MASTER'S THESIS

Voorspellers van Studiesucces.

Een Studie naar Talent, Elite en KNVB- Sporters met een Duale carrière in het Hoger Onderwijs in Nederland.

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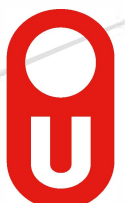
Predictors of Study Success: A Study of Talent, Elite en KNVB Dual career Athletes in Higher Education in the Netherlands

Samenvatting

In dit onderzoek wordt het studiesucces van talent, elite en KNVB- sporters van Nederlandse duale carrière (DC) sporters, die een topsportcarrière combineren met hoger onderwijs onderzocht. DC-sporters in Nederland kunnen in meer of mindere mate gebruik maken van faciliteiten in het hoger onderwijs om de combinatie van onderwijs en topsport succesvol te maken. Er zijn echter geen landelijke gegevens beschikbaar over het aantal DC-sporters dat hoger onderwijs volgt, er zijn geen gegevens beschikbaar die hun studiesucces beschrijven, en welke variabelen verschillen zouden kunnen verklaren. Het doel van deze studie is het onderzoeken van studiesucces van Nederlandse DC sporters in het hoger onderwijs en het onderzoeken van variabelen (leeftijd, geslacht, type sport, type sportstatus, trainingsuren, en intensiteit van het studieprogramma) die verschillen kunnen verklaren. Onderzoek data is verzameld door een exploratief, cross-sectioneel online survey design waarin gegevens van DC- sporters, die hoger onderwijs hebben gevolgd, werden verzameld. Logistische regressieanalyses identificeerden variabelen die hoger opgeleiden onderscheiden van degenen die dat niet deden. Vergelijkbare analyses werden uitgevoerd om onderscheid te maken tussen deelnemers die een HBO- diploma hadden behaald en deelnemers die een WO-diploma hadden behaald. Hypothesen werden als waar aangenomen wanneer het significantieniveau lager was dan $\alpha = .05$. Geconcludeerd werd dat uit de a selecte steekproef de meeste DC- sporters een talentstatus ontvingen tijdens hun studie en de minderheid ontving de KNVB-status. Er is een toename van het aantal DC-sporters door de jaren heen te zien. Het aantal DC- sporters met een KNVB- status blijft echter relatief klein. Opvallend is dat het aantal elite statussen afneemt en het aantal KNVB evenredig toeneemt. Studiesucces van DC- sporters werd behaald bij 26% (69/261), uitval was 4% (11/261). Negenenvijftig procent van de DC- sporters had een elite-, 30% een talent- en 10% een KNVB-status toen ze afstudeerden. De meerderheid van de deelnemers (70%) studeert momenteel, en 82% van de uitvallers gaf aan dat dit was omdat de combinatie van studie en topsport niet haalbaar was. Vrouwen (effectgrootte = 47,3) en DC- sporters die aan teamsport doen (effectgrootte = 43,4) hadden een grotere kans om af te studeren in het hoger onderwijs. DC-sporters die meer dan 10 uur per week trainen (effectgrootte = 0,24) verlaagden de kans op het behalen van een WO-diploma en de kans op het behalen van een HBO- diploma (effectgrootte = 0,28) in vergelijking met een WO-diploma. Voor zover wij weten is dit de eerste studie die inzicht geeft in studiesucces, afstuderen en uitval onder DC-sporters in het hoger onderwijs in Nederland en geeft het inzicht dat **geslacht**, **type sport** en **trainingsuren** geassocieerd kunnen zijn met studiesucces.

Keywords: studiesucces, sporters, Duale carrière, Hoger onderwijs, HBO, WO, NOC*NSF, KNVB

Summary

In this study, the study success of talent, elite and KNVB athletes of (former) Dutch dual career (DC) athletes, who combine a**n elite** sport career with higher education, is examined. DC athletes in the Netherlands can, to a greater or lesser extent, make use of facilities in higher education to make the combination of education and **elite** sport successful. However, no national data are available on the number of DC athletes pursuing higher education, respectively, no data are available describing their study success, and which variables might explain differences. The purpose of this study is to investigate study success of (former) Dutch DC athletes in higher education and to investigate variables (age, gender, type of sport, type of sport status, training hours, and intensity of study program) that might explain differences. The research data was collected through an exploratory, cross-sectional online survey design in which data from DC athletes, who have completed higher education, were collected. The data was collected to identify predictors between a higher vocational education degree (in Dutch "hoger beroepsonderwijs"; HBO) and scientific education degree (in Dutch "wetenschappelijk onderwijs"; WO) or dropout. Logistic regression analyses identified variables that distinguished those with higher education from those who did not. Similar analyses were conducted to distinguish between participants who had earned a**n HBO** degree and those who had earned a **WO** degree. Hypotheses were accepted as true when the significance level was less than α = .05. It was concluded that from **the participants**, most DC athletes received talent status during their studies and the minority received KNVB status. An increase in the number of DC athletes over the years can be seen. However, the number of DC athletes with KNVB status remains relatively small. It is notable that the number of elite statuses decreases and the number of KNVB increases proportionally. Study success of DC athletes was achieved at 26% (69/261) **and** dropout was 4% (11/261). Fifty-nine percent of DC athletes had elite, 30% talent and 10% KNVB status when they graduated. The majority of participants (70%) were currently studying, and 82% of **the** dropouts indicated that this was because the combination of study and elite sport was not feasible. Women (**Odds ratio (OR)** = 47.3) and DC athletes who participate in team sports (**OR** = 43.4) were more likely to graduate **in higher education**. DC athletes who exercise more than 10 hours per week (**OR** = 0.24) decreased the likelihood of **graduating in higher education** and the likelihood of earning a**n HBO degree** (effect size = 0.28) compared to a **WO** degree. To our knowledge, this is the first study to provide insight into study success, graduation and dropout among DC athletes in higher education in the Netherlands and provides insight that the variables gender, type of sport and training hours may be associated with study success.

