Continuation of running after a six-week running clinic: A longitudinal study on the effects of self-determination factors and running identity

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Master thesis

Continuation of running after a six-week running clinic: A longitudinal study on the effects of self-determination factors and running identity

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The picture on the front page comes from the following website: http://www.docsskincare.com/blog/wp-content/uploads/2012/05/runners11.jpg

"If you run, you are a runner. It doesn't matter how fast or how far. It doesn't matter if today is your first day or if you've been running for twenty years. There is no test to pass, no license to earn, no membership card to get. You just run."

--John Bingham

Foreword

This master thesis was written for the master degree Health and Society at Wageningen University. The main goal of a master thesis is to use all gained scientific knowledge and research skills to conduct social science research in a systematic and clear way.

With this thesis I hope I can contribute to the insights in what motivates people to start running, how their motivation, intention and running identity changes over time, and how these factors influence long-term running behaviour. It is possible to use this information for long-term exercise behaviour as well. Eventually this may lead to improving exercise behaviour in the general population. This study also aimed to enhance self-determination theory and identity theory, by integrating them and using them to explain running behaviour.

Without support, I would not have been able to write this thesis. Therefore, I would like to thank my supervisor Kirsten Verkooijen, for her ideas, critical feedback, useful data analysis suggestions, and enthusiasm. Furthermore, I want to thank Lenneke Vaandrager for her input and willingness to be my second supervisor.

Many thanks to my friends at university, who cheered me up with lots and lots of tea breaks and lunch breaks in the sun, and who helped me improve my thesis with all kinds of tips and SPSS support. Finally, I would like to thank my parents and my boyfriend for their support and optimism which helped me to bring this thesis to a success.

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Summary

Background: Given the significant influence of physical activity on health, and the rising physical inactivity levels among the general population, it has become more and more important to gain a better understanding of factors that are predictive of exercise behaviour. Approaching exercise participation from a self-determination theory or identity theory perspective has shown to provide insight in the dynamics of exercise participation. In the present study, these perspectives will be linked and used to study a running clinic for beginning runners. This intervention has been qualified as effective, feasible and successful in getting and keeping Dutch people active. Unfortunately, there is not much insight in what specific individual factors play a role in continuing running among these beginning runners. Therefore, the present study looked at what individual factors change during the running clinic, and how these factors have an influence on running identity and continuation of running. Based on these results, an integrated model in which self-determination variables, running identity, intention and running behaviour were included, was explored.

Methods: A longitudinal survey has been carried out among participants of a running clinic for beginning runners. Data were collected at three time points: before the start of the clinic, at the end of the clinic, and at 3.5 months follow-up. Respondents who filled in all three questionnaires (N = 35) were included in the data analysis. Questions related to demographics, running identity, self-determination variables (i.e. types of motivation, types of behavioural regulations and satisfaction of the three basic needs), intention and running behaviour. A Wilcoxon signed-rank test, multiple linear regressions and bivariate correlations were used to answer the research questions.

Results: Mean age of the participants was 41.06 years (SD = 9.84), and 74.3% of the sample was female. Type of motivation and intention did not change significantly during the running clinic. Running identity did show a significant increase during the running clinic, which is an indication of the process of identity formation. Factors associated with running identity were basic need satisfaction, self-determined motivation, and also introjected regulation. Concerning predictors of running behaviour, self-determined motivation, introjected regulation, basic need satisfaction and past behaviour had a significant influence on running behaviour at 3.5 months follow-up.

Discussion and conclusion: By giving more insight in what motives are important and what factors influence continuation of running, the running clinic can be further tailored to the needs of participants. This will improve the effectiveness of the running clinic. The integrated model can be used to predict which factors influence long-term running behaviour. Based on the present results, it is recommended that running clinics for beginners focus on optimising running behaviour during the clinic, intrinsic motives, self-determined motivation and fulfilment of the needs for competence, autonomy and relatedness. It is however necessary to repeat the presented study with a larger sample, to make sure that all existing relations between running behaviour and its predictors will be found. The small sample size was the most important limitation of the present study.

Contents

1. Introduction

Because of the importance of physical activity for health, and the rising physical inactivity levels, it has become more and more important to gain a better understanding of factors that can predict exercise behaviour. In the present study, motivational aspects and identity formation are used to gain a better understanding of one type of exercise behaviour; namely running. In this chapter, first some background information on physical activity and the policies that are in place to improve physical activity are given. Thereafter one specific project in the Netherlands, a running clinic for beginning runners, is explained. Finally, the present study is discussed, and the objectives and research questions are given.

1.1 Physical activity

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure (Caspersen, Powell & Christenson, 1985). It is a complex, multi-dimensional behaviour that involves all activities, ranging from gardening to walking to housework, as well as sport and exercise. Exercise is a specific category of physical activity, which consists of planned, structured, purposeful physical activity performed with the objective to improve or maintain one or more components of physical fitness. Sport can be seen as a subgroup of exercise, which usually involves some form of competition (Caspersen et al., 1985; Cavill, Kahlmeier & Racioppi, 2006). All forms of physical activity together have a major positive influence on health. Physical activity reduces the risk of hypertension, cardiovascular disease, stroke, diabetes, breast and colon cancer, depression and the risk of falls (Miles, 2007; Puska, Benaziza & Porter, 2003). Furthermore, it improves bone and functional health, and together with diet it has a great influence on energy balance and body composition (Miles, 2007; Puska et al., 2003). Although there are also threats to health when untrained or previously sedentary people undertake exercise, such as injuries or the risk of dehydration, these do not outweigh the health benefits (Miles, 2007; VWS, 2001).

1.2 Stimulating physical activity in the Netherlands

In 2010, only 58.6% of the Dutch adults aged 18 and over reached the recommended 30 minutes of moderate-intensity physical activity at least five times a week (Bernaards, 2010). These low physical activity levels are caused by the declined interwovenness of physical activity and daily routine: physical activity is now an activity that must consciously be planned (VWS, 2001). Reason for this declined interwovenness is amongst others the economic growth, modernization and urbanization (VWS, 2001; WHO, 2011). Mechanisation and computerization made housework and paid jobs less physically demanding, and the number of people with sedentary jobs increased (Gezondheidsraad, 2003). This has been accompanied by less active recreational pursuits, such as the introduction of the television and the computer, and the increasing use of mechanised transportation, which further stimulated physical inactivity and sedentary behaviour (WHO, 2011).

Since 1996, the Ministry of Health, Welfare and Sport (VWS) has been implementing policies and interventions to stimulate Dutch people to take on a more active lifestyle. An important aspect of this policy is 'het Nationaal Actieplan Sport en Bewegen' (NASB) [National Action plan Sport and Physical Activity], which runs from 2007 up to 2014 (Ooms & Veenhof, 2011; VWS, 2005). The action plan has as main goal to get more people engaged in sufficient physical activity and sport, and to decrease the number of inactive people. This is done by subsidising municipalities with high levels of physical inactivity to start with programmes that stimulate the population to exercise. The five areas of special interest are neighbourhood, school, work, care and sport (Leemrijse, Ooms & Veenhof, 2011; Ooms & Veenhof, 2011; VWS, 2005). The setting 'sport' is coordinated by 'het Nederlands Olympisch Comité*Nederlandse Sport Federatie' (NOC*NSF) [the Dutch Olympic Committee*Dutch Sport Federation]. They oversee ten sports associations that implemented fourteen accessible sport projects to stimulate less active people to exercise more (Ooms & Veenhof, 2011).

1.3 Start to Run

One of these fourteen sport projects to get people physically active, and that has been qualified as effective, feasible and successful is the Start to Run programme (see box 1.1) which was implemented by 'de Atletiekunie' [the Athletics union] (Leemrijse et al., 2011). Implementing this successful intervention fits well within the contemporary society where running is popular. Running has been the fastest growing sport in the Netherlands in the past few years, and it holds the third place (with 16%), behind fitness (22%) and swimming (17%), as most practiced sport (measured as being practised at least 40 weeks a year) (Tiessen-Raaphorst, 2010; Tiessen-Raaphorst et al., 2010). It is estimated that approximately 1.4 million Dutch people run annually (Hespen et al., 2009). When looking at the Start to Run intervention, 25.777 participants joined the clinic between 2008 and 2010 (Ooms & Veenhof, 2011; Van Esschoten, 2012). These running clinics start twice a year in more than 100 locations (Ooms & Veenhof, 2011). Besides the Athletics union, who organises the partly subsidised Start to Run clinics, there is also Run2Day, a store chain specialised in running, that started to organise running clinics (which are called the iRun clinics). The iRun clinics have a similar aim and content as the Start to Run clinics, and they start three times a year in 50 locations, with approximately 2000 participants joining the clinic each time (iRun, 2012).

Box 1.1: What is Start to Run

> The Start to Run clinic for beginning runners was developed to help people overcome the barrier to start running, and to show participants that running is not boring but fun and healthy. The clinics also provide professional support with theoretical and practical lessons that enable participants to run safely (Ooms & Veenhof, 2010). Each clinic consists of six weekly trainings, whereby the training load is slowly built up. Besides the trainings, participants receive homework to be able to run once or twice a week by themselves. At the end of the six weeks people should be able to run approximately three kilometres (20 minutes) non-stop (Start to Run, 2012). After the clinic, participants can move on to a regular running group, become a member of the Athletics union or continue running by themselves.

1.4 Start to Run evaluation

At participant level, an effect evaluation on the implementation of Start to Run was executed by 'het NIVEL' [the Netherlands institute for health services research]. Data were collected among 100 participants and 639 controls at the start of the clinic, directly after the clinic finished, and six months after the first measurement (Ooms & Veenhof, 2010; Ooms & Veenhof, 2011). Aspects that were measured included enjoyment, activities, organisation, quality of instructor and impression of the sports association. Participants evaluated Start to Run in general very positively with an 8.2 on a scale from 1 to 10 (Ooms & Veenhof, 2011). Participants who joined the Start to Run clinic showed a significant increase in exercise behaviour directly after the programme, as well as at six months follow-up (Ooms & Veenhof, 2010; Ooms & Veenhof, 2011). At six months follow-up 69.2% of the participants indicated they were still running (Ooms & Veenhof, 2010). Furthermore, a large number of less active people were attracted to join the running clinic: only 48% of the participants reached the recommended 30 minutes of moderate-intensity physical activity at least five times a week at the beginning of the clinic, compared to 64% afterwards. More than 90% of the participants enjoyed the clinic and the activities, and were satisfied with the organisation and the quality of the instructor (Ooms & Veenhof, 2010).

1.5 The present study

The success of Start to Run is a positive trend, given the high rates of physical inactivity, overweight and obesity in the Netherlands (Gezondheidsraad, 2003; Swinkels, 2011). However, the context of a

running clinic has not yet received much attention in research, even though it is an interesting setting to study. Many health promotion interventions focus on getting people physically active, while a significant problem is the poor adherence or maintenance of behaviour (Ryan et al., 2008). In a running clinic, participants go through a transition. They start with adopting a behaviour (running), and can then move on to maintaining that behaviour by continuing with an (advanced) clinic or by joining a running organisation. Although the evaluation of Start to Run showed that 69.2% were still running at 6 months follow-up, a substantial proportion of beginners drop out. Unfortunately, there is not much insight in what specific individual factors play a role in continuation of running among these beginning runners.

A systematic literature review showed that when looking at exercise behaviour in general, motivation plays a crucial role in exercise participation (Ingledew & Markland, 2008; Silva et al., 2008), and also intention and exercise identity have been found to be significant predictors of exercise behaviour (Jackson, Smith & Conner, 2003; Vlachopoulos, Kaperoni & Moustaka, 2011). Research that has focused on type of motivation, intention, exercise identity, and their influence on exercise behaviour (e.g. Ingledew & Markland, 2008; Vlachopoulos et al., 2011) has until now not focused specifically on the setting of a running clinic, whereas these factors may play an important role in determining running behaviour in this specific setting. Firstly, participants are motivated to run, but it is not known what type of motivation they have at the beginning or at the end of the clinic, which may have an impact on their continuation of running. Furthermore, they are likely to have a strong intention to run, but it is not known whether this changes during the running clinic. It is also likely that participants will form a running identity during the clinic, as can be explained by identity theory. Type of motivation, intention and strength of running identity can in turn influence running behaviour.

For understanding running identity, identity theory is used, because this theory can explain the formation and organisation of identities, which will give insight in the identities that beginning runners have and form. Furthermore, one theoretical perspective that appears useful for understanding motivational issues in exercise settings is self-determination theory (Hagger & Chatzisarantis, 2008; Vlachopoulos et al., 2011; Wilson, Mack & Grattan, 2008). This theory makes a distinction between behavioural regulations, participation motives and basic psychological needs, which will be discussed in the next chapter. Although research has focused before on using self-determination theory and identity theory to explain exercise behaviour, there has been little research that linked both theories. The present study will look at how self-determination factors can be used to explain strength of running identity in the specific setting of a running clinic, and how self-determination factors, intention and running identity can explain running behaviour.

Because participation motives, intention and strength of exercise identity may change over time (Ryan et al., 1997; Ryan & Deci, 2003; Stets & Burke, 2003), a longitudinal survey was conducted among participants of a running clinic for beginning runners. This allows to capture the changes in type of motivation, intention and the formation of a running identity, and to assess whether self-determination factors, intention and running identity were predictors of running behaviour. This is an improvement compared to previous studies, which mostly used cross-sectional designs (e.g. Ingledew & Markland, 2008; Stephan et al., 2010; Wilson & Rodgers, 2004), and could therefore not conclude that the found associations between self-determination factors, intention, identity and exercise behaviour were causal in nature.

Understanding how motivation, identity and intention change during the running clinic, and gaining insight in their importance for continuing running can help to tailor the intervention to the needs of participants and may further improve the effectiveness of these running clinics. Results from the present study can also help to design general health promotion interventions focused on getting and keeping people physically active, by emphasising and encouraging the right motivation and by

responding to identity and the needs of participants. This attention can help to sustain participation in the long run (Ingledew & Markland, 2008). Furthermore, integrating self-determination theory and identity theory will help to enhance and improve the existing theories.

1.6 Objectives and research question

Based on the mentioned gaps in knowledge, several objectives are developed. The first objective of the present study is to see what motivation, intention and identity people have when joining the running clinic, and how these variables change during the running clinic. The second objective is to determine the association between self-determination variables and running identity, because the link between self-determination theory and identity has received almost no attention in research. The third objective is to determine if the different self-determination variables, running identity and intention influence continuation of running. The last objective, based on the previous three objectives, is to explore an integrated model in which self-determination variables, running identity, intention and running behaviour are included. To meet these objectives, the following research question has been formulated:

What individual factors change during the running clinic, and how do these factors have an influence on running identity and continuation of running?

To answer this central research question, four specific sub questions were developed:

1. How do motivation, intention and running identity change during a six-week running clinic?
2. What is the association between the self-determination factors and running identity?
3. How do the different self-determination variables, identity and intention influence continuation of running?
4. How can the self-determination variables, running identity, intention and running behaviour be linked to each other?

In the following chapter, the theoretical background that underpins the present study will be discussed. The third chapter will explain the research methods that were used to answer the research questions. In chapter 4, the results of the study will be given. This is followed by a discussion in chapter 5, where recommendations for further research and practical implications will be discussed. At last, in chapter 6 a conclusion will be given.

2. Theoretical background

In this chapter, self-determination theory and identity theory, which form the theoretical basis for this thesis, are explained. Both theories are applied to exercise behaviour, and also the link between the two theories is given. Finally, the hypotheses of the present study are given. A summary of the applied theories can be found in box 2.2.

2.1 Self-determination theory

The first pillar of the theoretical framework of the present study consists of self-determination theory. Self-determination theory, originally developed by Deci and Ryan (1985), is a macro-theory of human motivation (Deci & Ryan, 2008). This theory assumes that people are active organisms, who tend toward growing, overcoming ambient situations, and integrating new experiences into a unified sense of self. To make these processes happen, ongoing social nutriments and supports are needed (Deci & Ryan, 2002; Ryan & Deci, 2000). By providing social support or not, the social context can either lead to or prevent optimal growth, social development and personal well-being.
Self-determination theory is comprised of five subcomponents, or 'mini-theories' that explain different aspects of human growth, assimilation, and integration of the self with the social world (Deci & Ryan, 2002; Wilson et al., 2008). The four mini-theories that are relevant for this research will be explained (Causality Orientations Theory is not discussed). A glossary with the most important concepts of self-determination theory can be found in box 2.1 at page 15.

2.1.1 Basic Needs Theory

The Basic Needs Theory (BNT) explains the central and fundamental role of the basic psychological needs in relation to motivation, mental health and well-being (Deci & Ryan, 2002). Needs are *"innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being*" (Deci & Ryan, 2000, p. 229). These basic needs are competence, autonomy and relatedness. The need for *competence* involves a need to feel capable of achieving desired outcomes and to feel effective in one's efforts. *Autonomy* reflects the need to feel a sense of ownership over one's actions, and to fully endorse one's behaviours (feeling uncoerced in one's actions). *Relatedness* involves a desire to feel respected, connected, understood and cared for by others (Patrick et al., 2007; Ryan et al., 2008). When these basic needs are satisfied, it is assumed that self-determined forms of motivational regulation guide behaviour, and that it leads to positive outcomes such as better mental health. However, when any of these three psychological needs is unsupported or thwarted within a social context this will lead to diminished motivation and well-being (Deci & Ryan, 2002; Patrick et al., 2007; Ryan & Deci, 2000).

