Wageningen University

MSc Thesis
Chair Group Communication and Innovation Studies

Behavioural determinants of university freshmen students' sport behaviour

July 2012

MSc Nutrition and Health
Specialisation Public Health Nutrition

COM-80424

Student: Ellen van Dongen
Supervisor: Dr. Marijn de Bruin

WAGENINGEN UR
For quality of life

Behavioural determinants of university freshmen students' sport behaviour

July 2012

Student:
Ellen van Dongen
880714189030

Supervisor:
Dr. Marijn de Bruin, Chair Group Communication and Innovation Studies
Wageningen University

MSc Thesis
COM-80424

MSc Nutrition and Health
Specialisation Public Health Nutrition
Wageningen University

Preface

Voor u ligt mijn masterthesis met het onderwerp '*Behavioural determinants of university freshmen students' sport behaviour*', geschreven bij de leerstoelgroep Communication and Innovation Studies als tweede afstudeeronderzoek.

In mijn master Nutrition & Health (specialisatie Public Health Nutrition) ligt de nadruk op voedingsgedrag. Een onderzoek uitvoeren op een ander aspect van gezondheidsgedrag, de lichamelijke activiteit, leek me een interessante verbreding. Aangezien ik zelf in het bestuur van Studenten Sport Vereniging SZV Aquifer (zwemmen) heb gezeten én lid ben geweest van een studentenvereniging, heb ik kunnen zien wat voor verschil kan zitten in gezondheidsgedrag van (eerstejaars) studenten. Ik wilde graag te weten komen wat de drijfveren van eerstejaars studenten zijn om te sporten en het sportgedrag (in gezonde of ongezonde richting) te veranderen als ze op de Universiteit starten. Binnen mijn masterstudie ben ik geïnteresseerd geraakt in gezondheids-voorlichting, gezondheidspromotie en daarbij horende interventies. Het leek mij een mooie aanvulling op mijn masterprogramma om een masterthesis te schrijven bij de leerstoelgroep Communication and Innovation Studies. Het was dan ook een uitdaging om te voldoen aan de werkwijze en eisen van deze leerstoelgroep, dus ik hoop dat ik er met deze thesis in geslaagd ben een interessant onderzoek en verslag af te leveren.

Ik wil graag mijn begeleider Marijn de Bruin bedanken voor zijn aanwijzingen en opbouwende kritiek op mijn onderzoek en verslag. Daarnaast wil ik Anne Marike Lokhorst bedanken omdat ze bereid is mijn tweede examinator te zijn. Tot slot gaat mijn dank naar mijn vrienden en huisgenoten, omdat ik altijd voor vragen, steun of afleiding bij hen terecht kon.

Tijdens deze thesis heb ik erg veel geleerd, met name over het zelf opzetten van een onderzoek, alle stappen die daarbij horen en het interpreteren van de resultaten. Ik hoop dat deze thesis wat meer inzicht verschaft in het sportgedrag van de Wageningse eerstejaars BSc studenten.

Ellen

Summary

Physical activity, in particular vigorous intensity exercise, is important for physical health and psychological wellbeing. Adolescents and young adults appear to be an important at-risk group for insufficient vigorous physical activity, as there seems to be a decline in physical activity as children grow older. The period of transitioning to university and starting a new life can be marked as a critical phase for adopting or abandoning an active lifestyle. Freshmen university students are therefore an interesting target group for the exploration of (determinants of) vigorous sport behaviour.

The goal of this study was to obtain insight in the sport behaviour of freshmen BSc students and the related behavioural determinants, for the following three domains: 1) general sport behaviour, 2) sport behaviour change in transition from secondary school to university, and 3) sport behaviour at the University Sports Centre (SCB). To reach this goal, an explanatory model was constructed to explain variance in sport behaviour, based on empirical and theoretical findings. Besides demographic variables, the following behavioural determinants were included in the model: attitudinal beliefs, attitudes, social influences, self-efficacy, intention, self-regulation, habit and barriers. An online questionnaire was developed, with questions on determinants and sport behaviour separately for all three domains. The questionnaire results were explored to see if the explanatory model was appropriate for predicting the three domains of freshmen student sport behaviour.

The questionnaire was completed by 109 Wageningen University freshmen BSc students. For the first two domains, determinant scales showed moderate to high internal consistency, were less reliable for determinants concerning sports at the SCB. Generally, the students practiced more than 120 minutes of vigorous sports a week. In transition from secondary school to university, a quarter of the students did not change the time they spent on sports, 41.2% of students decreased time spent on sports, while 33.9% increased minutes spent on sports at university. Furthermore, 64.2% of students owned sport rights of the SCB, and students with sport rights also sported more in general. The most important positive predictor of general sport behaviour from the explanatory model was habit. For the domain concerning transition, students that were older, had more self-regulatory skills at secondary school, and that had a stronger sport habit at university had a more positive change in sport behaviour. Applicability of the explanatory model for the domain focused on the SCB had less clear results, as only a selection of the model was used to predict the sport behaviour. Findings do suggest that students with a strong habit and positive attitude sport more at the SCB.

It can be concluded that the explanatory model was a good attempt at predicting freshmen student sport behaviour in general and in transition from secondary school to university (explaining over half of the variance in behaviour), even though in the latter domain experimental question formulations and a cross-sectional design were used. Sport habits seem to be a very important determinant for freshmen students' sports practice. Furthermore, if students have strong self-regulatory skills during adolescence, they might be better able to practice sports, even if they go through a transition.

Contents

1. Introduction

1.1 General problem statement

Physical activity is an emerging topic in the field of public health. The importance of (moderate to vigorous) physical activity for the physical and mental health is evident (Sherwood and Jeffery 2000; Kesaniemi, Danforth et al. 2001; Penedo and Dahn 2005; Haskell, Lee et al. 2007). Sufficient physical exercise is related to a lower chance of all-cause mortality, causes of cardiovascular disease (Kesaniemi, Danforth et al. 2001; Warburton, Nicol et al. 2006), all-cancer mortality (Wen, Wai et al. 2011) and a lower incidence of several (chronic) physical impairments like obesity, diabetes type II and colon cancer (Hiraoka, Nakamura et al. 1996; Kesaniemi, Danforth et al. 2001; CBS 2003). Furthermore, an active lifestyle contributes to better psychological well-being (US DHHS 1997; Fox 1999; Kesaniemi, Danforth et al. 2001; Warburton, Nicol et al. 2006), cardio respiratory fitness (WHO 2011), a longer life expectancy (Wen, Wai et al. 2011), and better quality of life (Bize, Johnson et al. 2007). Insufficient physical activity, also known as sedentariness, seems to be linked to negative health outcomes (WHO/FIMS Committee on Physical Activity 1995).

In order to monitor physical activity in the population, physical activity norms have been developed. A Dutch norm for physical activity has been created to facilitate the monitoring of activity in the Dutch population. This norm (the 'Nederlandse Norm Gezond Bewegen' or NNGB) differs between age groups, such as youth (<18 years) and adults (18 - 55 years). Besides a norm for moderate physical activity, also a norm for vigorous intensity activity ('*fitnorm*') is formulated (table 1), which is similar in all age groups. These norms focus on maintaining health and physical fitness (Wendel-Vos 2012).

Table 1; 'Nederlandse norm gezond bewegen' and 'fitnorm' (Wendel-Vos 2012).

Target group	**Moderate activity**	**Vigorous activity ('*fitnorm*')**
Youth (< 18 year)	Daily one hour moderate intense physical activity (≥ 5 METs[a]).	At least 20 minutes of vigorous intensity physical activity for at least three days a week.
Adults (18 – 55 year)	Half an hour moderate intense physical activity (≥ 4 METs), on at least five, but preferably all days of the week.	

[a] MET, Metabolic equivalent to express energy cost of activity.

The World Health Organisation (WHO) has also formulated physical activity recommendations, specifically for persons between 18 and 64 years of age (WHO 2011). Adults should engage in at least 150 minutes of moderate-intensity aerobic physical activity a week, or perform at least 75 minutes of vigorous intensity activity a week, or a combination of both. Furthermore, in order to obtain health benefits, the activities should be performed in bouts of at least 10 minutes (WHO 2011). In addition, a study of Haskell, Lee et al. (2007) showed that to ensure health, adults (18-64 years) should perform moderate intensive activity for at least 30 minutes on five days a week or vigorous intensity physical activity for at least 20 minutes on three days a week.

It seemed that vigorous intensity sports yields equal or greater health benefits for all-cause mortality than moderate intensity physical activity (Wen, Wai et al. 2011). It also seems that higher levels of physical activity have more benefits for health (US DHHS 1997). For the current study, the focus is on moderate to vigorous intensity exercise. This is high intensity physical activity that causes a raised heart rate, quickened breath and sweating (Haskell, Lee et al. 2007), which is achieved by sports practice and exercise.

A Dutch report from 2008 (Breedveld, Kamphuis et al. 2008) shows that between 2000 and 2007, there is a decline in the percentage of Dutch individuals (18 - 34 years) that meet the 'fitnorm' (from 26% to 22%). When looking at only students within the Dutch adult population, an increase is observed in the compliance to the '*fitnorm*' (28% in 2000/2001 and 44% in 2006/2007). It is however not completely clear if these findings were single observations at those time points or if this is a structural change that will continue over time. For adolescents (12 - 17 years) a decline in *fitnorm* compliance is noted between 2000 (34%) and 2007 (25%) (Breedveld, Kamphuis et al. 2008). The percentage of Dutch adults that meet the *'NNGB'* is a lot bigger and has increased in the last years (Bernaards 2010). Nevertheless, there is increasing evidence that intensive physical activities (e.g. sports) have a bigger positive effect on health than lower intensity activities (Breedveld, Kamphuis et al. 2008). Thus achieving the 'fitnorm' might be even more important than the norm for moderate intensity exercise. A study of TNO (Bernaards 2010) states that a big part of the Dutch population is not active enough to maintain good health. Almost half of youngsters aged 12 - 21 do not engage in vigorous activity (US DHHS 1997).

Research from the Central Bureau for Statistics (CBS) shows that Dutch children engage relatively much time in sports-exercise until they are 18. The time spent on sports and exercise decreases after their 18th year, which is partly explained by the fact that more interest goes to going out (CBS 2003). The structured type of physical education, as students receive during secondary school, is no longer there at university (Leslie, Sparling et al. 2001). Of Dutch children aged 12 - 17 year, about 80% practices sports for at least one hour a week, while 60% of youngsters aged 18 – 24 year does this. Young adults older than 25 year spend even less time on sports (CBS 2003). CBS data from 2010 shows that adolescents aged 16 - 20 spent on average 265 minutes a week on sports, while in young adults this was decreased to 206 minutes a week (CBS 2012). Data from the SCP (social cultural planning bureau) also showed a big decline in hours spent on sports and activity from the age of 20 years and onwards (Breedveld 2005). Whereas 68% of adolescents (12-19 year) practiced sports (on average 9.3 hr/week), only 49% of individuals 20 - 34 years practiced sports (on average 5.4 hr/week) in 2005. In general there seems to be a decline in physical activity as people grow older (Gordon-Larsen, Nelson et al. 2004). This decline starts in late adolescence and continues into early adulthood (Leslie, Sparling et al. 2001; Gordon-Larsen, Nelson et al. 2004; Crombie, Ilich et al. 2009) and is especially sharp during adolescence (US DHHS 1997).

1.2 Transition from secondary school to university

Previously discussed findings show that young adults might be an important at-risk group for being not sufficiently intensively active to remain good health. Especially the transition from late adolescence to young adulthood, the period where adolescence start college for example, appears o be an important period for physical activity change. A review from Keating, Guan et al. (2005) states that 30 – 50 % of college students do not engage in adequate levels of physical activity to ensure health benefits, which they state as a major concern. A study in English students showed that 70% of the participating students did not meet the physical activity guidelines (Dodd, Al-Nakeeb et al. 2010). This is consistent with the review of Crombie, Ilich et al. (2009), which states that college students do not meet the recommended levels of physical activity. Irwin (2007) found that that 65% of students from two American universities did not meet the physical activity recommendations for health. An Australian study found that 40% of participating students were not sufficiently active to reach long-term health benefits (Leslie, Owen et al. 1999).

Taking the above findings into account, there is an indication that students in transition from secondary education to university should be considered an important at-risk group for health (Bray and Kwan 2006), as this is a critical phase in an adolescents life. During this phase, their life is subject to a lot of changes (Arnett 2000; Leslie, Sparling et al. 2001; Strong, Parks et al. 2008), mainly regarding existing relationships with family and friends and increased independence (Lau, Quadrel et al. 1990; Bray and Kwan 2006; Doerksen, Umstattd et al. 2009). Also, negative lifestyle changes are associated with this period (Baranowski, Cullen et al. 1997; Strong, Parks et al. 2008), concerning dietary habits, alcohol consumption, and physical activity (Bray and Born 2004; Racette, Deusinger et al. 2005). The stress caused by the transition to university (Arthur and Hiebert 1996) makes it likely that health behaviour change (Childers, Haley et al. 2011), also because those behaviours get a lower priority in the busy student life (Nelson, Kocos et al. 2009). A decrease in physical activity in this transition can lead to negative health consequences for this student population (Bray and Kwan 2006). University students spend more time studying and sitting behind a computer; practicing sports is not part of their daily routine (Strong, Parks et al. 2008).

Numerous studies on physical activity in college students support these assumptions about transitioning students. International (cross-sectional) research showed that there is a relatively big decline in (intensive) activity in the free time, in students that transition from secondary education to university (Leslie, Owen et al. 1999; Kilpatrick, Hebert et al. 2005). In a Canadian retrospective study it was found that 66% of the students was sufficiently active during the last eight weeks of high school, while only 44% was sufficiently active during the first eight weeks of university (Bray and Born 2004). Studies among Spanish students that stopped being physically active, found that almost half of them stopped practicing sports because they started university (Gómez-López, Granero-Gallegos et al. 2011; Romaguera, Tauler et al. 2011). Han, Dinger et al. (2008) found that physical activity in American women decreased significantly during the transition from high school to university, especially during the summer between the two educations.

A decline in vigorous physical activity during freshmen year may have several short- and long-term physical and mental health implications (Bray and Born 2004). Insufficiently active (freshmen) students had a double change to visit the doctor for illness-related matters, had less good psychological well-being (Bray and Kwan 2006), and a less positive mood in transition compared to active students (Bray and Born 2004). Due to the increase in sedentary behaviour and decrease in physical activity (Strong, Parks et al. 2008), the transition is a critical period for increased bodyweight (Anderson, Shapiro et al. 2003; Jung, Bray et al. 2008; Crombie, Ilich et al. 2009), the so-called 'freshmen fifteen'. This refers to a fifteen pound (seven kg.) increase in bodyweight in the freshmen year, even though in a number of studies on average a weigh increase of two kg. was observed (Anderson, Shapiro et al. 2003; Crombie, Ilich et al. 2009). Nevertheless, even a small increase in body weight can be important for health, especially if it lasts in the following years (Crombie, Ilich et al. 2009).

As the period of university enrolment is a critical period for the adoption of health behaviour patterns, the university may be the best setting for establishing long-term health behaviour patterns (Nelson, Kocos et al. 2009; Romaguera, Tauler et al. 2011), e.g. on physical activity (Leslie, Sparling et al. 2001; Kwan, Bray et al. 2009; Molina-García, Castillo et al. 2009). Adolescent sedentary behaviour should be prevented by maintaining a physical activity habit all through the school years (US DHHS 1997). This activity behaviour should be established as an automatic behaviour early in life, so it will persist into adulthood (Aarts, Paulussen et al. 1997; Arnett 2000; Gyurcsik, Bray et al. 2004; Molina-García, Castillo et al. 2009), and reduce the risk on physical inactivity and obesity (Racette, Deusinger et al. 2005). Therefore, focussing on transitioning freshmen students as targets for healthy physical activity behaviour interventions is very promising. These students are readily accessible (Racette, Deusinger et al. 2005) and have a lot to gain in terms of health and staying active (Bray and Born 2004). New lifestyles will be adopted during the transition, so this offers good opportunities for promoting healthy lifestyles among students (Leslie, Sparling et al. 2001; Rovniak, Anderson et al. 2002; Doerksen, Umstattd et al. 2009; Wang, Ou et al. 2009), instead of students adopting a pattern of inactivity that could continue all trough university and beyond (Leslie, Owen et al. 1999; Bray and Born 2004).

1.3 General objectives

Quite a lot of research has been performed on determinants of physical activity behaviour, also in students. Nevertheless, the determinants of sports behaviours specific for Dutch freshmen students are unknown, for most studies are either conducted in a wide (more study-years) student sample or in other countries and university settings (e.g. university campus in Australia). Differences in cultures and environments might lead to different socio-cognitive factors that determine exercise behaviour.

Furthermore, it is not yet known which factors influence sport behaviour during the transition from high school to university (Doerksen, Umstattd et al. 2009). Understanding these factors can provide insight into reasons why leisure-time physical activity decreases during this transition-phase (Bray and Born 2004; Bray and Kwan 2006; Kwan, Bray et al. 2009). This is also necessary to

effectively intervene with these mediators to ensure a healthy physical activity level during transition (Bray and Born 2004) in freshmen students (Strong, Parks et al. 2008), and to help the university institution to guide and diversify their offer of different physical activity possibilities (Wang, Ou et al. 2009). The university environment is the setting for forming new social networks and building or breaking lifestyle habits. Students can either adopt a new healthy lifestyle, continue on the right path or discard healthy habits, which might be closely linked with their new social network. The role of the college environment in the adoption of new health behaviours in transition is thus a point of interest (Racette, Deusinger et al. 2005), and more specifically the attractiveness of sports facilities and barriers to use available facilities (Leslie, Owen et al. 1999). It is interesting to obtain information on factors determining the student sport behaviour at the Wageningen University Sports Centre (SCB), which might help in engaging freshmen students to sport at the SCB.

In order to obtain insight in the above mentioned aspects, three general study objectives have been formulated:

1. Obtain insight in the general sport behaviour and the determinants of sport behaviour of Wageningen University freshmen students.

2. Obtain insight in the sport behaviour in transition and the determinants of changing the physical activity behaviour of students transitioning from secondary education to Wageningen University.

3. Obtain insight in the sport behaviour at the university Sports Centre and the determinants of sport behaviour at the University Sports Centre of Wageningen University freshmen students.

2. Theoretical framework

Multiple studies have found that sufficient (vigorous) physical activity is associated with a lower risk on premature death by all-causes (Wen, Wai et al. 2011) and cardiovascular disease (Kesaniemi, Danforth et al. 2001; Warburton, Nicol et al. 2006). Besides that, it is also associated with a lower incidence of obesity, diabetes type II, colon cancer, osteoporosis and risk factors for cardiovascular diseases such as high blood pressure (Hiraoka, Nakamura et al. 1996; Kesaniemi, Danforth et al. 2001; CBS 2003). In addition to these physical effects, an active lifestyle is also linked to less mental problems (Fox 1999; Warburton, Nicol et al. 2006), such as depression (Kesaniemi, Danforth et al. 2001) and symptoms of depression and anxiety (US DHHS 1997). Furthermore, sufficient (vigorous) exercise leads to a better cardiorespiratory- and muscle fitness, and active persons have a better weight balance and body composition (WHO 2011). Cross-sectional studies have found a positive association between physical activity and health-related quality of life. This quality of life encompasses the perceived health, a combination of well-being, the ability to function properly on physical, intellectual and emotional field and being able to participate in social activities (Bize, Johnson et al. 2007). Besides above mentioned physical and mental health consequences, a sufficient amount of physical activity is also necessary for achieving an energy-balance to manage the bodyweight (Sherwood and Jeffery 2000; Daniels, Arnett et al. 2005).

Because of all beneficial consequences of being physically active, the RIVM stresses the importance of regular exercise and being active in daily life (Renders, Seidell et al. 2002; Schrijvers and Schoemaker 2008). Furthermore, physical inactivity should be reduced simultaneously (Renders, Seidell et al. 2002; Visscher, Kremers et al. 2007). Also, there is reason to believe that changing health behaviours, such as increasing physical activity, can have a positive influence on other health-related behaviours, such as smoking or dietary habits (Sherwood and Jeffery 2000). Romaguera, Tauler et al. (2011) found that Spanish students that were physically active, ate more fruit and were less often smokers than students that were inactive. Other results from this study were that active students spent less time behind a computer (men) or television (women), and active women drank less alcohol than inactive female students. To what extent this positive influence of physical activity works on other health behaviours in young adults is however not completely clear (Leslie, Sparling et al. 2001).

