1.

Table 1. Description of characteristics of participants of *Slim Leven* and relevant variables at T1 and T2

	All participants at T1 n= 59	Research group: Participants with data at T1 & T2 n= 17	Participants with only T1 data n= 42	Drop out after T1 n= 16
Gender				
Male, n (%)	9 (15.30%)	1 (5.90%)	8 (19.00%)	5 (31.30%)
Female, n (%)	50 (84.70%)	16 (94.10%)	34 (81.00%)	11 (68.80%)
Mean age, years (SD)	53.34	52.31	53.75	38.64*
Range	(20.04)	(17.20)	(21.27)	(11.51)
	18 – 94	21 – 72	18 – 94	18 – 54
BMI in kg/m², mean T1 (SD)	28.02 (6.85)	26.51 (8.96)	28.66 (5.79)	26.04 (6.50)
mean T2 (SD)	-	26.40 (8.50)	-	-
Perceived health T1				
Grade own health, mean (SD)	7.05 (1.21)	7.09 (1.18)	7.03 (1.24)	7.40 (1.50)
Perceived health T2				
Grade own health, mean (SD)	-	7.34 (1.19)	-	-
Physical active at T1, n (%)				
Yes	46 (78.00%)	13 (76.50%)	33 (78.60%)	13 (81.30%)
No	9 (15.30%)	2 (11.80%)	7 (16.70%)	2 (12.50%)
Missing	4 (6.80%)	2 (11.80%)	2 (4.80%)	1 (6.30%)
Social cohesion, mean T1 (SD)	12.81 (4.77)	14.31 (5.26)	12.14 (5.79)	11.67 (3.89)
mean T2 (SD)	-	13.53 (4.11)	-	-

* Significant different from mean of all participants

The results of table 1 show that there were more female than male participants in *Slim Leven.* The mean BMI of all participants at T1 was 28.02 kg/m^2. This BMI falls into the category 'overweight'. More than three-quarter (78.00%) of the participants are physically active. The mean grade the participants gave themselves for their health at the beginning of the intervention was 7.05 on a scale from 1 till 10. The mean perceived social cohesion at T1 was 12.81 within a range from 6 till 30.

Looking at the participants that dropped out before the T2 measurement (n=16) in comparison with all participants at T1 (n=59) there are some remarkable results. First of all, there was a bigger percentage of male participants that quit before T2. Where at T1 the percentage of male participants was 15.30%, the percentage of male of the participants that quit was 31.10%. The mean age of the participants that dropped out was significant lower than the mean age of all participants (38.64 years vs. 53.34 years). More participants that quit before T2 were physical active (81.30% vs. 78.00%). The participants that quit before T2 gave themselves a higher grade for their own health than all participants at T1, but the standard deviation was also slightly higher. The participants that dropped out scored lower on social cohesion than all participants.

Looking at the research group of n=17 participants there are also some notable results. The percentage males (5.90%) in the research group was lower than the percentage males (15.30%) for all participants. The mean age was almost the same, only the range was smaller (21 -72 years instead of 18 – 94 years). The mean BMI of the research group was lower than the mean BMI of all participants, but the BMI scores were more spread in the research group. The percentages of participants that were physical active, were almost equal in the research group and all participants. Also the mean grade participants gave their own health was almost the same for both groups participants. The research groups scored highest on social cohesion with a score of 14.3.

3.2 Associations between BMI, perceived health, physical activity and social cohesion at T1
Table 2 shows the results about the associations between BMI, perceived health, physical activity and social cohesion. The results in this paragraph are based on the data of all participants (n= 59) at T1.

Table 2. Correlation between BMI, perceived health, physical active and social cohesion (n=55*)

		BMI	Perceived health	Physical active
Perceived health	*Correlation coefficient*	-0.05	-	-
	Sig. (2-tailed)	0.73		
Physical active	*Correlation coefficient*	-0.11	0.08	-
	Sig. (2-tailed)	0.46	0.58	
Social cohesion	*Correlation coefficient*	-0.28	-0.01	0.22
	Sig. (2-tailed)	0.06	0.95	0.18

* Four participants are excluded because their data are incomplete

The results in table 2 show no significant correlation coefficients between perceived health, physical active and social cohesion at T1. There is a negative association between social cohesion and BMI. A lower social cohesion is associated with a higher BMI. This association is almost significant. Also there is an association between social cohesion and physical active. A higher social cohesion is associated with a higher physical active.

3.3 Associations between BMI, perceived health and social cohesion at T2

Table 3 shows the results of the associations between BMI, perceived health and social cohesion at T2. The data from the research group (n= 17) are used to analyse these results. The results of table 3 show no significant associations between BMI, perceived health and social cohesion. But table 3 contains some interesting results. The results at T2 show a negative association between BMI and perceived health. A higher score on perceived health is associated with a lower BMI. Another negative association has been found between perceived health and social cohesion. A higher score on perceived health is associated with a lower score on social cohesion. Both associations are not significant.