2.1.2 Cognitive Evaluation Theory

Cognitive Evaluation Theory (CET) describes the effects of social context on people's intrinsic motivation, and it links contextual elements such as autonomy and control to the different motivations (Deci & Ryan, 2002). Human motivation lies along a continuum which represents varying degrees of autonomy (see figure 2.1). Autonomy, one of the basic psychological needs, refers to behaviours being self-determined, or freely initiated by the individual (Ryan et al., 2008). Basically there are three types of motivation: amotivation, intrinsic motivation, and extrinsic motivation. When a person is *amotivated*, there is no intention at all to engage in a behaviour, and thus there is no motivation. This is manifested through either not acting at all or acting with no intention to do what one does (Ryan & Deci, 2002). Amotivation is shown on the far left end of the continuum, and stands in contrast with intrinsic and extrinsic motivation, where some degree of motivation and self-determination is present (Deci & Ryan, 2000). A person who is *intrinsically motivated* will engage in an activity for the inherent satisfaction or enjoyment they get from the activity. For example, an

exerciser who is intrinsically motivated might cycle because he or she enjoys the feeling of freedom when cycling at high speed. In this case, the behaviour is self-determined. A person who is *extrinsically motivated* will engage in an activity because it leads to outcomes that are separable from the behaviour itself such as attaining a reward or avoiding punishment (Ingledew & Markland, 2008; Ryan & Deci, 2000).
Intrinsic and extrinsic motivation lead to different outcomes, with intrinsic motivation leading to many advantages, such as more behavioural effectiveness, better learning, greater volitional persistence and enhanced mental health (Deci & Ryan, 2000; Deci & Ryan, 2008; Ingledew & Markland, 2008; Ryan & Deci, 2000).

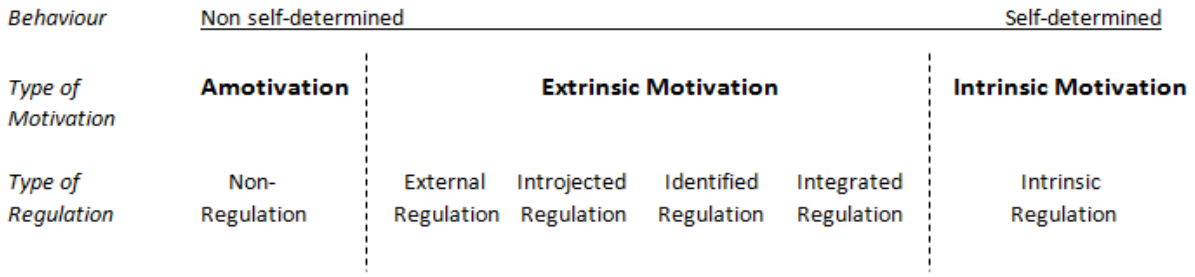

Figure 2.1: The self-determination continuum (Deci & Ryan, 2000)

2.1.3 Organismic Integration Theory

To explain the development and dynamics of extrinsic motivation, Organismic Integration Theory (OIT) was developed (Deci & Ryan, 2002). Extrinsic motivation consists of four distinct behavioural regulations that decrease in their degree of self-determination or autonomy (see figure 2.1). Controlled regulations (i.e. introjected and external regulation) represent the less self-determined end of the motivational continuum. *External regulation* is the least autonomous, and refers to the desire to obtain external rewards or avoid punishments administered by others. For example, an individual who exercises under external regulation might do so to please his or her partner (Ryan & Deci, 2000; Silva et al., 2008). *Introjected regulation* involves taking in a regulation but not fully accepting it as one's own. It involves an internal feeling of obligation, a need to act in order to avoid feelings of guilt or to heighten self-esteem. Although the behaviour is internally driven, the individual does not feel free regarding the behaviour (Ingledew & Markland, 2008; Silva et al., 2008). For example, an individual who exercises might do so to avoid feeling guilty.
Identified, integrated and intrinsic regulation are classified as autonomous regulations; they are more self-determined than the controlled regulations. *Identified regulation* refers to being motivated to perform a behaviour because it is personally important and leads to outcomes that are consciously valued. For example, individuals who exercise might do so because they know it is good for their health. The most autonomous form of extrinsic motivation is *integrated regulation*. This occurs when behaviour is seen as an important part of an individual's identity, and is brought into congruence with one's other values and needs. For example, individuals who exercise might do so because they see themselves as having an athletic identity (Ingledew & Markland, 2008; Ryan & Deci, 2000; Silva et al., 2008). According to Ryan and Deci (2000), the difference between integrated regulation and intrinsic regulation, is that intrinsic regulation involves interest in the activity itself, while integrated regulation involves an activity being important for attaining separable outcomes rather than for their inherent enjoyment: it is thus still an extrinsic form of motivation (Mullan & Markland, 1997; Ryan & Deci, 2000). However, although the two regulations are easy to distinguish theoretically, it is difficult to distinguish them empirically (Mullan & Markland, 1997). Therefore, many studies (e.g. Ingledew & Markland, 2008; Thøgersen-Ntoumani & Ntoumanis, 2006) do not measure integrated regulation.

Box 2.1: Glossary with self-determination theory concepts

Basic psychological needs

Competence: a need to feel capable of achieving desired outcomes and to feel effective in one's efforts.

Autonomy: a need to feel a sense of ownership over one's actions, and to fully endorse one's behaviours (feeling uncoerced in one's actions).

Relatedness: a need to feel respected, connected, understood and cared for by others.

Type of motivation

Amotivation: a state of lacking intention to act, and thus there is no motivation. This is manifested through either not acting at all or acting with no intention to do what one does.

Intrinsic motivation: engage in an activity for the inherent satisfaction or enjoyment they get from the activity. The behaviour is self-determined.

Extrinsic motivation: engage in an activity because it leads to outcomes that are separable from the behaviour itself such as attaining a reward or avoiding feelings of guilt.

Types of extrinsic motivation

External regulation: refers to the desire to obtain external rewards or to avoid punishments administered by others. The least self-determined form of extrinsic motivation.

Introjected regulation: involves an internal feeling of obligation, a need to act in order to avoid feelings of guilt or to heighten self-esteem.

Identified regulation: refers to being motivated to perform a behaviour because it is personally important and leads to outcomes that are consciously valued.

Integrated regulation: occurs when behaviour is seen as an important part of an individual's identity. The most self-determined form of extrinsic motivation.

2.1.4 Goal Contents Theory

Lastly, the Goal Contents Theory (GCT) looks at intrinsic and extrinsic goals, and their influence on motivation and well-being (Deci & Ryan, 2000). Within self-determination theory there is a distinction between goal contents or motives, and regulations. Participation motives are the aspirations people focus on during their activities ('what' goals). Regulations, such as intrinsic or introjected regulation, are the reasons for pursuing such aspirations ('why' goals) (Deci & Ryan, 2000; Ingledew & Markland, 2008). For example, a person might run twice a week to lose weight (i.e. the motive). The reason why a person wants to lose weight might be to heighten self-esteem (i.e. introjected regulation).

Extrinsic goals or participation motives relate to for example fitness or appearance, while enjoyment or personal growth are intrinsic motives. Different participation motives contribute to more or less controlled or autonomous regulation, which has consequences for behaviour (Deci & Ryan, 2000; Ryan, 2009).

2.2 Self-determination theory applied to exercise participation

Exercise is a natural activity in humans. However, because of the contemporary sedentary lifestyles, there are less natural opportunities for physical activity (e.g. as part of a job or transportation). Physical activity now needs to be planned, and has changed from being a spontaneous behaviour done for fun and enjoyment, to behaviour done for health or appearance (Ryan et al., 1997). Furthermore, exercise is not a stable behaviour: people start with exercise programs, participate actively for a while, and then stop, only to resume again later (Sherwood & Jeffery, 2000). Self-determination theory helps to explain exercise initiation and adherence by looking at different types of motivation.

2.2.1 Basic psychological need satisfaction and exercise participation

Basic psychological need satisfaction can have both an indirect and a direct influence on behaviour (Hagger, Chatzisarantis & Harris, 2006). In the context of exercise participation, not much research has focused on the direct influence of the basic psychological needs. Only two studies were found that looked at both the direct and indirect influence of psychological need satisfaction on exercise behaviour.

Edmunds, Ntoumanis and Duda (2006) studied the relationship between psychological need satisfaction, motivational regulations, and exercise behaviour using self-report questionnaires among a subsample of participants who reported taking part in regular exercise classes (*n* = 106). To measure psychological need satisfaction, statements for the three different basic needs were included like: 'I feel like I am free to decide for myself how to exercise' (to measure autonomy). It was shown that fulfilment of the three basic needs had an indirect influence on exercise behaviour by leading to more internalization of behaviour and self-determined motivational regulations, which in turn influenced exercise behaviour (Edmunds et al., 2006). Only competence, and not relatedness or autonomy, was also seen as a direct predictor of exercise participation (Edmunds et al., 2006).

Hagger et al. (2006) also measured psychological need satisfaction, motivation, intentions and behaviour. They used a sample of university students (*N* = 511) who completed three questionnaires at three time points. Psychological need satisfaction was found to have an indirect effect, via motivation, on exercise intention and behaviour. No direct effect of psychological need satisfaction was found (Hagger et al., 2006).

2.2.2 Participation motives, behavioural regulations and exercise participation

In a study among 251 young adults (mean age 19.49 years), Ingledew, Markland and Ferguson (2009) made a distinction between six types of exercise participation motives: social recognition motive, appearance/weight motive, stress management motive, health/fitness motive, affiliation motive, and challenge motive. Using self-report questionnaires, these motives, plus behavioural regulations and exercise participation were measured. To measure the behavioural regulations, the Behavioural Regulation in Exercise Questionnaire version 2 (BREQ-2; Markland & Tobin, 2004) was used. This measure does not distinguish between integrated and intrinsic regulation because they are difficult to distinguish empirically (Ingledew et al., 2009). The researchers hypothesised that different participation motives would contribute to different regulations, which would have differing consequences for behaviour. The participation motives were thus expected to indirectly influence exercise participation. Using structural equation modelling they concluded that appearance/weight motive positively predicted external and introjected regulation (i.e. introjected regulation: 'I need to exercise because it makes me feel better'), that social recognition motive positively predicted external regulation (i.e. 'I exercise because I don't want others to look down on me'), that health/fitness- and stress-related motives positively predicted identified regulation (i.e. 'I want to exercise because it is healthy'), and that affiliation and challenge motives positively predicted intrinsic regulation (i.e. 'I want to exercise to be with friends') (Ingledew et al., 2009). This was in agreement with a previous study by Ingledew and Markland (2008) among 252 office workers (mean age 40.36 years). In this study, also participation motives, behavioural regulations and exercise participation were measured. A difference with the study by Ingledew and Markland (2008) was the positive association of social recognition motive with external regulation. In the study by Ingledew and Markland (2008) social recognition motive formed together with affiliation, challenge and competition motives the more general motive of social engagement. This general motive was positively associated with intrinsic regulation. However, according to self-determination theory, social recognition is an extrinsic motive (i.e. behaviour that is performed to avoid punishment or to gain rewards). The more recent study by Ingledew et al. (2009) is an improvement on the previous study, because it isolates the effect of social recognition motive on external regulation.

As Ingledew et al. (2009) hypothesised, the different participation motives contributed to different regulations. These regulations in turn have an influence on exercise behaviour. Self-determination theory states that the autonomous regulations (i.e. intrinsic and identified regulation) are more likely to result in long-term adherence to regular exercise (Ingledew & Markland, 2008; Ryan et al., 2008). In Ingledew and Markland's (2008) study, identified but not intrinsic regulation positively predicted participation. They give as explanation that their study population of middle-aged workers may find aspects of exercise participation unappealing, making intrinsic regulation insufficient and identified regulation essential for participation. It is also possible that with increasing age, health issues become more salient which brings out the positive effect of identified regulation. Identified regulation involves valuing the outcomes of exercise (e.g. exercise is good for your health). Because the outcomes are consciously valued, individuals stay oriented towards the long-term significance of the behaviour (Deci & Ryan, 2002; Thøgersen-Ntoumani & Ntoumanis, 2006). Some other studies have also found identified regulation, more than intrinsic regulation, to predict exercise participation (e.g. Rose et al., 2005; Thøgersen-Ntoumani & Ntoumanis, 2006). In general, most studies demonstrated that the more autonomous regulations (both identified and intrinsic regulation) were associated with higher levels of participation and adherence (Deci & Ryan, 2000; Edmunds et al., 2006; Ingledew et al., 2009; Stephan, Boiché & Le Scanff, 2010). Also Ryan et al. (1997) found that among adults, motives linked to enjoyment, competence, and social relationships (i.e. autonomous motivations) directly and positively predicted the frequency of exercise participation, and they were negatively related to dropout. When looking at *intention* to exercise, the study by Wilson and Rodgers (2004) is relevant. They performed a cross-sectional study among 232 women, and could conclude that intrinsic and identified regulations were more strongly correlated with intention to exercise (Wilson & Rodgers, 2004). According to Deci and Ryan (2000) and Stephan et al. (2010), a reason for the relation between the autonomous regulations and exercise intention and behaviour is that the more self-determined a person is, the more likely it is that he/she experiences positive affective, cognitive and behavioural consequences of engaging in exercise. It is thought that those who exercise because it is fun or personally important, are less likely to experience motivational setbacks than individuals who exercise out of feelings of guilt or other extrinsic motives (Ryan et al., 1997; Thøgersen-Ntoumani & Ntoumanis, 2006).

The more controlled regulatory motivations (i.e. external and introjected regulation) were associated with lower levels of participation (Deci & Ryan, 2000; Stephan et al., 2010). In Ingledew and Markland's (2008) study, external regulation negatively predicted exercise participation. Introjected regulation was not associated with exercise participation. In the study by Ingledew et al. (2009), both regulations were unrelated to exercise participation. Furthermore, Silva et al. (2008) showed that scoring higher on controlling exercise regulations is associated with a greater number of dropouts from exercise compared to scoring higher on the more autonomous exercise regulations (Deci & Ryan, 2000; Silva et al., 2008). Stephan et al. (2010) found that older women who dropped out presented lower levels of self-determined motivations and higher levels of amotivation than persistent women. One of their objectives was to identify motivational differences between older women who drop out from a physical activity program and those who remain involved. The sample included 332 persistent older women (mean age 70.88 years) and 242 women who had ceased their participation (mean age 71.65 years). According to Ingledew & Markland (2008), a reason for the negative effects of controlling regulations on exercise participation and dropouts is that more controlling regulations do not fulfil the basic psychological needs of autonomy, relatedness and competence. These findings do not mean that extrinsic motives are not important: extrinsic motives are highly rated as reasons for *initiating* physical activity programs (Ryan et al., 1997).

Some caution is necessary when interpreting the results from the discussed studies, because most studies were cross-sectional in nature. The findings refer to associations and cannot be interpreted as causal effects. The directions of causation are theoretically underpinned, but it is possible that for example exercise participation can change the behavioural regulations.

2.2.3 Stages of change and exercise participation

The types of motivation (i.e. more intrinsic or extrinsic motives) may differ at different stages of behaviour change. An example of a stage is the preparation stage, whereby for example people start with a running clinic. After the running clinic they can maintain their behaviour for instance by continuing with an advanced running clinic, by joining a running organisation or by running on their own. Both preparation and maintenance are important stages in the transtheoretical model. The transtheoretical model states that health behaviour change involves progress through six stages of change: pre-contemplation, contemplation, preparation, action, maintenance, and termination (Prochaska & Velicer, 1997). This model is also used to describe exercise behaviour change, whereby individuals move from being sedentary to being active. Individuals in the *pre-contemplation* stage are sedentary and have no intention to become active within the next six months. In the *contemplation* stage individuals are still sedentary but they are intending to change within the next six months, and they are actively weighing up the pros and cons of becoming active. In the *preparation* stage, people have a plan of action, they are committed towards a change in their behaviour, and some have initiated (irregular) exercising. When individuals have made visible changes in their behaviour, and exercise regularly, they are in the *action* stage of change. Individuals are classified as being in the *maintenance* stage when they have been exercising regularly for six months (Prochaska & Velicer, 1997; Rose, Parfitt & Williams, 2005). *Termination* is the last stage, but this is not a practical reality: it involves 100% self-efficacy, and never returning to sedentary behaviour (Prochaska & Velicer, 1997). Progression through the stages is a cyclical rather than a linear process and most individuals will relapse and regress back to a previous stage before achieving sustained exercise behaviour (Rose et al., 2005).

According to Rose et al. (2005), progressing from one stage to the other is associated with changes in motivational focus, from non-self-determined, extrinsic behavioural regulations to self-determined, more intrinsic behavioural regulations (Rose et al., 2005). Wininger (2007) surveyed 143 undergraduates and looked amongst others at the relationship between self-determination theory and the transtheoretical model. He could conclude that individuals in the pre-contemplation stage had the highest amotivation scores, and individuals in the preparation stage scored highest on external regulation (Wininger, 2007). Thøgersen-Ntoumani and Ntoumanis (2006) examined whether amotivation, self-determined and controlling types of motivation could predict a range of exercise-related behaviours. They conducted questionnaires among exercisers (N = 375) from health clubs in the North of England to measure amongst others exercise motivation, exercise stages of change, number of relapses from exercise, and future intention to exercise. In general, they concluded that individuals who exercised more regularly, and were in the maintenance stage of change, were more self-determined in their motivation than those in the pre-contemplation, contemplation, preparation and action stages (Mullan & Markland, 1997; Thøgersen-Ntoumani & Ntoumanis, 2006). These findings are in agreement with the change in importance of different motives: extrinsic motives, like appearance and weight management, were more important in the early stages of behavioural change, whereas enjoyment (an intrinsic motive) was important for progression to and maintenance of regular exercise (Ingledew, Markland & Medley, 1998; Thøgersen-Ntoumani & Ntoumanis, 2006). However, these studies used cross-sectional data which makes it impossible to determine whether those regular exercisers became more self-determined when they progressed to another stage of change, or that they were more self-determined from the outset (Mullan & Markland, 1997; Thøgersen-Ntoumani & Ntoumanis, 2006).