2.1 Behavioural determinants

In order to obtain insight in the underlying mechanism of student sport behaviour, the determinants of behaviour are an important part of this study. Because physical activity is a dynamic process (Hoeyman, Melse et al. 2010), each individual transitions trough different phases in life, each phase with its own determinants (Sherwood and Jeffery 2000). Different subgroups in a population have different barriers and preferences (Sallis, Prochaska et al. 2000; Sherwood and Jeffery 2000), and other correlates for physical activity (De Bourdeaudhuij and Sallis 2002). Determinants of physical

activity can be socio-demographic, psychosocial and environmental factors (Trost, Owen et al. 2002; Hoeyman, Melse et al. 2010), which can influence exercise behaviour both individually and combined. Because there is such an abundance of studied determinants of exercise behaviour (Sherwood and Jeffery 2000; Keating, Guan et al. 2005), predicting exercise behaviour is a complex process (Sherwood and Jeffery 2000).

In this chapter, first findings of empirical studies and reviews on factors that associate with (student) physical activity will be discussed. Subsequently, the factors found in those studies will be placed within their corresponding theoretical models and frameworks. These findings will be the foundation of the preliminary explanatory model of physical activity behaviour in freshmen students.

2.1.1 Empirical studies

For there is a wide array of possible determinants available, the key determinants of behaviour change were defined in two articles, by expert consensus from an overview of behaviour change studies (Fishbein, Triandis et al. 2001; Michie, Johnston et al. 2008). In this part of the study, all determinants that were found related to physical activity in empirical studies were placed within one of those key determinants. In the end, the following key determinants were found applicable to the topic of this study: anticipated outcomes/attitudes (or beliefs about consequences), social influences (or norms), self-efficacy (or beliefs about capabilities), intention (or goals), self-regulation (or action planning/decision processes), and environmental constraints (barriers). Habits and demographic variables were added to this list of behavioural determinants. Below, empirical findings are discussed for each determinant, starting with demographics, following with the key determinants and ending with the added determinant habit.

Demographic factors – Firstly, besides psychosocial, cognitive or environmental determinants, also demographic factors can play a role in determining physical activity behaviour. A lot of empirical studies found that determinants were influenced by gender (Sallis, Prochaska et al. 2000; Bauman, Sallis et al. 2002; De Bourdeaudhuij and Sallis 2002; Tergerson and King 2002; Trost, Owen et al. 2002; Kilpatrick, Hebert et al. 2005; Molina-García, Castillo et al. 2009; Leggett, Irwin et al. 2011), and age (Sallis, Prochaska et al. 2000; Bauman, Sallis et al. 2002; Trost, Owen et al. 2002). Furthermore, aspects such as (over)weight (Sherwood and Jeffery 2000; Trost, Owen et al. 2002) and Socio-Economic status/education (Sallis, Hovell et al. 1992; Bauman, Sallis et al. 2002) could influence the physical activity behaviour. These latter factors have not been extensively used in studies so far.

Anticipated outcomes – In order to adopt a regular active lifestyle, an individual should perceive that the benefits of exercise (e.g. managing bodyweight, other positive health consequences, better emotional wellbeing) outweigh the costs (Sherwood and Jeffery 2000). Individuals that perceive few barriers to physical activity and have high enjoyment are in general more active, and vice versa (Salmon, Owen et al. 2003). This was also found in a study in undergraduate students, where the regularly exercising students perceived more benefits and less barriers to exercise than non-exercisers did (Grubbs and Carter 2002). Thus, perceived barriers to exercise are a more important influence on regular exercise habits in undergraduate students, than the benefits of exercise (Grubbs and Carter

2002). A large part of the retrieved studies focussed on benefits and barriers of physical activity. These determinants are however highly similar to outcome expectancies, whereas benefits are positive outcome expectancies and barriers can be seen as negative outcome expectancies. This will be further discussed in the section about the theoretical models (TPB). For practical reasons, terms barriers and benefits will be used discussing empirical studies.

Barriers can be described as factors that prevent an individual from engaging in exercise (Sallis, Hovell et al. 1992). A review of Sherwood and Jeffery (2000) assessed behavioural determinants of exercise in a general population. Lack of time and lack of access to facilities were found to be the biggest barriers for physical activity. Barriers showed a lack of association in a review on adolescent physical activity (Sallis, Prochaska et al. 2000), but were consistently negatively associated with adult physical activity in two other reviews (Bauman, Sallis et al. 2002; Trost, Owen et al. 2002) and with 16 – 25 year old male moderate and vigorous exercise (De Bourdeaudhuij and Sallis 2002). The barriers that were most often found negatively related to physical activity were lack of time (De Bourdeaudhuij and Sallis 2002; Tergerson and King 2002; Ebben and Brudzynski 2008; Nelson, Kocos et al. 2009; Romaguera, Tauler et al. 2011), lack of motivation (De Bourdeaudhuij and Sallis 2002; Tergerson and King 2002; Gyurcsik, Spink et al. 2006; Ebben and Brudzynski 2008; Romaguera, Tauler et al. 2011), laziness/no energy (Tergerson and King 2002; Gyurcsik, Spink et al. 2006; Ebben and Brudzynski 2008; Romaguera, Tauler et al. 2011), and several external obstacles (De Bourdeaudhuij and Sallis 2002; Gyurcsik, Spink et al. 2006; Ebben and Brudzynski 2008). Other barriers related to physical activity were health barriers (De Bourdeaudhuij and Sallis 2002; Gyurcsik, Spink et al. 2006), too much school work (Ebben and Brudzynski 2008), other priorities (Tergerson and King 2002; Ebben and Brudzynski 2008), and no work-out partner (Romaguera, Tauler et al. 2011). In a qualitative study among freshmen and sophomore American students it was shown that 'lack of time' was one of the causes that students prioritized things like studying, eating easy meals, and sleeping over exercising (Nelson, Kocos et al. 2009).

Expected and perceived benefits showed a consistent positive association with (young) adult physical activity (Bauman, Sallis et al. 2002; De Bourdeaudhuij and Sallis 2002). Competition was most important for the males, while females perceived health benefits to be the most important (De Bourdeaudhuij and Sallis 2002). Most important benefits (or positive outcome expectancies) for physical activity were enjoyment (Leslie, Owen et al. 1999; Kilpatrick, Hebert et al. 2005; Ebben and Brudzynski 2008; Romaguera, Tauler et al. 2011), staying in shape (Tergerson and King 2002; Kilpatrick, Hebert et al. 2005; Ebben and Brudzynski 2008), and performance/competition (Tergerson and King 2002; Kilpatrick, Hebert et al. 2005). Also, benefits of physical activity were health (Ebben and Brudzynski 2008; Romaguera, Tauler et al. 2011), endurance (Kilpatrick, Hebert et al. 2005; Ebben and Brudzynski 2008) and stress reduction (Tergerson and King 2002; Ebben and Brudzynski 2008).

Social influence – Reviews stated that social support from friends, peers, and family were important correlates of adult physical activity (Sherwood and Jeffery 2000; Bauman, Sallis et al. 2002; Trost, Owen et al. 2002) and adolescent physical activity (Sallis 2000). Peer modelling of physical

activity, perceived support from peers and subjective norms showed no or indeterminate associations with adolescent activity (Sallis, Prochaska et al. 2000). However, friends do seem to play an important role in young adults' physical activity motivation and behaviour (De Bourdeaudhuij and Sallis 2002), in terms of having encouraging friends and friends to exercise with for high school students (Tergerson and King 2002). Australian university students receiving a lot of social support from family and friends were more likely to be sufficiently active (Leslie, Owen et al. 1999) and American students noted insufficient social support as a barrier to exercising (Nelson, Kocos et al. 2009). Also, having a high number of friends that are active and having strong parental encouragement of physical activity were strong predictors of high school students' physical activity (Leggett, Irwin et al. 2011). This indicates that preferably people should exercise with others and that emphasis should be placed on the social aspect of physical activity.

Self-efficacy - Self-efficacy refers to individuals' beliefs of ones capability to regularly perform a certain behaviour (Noar and Zimmerman 2005) under different circumstances. A review of Sherwood and Jeffery (2000) stated that self-efficacy for exercise was the strongest and most consistent predictor of exercise behaviour. This determinant was also shown to be consistently positively associated with physical activity in (young) adults (Bauman, Sallis et al. 2002; Rovniak, Anderson et al. 2002; Trost, Owen et al. 2002). Besides that, this relation was also found for self-efficacy and moderate and vigorous activity in youngsters aged 16 - 25 (De Bourdeaudhuij and Sallis 2002), university students (Leslie, Owen et al. 1999), and adolescents (Winters, Petosa et al. 2003). Doerksen, Umstattd et al. (2009) found self-efficacy to be significantly related to only vigorous intensity exercise in university freshmen. In adolescents, self-efficacy had an indeterminate association with physical activity, while perceived competence showed a positive association (Sallis, Prochaska et al. 2000). The strongest predictor for self-reported physical activity in Canadian high school students was having a strong perception of one's athletic ability, or so called self-efficacy or perceived physical activity competence (Leggett, Irwin et al. 2011).

Self-regulation – The process of self-regulation consists of self-monitoring, judgemental processes and self-reactions (Bandura 1998), and regulates the goal-directed behaviour (Winters, Petosa et al. 2003). Self-regulation was significantly positively associated with both moderate and vigorous intensity exercise frequency in American High School students (Winters, Petosa et al. 2003). Rovniak, Anderson et al. (2002) found that self-regulation directly predicted university students' physical activity and mediated between self-efficacy and the activity behaviour. On the other hand, a study of de Bruin, Sheeran et al. (2012) found that self-regulation mediated between intention and exercise behaviour in an adult sample.

Intention – Intention represents the extent to which an individual is planning to conduct a certain behaviour (Fishbein, Triandis et al. 2001; Noar and Zimmerman 2005), and can be seen as a consequence of the motivation an individual has to perform that behaviour (Michie and Johnston 2005). In a review of Bauman, Sallis et al. (2002), intention to exercise was stated as a repeatedly positive associate of adult physical activity. Physical activity goals were significant predictors of university freshmen vigorous physical activity (Doerksen, Umstattd et al. 2009). A study in American

students found that intention was the only significant predictor of physical activity (behaviour measured one week after the survey on determinants). The constructs affective and instrumental attitudes, and perceived behavioural control were predictors of the intention to be physically active (Blanchard, Fisher et al. 2008). Lack of motivation to exercise was found to keep American students from exercising (Nelson, Kocos et al. 2009), which indicates the importance of exercise motivation.

Environmental constraints – One of the strongest predictors of physical activity in Canadian high school students was living in an urban setting (Leggett, Irwin et al. 2011). With regard to environmental variables, male activity seemed to be associated with participation in sports competition, while female activity was predicted by being member of a sports club. Leslie, Owen et al. (1999) found that sufficiently active university students were more aware of the facilities on campus and were gym-members. A review of determinants of adult physical activity found that perceived access to facilities had a repeatedly documented lack of association (Bauman, Sallis et al. 2002). However, another review found that the physical environment factors having exercise equipment at home, access to facilities, and satisfaction with recreation facilities were important predictors of adult physical activity (Trost, Owen et al. 2002). In American students, the weather and the perception of the gym being intimidating and overcrowded were factors that hindered them to exercise (Nelson, Kocos et al. 2009).

Habits – Most studies have focussed on the reasoned nature of exercise behaviour, and less on the role of habits in exercise and the fact that past behaviour can also influence future behaviour directly (Aarts, Paulussen et al. 1997). Habits thus have a history of repetition, and the more often we engage in a certain behaviour, the more likely it is to become a habit (Aarts, Paulussen et al. 1997; Verplanken and Orbell 2003; Verplanken and Melkevik 2008). The cumulative effect of repeated exercise is what makes it beneficial for health (Verplanken and Melkevik 2008), thus an automaticity aspect of exercise must be emphasized in research (de Bruijn and Rhodes 2011).

Most empirical studies focussed on habits in terms of past behaviour, and not in terms of automaticity. In adolescents, previous physical activity participation in community sports was a consistent positive predictor of physical activity (Sallis, Prochaska et al. 2000), while sedentary behaviour after school or in the weekend was found to be repeatedly negatively associated with adolescent physical activity. In adults, activity history during adulthood and adolescence was repeated positively associated with physical activity (Bauman, Sallis et al. 2002; Molina-García, Castillo et al. 2009), whereas activity history during childhood showed a lack of association (Bauman, Sallis et al. 2002). Past exercise behaviour was an important predictor of current activity behaviour (Trost, Owen et al. 2002), regardless of whether a person had a positive intention to be physically active (Kwan, Bray et al. 2009).

2.1.2 Theories

Theories are useful for placing the determinants of sport behaviour into a model, with a focus on behaviour (change). Three theories will be discussed; Theory of Planned Behaviour, Social-Cognitive

Theory and the Ecological model. These models were found to be most applicable to student sport behaviour based on findings from previously described literature findings. What must be taken into account, is that not all significant correlates of physical activity are part of a theory.

Theory of Planned Behaviour - According to the Theory of Planned Behaviour (TPB, figure 1), behaviour is directly predicted by an individual's intention to perform that behaviour, but also by the control an individual perceives to have over that behaviour (perceived behavioural control). Intention is predicted by three variables; behavioural attitudes, subjective norms and the perceived behavioural control (Ajzen 1991).

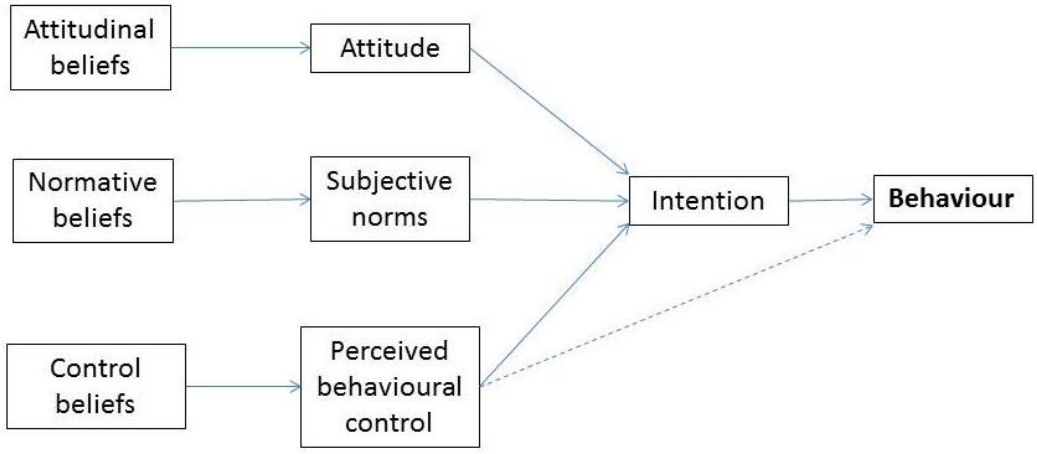

Figure 1; Theory of Planned Behaviour.

If the attitude for a behaviour is positive, the advantages of performing that behaviour will outweigh the disadvantages (Fishbein, Triandis et al. 2001). Attitudes are determined by beliefs regarding a specific behaviour, the so called attitudinal/behavioural beliefs (Ajzen and Madden 1986; Ajzen 2002). These outcome expectancies about the expected (positive or negative) consequences of a behaviour can thus be either a positive or negative motivator for that behaviour (Ajzen 1991). If an individual perceives that performing a behaviour will lead to a desirable outcome, it is more likely that the behaviour will be performed (Winters, Petosa et al. 2003). As mentioned before, many studies focus on perceived benefits and barriers of performing a behaviour, such as physical activity. Where benefits are similar to positive outcome expectancies, barriers are not necessarily similar to negative outcome expectancies (Williams, Anderson et al. 2005). Barriers are factors that prevent behaviour, and are not consequences of the behaviour. It must however be noted that there is a link between the two concepts, because the influence of a barrier on a behaviour is often due to anticipation on expected negative consequences (Williams, Anderson et al. 2005). The subjective norms refer to the social pressure an individual perceives to do or do not perform a specific behaviour (Ajzen 1991). Normative beliefs encompass the likelihood to which friends and family (significant others) would disapprove or approve of performing a certain behaviour (Ajzen and Madden 1986; Sallis, Hovell et al. 1992). The perceived behavioural control reflects the confidence an individual has about its capability to perform a specific behaviour (Ajzen 2002). This perception is composed of past experiences and anticipated

obstacles or difficulties (Ajzen 1991), the control beliefs. It usually contains both self-efficacy and controllability items (Ajzen 2002).

In general, the more positive the attitude and subjective norm are, and the greater the perceived behavioural control, the stronger an individual's intention to perform the behaviour should be. The specific influence of the separate predictors is not the same in all situations or for all behaviours (Ajzen 1991). Although prominent researchers state intention to be the most important predictor of a future behaviour (Fishbein, Triandis et al. 2001), a positive intention does not always lead to performance of the behaviour (Webb and Sheeran 2006).

Social Cognitive Theory - The Social Cognitive Theory *(SCT)*, developed by Bandura (1989) is one of the widely used models for developing interventions on physical activity (Marcus, Forsyth et al. 2000). The SCT focuses on the reciprocal interplay between personal factors, the environment and the behaviour (figure 2) (Bandura 1989). Personal factors are cognitions, such as attitudes, outcome expectancies, skills, and perceived self-efficacy. The environmental factors include aspects from the environment, both social and physical, that can help or hinder a specific behaviour. These factors are for example social support or availability of resources (Bandura 1989), because for example the ideas of individuals' immediate, social environment are influencing an individual's attitudes, skills, and beliefs (Molina-García, Castillo et al. 2009). Both personal and environmental constructs are predictors for health behaviours, such as physical activity behaviour (Rovniak, Anderson et al. 2002).

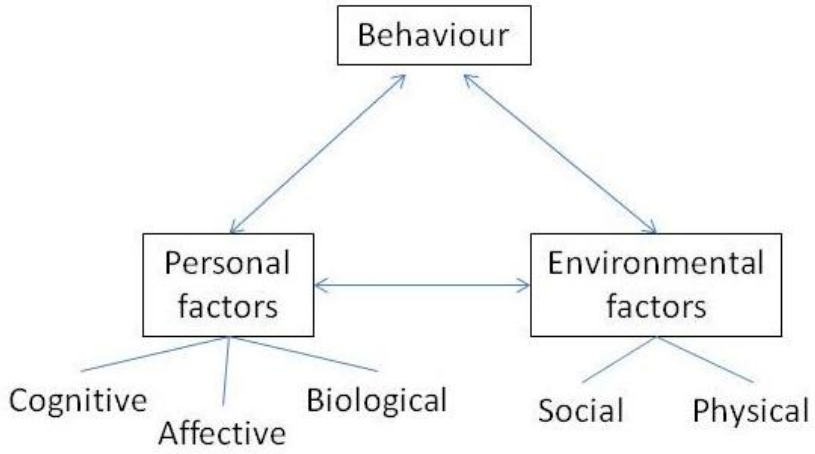

Figure 2; Social Cognitive Theory.

Self-efficacy is determined by a combination of internal and external aspects, such as former achievements and perceived physical abilities (Renders, Seidell et al. 2002). The strength of one's self-efficacy is determined by the extent to which an individual perceives to have control over the behaviour (Ajzen 1991; Fishbein, Triandis et al. 2001) and by the self-confidence of the individual (Michie and Johnston 2005). The use of skills and height of the goals an individual sets for itself are influenced by the beliefs about its own control capabilities (Bandura 1998). Even if a person is aware of the benefits of being active, a low self-efficacy can keep them from actually engaging in such behaviours (Patterson, McGeough et al. 2006).

Self-regulation is a very important part of the SCT. The self-regulatory processes (monitoring behaviour, judging against standards and following with behaviour attainment or formation of new goals) are essential for the maintenance of an active lifestyle (Bandura 2004). Individuals that believe they can be physically active will be likely to implement these self-regulatory processes to become and maintain active (Bandura 2004). Goals are in fact proximal intentions, that regulate effort and guide action (Bandura 1998). The SCT incorporates the need to form goals, self-evaluate and build resilience to overcome difficulties in the performance of a behaviour (Bandura 1998).

Outcome expectancies in the SCT are similar to outcome expectancies as used in the TPB, with a distinction in physical, social and self-evaluative outcomes (Bandura 2004). Social support is an example of a social facilitator. Support refers to the frequency in which others encourage, exercise with or offer to exercise with an individual (Sallis, Hovell et al. 1992).