Table 3. Correlation between BMI, perceived health and social cohesion at T2 (n=16*)

		BMI	Perceived health
Perceived health	*Correlation coefficient*	-0.38	-
	Sig. (2-tailed)	0.18	
Social cohesion	*Correlation coefficient*	-0.17	-0.24
	Sig. (2-tailed)	0.54	0.37

* One participant is excluded because his data is incomplete

3.4 Differences between health, perceived health and social cohesion at T1 & T2

In this paragraph the results of the research participants (n=17) are presented. Table 4 and table 5 show some results about the differences of the mean scores at T1 and T2 of perceived health, social cohesion and BMI. There is a significant difference between the mean at T1 and T2 if the P-value <0.05.

Table 4. Difference between T1 and T2 of perceived health and social cohesion (n=16*)

	T1 *Mean (SD)*	*T2* *Mean (SD)*	*T*	*df*	*P-value* *(2-tailed)*
Perceived health	7.16 (1.18)	7.34 (1.19)	0.68	15	0.51
Social cohesion	14.31(5.26)	13.44(4.23)	-0.74	15	0.47

* One participant is excluded because his data is incomplete

Looking at the results shown in table 4, there is slight increase of the perceived health at T2 and a small decrease of social cohesion. For both results, the P-value > 0.05. Table 4 shows no significant differences between the mean scores of the research group in perceived health and social cohesion at T1 and at T2.

Table 5 shows the results about the rank test of the mean scores of the BMI at T1 and T2. The table presents four Ties. A Tie means that the BMI at T1 is not different from the BMI at T2. There are 7 cases in which the BMI score at T2 is lower than the BMI score at T1 and 4 cases in which BMI is higher at T2 than T1.

Table 5. Difference between T2 and T1 of BMI scores (n=15*)

Mean BMI T1(SD)	*Mean BMI T2(SD)*		*Type of ranks*	*n*	*Mean rank*	*Sum of ranks*	*Z*	*P-value (2-tail)*
26.51 (8.96)	*26.40 (8.50)*	*BMI (T1-T2)*	Negative ranks	4[a]	6.75	27.00	-0.53	0.59
			Positive rank	7[b]	5.57	39.00		
			Ties	4[c]				
			Total	15				

* Two participants are excluded because their data is incomplete

[a] BMI T1 < BMI T2

[b] BMI T1 > BMI T2

[c] BMI T1 = BMI T2

The results of table 5 show no significant difference between the mean scores of BMI at T1 and T2, because the P-value > 0.05.

3.5 Activity levels

This paragraph describes the results of the interviews related to the activity levels of the participants. Seven participants have been interviewed. From those seven participants, five participants are joining *Slim Leven* for more than three months and two participants are joining *Slim Leven* for less than three months. The mean age of the participants that are interviewed was 57.70 years. Five participants are female and the other two are male.

Table 6 presents the grades each participant gave for their own perceived physical activity level before they started with *Slim Leven* and their perceived physical activity level they had at the moment of the interview. The most important explanation for the grades each participant gave is added to table 6.

Table 6. Grade perceived physical activity levels before *Slim Leven* and at the moment (n=7)

	*Before**	*Now***	*Difference*	*Reason*
Participant 1	8.00	8.00	0.00	My physical activities are more structured
Participant 2	4.50	6.00	+1.50	I can still be a lot more physical active
Participant 3	2.00	7.00	+5.00	I stopped my destructive way of life
Participant 4	8.00	7.00	-1.00	Arthrosis of my hip
Participant 5	8.00	7.00	-1.00	Arthrosis of my hip
Participant 6	4.00	6.50	+1.50	I am regularly active now
Participant 7	6.00	8.00	+2.00	I am regularly active now
Mean grade	5.79	7.07		

* Before the participant started with *Slim Leven*
**At the moment of the interview

Looking at table 6, the mean grade the participants gave for their physical activity levels before they started with *Slim Leven* is lower than the mean grade they gave for their physical activity levels at the moment of the interview.

Four participants gave themselves a higher grade for their physical activity level at the moment of the interview than before they started with *Slim Leven.* Two participants gave their physical activity level a lower grade at the moment of the interview than before they started with *Slim Leven.* One participant gave the same grade to his physical activity level before he started with *Slim Leven* and at the moment of the interview.

A couple of participants said that *Slim Leven* influenced their physical activity level in a way that they are more regularly active. They have to go each week to the activities they are joining at *Slim Leven*, so they are physically active for at least one or two times each week *"The most important change is the regularity"*. Two participants said that they are less physical active since they started with *Slim Leven* because they are having pain in their hip. This pain in their hip started before they joined *Slim Leven*. The participants who mentioned pain in their hip both said that they were very active during their whole life. They both are not thinking that they are less physical active because of *Slim Leven*. One participant had a stroke because of his destructive way of life. He wanted to change his lifestyle because of this stroke. He said that the stroke was a more important reason that he is more physical active than the reason he is joining *Slim Leven* *"For years I was not physical active"*. Most participants mentioned that there is still some improvement possible in their physical activity levels *"I still have those days where I'm sitting the whole day on the couch"*.