2.3 Identity theory

The second pillar of the theoretical framework of the present study consists of identity theory. Identity is the salient part of an individual's self which relates to a particular behaviour (Jackson et al., 2003). In identity-based research, there has been an interplay between social identity theory (Hogg & Abrams, 1988) and identity theory (Burke, 1980). In *social identity theory*, a social identity is a

person's knowledge that he or she belongs to a social category or group. Members endorse the group's perspective through group identification and they behave according to the group norms (Hogg & Abrams, 1988). According to *identity theory*, the self can be organized into multiple roles or identities, for example as parent, student or exerciser (Burke, 1980; Strachan et al., 2009). Identities involve classification of the self as an occupant of a role and the assimilation of role meanings (e.g. expectations associated with this role) into the self (Strachan et al., 2012). These expectations guide behaviour. In short, possessing a social identity involves seeing the self relative to a group, and identifying the self with that group (i.e. 'I am a member of this running clinic', which is social comparison), while possessing a role identity involves seeing the self as an individual, and classifying the self according to these roles (i.e. 'I am a runner', which is self-categorization) (Stets & Burke, 2000; Strachan et al., 2012). Although there are differences between the theories, both theories state that the more salient the identity, the greater the likelihood that the individual will behave consistently with that identity (Jackson et al., 2003; Strachan et al., 2009; Strachan et al., 2012). Identities give meaning and importance to past behaviour, as well as provide direction to future behaviour. Thus, identity should be a significant predictor of behaviour (Jackson et al., 2003).
In the present study, the focus will be on identity theory, because a central aspect of identity theory is identity formation. Identity formation is seen as a series of ongoing processes between an individual and the social environment that illustrate the values, roles, and beliefs adopted by individuals over time as they shift between contexts (Ryan & Deci, 2003; Stets & Burke, 2003). It is assumed that identity formation will be important for beginning runners, who do not yet have a running identity.

2.4 Identity theory applied to exercise participation

Until now, there is a lack of research on exercise identity and exercise behaviour, whereas adding exercise identity to other predictors of exercise behaviour has shown additional predicting value (De Bruijn & Van den Putte, 2012). People who define themselves as exercisers, exercise more and are more likely to act on their exercise intentions than people without such a self-definition (Jackson et al., 2003; Kendzierski, 1990; Ryan & Deci, 2003). Exercise identity can be measured using the items developed by Sparks and Shepherd (1992), which can be used to measure any type of identity, ranging from green consumerism to eating a healthy diet. To measure exercise identity also a specific scale, the 9-item Exercise Identity Scale, was developed (EIS; Anderson & Cychosz, 1994). In a study by De Bruijn and Van den Putte (2012), 538 undergraduate students completed amongst others measures of exercise identity (based on Sparks and Shepherd (1992)), exercise behaviour and theory of planned behaviour variables. Using regression analysis they showed that exercise identity was a strong predictor of exercise behaviour, and that it interacted with exercise intention. Also Jackson et al. (2003) found that identity had an independent effect both directly on exercise behaviour and indirectly through intentions.
Not only having an exercise identity, but also the strength of this identity plays an important role (Jackson et al., 2003; Ryan & Deci, 2003). Strachan et al. (2012) studied 80 running group members who completed measures of runner identity (EIS) and aspects of recent exercise (which included running). This study found that strength of running identity was positively related to vigorous exercise (which would include running) (Strachan et al., 2012). Also De Bruijn and Van den Putte (2012) found that those reporting a stronger exercise identity had stronger intentions, and exercised more minutes per week.

2.5 Link between self-determination theory and identity theory

Self-determination theory and identity theory can be linked by explaining exercise identity from a self-determination perspective. The linkages will be discussed below.

2.5.1 Basic psychological need satisfaction and exercise identity

Ryan and Deci (2003) state that the internalization of an identity is related to the extent that the basic psychological needs are fulfilled. Most importantly, identities facilitate relatedness by helping individuals connect with others and experience belonging in society. Secondly, identities support feelings of competence, by giving opportunities to engage in challenges, to gain skills and knowledge, and to work on self-development. Lastly, identities can also be a forum through which people develop and express personal interests, values and capacities, which promote autonomy (Ryan & Deci, 2003). According to Ryan and Deci (2003), when the basic needs are not fulfilled, the identity will not be completely accepted as one's own, and will not be stably held. This in turn influences well-being (Ryan & Deci, 2003).

Wilson and Muon (2008) studied the association between exercise identity, exercise behaviour and psychological need fulfilment among 629 Canadian students. They showed that exercise identity is associated with stronger fulfilment of the basic psychological needs, whereby feeling more competent, autonomous and related in the context of exercise is associated with a stronger sense of exercise as an integral part of one's identity (Wilson & Muon, 2008). This is in agreement with self-determination theory. Vlachopoulos et al. (2011) collected data among 733 exercise participants from private fitness centres in Greece, related to psychological need satisfaction, behavioural regulations and exercise identity. They showed that fulfilment of the need for competence but not autonomy nor relatedness was associated with exercise identity. This is relatively similar to the results discussed by Wilson and Muon (2008), where the need for competence was a stronger predictor of exercise identity than the needs for autonomy and relatedness. One explanation these authors give for the significance of competence is the extent to which the participants in the study are beginning or experienced exercisers: autonomy and relatedness may be more important for strengthening exercise identity in the initial stages of exercise participation, compared to more advanced stages. The importance of the different basic needs may thus vary during the process of identity formation, but this is not investigated yet (Wilson & Muon, 2008). Vlachopoulos et al. (2011) give as explanation that in the context of private fitness centres competence may be perceived as more important than autonomy and relatedness.

2.5.2 Behavioural regulations and exercise identity

Besides the basic needs, also behavioural regulations play a role in identity. According to self-determination theory, any identity can be understood as being adopted by individuals for different motives, and these motives in turn can be understood as reflecting differing degrees to which the identity has been internalized to the self (Ryan & Deci, 2003). This means that two people can both have a running identity, but for example, one might be running to please their partner who is a runner as well (non-self-determined), while the other sees this running identity as a personally valued and satisfying identity (self-determined).

The only study that has studied the relation between behavioural regulations and exercise identity is performed by Vlachopoulos et al. (2011). When looking at the different behavioural regulations, they found that the more self-determined regulations of identified and intrinsic motivation showed stronger associations with exercise identity compared to the less self-determined regulations (Vlachopoulos et al., 2011). Thus, the more an identity has been internalized, the more it will lead to identity-relevant exercise behaviour (Strachan et al., 2012; Vlachopoulos et al., 2011).

Box 2.2: Summary of the applied theories

Self-determination theory

According to self-determination theory, motivation is about *what* people want to achieve (different types of motives, e.g. good health), and *why* they want to achieve this (different types of regulations, e.g. because you see health as important). Furthermore, the more people feel autonomous, competent and related (i.e. the three basic needs), the more their behaviour will be guided by self-determined forms of motivation (Deci & Ryan, 2000, Ryan & Deci, 2000).

Related to exercise behaviour, the different exercise participation motives contributed to different behavioural regulations. Studies have shown that appearance/weight motive and social recognition motive influenced the controlled behavioural regulations (i.e. introjected and external regulation). Health/fitness and stress management motives predicted identified regulation, and affiliation and challenge motives predicted intrinsic regulation. In general, most studies showed that the more autonomous regulations (i.e. intrinsic and identified regulation) were associated with higher levels of exercise participation and adherence. The more controlled regulations were associated with lower levels of participation or there was no association with exercise participation (e.g. Ingledew et al., 2009; Stephan et al., 2010). When looking at the fulfilment of the basic needs, it was shown that they can have an indirect influence on exercise behaviour, via the behavioural regulations (Edmunds et al., 2006; Hagger et al., 2006). Concerning the direct influence on exercise behaviour, it was only found in one study that competence, and not relatedness or autonomy, was a direct predictor of exercise participation (Edmunds et al., 2006).

Identity theory

According to identity theory, the self can be organized into multiple roles or identities, such as student or exerciser (Burke, 1980; Strachan et al., 2012). Identity formation is seen as a series of ongoing processes between an individual and the social environment that illustrate the values, roles, and beliefs adopted by individuals over time as they shift between contexts (Ryan & Deci, 2003; Stets & Burke, 2003). It is assumed that identity formation will be important for beginning runners, who do not yet have a running identity.

People who define themselves as exercisers, exercise more and are more likely to act on their exercise intentions than people without such a self-definition (Jackson et al., 2003; Kendzierski, 1990; Ryan & Deci, 2003). Furthermore, strength of running identity is positively related to intention and vigorous exercise (De Bruijn & Van den Putte, 2012; Strachan et al., 2012).

Link between self-determination theory and identity theory

Exercise identity can be explained from a self-determination perspective. Ryan and Deci (2003) state that the internalization of an identity is related to the extent that the basic psychological needs are fulfilled. Vlachopoulos et al. (2011) showed that only fulfilment of the need for competence but not autonomy nor relatedness was associated with exercise identity. Wilson and Muon (2008) showed that the need for competence was a stronger predictor of exercise identity than the needs for autonomy and relatedness. Besides the basic needs, also behavioural regulations play a role in identity. According to self-determination theory, any identity can be understood as being adopted by individuals for different motives, which reflect differing degrees to which the identity has been internalized to the self (Ryan & Deci, 2003). Only one study was found that looked at the relation between behavioural regulations and exercise identity. Vlachopoulos et al. (2011) showed that the more self-determined regulations of identified and intrinsic motivation had stronger associations with exercise identity compared to the less self-determined regulations.

2.6 Hypotheses

To answer the research questions, four hypotheses were formulated. These hypotheses are based on the presented theories and research.

Hypothesis 1

The first sub question of the present study was 'How do motivation, intention and running identity change during a six-week running clinic?'. When looking at the different motives, extrinsic motives are often seen as reasons for initiating exercise programs, while intrinsic motives are important for maintaining exercise behaviour (e.g. Ingledew & Markland, 2008; Ryan et al., 1997). It is therefore expected that when starting with the running clinic, mainly extrinsic motives are salient (i.e. appearance/weight and social recognition motive), which will become less important during the clinic. Intrinsic motives (i.e. affiliation, challenge, health/fitness, stress management and enjoyment motive) will become more important over the course of the clinic. When looking at intention to run, it is expected that intention will be high at the beginning at the running clinic, and that it will further increase, because intrinsic motives, which are expected to increase during the clinic, have a positive influence on intention. Concerning running identity, it is expected that beginning runners will not (yet) have a running identity. It is thought that running identity at the end of the clinic will be higher than at the beginning of the clinic, because of the process of identity formation (Ryan & Deci, 2003).

Hypothesis 2

The second sub question was 'What is the association between the self-determination factors and running identity?'. This question was added because relatively little research has been done on this topic. When looking at the different behavioural regulations, it was found that the more self-determined regulations of identified and intrinsic motivation showed stronger associations with exercise identity compared to the less self-determined regulations (Vlachopoulos et al., 2011). Concerning basic psychological need satisfaction, research is inconsistent. Both studies that were found saw competence as a predictor of exercise identity, while relatedness and autonomy were seen as a predictor in only one of the studies (Vlachopoulos et al., 2011; Wilson & Muon, 2008).
The hypothesis that follows from this is that the more autonomous regulations (i.e. intrinsic and identified regulation), and fulfilment of the three basic psychological needs will be positively associated with running identity. There will be no association between the more controlled regulations (i.e. external and introjected regulation) and running identity.

Hypothesis 3

The third sub question was 'How do the different self-determination variables, identity and intention influence continuation of running?'. Research has shown that the more autonomous regulations (i.e. intrinsic and identified regulation) are associated with higher levels of exercise participation and adherence (Ingledew & Markland, 2008; Silva et al., 2008). The more controlled regulations (i.e. external and introjected regulation) are associated with lower levels of exercise participation and higher levels of dropout (Deci & Ryan, 2000; Stephan et al., 2010). Concerning the basic psychological needs, relatively little research has been done. Hagger et al., (2006) demonstrated that there was no direct relation between basic psychological need satisfaction and exercise behaviour. The study by Edmunds et al., (2006) concluded that only competence, and not relatedness or autonomy, was a direct predictor of exercise participation. The basic needs did have an indirect influence on exercise participation (Edmunds et al., 2006; Hagger et al., 2006). Furthermore, identity and intention have an influence on exercise behaviour as well (Jackson et al., 2003).
The hypothesis is therefore that the more autonomous regulations (i.e. intrinsic and identified regulation), the fulfilment of the basic needs, intention and running identity will be associated with higher levels of running behaviour at 3.5 months follow-up. There will be no association between the

more controlled regulations (i.e. external and introjected regulation) and running behaviour at 3.5 months follow-up.

Hypothesis 4

The last sub question was 'How can the self-determination variables, running identity, intention and running behaviour be linked to each other?'. By linking self-determination theory and identity theory, the relations that exist between self-determination variables, identity, intention and running behaviour could be investigated. Based on the presented research, an integrated conceptual model in which all these variables were included was developed (see figure 2.2). When looking at the model, it is however necessary to interpret the previously presented results with some caution. Because most studies were cross-sectional in nature, it is only possible to refer to associations and not to causal effects.

Based on the presented studies, it is expected that challenge motive, health/fitness motive, affiliation motive, stress management motive and enjoyment motive will be associated with self-determined motivation. Basic need satisfaction is expected to be related to self-determined motivation and running identity. The influence of basic need satisfaction on running behaviour has not yet been studied extensively, and does not give clear results, therefore this line is dotted. Self-determined motivation is thought to be associated with intention and running identity. It is also expected to predict long-term running behaviour directly. Running identity is expected to be associated with intention and to be a predictor of long-term running behaviour. Also intention is expected to have an influence on long-term running behaviour.

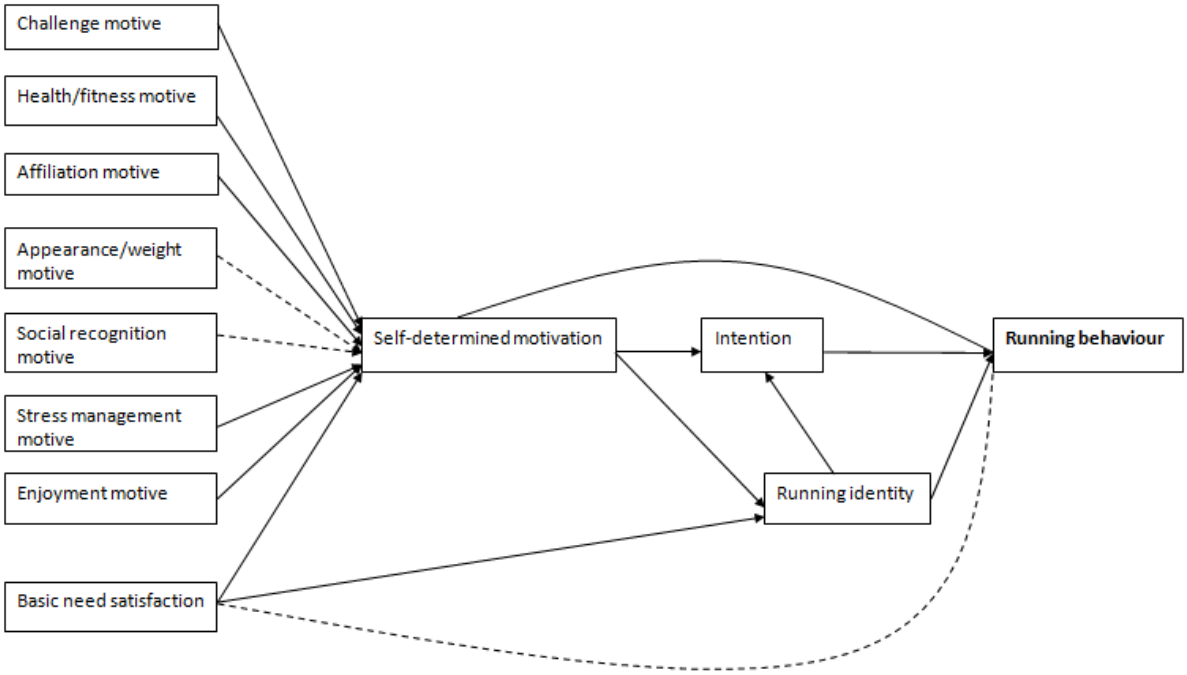

Figure 2.2: Conceptual model of the integration of self-determination variables, running identity, intention and running behaviour

3. Methodology

In this chapter the research methods are described. Elements that are addressed are the participants, procedure and study design, and the measures of which the different questionnaires consist. Finally, an overview is given of how the data were analysed.

3.1 Participants

Data were collected among people aged 18 and over, who started a 6-week running clinic for beginning runners during Spring 2012. Participants were recruited from running clinics organised in Wageningen by the Athletics union (Start to Run clinic) and in Amsterdam, Amersfoort and Utrecht by Run2Day (iRun clinic).

3.2 Procedure and design

To answer the research question, a prospective longitudinal survey with three data collection points was used (table 3.1). The three measurements will be referred to as T1, T2 and T3. The questionnaires were pilot tested amongst participants of a running clinic that started in September 2011, and were adjusted and extended to make sure that the items measured what they were supposed to measure.

The first questionnaire (T1) was a self-administered paper questionnaire, which was distributed just before the first training started (see appendix I). The iRun instructors were asked to give the questionnaire to all participants. The distribution of the questionnaire at the Start to Run clinic in Wageningen was done by the researcher herself, who visited the first training. A paper questionnaire was used because offering the questionnaire face-to-face would lead to a higher response rate than using an electronic questionnaire (Nulty, 2008). It was explained that participation was voluntary, and completion of the questionnaire was taken to indicate their informed consent. The second (T2) and third (T3) data collections involved self-administered electronic questionnaires, which were designed using Qualtrics software (see appendices II and III). Electronic questionnaires were used here to make sure that also people who were not able to attend the last training or who quit running during or after the clinic were invited to participate. The questionnaires were send to all participants who filled in their email address on the first questionnaire. The second questionnaire was send seven weeks after the first measurement (one week after the last training). The third questionnaire was send 3.5 months after the first measurement (eight weeks after the running clinic was finished).

