Dual Careers and Academic Achievements: Does Elite Sport Make a Difference?

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ABSTRACT

In the literature on Dual Careers (DC) there has been an ongoing debate on whether there is a trade-off between being an elite athlete and achieving academically. Is the time needed to compete at the highest level a barrier to academic achievement? Or can knowledge and expertise obtained from an elite sporting career be transferred into academic performance? In this paper, we aim to answer these questions using a unique database on talented young athletes enrolled in the Danish high-performance program covering the period from 2010 to 2019. Comparing high school graduation grades from a full national sample of non-athlete high school students and elite athletes who also attend high school – and controlling for relevant covariates – our results suggest that student-athletes perform better than their fellow students who are not engaged in elite sport. We also test whether DC support initiatives make a difference in this regard. Results and implications of the study are discussed.

Key Words: Dual Career; Student-Athletes; Educational Performance; Denmark

INTRODUCTION

There has been a decade-long discussion in academia and in public opinion on whether elite sport leverages or constrains academic achievements (Jonker et al., 2009). The question asked, particularly regarding young talented athletes, is whether they are at risk of lagging behind in education when they are pursuing a career in elite sport (Huml et al., 2019). Over the years, demands on athletes to keep up with international competition – i.e. investing sufficient time in training and competition – have increased significantly (Küttel et al., 2020), while school pressures are also present (Brettschneider, 1999; Murdock et al., 2016). This makes it increasingly difficult for student-athletes to dedicate the necessary time and effort to both areas of their lives (López de Subijana et al., 2015).

Counter measures and support systems have been established in many nations to address this concern among athletes (Guidotti et al., 2015; Stambulova & Ryba, 2013). Today there are not only support initiatives being provided to help athletes with their physical optimisation, access to facilities, equipment, finances, and training schedules, but also private school initiatives (for example in Norway (Kårhus, 2016)) and public Dual Career (DC) programs that aim to balance their athletic careers with educational and/or civic achievements (De Bosscher, 2007; De Bosscher et al., 2015). In 2012, The European Union (EU) developed guidelines on athletes' DCs (Commission of the European Communities, 2012) with the aim to assist athletes in reaching their full potential through programs that can reduce stress, build life skills and help them achieve a balance between sport and civic life in general (Aquilina, 2013; Stambulova et al., 2014).

A growing body of research has been published on DCs (Guidotti et al., 2015; Stambulova & Wylleman, 2019), including studies examining impact on academic

performance. However, those touching or focusing on the effect of DC on academic achievements are mainly qualitative (e.g. Christensen & Sørensen, 2009; Gustafsson et al., 2008), descriptive (Nielsen et al., 2000), or apply simple bivariate tests (e.g. Jonker et al., 2009) when examining the effects of relevant programs, raising questions about generalisability as well as the methodologies applied. While the studies provide interesting insights, there is a need to test effects more generally and to apply methodological designs that can single out potential effects from DC programs.[1] Further, because DC research is contextual – due to differences in DC organisation in different countries (Stambulova et al., 2020) – more research into dual careers in different nations is also needed.

In this paper, we aim to test whether the pressure on athletes to perform in their sports affects their academic performance and to what extent a DC program can assist the athletes in obtaining academic competences. We add to existing research by deploying appropriate regression modelling to a large and unique database on high school students and student-athletes to expand the DC knowledge base by adding evidence from Denmark.

Over the years, Denmark has performed well in international elite sport, reaching a peak in competitiveness in the 2010s. At the 2016 Olympics in Rio de Janeiro, its proportion of medals won (15 in total) meant that Denmark was one of the best performing nations in relation to its population size (Storm & Nielsen, 2019). The positive result was attributed to a high performance system that – based on increasing national ambitions from the 2000s onward (Storm, 2012) – has focused on supporting Danish

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[1] We will touch more upon this in the Data and Methods section.

talents in a selected number of disciplines, thereby improving overall performance (Storm et al., 2016; Storm & Nielsen, 2010).

Denmark's impressive results have also put increasing pressure on its athletes in terms of the time and effort they need to devote to their sports (Storm et al., 2020), making it imperative to test the potential effects of this on their abilities to balance dual careers. The Danish case is interesting because it can illustrate the consequences for athletes when nations establish high ambitions in the international sporting arms race. The Danish law on elite sport demands that Danish elite sport must be developed and supported in a socially responsible manner (Ibsen et al., 2011). As this law is quite unique to Denmark, it is particularly interesting to analyse to find out whether there is evidence that this law has created conditions for athletes to succeed in their academic achievements – and secure job opportunities later in life – as well as in their sports.

The paper is structured as follows: First, we briefly sketch a theoretical framework to underpin the analysis. Second, we review existing literature on elite athletes in relation to academic achievements and DC issues. Third, we present the data and methods deployed in the paper, and fourth, we present the results of our analysis and discuss them in light of the reviewed research. Finally, we conclude and touch upon research perspectives and future research agendas.

THEORETICAL UNDERPINNING

This paper is mainly an empirical endeavour, but a theoretical underpinning is also needed to frame the analysis. As pointed out above, the literature on DC issues has increased significantly over the years. Several themes have been studied, such as the transition from being an elite athlete to starting a civic career (e.g. Curtis & Ennis, 1988; Stambulova et al., 2014), the transition from one part of an elite career and/or educational step to the next (e.g. Brown et al., 2015; Debois et al., 2015), and differences between different DC programs across nations and contexts (e.g. Condello et al., 2019; Küttel, 2017).