Keywords: study success, athletes, dual career, Higher education, HBO, WO, NOC*NSF, KNVB

1. Introduction

Athletes face multiple challenges to combine education with their sporting career. It is estimated that currently, across the European Union (EU), about 120.000 young individuals, during every Olympic cycle, are in a 'situation' of Dual Career (DC). DC athletes are trying to perform sports at elite level, in combination with education (European Union, 2016). A DC can be defined in different ways. In this study a dual career encapsulates the requirement for athletes to successfully initiate, develop and finalize an elite sporting career as part of a lifelong career, in combination with the pursuit of education (De Bosscher, De Knop, & Vertonghen, 2016). A DC athlete, in this study, is defined as an athlete who has a professional contract with a Dutch national soccer organisation (in Dutch "koninklijke Nederlandse voetbal bond"; KNVB) or has a recognized talent or elite status by the Dutch national Olympic committee (in Dutch "Nederlands olympisch comité*Nederlandse sport federatie"; NOC*NSF) and is also registered as a student at a higher educational institute.

DC athletes in the Netherlands can, to a greater or lesser extent, make use of facilities in higher education to make the combination of education and elite sport successful. The Ministry of Health, Welfare and Sport (VWS), the Ministry of Education, Culture and Science (OCW) and NOC*NSF are committed in their policies to a successful dual career. By a successful dual career, they mean that it should be possible for every athlete to follow the education (HBO and WO) that suits him or her in terms of interest and competences in order to have a smooth transition to a post-athletic career (NOC*NSF, 2016). At this moment, there are no national data available in the Netherlands on the number of DC athletes enrolled at HBO or WO institutions, whether (and when) students obtain a diploma, what the dropout rate is and what variables may explain differences in study success. Although research has been conducted on study success in vocational education (in Dutch "middelbaar beroepsonderwijs"; MBO), no research has been conducted on DC athletes and study success in higher education (in the Netherlands). As a result, there are no insights into the variables associated with differences in study success of DC athletes in higher education, and thus educational institutions cannot effectively provide services to adequately support, inform, and encourage DC athletes. Therefore, the objectives of this study are (a) to investigate study success of (former) Dutch DC athletes in higher education; and (b) to investigate variables (age, gender, type of sport, type of status, training hours, and intensity of study program) that correlate with differences in study success and are possible determining factors.

1.1 Theoretical framework

Higher education in the Netherlands

Higher education in the Netherlands is offered at 2 types of education: higher vocational education (in Dutch "hoger beroepsonderwijs"; HBO) and scientific education (in Dutch "wetenschappelijk onderwijs"; WO). The HBO and WO each have a specific role in higher education, as defined in the law for higher education (in Dutch "Wet op het Hoger Onderwijs en Wetenschappelijk Onderzoek":

WHW). The WHW states that: "higher vocational education (HBO) prepares students to practise a profession and enable them to function self-consciously in the society at large and that scientific education (WO) prepare students for independent scientific work in an academic or professional setting (WHW, 1993). In the Netherlands, over 456.633 students are enrolled at 36 HBO and more than 260.000 students are enrolled at 20 WO institutions (CBS, 2019).

Study success in higher education in the Netherlands. For a number of decades, study success has been an important theme in higher education, and educational research. There are several definitions for study successes. The concept of study success was introduced in the education field in the Netherlands with the publication of the Education Memorandum 'The highest good' in 2007 (OCW, 2007). In this memorandum the government states that higher education should first and foremost contribute to a Dutch economy that can remain competitive in the international knowledge society. This includes "an ambitious study culture". Study success must be central to this culture, explained as a reduction in the dropout rate of students and a reduction of the study duration until graduation. In 'The value (s) of knowledge', Strategic Agenda for Higher Education and Research 2015-2025' (OCW, 2015) study success is redefined and the old definition: 'Higher education should attracts as many students as possible in the shortest possible time to the job market' is changed to 'prepare students for life and work and teach them how you can contribute with knowledge, skills and who you are as a person to the complex societal challenges we face'. In the 2018 National Budget (in Dutch: "Rijksbegroting, 2018") for higher education under the objective of "ambitious education that challenges all pupils and students", study success is stated as a quantifiable indicator for higher education, broken down by study success rate (obtained a degree), dropout rate and study switch (Rijksbegroting, 2018). In this study we will focus on the study success (obtained an HBO and/ or WO degree) and the dropout rate.

Dual career, DC athlete and higher education, in the Netherlands

Dual career. As described before a DC athlete combines an elite sports career with a higher education. For a DC athlete, pursuing education while competing in high-performance sport can be a challenge. There is an increasing demand on athletic performance in elite sports (Aquilina, 2013; Henry, & Taylor, 2004; Geraniosova & Ronkainen, 2015; Stambulova & Wylleman, 2019). This demand can put DC athletes into a conflict between their athletic career and their academic pursuits, which can escalate into a forced choice between maximizing their athletic potential or obtaining a degree in their education for their post-athletic career (Wylleman, Alfermann, & Lavallee, 2004). This can lead to premature discontinuation of the athletic career due to prioritization of education (Amara, Aquilina, Henry, & Taylor, 2004; Geraniosova & Ronkainen, 2015) or the DC athletes can decide to invest less in education and focus on athletic success instead (Aries, McCarthy, Salovey, & Banaji, 2004; Stambulova & Wylleman, 2019).

Several studies have identified a range of attitudes, knowledge, skills and experiences that DC athletes need to succeed in their dual careers (Brown et al., 2015; Debois, Ledon & Wylleman, 2015; MacNamara & Collins, 2010; Miró, Pérez-Rivasès, Ramis & Torregrosa, 2017; Stambulova, Engström, Franck, Linnér, & Lindahl, 2015). Given the variety of approaches to successfully managing a dual career, there is no "ideal" strategy that everyone can define as successful. Rather, strategies depend on a number of factors. The first set of factors are inherent in the individual and include aspects such as age, general perception of elite sports and education, athletic and school performance, and whether they have long-term injuries (Aquilina, 2013). The second set of factors include more external elements and include the demands placed on the DC athletes by both elite sport and higher education.