The participants also were asked if they are doing more sport activities besides the activities of *Slim Leven* or if they are doing more other physical activities like cleaning, gardening, cycling or walking. The answers the participants gave were very diverse.

Two participants mentioned that they are doing extra sport activities besides *Slim Leven* since they started with *Slim Leven*. One participant mentioned swimming as another sport activity and the other participant goes sometimes to an outdoor gym. The other participants did not join any extra sport activities since they started with *Slim Leven* *"I am still doing my normal sport activities the same as before Slim Leven"*, *"I think it is already important that I join Slim Leven"*.

Four participants said that they are doing more other physical activities since they started with *Slim Leven*. All four participants said that they started to walk more *"I walk small distances more often instead of taking my bicycle"*. Some participants also mentioned that they are taking the stairs more often instead of the elevator *"I live on the fifth floor and I am talking the starts more often now, just to be more physical active and feel healthier"*. Three participants did not mention any change in their other physical activities since they started with *Slim Leven*. One participant said that he cycles a lot, but he already did that before he started with *Slim Leven*.

3.6 Reasons to be physical active at Slim Leven

The participants were asked to give some reasons why they joined *Slim Leven* or why they are still joining *Slim Leven*. They were first questioned using an open question what reasons they had to join or stay active at *Slim Leven*. The reason mentioned by almost every participant is the cosiness. A lot of participants liked that they are physical active with other people that can motivate them, to have some personal contact with others or where they can meet new people *"I love to be around other people", "I am not the only one willing to change my lifestyle"*. One participant did not like to be physical active alone and found other sport facilities too expensive *"In a gym you sport most of the times alone or you should take a personal trainer. A personal trainer is too expensive for me. Also you have to take a subscription. At Slim Leven you are not stuck to a subscription"*. Some participants mentioned that they are joining *Slim Leven* because they want to work on their shape. They mentioned losing weight as an important reason, but also to feel good or to feel healthy was an important reason. Also *Slim Leven* was mentioned as an easily approachable intervention, because of its low level of activity lessons *"There are even some 60 years old women in my group"*. During the interview only one participant mentioned the volunteer as a contributor to become healthy at *Slim Leven*. The participant said that the buddy motivated him to eat healthy. Other reasons to join *Slim Leven* and why they are still joining *Slim Leven* mentioned by the participants are the diversity of lessons, being physical active outside, to have time for yourself, to stay busy after retirement, to relax, because they were curious about *Slim Leven,* they just wanted to stay active or be more physical active and they love physical activity.

Next the participants were asked again what reasons they had to join or stay active at *Slim Leven,* but now the interviewer gave them a couple of reasons. They had to answer this closed question to give a grade on scale from 1 till 5 for each reason mentioned. Table 7 presents the mean grades that the participants gave for each reason ranked on highest score.

Table 7. Reasons to join/stay active at *Slim Leven* ranked by mean score (n=7)

Reason to join/stay active at Slim Leven	*Mean score*
Motivated coach	4.86
Motivated participants	4.57
I think my health is important	4.43
Cosiness	4.29
To be active with a group of people	4.29
Good lessons/ building of the program	4.29
Regularly contact with my volunteer	4.00
Get to learn new people/ the neighbourhood	3.43
I signed up, so I have to go	3.43
So I won't sit at home the whole day	3.29
I feel healthier everyday	3.29
I am active, because I have to be active	3.00

Looking at table 7, 'Motivated coach' got the highest mean grade. The reasons 'Motivated participants' and 'I think my health is important' also got a high mean score. 'I am active, because I have to be active' was the reason with the lowest mean score. The reasons 'So I won't sit at home the whole day' and 'I feel healthier everyday' belonged to the reasons which scored the lowest.

4.   Conclusion and discussion

The aim of this study was to assess the experiences and outcomes of the intervention *Slim Leven* Vinkhuizen on health, perceived health, physical activity levels and social cohesion. *Slim Leven* is a lifestyle intervention that takes place in disadvantaged or deprived neighbourhood of the city Groningen. The intervention tends to increase, with help of volunteers, the health of the inhabitants of the neighbourhood Vinkhuizen by organizing sport lessons and nutrition lessons. The intervention tends to increase the social cohesion in the neighbourhood too. The main question of the current study was '*What are the experiences and outcomes of the intervention Slim Leven on health, perceived health, physical activity levels and the perceived social cohesion of the participants?'*. Five sub questions were formulated to answer the main question.