For the first and third questionnaire, no reward was given. As a reward for completing the second questionnaire, every participant got one chance in a drawing for two €15,- movie vouchers. For every completed questionnaire €2,- went to a good cause (Stichting KiKa, a foundation that raises money to finance research related to children's cancer).

With regard to privacy, the results of the questionnaires were analysed and reported anonymously, and the email addresses were stored in a separate document where they could not be traced to the original data.

Table 3.1. Timing of baseline and follow-up questionnaires

	Weeks in 2012																		
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Trainings	1	2	3	4	5	6													
Conducting questionnaires	T1						T2	R	R						T3	R			

T1 = baseline questionnaire; T2 = second questionnaire; T3 = third questionnaire; R = reminder

3.3 Measures

In this section the three questionnaires are discussed. For every questionnaire a brief explanation is given of the different questions and scales that were used. The questions that are not elaborated on were added to give the running organisations some information about their participants. These questions included topics such as structure of the running clinic, interest in a follow-up clinic, and satisfaction with the running clinic. The questionnaires are included in appendices I, II and III.

3.3.1 Baseline questionnaire (T1)

In the first questionnaire, demographic questions were followed by questions asking about running experience and exercise behaviour. Furthermore, the different running motives, intention to run, and running identity were measured. In appendix IV table IV.1, the different variables that were derived from previous studies are schematically represented. In addition, the number of items per variable and the internal reliability estimates (Cronbach's alpha) were given.

Demographic information

Demographic characteristics that were measured were gender and date of birth. Date of birth was used to calculate age, and it was used as a key variable to link the data from the different questionnaires. To send the follow-up questionnaires, email addresses were asked for.

Running experience and current exercise participation

Respondents were asked questions concerning their running history and other exercise to obtain baseline information on their exercise behaviour. To assess whether respondents had experience with running, it was asked 'Have you ever run before?'. Answer options were: 'no', 'yes but never as regularly as at least once a week' or 'yes I have run at least once a week before'. To measure the amount of exercise people engaged in during a regular week it was asked 'Are you currently practicing any other sport besides running?', with answers options: 'no' or 'yes', and 'if yes, what other sport and on average how many hours a week/month'.

Running motives

Running motives were adapted from Ingledew et al. (2009). The following motives were assessed: challenge motive, enjoyment motive, health/fitness motive, affiliation motive, appearance/weight motive, social recognition motive, and stress management motive. To measure affiliation motive, two items were used. These two items had a Cronbach's alpha of .80. The other motives were measured using one item. Each item consisted of a statement where respondents had to answer using a 5-point Likert scale ranging from 1 (*very unimportant*) to 5 (*very important*). The statements were 'I want to improve my physical fitness' (health/fitness motive), 'I like to get to know new people' and 'I like running together' (affiliation motive), 'I'd like to lose weight and/or work on my figure' (appearance/weight motive), 'I want to improve my running performance' (challenge motive), 'I enjoy running' (enjoyment motive), 'Others recommended running' (social recognition motive), and 'This is for me a way of relaxation' (stress management motive).

Intention

To measure intention to run, two statements were included. These statements were based on the items used by Jackson et al. (2003). Items were 'I want to run at least once a week' and 'I expect to run at least once a week', where respondents could answer on a scale from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha for the two items was .81 in the present study.

Running identity

Running identity was measured using four items. These items were adapted from the identity items used by Sparks and Shepherd (1992). Items included: 'Running at least once a week is part of who I am', 'I see myself as a runner', 'Others see me as a runner' and 'I like to be described as a runner'. Answer options ranged from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha in the present study was .71.

3.3.2 Second questionnaire (T2)

In the second questionnaire, first demographic variables were measured. This was followed by questions on running behaviour, running identity, behavioural regulations and basic psychological need satisfaction. Variables that were measured using the same items as in the first questionnaire (i.e. motives to run and intention to run) were not discussed again. Running identity was included here again because this variable was measured using both the same items as in the first questionnaire as well as another measure, to check the validity of the 4-item measure. In appendix IV, table IV.2 the different variables that were derived from previous studies are schematically represented. In addition, the number of items per variable and the internal reliability estimates (Cronbach's alpha) were given.

Demographic information

Demographic characteristics that were measured included gender and date of birth, educational level, weight and height. Weight and height were used to calculate Body Mass Index (BMI = weight (kg)/height (m)^2).

Running behaviour

Two questions were used to assess how many times people went running during the six weeks of the running clinic. The first question asked: 'Which of the six trainings did you attend?'. Answer options for every training date were: 'yes I did join', 'no I did not join' or 'I can't remember'. The second question asked: 'Did you run besides the organised trainings?'. Answer options for every week were: 'no', 'yes once', 'yes twice', 'yes more than twice', or 'I can't remember'. To calculate running behaviour, the responses to these two questions were added up. For every week, total scores could range from 0 (did not run at all this week) to 4 (joined the weekly training, and ran more than twice that week besides the training). For the six week running clinic in total, scores could range from 1 (only joined the first training) to 21 (joined the training every week, and ran more than twice every week besides the training).

Running identity

The four items that were used to measure running identity in the first questionnaire were used in the second questionnaire as well. To see whether these four items were able to capture running identity, and could be used as a valid scale, an additional scale was added to the second questionnaire: the Exercise Identity Scale (EIS; Anderson & Cychosz, 1994). The 9-item Exercise Identity Scale was adapted to measure the strength of running identity rather than exercise identity. Sample items included 'I consider myself a runner' and 'I need to run to feel good about myself'. Using a 7-point Likert scale, ranging from 1 (*completely disagree*) to 7 (*completely agree*), participants rated the extent to which they saw running as an important part of their self-concept. A mean score for each participant was derived based on the item scores. The scale has high internal reliability (Cronbach's alpha between .92 and .94) and a test-retest reliability of .93 (Anderson & Cychosz, 1994; Vlachopoulos et al., 2011). In the present study a Cronbach's alpha of .90 was derived. There was a correlation of r = .84 between the four identity items and the Exercise Identity Scale (p < .01), which indicates that the four items can be used as well as a valid measure for running identity. To maintain

consistency in the present study, the 4-item scale was used during data analysis, because this scale was used at both T1 and T2.

Running regulations

To measure behavioural regulations, which range from very autonomous to very controlled, a short form of the BREQ-2 (Markland & Tobin, 2004) was used (Helmink et al., 2011). BREQ-2 stands for Behavioural Regulation in Exercise Questionnaire, version two. The short form BREQ-2, consisting of twelve items, measures every regulation (amotivation, external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic regulation) using two items. Integrated regulation however, was not included separately in the data analysis, because although it is easy to distinguish from intrinsic regulation theoretically, it is difficult to distinguish empirically (Mullan & Markland, 1997). Together with intrinsic regulation and identified regulation, integrated regulation formed self-determined motivation (i.e. intrinsic, integrated and identified regulation together), which was used in the conceptual model. In the present study all items were adapted to measure running regulations instead of exercise regulations. Sample items were: 'I don't see the point in running' (amotivation), 'I run because other people say I should' (external regulation), 'I feel guilty when I don't run' (introjected regulation), 'I value the benefits of running' (identified regulation), 'Running has great value for me' (integrated regulation), and 'I run because I enjoy it' (intrinsic regulation). Answer scales ranged from 1 (*completely disagree*) to 5 (*completely agree*). In the study by Helmink et al. (2011), Cronbach's alpha for all regulations were above .62, except for external regulation which had a Cronbach's alpha of .55. In the present study, Cronbach's alpha values were .16 for amotivation, .93 for external regulation, .83 for introjected regulation, .66 for identified regulation, .68 for integrated regulation and .71 for intrinsic regulation. The extremely low alpha coefficient for amotivation was not seen in the original study, where amotivation had a Cronbach's alpha value of .88. Because this value is unacceptably low, and because the beginning runners in this sample are considered to be motivated to start running, this regulation is removed from analysis.

Basic psychological need satisfaction

The Basic Psychological Needs in Exercise Scale (BPNES; Vlachopoulos & Michailidou, 2006; Vlachopoulos, Ntoumanis & Smith, 2010) was used to measure the extent to which the psychological needs of respondents were fulfilled in the running clinic. The scale consists of twelve items, divided into three subscales of four items. The scale was translated into Dutch and adapted to specifically assess running instead of exercise behaviour in general. Participants were asked to rate their overall experiences with running by providing answers on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Sample items included 'The way I run is in agreement with my choices and interests' (autonomy), 'I feel running is an activity which I do very well' (competence), and 'My relationships with the people I run with are very friendly' (relatedness). The scale showed high internal consistency in both studies done by Vlachopoulos and colleagues, with Cronbach's alpha values ranging from .75 to .92 for the three subscales (Vlachopoulos & Michailidou, 2006; Vlachopoulos et al., 2010). Also high levels of test–retest reliability for all three BPNES subscales were measured, which were all three .97 (Vlachopoulos & Michailidou, 2006). The present study showed lower internal consistency, with Cronbach's alpha values of .80 for competence, .67 for relatedness, and .68 for autonomy.

3.3.3 Third questionnaire (T3)

The third questionnaire first asked for demographic characteristics. Furthermore, this questionnaire was mainly used to assess running behaviour at 3.5 months follow-up.

Demographic information

Demographic characteristics that were measured were gender and date of birth. Date of birth was used to link the data to data from the first and second questionnaire.

Running behaviour

To assess running behaviour, two questions were included. The first question asked: 'Did you go for a run during the past two weeks, and if yes, how often?'. Answer options included: 'no', 'yes once', 'yes twice', 'yes three times' or 'yes four times or more'. The second question was used as a control measure. This question asked: 'When thinking back to the past ten weeks (the period after the running clinic), how often did you run on average?'. Answer options were: 'not at all', 'less than once a week', 'on average once a week', 'on average twice a week' or 'on average three times a week or more'.

Continuation of running

When respondents indicated they did run in the past two months, they were asked if they joined a running association or a new (advanced) running clinic. Answer options were 'yes' or 'no'.

3.4 Data analysis

The data were analysed using SPSS statistics 19. Data from the first questionnaire were manually entered into SPSS, while data from the second and third questionnaire, which were gathered using an online questionnaire, were transported into SPSS. Data from the same participants at the different time points were linked by making use of the personal identifier date of birth.

Using histograms, skewness and kurtosis values, and a one-sample Kolmogorov-Smirnov test, it was assessed whether the studied variables were normally distributed. All variables were normally distributed, except for five of the running motives at T1 and T2 (i.e. challenge, health/fitness, enjoyment, appearance/weight and stress management motive), intention at T2 and external regulation. Because of these results, the first and fourth hypothesis were tested with non-parametric tests, and the second and third hypothesis were tested with parametric tests.

To describe the sample, descriptive measures such as frequencies, percentages, means, standard deviations and reliability estimates (Cronbach's alpha) were calculated. It was also checked, by making use of Mann-Whitney tests, whether responders differed significantly from non-responders, and whether there were any significant differences by gender and by type of running clinic (iRun clinic or Start to Run clinic) on key variables. The Mann-Whitney test is the non-parametric equivalent of the independent samples *t*-tests. Bivariate correlations were computed and analysed to examine strength and direction of possible relationships between variables at T1 and T2.

To see what motivation, intention and identity people have when joining the running clinic, and how these variables change during the running clinic (between T1 and T2), a Wilcoxon signed-rank test was used, as a non-parametric alternative to the paired samples *t*-test.

Using a multiple linear regression, it was assessed whether the different behavioural regulations and the basic psychological needs were associated with the dependent variable running identity at T2.

Another multiple regression was used to determine if the different behavioural regulations, the three basic psychological needs, intention, running identity and running behaviour at T2 could predict running behaviour at T3.

Finally, an integrated conceptual model where participation motives, self-determined regulation (i.e. intrinsic, integrated and identified regulation together), satisfaction of the basic psychological needs (i.e. autonomy, competence and relatedness), running identity, intention and running behaviour were included was explored using bivariate correlations.

4. Results

In this chapter, the results are presented. First, the sample is described using descriptive measures and Mann-Whitney tests. Thereafter, the first three hypotheses are tested using a Wilcoxon signed-rank test and multiple linear regressions. Finally, the last hypothesis is tested using bivariate correlations, which shows a model that integrates self-determination variables, running identity, intention and running behaviour.

4.1 Sample characteristics

The first questionnaire was completed by 85 participants, of whom 83 participants entered their email address. Response rate at T2 was 60%, with 51 completed questionnaires. At T3, 44 questionnaires were filled in, which gave a response rate of 51.8%.

In the present study, only the participants who filled in all three questionnaires were included in the data analysis. In total, there were 35 participants who filled in all three questionnaires. Mean age was 41.06 years (*SD* = 9.84), and 74.3% of the sample was female. The average body mass index (BMI) was 24.19 (*SD* = 3.28). When looking at participants' educational level, 85.7% completed tertiary education, 11.4% secondary education, and 2.9% primary education (see table 4.1).

Almost one third of the participants (28.6%) had never run before, 25.7% had run before but never as regularly as once a week, and 45.7% reported to have run at least once a week before. A majority of the participants (60%) indicated that at the present time they did not practice any other sport besides running. During the running clinic, participants ran on average about two times a week (*M* = 2.05, *SD* = 0.71). At 3.5 months follow-up, 12 of the 35 respondents (34.3%) indicated they did not run the past two weeks. The remaining participants (*n* = 23) ran on average one and a half times a week (*M* = 1.52, *SD* = 0.46). Of these 23 participants, 10 (43.5%) joined a running association or an advanced running clinic.

Table 4.1: Sample characteristics

Characteristic	n	%
Age		
18 – 30 years	6	17.1%
31 – 40 years	11	31.4%
41 – 50 years	10	28.6%
51 – 60 years	8	22.9%
Gender		
Female	26	74.3%
Male	9	25.7%
BMI		
< 18.5	0	0%
18.5-24.9	22	66.7%
25 – 29.9	8	24.2%
> 30	3	9.1%
Educational level		
Primary education	1	2.9%
Secondary education	4	11.4%
Tertiary education	30	85.7%
Type of clinic		
iRun (Run2Day)	18	51.4%
Start to Run (Athletics Union)	17	48.6%

4.1.1 Differences between responders and non-responders

To test whether respondents who filled in all three questionnaire differed from respondents who filled in only one or two of the questionnaires, three Mann-Whitney tests were used.

In total, 25 respondents only filled in the first questionnaire, compared to 35 respondents who filled in all three questionnaires. Respondents were compared on all variables measured at T1. These included age, gender, intention to run, running identity and the different running participation motives at T1 (i.e. challenge, health/fitness, affiliation, appearance/weight, social recognition, stress management and enjoyment motive). Respondents who only filled in the first questionnaire scored significantly higher on the appearance/weight motive than respondents who filled in all three questionnaires (*Mdn* = 4.00 vs. *Mdn* = 4.00 respectively, $U = 297.00$, $z = -2.10$, $p < .05$).

There were 16 respondents who only filled in the questionnaires at T1 and T2. Respondents were compared on all variables measured at T1 and T2. No significant differences were found for gender, BMI, educational level, intention to run, running identity, the different running participation motives, the three basic needs, the different behavioural regulations and running behaviour at T2. The only significant difference was found for age: respondents who only filled in the questionnaires at T1 and T2 scored significantly lower on age than respondents who filled in all three questionnaires (*Mdn* = 33.50 vs. *Mdn* = 41.00 respectively, $U = 175.50$, $z = -2.12$, $p < .05$).

Finally, there were 8 respondents who only filled in the questionnaires at T1 and T3. These respondents were compared with respondents who filled in all questionnaires on all variables measured at T1 and T3 (i.e. age, gender, BMI, educational level, the different running participation motives, intention to run, running identity and running behaviour at T3). The respondents who filled in the questionnaires at T1 and T3 did not differ significantly on any of the variables from the respondents who filled in all questionnaires.

4.1.2 Differences by gender

Using a Mann-Whitney test it was also tested whether there were any significant differences between men and women on the studied variables. When looking at age, educational level, the different running participation motives, intention and running identity at both T1 and T2, no significant differences were found between men and women. BMI in men was significantly higher than BMI in women (*Mdn* = 25.77 vs. *Mdn* = 23.22 respectively, $U = 64.00$, $z = -2.00$, $p < .05$). When looking at the different behavioural regulations and basic psychological needs, the only significant difference was found for the need for relatedness. Men scored significantly higher on relatedness than women (*Mdn* = 3.75 vs. *Mdn* = 3.25 respectively, $U = 54.50$, $z = -2.19$, $p < .05$). This means that men felt more connected, and felt more comfortable with the other runners than women. Running behaviour at T2 and T3 did not show any significant differences between men and women.

4.1.3 Differences by type of running clinic

There were no differences found between the Start to Run and iRun participants for age, gender, BMI, educational level, intention and the different participation motives at T1 using a Mann-Whitney test. iRun participants did score significantly higher on running identity at T1 than Start to Run participants (*Mdn* = 3.88 vs. *Mdn* = 2.75 respectively, $U = 64.00$, $z = -2.00$, $p < .05$). At T2 Start to Run participants scored significantly higher on running identity (*Mdn* = 3.50 vs. *Mdn* = 4.38 respectively, $U = 73.00$, $z = -2.28$, $p < .05$). Furthermore, when looking at the different motives at T2, Start to Run participants scored significantly higher on affiliation motive (*Mdn* = 3.00 vs. *Mdn* = 4.00 respectively, $U = 75.00$, $z = -2.63$, $p < .01$) and enjoyment motive (*Mdn* = 4.00 vs. *Mdn* = 4.00 respectively, $U = 86.00$, $z = -2.35$, $p < .05$). This means that Start to Run participants found getting to know new people ((i.e. affiliation motive) and running for enjoyment (i.e. enjoyment motive) more important than iRun

participants. Scores on the three basic needs, the different regulations and running behaviour at T3 did not show any significant differences. iRun participants did score significantly higher on running behaviour at T2 (*Mdn* = 2.43 vs. *Mdn* = 1.83 respectively, $U = 91.00$, $z = -2.05$, $p < .05$).