Elite sport & Higher education. In higher education in the Netherlands, the action plan flexible education, and elite sport (in Dutch "flexibel onderwijs en topsport"; FLOT) was signed in 2013, in which boards of HBO and WO institutions made structural agreements with NOC*NSF to organize and sustainably embed the policy to guide athletes in their dual careers (FLOT, 2013). The action plan was amended in 2019 (FLOT, 2019). The aim of the action plan is that every DC athlete in higher education is able to attain the study of their choice and that every educational program has minimal facilities to be able to properly supervise a dual career athlete. The university of applied sciences in Amsterdam (AUAS), for example, guides approximately 230 DC athletes with NOC*NSF or KNVB status (D van Vlaanderen, personal communication, November 11, 2020). With this action plan higher education meets the dual career goal of NOC*NSF, VWS, and OCW (NOC*NSF, 2016).

Elite sports infrastructure, talent and elite status in the Netherlands

Infrastructure. The aim of NOC*NSF and the Dutch ministry of OCW and VWS is to structurally position themselves within the top 10 sports countries of the world (NOC*NSF, 2012; VWS, 2008). The results of the Olympic and Paralympic games and the World Championships of non-Olympic elite sports programs will be used to measure the top 10 ambition (NOC*NSF, 2012). In order to realize this top 10 ambition a sports infrastructure has been organized by NOC*NSF in cooperation with sports associations, OCW, VWS, municipalities, provinces, educational, and medical institutions (NOC*NSF, 2010). One of the characteristics of this infrastructure is that DC athletes get the support from NOC*NSF, OCW, and VWS. Athletes who practise their sport at a national and / or international level may qualify for a sport status.

Talent and elite status. NOC*NSF, in cooperation with the sports associations, has developed a system in which talents and athletes can be awarded a talent status ('promise', 'national talent', and 'international talent') or an elite sports status ('high potential', 'selection-status'[1], and 'A-status'). The sports federations nominate the athletes to NOC*NSF. This nomination is assessed by

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[1] Before January 2017 it was called the B-status.

NOC*NSF against the performance and level of sport participation of the athlete. Since the 2012-2013 school year, the ranking of athletes, and their level of sport, has been based on the current NOC*NSF and KNVB status. After a status has been granted, NOC*NSF adds the athlete to the national database, the elite sports monitoring system. In contrast to other athletes, male soccer players who are in contract with a professional soccer organization and/or play for representative national (youth) teams have at least a NOC*NSF talent status but are not included in the NOC*NSF database. The KNVB registers the (elite or talent) status of the male soccer players in its own system. Female soccer players are registered in the NOC*NSF database. The target group of this study are registered NOC*NSF and KNVB athletes in higher education.

Variables influencing study success in a dual career

There is no research available in the Netherlands about variables that are associated with study success by DC athletes in higher education. In this study we focus on the variables age, gender, type of sport status (elite, talent and KNVB), type of sport (individual- or team sport), training hours (hours a week), and intensity of the study program (predominantly full-time or part-time). As illustrated in the next paragraph, these variables have been found to be significantly related to study success in a dual career.

Age. When inquiring at the information service of the Dutch Central Bureau of Statistics (CBS), it appears that at the moment HBO students are on average 24.5 (*SD*= 5.1) years old and WO students 25.1 (*SD*= 3.7) years old when they graduate (A. Lafeber, personal communication, September 7, 2020). According to Aquilina (2013), DC athletes need to reach a certain age (>24) and experience in life to learn how to prioritize their time and find the right balance. Some younger DC athletes believe that other aspects of life, such as academic results, should be sacrificed, and young DC athletes are dedicated to the importance of their sporting careers. Older DC athletes assume that balance is essential for both performances and life as a whole (Aquilina, 2013; Douglas et al., 2014). Research suggests that the older the DC athletes are, the better they can find a balance between education and sport and be successful in their dual career (Aquilina, 2013; Douglas & Carless, 2014).

Gender. Earlier research indicates that female DC athletes perform better than male DC athletes in academic outcomes (Adler & Adler, 1985; Rubin & Rosser, 2014; Ryba, Aunola, Kalaja, Sel nne, Ronkainen & Nurmi, 2016). According to De Brandt et al., (2017) there is a difference between females and males and finding balance in their dual career. Female DC athletes choose to focus on their academic performance more often compared to male DC athletes, which ultimately results in a better academic performance (De Brandt, Wylleman, & De Knop, 2015). In Vocational Education and Training (MBO) institutes in the Netherlands, male DC athletes with NOC*NSF status were significantly more likely to drop out without a MBO degree (Stroo, 2017).

Type of sport status. Although research has identified DC athletes at a very high level (elite sport) as a risk group for dropout (De Knop, Wylleman, Van Houcke, & Bollaert, 1999; Wylleman,

Alfermann & Lavallee, 2004), This does not seem to be confirmed in MBO education (Blom & Duijvestijn, 2008; Stroo, 2017). Stroo (2017) showed that DC athletes with an elite status dropped out less often in MBO education than DC athletes who had a talent status. Little can be found in the literature about the influence of the type of sport status on study success.

      Type of sport. There are many contradictions in the literature around the influence of the type of sport on a dual career and its consequences, much is still unclear. In general, authors do agree that several elements are inherent to the individual, such as the general perception about the feasibility of a dual career and sport and that sport influences study success in a dual career (Aquilina, 2013; Subijana, Barriopedro & Sanz, 2015). In addition, sports psychologists indicate that there is a difference between the psychological profile of team DC athletes and individual DC athletes (Pluhar, McCracken, Griffith, Christino, Sugimoto & Meehan, 2019). When looking at research advocating that individual DC athletes are more likely to graduate from higher education, authors indicate that DC athletes in an individual sport have a higher level of dual career management because they cannot rely on their teammates (Graczyk, Wylleman, Nawrocka, Atroszko, Moska, Tomiak & Krysztofiak, 2017). Research by Aquilina (2013) and Subijana et al., (2015), additionally indicates that individual sport DC athletes are more motivated than team sport DC athletes. This is in contrast to the study by Lupo, Tessitore, Capranica, and Rauter (2012) where team sport DC athletes achieved higher motivation for their dual careers and working together to motivate their teammates. In addition, research suggests that there appears to be a correlation that individual DC athletes report anxiety and depression more often than team DC athletes making the combination of study and sport more difficult (Pluhar, McCracken, Griffith, Christino, Sugimoto & Meehan, 2019). Concluding, most studies in sport psychology show significant differences between DC athletes in individual and team sports. However, no consensus has been reached in the literature inf individual or team sport is a predictable variable obtaining a degree in higher education.