The first sub question of this study is *'Are the participants more healthy and feeling more healthy since they started the intervention?'*. A comparison of the mean BMI before the participant started with *Slim Leven* and at least three months later, showed some increase in health because the mean BMI was slightly lower after at least three months of joining *Slim Leven*. Seven of the fifteen participants in this current study had a lower BMI after at least three months of joining *Slim Leven*. This difference is not statistical significant. So there cannot be concluded that the participants are more healthy since they started with the intervention.

This conclusion might be affected by the fact that the BMI of the participants was based on self-reported height and weight. Self-reported height and weight are not always reliable, there may be substantial differences in self-reports versus scale measurements (Wagner et al., 2013). Errors in self-reported height and weight are higher in people with overweight and people above 45 years (Rowland, 1990). The mean participant of *Slim Leven* falls, with a mean BMI of 28.02 kg/m^2, in the category overweight and with a mean age of 53.34 years, is above this age of 45 years. So there might have been an increased chance of error in self-reported height and weight in the data of *Slim Leven*. But the measurements used to calculate BMI are both self-reported measurements. Maybe the error in the self-reported height and weight is the same at both measurements and makes the data more reliable.

Another factor that may have influenced the conclusion is that BMI does not take into account the differences between body shape, it fails to quantify body composition (Nevill, Stewart, Old & Holder, 2006). BMI is only used to establish a person's weight in relation to

height as a simple index to identify overweight and obesity among the population and does not always relate to the state of health of a body (Whitney & Rolfes, 2008). For example, a female with a thin figure but with excess fat may be classified as a healthy body or a male with a muscled body with a low body-fat percentage may be classified as overweight. Also it is possible that people who were not very active become healthier by the simple fact that they are more active now, but without significant changes in body weight (Reiner, Niermann, Jekauc & Woll, 2013). This change means that a person is getting healthier and the BMI is staying almost the same. So maybe the participants of the intervention *Slim Leven* got a healthier, without losing weight.

Another factor that may have influenced the conclusion is that only BMI is used to establish health. Health means not only the absence of diseases but health is a multidimensional concept with a lot of different aspect that can be measured (Ware, 1987). BMI is one measurement that can be used as an objective measurement of physical health. But physical health can also be measured by for example blood pressure or body fat percentage. This current study only assessed BMI as objective health indicator. It is possible that the participants increased their health on other aspects of health, for example the lipid levels in their blood may have decreased or their stress levels decreased. But those aspects of health are not measured.

Perceived health, as an indicator of subjective health, is used in the current study to give additional information to the objective measured health. The participants gave themselves a higher grade on perceived health after three months of joining *Slim Leven* than they gave themselves for their health before they started with *Slim Leven*. This difference is not significant. So based on both results, it can be concluded that after three months there is no significant increase in both health and perceived health.

The second sub question of this study is '*Is there a change in the perceived social cohesion since the participants started the intervention?'*. The hypotheses expected that the perceived social cohesion would slightly increase but the mean perceived social cohesion after three months since the participants started joining *Slim Leven* was slightly lower than the mean social cohesion before the participants started with *Slim Leven*. This difference is very small and not significant. It can be concluded that there is no significant change in the perceived social cohesion of the participants since they started the intervention. The hypotheses could not be confirmed.

The results of the questions about social cohesion show not a high perceived social cohesion. Both means, at the beginning of the intervention and after three months, are lower than half of the maximum score. Research shows that increasing network ties is related to increased social cohesions (Gesell, Barkin, Sommer, Thompson & Valente, 2015). Gesell et al. (2015) found that there is an association between increasing network ties and increased social cohesion within a behavioural intervention. They concluded in their study that being able to name new network contacts was associated with feelings of higher social cohesion. Looking at the intervention *Slim Leven* the participants probably have met new network ties, so it would be expected that the social cohesion would have increased.

An explanation that the social cohesion did not increase might be that social cohesion is a complex concept consisting of several different dimensions and it is difficult to measure all of those dimensions of social cohesion (Berger-Schmitt, 2000). In the current study only six questions to estimate the social cohesion, were used. These questions might be too limiting to establish the perceived social cohesion of the participants.

Maybe social cohesion has not been measured adequately. In the interviews all participants mentioned that the cosiness is a very important factor to keep up with *Slim Leven.* Maybe the participants perceived a higher social cohesion within the intervention, but not a higher neighbourhood social cohesion. Three of the six questions on the intake and evaluation form are used in another research to assess the social cohesion in a neighbourhood (Kim, Hawes & Smith, 2014). The other three questions are focussing on the neighbourhood too. Maybe when asking questions about group cohesion, results will show that the group cohesion has increased.