4.2 Descriptive statistics

Overviews of the means, standard deviations, reliability estimates and Spearman's correlation coefficients of the studied variables are given in table 4.2 (T1) and table 4.3 (T2).

4.2.1 Descriptive statistics at T1

As can be seen in table 4.2, at T1 participants scored highest on the motives health/fitness, with a mean score of 4.74 (on a 5-point scale) and challenge (*M* = 4.00, *SD* = 0.92). This means that exercising to improve physical condition and running performance were the most important reasons for joining the running clinic. Average scores were obtained for enjoyment motive (i.e. running because you enjoy it; *M* = 3.60, *SD* = 0.91), appearance/weight motive (i.e. running to lose weight or improve appearance; *M* = 3.62, *SD* = 1.13) and stress management motive (i.e. running as a way to relax; *M* = 3.71, *SD* = 0.91). Lowest scores were obtained for affiliation motive (*M* = 3.40, *SD* = 0.85) and social recognition motive (*M* = 2.50, *SD* = 1.35). Running because you like to get to know new people and running because others recommended it were thus the least important motives to run (i.e. affiliation motive and social recognition motive respectively). Furthermore, measured on a 7-point scale, participants had a mean score of *M* = 6.18 on intention (*SD* = 0.86), while having a mean score of *M* = 3.29 on running identity (*SD* = 0.88). This means that participants had a very strong intention to run at least once a week, and on average did not have a strong running identity.

Correlations between variables at T1

When looking at the bivariate correlations between T1 variables (see table 4.2), a large positive correlation was observed between BMI and appearance/weight motive. This means that on average, participants with a higher BMI considered the appearance/weight to be more important. BMI had a moderate negative correlation with gender. This means that on average, women had a lower BMI than men. None of the variables at T1 showed a correlation with running behaviour at T2.

4.2.2 Descriptive statistics at T2

In table 4.3, the means and standard deviations of variables at T2 can be found. Besides participation motives, intention and running identity, several other variables were measured. Participants scored relatively high on the three basic psychological needs (on a 5-point scale, autonomy *M* = 3.75, *SD* = 0.61, competence *M* = 3.69, *SD* = 0.72 and relatedness *M* = 3.37, *SD* = 0.54). Concerning the regulations, the lowest score was seen for external regulation (i.e. running to obtain external rewards or avoid punishments administered by others; *M* = 1.38, *SD* = 0.74). Introjected regulation had a medium score (i.e. a need to act in order to avoid feelings of guilt or to heighten self-esteem; *M* = 2.91, *SD* = 1.30). Highest scores were obtained for identified regulation (i.e. seeing running as personally important; *M* = 4.20, *SD* = 0.68) and intrinsic regulation (i.e. running because you enjoy it; *M* = 4.18, *SD* = 0.72).

Correlations with behavioural regulations

When looking at the different participation motives and their associations with the behavioural regulations, it can be seen that health/fitness motive and stress management motive had moderate to large positive correlations with identified regulation and intrinsic regulation. Challenge motive and enjoyment motive had large positive correlations with intrinsic regulation. Affiliation motive, appearance/weight motive and social recognition motive did not show significant correlations with

any of the behavioural regulations. The basic psychological needs autonomy and competence had large positive correlations with intrinsic regulation and introjected regulation. Furthermore, autonomy had a moderate correlation with identified regulation, and competence had a moderate correlation with external regulation. Relatedness correlated with none of the regulations.

Correlations with intention

Intrinsic regulation, identified regulation and the basic psychological needs for autonomy and competence had moderate to large correlations with intention to run. BMI had a moderate negative correlation with intention. Age, gender, external regulation, introjected regulation, relatedness and running identity did not have significant relations with intention to run.

Correlations with running identity

The basic psychological needs for autonomy and competence, intrinsic regulation and introjected regulation showed moderate to large positive relationships with running identity. Age, gender, BMI, the basic need for relatedness, identified regulation and extrinsic regulation did not have significant correlations with running identity.

Correlations with running behaviour at T3

Moderate to large positive correlations were observed between all three basic psychological needs, identified and introjected regulation, and running behaviour at T3. Age had a moderate negative correlation with running behaviour. Furthermore, intrinsic regulation, intention and running identity at T2 did not have a significant relationship with running behaviour at T3, while running behaviour at T2 was largely correlated with running behaviour at T3.

Table 4.2: Descriptive statistics and Spearman's correlations between variables at T1

Variables at T1	1	2	3	4	5	6	7	8	9	10	11	12	13
M	41.06	0.74	24.19	4.00	4.74	3.40	3.62	2.50	3.71	3.60	6.18	3.29	2.05
SD	9.84	0.44	3.28	.92	0.51	0.85	1.13	1.35	0.91	0.91	0.86	0.88	0.71
Cronbach's alpha	-	-	-	-	-	.80	-	-	-	-	.81	.71	-
1. Age	-												
2. Gender†	-.07	-											
3. BMI	-.14	-.34*	-										
4. Challenge motive	-.24	-.21	-.12	-									
5. Health/fitness motive	.03	.02	.18	-.05	-								
6. Affiliation motive	.20	.07	.00	-.39*	.08	-							
7. Appearance/weight motive	-.13	.02	.63**	-.08	.13	.12	-						
8. Social recognition motive	-.13	-.27	.04	.36*	.11	.07	.06	-					
9. Stress management motive	-.02	.09	-.03	-.15	.13	.24	-.04	-.21	-				
10. Enjoyment motive	-.06	.12	-.14	-.07	.02	.06	-.16	-.11	.39*	-			
11. Intention	.20	.11	.04	-.08	.37*	.14	.06	-.17	.22	.04	-		
12. Running identity	.10	-.16	-.20	.29	.07	-.10	-.16	.25	.10	.48**	.06	-	
13. Running behaviour†† (T2)	-.16	-.20	-.10	.02	-.29	-.10	-.07	-.16	.06	.20	-.07	.10	-

Note: † 0 = male, 1 = female; ††number of times running per week; nr. 4 - 10 are measured on a 5-point scale; nr. 11 and 12 are measured on a 7-point scale
**p < .05; **p < .01.*

Table 4.3: Descriptive statistics and Spearman's correlations between variables at T2

Variables at T2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
M	41.06	0.74	24.19	3.89	4.66	3.34	3.46	2.46	3.86	3.89	6.20	3.80	3.75	3.69	3.37	1.38	2.91	4.20	4.18	2.05	1.00
SD	9.84	0.44	3.28	1.13	0.48	0.82	1.34	1.27	0.94	1.11	1.22	1.11	0.61	0.72	0.54	0.74	1.30	0.68	0.72	0.71	0.82
Cronbach's alpha	-	-	-	-	-	.57	-	-	-	-	.97	.82	.68	.80	.67	.93	.83	.66	.71	-	-
1. Age	-																				
2. Gender†	-.07	-																			
3. BMI	-.14	-.34*	-																		
4. Challenge motive	-.11	-.33	-.38*	-																	
5. Health/fitness motive	-.01	.13	-.19	.13	-																
6. Affiliation motive	.26	.06	-.18	.13	.31	-															
7. Appearance/weight motive	.26	.03	.63**	-.30	.10	-.09	-														
8. Social recognition motive	-.33	-.22	.11	.27	.03	.14	.18	-													
9. Stress management motive	.03	-.06	-.25	.41*	.27	.31	-.30	-.06	-												
10. Enjoyment motive	.37*	.09	-.50**	.43**	.45**	.61**	-.42*	.03	.63**	-											
11. Intention	.18	-.09	-.35*	.48**	.02	.20	-.20	.04	.38*	.51**	-										
12. Running identity	-.21	-.15	-.16	.58**	.13	.29	.04	-.01	.28	.23	.33	-									
13. Autonomy	-.29	-.18	-.21	.48**	.47**	.32	.08	.11	.39*	.33	.42*	.45**	-								
14. Competence	-.32	-.25	-.22	.39*	.11	.04	.11	.04	.22	.10	.38*	.50**	.75**	-							
15. Relatedness	-.05	-.39*	.13	.10	-.01	.43*	.23	.09	.08	.10	.18	.19	.49**	.46**	-						
16. External regulation	-.08	-.24	.15	.23	-.07	.00	.06	.06	.03	-.15	-.22	.19	.10	.35*	.10	-					
17. Introjected regulation	-.24	-.22	.02	.34	.13	.04	.25	-.01	.20	.00	.29	.64**	.45**	.55**	.34	.13	-				
18. Identified regulation	.07	-.02	-.14	.02	.44*	.22	.03	.15	.35*	.27	.40*	.26	.44*	.27	.23	-.20	.45**	-			
19. Intrinsic regulation	-.01	-.16	-.30	.49**	.37*	.19	-.10	-.03	.67**	.57**	.61**	.38*	.65**	.55**	.20	-.12	.32	.46**	-		
20. Running behaviour†† (T2)	-.16	-.20	-.10	.17	.01	-.07	.09	-.03	.36*	.02	.24	.20	.41*	.61**	.41*	.26	.42*	.21	.49**	-	
21. Running behaviour†† (T3)	-.42*	-.18	.02	.10	.11	-.14	.33	.24	-.01	-.21	.04	.02	.38*	.41*	.35*	.07	.39*	.38*	.20	.55**	-

Note: † 0 = male, 1 = female; ††number of times running per week; nr. 4 – 10 and 13 – 19 are measured on a 5-point scale; nr. 11 and 12 are measured on a 7-point scale

**p < .05; **p < .01.*

4.3 Change in motivation, intention and running identity during a running clinic

To see how the different participation motives, intention to run and running identity changed during the running clinic (i.e. between T1 and T2), a Wilcoxon signed-rank test was used. The results can be found in table 4.4.

Scores on the different motives (i.e. challenge, health/fitness, affiliation, appearance/weight, social recognition, stress management and enjoyment motive) and intention did not change significantly during the running clinic. On average, participants experienced significantly higher running identity after the clinic (*Mdn* = 4.00) compared to before the clinic (*Mdn* = 3.25), $z = -2.05$, $p < .05$, $r = -.36$.

Table 4.4: Change in motives, intention and running identity T1 – T2

Variable	Median T1 (inter-quartile range)	Median T2 (inter-quartile range)	*z*	*p*
Challenge motive	4.00 (4.00 – 5.00)	4.00 (4.00 – 5.00)	0.61	.54
Health/fitness motive	5.00 (5.00 – 5.00)	5.00 (4.00 – 5.00)	0.91	.37
Affiliation motive	3.50 (3.00 – 4.00)	3.50 (3.00 – 4.00)	0.45	.65
Appearance/weight motive	4.00 (3.00 – 4.00)	4.00 (2.00 – 4.00)	1.03	.31
Social recognition motive	2.50 (1.00 – 3.00)	3.00 (1.00 – 3.00)	0.01	.96
Stress management motive	4.00 (3.00 – 4.00)	4.00 (3.00 – 5.00)	-0.58	.57
Enjoyment motive	4.00 (3.00 – 4.00)	4.00 (3.00 – 5.00)	-1.31	.19
Intention	6.33 (5.67 – 7.00)	6.67 (6.00 – 7.00)	-0.78	.44
Running identity	3.25 (2.50 – 4.00)	4.00 (3.13 – 4.50)	-2.05	.04*

*Baseline values (T1) versus values after the running clinic (T2) using a Wilcoxon signed-rank test; * p < .05*

4.4 Self-determination variables and running identity

To assess whether the behavioural regulations and basic needs at T2 were associated with running identity at T2, a multiple linear regression using block wise entry was performed. Block 1 included age and gender, which are unchangeable and stable variables, and BMI. By controlling for their influence, it was possible to determine whether the theoretical constructs of self-determination theory accounted for additional variance in running identity, above and beyond these demographic variables. Block 2 included intrinsic and identified regulation, because these more self-determined regulations have shown stronger associations with exercise identity in past research (Vlachopoulos et al., 2011). When looking at the basic psychological needs, competence has shown to be the strongest predictor, or only predictor of exercise identity (Vlachopoulos et al., 2011; Wilson & Muon, 2008), and was therefore included in block 2 as well. The less self-determined regulations (i.e. external and introjected regulation) and autonomy and relatedness were included in block 3 (see table 4.5).

The regression analysis revealed that age, gender and BMI together made a statistically significant contribution to the prediction of running identity (Adj. R^2 = 21%). In step 2, after controlling for the association with age, gender and BMI, an additional 10% of the variance in running identity was explained by intrinsic regulation, identified regulation and competence. In step 3, external and introjected regulation, and autonomy and relatedness explained a further 17% of the variance in the outcome variable. Overall, it was BMI ($\beta = -.37$, $p < .05$) and introjected regulation ($\beta = .55$, $p < .01$) that were significantly associated with running identity. The beta weight for BMI was negative, suggesting that having a higher BMI would be associated with lower running identity. Introjected regulation had a positive beta weight, which indicated that higher introjected regulation (i.e. an internal feeling of obligation) was associated with higher running identity.

Table 4.5: Associations between self-determination variables and running identity at T2

	B	SE *B*	*β*	*t*	*p*	Adj. R^2
Block 1						.21*
Age	0.00	0.02	-.03	-0.22	.83	
Gender	0.05	0.38	.02	0.14	.89	
BMI	-0.13	0.06	-.37	-2.14	.04*	
Block 2						.31
Intrinsic regulation	0.10	0.29	.06	0.33	.74	
Identified regulation	-0.23	0.31	-.14	-0.75	.46	
Competence	-0.15	0.41	-.09	-0.35	.73	
Block 3						.48*
External regulation	0.18	0.25	.12	0.72	.48	
Introjected regulation	0.47	0.15	.55	3.17	.00**	
Autonomy	0.54	0.49	.30	1.09	.29	
Relatedness	0.05	0.38	.02	0.12	.91	

*Dependent variable: running identity at T2; Adj. R^2 = Adjusted R-squared value; All values refer to complete model; *p < .05; **p < .01.*

4.5 Prediction of running behaviour

To assess if the different behavioural regulations, the three basic needs, running identity, intention and running behaviour at T2 predicted running behaviour at T3, a multiple linear regression was performed. Running behaviour at T2 was added because the correlation table showed a large correlation between running behaviour at T2 and T3. Block 1 included age, gender and BMI. Block 2 included the autonomous regulations (i.e. intrinsic and identified regulation), the basic need for competence, running identity, intention and running behaviour at T2. The autonomous regulations, running identity, intention and past behaviour have shown in past research to positively predict exercise participation (Edmunds et al., 2006; Hagger, Chatzisarantis & Biddle, 2002; Ingledew et al., 2009; Jackson et al., 2003). Because competence, and not relatedness or autonomy, is seen as a direct predictor of exercise participation (Edmunds et al., 2006), this variable was included in block 2 as well. Block 3 included the remaining regulations (i.e. external and introjected regulation) and the basic needs of autonomy and relatedness (see table 4.6).

The regression analysis revealed that age, gender and BMI made a small (13%) but statistically not significant contribution to the prediction of running behaviour at T3. In step 2, after controlling for age, gender and BMI, the autonomous regulations, competence, running identity and running behaviour at T2 explained an additional 20% of the variance in running behaviour at T3, although not statistically significant. In step 3, the controlled regulations (i.e. external and introjected regulation) and the basic needs of autonomy and competence decreased the overall explained variance in running behaviour. Overall, it was only the variable age (β = -.48, p < .05) that made a significant contribution to the prediction of running behaviour at T3. The beta weight for age was negative, suggesting that the older a participant, the lower running behaviour at T3.

Table 4.6: Predicting running behaviour at T3

	B	SE B	β	*t*	*p*	Adj. R^2
Block 1						.13
Age	-0.08	0.03	-.48	-2.55	.02*	
Gender	0.05	0.70	.01	0.07	.94	
BMI	-0.07	0.12	-.14	-0.59	.57	
Block 2						.33
Intrinsic regulation	-0.17	0.55	-.07	-0.30	.77	
Identified regulation	0.74	0.57	.31	1.30	.21	
Competence	-0.29	0.78	-.13	-0.37	.71	
Running identity	-0.75	0.41	-.51	-1.82	.08	
Intention	0.23	0.36	.17	0.63	.54	
Running behaviour at T2	0.75	0.54	.32	1.38	.19	
Block 3						.28
External regulation	0.44	0.49	.20	0.90	.38	
Introjected regulation	0.24	0.32	.19	0.76	.46	
Autonomy	-0.11	0.93	-.04	-0.12	.91	
Relatedness	0.85	0.76	.28	1.12	.28	

*Dependent variable: running behaviour at T2; Adj. R^2 = Adjusted R-squared value; All values refer to complete model; *p < .05.*

4.6 Exploration of an integrated conceptual model

A conceptual model was developed, based on the existing literature and the set-up of the study (see paragraph 2.6). This model describes the integration between self-determination variables, running identity, past behaviour, intention to run and running behaviour. To explore the adequacy of this model, Spearman's correlations between the different variables were measured (see figure 4.1).