      Training hours. Achieving individual athletic excellence in sports requires 20-30 hours of training and at least one competition per week. It is known that DC athletes from individual sports generally have a higher training load than DC athletes from team sports (Subijana et al., 2015; Graczyk et al., 2017). Although training hours vary by DC athlete and sport, in the Netherlands talents train on average about 16.9 hours (SD= 7.2) and elite athletes about 20.6 (SD= 6.0) hours spread over six days in the week. The range indicated by the athletes is wide. The talents indicate between 1 and 50 hours of training per week and the top athletes 2 and 60 hours of training per week (NOC*NSF, 2019). In the Considering that students spend approximately 30 hours per week on a satisfactory study career (Aquilina, 2013), and taking into account training hours, it is plausible that it is difficult for DC athletes in general, and individual DC athletes in particular, to balance sport and study. For an individual athlete, it may well be easier to be flexible in scheduling his or her training, whereas a team sport DC athlete is dependent on teammates and training hours therefore tend to be inflexible (Aquilina, 2013; Subijana et al., 2015).

Intensity of the study program. To achieve both athletic and academic success, sports and higher education there is a general consensus in literature that DC athletes must learn how to weigh priorities in managing their educational and sporting commitments (David, 2008; Blom & Duijvestijn, 2008; Aquilina, 2013; Wylleman, De Brandt, & Defruyt, 2017).This has immediate implications for the individual's lifestyle in terms of time management, effort required and dedication to fulfil his or her role as a student and as an DC athlete. Research shows that finding the right balance for a DC athlete depends to varying degrees on the personal characteristics of the individual, his/her sport and specific lifestyle choices One of the options available to DC athletes to find the right balance is following a study part- time (Aquilina, 2009; 2013).

1.2 Research questions and hypotheses

The aim of the study is: What is the study success of DC athletes with NOC*NSF and KNVB status in higher education in the Netherlands, and which variables may explain differences in study success? This question is answered by investigating the following sub questions and testing the associated hypotheses (h1- h5):

1. What was the type of sport status (NOC*NSF or KNVB) by DC athletes while following a study in higher education measured by school year since 2012-2013?

2. What percentage of DC athletes with a NOC*NSF and/or KNVB status have obtained a degree in higher education, measured by school year since 2012-2013, at what level, and how many dropped out without a higher education degree?

3. Are age, gender, type of sport (predominantly individual- or team sport), the number of training hours, type of sport status (Elite-, Talent- or KNVB status), and intensity of the study program (predominantly full-time or part-time) predictors of study success in higher education?

  h1) There is no difference between the sport status and obtaining a degree or dropping out.

  h2) DC athletes >24 year are more successful in obtaining a higher education degree than DC athletes who are younger.

  h3) Female DC athletes are more successful in obtaining a higher education degree than male DC athletes.

  h4) Team sport DC athletes are more successful in obtaining a higher education degree than individual sport DC athletes.

  h5) The more DC athletes spend on training hours during the week, the less successful they are in obtaining a higher education degree.

  h6) DC athletes who study part time are more successful in obtaining a degree in higher education than DC athletes who study full time.

2. Methods

2.1 Design

This study is an exploratory, cross-sectional survey design. The research is correlational (i.e., non-experimental) in which data of DC athletes who obtained a degree (in HBO or WO) or dropped out is collected. Although an analysis of all DC athletes in the Netherlands would have been ideal, NOC*NSF and the KVNB could not meet the demand to reach all DC athletes. A random selection of participants was asked to complete the survey. Distribution took place by email. Elite sports coordinators of all professional soccer organizations, HBO and WO institutions in the Netherlands distributed the survey to their (former) DC athletes.

2.2 Participants

The criteria to be included in the study were (former) athletes (a) studying in higher education institution (HBO or WO education) and (b) received a NOC*NSF or KNVB status during the 2012-2020 schoolyear(s). There are approximately 4700 athletes registered in the NOC*NSF database and 2600 male soccer players in the database from KNVB who have (had) a professional contract between 2012-2019. These figures are not exact because NOC*NSF and KNVB cannot guarantee that there are no duplicates and / or errors. The total population is unknown. For example, it may be that 1 person in the NOC*NSF database plays two sports and this person was then counted twice. In addition, it is unknown how many of the approximately 7300 athletes have received the online survey and how many of these athletes participate(d) in higher education between 2012 and 2019. In view of the study design (i.e., examining the different variables influencing study success in DC athletes) the participants are divided in two groups (obtain a degree and didn't obtain a degree). Resulting a G-power calculation (effect size, odds ratio (OR) = 0.5, α err probability = .05, power = 95%, allocation ratio N2 / N1 = 0.2) showing that a total sample size of 148 participants is required.

2.3 Materials

Data were collected using LimeSurvey. In the survey, participants provided general background information (age and gender), sport variables (Type of sport, type of sport status, training hours), and study variables (year of study, HBO or WO study, intensity of the study program). The *type of sport* was measured in twofold, the actual type of sport (nominal, e.g., triathlon, hockey, basketball etc) and if this was an individual sport or a team sport (dichotomous, yes/no). Participants were asked to indicate which *type of sport status* (nominal) they had. NOC*NSF uses several statuses High Potential (HP), Selection status (SEL), A- status (A), Promise (P), National Talent (NT), and International Talent (IT) status. The statuses were further categorized into elite (HP, SEL and A- status) and talent status (P, NT, and IT- status). The third type of status a DC athlete can have is the KVNB status, only given to male soccer players. Since DC athletes indicate a wide range in terms of the amount of

training hours per week (Range = 1-60 hours), it was decided to categorize the estimated number of training hours DC athletes spend on their sport into four options: < 5 hours per week, 5-10 hours per week, 10-20 hours per week, or more than 20 hours per week. Participants were asked in what year (since 2012- 2013) they were enrolled in a study program and what kind of study program (HBO or WO). *Intensity of the program*, dichotomous, indicated whether the study program was followed full-time or part-time, independent if the study was originally a full-time or part-time program. In this study, study success was operationalized with one question with the following answer options: obtained HBO degree, obtained WO degree, dropped-out, and still enrolled.