The third sub question is *'Are health, perceived health, physical activity levels and social cohesion related to each other?'.* The results from before the start of *Slim* Leven showed no significant relationships between health, perceived health, physical activity levels and social cohesion. Although no significant relationships have been found, there are two remarkable results. There is a weak association between health (BMI) and social cohesion. A higher score on social cohesion is associated with a lower score on health (BMI). BMI is used as a measurement of health. A lower BMI means that the body weight is in a more healthy balance with the body height. As long as the BMI is above $18kg/m^2$. So when someone perceives a higher social cohesion, he tends to have a lower BMI and has a better health. Another weak association has been found between physical activity levels and social cohesion. Physical active is associated with a higher social cohesion. Both associations are not

significant, but the association between health and social cohesion is very close to significance.

Also the results after three months showed no significant relationships between health, perceived health and social cohesion. But remarkable is that there is a weak association between health and perceived health and between perceived health and social cohesion. A higher score on perceived health is associated with a lower score on health, so a lower BMI. Perceived health and social cohesion are negatively associated. A higher perceived health is associated with a lower social cohesion. Both associations are not significant.

So to answer the third sub question *'Are health, perceived health, physical activity levels and social cohesion related to each other?'* it can be concluded that there is no significant relationship between health, perceived health, physical activity levels and social cohesion before the participants started with the intervention and after three months since the participants started joining *Slim Leven*.

Despite that there have been no statistical significant relationships found between the different variables before the participants started joining *Slim Leven* and after three months the participants started with *Slim Leven*, should not mean that there are absolutely no relationships. Others studies show relationships between the different variables. For example Wu et al. (2013) found a relation between self-rated health and the objective health. They asked 18000 participants to fill in a single-item health measure and they tested all of the participants on the prevalence of diseases. Wu et al. (2013) compared the prevalence of diseases with the outcome of the self-rated health. Most of the health-related factors regarded as risks were associated with poorer self-related health. Wu et al. (2013) concluded that self-rated health can reflect the objective health status and serve as a global measure of health status in general population. A possible explanation between the different results of the study from Wu et al. (2013) and the current study might be the number of participants and the assessment of objective health. The results from *Slim Leven* are derived from a dataset of maximal 59 participants, whereas Wu et al. (2013) used 18000 participants in their research. Another difference between the studies might explain the opposite results is that *Slim Leven* measured objective health only by BMI. Wu et al. (2013) used a lot of different components to assess objective health, like blood pressure, blood samples, BMI, stress levels, exercise levels, smoking habits and the presence of diseases. So Wu et al. (2013) measured health in a more broad context.

Many prior studies tried to find an association between social cohesion and health, but those studies show inconsistent results. In a research (Chuang, Chuang & Yang, 2013) about

the relation between social cohesion and health, there has been found an association between social cohesion and self-rated health after controlling for individual characteristics. But in another research about social cohesion at the national level and perceived health, results showed that social trust and civic participation, elements of social cohesion, did not show significant relation between perceived health of people after controlling for compositional differences in socio-demographics (Poortinga, 2006). These inconsistent results may be caused by the measurement of social cohesion. As mentioned before, social cohesion is a complex concept consisting of several different dimensions and it is difficult to measure social cohesion at all of those dimensions in relation to another complex concept like health (Berger-Schmitt, 2000). In the current study only six questions, to estimate the social cohesion, were used. These questions may be too limiting to establish the perceived social cohesion of the participants.

In the literature, results about an association between social cohesion and physical activity are more consistent. Different studies show a positive association between physical activity and social cohesion (Fisher, Li, Michael & Cleveland, 2004 ; Cradock, Kawachi, Colditz, Gortmaker & Buka, 2009). Maybe the results of the current study show different results because of the limiting data of physical activity. Physical activity is only measured before the participants started with the intervention and only the data "Yes, I am physical active" and "No, I am not physical active" are used to find any association with social cohesion.

Another sub question of this research is '*Are the physical activity levels of the participants increased since they started with the intervention?'*. It was expected in the hypotheses that the physical activity levels would increase due to the fact that the participants would be more regular active. The results of the interviews showed that there is a difference in physical activity levels since the participants started with *Slim Leven*. From the seven participants that have been interviewed, four participants said that they were more active since they started with *Slim Leven*. One participant mentioned that there was no difference in physical activity levels since he started with *Slim Leven*. And two participants were less active since they started with *Slim Leven*. The participants that mentioned that there was a decrease in their physical activity levels since they started with *Slim Leven,* said both that this decrease was not caused by *Slim Leven*. They had always been very active, but due to pain in their hip, it is not possible for them to be as active as they were. From the four participants that mentioned an increase in physical activity levels, three mentioned that this increase is caused

by the fact that they were regularly active. Even the participant that mentioned no difference in his physical activity levels said that he was more regular active now. So even though the intervention might not increase the physical activity levels of all participants, this research shows that *Slim Leven* might have a positive effect on the regularity of physical activity. The part of the hypotheses that says that the participants are more regular active can be confirmed. It cannot be confirmed that the physical activity levels are increased in all participants.