Ecological model - The ecological model for determinants of health behaviour places the individual in an environment, and takes environmental factors into account that can influence the behaviour besides personal and behavioural variables (Gyurcsik, Spink et al. 2006). Considering the new university setting and the University Sports Centre as influence on the sport behaviour of transitioning students, this model seems important. In research, two types of categorizing models have been used to classify the barriers to (vigorous) activity. Firstly, the widely used two-dimensional model has two categories; internal and external factors. Internal factors are factors related to the person (e.g. motivation, self-consciousness), while external factors encompass things like outside of the person, such as social environment (Allison, Dwyer et al. 1999). The second model type is the multi-dimensional ecological approach, consisting of the categories intrapersonal factors, interpersonal factors, institutional factors, community factors, public policy and physical environment (McLeroy, Bibeau et al. 1988; Gyurcsik, Bray et al. 2004). These categories can also be used to classify barriers that transitioning students can relate physical activity. Intrapersonal barriers are personal characteristics, e.g. lack of motivation or illness. Interpersonal barriers relate to formal and informal social networks, e.g. lack of friend support or social invitations during workout time. Institutional barriers have to do with the social institutions, such as opening-hours of sport facilities and too high workload. The community barriers take place between organisations and institutions, such as limited opportunities to be vigorously active or lack of transportation. The public policy obstacles refer to laws and policies that can obstruct behaviour. Finally, the physical environment includes other barriers that were not incorporated in any of the previous categories, such as bad weather (McLeroy, Bibeau et al. 1988; Gyurcsik, Bray et al. 2004).

Determinants of transition - Previously discussed determinants have shown to be important in predicting current or future physical activity behaviour. However, the focus of this study is also on physical activity behaviour in transition. Although studies on determinants of physical activity in transitioning students are rare, there are indications that a lot of the behavioural determinants

discussed on general sport behaviour might also be important in explaining sport behaviour in transition. According to Ajzen (1991), if all (internal and external) factors that determine a behaviour are known and stable, the past behaviour would be the best predictor of future behaviour. This is obviously not the case in transitioning students, for external determinants are likely to change because the student moves to a different environment. On the other hand, while in a study of Kwan, Bray et al. (2009) the applicability of the TPB for predicting physical activity in a transition phase was not convincing, the behaviour that students performed at the end of high school could be an important determinant of sports behaviour during university. A past of physical activity should positively influence the activity behaviour, by shaping a self-efficacy for exercise and by the development of skills (Sherwood and Jeffery 2000). This provides a foundation for including a habit aspect in this study, as transition to university is a time where habits can be built of broken. Habits are very important for the initiation of exercise or the adherence to exercising (Verplanken and Melkevik 2008), which is of high relevance for the exercise pattern through transition.

Most freshmen students move away from their parents to their university city when they start their study. Lau, Quadrel et al. (1990) stated that the time when children leave their parents' home and begin to live on their own is one of the periods of vulnerability. In that period, children are open to influence from socializing agents in the new environment, other than their parents, who were the main influence in the time before transition (Lau, Quadrel et al. 1990). Changes in health behaviour (such as exercise) can be explained by other socializing agents, which are mostly peers at university. They mainly influence individuals' health behaviour through direct modelling not mainly via sharing of health/exercise beliefs (Lau, Quadrel et al. 1990). Abandoning a healthy lifestyle, also in transitioning students, is mainly caused by external barriers, in particular a lack of time (Gómez-López, Granero-Gallegos et al. 2011). As hardly any studies on physical activity and transition were found, findings from a study concerning change in exercise patterns were studied. One study looked at psychological, physiological, social and physical environmental determinants of change/maintenance in vigorous physical activity behaviour in an adult population (Sallis, Hovell et al. 1992). Exercise self-efficacy and physical exercise history were found to be the two significant predictors (respectively positive and negative) of vigorous adoption in (Sallis, Hovell et al. 1992).

2.1.3 Explanatory model

A lot of previously discussed studies on determinants of physical activity behaviour focused not solely on one of the behavioural theories, but combined factors from several models. Using just one theory to explain a complex behaviour such as physical activity is not realistic (Noar and Zimmerman 2005). It is however, not really realistic to use all variables that have empirical support to create a new, complex theory. Therefore an empirically and theoretically founded selection of behavioural determinants is combined to form a preliminary explanatory model (figure 3). This model shows the most important determinants for freshmen students' sport behaviour. This model is also assumed to predict sport behaviour change in transition from secondary school to university. Additionally, it is

assumed that a selection of these factors is also important in determining student sports behaviour at the University Sports Centre.

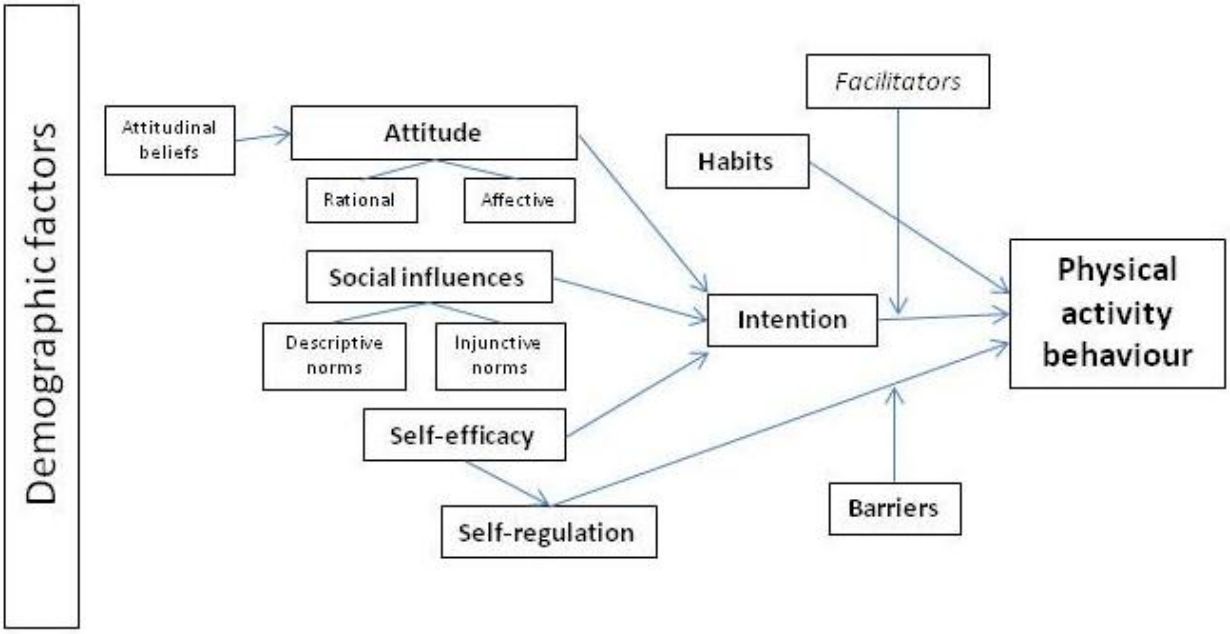

Figure 3: Preliminary explanatory model of correlates of physical activity in freshmen students.

As can be seen, physical activity behaviour is assumed to be directly predicted by habits, intention and self-regulation. Habits are assumed to influence the behaviour directly, as habitual behaviours don't use cognitive pathways but are performed automatically (Aarts, Paulussen et al. 1997). Derived from the TPB, intention is assumed to be predicted by attitudes, social influences and self-efficacy (Ajzen 1991), the latter showing similarities with Perceived Behavioural Control. Self-regulation mediates between self-efficacy and the sport behaviour (Rovniak, Anderson et al. 2002), and its effect on physical activity is influenced by perceived barriers. These barriers include also the determinant 'environmental constraints'. The only beliefs included in the model are attitudinal beliefs (or outcome expectancies), for their association with physical activity is widely proven in research. Of course, demographic factors are also presented in the model, to account for possible influence on all determinants and the physical activity behaviour.

2.2 Specific objectives

This study aims to test the developed theoretical model of physical activity behaviour in freshmen Wageningen University students. This study aim has been split into six separate study objectives, two for each of the following domains: 1) general sport behaviour, 2) sport behaviour change in transition and 3) sport behaviour at the University Sports Centre.

1. General sport behaviour

1.1 Find out what the current sport behaviour of Wageningen University freshmen students is, in minutes spent on sports, days sported and type of sports.

1.2 Find out what combination of the behavioural determinants attitudinal beliefs, attitude, social influence, self-efficacy, self-regulation, intention, habit and barriers best predicts current vigorous sport behaviour of Wageningen University freshmen BSc students (to test the preliminary explanatory model for freshmen sport behaviour).

2. Sport behaviour in transition

2.1 Find out how Wageningen University freshmen students' sport behaviour has changed in transition from secondary school to university.

2.2 Find out what combination of the transition specific behavioural determinants attitude, social influence, self-regulation, self-efficacy and habit best predicts sport behaviour change during transition from secondary school to Wageningen University.

3. Sport behaviour at University Sports centre

3.1 Find out what the sport behaviour of Wageningen University freshmen students is at the University Sports Centre, in minutes spent at the sports centre, days sported and type of sports.

3.2 Find out what combination of Sports Centre specific behavioural determinants attitudinal beliefs, attitude, descriptive norm and habit best predicts the sport behaviour at the University Sports Centre.

3. Methods

In order to reach the study objectives, a questionnaire was developed, pre-tested, data was collected and data analysis was performed. Used methods in this study are discussed below.

3.1 Questionnaire development

The developed questionnaire was processed into an online format (using the website 'Qualtrics'). In this way, respondents could access the questionnaire via a hyperlink and fill in the questionnaire on the computer. Also, data could be downloaded from the website by the researcher instead of filling in the data from the questionnaires by hand into the statistical program.

The questionnaire has been developed using multiple sources of information and previously developed questionnaires from other studies. Questions have been formulated according to guidelines for questions on behavioural determinants, as defined by Fishbein, Triandis et al. (2001) and Ajzen (2002). At least three items per construct were included in the questionnaire, in order to form a good scale. The questionnaire consisted of three behavioural domains, each with its own determinants: (1) general sport behaviour, (2) sport behaviour in transition from secondary school to university, and (3) sport behaviour at University Sports centre de Bongerd. Constructs were ordered per domain, and items of different constructs were placed randomly in the questionnaire when possible, to minimize risk of 'trend' answering.

In this chapter, per domain each construct will be discussed in the order (left to right) as presented in the explanatory model of figure 3 (chapter 2, Introduction). Reliability (internal consistency) of the construct-scales will also be discussed, using reliability coefficient Cronbach's alpha. This measure is an indication of whether the items within one construct are an accurate measure of that construct. Scales were assumed to be internaly consistent if the reliability coefficient was > .70 (Jensen 2003), and individual items had an item-total correlation of > .30 (Field 2009a). For the order and lay-out of the (Dutch) questions in the questionnaire, see appendix I.

The questionnaire started with questions on demographic variables gender and age, to ensure basic demographic information on respondents in case the questionnaire was not completed. The questionnaire was concluded with five demographic questions, asking for the date of high school graduation (right before summer 2011 or on another date), BSc study, length, weight and whether the student has a (physical) restriction for sports performance. After the first two demographic questions, questions on the first domain of interest from this study were presented, concerning the general sport behaviour of the students. A short discussion of the questions as developed for each determinant of this domain is presented below.

Attitudinal beliefs – To assess the behavioural beliefs related with intensive sport behaviour, respondents had to score on a 7-point scale to what extent they expected different outcomes to occur. The statement preceding the expected outcomes was 'if I would perform intensive sports for at least 75 minutes each week, I expect that...'. The items for this construct were derived from other

studies that looked at the most important motives or expected outcomes of physical activity/sports in (freshmen) students or adults (table 2).

Table 2: Items used for the attitudinal belief scale.

Item	**References**
Positive	
Increase muscle strength	(Grubbs and Carter 2002; Tergerson and King 2002; Kilpatrick, Hebert et al. 2005)
I am more relaxed (*Stress reduction/relaxation*)	(Tergerson and King 2002; Ebben and Brudzynski 2008)
I enjoy it	(Kilpatrick, Hebert et al. 2005; Ebben and Brudzynski 2008; Romaguera, Tauler et al. 2011)
Is good for my looks (*better shape/attractiveness*)	(Grubbs and Carter 2002; Tergerson and King 2002; Ebben and Brudzynski 2008; Strong, Parks et al. 2008)
I get social contacts (s*ocial recognition*)	(Kilpatrick, Hebert et al. 2005; Strong, Parks et al. 2008)
I can manage my weight	(Tergerson and King 2002; Kilpatrick, Hebert et al. 2005)
I increase my stamina (*energy*)	(Tergerson and King 2002; Kilpatrick, Hebert et al. 2005; Ebben and Brudzynski 2008)
Have no regret later (*anticipated regret*)	(Brug, van Assema et al. 2010)
Negative	
Sport makes me tired	(Grubbs and Carter 2002)
Rather done other things time	(Tergerson and King 2002)
Have lack of motivation	(Tergerson and King 2002; Gyurcsik, Spink et al. 2006; Nelson, Kocos et al. 2009)
Takes lot of time	(Grubbs and Carter 2002; Ebben and Brudzynski 2008; Gómez-López, Gallegos et al. 2010; Romaguera, Tauler et al. 2011) (lack of time)

The attitudinal belief scale showed a Cronbach's α of .72 after three items were removed from the scale ('sport makes me tired', 'have no regret later' and 'takes a lot of time'). Those items had low item-total correlation with the total attitudinal belief construct, but also did not form a separate subscale. They were therefore included in the following analysis as individual items, for they could still be relevant for student sport behaviour.

Attitude – For the attitude questions a 7-point semantic differential scale was used, measuring attitude on a scale between two bipolar adjectives (Ajzen 2002). This construct was a direct measure of attitude. The questions were formulated as 'if I imagine to sport for at least 75 minutes each week, I find that' and 'personally I find sporting for at least 75 minutes a week..'. The scales consisted of three affective beliefs (enjoyable - not enjoyable, boring - challenging, unpleasant - pleasant), three instrumental beliefs (unimportant – important, wise – foolish, useful – useless), and one overall belief 'good – bad' (Ajzen 2002). The items have been counterbalanced with regard to positive and negative adjectives, to avoid response sets (Ajzen 2002). The total attitude scale with all seven items, had an internal consistency of α = .82. The sub-scales for affective attitudes and instrumental attitudes had α = .72 and α = .75 respectively, both consisting of three items. These sub-scales were not included in further analysis, for the total attitude scale was more internally consistent and complete.

Social influence – for social influence, a distinction was made between injunctive norms (ones belief whether their social network wants them to perform a behaviour (Rhodes and Courneya 2003),

also called subjective norms) and descriptive norms (whether ones social network performs the behaviour (Ajzen 2002; Smith and Louis 2009)). The sources of influence were 'friends', which are assumed to be important to the students and a big part of their social environment, and 'students'. Items for injunctive norm were (1) 'My friends think I should practice intensive sports every week for at least 75 minutes', (2) 'My friends approve of it if I sport intensively for at least 75 minutes each week', and (3) 'My friends encourage me to sport intensively for at least 75 minutes each week'. These items were almost similar to items assessing subjective norm as used by Courneya and Bobick (2000), that found a Cronbach's alpha of .81 for that scale. Items for descriptive norm were (1) 'My friends sport intensively for at least 75 minutes each week', (2) 'Sport intensively for at least 75 minutes each week is normal for students' and (3) 'My friends often go with me to sport intensively'. All items were rated on a 7-point scale, from 1 (absolutely not) to 7 (absolutely). The total scale for social influence had a Cronbach's α of .78 after the second injunctive norm and second descriptive norm item were removed. Subscales injunctive norm and descriptive norm showed lower reliability coefficients, of .71 (without second item) and .68 (without second item) respectively. It was decided to only include the total social influence construct in the following analysis and include the removed items individually.

Self-efficacy – The self-efficacy scale was also tailored to the domain of interest, regular intensive sports performance, to make sure the items had proper explanatory and predictive value (Bandura 2006). Although Bandura (2006) recommends to use scales ranging from 0 – 100 or 0 – 10, it is decided to use a 7-point scale (1 (absolutely not) – 7 (absolutely)) to retain a consistent format in the questionnaire. The question was formulated using 'can do', as a term of capability and not as a term of intention (will do), and focussed on the respondents operative capabilities (now) and not on future capabilities (Bandura 2006). The scale included six items, and some of them overarched a few factors (table 3).

Table 3: Items used for the self-efficacy scale.

Item	**References**
Having a busy week	'Set time aside for exercise' (Sallis, Prochaska et al. 2000), 'Make time for exercise' (Rovniak, Anderson et al. 2002), 'Lack of time' (Sherwood and Jeffery 2000; Nelson, Kocos et al. 2009; Gómez-López, Granero-Gallegos et al. 2011; Romaguera, Tauler et al. 2011), 'Takes too much time' (Grubbs and Carter 2002), 'Other priorities' (Tergerson and King 2002)
Nobody to exercise with	'Lack of social support' (Gómez-López, Gallegos et al. 2010)
No motivation (not feeling like sporting)	(Tergerson and King 2002; Gyurcsik, Bray et al. 2004; Gyurcsik, Spink et al. 2006; Nelson, Kocos et al. 2009)
Being tired / laziness	(Saunders, Pate et al. 1997; Tergerson and King 2002; Ebben and Brudzynski 2008; Romaguera, Tauler et al. 2011), 'Lack of sleep' (Gyurcsik, Spink et al. 2006)
A lot of schoolwork / stress	(Gyurcsik, Bray et al. 2004)
Social invitation during exercise time	(Saunders, Pate et al. 1997; Gyurcsik, Bray et al. 2004), 'Great social demands' (Sallis, Prochaska et al. 2000)

The self-efficacy items described situations that could make it difficult to engage in regular sports performance, and were based on previous research on sports behaviours and factors that make a regular sport routine difficult. Furthermore, items encompassed factors that an individual can have some control over (Bandura 2006). The items seemed to form a consistent scale (Cronbach's alpha is .89).

Intention – Three items were used to assess students' intention to exercise at least 75 minutes per week, using the formulations 'I will try to', 'I intend to' (Ajzen and Madden 1986) and 'I expect to have vigorous exercise for at least 75 minutes a week in the next month' (7-point scale from strongly disagree to strongly agree). A study of Courneya and Bobick (2000) found good reliability for a similar kind of intention scale (Cronbach's alpha 0.83), with the difference that their third item assessed how many times the respondents were planning to exercise a week. The intention-scale had a Cronbach's alpha of .93 in the current study, which is highly reliable.

Self-regulation – The self-regulation scale consisted of four items, tapping into two factors that are important parts of self-regulation: monitoring progress (two items) and responding to discrepancies/problem solving (two items) (de Bruin, Sheeran et al. 2012), all on a 7-point scale. These items showed a internal consistency of .96 in a study among Dutch adults (de Bruin, Sheeran et al. 2012). In this study, the four self-regulation items formed a reliable scale with Cronbach's alpha of .87.

Barriers – This question assessed situational factors that interfere with a persons' plan to sport intensively for at least 75 minutes a week. The items in the questionnaire were 'high study workload', 'sports costs a lot of money' (lack of money) (Gyurcsik, Bray et al. 2004), 'lack of access to facilities (Sherwood and Jeffery 2000; Gómez-López, Gallegos et al. 2010), and 'no-one to sport with' (lack of social support) (Sallis, Hovell et al. 1989; Grubbs and Carter 2002; Nelson, Kocos et al. 2009; Gómez-López, Gallegos et al. 2010). Items were rated on a 7-point scale, ranging from 1 (no barrier at all) to 7 (strong barrier). The barrier items did not form an internally consistent scale (Cronbach's alpha = .52), even if items were removed. The individual barrier items will be used for further analysis.

Habits – For the habit scale, the Self Report Index of Habit Strength (SRHI) of Verplanken and Orbell (2003) was adapted to fit the developed questionnaire. The complete scale showed to be applicable to exercise behaviour with high internal reliability and test-retest reliability (Verplanken and Melkevik 2008), but was too long to use completely in this study. Habit strength is a construct that consists of multiple aspects, and thus using a multi-item instrument is a better measure of habit than only assessing behavioural frequency (Verplanken and Orbell 2003). Four of the twelve items of the SRHI were used, two regarding automaticity (practicing sports is something I do automatically, practicing sports is part of weekly routine), one regarding history of repetition (I practice sports for a long time already) and one concerning identity (it would cost effort not to practice sports). These questions assessed whether engaging in intensive sports for at least 75 minutes a week is a habit for the respondents, rated on a 7-point scale, 1 (strongly disagree) – 7 (strongly agree). Even though only a selection of the twelve SRHI items was used, the habit scale showed high reliability ($\alpha = .94$).

Sport behaviour – The questions to assess sport behaviour were derived from the SQUASH questionnaire, developed by Wendel-Vos, Schuit et al. (2003). Only the section of the SQUASH concerning sports activities has been used in this questionnaire, because the focus of this study was not on household activities or transportation activities. The SQUASH was found to be a reasonable reliable and valid questionnaire that can be used to order subjects according to their physical activity level in an adult population and it is good to assess compliance to the physical activity norm (Wendel-Vos, Schuit et al. 2003). It is also showed that high intense activities, such as intensive sports, were more reliable in recalling than low intense activities (Wendel-Vos, Schuit et al. 2003). The questions assessed which sports were practiced, on which days of the week and for how many minutes a day on average. The sport norm as used in this questionnaire, was set on at least 75 minutes of vigorous intensity sports a week, according to the guidelines of the WHO (WHO 2011).