2.4 Procedure

The study was approved by the Ethics Committee of the Open University, athletes were informed of the study objectives and had to fill in an informed consent form prior to the start of the survey. Data was filled in anonymously, not traceable to individual athletes and participation was voluntary. Elite sports coordinators of all HBO and WO institutions in the Netherlands distributed the survey to their (former) DC athletes. The data were collected at the beginning of February 2020 from students who participate(d) in higher education since the 2012 schoolyear and who had a NOC*NSF or KNVB status.

2.5 Data-analysis

The research questions are analysed with SPSS (version 26). Descriptive statistics were presented according to the type of variable, mean (and SD) by continuous variables, number and percentage for dichotomous variables and median (and IQR) for research questions 1 and 2. To gain further insight into variables that predict study success in higher education a binary logistic regression was calculated with age, gender, type of sport (predominantly individual- or team sport), the number of training hours (<10 or >10 training hours a week), type of sport status (Elite-, Talent- or KNVB status), and intensity of the study program (predominantly full-time or part-time) as predictors and study success (obtaining HBO or WO degree) as the dependent variable (research question 3). Due to the small numbers among the graduates who indicated <5 and >20 training hours per week, the logistic regression was chosen to divide the number of training hours into two categories. Category 1 is the number of DC athletes who train <10 hours per week and category 2 trains >10 hours per week. Afterwards, we divided the dependent variable study success in obtained HBO or WO degree to see if there is a difference in the level of education (HBO or WO). DC athletes who are still enrolled where not included in the logistic regressions. An odds ratio of above 1 means that there is a greater likelihood of having the outcome and an odds ratio of below 1 means that there is a lesser likelihood of having the outcome. In this study, hypotheses were accepted when the significance level was less than $\alpha = .05$.

3. Results

The online survey was completed by 261 (former) DC athletes who are participating in 50 different sports. The mean age of the participants was 21.8 years (SD= 4.0), with 46% male and 54% female. The training hours a week (overall) was mostly in a range between 5-10 (48%) and 10- 20 (46%). The sample shows an equal distribution between participation in individual sports (48%) and team sports (52%). Students participate in a full-time (94%) program more often than in a part-time (7%) program (Table 1).

Table 1. *Characteristics of the participants[1] in this study*

	N	%
Training hours		
< 5	2	.8
5-10	124	47.5
10-20	119	45.6
>20	16	6.1
Intensity of the study program		
Predominantly part-time	17	6.5
Predominantly full-time	244	93.5
Type of sport		
Predominantly individual sport	125	47.9
Predominantly team sport	136	52.1

[1]*Total: N= 261*

To answer research question 1, Table 2 provides an overview of the number of DC athletes with Elite, Talent or KNVB status who followed higher education since the school year 2012-2013, measured per school year. DC athletes have been asked to indicate each school year if they were enrolled in a higher education institution. This means that DC athletes can be registered in several years. During these years they may have received different sports statuses. Every year, the sports performance is reviewed to which a certain status is assigned. Most of the DC athletes in this study have received a talent status during their study years and the minority has received a KNVB status. There is a pattern when looking at the number of DC athletes over the years. Over the years, an increase in the number of DC athletes can be observed. The number of DC athletes with KNVB status remains relatively small. In addition, the number of elite statuses is decreasing and the number of KNVB increases proportionally over the years (Table 2).

Table 2**.** *Overview of the percentage DC athletes with elite-, talent- or KNVB status who have or had been following a study in higher education since 2012-2013*

	Elite		Talent		KNVB		Total	
	N	%	N	%	N	%	N	%
2012-2013	14	48.3	11	37.9	4	13.8	29	100.0
2013-2014	14	41.2	17	50.0	3	8.8	34	100.0
2014-2015	18	36.7	29	59.2	2	4.1	49	100.0
2015-2016	21	30.4	45	65.2	3	4.3	69	100.0
2016-2017	36	36.4	60	60.6	3	3.0	99	100.0
2017-2018	45	36.0	73	58.4	7	5.6	125	100.0
2018-2019	54	32.5	98	59.0	14	8.4	166	100.0
2019-2020	61	28.6	125	58.7	27	12.7	213	100.0

DC athletes were asked whether they have obtained a degree in higher education, at what level (HBO or WO degree) and when (schoolyear) to answer research question 2 (Appendix 1). Since the 2012-2013 school year, study success was achieved in 26% (16% HBO, 9% WO, and 1% HBO and WO graduate) of the DC athletes in the sample. Fifty-nine percent of the DC athletes had an elite-, 30% a talent-, and 10% an KNVB status when they obtained their degree. If they did not obtain a degree, they were asked whether they were still in education and if not, what was the reason for dropping out. Of the 69 DC athletes who graduated, 26 (38%) DC athletes continued studying. We don't know what kind of study. The majority of participants (70%) is currently enrolled in a study program and 82% of the students who dropped out indicated that this was because the combination of study and elite sport was impossible to organize (Table 3).

Table 3. *Percentage[2] of DC athletes with a NOC*NSF or KNVB status who obtained a degree or dropped out*

		N	%
Study success	Total	69	26.4
	HBO graduate	44	16.4
	WO graduate	24	9.2
	HBO and WO graduate	1	.9
Still studying after graduate	Total	69	26.4
	Yes	26	37.7
	No	43	62.3
Dropout	Total	11	4.2
	Not enough credits	0	0.0
	The study didn't suit me	2	18.2
	The study could not be combined with sport	9	81.8
Type of sport status with a degree	Total	69	100.0

Elite	41	59.4
Talent	21	30.4
KNVB	7	10.1

[2]Total: N= 261

Note: The student who obtained an HBO and a WO degree had a talent status in both cases.