A possible reason why there are differences in the physical activity levels of the participants that have been interviewed is that they are not joining *Slim Leven* for the same period of time. Two of the seven participants are joining *Slim Leven* for less than three months at the moment of the interview. Maybe it takes a longer period of time to say that the physical activity levels are really changed. There have been a lot of interventions that tend to increase physical activity levels. In a review from Hobbs et al. (2013) about interventions that are effective in increasing physical activity levels in adults aged 55 to 70 years, interventions with a duration of twelve months are most effective in increasing the physical activity levels of the participants.

The fact that not all of the participants mention that their physical activity levels are increased, does not mean that *Slim Leven* has failed to get people physical active. Because *Slim Leven* is for people of eighteen years or older, there is a big age difference. Two of the participants that have been interviewed mention that their physical activity levels are decreased. Those two participants are both over the 70 years of age and both have always been very physical active. It might be that they are still very active comparing to people who have the same age. But because they are less active that they are used to be, they say that their activity levels have been decreased.

The last sub question of this study is '*What are the reasons that the participants are more or less physical active since they started with the intervention?*'. When the participants were asked using an open question during the interview to give a reason why they are more physical active within *Slim Leven,* they gave a lot of different reasons. One reason most mentioned by the participants was cosiness. The participants like the ambiance and the other friendly and nice participants at *Slim Leven.* When the participants were asked to say if a given reason asked in a closed question fitted their own motivation to join or stay active at *Slim Leven,* the motivation of the other participants and especially the motivated coach was mentioned as a very important reason for the participants to stay active.

So reasons given by the participants themselves shows that cosiness is very important, but on the closed question where different reasons were given to the participants, it seems to be that motivation is more important than the cosiness. Even the reason 'I think my health is very important' is more important than the reason 'Cosiness' when the reasons are given to the participants. A reason for this might be that the motivated coach is simply forgotten when the participants had to give reasons themselves.

Research (Pensgaard & Roberts, 2002) shows that the coach is one of the most important sources of influence on the motivation of the athletes. The coach is an important creator of the supportive and caring climate. The coach is a great contributor to someone's intrinsic motivation and self-determined extrinsic motivation (Tenebaum & Eklund, 2007).

This study has limitations and strengths. A factor that may have limited this study is the number of included participants in this research. It is hard to evaluate the intervention properly, because the small number of people included in the study. Especially the data after three months were very limited, because from the 59 participants that started with *Slim Leven* only from 17 data of the second measurement were available.

Another factor that may have limited this study is that the volunteers are busier with guiding their participant than collecting data. Quantitative data from the administration of the intervention *Slim Leven* is used. Data of the participants is obtained by the volunteers of the intervention that are guiding the participants. Collected data were administrated by another volunteer. Data were not collected at the moments it was supposed to be. When the researcher of the current study wanted to start evaluating the data, only one measurement after three months was recorded, even though there were more participants joining *Slim Leven* for at least three months. Some participants that had already quit the intervention, did not fill in an evaluation measurement despite that they have joined *Slim Leven* for at least three months. The volunteers were reminded to collect the evaluation forms together with their participant. Eventually from the 24 participants that were joining *Slim* Leven for at least three months, only less than two-third were able to fill in an evaluation measurement that had to be filled in after three months since the participants started with the intervention.

Another limiting factor might be that the changes in health related behaviour need a longer period of time than three months. There are three months between the intake and the evaluation form. Maybe a substantial change takes more than three months to show in the results. For example it might be hard to break through habits. If someone has never been physical active, he will probably not be very physical active in a week. He will slightly

change his lifestyle habits into more active lifestyle. It might be that this his body changes in reaction to this more active lifestyle in more than three months.

This research did not use a control group. A control group might be useful to evaluate the outcomes of the intervention. Maybe if a control group was used and would be compared with the intervention group, other results might have been seen. But in this research an intervention group was not possible, because the participants can choose themselves when they want to start with the intervention. This means that every participant has a different intake and evaluation date. It is not possible to have a control group that would be tested in exact same conditions. There were too less participants to start at the same time.

Despite these limitations, this current study has also several strengths. One strength is the use of mixed methods. Both quantitative and qualitative data are used in the current study. In this way the experiences and outcomes of the intervention are well evaluated. Especially the qualitative data is a good method to get better knowledge about the physical activity levels of the participants. But is also a good method to know more about the personal experiences of the participants. Physical activity is a term that can be broadly interpreted. People might find it hard to say whether an activity belongs to a physical activity or not. Also it is difficult to remind how active someone has been during a week when someone is not regular active. To ask people if they are more physical active and why they think their activity levels are increased, stayed the same or are decreased, gives more clear insight about the activity levels of the participants.