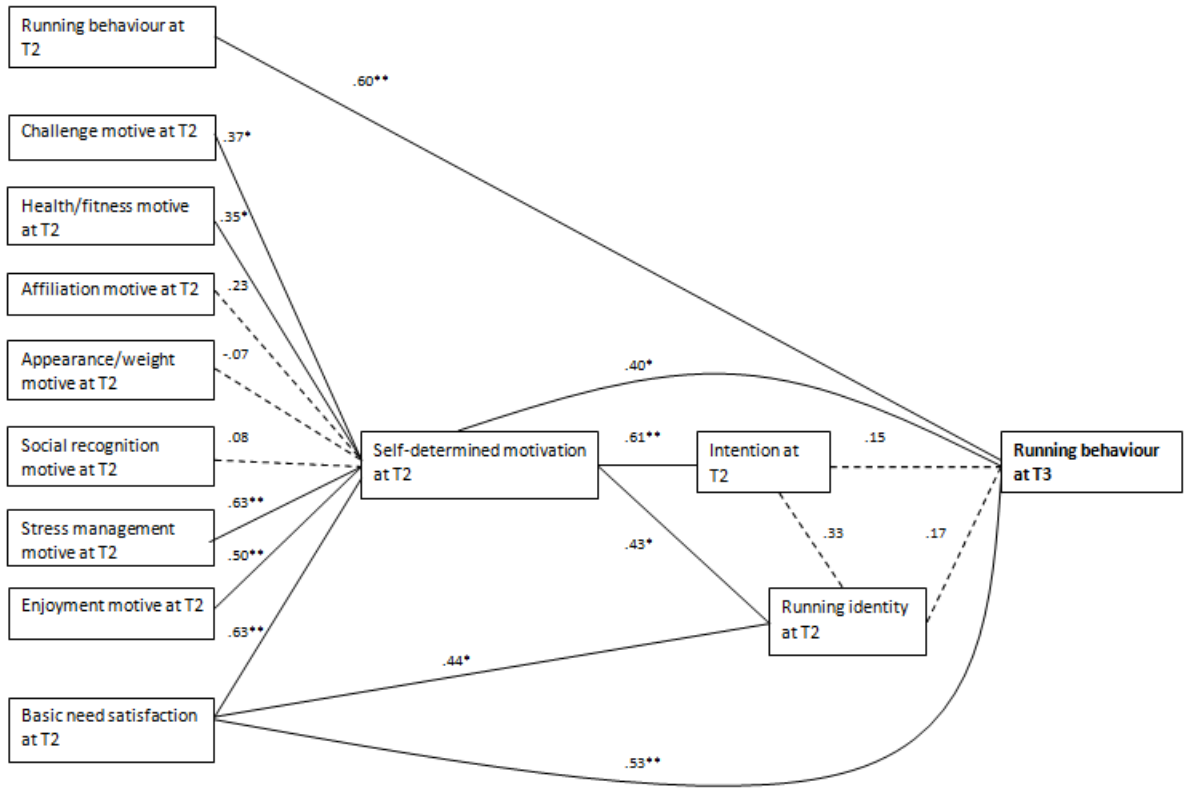

*Figure 4.1: Bivariate correlations between the self-determination variables, identity, intention and behaviour; *p < .05; **p < .01.*

The most interesting findings were the absence of a significant correlation between intention at T2 and running behaviour at T3 (r = .15, p > .05) and between running identity at T2 and running behaviour at T3 (r = .17, p > .05). There was also no association found between running identity and intention (r = .33, p > .05). When looking at the associations between the different participation motives and self-determined motivation, it can be seen that enjoyment motive (r = .50, p < .01), stress management motive (r = .63, p < .01), challenge motive (r = .37, p < .05) and health/fitness motive (r = .35, p < .05) showed moderate to large correlations with self-determined motivation. Appearance/weight motive (r = -.07, p > .05), social recognition motive (r = .08, p > .05) and affiliation motive (r = .23, p > .05) did not have a significant relationship with self-determined motivation. A large significant relationship was observed between basic need satisfaction and self-determined motivation (r = .63, p < .01). Both basic need satisfaction (r = .44, p < .05) and self-determined motivation (r = .43, p < .05) had a moderate correlation with running identity. Basic need satisfaction (r = .53, p < .01), self-determined motivation (r = .40, p < .05) and running behaviour at T2 (r = .60, p < .01) had a direct positive influence on running behaviour at T3.

5. Discussion

In this chapter, the main findings are interpreted in relation to the hypotheses and existing literature. Furthermore, the strengths and limitations of the present study are given, which is followed by recommendations for further research and practical implications.

5.1 Introduction

In the present study, a longitudinal survey has been carried out among participants of a running clinic for beginning runners. This was done to see what motivation, intention and identity people have when joining a running clinic, and how these variables change during this running clinic. In this way, insight is gained into the importance of these individual factors for runners. Furthermore the study aimed to explore the association between self-determination variables (i.e. behavioural regulations and basic needs) and running identity, because this link has not yet received much attention in research. It was also assessed what the influence of self-determination variables, intention and running identity was on continuation of running. Finally this study aimed to explore an integrated model in which self-determination variables, running identity, intention and running behaviour were combined.

5.2 Hypothesis 1: Change in motivation, intention and running identity during a running clinic

The first objective of the present study was to see what motivation, intention and running identity people have when they start with a running clinic (at T1), and how these variables change during the running clinic (from T1 to T2). It was hypothesised that extrinsic motives would become less important and that intrinsic motives would become more important. Furthermore, intention and running identity were expected to increase during the running clinic.

When looking at the participation motives, it can be seen that the most important motive at T1 was health/fitness motive, followed by challenge and stress management motives. Appearance/weight motive and enjoyment motive were considered less important, while affiliation motive and social recognition motive were least important. These results are not in agreement with previous studies, such as the studies by Ingledew et al. (1998) and Ryan et al. (1997), who showed that mainly extrinsic motives (i.e. appearance/weight motive and social recognition motive) would be salient when initiating exercise (participants starting with the running clinic initiate running). It is possible that the focus on running, and not exercise behaviour in general, has led to different results. At T2 approximately the same trend is seen as at T1. Here, the health/fitness motive is again reported as most important, followed by challenge and enjoyment motives. Stress management motive and appearance/weight motive were less important, and affiliation motive and social recognition motive were considered least important. These outcomes are more in agreement with previous research, that has found intrinsic motives to be more important in the maintenance stage of exercise behaviour than extrinsic motives (Ingledew & Markland, 2008; Silva et al., 2008). None of the different participation motives changed significantly during the running clinic. The hypothesis that assumed that extrinsic motives would become less important, and that intrinsic motives would become more important, could therefore not be supported. Overall, motives that were initially considered to be important, were also important at the end of the clinic. A possible explanation is that the time between the measures was too short: no research has been done to show how long it takes for motives to change.

Intention at T1 and T2 were both very high. This means that at the beginning of the running clinic participants had a strong intention to run at least once a week, and when the running clinic was finished they still had this strong intention to continue running. This is in agreement with the transtheoretical model, where people in the action stage would have high intentions to perform exercise behaviour, and also to implement these intentions (e.g. Rose et al., 2005). The hypothesized

increase in intention could not be supported by the data. It is possible that this is caused by the very high scores for intention at the start of the clinic.
Concerning running identity, respondents scored significantly higher at T2 than at T1. This provides support for the hypothesis that running identity at the end of the clinic would be higher than at the beginning. Performing the behaviour (running) is likely to have led to identity formation (Ryan & Deci, 2003), whereby participants took on the role of runner.

5.3 Hypothesis 2: Self-determination variables and running identity

The second objective was to determine if there were any associations between self-determination variables (i.e. behavioural regulations and basic needs) and running identity. It was hypothesised that the more autonomous regulations, and the three basic needs would be positively associated with running identity, and that the more controlled regulations would have no association with running identity. Because all variables were measured at the same point in time it was not possible to determine causality. Age, gender, BMI, the three basic needs and the different behavioural regulations accounted in the present study for 48% of the variability in running identity. This means that demographics and self-determination variables can explain almost half of the running identity respondents had. The study by Vlachopoulos et al. (2011) made use of hierarchical regression analysis as well, with the same predictor variables as in the present study. They made a distinction between exercise role identity and exercise beliefs, with total explained variance in exercise role identity being 53%, and in exercise beliefs being 67%. These results are relatively similar to the results found in the present study.
The multiple linear regression in the present study showed that two of the variables were independently associated with running identity, namely BMI and introjected regulation. Intrinsic and identified regulation and the three basic needs did not have a significant association with running identity. BMI had a negative association with running, which means that a higher BMI went together with a lower running identity. People who are overweight or obese may not see themselves as sporty, or as a runner. Introjected regulation had a positive association with running identity. This type of regulation involves running because of an internal feeling of obligation (i.e. people may run to avoid feelings of guilt or to heighten self-esteem). This behaviour is internally driven but controlled. The positive association suggests that running identity is driven by a sense of obligation, rather than more adaptive and personally relevant motives. These two associations were also found by Vlachopoulos et al. (2011), however they also found significant associations for exercise identity with the other behavioural regulations, and the fulfilment of the need for competence.
Based on the present results, the hypothesis that the more autonomous regulations and the three basic needs would be associated with running identity could not be supported. It is possible that this is caused by the small sample size, which may not have been large enough for performing multiple regression analysis. When looking at the bivariate correlations in the presented conceptual model, self-determined motivation and basic need satisfaction did have a relation with running identity (see paragraph 5.5).

5.4 Hypothesis 3: Prediction of running behaviour

The third objective was to study the influence of the different self-determination variables, identity and intention on continuation of running. The hypothesis was that the more autonomous regulations (i.e. intrinsic and identified regulation), the fulfilment of the basic needs, intention and running identity would be associated with higher levels of running behaviour at 3.5 months follow-up. Past behaviour was also expected to influence running behaviour. The more controlled regulations (i.e. external and introjected regulation) would not be associated with running behaviour at 3.5 months follow-up.
Age, gender, BMI, the three basic needs, the different behavioural regulations, running identity, intention and running behaviour at T2 accounted for 28% of the variability in running behaviour at

T3. When excluding external and introjected regulation, autonomy and relatedness, the explained variability in running behaviour at T3 was 33%. This means that demographics, intrinsic regulation, identified regulation and competence can explain a third of the running behaviour 3.5 months later. The study by Edmunds et al. (2006) used age, gender, the three basic needs and the different behavioural regulations to predict total exercise behaviour and strenuous exercise behaviour. In their study, 18% of the variance in total exercise behaviour, and 32% of the variability in strenuous exercise behaviour was explained by this model (Edmunds et al., 2006). In the study by Edmunds et al. (2006), two of the variables contributed independently to the prediction of total exercise behaviour; namely, age and introjected regulation. Six of the variables contributed independently to the prediction of strenuous exercise behaviour: gender, age, external regulation, introjected regulation, identified regulation and competence. In the current study, the only significant predictor of running behaviour at T3 was age. The negative association indicates that older respondents were less likely to continue running. Based on the present results, the hypothesis that the autonomous regulations, competence, running identity, intention and past behaviour would be associated with running behaviour could not be supported. This could also be caused by the small sample size. When looking at the bivariate correlations in the present study, running behaviour at T3 did have significant correlations with self-determined motivation and basic need satisfaction (see paragraph 5.5).

5.5 Hypothesis 4: Exploration of an integrated conceptual model

The last objective was to explore an integrated model in which self-determination variables, running identity, intention and running behaviour were combined. As hypothesised, more intrinsic motives (i.e. challenge, health/fitness, stress management and enjoyment motive) were associated with self-determined motivation, while the extrinsic motives (i.e. appearance/weight and social recognition motive) were not associated with self-determined motivation. Contrary to expectations, affiliation motive did not have an association with self-determined motivation. This might be caused by its low Cronbach's alpha at T2, which made it likely that the items did not properly measure affiliation.

In accordance with self-determination theory, basic need satisfaction was positively related to self-determined motivation and running identity. Furthermore, self-determined motivation was positively associated with intention and running identity. The finding that self-determined motivation was a predictor of running behaviour at T3 is also consistent with self-determination theory and with previous research (e.g. Ingledew et al. 2009; Thøgersen-Ntoumani & Ntoumanis, 2006). Past behaviour was a strong predictor of running behaviour, which was also shown by Hagger et al. (2002) and Jackson et al. (2003). This means that how often participants went running during the running clinic had an influence on running behaviour at T3.

Running identity was not associated with intention, and did not predict running behaviour at T3. This finding is not supported by previous research, where exercise identity has shown to be a significant predictor of intention and exercise behaviour (De Bruijn & Van den Putte, 2012; Strachan et al., 2012). It is possible that the current beginning runners did not yet have a strong enough running identity to be associated with running behaviour (the average score at T2 was 3.80 on a 7-point scale, which indicates a neutral position). The process of forming a full running identity might take longer than six weeks. Furthermore, a running identity, which is very specific, is likely to be different from an exercise identity, with people having a higher chance of having or developing an exercise identity compared to a running identity because all types of exercise behaviour fall under this identity.

Furthermore, contrary to expectations, intention was not a predictor of running behaviour at T3. This could be explained by the intention score. Intention score in the present study measured very high on a 7-point Likert scale, and had a rather low standard deviation (M = 6.20, SD = 1.22). This makes it difficult to predict differences in running behaviour. Another explanation is the habitual component of exercise behaviour, which makes the behaviour automatic and not intended. A *habit* is a form of automaticity in responding, which develops as a person repeats a particular behaviour in stable circumstances (e.g. going for a run each Saturday evening; Verplanken & Melkevik, 2008). The intention-behaviour relationship is well established in exercise research (e.g. Hagger et al., 2002), but

there is still a large discrepancy between intention and exercise: people who have positive exercise intentions, are not always acting in accordance with those intentions (De Bruijn & Rhodes, 2011; De Bruijn, 2011). Studies focusing on habit strength show that the influence of intention on for example fruit consumption was weak and not significant in people who had a strong habit towards fruit consumption. For people who had a low or medium habit strength towards fruit consumption, intention was a significant predictor of fruit consumption (De Bruijn et al., 2007). This is also found in relation to exercise behaviour: studies by De Bruijn and Rhodes (2011) and by Chatzisarantis and Hagger (2007) have shown that when exercise habits were stronger, exercise was less intentional. The intention–exercise relationship was nearly three times stronger for people with low levels of exercise habit strength compared to people with strong exercise habits (De Bruijn & Rhodes, 2011). Habit can thus be an important predictor of exercise behaviour (Verplanken & Melkevik, 2008). Overall, the proposed integrated conceptual model could be partially supported.

5.6 Strengths

The first strength of the present study is the longitudinal design. As Ryan et al. (1997) stated, initial motives to exercise might change over time. A person who begins to exercise for appearance motives may come to enjoy the activity after a while. Therefore, longitudinal research which assesses the development of motives over time is needed (Ryan et al., 1997). Furthermore to see if identity, the different behavioural regulations and the basic psychological needs predict running behaviour, it is necessary to conduct longitudinal research. For example, Ingledew and Markland (2008), Ingledew et al. (2009) and Wilson and Rodgers (2004) used cross-sectional questionnaires, and could therefore not conclude that the found associations were causal in nature. The present study collected data at three time points, and tried to capture the changes in participation motives, and the influence of running identity, basic need satisfaction and behavioural regulations on continuation of running.

Secondly, the context of a running clinic, where beginning runners start running in a structured way, is a setting that has not been studied before. Many health promotion interventions focus on getting people physically active, while a significant problem is the poor adherence (Ryan et al., 2008). The transition of participants from adopting a behaviour to maintaining this behaviour in the running clinic is useful for gaining insight in what determines continuation of running. Self-determined motivation, basic need satisfaction and past running behaviour seem important predictors of running behaviour, which can be used to increase long-term running behaviour.

Integrating self-determination variables with identity is another strength, because this has not received much attention in research so far. The study by Vlachopoulos et al. (2011) found that the self-determined types of regulations and the need for competence explained variation in exercise identity. A study by Wilson and Muon (2008) showed that all three basic needs were related to exercise identity. The present study shows that basic need satisfaction and self-determined motivation were correlated with running identity. Also introjected regulation (a more controlled regulation) showed a relationship with running identity. When splitting basic need satisfaction into the needs for competence, relatedness and autonomy, only competence and autonomy showed correlations with running identity. The absence of a correlation between relatedness and running identity was not expected based on Wilson and Muon's (2008) explanation that the need for relatedness would be more important for strengthening exercise identity among beginning exercisers. In the present study the absence of a correlation could be explained by the fact that running is more an individual sport, even when it is performed in groups (it is not a team sport). Based on these studies, it can be stated that the reasons why people run (the behavioural regulations) and the extent to which people feel competent, autonomous and related are likely to influence the formation of a running identity.

Lastly, the use of validated measurement instruments is an advantage, because the data that are collected using validated scales will have a higher quality (i.e. they measure what they are expected to measure). Furthermore, if multiple studies use the same instrument, the data can be easier compared, allowing researcher to build on each other's work and conduct meta-analyses. Eventually, the use of validated instruments will improve the usefulness and credibility of the results.

5.7 Limitations

The first important limitation is the small sample size (*N* = 35) in the present study. This could explain why no significant differences were found for the different motives between T1 and T2. Furthermore, the sample size was not large enough to perform reliable multiple linear regressions. According to Field (2009) a sample size of 80 will always suffice (with up to 20 predictors) if you expect to find a large effect. Therefore the results from the present study should be interpreted with caution, and it is advised to focus on the results obtained through descriptive measures and bivariate correlations.

Secondly, in the first questionnaire, all items were based on existing items, but had to be translated to Dutch. The translations were checked by two researchers, but these translations were not tested for their validity and reliability. Furthermore, not all the existing items to measure one variable were used. This was done for practical reasons: the questionnaire should not be too long, to avoid drop-out. When looking at the different participation motives, the use of only one item per motive is another possible reason why no significant changes in motives were found over the course of the running clinic. It is recommended to use at least two items, and preferably three items to measure one variable (for example to measure participation motives the Exercise Motivation Inventory version 2 (EMI-2) can be used; Markland & Ingledew, 1997).