When examining predictors for study success, logistic regression analysis showed that gender ($p = .008$), type of sport ($p = .010$) and training hours ($p = .018$) were significant predictors of obtaining a degree in higher education. Females were more likely to obtain a degree (odds ratio [OR]= 47.3, 95% CI [2.72,822.14]) compared to males. DC athletes who participate in team sport are more likely to obtain a degree (OR = 43.4, 95% CI [2.49,757.25]) compared to individual sport DC athletes. DC athletes who have > 10 training hours a week are less likely to obtain a degree (OR = 0.24, 95% CI [0.01,0.52]) compared to DC athletes who have <10 training hours a week. When we look at the type of sport status, we see that there is no significant difference overall. Additionally, a trend can be seen in DC athletes with elite status ($p = .059$, OR = 29.9) and talent status ($p = .077$, OR = 24.4) compared to KNVB DC athletes (Table 4).

Table 4. *Results of the binary logistic regression with age, gender, type of sport, the number of training hours, type of sport status, and intensity of the study program as covariates and with study success (obtaining a degree/ dropped out) as the dependent variable*

						95% C.I. for EXP (B)	
		β	S.E.	Sig.	Exp (B)	Lower	Upper
Age		.013	.165	.939	1.013	.732	1.401
Gender		3.856	1.457	**.008**	47.267	2.717	822.136
Type of sport		3.770	1.459	**.010**	43.386	2.486	757.254
Training hours		-3.743	1.579	**.018**	.024	.001	.523
Type of sport status				.144			
	Elite	3.398	1.796	.059	29.912	.884	1011.643
	Talent	3.194	1.805	.077	24.358	.710	838.004
Intensity of study program		-.211	2.353	.929	.810	.008	81.611

Note: Dependent variable is obtaining a higher education degree/ dropped out

When examining predictors for study success between HBO and WO degree, logistic regression analysis showed that training hours ($p = .047$) is a significant predictor. DC athletes who have > 10 training hours a week are less likely to obtain an HBO degree (OR = 0.28, 95% CI [0.79, 0.98]) compared to a WO degree. For the other variables examined, we see no significant differences (Table 5).

Table 5. *Results of the binary logistic regression with age, gender, type of sport, the number of training hours, type of sport status, and intensity of the study program as covariates and with the level of education (obtaining an HBO or WO*

degree) as the dependent variable

		β	S.E.	Sig.	Exp (B)	95% C.I. for EXP (B)	
						Lower	Upper
						Total (n=68)	
Age		.072	.072	.322	1.074	.932	1.238
Gender		.831	.697	.233	2.295	.586	8.991
Type of sport		1.056	.745	.157	2.875	.667	12.392
Training hours		-1.277	.642	**.047**	.279	.079	.981
Type of sport status				.529			
	Elite	-.796	.961	.408	.451	.069	2.969
	Talent	-.107	.921	.907	.898	.148	5.464
Intensity of study program		-.088	.964	.927	.916	.138	6.062

Note: Dependent variable is obtaining HBO or WO degree

4. Conclusion / Discussion

The purpose of this study was to examine the study success of (former) Dutch DC athletes in higher education and to examine variables (age, gender, type of sport, type of sport status, training hours, and intensity of the study program) that may explain differences in study success. When we look at type of sports status (NOC * NSF or KNVB) during the study of higher education, we can say that majority of the DC athletes during their study years received a talent status, little less an elite status and minority a KNVB status. Upon inquiry at NOC*NSF it appears that annually approximately 4700 athletes receive a status from NOC*NSF. The distribution of this athlete status shows that approximately 15% received an elite status and 85% received a talent status (NOC*NSF, 2019). This is similar to our sample. Inquiries with the KNVB reveal that approximately 2600 male soccer players are registered with a professional soccer organization each year (A. van Woudenberg, personal communication, October 23, 2019). Given these numbers, we would have expected slightly more students with KNVB status in our sample. Of the graduated DC athletes, 59% had elite, 30% talent, and 10% had KNVB status. Here we see a shift in the number of talent and elite statuses. This is logically explainable because it is plausible that in most sports, talent status converts to elite status around the age of 18 if sport presentations remain good. HBO students are on average 24.5 (*SD*= 5.1) years old and WO students 25.1 (*SD*= 3.7) years old when they graduate (A. Lafeber, personal communication, September 7, 2020). Since these average ages generally fall outside the talent status category, it is likely that "Talents" have risen to "Elite" by the time they graduate. As for the pattern that can be observed regarding an increase in the number of DC athletes over the years, it is likely that DC athletes are more motivated to complete the questionnaire and are better able to answer the questions when they are still studying or have graduated not too long ago. When it has been years since study was a part of DC athletes' lives, it is likely that they are less likely to complete the questionnaire.

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There is no explanation, as a result of this survey, why percentages over the years the number of DC athletes with elite status decreases and the number of DC athletes with KNVB status increases.

In our sample we see that 26% of the DC athletes with NOC*NSF or KNVB status graduated (16% HBO, 9% WO, and 1% HBO and WO). Of the 69 graduated DC athletes, 38% went on to study. It is not known which studies the DC athletes went on to pursue after graduation. The majority of the participants (70%) in our sample are currently following a study. Unfortunately, we cannot say much about this group because the questionnaire did not mention when they started studying and/or how many credits they obtained. There were 11 DC athletes who completed the questionnaire and quit their studies. We asked them why, the majority (82%) indicated that it was because of the difficult combination between sport and study. Looking at the overall pass/fail rates in the Netherlands, 44% have a bachelor's degree and 19% a master's degree after five years of study. The dropout rates in higher education in the Netherlands is 32.3% (Onderwijs in cijfers, 2021). Because in our sample there is still a large group studying who can still obtain a diploma or who can dropout, we can say based on our figures that the distribution pass and dropout rates are currently acceptable, but hard statements about this cannot be made. It is striking, however, that the reason given for dropping out is the difficult combination of sport and study. This percentage should ideally be less because of the guidance and facilities offered in higher education (FLOT, 2019).

When we looked at variables that predicted study success, we found that gender, type of sport, and fewer training hours were associated with a greater likelihood of obtaining a higher education degree (Table 4). When we looked at the variables that predicted study success between HBO and WO, we found that fewer training hours were associated with a greater likelihood of obtaining an HBO degree (OR = 0.28, 95% CI [0.79, 0.98]) compared to a WO degree (table 5). Interestingly, the odds ratio (ExpB) and confidence interval for whether or not students obtained a higher education degree for gender (OR = 47.3, 95% CI [2.72, 822.14]) and type of sport OR = 43.4, 95% CI [2.49,757.25]) were unusually high. It is possible that this is due to the skewed distribution (69 passers, 11 dropouts), which makes the point estimate of the ExpB slightly less reliable and slightly less value should be placed on the absolute number. Nevertheless, the lower bound of the confidence interval is also above 1, so this is something that cannot be ignored.