The second part of the questionnaire showed questions on the second domain; sport behaviour in transition. Almost no studies concerning triggers in the student life during transition in relation to physical activity or sports were found. As mentioned earlier, it was therefore decided to use the determinants from the preliminary explanatory model as determinants of sport behaviour change during transition. However, not all determinants that were expected to determine sport behaviour were found to be appropriate to formulate as determinants of transition in this questionnaire. For transition, the selected constructs in the questionnaire were attitude, barriers, social influence (injunctive norm and descriptive norm), self-efficacy, self-regulation and habits. The intention construct has been excluded for this construct would be formulated as plans for the future, which makes it conceptual impossible to the respondents intention from the past. The attitudinal belief construct was also eliminated for this domain, as it was expected that respondents could only generally recall their thoughts and feelings during secondary school, and not specific beliefs they had at that time.

All items regarding transition were formulated in terms of comparison between the last year of secondary school and now (at university). In this way, insight will be obtained in whether there has been a change in beliefs of the students in the transition period. Included items were assumed to are important aspects in student life and an alteration in those aspects may have caused either a negative or positive behaviour change. As formulating items in terms of change was a new and experimental way of assessing determinants of behaviour, it was likely that construct scales showed lower internal consistency than 'normal' scales, because there were low inter-item correlations. It was therefore decided that a Cronbach's alpha of > .6 was considered reliable enough to include the scale in further analysis. All included constructs scales will be shortly discussed.

Attitude – The attitude scale consisted of two affective items (sport is fun, sport makes me feel better) and two instrumental items (sport is important, sport has advantages). Questions were formulated as 'During the last year of secondary school, it was more important for me to sport vigorously than it is now' and 'I liked vigorous exercise better during the last year of secondary school

than I like it now'. Items were rated on a 7-point scale, 1 (absolutely not) - 7 (absolutely). The scale had an internal consistency of α = .63. The subscales affective and instrumental attitudes with two items both showed a very low internal consistency (α < .30).

Social influence – Two items to assess injunctive norm were included, one with regard to friends stimulation to sport ('Compared to secondary school, my friends at university stimulate me more to practice intensive sports'), and one concerning positive reactions of friends when the respondent performed sports. In addition, three descriptive norm items were included, one regarding the amount of friends that sport, one concerning sporting with friends, and the third one regarding the sport behaviour of students in the environment ('At university I see more students practice intensive sports than I saw students do at secondary school'). Items were scaled on a 7-point scale, 1 (totally disagree) – 7 (totally agree)., The internal consistency of the social influence scale was .67 after removing the items concerning friends reacting positively if the respondent sports (second injunctive norm item). The removed item will be included in the analysis individually. The subscales injunctive and descriptive norm had low reliability, so further analysis restricted to the total social influence construct.

Self-efficacy – Five of the included items were similar to the ones used for 'general' sport self-efficacy (being tired, having a busy week, not motivated, a lot of study work and social invitations while planning to sport), with the question formulated as 'I succeeded better in always practicing intensive sports during secondary school, than I succeed now, if I..'. A sixth item was formulated as 'During secondary school I had much more discipline in practicing intensive sports than I have now'. All items were scored on a 7-point scale, 1 (absolutely not) - 7 (absolutely). The Cronbach's alpha for this construct was .93, which indicates high internal consistency.

Self-regulation – For the self-regulation construct, four items were included. They were similar to the ones used for 'general' self-regulation, but then formulated in terms of comparison between the self-regulatory skills during the last year of secondary school and university ('During secondary school I kept better track of whether I practiced enough intensive sports than I do now'). A 7-point scale was used and the four items of this construct had an acceptable scale reliability with Cronbach's alpha of .70.

Barriers – This construct assessed in to what extent the included items formed a barrier for intensive sports practice at secondary school and at university. Included barriers were 'high study load', 'sporting costs a lot of money', 'lack of access to facilities' and 'no-one to sport with'. Students could state per item whether it was a bigger barrier at secondary school, a bigger barrier at university, a barrier at both secondary school and university or no barrier at all. In reliability analysis, the scale showed a reliability coefficient of .68. It was however decided that this type of scaling was not really suitable for further analysis, so these items will only be used for descriptive purposes.

Habit – Three items for habit were included, namely 'Practicing sports was more a routine at secondary school than it is now', 'Regular sports practice was a habit at secondary school, but is not at university', and 'Practicing sports was natural for me during secondary school, but is not anymore at university'. Items did not distinguish between the different concepts of habit, but focused on the

overall habit of regular intensive sports performance. Items were also scored on a 7-point scale. This construct had a high reliability of α = .92.

Sport behaviour during transition – In order to obtain a good estimate of the transition the students have made in their sports behaviour, the question regarding their sport behaviour in transition was formulated in terms of change. It was expected that students would have difficulties accurately recalling the days/time practicing sports during the last year of secondary school. Therefore, to measure a positive/negative change in sports behaviour between secondary school and the present, students had to note if they currently sport (a lot) less, an equal amount or (a lot) more than during their last year of secondary school. A second question asked how many minutes on average they sport more/less a week now at university.

The third part of the questionnaire showed questions on the third domain of interest, sports behaviour at the University Sports Centre de Bongerd. In this domain, only a selection of the determinants form the explanatory model was used. For this domain, the determinants are discussed in the order in which they were shown in the questionnaire for practical reasons.

Sport behaviour at University Sports Centre de Bongerd – The first question on sport behaviour assessed whether students had sport rights of the SCB. Students without sport rights could note why they did not buy sport rights, with answer options e.g. sporting somewhere else, too expensive or I don't feel at home at the University Sports Centre. After this question they continued with questions on attitude, attitudinal beliefs and one descriptive norm question about sporting at the SCB (discussed below). Students with sport rights were asked on which days they sported at the SCB in a normal week and for how many minutes a day on average on the days they sported there. They were also asked to fill in which sports they normally practice at the SCB. After that, students with sport rights continued with questions on all determinants of sporting at the SCB.

Attitudinal beliefs – The question concerning attitudinal beliefs was formulated as 'If I would practice intensive sports for at least 75 minutes a week at the University Sports centre, I expect that..'. Items were 'to get to know more students', 'get to know more sports', 'it takes little time to travel to the sports centre', 'I can do the sports I want to do', and 'it is hard to register for courses'. All five items were rated on a 7-point scale, 1 (absolutely not) – 7 (absolutely). Cronbach's alpha for this construct was α = .64, after the item 'it is difficult to register for courses' was removed.

Attitude – The attitude scale consisted of four items, with regard to practicing sports at University Sports centre the Bongerd ('Personally, I think practicing intensive sports at the University Sports centre is..'). The items were stated on a 7-point bipolar adjective scale, and were 'expensive – cheap', 'nice - not nice', 'fun - not fun', and 'accessible – inaccessible'. Reliability analysis showed an internal consistency of α = .54, which is low. Removing items did not increase the reliability of this construct.

Descriptive norm – Two items assessed descriptive norm, 'My friends sport intensively at the SCB for at least 75 minutes week' and 'My friends very often join me to sport intensively at the University Sports Centre'. Respondents without sports rights for the SCB could only fill in the first question.

Answers were rated on a 7-point scale. Internal consistency of the two-item construct (only including respondents with sport rights), was α = .72.

Habit – Due to practical limitations only one habit item has been included, 'Practicing intensive sports for at least 75 minutes a week at the University Sports Centre is part of my weekly routine' (1 - totally disagree, 7 - totally agree). As only one item assessed habit, no reliability analysis was performed.

Knowledge about the SCB – Additionally, two questions were included about the students' awareness and knowledge of the SCB. It was assessed how familiar the student was with the SCB (1 (totally not familiar) – 7 (very familiar)) and how good the student perceived his acquaintance with the sports offer at the SCB (1 (absolutely not) – 7 (absolutely)).

3.2 Pre-test

Before the data collection started, the questionnaire was pre-tested in five freshmen BSc students of Wageningen University. In this pre-test it was checked if there were any difficulties with filling in the questionnaire online or if there were unclear questions. Remarks could be noted on a separate questionnaire. It was also checked how long it took to complete the questionnaire (on average 15 minutes). The pre-test showed that the students found it feasible to recall and compare their physical activity behaviour and thoughts between the last year of secondary school and university. Some small adaptations were made to the questionnaire, such as clarifying the questions on how many minutes the respondents sported a day, and changing some of the answer options.

3.3 Data collection

The population of interest for this study was freshmen BSc university students. For practical reasons only students of Wageningen University were used. Inclusion criteria were that participants were in their first year of their Wageningen University BSc and were fluent in Dutch language.

The goal was to approach as many first-year BSc students of Wageningen University as possible. All BSc study advisors were approached and requested to invite the freshmen students of their specific study via e-mail (hyperlink). In case the study advisor was not willing to invite the students, the study organisation of that study was approached, and asked to include the questionnaire invitation in their weekly news mailing. In addition, the invitation was distributed online among first year SSR-W and JV Unitas students (student organisations). Also, flyers and posters were distributed at the university buildings with the link to the survey. Furthermore, flyers were distributed among students of one of the biggest BSc studies (Biology), for it was not possible to invite them via e-mail. An overview of student recruitment via the study advisors or study organisations is presented in appendix II.

3.4 Data analysis

All analyses were performed using statistical package SPSS Statistics version 19. Statistical significance was accepted at $p \leq .05$. Before starting analysis, the data has been downloaded from the Qualtrics website and exported into SPSS. The dataset has been cleaned and recoded if necessary. Also, variables were checked for outliers and distributions. An overview was created of missing values per domain, so that for analysis on one domain only respondents with no missings on that domain would be included. The construct scales were checked for reliability, which was already presented in paragraph 3.1. Reliable scales were computed into a construct score (mean of all items), to use in further analysis. The mean score instead of the sum-score was used, taking the number of items in each construct into account. In this way, constructs on the same topic but with a different number of items could be compared for their strength and direction.

The first analysis step was to obtain an overview of the sample. Descriptive statistics of demographic factors were created for all students that finished the questionnaire. To explore the sport behaviour of the students at present (objective 1.1), during transition (increase or decrease) (objective 2.1) and at the University Sports Centre (objective 3.1), the sport behaviour measures were recalculated into minutes of sport per week to obtain a continuous measure of vigorous sport behaviour. In this part of the analysis an overview was also created of the days the respondents sported and the type of sports they did.

The second step in analysis was to examine assumed relations between the constructs in the explanatory model of sport behaviour using correlations. For this, correlations and descriptive statistics for the constructs, the items that did not fit within a construct, the demographic variables and the sport behaviour were explored. Separate correlation matrices were produced for each domain (general sport behaviour, transition sport behaviour change and SCB sport behaviour). For the constructs and individual determinants, the mean and standard deviation (SD) was presented, as the variables were perceived normally distributed. Pairwise exclusion of cases was applied, using all respondents that had no missing for the variables in each separate correlation. For all correlations, Spearman correlation coefficient (rho) is used, for the distributions of the sport behaviour variables was non-parametric (Field 2009). For the correlations of minutes sport at the SCB, only students with sport rights were included in the matrix. A separate (Pearson) correlation analysis was performed to test whether determinants of sporting at the SCB were related to the possession of sports rights.

Finally, to examine whether the explanatory model of determinants of sport behaviour was a found to be an accurate representation of the way behavioural determinants predicted the sport behaviour of freshmen students, regression analysis were performed (study objectives 1.2, 2.2 and 3.2). This was done per domain, using hierarchical multiple linear regression as the measures of sport behaviour were continuous. The used predictors were the demographic variables, the construct scores and some individual items that did not fit within a construct. Predictors were entered hierarchically into the regression model, according to the explanatory model from figure 1. For these analyses, listwise exclusion was used, including only respondents without missings. Also, backward elimination

(removal of items that were not significant predictors) was performed on the individual items that did not fit within a construct, to reduce the number of predictors. For each regression analysis, the Cook's distance (check for influential cases, should be < 1), Durbin-Watson statistic for independence of errors (should be close to two), and normality of studentized residuals were checked, in order to see if assumptions on normality of residuals distribution were met (Field 2009). Also VIF (Variance Inflation Factor) was checked to see if collinearity between predictors could influence results (problem if VIF > 10 or Tolerance < .2 (Field 2009)). Collinearity would increase the standard errors of the B's, making the b-value less likely to represent the population. It would also limit the size of 'R' and make it difficult to say which predictor is most important if they account for the same variance in the outcome (Field 2009). Results of the hierarchical multiple regression will be presented in tables, showing the standardized beta, p-values and R^2 of the model per step. Also, R^2 change of each step will be presented below the tables.

Hierarchical regressions were performed to test the explanatory model for the following (behavioural) outcomes: (1) Intention to sport at least 75 minutes a week, (2) Sport behaviour (minutes/week), (3) Sport behaviour in transition (change in minutes/week), and (4) Sport behaviour at University Sports Centre (only for students with sport rights, minutes/week). For the outcome intention, key constructs attitudinal beliefs, attitude, social influence and self-efficacy were used. For the outcome sport behaviour, all key constructs from the explanatory model, focused on sporting at least 75 minutes/week were used in the prediction model. For the third outcome, all constructs from the theoretical model focussed on the transition from secondary school to university were used, except for the constructs attitudinal beliefs, intention and barriers. For the fourth outcome the hierarchical multiple regression was performed only for students with sport rights, to test which determinants of sports at the SCB (attitudinal beliefs, attitude, descriptive norm and habit) seemed to predict the time students sport at the SCB. Caution must be taken for this analysis, as the reliability of constructs attitudinal beliefs and attitude of sporting at the SCB was low. Also two items concerning awareness of sport facilities were included as predictors in this latter regression analysis. In all prediction models, also demographic factors with significant correlations with the outcome were included.

4. Results

This chapter presents the results from the performed data analyses to answer the research questions. First, a description of the sample and the current sport behaviour, change in sport behaviour in transition and sport behaviour at the University Sports Centre is presented (paragraph 4.1). After that, descriptive statistics of the behavioural determinants (constructs) is shown (paragraph 4.2). Subsequently, correlations between the key constructs, individual items that did not fit within a scale, demographics and sport behaviour are displayed (also paragraph 4.2). Finally, to examine the logic model, results from the regression analysis are presented (paragraph 4.3). For each part of the analysis, results will be discussed per domain.

4.1 Sample

In total, 109 Wageningen University freshmen BSc students completed the questionnaire. Demographic characteristics of the sample are presented in table 4. Mean age of the population is 19.3 years, with the majority of the respondents being female (60.6%). Most of the respondents (74.1%) finished their secondary school just before the summer of 2011, while the other one fourth of the population finished their high school earlier. Average Body Mass Index (BMI) of the respondents was 21.4. A small part of the study population noted a physical restriction for sports (9.2%).

Table 4; Socio-demographic characteristics of the study sample.

	Mean	**SD**
Age (N=108)	19.31	1.56
BMI[a] (N=107)	21.43	2.60
	N	**%**
Gender (N=109)		
Male	43	39.4
Female	66	60.6
Restriction in sports (N=109)		
No	99	90.8
Yes[b]	10	9.2
High school graduation (N=108)		
Summer 2011	80	74.1
Other[c]	28	25.9

Only completed questionnaires were used. [a] BMI = weight (kg) / height $(m)^2$.

[b] Restrictions: physical, mostly shoulder, breathing, and joint problems.

[c] Dates ranging from summer 2005 to summer 2010.

A total of twenty BSc studies are available at Wageningen University. In table 5 it is shown how the division of the respondents was over the different BSc studies. As can be seen, some studies are represented by a relatively large percentage of respondents, while other studies have limited representation in the study population.

Table 5: Overview number of students per BSc study.

Name study[a]	Abbreviation	N (students)	%
Internationale ontwikkelingsstudies	BIN	16	15.1
Bodem, water, atmosfeer	BBW	15	14.2
Biotechnologie	BBT	12	11.3
Moleculaire wetenschappen	BML	11	10.4
Bedrijfs- en consumenten wetenschappen	BBC	11	10.4
Biologie	BBI	6	5.7
Bos- en natuurbeheer	BBN	6	5.7
Gezondheid en maatschappij	BGM	6	5.7
Plantenwetenschappen	BPW	5	4.7
Internationaal land- en waterbeheer	BIL	4	3.8
Dierwetenschappen	BDW	3	2.8
Milieuwetenschappen	BMW	3	2.8
Voeding en gezondheid	BVG	3	2.8
Levensmiddelen technologie	BLT	2	1.9
Economie en beleid	BEB	1	0.9
Landschapsarchitectuur en ruimtelijke planning	BLP	1	0.9
Orientatiejaar life sciences	BLS	1	0.9
Total		106	100

N = 106. No students from studies: BAT (Agrotechnologie), BTC (Toegepaste communicatiewetenschap) and BTO (Tourism). [a] Study names are in Dutch, as the Wageningen University BSc's are all Dutch.

To answer study objective 1.1 (current sport behaviour of freshmen students), table 6 presents an overview of students' sport behaviour. As can be seen, respondents practiced on average 190 minutes sports a week (SD = 211.8), with a slightly lower median of 120.0 minutes/week. As mentioned in the introduction, the norm for vigorous activity was set to at least 75 minutes of activity a week. Of all respondents, 66 (61.7%) met this norm, while the other 41 (38.3%) students spent less than 75 minutes/week on vigorous activity. Of those respondents, 26 (24.3%) noted they practiced no sports at all.

Table 6: Overview of general sport behaviour.

	Mean (SD)	Median (IQR)
Minutes sport/week	190.2 (211.8)	120.0 (40.0 - 285.0)
	N (students)	**%**
Vigorous activity norm compliance[a]		
Yes	66	61.7
No	41	38.3
Not practicing sports	26	24.3

N=107. [a] Norm: at least 75 minutes a week of vigorous intensity physical activity.

As part of sport behaviour, type of sports was also assessed. In total 39 different sports were mentioned by the respondents. Sports most practiced were running (n = 30), going to the gym (n =

18), rowing (n = 13), swimming (n = 10), soccer (n = 8), squash (n = 7), badminton (n = 5), and biking (n = 5). Respondents most frequently practiced sports on Mondays, Tuesdays, and Thursdays. The respondents seemed to practice less sports on Fridays and during the weekends.

As an answer to study objective 2.1 (sport behaviour change in transition), table 7 shows the respondents answers to the question whether they sport more, less or an equal amount now at university compared to the last year of secondary school. As can be seen, 44 (41.4%) respondents are sporting less at university compared to the last year of secondary school, while 39 (33.9%) respondents increased their time spent on sports after the transition to university. The other 25 (23.6%) students did not change their sport behaviour. These numbers do not say anything about healthy or unhealthy habits, because the minutes of sports practice during the last year of secondary school has not been checked for vigorous activity norm compliance. Furthermore, activity change in minutes was assessed, showing that students that sport less at university sported on average 112.3 minutes less, while students that started sporting more at university sported on average 146.5 minutes more now than they did during secondary school. The large SD indicates that there is a wide variation in minutes sport change in transition within the study population. Looking at the median of minutes sport change, the change is a bit attenuated compared to the mean.

Table 7: Change in sport behaviour at university (minutes), compared to their sport behaviour at secondary school.

Change in sports[a]	N (students)	%	N (Students)	%	Mean (SD)	Median (IQR)
Much less	18	17.0	44	41.4	-112.3 (96.0)	-80.0 (-150 - -60.0)
Less	26	24.5				
Equal amount	25	23.6			-	-
More	24	22.6	37	33.9	146.5 (167.0)	60.0 (36.3 - 180.0)
Much more	13	12.3				

N=106. [a] Change: now at university compared to the last year at secondary school.

To answer study objective 3.1 (sport behaviour at the University Sports Centre), table 8 shows an overview of the sport behaviour at the SCB. Of the students that completed the questionnaire, 70 (64.2%) owned sport rights for the University Sports Centre, while 39 (35.8%) did not. Most important reasons for not buying sport rights, as selected from a list of reasons, were sporting somewhere else (n = 18) and not having enough time to sport (n = 13). Other reasons were that sport rights were too expensive, students lacked awareness of the sports centre facilities, disliking sports and that the students did not live in Wageningen. Students with sport rights sported on average 117.7 minutes a week at the SCB (SD = 106.0, median = 90.0).

Table 8: Overview of sport behaviour at University Sports centre.

	N (students)	%
Students with sport rights		
Yes	70	64.2
No	39	35.8
	Mean (SD)	**Median (IQR)**
Minutes sport/week at SCB[a]	117.7 (106.0)	90.0 (47.5 - 150.0)

N=109. [a] Only students with sport rights (N=69).