Thirdly, for all variables measured using two or more items, reliability analyses indicated that internal consistency coefficients were above .70, except for affiliation motive at T2 (α = .57), autonomy (α = .68), relatedness (α = .67), identified regulation (α = .66) and integrated regulation (α = .68) which had questionable Cronbach's alpha. This means that the items together did not properly measure an underlying construct. This could be caused by the translation of the items into Dutch, or the change of 'exercise behaviour' into 'running' specifically. The present results based on variables with questionable internal reliability should be interpreted with caution. Furthermore, amotivation had a Cronbach's alpha of .16 which is unacceptably low. For this reason, amotivation was excluded from data analysis.

Fourthly, not all beginning runners were willing to fill in all three questionnaires, which could have led to non-response bias. The Mann-Whitney tests showed two differences between responders and non-responders on demographic characteristics (i.e. age, with respondents who filled in only the first questionnaire scoring significantly lower on age than respondents who filled in all questionnaires) and motivational characteristics (i.e. appearance/weight motive, with respondents who filled in only the first and second questionnaire scoring significantly higher on this motive than respondents who filled in all questionnaires). However, response rate at T2 was 60%, and response rate at T3 was 51.8%. For email questionnaires, these rates are considered to be good (< 50%) to very good (< 60%) (Instructional Assessment Resources, 2011), which has likely reduced the non-response bias.

Fifthly, injuries were not taken into account. A study by Hespen et al. (2009) showed an incidence of 15.1 injuries for every 1000 hours of running. Annually, Dutch runners develop 400.000 injuries, which makes running an injury-sensitive sport. Furthermore, beginning runners have a higher chance of developing an injury than experienced runners (Hespen et al. 2009). The beginning runners in the present study could have developed injuries, which might have been a reason for them to quit running (temporarily). This is not related to their participation motives or behavioural regulations,

which might have biased the results. In future research, injuries should therefore be taken into account.

Another limitation was that the data reported in the present study relied exclusively on self-report methods, and that social desirability bias could have occurred. It is possible that people have answered in a way they think is socially desired, rather than giving answers that represent reality. This is tried to be prevented by having an anonymous questionnaire.

Finally, the present study had a relatively similar population compared to the Start to Run evaluation by Ooms and Veenhof (2010) when looking at age and gender, The average age in their study was 40 years old (vs. 41.06 years old in the present study), with 70% female (vs. 74.3% in the present study). However, the findings may be difficult to generalize to all participants of running clinics for beginning runners, because differences were found between the two different running clinics (i.e. the Start to Run and iRun clinic). iRun participants scored significantly higher on running identity at T1, while Start to Run participants scored higher on running identity at T2. Furthermore Start to Run participants scored higher on affiliation motive and enjoyment motive at T2, and iRun participants scored higher on running behaviour at T2. It is possible that these differences can be explained by the content of the clinics, or the quality of the trainers.

5.8 Recommendations for further research

A few future research directions are offered to advance the study of motivation, identity, intention and behaviour, applied to both running behaviour specifically and exercise behaviour in general.

Firstly, the present study can be seen as a pilot study, which made a start with studying beginning runners. Further research should make use of a larger sample size. This is needed to perform reliable regression analyses, and to make sure that all the existing relations between variables are found. For example, there is a lot of research that showed exercise identity to be an important predictor of intention and exercise behaviour (e.g. Jackson et al., 2003; Strachan et al., 2012), but this was not found in the present study. Besides regression analyses, it would be interesting to make use of structural equation modelling to test the causal relations among self-determination variables, identity and running behaviour (as proposed in the integrated conceptual model in paragraph 4.6). Another useful method to add is qualitative research. In-depth interviews or focus groups can for example be used to give respondents the opportunity to explain their motivation (e.g. why is a certain motive important for them), to explain how they experience having a running identity (or not), or to explain what would be improved to make the running clinic more attractive for beginning runners.

Secondly, the conceptual model should be extended with less self-determined forms of regulation (i.e. introjected and extrinsic regulation), because in the present study introjected regulation had significant correlations with running identity and running behaviour at T3. Furthermore, self-determination theory and identity theory could be linked to the theory of planned behaviour (Hagger & Chatzisarantis, 2008; Jackson et al., 2003) to make the model even more comprehensive. Self-determination theory is successful in explaining what motivates behaviour, but lacks a detailed explanation of how motivational orientations are converted into specific behaviour. For this part, theory of planned behaviour variables of attitudes, subjective norms, perceived behavioural control and intentions can be used (Hagger & Chatzisarantis, 2008). Adding past behaviour to the theory of planned behaviour is also useful, because past behaviour has been found to be a predictor of exercise behaviour (Hagger et al., 2002; Jackson et al., 2003). The influence of age, gender and BMI should always be taken into account, as BMI has shown to be associated with identity, and age has shown to be a predictor of running behaviour at 3.5 months follow-up.

Thirdly, there is still a lot of research that could be done with the target group beginning runners. An interesting study would be to look at both a group of people starting with a running clinic, and a group who does not start with a running clinic (control group). This could give insight in what motives people have to *initiate* running, instead of what motives play a role in *continuing* running, and what barriers need to be overcome for people to start joining a running clinic. This is interesting because exercise is cyclical or episodic behaviour, with people who start to exercise, participate actively for a while, discontinue exercise and reinitiate exercise later (Sherwood & Jeffery, 2000). Because relatively little information is available regarding how motivation varies by phase of exercise (pre-contemplation, contemplation, preparation, action, maintenance and termination), the questionnaire could be extended with the transtheoretical model, to see at what stage the beginning runners are, and how this is related to their participation motives and behavioural regulations.

Lastly, the present study used the 9-item Exercise Identity Scale and a 4-item scale to measure running identity. The correlation between the four item version and the complete scale was $r = .84$ ($p < .01$). It is worthwhile to consider using the short version in future research because the high correlation shows that the results will be relatively similar, and using the short version will reduce the burden on participants. This is especially important in longitudinal research where respondents are asked several times to fill in a questionnaire. To measure the behavioural regulations, it is recommended to use the original BREQ-2 scale, and not the short form. Reason is the low Cronbach's alpha for three of the behavioural regulations, which made it necessary to delete amotivation from data analysis, and to interpret the data with caution. It would be useful to assess the applicability of short versions also for other validated scales which consist of many items.

In sum, these recommendations should help to improve the theoretical base on which behavioural interventions aimed at increasing and sustaining levels of exercise can be designed, tested and implemented.

5.9 Practical implications

The running clinic for beginning runners has proven to be an effective way to get inactive people physically active (Ooms & Veenhof, 2010). In the present study, 60% of the respondents indicated that at the present time they did not practice any other sport besides running. By giving more insight in what individual factors are important and influence continuation of running, the intervention can be further tailored to the needs of participants. This may lead to higher participation rates which improves levels of physical activity.

It is suggested that the intervention should appeal to individual pre-existing motives or to a range of motives, to get people initially engaged in the program (Ingledew & Markland, 2008; Ingledew et al., 2009). For example, to appeal to health/fitness motive, the intervention could highlight the benefits of the program for participant's health. The extrinsic motives, such as appearance and weight management, can also be used to engage people in the intervention. However, when the intervention has started, the well-being and enjoyment benefits (i.e. stress management and enjoyment motive) should be emphasized, because these intrinsic motives influence self-determined motivation, which is a predictor of continuation of running in the long-run. Changing motivation can be done by increasingly emphasising incentives related to the intrinsic motives. It is however important not to denigrate extrinsic motives because this can lead to dropout (Deci & Ryan, 1985). Throughout the clinic, all motives should be respected.

Not only the different motives and behavioural regulations are important for running behaviour: the current study showed the importance of basic need satisfaction, which had a large correlation with running behaviour at 3.5 months follow-up. The running clinic could further emphasise the fulfilment of the basic needs in its program. The need for competence (i.e. the need to feel capable of achieving

desired outcomes) is fulfilled in the running clinic by providing professional support with theoretical and practical lessons, which is likely to help participants to feel competent. Relatedness (i.e. the need to feel connected and to feel comfortable with the other runners), could be supported by the informal atmosphere and the fact that all runners have no or little experience. Autonomy (i.e. the need to feel a sense of ownership over one's actions) is fulfilled by the voluntary participation.

Because the conceptual model shows the important role of running behaviour during the clinic for running behaviour at 3.5 months follow-up, it should be emphasised by the instructors that it is important for participants to join all trainings, and also that it is important to practice once or twice besides the training.

The people in the present study showed they had strong intentions to continue running, however this did not have an influence on their actual future behaviour. It is suggested that habit formation could have played a role here, whereby habit formation has led a discrepancy between intention and behaviour (because habits are not intentional). Also running identity did not seem to have a relation with continuation of running. Focusing on running behaviour during the clinic, intrinsic motives, self-determined motivation and feelings of competence, autonomy and relatedness should therefore have priority.

Besides giving insight in running behaviour, and giving advice to make the running clinic even more effective, these insights in behaviour, motivation and identity can also be used in general health promotion interventions. It is likely that the motives that were salient in the case of a running clinic will also be important for people to engage in other exercise behaviour. Emphasising intrinsic motivation and paying attention to fulfilment of the basic needs will be useful for maintaining this behaviour. Furthermore, an intervention could try to turn the exercise behaviour into a habit, to make sure people will continue to perform the behaviour in the future. This can be done by letting participants repeat a particular behaviour in stable circumstances (e.g. going for a swim each Saturday morning or following judo lessons after school time).

6. Conclusion

The present study has been carried out to gain insights in how individual factors changed during a running clinic for beginning runners, and how these factors had an influence on running identity and continuation of running. The research question was: *'What individual factors change during the running clinic, and how do these factors have an influence on running identity and continuation of running?'*. This question has been answered by conducting a longitudinal survey among participants of a running clinic for beginning runners.

Results showed that participants had a strong intention to run, and the most important motive to initiate running was the health/fitness motive. No significant change occurred in intention or in the different participation motives during the running clinic. Running identity did show a significant increase during the running clinic, which is an indication of the process of identity formation.

Factors associated with running identity were basic need satisfaction and self-determined motivation. Also introjected regulation was related to running identity. This means that linking self-determination theory to identity theory is useful for understanding what predictors are of running identity. Furthermore, integrating self-determination theory and identity theory has helped to enhance and improve the existing theories by visualising the underlying relations.

The presented conceptual model in which these theories are integrated included the different participation motives, self-determined motivation, basic need satisfaction, running identity, intention, running behaviour during the running clinic and running behaviour at 3.5 months follow-up. It was shown that self-determined motivation, introjected motivation, basic need satisfaction and running behaviour during the running clinic had a significant influence on running behaviour at 3.5 months follow-up. The present study can be used to further improve the effectiveness of running clinics for beginning runners, and to tailor them to the needs of participants.

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Appendix I – Baseline questionnaire (T1)

WAGENINGEN UR
For quality of life

Hartelijk dank voor uw deelname aan dit hardloop-onderzoek van Wageningen Universiteit in samenwerking met Pallas '67. Alle informatie wordt vertrouwelijk verwerkt. Voor meer informatie: kirsten.verkooijen@wur.nl

Geslacht: M / V

Geboortedatum: _____ Postcode: _____

E-mail*: _____

*Omdat we zowel geïnteresseerd zijn in hoe u *nu* tegen hardlopen aankijkt als *na afloop* van de cursus, vragen wij om uw e-mailadres. Deze wordt enkel en alleen gebruikt om u na afloop opnieuw een korte digitale vragenlijst te kunnen toesturen.

1. Heeft u eerder aan hardlopen gedaan?

O Nee
O Ja, maar nooit zo regelmatig als minstens één keer per week
O Ja, ik heb ooit eerder minstens één keer per week hardgelopen

2. Doet u momenteel aan een andere sport dan hardlopen?

O Nee
O Ja, namelijk _____ gemiddeld _____ uur per week/maand*
(*graag doorhalen wat niet van toepassing is)

3. Hieronder volgen enkele redenen om je aan te melden voor Start to Run. Hoe belangrijk zijn deze redenen voor u?

	totaal onbelangrijk	enigzins onbelangrijk	neutraal	enigzins belangrijk	heel belangrijk
a. Ik wil mijn loopprestatie verbeteren	O	O	O	O	O
b. Ik wil mijn lichamelijke conditie verbeteren	O	O	O	O	O
c. Ik vind hardlopen leuk	O	O	O	O	O
d. Ik vind het leuk om nieuwe mensen te leren kennen	O	O	O	O	O
e. Ik wil graag afvallen en/of aan mijn figuur werken	O	O	O	O	O
f. Ik vind het gezellig(er) om samen hard te lopen	O	O	O	O	O
g. Anderen hebben mij dit aangeraden	O	O	O	O	O
h. Ik zoek op deze manier ontspanning	O	O	O	O	O

4. Heeft u specifieke doelen ten aanzien van hardlopen? (Meerdere antwoorden mogelijk)

O Nee
O Ja, ik wil een minimaal aantal keer per week hardlopen
O Ja, ik wil een bepaalde snelheid kunnen halen
O Ja, ik wil een bepaalde afstand kunnen lopen
O Ja, ik heb het doel om aan een loopevenement mee te doen

5. Hieronder volgen een aantal stellingen over hardlopen in het algemeen. In hoeverre bent u het met deze stellingen eens? **1 = totaal mee *oneens*, 7 = totaal mee *eens***
(Als nu nog geen ervaring heeft met hardlopen, vul dan in wat u *denkt* dat van toepassing is)

	totaal mee ***oneens***						*totaal mee* ***eens***
	1	2	3	4	5	6	7
a. Ik wil graag minstens 1 keer per week hardlopen	O	O	O	O	O	O	O
b. Ik verwacht minstens 1 keer per week te zullen hardlopen	O	O	O	O	O	O	O
c. Minstens 1 keer per week hardlopen heeft voor mij grote prioriteit	O	O	O	O	O	O	O
d. Of ik minstens 1 keer per week hardloop heb ik zelf in de hand	O	O	O	O	O	O	O
e. Minstens 1 keer per week hardlopen vind ik erg moeilijk	O	O	O	O	O	O	O
f. Ik ben ervan overtuigd dat ik minstens 1 keer per week kan hardlopen als ik dat wil	O	O	O	O	O	O	O
g. Hardlopen is iets waar ik goed in ben	O	O	O	O	O	O	O
h. Vergeleken met anderen ben ik goed in hardlopen	O	O	O	O	O	O	O
i. Vergeleken met anderen doe ik veel aan hardlopen	O	O	O	O	O	O	O
j. Ik vergelijk mijn hardloopgedrag regelmatig met dat van anderen	O	O	O	O	O	O	O
k. Hardlopen doe ik meestal met tegenzin	O	O	O	O	O	O	O
l. Hardlopen voelt vaak onaangenaam	O	O	O	O	O	O	O
m. Als ik aan het hardlopen ben dan geniet ik er meestal van	O	O	O	O	O	O	O
n. Hardlopen voelt over het algemeen plezierig	O	O	O	O	O	O	O
o. Minstens 1 keer per week hardlopen past bij wie ik ben	O	O	O	O	O	O	O
p. Ik zie mijzelf als een hardloper	O	O	O	O	O	O	O
q. Anderen zien mij als een hardloper	O	O	O	O	O	O	O
r. Ik word graag beschreven als een hardloper	O	O	O	O	O	O	O
s. Ik beschouw mijzelf als sportief	O	O	O	O	O	O	O

Nogmaals hartelijk dank!

Mocht u een opmerking hebben dan kunt u die hier kwijt.

_____
_____
_____
_____
_____

Appendix II – Second questionnaire (T2)

Q0 Fijn dat u mee wilt doen aan dit onderzoek! Deze vragenlijst maakt deel uit van een onderzoek naar motivatie en opvattingen die bij hardlopen een rol spelen. Daarnaast wordt uw ervaring met iRun geëvalueerd. Het invullen van de vragenlijst zal ongeveer 10 minuten duren. Er zijn geen goede of foute antwoorden en als deelnemer blijft u geheel anoniem. Onder de deelnemers worden 2 bioscoopbonnen ter waarde van € 15,- verloot. Om winnaars hierover te berichten, wordt gevraagd uw e-mailadres in te vullen aan het einde van de vragenlijst. Uw e-mailadres wordt niet gekoppeld aan uw antwoorden. Voor eventuele vragen kunt u contact opnemen met Kirsten Verkooijen (kirsten.verkooijen@wur.nl)

Q1 Wat is uw geslacht?
- ❍ Vrouw (1)
- ❍ Man (2)

Q2 Wat is uw geboortedatum? (dd/mm/jjjj)

Q3 Wat is uw hoogst genoten opleiding?
- ❍ Lager (beroeps) onderwijs zoals LBO of VMBO (1)
- ❍ Middelbaar (beroeps) onderwijs zoals MAVO, MTS of MBO (2)
- ❍ Hoger (beroeps) onderwijs zoals HAVO, VWO, HBO of WO (3)

Q4 Zouden wij uw lengte en gewicht mogen weten?