Data from this study show that gender (p = .008) is associated with a factor of OR = 47.3 increase in the likelihood of female participants obtaining a degree (HBO or WO). Therefore, our hypothesis that female DC athletes perform better than male DC athletes in successfully completing a higher education is accepted. This is similar to previous research where female DC athletes outperform male DC athletes in academic outcomes (Adler & Adler, 1985; Rubin & Rosser, 2014; Ryba, Aunola, Kalaja, Sel nne, Ronkainen & Nurmi, 2016; Stroo, 2017). According to De Brandt et al, (2017) there is a difference between female and male and finding a balance in their dual careers. Female DC athletes are more likely to choose to focus on their academic performance than male DC athletes, which ultimately results in better academic performance (De Brandt, Wylleman, & De Knop,

2015). Research on study success generally shows that females achieve greater study success than males (Cappellari & Lucifora, 2009; Declercq & Verboven, 2010; Pinxten et al., 2014; Smedts, Van Landeghem & Van Damme, 2011). Although it is not entirely clear from the scientific literature why females may adapt better to higher education than males, it is clear that an analysis of study success must also take into account the gender of the student. Our study also makes this visible for DC athletes in the Netherlands, which can be taken into account in counseling DC athletes.

The data show that the type of sport ($p = .010$) is associated with a factor of OR = 43.4 increase in the likelihood of team sport DC athletes obtaining a degree (HBO or WO). This is what our hypothesis suggested and thus accepted. Studies contradict each other and various causes have been mentioned that explain differences in study success and participation in an individual or team sport. For example, the difference in motivation (Aquilina, 2013; Lupo, Tessitore, Capranica & Rauter, 2012) help from teammates and mental health benefits in team sports (Graczyk, Wylleman, Nawrocka, Atroszko, Moska, Tomiak & Krysztofiak, 2017; Pluhar, McCracken, Griffith, Christino, Sugimoto & Meehan, 2019). Aquilina (2013), Lupo, Tessitore, Capranica & Rauter (2012) indicate that in a team, peers motivate each other to be successful in sports and studies and help each other with homework. Multiple studies show that team DC athletes generally feel less depressed and seek each other out when problems arise so they feel better mentally. However, other research shows that individual DC athletes are more successful in combining study and sport because they can be more flexible in organising training load despite that they have more training hours a week (Subijana et al., 2015; Graczyk et al., 2017). This is particularly advantageous in the case of mandatory attendance and fixed class schedules. In addition, Sanz (2015), for example, indicates that perseverance is higher in individual DC athletes than in team DC athletes. The reason why was not investigated in this study, nor has consensus been reached in the literature; further research on this is needed.

The amount of training hours ($p = .018$) is associated with a factor of OR = 0.24 decrease in the likelihood when DC athletes have > 10 training hours a week obtaining a degree (HBO or WO), and thus hypothesis accepted. Based on literature (Aquilina, 2013; Subijana et al., 2015) it was assumed that when more training hours per week were spent on sports, the chances of obtaining a diploma decreased. Similarly, research on study success between HBO and WO degree in relation to the number of training hours indicated a significant difference ($p= .047$). Here it can be seen that DC athletes who have >10 training hours in the week are less likely to obtain an HBO degree by a factor of OR = 0.28 compared to a WO degree (table 5). For the other variables examined, we see no significant differences between HBO and WO degree. It is plausible that this is due to the presence of more mandatory attendance and the multitude of contact hours in HBO compared to WO education. Because of this, scheduling sports (at <10 hours per week) around the study may be a bit easier in the WO. What is important to take into account when interpreting this in comparison to obtaining an HBO or WO degree is that the data in this study do not say anything about prior education, the duration of study and whether there were any interruptions while obtaining an HBO or WO degree. This research

does not suggest that part time DC students are more successful in obtaining a degree than students who pursue their studies full time. The hypothesis is not accepted. The hypothesis is not accepted. Finding balance as Aquilina, 2009; 2013) and de Brandt (2017) name when comparing female and male, number of training hours, and following a part-time or full-time study did not emerge in this study. It is recommended that this be included in follow-up research.

We found no overall significant difference between sport status and graduation or dropout, so hypothesis one is rejected. However, a trend can be seen in DC athletes with an elite or talent status compared to KNVB DC athletes, but the sample size was too small to conclude anything from that. This may have been based on chance. Previous research did identify DC athletes at very high levels (elite sport) as a risk group for dropout (De Knop, Wylleman, Van Houcke, & Bollaert, 1999; Wylleman, Alfermann & Lavallee, 2004). Due to the small numbers of dropouts in the sample of this study, it is difficult to confirm this is the case in higher education. In addition, it is plausible that over the years, the guidance of DC athletes in pursuing studies with the introduction of FLOT 2019 and the digitalization and flexibilization of education has helped to reduce this risk. Stroo's (2017) research in MBO education also showed similarities to these study results. Stroo's research also showed no significant differences between study success and NOC*NSF or KNVB status in a larger sample. It should be noted, however, that MBO education cannot be compared to higher education. For example, in MBO education, there are more required class hours, more explanation and guidance, and more repetition of material. In higher education, there are generally fewer class hours per week, more reliance is placed on DC students' independence, and students move through the material more quickly. Besides these differences in education, there are also more talent and KNVB statuses in MBO than in higher education. This is age related, students in MBO are generally younger than those in higher education and regarding the KNVB statuses it appears that the MBO study programme in sport and exercise is often chosen. The comparison with the type of status and study success of MBO and HBO is therefore difficult (Stroo, 2017). In conclusion, in our sample there is little to say about the type of status and study success and it is not clear in the literature either. Further research in this is recommended.