Also the reasons for a possible increase or decrease in physical activity levels that are questioned in the interview are a strong factor of this research. It gives some additional practical information which *Slim Leven* can use to attract more people to the intervention.

Some additional recommendations can be formulated based on the conclusions of this study and the limitations mentioned above. First of all, the organisations of the assessments of the participants can be improved. The volunteers have to take care that the intake and evaluation forms for each participant are assessed and handed in on time. The evaluation forms are not always handed in on time or are not even assessed. It would be best if all of the measurements would be taken at the moments they are supposed to be and that the forms will be administrated directly. So if participants do quit after three months since they started with the intervention, all of the data of those participants would be available to evaluate the intervention. More data would provide more reliable results if the experiences and outcomes

of the intervention would be evaluated again. It might be helpful if one volunteer will keep an eye on the evaluation forms and will remind the volunteers when the participant has to fill in the evaluation form.

Another recommendation is to evaluate the progress of the participants also after six months. The participants are measured two times: when they start joining the intervention and after three months since they started with the intervention. Lifestyle change and the outcomes of this change might need a longer period of time. If the participants have to fill in an evaluation form after 6 months since they started with the intervention, maybe desired outcomes of the intervention, like increased physical activity levels, are seen.

To attract new people to the intervention it is important to let the new people experience the cosiness and the motivated trainer. The results of the interview show that the participants like the cosiness and the motivated coach. The participants experience the intervention as something positive when they are actually training with the coach and the other participants. So to attract new people to the intervention, it is important that they are experiencing the training with its cosiness and motivated trainer. A lot of try out days might attract new people. When there are more participants joining the intervention, *Slim Leven* might come closer in achieving their goal to increase the lifestyle and health of the people living in this neighbourhood and to enhance the social cohesion.

Conclusion

The overall experiences and outcomes of the intervention *Slim Leven* are diverse. The participants that are interviewed are positive about the intervention. They like the cosiness and the motivation of the other participants and the trainers. About half of the participants that have been interviewed say that they are regular active and that they are more physical active since they started with the intervention. Statistical data of seventeen participants of *Slim Leven* that have filled in an intake and evaluation form show no change in health, perceived health and social cohesion. So the experiences of the participants are mainly positive but the results show no improvements in health, perceived health and social cohesion. Health, perceived health and social cohesion of the participants of *Slim Leven* stayed the same during the intervention.

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Appendix A

Translated Questions
Question 5a from the intake form translated into English. And the questions 6 & 7 from the intake form and the evaluation form translated into English.

Quistion 5 Physical activity

   5a. Are you physical active?

       0 No, what is the reason of this? ....

       0 Yes, my activity is ....

          I. How many minutes are you physical active each time?

            ....

          II. How many times a week are you physical active?

            ....

Question 6 Health
What mark, on a scale from 1 till 10, will you give yourself on the next two questions? The mark 1 means 'very bad' and the mark 10 means 'excellent'.

   6a. How do you feel right now? …………………………….

   6b. What kind of mark will you give yourself for your health? ………

We also like to know your weight and height.

   6c. What is your weight? ……………………..kg

   6d. What is your height?………………………..cm

Question 7 Environment
The next questions are quotes you can agree with or disagree with. Answer the next quotes by filling in the answer that fits your opinion the best.

   7a. I really feel part of this area.

       0 Strongly agree
       0 Agree
       0 Agree/disagree
       0 Disagree
       0 Strongly disagree

   7b. I have good contacts in this neighbourhood.

       0 Strongly agree
       0 Agree
       0 Agree/disagree
       0 Disagree
       0 Strongly disagree

7c. I am involved in this neighbourhood.

- 0 Strongly agree
- 0 Agree
- 0 Agree/disagree
- 0 Disagree
- 0 Strongly disagree

7d. Most people in this area can be trusted.

- 0 Strongly agree
- 0 Agree
- 0 Agree/disagree
- 0 Disagree
- 0 Strongly disagree

7e. Most people in this area are friendly.

- 0 Strongly agree
- 0 Agree
- 0 Agree/disagree
- 0 Disagree
- 0 Strongly disagree

7f. I get support from my (close) environment like family, neighbours, friends, etc. while achieving my goals at Slim Leven.

- 0 Strongly agree
- 0 Agree
- 0 Agree/disagree
- 0 Disagree
- 0 Strongly disagree

Appendix B

Interview plan

Interview   Date:

The meaning of this interview is to collect some information about the activity levels of couple of participants of *Slim Leven.* There will be searched for any differences in the movement patters of the participants before *Slim Leven* and at the moment. If there are any changes, we would like to know what these changes are and what causes these changes.

The interviews will be recorded, with permission of the participant. The records will only be used to transcript all of the information from the interview. The information of the interview will be treated confidentially and anonymously. The record of the interview will be deleted when all of the information is transcribed.