Respondents with sport rights practiced sports at the SCB mainly on Mondays (n = 25), Tuesdays (n = 28), Wednesdays (n = 23), and Thursdays (n = 28). During the weekend usually a lot less of the students in the study sample were at the SCB (Fridays n = 9, Saturdays and Sundays both n = 4). Eight of the respondents noted that they usually do not sport at the University Sports Centre, even though they bought sport rights. In general, students sported on average between one and two days a week at the SCB (mean days = 1.8, SD = 1.4). Table 9 shows which sports the students practiced in a regular week. This shows that swimming, sports at the gym and separate lessons were practiced by most students.

Table 9: Sports performed at the University Sports Centre.

Sport	N (Students)	Specification
(Free) swimming	25	-
Sports at the gym	22	-
Separate lessons	22	Zumba, exercise on music, steps aerobics, power dumbbell
Member of student sport organization	18	Rowing, tennis, volleyball
Squash	9	-
Internal competitions	8	*Knotsbal*, korfball, soccer
Courses (multiple weeks)	8	Squash, Steps aerobics, belly dancing

4.2 Descriptives and relationships between constructs

To assess whether the key constructs, individual items that did not fit within those constructs and demographic variables and sport behaviour variables were related, correlation matrices are presented. First, correlations are shown for the domain general sport behaviour with the key constructs (table 10). Second, to explore whether individual items that did not fit in any particular construct have a potential relation with intention and sport behaviour, a table is presented with correlations for those individual items focussed on general sport behaviour, with intention to sport and sport behaviour (table 11). In case alpha < . 05, the items were retained in consecutive regression analyses. Table 12 shows correlations for the variable sport behaviour in transition with all constructs of transition, and individual items that did not fit within those constructs. Subsequently, a correlation matrix is presented for sport behaviour at the University sports centre and constructs related to sports at the

SCB (table 13), with only students with sport rights. Finally, table 14 presents correlations of a selection of behavioural determinants of sports at the SCB with the variable 'possession of sport rights'. Table 10, 12, 13 and 14 also show correlations with demographical variables. Also, descriptive data of the constructs and individual items are presented in the tables. All constructs and individual items that did not fit within a construct were scored on a scale from 1 - 7, so a score of four would indicate a neutral score on that construct.

Table 10; Correlations and descriptive data for the domain general sport behaviour (all key constructs, demographics and sport behaviour (minutes/week)).

Determinant	1	2	3	4	5	6	7	8	9	10
1. Sport	—									
2. Intention	.68**	—								
3. Attitude	.55**	.70**	—							
4. Social influence	.34**	.36**	.34**	—						
5. Self-efficacy	.69**	.74**	.62**	.32**	—					
6. Self-regulation	.52**	.56**	.57**	.20*	.61**	—				
7. Habit	.79**	.76**	.60**	.38**	.80**	.58**	—			
8. Attitudinal beliefs	.49**	.55**	.75**	.35**	.57**	.46**	.54**	—		
9. Gender[a]	.15	.15	.12	.18	.14	.01	.21*	.09	—	
10. Age	.36**	.29**	.11	.11	.31**	.26**	.27**	.14	.06	—
Mean[b]		5.2	5.6	3.6	4.0	3.6	4.2	5.2		
SD		1.9	0.9	1.4	1.6	1.7	2.1	0.8		

N=107. * Correlation is sign at the 0.05 level (2-tailed), ** correlation is sign at the 0.01 level (2-tailed). Spearman correlation coefficients are reported. [a] Coded as 0 = female, 1 = male. [b] All constructs/items scaled ranging from 1 - 7.

Looking at descriptives for the domain general sport behavior (table 10), in general respondents had a strong intention (mean = 5.2) and positive attitude (mean = 5.6) towards practicing sports at least 75 minutes a week. Respondents had a score just under neutral on social influence (mean = 3.6), so they seemed to perceive not much support and encouragement from their social environment. Their self-efficacy and habit scores were (close to) neutral (respectively mean = 4.0 and mean = 4.2), while self-regulation for sporting at least 75 minutes a week was just below neutral (mean = 3.6). Individual items on injunctive and descriptive norm (table 11) were positive, while most individual barrier items scored on average negative, except for the barrier 'study pressure'. A negative mean on the barriers indicates that the items are perceived stronger barriers to vigorous sports practice. Attitudinal beliefs 'sport makes me tired' and 'sport takes a lot of time' had a negative mean, while the belief 'no regret later' scored on average positive.

Table 11: Correlations and descriptive data for the domain general sport behaviour (all individual items that did not fit within a construct, intention and sport behaviour (minutes/week)).

Individual item	Mean (SD)[b]	Intention to sport	General sport behaviour
Injunctive norm 'friends approve'	4.9 (2.1)	.12	.01
Descriptive norm 'practicing sports is normal for students'	4.3 (1.6)	.31**	.31**
Barrier 'study pressure'	4.8 (1.7)	-.10	-.14
Barrier 'sports costs money'	3.0 (1.8)	-.12	-.23*
Barrier 'lack of access to facilities '	2.5 (1.6)	-.12	-.18
Barrier 'nobody to sport with'	3.1 (1.8)	-.16	-.28**
Attitudinal belief 'sport makes me tired'[a]	3.5 (1.8)	-.10	-.22*
Attitudinal belief 'no regret later'[a]	5.1 (2.0)	.06	-.05
Attitudinal belief 'sport takes a lot of time'[a]	3.9 (1.6)	.24*	.15

N=107. * Correlation is sign at the 0.05 level (2-tailed), ** correlation is sign at the 0.01 level (2-tailed). Spearman correlation coefficients are reported. [a] Item was reverse scored, so a higher item-score indicates a positive belief. [b] All items/constructs scaled ranging from 1 - 7.

For the domain sport behaviour in transition, most of the constructs of sport behaviour in transition (table 12) have a positive score (mean > 4). A score > 4 indicates that the students perceived this construct more positive now at university compared to the last year of secondary school. Most students seemed to have a more positive attitude (mean = 4.7), stronger self-regulation (mean = 4.6), and stronger self-efficacy (mean = 4.7) towards sport behaviour at university than they had during secondary school. For example, a mean score > 4 for the construct self-regulation means that the students perceived themselves more able to regulate the sport behaviour now at university than during the last year of secondary school. The perceived social influence seemed to be similar at university as it was at secondary school (mean = 4.0), while the habit to sport seemed to be a bit stronger at secondary school than it is now (mean = 3.6).

The four barrier items are not presented in table 12 due to a response format inappropriate for correlation analyses, but their scores will be shortly discussed. The barrier 'study pressure' was reported as being a more strong barrier for sports at university than at secondary school by 55 (59.1%) students. The barrier 'sports costs a lot of money' was perceived as no barrier by 43 (40.6%) students, while 37 (34.9%) students noted that this was a bigger barrier at university than it was at secondary school. Lack of access to facilities was no barrier for 45 (42.5%) of the students, whereas 39 (36.8%) students thought that lack of access to facilities was a bigger barrier to sports at secondary school than now at university. The final barrier, having no-one to sport with, was not perceived as a barrier by more than half of the respondents (50.9%), while 21 (19.8%) students perceived this to be an equally strong barrier at secondary school and university.

Table 12: Correlations and descriptive data for the domain sport behaviour in transition (change in minutes/week).

Determinant	1	2	3	4	5	6	7	8	9
1. Sport transition	—								
2. Attitude	.55**	—							
3. Social influence	.38**	.52**	—						
4. Injunctive norm 'friends react positive'	.15	.15	.24**	—					
5. Self-regulation	.61**	.74**	.53**	.20*	—				
6. Self-efficacy	.44**	.42*	.30**	.30**	.43**	—			
7. Habit	-.50**	-.22*	-.23*	-.20*	-.43**	-.45**	—		
8. Gender[a]	.16	.08	-.14	-.08	.02	.11	-.18	—	
9. Age	.41**	.23*	.12	-.04	.26**	.16	-.20*	.12	—
Mean[d]		4.7	4.0	5.1	4.6	4.7	3.6		
SD		1.2	1.3	1.5	1.3	1.6	0.8		

Number of cases ranges from 97 to 106. * Correlation is sign at the 0.05 level (2-tailed), ** correlation is sign at the 0.01 level (2-tailed). Spearman correlation coefficients are reported. [a] Coded as 0 = female, 1 = male. [b] coded as 0 = date before summer 2011, 1 = summer 2011. [c] Coded as 0 = no restriction in sports practice, 1 = restriction in sports practice. [d] All items/constructs scaled ranging from 1 - 7.

Finally, table 13 shows descriptives of constructs and individual items for the domain sport behaviour at the SCB. Overall, the respondents with sport rights had a slight positive attitude and attitudinal beliefs (both constructs mean = 4.8) with regard to sporting at the University Sports Centre. They perceived sport at the SCB not really as part of their weekly routine, with a mean score of 4.2. There was quite some variation in the scores on this item (SD = 2.2). In general, the students did indicate that they are familiar with the SCB (mean = 5.2) and have a fairly good knowledge of the sports offer (mean = 5.4). The descriptive norm of sporting at the SCB was just below neutral, so there is no strong positive or negative perception of friend norms.

The previously discussed tables also showed correlations between the determinants and the sport behaviours. Firstly, the relations between intention to sport at least 75 minutes/week and the key constructs that were assumed to predict intention were shown in table 10. Moderate to strong significant correlations with intention were found for the attitude ($r = .70$, $p < .01$), social influence ($r = .36$, $p < .01$), self-efficacy ($r = .74$, $p < .01$), self-regulation ($r = .56$, $p < .01$), habit ($r = .76$, $p < .01$), and attitudinal beliefs ($r = .55$, $p < .01$). For the individual items that did not fit within a construct, the descriptive norm item 'practicing sports is normal for students' ($r = .31$, $p < .01$), and item attitudinal belief 'sports takes a lot of time' ($r = .24$, $p < .05$) were significantly correlated with intention (table 11). These items were thus initially included in regression analysis as predictor of intention to sport. Demographic variable age ($r = .29$, $p < .01$) was also significantly correlated with intention. Although the construct habit was correlated with intention, it is not assumed to predict the intention according to the explanatory model. Self-regulation is however assumed to mediate the relation between intention and behaviour, and therefore the significant positive correlation with intention is of importance ($r = .56$, $p < .01$).

Table 13: Correlations and descriptive data for the domain sport behaviour at University Sports Center (minutes/week).

Determinant	1	2	3	4	5	6	7	8	9	10
1. Sport SCB	—									
2. Attitude	.39**	—								
3. Attitudinal beliefs	.08	.21	—							
4. Attitudinal belief 'register'	.17	.10	.18	—						
5. Descriptive norm	.29*	.17	.17	.02	—					
6. Habit	.71**	.40**	.15	.20	.38**	—				
7. Familiar SCB	.29*	.15	.05	-.12	.06	.37**	—			
8. Knowledge sports	.09	.26*	.18	-.19	-.01	.02	.62**	—		
9. Gender[a]	.18	-.04	.06	.22	.01	.32**	.08	-.6	—	
10. Age	.08	.08	.09	.17	.09	.11	-.06	.00	.28*	—
Mean[b]		4.8	4.8	4.4	3.9	4.2	5.2	5.4		
SD		0.9	1.1	1.7	1.6	2.2	1.3	1.3		

Only respondents that own sport rights are used for these correlations. Number of cases ranges from 67 to 72. * Correlation is sign at the 0.05 level (2-tailed), ** correlation is sign at the 0.01 level (2-tailed). Spearman correlation coefficients are reported. [a] Coded as 0 = female, 1 = male. [b] All items/constructs scaled ranging from 1 - 7.

Secondly, relations between the key constructs of the explanatory model and general sport behaviour (minutes/week) were explored (table 10). Key constructs that were significant positively correlated with exercise behavior were intention ($r = .68$, $p < .01$), attitude ($r = .55$, $p < .01$), social influence ($r = .34$, $p < .01$) self-efficacy ($r = .69$, $p < .01$), self-regulation ($r = .52$, $p < .01$), habit ($r = .79$, $p < .01$), attitudinal beliefs ($r = .49$, $p < .01$). This means that for example a more positive attitude is related to more minutes a week spent on sport. Furthermore, the individual item descriptive norm 'practicing sports is normal for students' ($r = .31$, $p<.01$) and demographic variable age ($r = .36$, $p < .01$) were also significantly correlated with the general sport behaviour (table 11). Significant negative correlations were found between barriers 'sports costs money' ($r = -.23$, $p < .05$) and 'nobody to sport with' ($r = -.28$, $p < .01$), and individual item attitudinal belief 'sport makes me tired' ($r = -.22$, $p < .05$) and the sport behaviour. The stronger the respondents perceived those barriers were hindering their sport behaviour, the less they actually sported. The significant individual items were included in consecutive regression analysis as predictors for general sport behaviour. Besides the correlations with the sport behaviour, strong correlations between constructs also became evident from the matrix, between attitude, self-efficacy, habit, self-regulation, and intention (all $r > .50$, $p < .05$).

Thirdly, explored relations between the constructs on sport behaviour in transition and the change in sport behaviour in transition are presented in table 12. The sport behaviour change was significant positively correlated with the constructs focused on the transition from secondary school to university attitude ($r = .55$, $p < .01$), social influence ($r = .38$, $p < .01$), self-regulation ($r = .61$, $p < .01$), self-efficacy ($r = .44$, $p < .01$), and age ($r = .41$, $p < .01$). A significant negative correlate of sport behaviour change in transition from secondary school to university was habit ($r = -.50$, $p < .01$).

The construct attitude is relatively strongly correlated with the constructs social influence and self-regulation. Self-regulation is also correlated with social influence.

Furthermore, relations between the determinants of sport behaviour at the SCB and the sport behaviour were explored in table 13. The constructs attitude ($r = .39$, $p < .01$), habit ($r = .71$, $p < .01$), descriptive norm ($r = .29$, $p < .05$) and individual item familiarity with the University Sports Centre ($r = .29$, $p < .05$) were all positively correlated with minutes sport practice at the University Sports centre. Attitudinal beliefs and demographic variables showed no significant correlation with the sport behaviour.

It was also explored whether the attitudinal beliefs, attitude, the individual perceived descriptive norm item and familiarity and knowledge on the SCB were related to whether the student has sport rights or not (table 14). This was checked for the total attitude and attitudinal belief constructs as well as for the individual items that were used to form those constructs. Only individual items that seemed to be important for the possession of sport rights are shown in the table. As can be seen, the total attitude construct ($r = .30$, $p < .01$), the individual attitude item 'sociable' ($r = .38$, $p < .01$), the individual attitudinal belief 'meet new students at the SCB' ($r = -.26$, $p < .01$), and the familiarity with the University Sports Centre ($r = .54$, $p < .01$) were significantly correlated with the possession of sport rights. It seemed that most individual beliefs and attitudes were not strongly related to whether a student has sport rights or not.

Table 14: Correlations for the domain sport behaviour at University Sports Centre (sport rights yes/no).

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Sport rights SCB[a]	—							
2. Attitude (total)	.30**	—						
3. Attitudinal beliefs (total)	-.02	.23*	—					
4. Attitude 'sociable'	.38**	.60**	.33**	—				
5. Attitudinal belief 'meet students'	-.26**	.09	.67**	.25*	—			
6. Familiarity SCB	.54**	.36**	.01	.31**	-.10	—		
7. Gender[b]	-.13	-.13	-.02	-.11	.07	.11	—	
8. Age	.11	.07	.04	.07	.06	-.07	.20*	—

Number of cases ranges from 103 to 112. * Correlation is sign at the 0.05 level (2-tailed), ** correlation is sign at the 0.01 level (2-tailed). Pearson correlation coefficients are reported. [a] Coded as 0=no sport rights, 1=sport rights. [b] Coded as 0=female, 1=male.

Lastly, relations between the three sport behaviours were explored to see if there was a relation between these behaviours over the behavioural determinants. The general sport behaviour (minutes/week) was significantly possitively correlated with sport behaviour in transition ($r = .53$, $p < .01$). A more positive change in sport behaviour in transition is thus related with more minutes spent on sporting at university. Furthermore, students with sport rights of the University sports centre seemed to also sport more in general ($r = .29$, $p < .01$) and had a more positive change in sport behaviour in transition to university ($r = .26$, $p < .01$).

4.3 Prediction of sport behaviour

In order to test the explanatory model with determinants of sport behaviour, hierarchical multiple linear regression analyses have been performed. First, to find out what combination of the behavioural determinants attitudinal beliefs, attitude, social influences, self-efficacy, self-regulation, intention, habits and barriers best predicts current vigorous sport behaviour of first year BSc students (study objective 1.2). Secondly, it was explored which combination of behavioural determinants of transition formed the best prediction model for sport behaviour in transition (study objective 2.2). Finally, to answer study objective 3.3, it was examined whether the behavioural determinants of sport at the University Sports centre were predictors of the sport behaviour at the SCB.

The first step into answering research question 1.2, is to test the logic model for determinants preceding intention to sport at least 75 minutes a week in the following month, regression analysis has been performed with intention as outcome (table 15). In step 1, only age was entered as demographic variable, as gender was a non-significant correlate of intention. Age was a positive significant predictor of the intention (β = .25, p = .009), and explained 6.3% of the variance in intention (p = .009). After addition of the attitudinal beliefs construct and individual attitudinal belief item 'sport costs a lot of money' (that did not fit in the construct but was a significant correlate of intention), the explained variance of intention increased with 33.2% (p = .000). All three variables in the model were significant positive predictors of the intention to engage in vigorous sports.

Table 15; Hierarchical multiple regression analysis predicting 'intention to sport' (Standardized beta's).

Predictor	Step 1	Step 2	Step 3
Age	.25**	.21*	.14*
Attitudinal beliefs		.49**	-.02
Attitudinal belief 'sports costs a lot of time'[a]		.25**	.15*
Attitude			.43**
Social influence			.13
Self-efficacy			.28**
R^2 model	**.063****	**.395****	**.601****

N=105. * p < .05, ** p< .01.

ΔR^2 =.063 for step 1 (p .009), ΔR^2 = .332 for step 2 (p .000), ΔR^2 = .206 for step 3 (p .000).

Individual items attitudinal beliefs 'sport makes me tired' and 'no regret later' and injunctive norm item 'friends approve' were not included because of non-significant correlations. Individual descriptive norm item 'practicing sports is normal for students' was removed via backwards deletion, and thus not included in prediction model.

[a] Item was reverse scored, so a higher item-score indicates a positive belief (sports does not cost a lot of time).

In the final step, attitude, social influence and self-efficacy were included into the prediction model. Addition of these predictors increased the explained variance of the total model to 60.1% (F (6,99) = 24.837, p = .000). In the complete regression model, age (β = .14, p < .05), attitudinal belief 'sports costs a lot of time' (β = .15, p < .05), attitude (β = .43, p < .01) and self-efficacy (β = .28, p < .01) were all significant positive predictors of the intention to sport. This indicates that (if all predictors are

kept constant) students that are older, have a more positive attitude, think that sports does not cost at lot of time (item is reverse coded) and that have a strong self-efficacy have a stronger intention to be vigorously active in the following month. The attitudinal belief construct was no longer significant in step three. This is in line with the explanatory model, where attitudinal beliefs were placed prior to the attitude, and the influence of attitudinal beliefs on intention was therefore expected to be mediated by the general attitude.

The next step in testing the theoretical model for prediction of sport behaviour was to examine which of the behavioural determinants were best suited to explain the variance in sport behaviour (research question 1.2). Results from the hierarchical regression with all determinants from the model are presented in Table 16.

In step one, only the demographic variable age was used as a predictor for the general sport behaviour. It was found to be a significant, positive predictor ($\beta = .28$, $p = .004$) and explains 7.8% of the variance in the outcome ($F (1,104) = 8.776$, $p < .01$). In the second step, attitudinal beliefs (construct and individual item 'sport makes me tired' that did not fit into the total scale), attitudes, social influence and self-efficacy were added to the regression model. This addition increased the explained variance of the outcome with 44.0% ($p = .000$) to a total of 51.8% ($F (6,99) = 17.702$, $p < .001$). Age remained a significant predictor of the sport behaviour. Furthermore, self-efficacy and the individual attitudinal belief item ('sport makes me tired') were significant predictors of the outcome, respectively positive and negative.

The third step significantly increased the explained variance of the prediction model with 5.9% ($p = .002$), by addition of the constructs intention and habit. In this step, self-efficacy became a just insignificant predictor ($\beta = .22$, $p = .065$), as the relation between self-efficacy and sport behaviour was supposed to be mediated by intention, which was added in this step of the regression. The individual attitudinal belief item remained a significant negative predictor of the sport behaviour ($\beta = -.21$, $p = .004$). Furthermore, while controlling for all other variables in the model, habit also became a significant positive predictor of the outcome ($\beta = .44$, $p = .000$). The total model in step three explained 57.6% of the variance in the outcome, $F (8,97) = 16.480$, $p < .001$. In the final step of this hierarchical regression the construct self-regulation was added, which did not significantly increase the prediction power of the model. The final model with all predictors explained 57.7% of the variance in sport behaviour, $F (9,96) = 14.578$, $p < .001$. After controlling for all variables in the model, the individual attitudinal belief item and habit remained significant predictors of the sport behaviour. This indicates that students that have the belief that sports does not make them tired and that have a strong habit for sports spent more time practicing sports.