Age does not show a significant difference in this study. Although previous research has shown that DC athletes older than 24 are better able to balance education and sport and are successful in their dual careers (Aquilina, 2013; Douglas & Carless, 2014), this hypothesis is rejected in our study. One explanation could be that in this study the sample has a mean age of 21.8 years and the age range is not that wide to show significant differences. The relationship between finding balance and age was not considered in this study. However, it is an interesting variable to include in further research.

This study is the first study to provide an insight in study success, graduation or dropout among DC athletes in higher education in the Netherlands and provides information about the variables that may be associated with study success. Nevertheless, the results of the study should be

considered within some limitations. Firstly, data was collected retrospectively. The results show that, proportionally, there have been more DC athletes over the years. As stated earlier in the discussion, there has been a growth from 2012- 2020 in the number of DC athletes who completed the questionnaire. It is plausible that this is because DC athletes who have been out of school for a shorter period of time, or are still in school, were more likely to complete this questionnaire. The more recent a DC athlete has been, or is still studying, the easier it is to complete this questionnaire. This can give a distorted picture of the actual numbers. In addition, our findings show low numbers of KNVB. On the one hand this may be lower because they may be studying less in higher education, on the other hand this questionnaire was distributed through a different channel than the NOC*NSF statuses and therefore fewer athletes may have been reached with this questionnaire. We also do not know whether we were able to reach all DC athletes in the Netherlands. It is therefore unclear whether the sample is representative in terms of the distribution in Talent-, elite- and KNVB-status in the Netherlands. Furthermore, due to some inaccuracies in the questionnaire, we cannot distinguish when the DC athletes started their studies, whether they had previously obtained a diploma and/or whether they consciously chose to extend their study duration, because of the combination with sports. Finally, the limitation is that in this study we have defined study success as whether or not a degree was obtained. Study success can also be measured, for example, by the number of credits obtained (average per semester, per year), the dropout rate after the first year, nominal graduation etcetera (Gubbels & Kappe, 2017). In order to keep the response rate as high as possible, the choice was made to keep the questionnaire as simple as possible. The expectation was that asking for the average number of credits, for example, would penalize the response.

Recommendations for future research are to conduct further quantitative and qualitative research on finding balance in study and sport and associated success factors. As an example, one could look at the success of DC athletes in flexible studying (in Dutch "Flexstuderen"), which has been offered as an experiment by a number of institutions since 2017. Flex studying offers DC athletes the opportunity to set their own study pace and balance in sport and study and to pay per credit. In addition, it is worth investigating which variables are successful or unsuccessful in participating in individual or team sports in combination with studying in higher education. Finally, a national registry could be useful to track DC athletes structurally longitudinally to facilitate further research. This would allow for better analysis of the various aspects of study success.

It can be concluded that the results of this study can be used to inform DC athletes and educational institutions about the combination of sport and study in higher education in the Netherlands. This means that it does not matter how old the DC athlete is, what sport status the DC athlete has and whether he studies part-time or full-time to successfully obtain a higher education degree. Female DC athletes appear to be slightly more successful than male DC athletes, and team DC athletes appear to have a slightly easier time completing the higher education program than individual DC athletes. It can also be mentioned that it seems that the number of training hours has an influence

on whether or not a diploma is obtained. The probability of obtaining a degree decreases when training more than 10 hours per week. Of course, the above conclusion does depend on the individual. One may question whether a DC athlete can reach the athletic top 10 when there are less than 10 training hours per week. As indicated in the theoretical framework, 20-30 hours of training and at least one competition per week is required to achieve athletic excellence (Subijana et al., 2015; Graczyk et al., 2017). Considering that students need to spend approximately 30-40 hours per week on their studies (Aquilina, 2013), it is a nice ambition of the Ministry of VWS, OCW and NOC*NSF to indicate that by a successful dual career they mean that it should be possible for every athlete to follow the education (HBO and WO) that suits him or her in terms of interest and competences, in order to have a smooth transition to a post-athletic career. However, there is still some work to be done on the flexibility of both education and sport as well as the coaching of DC athletes to make this possible.

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Appendix

Appendix 1: Overview of the percentage DC athletes in Higher education with a sport status who obtained a degree.

Table 6*: Overview of the percentage DC athletes in higher education with elite-, talent- or KNVB status who obtained a bachelor and or master's degree since 2012-2013*

		Elite		Talent		KNVB		Total	
		n	%	n	%	n	%	n	%
2012-2013	**Total**	14	48.3	11	37.9	4	13.8	29	100.0
	Degree HBO	1	7.1	1	9.1	0	0.0	2	6.9
	Degree WO	1	7.1	0	0.0	0	0.0	1	3.4
2013-2014	**Total**	14	41.2	17	50.0	3	8.8	34	100.0
	Degree HBO	1	7.1	0	0.0	1	33.3	2	8.0
	Degree WO	0	0.0	0	0.0	0	0.0	0	0.0
2014-2015	**Total**	18	36.7	29	59.2	2	4.1	49	100.0
	Degree HBO	1	8.3	0	0.0	0	0.0	1	4.8
	Degree WO	0	0.0	1	12.5	0	0.0	1	4.8
2015-2016	**Total**	21	30.4	45	65.2	3	4.3	69	100.0
	Degree HBO	1	9.1	0	0.0	0	0.0	1	5.6
	Degree WO	1	9.1	2	33.3	1	100.0	4	22.2
2016-2017	**Total**	36	36.4	60	60.6	3	3.0	99	100.0
	Degree HBO	3	15.8	4	57.1	0	0.0	7	26.9
	Degree WO	2	10.5	0	0.0	0	0.0	2	7.7
2017-2018	**Total**	45	36.0	73	58.4	7	5.6	125	100.0
	Degree HBO	8	26.7	5	38.5	0	0.0	13	29.5
	Degree WO	3	10.0	2	15.4	1	100.0	6	13.6
2018-2019	**Total**	54	32.5	98	59.0	14	8.4	166	100.0
	Degree HBO	7	16.3	5	22.7	1	100.0	13	19.7
	Degree WO	5	11.6	2	9.0	0	0.0	7	12.1
2019-2020	**Total**	61	28.6	125	58.7	27	12.7	213	100.0
	Degree HBO	5	8.2	1	3.2	0	0.0	6	6.3
	Degree WO	1	1.6	1	3.2	1	25.0	3	3.1