Uw lengte in centimeters (1)

Uw gewicht in kilogram (2)

Vraag Q5c wordt alleen gesteld aan iRun deelnemers:

Q5c Aan welke iRun clinic heeft u meegedaan?
- ❍ Amsterdam (1)
- ❍ Amersfoort (2)
- ❍ Utrecht (3)

Q5a Aan welke iRun trainingen heeft u meegedaan?

	wel meegedaan (1)	niet meegedaan (2)	weet ik niet meer (3)
1. zaterdag 10 maart (1)	❍	❍	❍
2. zaterdag 17 maart (2)	❍	❍	❍
3. zaterdag 24 maart (3)	❍	❍	❍
4. zaterdag 31 maart (4)	❍	❍	❍
5. zaterdag 7 april (5)	❍	❍	❍
6. zaterdag 14 april (6)	❍	❍	❍

Q5b Heeft u naast de georganiseerde trainingen nog zelf hardgelopen?

	nee (1)	ja, 1 keer (2)	ja, 2 keer (3)	ja, meer dan 2 keer (4)	weet ik niet meer (5)
In week 1 (za 10 maart - vrij 16 maart) (1)	❍	❍	❍	❍	❍
In week 2 (za 17 maart - vrij 23 maart) (2)	❍	❍	❍	❍	❍
In week 3 (za 24 maart - vrij 30 maart) (3)	❍	❍	❍	❍	❍
In week 4 (za 31 maart - vrij 6 april) (4)	❍	❍	❍	❍	❍
In week 5 (za 7 april - vrij 13 april) (5)	❍	❍	❍	❍	❍

Q6 Heeft u in de afgelopen weken tijdens of na het hardlopen last van een blessure gehad?

- ❍ Nee (1)
- ❍ Ja, maar de klachten zijn weer over gegaan (2)
- ❍ Ja, ik heb nog steeds last van een blessure (3)

Q7 Hieronder volgen enkele redenen om aan hardlopen te doen. Hoe belangrijk zijn deze redenen op dit moment voor u?

	totaal onbelangrijk (1)	enigszins onbelangrijk (2)	neutraal (3)	enigszins belangrijk (4)	heel belangrijk (5)
Ik wil mijn loopprestatie verbeteren (1)	❍	❍	❍	❍	❍
Ik wil mijn lichamelijke conditie verbeteren (2)	❍	❍	❍	❍	❍
Ik vind hardlopen leuk (3)	❍	❍	❍	❍	❍
Ik vind het leuk om nieuwe mensen te leren kennen (4)	❍	❍	❍	❍	❍
Ik wil graag afvallen en/of aan mijn figuur werken (5)	❍	❍	❍	❍	❍
Ik vind het gezellig om met anderen hard te lopen (6)	❍	❍	❍	❍	❍
Anderen hebben mij hardlopen aangeraden (7)	❍	❍	❍	❍	❍
Ik zoek op deze manier ontspanning (8)	❍	❍	❍	❍	❍

Q8 Hieronder volgen mogelijke barrieres om te gaan hardlopen. Hoe zeker bent u ervan dat het u lukt om in de volgende situaties te gaan hardlopen?

	totaal niet zeker (1)	niet zeker (2)	neutraal (3)	redelijk zeker (4)	heel zeker (5)
Als het slecht weer is (1)	❍	❍	❍	❍	❍
Als u geen zin heeft (2)	❍	❍	❍	❍	❍
Als u druk bent met andere dingen (3)	❍	❍	❍	❍	❍
Lastig met wensen van mijn gezin (partner en/of kinderen) te combineren (4)	❍	❍	❍	❍	❍
Als u moe bent (5)	❍	❍	❍	❍	❍

Q9 In hoeverre is hardlopen op dit moment een "gewoonte" voor u? Minstens 1 keer per week hardlopen is iets ...

	helemaal oneens (1)	enigszins oneens (2)	neutraal (3)	enigszins eens (4)	helemaal eens (5)
1. Wat ik automatisch doe (1)	❍	❍	❍	❍	❍
2. Wat ik doe zonder het me bewust te herinneren (2)	❍	❍	❍	❍	❍
3. Wat ik doe zonder erbij na te denken (3)	❍	❍	❍	❍	❍
4. Waar ik mee begin voordat ik me realiseer dat ik er al mee begonnen ben (4)	❍	❍	❍	❍	❍
5. Waar ik niet over hoef na te denken om mee te beginnen (5)	❍	❍	❍	❍	❍
6. Wat ik regelmatig doe (6)	❍	❍	❍	❍	❍
7. Wat ik al lang doe (7)	❍	❍	❍	❍	❍
8. Wat behoort tot mijn dagelijkse/wekelijkse routines (8)	❍	❍	❍	❍	❍
9. Wat typisch bij mij hoort (9)	❍	❍	❍	❍	❍
10. Wat ik moeilijk zou vinden om niet te doen (10)	❍	❍	❍	❍	❍
11. Wat moeite zou kosten om niet te doen (11)	❍	❍	❍	❍	❍
12. Wat me een raar gevoel zou geven als ik het niet zou doen (12)	❍	❍	❍	❍	❍

Q10 Deze vraag gaat over uw motivatie om hard te lopen. In welke mate bent u het met de volgende stellingen eens?

	helemaal oneens (1)	enigszins oneens (2)	neutraal (3)	enigszins eens (4)	helemaal eens (5)
Ik zie niet in waarom ik moeite zou moeten doen om hard te lopen (1)	❍	❍	❍	❍	❍
Ik loop hard omdat anderen vinden dat ik dat moet doen (2)	❍	❍	❍	❍	❍
Ik voel me schuldig als ik niet hardloop (3)	❍	❍	❍	❍	❍
Ik waardeer de voordelen van hardlopen (4)	❍	❍	❍	❍	❍
Hardlopen maakt een belangrijk deel uit van mijn leven (5)	❍	❍	❍	❍	❍
Ik loop hard omdat ik dat leuk vind (6)	❍	❍	❍	❍	❍
Ik zie het nut niet in van hardlopen (7)	❍	❍	❍	❍	❍
Ik voel dat mijn vrienden / familie / partner mij onder druk zetten om hard te lopen (8)	❍	❍	❍	❍	❍
Ik schaam me als ik een hardlooptraining gemist heb (9)	❍	❍	❍	❍	❍
Ik vind het belangrijk om regelmatig hard te lopen (10)	❍	❍	❍	❍	❍
Hardlopen is voor mij van grote waarde (11)	❍	❍	❍	❍	❍
Ik vind plezier en voldoening in hardlopen (12)	❍	❍	❍	❍	❍

Q11 In hoeverre maakt hardlopen deel uit van hoe u zichzelf ziet?

	helemaal oneens (1)	2 (2)	3 (3)	neutraal (4)	5 (5)	6 (6)	helemaal eens (7)
1. Ik zie mijzelf als een hardloper (1)	❍	❍	❍	❍	❍	❍	❍
2. Wanneer ik mijzelf tegenover anderen beschrijf, benoem ik meestal mijn betrokkenheid bij hardlopen (2)	❍	❍	❍	❍	❍	❍	❍
3. Ik heb vele doelen ten aanzien van hardlopen (3)	❍	❍	❍	❍	❍	❍	❍
4. Hardlopen is een centraal onderdeel van mijn zelfbeeld (4)	❍	❍	❍	❍	❍	❍	❍
5. Ik moet hardlopen om me goed over mezelf te voelen (5)	❍	❍	❍	❍	❍	❍	❍

6. Anderen zien me als iemand die regelmatig hardloopt (6)	❍	❍	❍	❍	❍	❍	❍
7. Voor mij betekent hardloper zijn meer dan alleen bewegen (7)	❍	❍	❍	❍	❍	❍	❍
8.Het zou als een verlies voelen als ik gedwongen werd te stoppen met hardlopen (8)	❍	❍	❍	❍	❍	❍	❍
9. Hardlopen is iets waar ik vaak over nadenk (9)	❍	❍	❍	❍	❍	❍	❍

Q12 Wat zijn uw gevoelens ten aanzien van hardlopen?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
1. Ik heb er plezier in - Ik haat het (1)	❍	❍	❍	❍	❍	❍	❍
2. Ik vind het interessant - Ik vind het saai (2)	❍	❍	❍	❍	❍	❍	❍
3. Ik vind het leuk - Ik vind het niet leuk (3)	❍	❍	❍	❍	❍	❍	❍
4. Het is plezierig - Het is onplezierig (4)	❍	❍	❍	❍	❍	❍	❍
5. Het is gezellig - Het is ongezellig (5)	❍	❍	❍	❍	❍	❍	❍
6. Het is aangenaam - Het is onaangenaam (6)	❍	❍	❍	❍	❍	❍	❍
7. Ik zou niets liever doen - Ik zou liever iets anders doen (7)	❍	❍	❍	❍	❍	❍	❍
8. Ik word geheel in beslag genomen door hardlopen - Ik word helemaal niet in beslag genomen door hardlopen (8)	❍	❍	❍	❍	❍	❍	❍

Q13 De volgende stellingen gaan over uw ervaring met hardlopen tijdens de iRun clinic. In hoeverre bent u het eens met deze stellingen?

	helemaal oneens (1)	oneens (2)	neutraal (3)	eens (4)	helemaal eens (5)
1. Ik heb het gevoel dat ik veel vooruitgang heb geboekt met betrekking tot het doel wat ik wilde bereiken (1)	❍	❍	❍	❍	❍
2. De manier van hardlopen bij iRun is in overeenstemming met mijn keuzes en interesses (2)	❍	❍	❍	❍	❍
3. Ik heb het gevoel dat ik succesvol ben in de activiteiten van de running clinic (3)	❍	❍	❍	❍	❍
4. Mijn relaties met de mensen met wie ik hardloop zijn erg vriendschappelijk (4)	❍	❍	❍	❍	❍
5. Ik heb het gevoel dat de manier waarop ik hardloop de manier is waarop ik dit wil (5)	❍	❍	❍	❍	❍

6. Ik heb het gevoel dat hardlopen een activiteit is waar ik goed in ben (6)	❍	❍	❍	❍	❍	
7. Ik heb het gevoel dat ik goed communiceer met de mensen met wie ik hardloop (7)	❍	❍	❍	❍	❍	
8. Ik heb het gevoel dat de manier waarop ik hardloop goed weergeeft wie ik ben (8)	❍	❍	❍	❍	❍	
9. Ik ben in staat om te voldoen aan de eisen van de running clinic (9)	❍	❍	❍	❍	❍	
10. Mijn relaties met de mensen met wie ik hardloop zijn hecht (10)	❍	❍	❍	❍	❍	
11. Ik heb het gevoel dat ik de kans heb om keuzes te maken over mijn hardloop activiteiten (11)	❍	❍	❍	❍	❍	
12. Ik voel me comfortabel bij de mensen met wie ik hardloop (12)	❍	❍	❍	❍	❍	

Q14 Onderstaande stellingen zullen u wellicht bekend voorkomen. Deze heeft u namelijk ook aan het begin van de hardloop clinic beantwoord. We zijn echter erg benieuwd in hoeverre u het NU met deze stellingen eens bent.

	helemaal oneens (1)	2 (2)	3 (3)	neutraal (4)	5 (5)	6 (6)	helemaal eens (7)
a. Ik wil graag minstens 1 keer per week hardlopen (1)	❍	❍	❍	❍	❍	❍	❍
b. Ik verwacht minstens 1 keer per week te hardlopen (2)	❍	❍	❍	❍	❍	❍	❍
c. Minstens 1 keer per week hardlopen heeft voor mij grote prioriteit (3)	❍	❍	❍	❍	❍	❍	❍
d. Of ik minstens 1 keer per week hardloop heb ik zelf in de hand (4)	❍	❍	❍	❍	❍	❍	❍
e. Minstens 1 keer per week hardlopen vind ik erg moeilijk (5)	❍	❍	❍	❍	❍	❍	❍
f. Ik ben ervan overtuigd dat ik minstens1 keer per week kan hardlopen als ik dat wil (6)	❍	❍	❍	❍	❍	❍	❍
g. Hardlopen is iets waar ik goed in ben (7)	❍	❍	❍	❍	❍	❍	❍
h. Vergeleken met anderen ben ik goed in hardlopen (8)	❍	❍	❍	❍	❍	❍	❍
i. Vergeleken met anderen doe ik veel aan hardlopen (9)	❍	❍	❍	❍	❍	❍	❍
j. Ik vergelijk mijn hardloopgedrag regelmatig met dat van anderen (10)	❍	❍	❍	❍	❍	❍	❍
k. Hardlopen doe ik meestal met tegenzin (11)	❍	❍	❍	❍	❍	❍	❍
l. Hardlopen voelt vaak	❍	❍	❍	❍	❍	❍	❍

onaangenaam (12)							
m. Als ik aan het hardlopen ben dan geniet ik er meestal van (13)	❍	❍	❍	❍	❍	❍	❍
n. Hardlopen voelt over het algemeen plezierig (14)	❍	❍	❍	❍	❍	❍	❍
o. Minstens 1 keer per week hardlopen past bij wie ik ben (15)	❍	❍	❍	❍	❍	❍	❍
p. Ik zie mijzelf als een hardloper (16)	❍	❍	❍	❍	❍	❍	❍
q. Anderen zien mij als een hardloper (17)	❍	❍	❍	❍	❍	❍	❍
r. Ik word graag beschreven als een hardloper (18)	❍	❍	❍	❍	❍	❍	❍

Q15 Tenslotte een paar laatste vragen over uw ervaring met iRun. Wat vindt u van de opbouw van de iRun clinic?

- ❍ Prima opbouw (1)
- ❍ De opbouw zou langzamer mogen (nu een te snelle toename in trainingslast) (2)
- ❍ De opbouw zou sneller mogen (nu een te langzame toename in trainingslast) (3)

Q16 Heeft u interesse in een vervolg traject, zoals een iRun clinic voor gevorderden of een clinic die naar een bepaald loopevenement toewerkt?

- ❍ Ja (1)
- ❍ Misschien (2)
- ❍ nee (3)
- ❍ Nee, ik ga voor mezelf hardlopen (4)

Q17 Hoe tevreden bent u over de volgende aspecten van iRun?

	Zeer ontevreden (1)	Ontevreden (2)	Neutraal (3)	Tevreden (4)	Zeer tevreden (5)
De inhoud van de trainingen (type oefeningen, etc.) (1)	❍	❍	❍	❍	❍
De kundigheid van de iRun instructors (2)	❍	❍	❍	❍	❍
De kwaliteit van iRun in het algemeen (3)	❍	❍	❍	❍	❍

Q18 Heeft u opmerkingen of aanbevelingen om de kwaliteit van iRun verder te verbeteren?

Q19 Als u kans wilt maken op één van de bioscoopbonnen ter waarde van €15,- vul dan hieronder uw emailadres in.

Q20 Nogmaals hartelijk dank! Omdat we ook graag willen weten hoe u over een paar maanden tegen hardlopen aankijkt, meld ik alvast dat u tegen die tijd opnieuw een uitnodiging voor een vragenlijst kunt verwachten. Uiteraard is deelname altijd vrijblijvend, en ik hoop dan ook dat u dit niet vervelend zult vinden. Hartelijke groet, Kirsten

Appendix III – Third questionnaire (T3)

Q1 Heeft u in de afgelopen 2 weken hardgelopen, en zo ja, hoe vaak? (dus in een periode van 14 dagen)

- ❍ nee (1)
- ❍ ja, 1 keer (2)
- ❍ ja, 2 keer (3)
- ❍ ja, 3 keer (4)
- ❍ ja, 4 keer of vaker (5)

Q2 Als u terugdenkt aan de afgelopen 10 weken (de periode na de running clinic), hoe vaak heeft u dan gemiddeld hard gelopen?

- ❍ helemaal niet (1)
- ❍ minder dan 1 keer per week (2)
- ❍ gemiddeld 1 keer per week (3)
- ❍ gemiddeld 2 keer per week (4)
- ❍ gemiddeld 3 keer per week of vaker (5)

Als antwoord 'helemaal niet' (1) op Q2 is geselecteerd:

Q3a Wat is voor u de (belangrijkste) reden om niet meer hard te lopen?

Als antwoord 'helemaal niet' (1) op Q2 niet is geselecteerd:

Q3b Bent u lid geworden van een loopvereniging of doet u momenteel mee aan een nieuwe (vervolg) clinic?

- ❍ nee (1)
- ❍ ja (2)

Q4 Tenslotte, wat is uw geslacht?

- ❍ Vrouw (1)
- ❍ Man (2)

Q5 En uw geboortedatum? (dd/mm/jjjj)

Q6 Nogmaals hartelijk dank voor uw deelname aan dit hardloop-onderzoek! Mocht u nog vragen hebben dan kunt u altijd mailen naar kirsten.verkooijen@wur.nl

Appendix IV – Measures and their characteristics

Table IV.1: measures, number of items, studies from which the measures were derived and internal reliability coefficients at T1.

Measure	Nr. of items	Derived from	Cronbach's α at T1
Participation motives	**8**	Ingledew et al. (2009)	
Challenge motive	1		-
Health/fitness motive	1		-
Affiliation motive	2		.80
Appearance/weight motive	1		-
Social recognition motive	1		-
Stress management motive	1		-
Enjoyment motive	1		
Intention	**2**	Jackson et al. (2003)	.81
Running identity	**4**	Sparks & Shepherd (1992)	.71

Table IV.2: measures, number of items, studies from which the measures were derived and internal reliability coefficients at T2.

Measure	Nr. of items	Derived from	Cronbach's α from literature	Cronbach's α at T2
Participation motives	**8**	Ingledew et al. (2009)	-	
Challenge motive	1			-
Health/fitness motive	1			-
Affiliation motive	2			.57
Appearance/weight motive	1			-
Social recognition motive	1			-
Stress management motive	1			-
Enjoyment motive	1			-
Intention	**2**	Jackson et al. (2003)	-	.97
Running identity	**4**	Sparks & Shepherd (1992)	-	.82
Short form Behavioural Regulation Exercise Scale (BREQ2)	**12**	Helmink et al. (2011)		
Amotivation	2		.88	.16
External regulation	2		.55	.93
Introjected regulation	2		.62	.83
Identified regulation	2		.64	.66
Integrated regulation	2		.78	.68
Intrinsic regulation	2		.84	.71
Exercise Identity Scale (EIS)	**9**	Anderson & Cychosz (1994)	.92	.90
Basic Psychological Needs in Exercise Scale (BPNES)	**12**	Vlachopoulos & Michailidou (2006)		
Autonomy	4		.84	.68
Competence	4		.81	.80
Relatedness	4		.92	.67