Are you giving permission to make a sound record of interview?   Yes / No

1. When did you start joining *Slim Leven?*

2. Which activities of *Slim* Leven are you joining? Why did you choose to participate with those activities?

3. Do you think that you are physical active in another way? For example, are you more or less active? What is this change exactly? Why did your activity pattern change?

4. Are you also doing more sport activities besides the activities of *Slim Leven* since you started with *Slim Leven?* How much more or less are you doing sport activities? Why did this change? What causes you to do more/less sport activities?

5. If you look at other physical activities, like gardening, cleaning, walking, is there any change in those activities since you started with *Slim Leven?* What is this change exactly? What causes this change?

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6. If you can give yourself a grade at this moment about "To be physical active", what kind of grade would you give yourself on a scale from 1 till 10?
1= I am absolutely not active, 10= I am very active. And why would you give yourself this grade?

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7. And what kind of grade would you give yourself about "To be physical active" in the period before you started with *Slim* Leven? Why would you give yourself this grade in that period? If so: why would you give yourself another grade than the question before?

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8. What was your most important reason to start with *Slim Leven?*

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9. What do you think is the most important factor that you are more physical active within or even maybe outside *Slim Leven?* Why is this reason the most important reason? In what way caused this you to be more physical active?

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10. I have a list of potential reasons that causes people to be more physically active. I would like to know which reasons are important for you. I would like you to give a grade for each reason on a scale from 1 till 5 according to your opinion. 1= absolutely not important, 2= not important, 3= neutral, 4= a little bit important, 5= absolutely important.

- Regularly contact with my volunteer ..
- Cosiness ..
- Get to learn new people/the neighbourhood ..
- I signed in, so I have to go ..
- To be active with a group of people ..
- Good lessons/ building of the program ..
- Motivated participants ..
- So I won't sit at home the whole day ..
- I think my health is important ..
- I feel healthier everyday ..
- I am active because I have to be active ..
- Motivated trainer ..
- Other reasons:

Thess where all of the question I wanted to ask you. Maby you have some questions, comments or additions for me?

This is the end of the interview. I want to thank you for the interview. The record of this interview will be deleted when I have transcribed the interview. The information of the interview will be treated confidentially and anonymously.

End

Appendix C

Test of normality

Table A-1 shows the results of the Shapiro-Wilk test. This test shows which data are normally distributed. A p-value of $p < 0.05$ means that the data is not normal distributed. But also the test statistic can be used to determine the normality. A test statistic of 1 means that the data is perfectly normal distributed. A statistic score of 0.900 or higher is used in this research as data that is normal distributed. Table 9 shows that perceived health at T1 and T2, social cohesion at T1 and T2 and BMI at T1 are normally distributed.

Table A-1. Test of normality: Shapiro-Wilk Test at T1 (n=59) and T2 (n=17)

	Statistic	*df*	*Sig.*
Perceived health T1	0.95*	54	0.02
Perceived health T2	0.94*	16	0.39*
BMI T1	0.91*	51	0.00
BMI T2	0.74	15	0.00
Social cohesion T1	0.90*	52	0.00
Social cohesion T2	0.94*	17	0.37*

*Normal distributed

Appendix D

Results of the given reasons
Table A-2 contains the givens reasons asked in a closed question. Each reason is linked to a number. Table A-3 shows the grades given by the participants for each reason. Also the mean grades are given for each reason in table A-3.

Table A-2. Reasons to join/stay active at *Slim Leven*

	Reason to join/stay active at Slim Leven
Reason 1	Regularly contact with my volunteer
Reason 2	Cosiness
Reason 3	Get to learn new people/the neighbourhood
Reason 4	I signed in, so I have to go
Reason 5	To be active with a group of people
Reason 6	Good lessons/ building of the program
Reason 7	Motivated participants
Reason 8	So I won't sit at home the whole day
Reason 9	I think my health is important
Reason 10	I feel healthier everyday
Reason 11	I am active, because I have to be active
Reason 12	Motivated coach

Table A-3. Grades given by the participants for each reason questioned in a closed question

	P. 1	*P. 2*	*P. 3*	*P. 4*	*P. 5*	*P.6*	*P.7*	*Mean*
Reason 1	4	3	3	4	4	5	5	4.00
Reason 2	4	4	5	4	4	4	5	4.29
Reason 3	3	5	3	4	2	4	3	3.43
Reason 4	3	5	4	3	1	4	4	3.43
Reason 5	4	5	4	4	4	5	5	4.43
Reason 6	3	4	5	4	4	5	5	4.29
Reason 7	5	5	5	4	4	4	5	4.57
Reason 8	3	4	5	2	2	3	4	3.29
Reason 9	4	4	4	4	5	5	5	4.43
Reason 10	3	3	4	3	1	4	5	3.29
Reason 11	2	3	1	5	4	5	1	3.00
Reason 12	5	5	5	5	4	5	5	4.86