Table 16 : Hierarchical regression analysis predicting general sport behaviour (Standardized beta's).

Predictor	Step 1	Step 2	Step 3	Step 4
Age	.28**	.14*	.12	.12
Attitudinal beliefs		.06	.04	.04
Attitudinal belief 'sport makes me tired'		-.20**	-.21**	-.21**
Attitude		.07	.06	.05
Social influence		.14	.11	.12
Self-efficacy		.47**	.22	.20
Intention			-.11	-.12
Habit			.45**	.44**
Self-regulation				.05
R^2 model	**.078****	**.518****	**.576****	**.577****

N=105. * p < .05, ** p< .01.

ΔR^2 =.078 for step 1 (p .004), ΔR^2 = .440 for step 2 (p .000), ΔR^2 = .059 for step 3 (p .002), ΔR^2 = .001 for step 4 (p .581). Individual items attitudinal belief 'much time' and 'regret', injunctive norm 'friends approve', and barriers 'study pressure' and 'lack of access to facilities' were not included due to non-significant correlations with sport behaviour. Individual items descriptive norm 'practicing sports is normal for students', barrier items 'sports costs money' and 'nobody to sport with' were excluded from analysis via backwards deletion.

To explore in which way the determinants of change can be used to predict sport behavior in transition (research question 2.2), hierarchical regression analysis was performed with the outcome 'change in sport behaviour in transition from secondary school to university' (table 17). This number of minutes change could be either negative (sporting less at university than during secondary school), zero (no change), or positive (sporting more at university than during secondary school). The outcome is thus a measure of change in sport behaviour due to the transition, and does not provide information on how healthy the behaviour is. The predictors in this model assessed the change in the beliefs or perceptions between the two periods. A higher score on the predictors indicates more positive belief or perception now at university than during secondary school. This should be kept in mind for the interpretation of the regression results.

In the first step, the demographic variable age was an important predictor of the change in sport behaviour (β = .50, p = .000). Age alone explained 24.8% of the variance in the outcome (F (1,98) =32.298, p < .001). So, students that are older have a more positive change in sport behaviour when they compare their behaviour now at university with the last year of secondary school. After addition of attitude, social influence and self-efficacy in the second step, the model increased the variance it explains of the outcome with 19.1% (p = .000). With those constructs and age in the model, age and attitude were significant predictors of the change in sport behaviour, when controlling for all variables in the model. It seems that students with a more positive attitude about sporting now at university have a more positive (or less negative) change in sport behaviour when they started university. The constructs attitude and social influence were slightly correlated (r = .52, p < .01), with attitude having a stronger correlation with the outcome than social influence (r = .55 and r = .38 respectively, both p

< .01). This could explain why attitude was a significant predictor of the outcome in step 2, and social influence was not (β = .17, p = .060), for they could share a reasonable part in the explained variance of the outcome.

Table 17; Hierarchical multiple regression analysis predicting sport behaviour in transition (Standardized beta's).

Predictor	Step 1	Step 2	Step 3
Age	.50**	.33**	.30**
Attitude		.27**	.09
Social influence		.17	.10
Self-efficacy		.14	.02
Self-regulation			.30*
Habit			-.19*
R^2 model	**.248****	**.438****	**.520****

N=99. * p < .05, ** p< .01.

ΔR^2 =.248 for step 1 (p .000), ΔR^2 = .191 for step 2 (p .000), ΔR^2 = .081 for step 3 (p .001).

Individual injunctive norm item 'friends react positive' is removed via backwards deletion, and thus not included in prediction model. Barriers are also not included in the model due to difficult scaling.

Once self-regulation and habit were entered into the regression model (step three), age remained a significant positive predictor of the outcome (β = .30, p = .000), while attitude was no longer very important (β = .09, p = .461). Self-regulation and habit became however significant (respectively positive and negative) predictors of the sport behaviour in transition. Attitude and self-regulation were strongly correlated (r = .74, p < .01), so could share a large part of the explained variance in the outcome sport behaviour. Findings indicate that when all influence from other variables was kept constant, the change in sport behaviour when transitioning to university is more positive (or less negative) for students that are older, have a stronger self-regulation for practicing sport at university than during secondary school and that had a stronger habit of sports at secondary school. The total model with all predictors, explained 52.0% of the variance in the outcome, F (6,93) = 16.781, p < .001.

Lastly, for testing the explanatory model for sports at the SCB (research question 3.2), multiple hierarchical regression with outcome 'sport behavior at SCB', was performed with only respondents that own sport rights of the University Sports Center (table 18). As can be seen, the first step included two demographic variables (age and gender), which together explained 6.4% of the variance in the outcome (p = .124). If a student was male, significantly more time was spent sporting at the University Sports center (β = .26, p = .048), whilst controlling for age. In the second step, two items concerning knowledge about the sports center were added to the model. Addition of those predictors did not significantly increase the explained variance, but inclusion of these items removed the significant prediction ability of 'gender'. With these four predictors in the model, the extent to which the student was familiar with the sports center was a significant positive predictor (β = .28, p = .049)

of the minutes sport practice at the SCB. Age and knowledge about sport possibilities seemed to have very little predictive value for the outcome.

Table 18 : Hierarchical multiple regression analysis predicting sport behaviour at the SCB (Standardized beta's).

Predictor	Step 1	Step 2	Step 3	Step 4
Gender[a]	.26*	.21	.21	.08
Age	-.03	.02	-.03	.01
Familiarity SCB		.28*	.24	.02
Knowledge sports SCB		-.07	-.16	-.07
Attitudinal beliefs			.01	-.02
Attitude			.42**	.24*
Descriptive norm			.11	.00
Habit[b]				.51**
R^2 model	**.064**	**.127**	**.321****	**.451****

N=65 (only included respondents with sport rights). * p < .05, ** p< .01.

ΔR^2 =.064 for step 1 (p .124), ΔR^2 = .063 for step 2 (p .121), ΔR^2 = .195 for step 3 (p .002), ΔR^2 = .129 for step 4 (p .001).

Backwards deletion of individual attitudinal belief item 'register for courses'.

[a] Coded as 0 = female, 1 = male. [b] Single item.

The third step in this hierarchical regression added the constructs attitudinal beliefs, attitude and descriptive norm. With these constructs in the model, familiarity with the SCB was no longer a significant predictor (β = .24, p = .066), while attitude seemed to become the only significant predictor of the outcome (β = .42, p = .001). When corrected for all other variables, students with a positive attitude towards sporting at the University Sports center seemed to spent more time being active at the SCB. This step significantly increased the explained variance of the model with 19.5% (p = .002) to a total of 32.1% (F (7,58) = 3.923, p < .01). Finally, also the single habit item was included. Addition of habit alone significantly increased the explained variance of the outcome to a model total of 45.1%, F (8,57) = 5.844, p < .001. The habit item and the attitude construct seemed to be the two significant positive predictors of the sport behaviour at the SCB. Thus, if all variables are controlled for, students with a positive attitude towards sporting at the University Sports Centre (β = .24, p = .040) and that see sporting at the SCB as part of their weekly routine (β = .51, p = .001), sport more minutes a week at the SCB.

5. Discussion

The aim of this study was to obtain insight in the determinants of sport behaviour in freshmen university students. The three domains of interest were general sport behaviour, sport behaviour change in transition from secondary school to university and the sport behaviour at the University Sports Centre (SCB). An explanatory model was developed, incorporating behavioural determinants that were assumed to predict the student sport behaviour in all three domains. This model included demographical factors, and the determinants attitudinal beliefs, attitudes, social influence, self-efficacy, intention, self-regulation, habit and barriers. A questionnaire assessing sport behaviour and the determinants of sports specific for all three domains was constructed, and filled in by 109 first-year BSc students of Wageningen University.

This study found that the determinants attitudes, social influence and self-efficacy were strong predictors of the intention to sport. Together with age and attitudinal beliefs, the model explained more than half of the variance in intention. The determinants sport habits and the attitudinal belief 'sport makes me tired' were the strongest predictors for the general sport behaviour, respectively positive and negative. Also, there is an indication from that the intention to be active or habits mediated between self-efficacy and the sport behaviour. Concerning this domain, it can be concluded that the explanatory model was quite a good model to predict sport behaviour, as it explained a relatively large part (57.7%) of the variance in freshmen sport behaviour.

The sport behaviour in transition was found to be mostly predicted by age, the change in self-regulation (both positive predictors) and habits (negative predictor). For sport behaviour in transition it can be concluded that the determinants of change were a reasonably good attempt at explaining sport behaviour change (explaining 52.0% of variance in change). These results need to be interpreted with caution, as an experimental way of assessing determinants of change was used.

For sport behaviour at the SCB, the determinants attitude and habit seemed to play an important role in determining the number of minutes sported at the SCB. Students' attitude and familiarity with SCB facilities were positively associated with owning sport rights of the Sports centre, while the belief that they could meet students at the SCB was negatively associated. This study showed that in the domain of sport practice at the SCB, the used determinants from the explanatory model were a good start in predicting the sport behaviour at the sports centre (45.1% of variance explained).

To place the findings from this study into perspective, per domain results will be discussed and linked to findings from other studies. Furthermore, some limitations to this study and a conclusion will be presented.

5.1 General sport behaviour

Of all respondents, 62.7% spent more than 75 minutes/week on vigorous activity, while the other 38.3% of students did not meet this vigorous intensity exercise norm. Comparing the results from this

study with findings from other studies should be done with caution, as most studies on sport behaviour use different sport intensity levels as outcomes, and different types of behavioural measures. Similar rates were found in comparable studies, such as a study among 2729 Australian students where 40% was not sufficiently active (using energy expenditure as a measure of activity) to achieve long-term health benefits (Leslie, Owen et al. 1999), and in college undergraduates, where 31.2% of participants were rated 'non-exercisers' (Grubbs and Carter 2002). A study in American university freshmen students showed lower vigorous activity rates; 53% of the sample was not meeting national criteria for vigorous physical activity (Gyurcsik, Bray et al. 2004). Compared to the latter study, the sample in the present study consisted of freshmen students that appeared to be more active. However, the data collection in this study was performed a lot later in the college year than in the study of Gyurcsik, Bray et al. (2004), which might also explain this difference as the sport behaviour might have been attenuated as the students start to settle.

Furthermore, although a part of the validated measure SQUASH has been used to measure sport behaviour, it is still possible that respondents have a different interpretation of the term 'vigorous sport behaviour'. In the beginning of the survey, a short description of this behaviour was presented, to prevent differences in interpretation as much as possible. On the other hand, the extent to which a sport or intensity is perceived as vigorous exercise depends on physical condition and age (Leslie, Sparling et al. 2001; Breedveld, Kamphuis et al. 2008), and thus differs per person. As it is likely for respondents to answer the questions on determinants with a type of sport behaviour in mind that is vigorous to them, the behaviour might not meet the set criteria for vigorous intensity exercise and vigorous sport behaviour might therefore be overestimated.

The first step in testing the explanatory model for sport behaviour was checking whether the demographic variables and the determinants attitudinal beliefs, attitudes, social influence and self-efficacy indeed predicted the intention to be vigorously active in the student sample. It was found that these constructs explained 60.1% of variance in intention, which is quite high. A study in first-year students found attitude, subjective norm, and perceived behavioural control (showing similarities with self-efficacy) to be good predictors of the intention to engage in physical activity, explaining 37% of the variance (Kwan, Bray et al. 2009). A similarity between findings from that study and the current study, is that social influence/subjective norms seemed to be the least important predictor for intention. An explanation for the bigger explained variance of intention in this study could be the inclusion of demographic variable 'age' and attitudinal beliefs. The latter determinant's influence on intention was however found to be mediated by attitude.

As the explanatory model was tested for predictive strength for the sport behaviour, this study showed that the variables in the model explained 57.7% of the variance in sport behaviour in the student sample. A study that explored the relation between determinants intention, perceived behavioural control and past behaviour, and physical activity (through logistic regression) found an explained variance of 16% of the outcome (Kwan, Bray et al. 2009). This is similar to findings from Doerksen, Umstattd et al. (2009), which also found an explained variance of vigorous activity of 16% (SCT variables and BMI as predictors). De Bourdeaudhuij and Sallis (2002) tested a model with

predictors social influences, self-efficacy, perceived benefits and barrier for physical activity, and explained 22% (males) to 13% (females) of the variance in the behaviour. Compared to these studies, the predictors in this study explained a lot of the variation in sport behaviour of the students. However another study found the determinants of the social cognitive model (self-efficacy, self-regulation, outcome expectations and social support) explained 55% of the variance observed in physical activity (Rovniak, Anderson et al. 2002). As the current study included a lot of predictors, it is likely that the model accounts for more variation in the outcome. Caution should be taken concerning inclusion of too many predictors in the prediction model, although the used predictors all had a strong empirical and theoretical founding to be important predictors for the student sport behaviour.

In step two of this hierarchical regression analysis, self-efficacy was found to a significant predictor, while attitude and social influence were not. The importance of social influence on sport behaviour is widely supported (Leslie, Owen et al. 1999; Sherwood and Jeffery 2000). The finding that this determinant was not a significant predictor in step two of the analysis could partly be explained by the fact that the influence of social influence on sport behaviour might be mediated by self-efficacy, which was the case in a study of Rovniak, Anderson et al. (2002). Another explanation could be that as the social influence construct was formed from items on descriptive and injunctive norms, including these two types of norms separately would change the predicting quality of the social influences. This was not done because of better scale consistency for the combined construct, which is more practical (Rhodes and Courneya 2003) and usual practice within empirical studies (Smith and Louis 2009).

In a study by Rovniak, Anderson et al. (2002), the relation between self-efficacy and the exercise behaviour was mediated by self-regulation, but that did not show in the results from the current study. In this study it might be more likely that the influence of self-efficacy on sport behaviour was mediated by intention, as proposed in the TPB (Ajzen 1991). When intention (and habit) were entered into the prediction model, self-efficacy was no longer a significant predictor. On the other hand, intention was also not found to be a significant predictor of the sport behaviour, which is in line with findings from the study from Kwan, Bray et al. (2009). This might be caused by the fact that intention to be active in the following month and sport behaviour were assessed at the same time. It is therefore not logical that the measured intention would indeed explain variance in the sport behaviour. Another study has found that current physical activity was a positive predictor of the future intention to be active (Molina-García, Castillo et al. 2009), but due to the cross-sectional nature of this study this cannot be concluded. In contrast to intention, habit was however found to be a significant predictor of sports behaviour, when all determinants from the explanatory model was corrected for. A review of Sherwood and Jeffery (2000) stated that individuals with stronger self-efficacy are likely to exercise with such regularity that the behaviour becomes somewhat habitual. It could therefore be that the influence from the self-efficacy determinant on sport behaviour is mediated by the habit determinant, as the sport behaviour became habitual for individuals with greater self-efficacy. This is however not in line with the explanatory model, which stated that habit was a single, direct predictor of sport behaviour. As mentioned earlier in this report, habit has some congruence with past

behaviour. In a study of Kwan, Bray et al. (2009), past behaviour was found to be an important predictor of physical activity, on top of the TPB variables. Although it is obvious that habit is important for freshmen sport behaviour, the exact way in which it has influence on the behaviour is not completely clear.

Self-regulation was found to have a very small contribution to the regression model ($r = .001$, $p = .581$). This is in contrast with findings from a study of Rovniak, Anderson et al. (2002), which found self-regulation to have a strong effect on physical activity behaviour. Also, de Bruin, Sheeran et al. (2012) found that adding self-regulation to the prediction model increased the explained variance with 6.5%. It would be expected for self-regulation to be important, for vigorous intensity activity is challenging and requires processes such as goal setting and monitoring to perform the behaviour (Doerksen, Umstattd et al. 2009). In the used sample, self-regulatory skills seemed not to be important for student sport behaviour, while the effect of other determinants was kept constant. This might indicate that not necessarily the monitoring and responding to difficulties actions that would strengthen sport behaviour, but more other factors like the behaviour being habitual and students' feeling able to overcome difficult situations.

Findings from previous studies indicated that barriers are an important factor in determining student sport behaviour (Gyurcsik, Bray et al. 2004; Gómez-López, Gallegos et al. 2010). In this study, the barrier items did not form a consistent construct, and the individual items were eliminated from the prediction model with backwards deletion. If barrier items for sport behaviour would have formed a reliable construct, they might have showed to influence the relation between self-regulation and behaviour as proposed in the theoretical model.

5.2 Transition

The results of testing the explanatory model for sport behaviour in transition must be interpreted with caution, as recalling activity during secondary school is prone to disruption and memory degradation (Bray and Born 2004). Ideally, to measure determinants of sport behaviour change, respondents should complete a survey at the end of secondary school and at the beginning of university. In that way, scores on determinants and actual behaviour change could be compared accurately. This was however not possible in this current study, as the time of data collection was halfway through the college year. As the students had already settled in their new student life, the big change in sport behaviour as present at the first few months of university could be attenuated further in the year due to the decrease of initial 'stress'. Respondents thus could have noted smaller differences in determinants and behaviours than they might have reported closer after the transition period. On the other hand, the current student' sport habit behaviour might be closer related to the future sport behaviour.

The determinants used to predict behaviour change in transition were similar to the ones used for predicting current sport behaviour. A lack of studies on the transition domain has led to this decision, but it is not obvious that the same determinants are important in both domains. The measures for the determinants and behaviour were all formulated in terms of change, comparing the last year at

secondary school with now at university. Scores and outcomes were thus more difficult to interpret, as they all concern change. The total prediction model, including demographic variable age, and determinants attitude, social influence, self-efficacy, self-regulation and habit explained 52.0% of variance in minutes sported less/more after transition to university, which was quite high for a model with experimental types of determinant and behaviour formulations.

When looking at the regression results, it became clear that social influence was not an important determinant of the transition sport behaviour. This does not necessarily indicate that social influence was not at all important during transition, as the measure was only focussed on friend support and modeling. Parental influence was not included in the questionnaire, but there is reason to believe that there can be a big shift in parental influence on the child's behaviour as it leaves the parental home to move to university (Lau, Quadrel et al. 1990), which can influence the change in sport behaviour. In adolescence, the degree of parental support and rules decreases and the child gets more autonomy (Snoek 2010). This could also explain why self-regulation seemed to be an important predictor of the sport behaviour change. The older children get, the more self-regulating they become (Snoek 2010). It appeared that students with stronger self-regulatory skills at university than at secondary school and a stronger activity habit during secondary school had a more positive change in sport behaviour when they transitioned to university. Self-regulatory skills are needed to achieve habit change, for only motivation is not enough (Bandura 1998).

The finding that a stronger sport habit during university was a significant negative predictor of the behavioural change in transition is somewhat in line with expectations. In other words, students with a stronger sport habit during secondary school had a more positive change in sport behavior. A longitudinal study found that sport participation during adolescence was a significant positive predictor of sports participation in young adulthood (Perkins, Jacobs et al. 2004). If students have a habit of sports, it would be likely that this habit is maintained when the students starts university, and it seems that the sport behavior is even increased when transitioning to university. This is somewhat remarkable, as habitual sport behaviour is mainly practiced in stable situations, where environmental cues automatically initiate the behavior (de Bruijn and Rhodes 2011). The environment that students were used to during secondary school is obviously no longer there at university, but that did not seem to hinder students to practice sports.

Age was an important positive predictor in all steps of the hierarchical regression. This might need some consideration, as it is likely that older freshmen students did not transition directly from secondary school to university. In that case, the stressor effect of transition might have less influence on those students. The demographic variable gender has been found to be strongly related to sport behaviour through transition from adolescence to young adulthood (Perkins, Jacobs et al. 2004). In the current study, gender was not included in the prediction model because it was a non-significant correlate of the sport behaviour change, but including this variable in the model might have increased the explained variance of sport behaviour change. Furthermore, the constructs intention and barriers of sport behaviour change were not included in the prediction model, but might have been important for a shift in sport behaviour. Intention with regard to students planning to adopt (new) healthy habits

might be important for the actual behaviour they perform after transition. This could be improved in future studies, when data is collected both at the end of secondary school and at the beginning of university.

5.3 University Sports Centre

Firstly, it must be noted that due to practical reasons, only a selection of determinants from the explanatory model was used to assess sport behaviour at the University Sports Centre. Nevertheless, these determinants still explained 45.1% of variation in minutes sported at the SCB. This result was however obtained with eight predictors in the model (gender, age, familiarity with SCB, knowledge sports SCB, attitudinal beliefs, attitude, descriptive norm and habit), and only 65 cases. With only demographics and knowledge-items in the model, familiarity of SCB facilities was a significant positive predictor of the minutes sported. When attitudinal beliefs, attitude and descriptive norms were added, familiarity lost its predictive quality, while attitude became the sole significant predictor. Attitudinal beliefs did not seem to play a role, which was probably due to the mediating effect of attitudes. Finally, habit of sporting at the SCB and attitude were significant positive predictors of minutes sport at the SCB, when effect from all other determinants was controlled for. This indicates that students that have sport at the SCB as part of their weekly routine, sport more minutes a week at the SCB. As this is such a specific study domain, comparison with other studies is difficult.

With regard to the association between behavioural determinants and the possession of sport rights, only a few factors were significantly associated. These determinants could not be linked to the explanatory model, as only a few determinants concerning sports at the SCB were measured in students without sport rights. It is however expected that besides attitudes and beliefs about sporting at the SCB, other (practical) factors that were not assessed in this study play a role, such as motivation, time, and money.

The finding from this study that students that own sport rights of the University Sports centre seem to sport more in general, is in line with findings from a study in Spanish students (Molina-García, Castillo et al. 2009). In that study, students (both male and female) that were a member of a sports club seemed to practice more physical activity. This positive association is somewhat logical, as becoming a member of a gym is probably related with a desire of being physically active (Leslie, Owen et al. 1999).

5.4 Limitations

Although this study had some interesting findings on the applicability of the explanatory model on the domains of sport behaviour, there are some aspects that need to be considered regarding the interpretation of the results.

Data was collected using (online) self-report questionnaires, a method that is sensible to social desirable answers and reporting bias (Brug, van Assema et al. 2010). It is however the easiest and most convenient way to measure personal beliefs within a large population. The respondents were recruited via e-mail, poster or flyer-invitation. This might have induced selection bias, leading to only

respondents with an interest in sports, or a strong aversion of sports, completing the questionnaire. This was prevented as much as possible, by not mentioning the topic of the survey in the invitation. In this way, it was attempted to obtain a diverse student sample completing the survey. Still, generalizing the found results to the complete (Wageningen University) freshmen student population should be done with caution. The used subjects (N = 105 or less in other parts of the analyses) are only a small part of the total Wageningen University freshmen population, consisting of 1055 students (WUR 2012). The gender division in the used sample (39.4% male, 60.6%) is quite similar to the total freshmen population (43.4% male, 56.6% female). The used sample size was right in the middle of sample size recommendations for the used number of predictors in the regression model (Field 2009).

A design limitation for the second domain of interest in this study was that students had to recall aspects from their last year of secondary school, which was at the time of data collection (April 2012) about ten months ago. The use of this retrospective method might have led to memory bias and thus less reliable or accurate answers. During the pre-test (March 2012), the students noted that it was a bit difficult to recall but not impossible. To facilitate recalling the time at secondary school, questions are formulated in terms of change, to allow students to compare the present moment to that time. On the other hand, as the present beliefs and behaviour are easier to perceive, this might have caused the students to over- or underestimate their beliefs or behaviour at secondary school. It is evident that using a longitudinal design with questionnaires at two time points would have been better to examine this sport behaviour domain.

The scales used to measure the behavioural determinants were (partly) specifically designed for this study, and items were based on empirical and theoretical findings. Most of the used scales showed high reliability coefficients ($\alpha > .70$), indicating good internal consistency (Field 2009). High reliability coefficients can be caused by having a lot of items within a scale or by items that are highly inter-correlated (indicating good internal validity) (Clark and Watson 1995). Also, as the influence of a big number of items in a scale is mostly present above 40 items in one scale (Clark and Watson 1995), our study stays well below that with the highest number of items in one scale being nine. Nevertheless, it might have been better to use complete, validated determinant-scales from other studies, that have already been validated and tested in a similar population. In that way, it would be evident that good, founded, and reliable scales were used to collect data. On the other hand, because this study included such a wide array of determinants, using existing scales (often with a lot of items) was not practical, as it would lead to a too lengthy survey and induce high drop-out rates. Furthermore, there is reason to believe that different determinants are important for moderate and vigorous intensity exercise (Winters, Petosa et al. 2003). The determinants included in the explanatory model may thus not all be equally important for this study, as the focus is solely on vigorous intensity sports.

Future studies might narrow focus to one of the three domains from this study, and use existing validated construct scales and a larger sample to obtain more insight in the use of the explanatory model. Also, using a longitudinal design can fully capture the influence of the determinants on the sport behaviours.

5.5 Conclusion

This study presents a broad examination of the determinants of freshmen students' physical activity (in general, in transition and at the University Sports Centre), based on an extensive explanatory model with behavioural determinants, selected from empirical studies and multiple theories. Although no conclusions about causality could be made due to the cross-sectional design of this study, this study had some some interesting findings.

The determinants for general sport behaviour were found to be good predictors of the minutes spent on sport of Wageningen University freshmen BSc students, explaining over half of the variance in sport behaviour. Sport habits are important in ensuring physically active students, and might mediate the relation between self-efficacy and the sport behaviour.

Experimentally formulated determinants of change from the explanatory model explained over half of the variance in sport behaviour change in transition from secondary school to university. For this domain, students that were older, had stronger self-regulatory skills at university and that had a stronger sport habit during secondary school were found to have a more positive change in sport behaviour. Using a longitudinal design with measurement during secondary school and at university, would allow to further test the applicability of the determinants of the model for sport behaviour in transition and to include intention to the model.

Finally, the few predictors used from the explanatory model to predict sport behaviour at the SCB explained just less than half of the variance in minutes sported at the SCB. Students with sport rights from the SCB that had a more positive attitude and a habit of practicing sports at the SCB spent more minutes at the Sports Centre. Also in this domain, sport habit showed to be important for sports practice.

Overall, the explanatory model was found to be a quite good prediction model for freshmen sport behaviour in all three domains. However, as the model showed no perfect relation with the behaviours, other factors that were not included in the model seemed to be important as well. Future studies could explore the use of this explanatory model further, by using a larger sample and using students from multiple universities to assess generalizability. Also, using a longitudinal design to assess sport behaviour change in transition with inclusion of the determinant 'intention' and a more extensively considered question format would derive more understanding of sport behaviour in this transition period. Including more specific factors concerning sports at the University Sports Centre to obtain more insights in determinants of sporting at a university sports Centre. It might help the University Sports centre to encourage more freshmen students to become active, also right when they start university. Overall, this study indicates that creating a physical activity habit is important for the formation of an active student population and that using determinants from multiple theories is good for predicting students' sport behaviour.

References

Aarts, H., T. Paulussen, et al. (1997). "Physical exercise habit: on the conceptualization and formation of habitual health behaviours." Health Education Research **12**(3): 363-374.

Ajzen, I. (1991). "The Theory of Planned Behavior." Organizational Behavior and Human Decision Processess **50**: 179-211.

Ajzen, I. (2002). Constructing a TpB Questionnaire: Conceptual and Methodological Considerations.

Ajzen, I. and T. J. Madden (1986). "Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control." Journal of Experimental Social Psychology **22**(5): 453-474.

Allison, K. R., J. J. M. Dwyer, et al. (1999). "Perceived barriers to physical activity among high school students." Preventive Medicine **28**(6): 608-615.

Anderson, D. A., J. R. Shapiro, et al. (2003). "The freshman year of college as a critical period for weight gain: An initial evaluation." Eating Behaviors **4**(4): 363-367.

Arnett, J. (2000). "Emerging Adulthood: A Theory of Development From the Late Teens Through the Twenties." American Psychologist **55**(5): 469-480.

Arthur, N. and B. Hiebert (1996). "Coping with Transition to Post-Secondary Education." Canadian Journal of Counselling **30**(2): 93-103.

Bandura, A. (1989). Social cognitive theory. Annals of child development - Six theories of child development. R. Vasta. Greenwich, CT: JAI Press. **6**.

Bandura, A. (1998). "Health promotion from the perspective of social cognitive theory." Psychology & Health **13**(4): 623-649.

Bandura, A. (2004). "Health Promotion by Social Cognitive Means." Health Education & Behavior **31**(143): 143 - 164.

Bandura, A. (2006). Guide for constructing self-efficacy scales. Self-efficacy beliefs of adolescents. F. Parajes and T. Urdan. Greenwich, Information Age Publishing**:** 307–337.

Baranowski, T., K. W. Cullen, et al. (1997). "Transitions out of high school: Time of increased cancer risk?" Preventive Medicine **26**(5 I): 694-703.

Bauman, A. E., J. F. Sallis, et al. (2002). "Toward a better understanding of the influences on physical activity: The role of determinants, correlates, causal variables, mediators, moderators, and confounders." American Journal of Preventive Medicine **23**(2 SUPPL. 1): 5-14.

Bernaards, C. (2010). Bewegen in Nederland 2000-2010 - Resultaten TNO-monitor bewegen en gezondheid. Leiden, TNO.

Bize, R., J. A. Johnson, et al. (2007). "Physical activity level and health-related quality of life in the general adult population: A systematic review." Preventive Medicine **45**(6): 401-415.

Blanchard, C., J. Fisher, et al. (2008). "Understanding physical activity behavior in African American and Caucasian college students: An application of the theory of planned behavior." Journal of American College Health **56**(4): 341-346.

Bray, S. R. and H. A. Born (2004). "Transition to University and Vigorous Physical Activity: Implications for Health and Psychological Well-Being." Journal of American College Health **52**(4): 181-188.

Bray, S. R. and M. Y. W. Kwan (2006). "Physical activity is associated with better health and psychological well-being during transition to university life." Journal of American College Health **55**(2): 77-82.

Breedveld, K. (2005). "Vrije tijd - Sport en bewegen." Tijdbesteding, 2012, from http://www.tijdsbesteding.nl/ > Organisatie > Onderzoeksgroepen > Tijd, Media & Cultuur > Tijdsbesteding > Hoe lang en hoe vaak > Vrije tijd > Sport en bewegen.

Breedveld, K., C. Kamphuis, et al. (2008). Rapportage sport 2008. Den Haag, Sociaal en Cultureel Planbureau / W.J.H. Mulier Instituut.

Brug, J., P. van Assema, et al. (2010). Gezondheidsvoorlichting en gedragsverandering: Een planmatige aanpak. Assen, Van Gorcum & Comp. B.V.

CBS (2003). Jeugd 2003, cijfers en feiten. Voorburg/Heerlen, Centraal Bureau voor de Statistiek.

CBS. (2012). "Leefstijl, preventief onderzoek; sport." 2012, from http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=81177ned&D1=51,57,60-61&D2=0-2,5,13,26-27,30,37&D3=0&D4=l&HDR=T&STB=G1,G2,G3&VW=T.

Childers, C. C., E. Haley, et al. (2011). "Insights into university freshman weight issues and how they make decisions about eating." Journal of Consumer Affairs **45**(2): 306-328.

Clark, L. A. and D. Watson (1995). "Constructing validity: Basic issues in objective scale development." Psychological Assessment **7**(3): 309 - 319.

Courneya, K. S. and T. M. Bobick (2000). "Integrating the theory of planned behavior with the processes and stages of change in the exercise domain." Psychology of Sport and Exercise **1**(1): 41-56.

Crombie, A. P., J. Z. Ilich, et al. (2009). "The freshman weight gain phenomenon revisited." Nutrition Reviews **67**(2): 83-94.

Daniels, S. R., D. K. Arnett, et al. (2005). "Overweight in Children and Adolescents." Circulation **111**(15): 1999-2012.

De Bourdeaudhuij, I. and J. Sallis (2002). "Relative Contribution of Psychosocial Variables to the Explanation of Physical Activity in Three Population-Based Adult Samples." Preventive Medicine **34**(2): 279-288.

de Bruijn, G. J. and R. E. Rhodes (2011). "Exploring exercise behavior, intention and habit strength relationships." Scandinavian Journal of Medicine & Science in Sports **21**(3): 482-491.

de Bruin, M., P. Sheeran, et al. (2012). "Self-Regulatory Processes Mediate the Intention-Behavior Relation for Adherence and Exercise Behaviors." Health Psychology.

Dodd, L. J., Y. Al-Nakeeb, et al. (2010). "Lifestyle risk factors of students: A cluster analytical approach." Preventive Medicine **51**(1): 73-77.

Doerksen, S. E., M. R. Umstattd, et al. (2009). "Social cognitive determinants of moderate and vigorous physical activity in college freshmen." Journal of Applied Social Psychology **39**(5): 1201-1213.

Ebben, W. and L. Brudzynski (2008). "Motivations and barriers to exercise among college students." Journal of Exercise Physiology Online **11**(5): 1-11.

Field, A. (2009). Discovering statistics using SPSS, SAGE Publications.

Fishbein, M., H. Triandis, et al. (2001). Factors Influencing Behavior and Behavior Change. Handbook of Health Psychology. A. Baum, T. Revenson and J. Singer, Lawrence Erlraum Associates.

Fox, K. R. (1999). "The influence of physical activity on mental well-being." Public Health Nutrition **2**(3 A): 411-418.

Gómez-López, M., A. G. Gallegos, et al. (2010). "Perceived barriers by university students in the practice of physical activities." Journal of Sports Science and Medicine **9**(3): 374-381.

Gómez-López, M., A. Granero-Gallegos, et al. (2011). "The abandonment of an active lifestyle within university students: Reasons for abandonment and expectations of re-engagement." Psychologica Belgica **51**(2): 155-175.

Gordon-Larsen, P., M. C. Nelson, et al. (2004). "Longitudinal physical activity and sedentary behavior trends: Adolescence to adulthood." American Journal of Preventive Medicine **27**(4): 277-283.

Grubbs, L. and J. Carter (2002). "The relationship of perceived benefits and barriers to reported exercise behaviors in college undergraduates." Family and Community Health **25**(2): 76-84.

Gyurcsik, N. C., S. R. Bray, et al. (2004). "Coping with barriers to vigorous physical activity during transition to university." Family and Community Health **27**(2): 130-142.

Gyurcsik, N. C., K. S. Spink, et al. (2006). "An ecologically based examination of barriers to physical activity in students from grade seven through first-year university." Journal of Adolescent Health **38**(6): 704-711.

Han, J. L., M. K. Dinger, et al. (2008). "Changes in women's physical activity during the transition to college." American Journal of Health Education **39**(4): (Abstract only).

Haskell, W. L., I.-M. Lee, et al. (2007). "Physical Activity and Public Health: Updated Recommendation for Adults from the American College of Sports Medicine and the American Heart Association." Medicine & Science in Sports & Exercise **39**(8): 1423-1434.

Hiraoka, J., Y. Nakamura, et al. (1996). "A comparative epidemiological study on the effects of physical fitness on health level." Journal of Epidemiology **6**(3): 120-127.

Hoeyman, N., J. Melse, et al. (2010). Gezondheid en determinanten: Deelrapport van de VTV 2010, Van gezond naar beter. Bilthoven, Rijksinstituut voor Volksgezondheid en Milieu (RIVM).

Irwin, J. D. (2007). "The prevalence of physical activity maintenance in a sample of university students: A longitudinal study." Journal of American College Health **56**(1): 37-41.

Jung, M. E., S. R. Bray, et al. (2008). "Behavior change and the freshman 15: Tracking physical activity and dietary patterns in 1st-year university women." Journal of American College Health **56**(5): 523-530.

Keating, X. D., J. Guan, et al. (2005). "A meta-analysis of college students' physical activity behaviors." Journal of American College Health **54**(2): 116-125.

Kesaniemi, Y. K., E. Danforth, et al. (2001). "Dose-response issues concerning physical activity and health: an evidence-based symposium." Medicine and science in sports and exercise **33**(6 Suppl): S351-358.

Kilpatrick, M., E. Hebert, et al. (2005). "College Students' Motivation for Physical Activity: Differentiating Men's and Women's Motives for Sport Participation and Exercise." Journal of American College Health **54**(2): 87-94.

Kwan, M. Y. W., S. R. Bray, et al. (2009). "Predicting physical activity of first-year university students: An application of the theory of planned behavior." Journal of American College Health **58**(1): 45-52.

Lau, R. R., M. J. Quadrel, et al. (1990). "Development and Change of Young Adults' Preventive Health Beliefs and Behavior: Influence from Parents and Peers." Journal of Health and Social Behavior **31**(3): 240-259.

Leggett, C., M. Irwin, et al. (2011). "Factors associated with physical activity among Canadian high school students." International Journal of Public Health: 1-10.

Leslie, E., N. Owen, et al. (1999). "Insufficiently Active Australian College Students: Perceived Personal, Social, and Environmental Influences." Preventive Medicine **28**(1): 20-27.

Leslie, E., P. Sparling, et al. (2001). "University campus settings and the promotion of PA in young adults: lessons from research in OZ and the USA." Health Education **101**(3): 116-125.

Marcus, B. H., L. H. Forsyth, et al. (2000). "Physical activity behavior change: Issues in adoption and maintenance." Health Psychology **19**(1 SUPPL.): 32-41.

McLeroy, K. R., D. Bibeau, et al. (1988). "An ecological perspective on health promotion programs." Health Education Quarterly **15**(4): 351-377.

Michie, S. and M. Johnston (2005). "Making psychological theory useful for implementing evidence based practice: a consensus approach." Quality and Safety in Health Care **14**(1): 26 - 33.

Michie, S., M. Johnston, et al. (2008). "From Theory to Intervention: Mapping Theoretically Derived Behavioural Determinants to Behaviour Change Techniques." Applied Psychology: An International Review **57**(4): 660 - 680.

Molina-García, J., I. Castillo, et al. (2009). "Determinants of leisure-time physical activity and future intention to practice in Spanish College Students." Spanish Journal of Psychology **12**(1): 128-137.

Nelson, M. C., R. Kocos, et al. (2009). "Understanding the Perceived Determinants of Weight-related Behaviors in Late Adolescence: A Qualitative Analysis among College Youth." Journal of Nutrition Education and Behavior **41**(4): 287-292.

Noar, S. M. and R. S. Zimmerman (2005). "Health Behavior Theory and cumulative knowledge regarding health behaviors: are we moving in the right direction?" Health Education Research **20**(3): 275 - 290.

Patterson, E., D. McGeough, et al. (2006). "Self-efficacy, stages of change and physical activity in Irish college students." Journal of Public Health **14**(2): 81-86.

Penedo, F. J. and J. R. Dahn (2005). "Exercise and well-being: a review of mental and physical health benefits associated with physical activity." Current Opinion in Psychiatry **18**(2): 189-193.

Perkins, D. F., J. E. Jacobs, et al. (2004). "Childhood and Adolescent Sports Participation as Predictors of Participation in Sports and Physical Fitness Activities During Young Adulthood." Youth & Society **35**(4): 495-520.

Racette, S. B., S. S. Deusinger, et al. (2005). "Weight changes, exercise, and dietary patterns during freshman and sophomore years of college." Journal of American College Health **53**(6): 245-251.

Renders, C., J. Seidell, et al. (2002). Het gezondheidsprobleem rond overgewicht bij kinderen. Gezondheid en gedrag: debatten en achtergrondstudies. Zoetermeer, Raad voor Volksgezondheid en Zorg.

Rhodes, R. E. and K. S. Courneya (2003). "Investigating multiple components of attitude, subjective norm, and perceived control: An examination of the theory of planned behaviour in the exercise domain." British Journal of Social Psychology **42**(1): 129-146.

Romaguera, D., P. Tauler, et al. (2011). "Determinants and patterns of physical activity practice among Spanish university students." Journal of Sports Sciences **29**(9): 989-997.

Rovniak, L., E. Anderson, et al. (2002). "Social cognitive determinants of physical activity in young adults: A prospective structural equation analysis." Annals of Behavioral Medicine **24**(2): 149-156.

Sallis, J. F., M. F. Hovell, et al. (1992). "Predictors of Adoption and Maintenance of Vigorous Physical Activity in Men and Women." Preventive Medicine **21**: 237 - 251.

Sallis, J. F., M. F. Hovell, et al. (1989). "A multivariate study of determinants of vigorous exercise in a community sample." Preventive Medicine **18**(1): 20-34.

Sallis, J. F., J. J. Prochaska, et al. (2000). "A review of correlates of physical activity of children and adolescents." Medicine & Science in Sports & Exercise: 963 - 975.

Salmon, J., N. Owen, et al. (2003). "Physical activity and sedentary behavior: A population-based study of barriers, enjoyment, and preference." Health Psychology **22**(2): 178-188.

Saunders, R. P., R. R. Pate, et al. (1997). "Development of Questionnaires to Measure Psychosocial Influences on Children's Physical Activity." Preventive Medicine **26**(2): 241-247.

Schrijvers, C. T. M. and C. Schoemaker (2008). Spelen met gezondheid - Leefstijl en psychische gezondheid van de Nederlandse jeugd. Bilthoven, RIVM.

Sherwood, N. and R. Jeffery (2000). "The behavioral determinants of exercise: Implications for Physical Activity Interventions." Annu. Rev. Nutr. **20**(1): 21-44.

Smith, J. R. and W. R. Louis (2009). "Group Norms and the Attitude–Behaviour Relationship." Social and Personality Psychology Compass **3**(1): 19-35.

Snoek, H. (2010). Families on the balance - Eating behaviour and weight status of adolescents and their families. , Radboud University Nijmegen.

Strong, K. A., S. L. Parks, et al. (2008). "Weight Gain Prevention: Identifying Theory-Based Targets for Health Behavior Change in Young Adults." Journal of the American Dietetic Association **108**(10): 1708-1715.e1703.

Tergerson, J. L. and K. A. King (2002). "Do Perceived Cues, Benefits, and Barriers to Physical Activity Differ Between Male and Female Adolescents?" Journal of School Health **72**(9): 374-380.

Trost, S., N. Owen, et al. (2002). "Correlates of adults' participation in physical activity: review and update." Medicine & Science in Sports & Exercise **34**(12): 1996-2001.

US DHHS (1997). Physical Activity and Health: A Report of the Surgeon General, U.S. Department of Health and Human Services.

Verplanken, B. and O. Melkevik (2008). "Predicting habit: The case of physical exercise." Psychology of Sport and Exercise **9**(1): 15-26.

Verplanken, B. and S. Orbell (2003). "Reflections on Past Behavior: A Self-Report Index of Habit Strength1." Journal of Applied Social Psychology **33**(6): 1313-1330.

Visscher, T., S. Kremers, et al. (2007). Preventie van gewichtsstijging en richtlijnen voor gewichtsbeheersing. Bilthoven, RIVM.

Wang, D., C. Ou, et al. (2009). "Health-promoting lifestyles of university students in Mainland China." BMC Public Health **9**: 379.

Warburton, D. E. R., C. W. Nicol, et al. (2006). "Health benefits of physical activity: The evidence." CMAJ **174**(6): 801-809.

Webb, T. L. and P. Sheeran (2006). "Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence." Psychological Bulletin **132**(2): 249-268.

Wen, C. P., J. P. M. Wai, et al. (2011). "Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study." The Lancet **378**(9798): 1244-1253.

Wendel-Vos, G. C. W. (2012). "Normen van lichamelijke (in)activiteit." Volksgezondheid Toekomst Verkenning, Nationaal Kompas Volksgezondheid, from http://www.nationaalkompas.nl > Gezondheidsdeterminanten > Leefstijl > Lichamelijke activiteit.

Wendel-Vos, G. C. W., A. J. Schuit, et al. (2003). "Reproducibility and relative validity of the short questionnaire to assess health-enhancing physical activity." Journal of Clinical Epidemiology **56**(12): 1163-1169.

WHO (2011). Global Recommendations on Physical Activity for Health - 18-64 years old. W. H. Organisation.

WHO/FIMS Committee on Physical Activity (1995). Exercise for health. Bullitin of the World Health Organization. **2:** 135 - 136.

Williams, D., E. Anderson, et al. (2005). "A review of the outcome expectancy construct in physical activity research." Annals of Behavioral Medicine **29**(1): 70-79.

Winters, E. R., R. L. Petosa, et al. (2003). "Using social cognitive theory to explain discretionary, "leisure-time" physical exercise among high school students." Journal of Adolescent Health **32**(6): 436-442.

WUR (2012). Data studenten Wageningen Universiteit 2011-2012 - studie en leeftijd. Wageningen.

Appendix I: Questionnaire

Bedankt dat je deze vragenlijst in wilt vullen!

Deze vragenlijst gaat over intensief sporten.
Dit is intensieve lichamelijke activiteit, waarbij de hartslag verhoogt, je het warm krijgt en/of begint te zweten.
Voorbeelden: voetbal, volleybal, hardlopen, (indoor) fietsen, fitness, zwemmen, tennis, etc.

Lees de vragen goed, en geef eerlijk antwoord. Je eerste ingeving is meestal het beste.
Je antwoorden worden anoniem verwerkt.
Het invullen van deze vragenlijst duurt ongeveer 15 minuten.

Onder de studenten die de vragenlijst volledig invullen worden 2 bioscoopbonnen verloot.
Vul daarom aan het eind van de vragenlijst je e-mailadres in.

Geslacht

- Man
- Vrouw

Leeftijd

We zijn benieuwd naar jouw sportgedrag.

Denk aan een normale week in de afgelopen maand, dus niet aan bv. een vakantieweek of een week waarin je ziek was.

Op elke regel kun je één sport invullen, en voor die sport aangeven op welke dagen je die sport doet.
Geef ook aan hoeveel minuten je gemiddeld per dag die sport doet, op de dagen dat je die sport uitvoert.
Vul alleen de sporten in die je in een normale week doet, dus niet alle regels hoeven ingevuld te worden.

Het gaat hierbij om activiteiten die je minstens 10 aaneengesloten minuten hebt uitgevoerd.
Beweging als transport (bijvoorbeeld fietsen naar de universiteit) hoort hier niet bij.
Als je niet sport, kun je dat onderaan aangeven.

	Op welke dag(en) doe je deze sport?							
	ma	di	wo	do	vr	za	zo	Gemiddeld aantal minuten per dag
	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	

- Ik sport niet

Determinanten huidig sportgedrag

De onderstaande vragen gaan over intensieve beweging, oftewel sporten.
Lees de vragen goed, en geef eerlijk antwoord.

Ik ben van plan om de komende maand elke week minstens 75 minuten intensief te sporten.

Absoluut mee oneens	○	○	○	○	○	○	○	Absoluut mee eens

Als ik me voorstel dat ik elke week minstens 75 minuten intensief sport, dan vind ik dat...

Heel erg onplezierig	○	○	○	○	○	○	○	Heel erg plezierig
Heel erg onbelangrijk	○	○	○	○	○	○	○	Heel erg belangrijk

	Heel erg onbelangrijk	○	○	○	○	○	○	Heel erg belangrijk
	Heel erg uitdagend	○	○	○	○	○	○	Heel erg saai

Ik verwacht de komende maand elke week minstens 75 minuten intensief te sporten

	Helemaal mee oneens	○	○	○	○	○	○	Helemaal mee eens

Als ik elke week minstens 75 minuten zou sporten, verwacht ik dat..

	Zeker niet						**Zeker wel**
Mijn spieren sterker worden	○	○	○	○	○	○	○
Ik veel meer ontspannen ben	○	○	○	○	○	○	○
Ik er moe van word	○	○	○	○	○	○	○
Ik er plezier aan beleef	○	○	○	○	○	○	○
Dat goed is voor mijn uiterlijk	○	○	○	○	○	○	○
Ik sociale contacten opdoe	○	○	○	○	○	○	○
Ik liever andere dingen met mijn tijd had gedaan	○	○	○	○	○	○	○

Mijn vrienden vinden dat ik elke week minstens 75 minuten intensief moet sporten

	Absoluut niet mee eens	○	○	○	○	○	○	Absoluut mee eens

Mijn vrienden keuren het goed als ik elke week minstens 75 minuten intensief sport

	Absoluut wel	○	○	○	○	○	○	Absoluut niet

Mijn vrienden moedigen me aan om elke week minstens 75 minuten intensief te sporten

	Absoluut niet	○	○	○	○	○	○	Absoluut wel

Ik ga proberen om de komende maand elke week minstens 75 minuten intensief te sporten

	Zeker niet	○	○	○	○	○	○	Zeker wel

Als ik elke week minstens 75 minuten intensief zou sporten, verwacht ik dat..

	Zeker niet						**Zeker wel**
Ik mijn gewicht kan beheersen	○	○	○	○	○	○	○
Ik weinig motivatie heb	○	○	○	○	○	○	○
Ik veel uithoudingsvermogen krijg	○	○	○	○	○	○	○
Ik later geen spijt heb	○	○	○	○	○	○	○
Dat me veel tijd kost	○	○	○	○	○	○	○

Persoonlijk vind ik elke week minstens 75 minuten intensief sporten..

	Heel erg slecht	○	○	○	○	○	○	Heel erg goed
	Heel erg prettig	○	○	○	○	○	○	Heel erg onprettig
	Heel erg onverstandig	○	○	○	○	○	○	Heel erg verstandig
	Heel erg nuttig	○	○	○	○	○	○	Heel erg zinloos

Als je van plan bent om te sporten, belemmeren de volgende factoren je daarbij?

	Absoluut geen belemmering						**Absoluut wel een belemmering**
Hoge studiedruk	○	○	○	○	○	○	○
Sporten kost veel geld	○	○	○	○	○	○	○
Je hebt niet voldoende toegang tot faciliteiten	○	○	○	○	○	○	○
Je hebt niemand om mee te gaan sporten	○	○	○	○	○	○	○

Mijn vrienden sporten elke week minstens 75 minuten intensief

	Absoluut niet	○	○	○	○	○	○	Absoluut wel

Elke week minstens 75 minuten intensief sporten is normaal voor studenten

Zeker wel								Zeker niet

Mijn vrienden gaan vaak mee intensief sporten

Absoluut niet								Absoluut wel

Ik houd altijd in de gaten of ik elke week minstens 75 minuten intensief sport

Absoluut niet mee eens								Absoluut wel mee eens

Ik denk dat het me lukt om altijd 75 minuten per week intensief te sporten, ook als ik..

	Zeker niet						Zeker wel
Een drukke week heb							
Niemand heb om mee te sporten							
Geen zin heb							
Me moe voel							
Nog veel voor mijn studie moet doen							
Een sociale uitnodiging krijg op momenten dat ik van plan was om te sporten							

Als ik merk dat ik in een week niet toe ga komen aan 75 minuten intensief sporten, probeer ik mijn week zo in te delen dat het me toch gaat lukken

Zeker niet								Zeker wel

Elke week minstens 75 minuten intensief sporten is iets dat..

	Helemaal niet mee eens						Helemaal mee eens
Ik doe zonder na te denken							
Ik al een lange tijd doe							
Deel uitmaakt van mijn wekelijkse routine							
Me moeite zou kosten om niet te doen							

Ik let altijd goed op of ik elke week minstens 75 minuten intensief sport

Zeker niet								Zeker wel

Als ik op een dag niet aan sporten toe kom, probeer ik dit op een andere dag in die week in te halen

Helemaal niet mee eens								Helemaal wel mee eens

Sportgedrag transitie middelbare school - universiteit

We zijn ook benieuwd naar je sportgedrag in het laatste jaar van de middelbare school, en of je sportgedrag veranderd is toen je in Wageningen ging studeren.

Vergeleken met mijn sportgedrag in het laatste jaar van de middelbare school, sport ik nu per week gemiddeld..

Veel minder	Minder	Evenveel	Meer	Veel meer

Geef aan hoeveel minuten per week je nu meer/minder sport dan tijdens het laatste jaar van de middelbare school? (Vul alleen getallen in. Indien je evenveel sport, vul dan 0 in)

Determinanten sportgedrag transitie

Denk bij de volgende vragen terug aan het laatste jaar van je middelbare school.

Lees de vragen goed!

Op de middelbare school vond ik intensief sporten veel leuker dan nu

Absoluut niet mee eens	○	○	○	○	○	○	○	Absoluut wel mee eens

Intensief sporten was op de middelbare school veel belangrijker voor me dan nu

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Vergeleken met de middelbare school zetten mijn vrienden op de universiteit me veel meer aan om te gaan sporten

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Sporten geeft me nu een veel beter gevoel dan toen ik nog op de middelbare school zat

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Voor mij zitten er nu meer voordelen aan intensief sporten dan op de middelbare school

Helemaal niet mee eens	○	○	○	○	○	○	○	Helemaal wel mee eens

Mijn vrienden op de middelbare school reageerden veel vaker positief op het feit dat ik intensief sport dan mijn vrienden nu

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Het lukte me op de middelbare school beter om altijd intensief te sporten dan me dat nu lukt, als ik..

	Zeker niet						Zeker wel
Moe ben	○	○	○	○	○	○	○
Een drukke week heb	○	○	○	○	○	○	○
Geen zin heb	○	○	○	○	○	○	○
Nog veel voor mijn studie moet doen	○	○	○	○	○	○	○
Een sociale uitnodiging krijg op momenten dat ik van plan was om te sporten	○	○	○	○	○	○	○

Op de middelbare school had ik veel meer vrienden die intensief sportten dan nu

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Ik ga nu veel vaker met mijn vrienden sporten dan op de middelbare school

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Op de universiteit zie ik veel meer studenten intensief sporten dan scholieren op de middelbare school

Helemaal niet mee eens	○	○	○	○	○	○	○	Helemaal mee eens

Ik had op de middelbare school veel meer discipline in intensief sporten dan nu

Zeker niet	○	○	○	○	○	○	○	Zeker wel

Op de middelbare school was intensief sporten veel meer routine dan nu

Helemaal niet mee eens	○	○	○	○	○	○	○	Helemaal mee eens

Waar regelmatig sporten echt een gewoonte was op de middelbare school, is het dat nu niet meer

Helemaal niet mee eens	○	○	○	○	○	○	○	Helemaal mee eens

Ik hield op de middelbare school veel beter in de gaten of ik voldoende intensief sportte dan nu

Zeker niet	○	○	○	○	○	○	○	Zeker wel

In welke mate vormen onderstaande dingen een belemmering voor intensief sporten op de middelbare school en de universiteit?

	Even grote barriere op de middelbare school en universiteit	Grotere barriere op de middelbare school	Grotere barriere op de universiteit	Geen barriere op de middelbare school en universiteit
Hoge studiedruk	○	○	○	○
Sporten kost veel geld	○	○	○	○
Niet voldoende toegang tot faciliteiten	○	○	○	○
Niemand hebben om mee te sporten	○	○	○	○

Ik ben nu veel beter in staat om intensief sporten in mijn week in te plannen dan op de middelbare school

Zeker niet ○ ○ ○ ○ ○ ○ ○ Zeker wel

Terwijl op de middelbare school intensief sporten voor mij vanzelfsprekend was, is dat nu niet meer zo

Helemaal mee oneens ○ ○ ○ ○ ○ ○ ○ Helemaal mee eens

Vergeleken met de middelbare school ben ik nu veel bewuster bezig met voldoende intensief sporten

Zeker niet ○ ○ ○ ○ ○ ○ ○ Zeker wel

Intensief sporten had voor mij op de middelbare school een hogere prioriteit dan het nu heeft

Zeker niet ○ ○ ○ ○ ○ ○ ○ Zeker wel

porten bij USB

De volgende vragen gaan over sporten bij het Universitair Sportcentrum de Bongerd.

Heb je sportrechten van Universitair Sportcentrum de Bongerd?

- ○ Ja
- ○ Nee

Waarom heb je geen sportrechten van het Universitair Sportcentrum de Bongerd? (meerdere antwoorden mogelijk)

- ☐ Ik sport al ergens anders
- ☐ Ik heb niet genoeg tijd om te sporten
- ☐ Ik vind de sportrechten te duur
- ☐ Ik voel me niet thuis bij het universitair sportcentrum De Bongerd
- ☐ Ik was niet voldoende op de hoogte van de sportmogelijkheden
- ☐ Ik houd niet van sporten
- ☐ Anders, namelijk:

Denk aan een normale week in de afgelopen maand, dus niet aan bv. een vakantieweek of een week waarin je ziek was.

Vul in op welke dagen in een normale week je sport bij het Universitair Sportcentrum de Bongerd.
Ofwel:
- Lichamelijke activiteiten die je op het sportcentrum kan doen (o.a. fitness, squash, hardlopen, cursussen, losse lessen, interne competities)
- Zwemmen bij het zwembad de Bongerd
- Sporten bij Studenten Sportverenigingen in Wageningen

Het gaat hier om activiteiten die je minstens 10 aaneengesloten minuten hebt uitgevoerd.
Als de dagen waarop je sport per week verschillen, denk dan terug aan de laatste normale week.

Maandag	Dinsdag	Woensdag	Donderdag	Vrijdag	Zaterdag	Zondag	Ik sport niet bij het universitair sportcentrum
☐	☐	☐	☐	☐	☐	☐	☐

Op de dagen dat je bij het Universitair Sportcentrum de Bongerd sport, hoeveel minuten sport je dan gemiddeld per dag?

Welke sporten doe je over het algemeen op het Universitair Sportcentrum de Bongerd ? (meerdere antwoorden mogelijk)

- ☐ Fitness
- ☐ Squash
- ☐ Interne competitie(s), namelijk:
- ☐ Losse les(sen), namelijk:
- ☐ cursus(sen), namelijk:
- ☐ Sporten bij Studentensportvereniging(en), namelijk:
- ☐ Vrij zwemmen

Determinanten sportgedrag USB

We zijn benieuwd hoe je denkt over sporten bij het Universitair Sportcentrum de Bongerd.

Lees de vragen goed en geef eerlijk antwoord.

Persoonlijk vind ik intensief sporten bij het Universitair Sportcentrum de Bongerd..

Heel erg ongezellig	○ ○ ○ ○ ○ ○ ○	Heel erg gezellig
Heel erg duur	○ ○ ○ ○ ○ ○ ○	Heel erg goedkoop
Heel erg plezierig	○ ○ ○ ○ ○ ○ ○	Heel erg onplezierig
Heel erg ontoegankelijk	○ ○ ○ ○ ○ ○ ○	Heel erg laagdrempelig

Als ik elke week minstens 75 minuten intensief zou sporten bij het Universitair Sportcentrum de Bongerd, verwacht ik dat..

	Zeker niet						**Zeker wel**
Ik meer studenten leer kennen	○	○	○	○	○	○	○
Ik nieuwe sporten kan leren kennen	○	○	○	○	○	○	○
Ik weinig tijd kwijt ben met reizen naar het sportcentrum	○	○	○	○	○	○	○
De sport(en) kan doen die ik graag zou doen	○	○	○	○	○	○	○
Het lastig is me aan te melden voor een les/cursus/training	○	○	○	○	○	○	○

Mijn vrienden sporten elke week minstens 75 minuten intensief bij het Universitair Sportcentrum de Bongerd

Absoluut niet	○ ○ ○ ○ ○ ○ ○	Absoluut wel

Mijn vrienden gaan vaak mee intensief sporten bij Universitair Sportcentrum de Bongerd

Zeker niet	○ ○ ○ ○ ○ ○ ○	Zeker wel

75 Minuten intensief sporten bij Universitair Sportcentrum de Bongerd maakt deel uit van mijn wekelijkse routine

Helemaal niet mee eens	○ ○ ○ ○ ○ ○ ○	Helemaal mee eens

Info USB

Hoe bekend ben je met het Universitair Sportcentrum de Bongerd?

Helemaal niet bekend	○ ○ ○ ○ ○ ○ ○	Heel erg bekend

Heb je een goed overzicht van het sportaanbod bij het Universitair Sportcentrum de Bongerd?

Zeker niet	○ ○ ○ ○ ○ ○ ○	Zeker wel

Demografische gegevens

Datum afronding middelbare school

- Voor de zomer 2011 (juni)
- Anders, namelijk:

Welke BScstudie doe je?

Lengte (in cm)

Gewicht (in kg)

Heb je een (lichamelijke) beperking in sporten?

- Nee
- Ja, namelijk:

Vul hieronder je e-mailadres in, om kans te maken op één van de bioscoopbonnen

Appendix II: Data collection

BSc study		Study advisor[a]	Study organisation	Other
Bedrijfs- en Consumentenwetenschappen	BBC	Yes		
Economie en Beleid	BEB	?		
Gezondheid en Maatschappij	BGM	Yes		
Internationale Ontwikkelingsstudies	BIN	Yes		
Toegepaste Communicatiewetenschap	BTC	Yes		
Bodem, Water, Atmosfeer	BBW	Yes		
Bos- en Natuurbeheer	BBN	?	?	
Internationaal Land- en Waterbeheer	BIL	Yes		
Landschapsarchitectuur en Ruimtelijke Planning	BLP	No	?	
Milieuwetenschappen	BMW	Yes		
Tourism	BTO	?		
Orientatiejaar Life Sciences	BLS	Ja		
Agrotechnologie	BAT		?	
Biologie	BBI	No	?	Distributed flyers after practical
Biotechnologie	BBT	?	?	
Dierwetenschappen	BDW	No	Yes	
Levensmiddelentechnologie	BLT	?	?	
Moleculaire Levenswetenschappen	BML	Yes		
Plantenwetenschappen	BPW	?	?	
Voeding en Gezondheid	BVG	No	No	Distrubuted flyers after lecture

? = unclear if invitation was send or included in news mailing.
[a] Invitation send by study-advisor. [b] Invitation included in weekly news mailing.
Study names are in Dutch, as all Wageningen University BSc studies are in Dutch.