This study has a more narrow focus, and by following the conceptual framework provided by Guidotti (2015), which divides DC research into *"...micro (i.e., individual student-athletes), meso (i.e., interpersonal relationships of student-athletes with family, peers, educators, coaches and managers), [and] macro (i.e., organizational and Governmental policies) dimensions of DC (p.7)"*, it falls mainly within the micro-level category.

However, and as indicated earlier, we also touch upon the macro dimensions of DC research by testing the effect of governmental policies (DC programs) on athletes' academic achievements. Conceptually speaking we are inspired by life course research (Elder, 1996). However, we only focus on a limited aspect of the student-athlete's life course in order to test potential effects of being a student-athlete on academic achievement and to identify potential impact of DC programs. Our general approach to the paper's research problem is illustrated in Figure 1.

Figure 1: Conceptual Understanding of the Research Problem
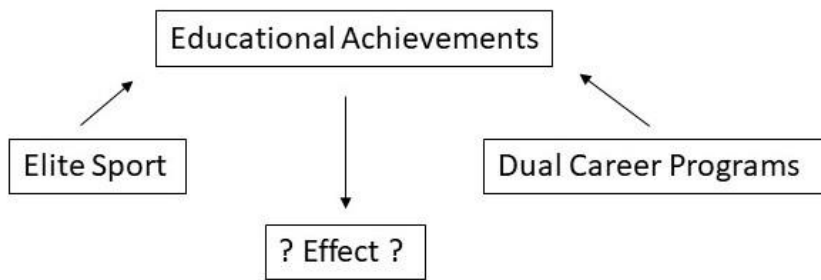
We follow Conzelmann and Nagel's (2003) observation by seeing individual professional careers – outside of elite sport – as being potentially affected (either positively or negatively) by the pursuit of elite sporting careers. This is consistent with Jonker et al. (2009), who argue that *"... as a result of the extensive commitment towards their sports, elite athletes are used to work on self-conscious, goal-orientated, and problem-focussed behaviours in a goal-directed environment by the goal of improving their performances"* (p. 56). In short, the theoretical and conceptual idea is that the transferability of earned skills and expertise from elite sport to education is possible because elite sport teaches athletes competences that can be applied to academic studies, such as goal setting, self-awareness, planning and discipline.

On the other hand, Conzelmann and Nagel (2003) stress that *"[s]ince the 1960s the load caused by training, competitions and the elongation of the sports career has permanently intensified. This leads to an increasingly negative influence in the professional career* [outside elite sport, (ed.)]" (p. 262). However, and as also mentioned in the introduction, more and more nations have institutionalised DC programs to assist the athletes in balancing their endeavours and gaining the best possible results educationally and in terms of sporting performance. This is also illustrated in Figure 1 as being part of our analysis.

Nagel (2002) and Conzelmann and Nagel (2003) state that one's life course is embedded in institutions that require them to meet certain demands but also assist them in overcoming challenges in order to meet these demands. This institutionalisation of the life courses cannot be analysed in isolation from other fields of life – for example the family and socio-economic determinants. In our study we aim to take this into consideration in our regression design.

In the review below, we look at academic studies that have asked the question of how engagement in elite sport affects performance in the educational system.[2] We also evaluate the effect of DC programs, if they have been analysed in the reviewed literature. This leads on to the methods section, where our analytical approach is presented corresponding to the conceptual underpinning described above and outlined in Figure 1.

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[2] We only take into consideration reviewed journal papers and book chapters. However, because we focus on Danish student-athletes, we also include reports and other types of grey literature published in Denmark.

DUAL CAREERS AND ACADEMIC ACHIEVEMENTS: A BRIEF REVIEW
OF THE LITERATURE

Over the years, the body of literature on life transition and career performance of elite athletes (Park et al., 2013) has grown significantly. This is also the case with research on student-athletes and academic performance specifically. However, as pressures on elite athletes have increased in parallel to the growth in literature, we only review more recent studies because the older ones are less relevant to contemporary discussions on dual careers (Conzelmann & Nagel, 2003).

One of the first studies in this period conducted on elite sport and academic achievement is from the US, where Purdy, Eitzen, and Hufnagel (1982) focused on the relationship between participation in college sport and educational performance. Studying 2,091 student-athletes over 10 years (from 1970 to 1980), and deploying simple bi-variate significance tests, they found that student-athletes performed worse than ordinary students. Differences were also found across sex, sport, and race among the athletes.

Also studying student-athletes in the US, Adler and Adler (1985) took a participatory approach to study participants in a major college basketball program. Their qualitative approach reveals that even though the student-athletes were initially positive about embarking on an academic career, they ended up shelving their academic ambitions as a result of poor educational performance. According to the authors, these students' elite sport identity makes them detach themselves from fellow students with a clearer academic identity.

In a retrospective examination of 616 successful German Olympic athletes, Conzelmann and Nagel (2003) find that elite level athletes end up with higher educational expertise than the average German. The authors indicate that this could be because the

athletes' parents have a privileged social background. However, this assumption is not tested in the study. Deploying cluster analysis to the data, and in accordance with the conceptual framework outlined earlier, the authors suggest that engaging in sport is favourable in pursuing a civic professional career due to the transferability of skills, even though the data also reveals that this is not the case for all of the athletes studied. But the overall impression given is that the benefits of being engaged in an elite sporting career outweigh the risks in relation to potential effects on the athlete's civic career.

Hickey and Kelly (2008) studied the question of becoming a 'complete person' among Australian professional footballers. This notion implies that, whilst performing at the highest professional level of their sport, footballers are expected to prepare for life after sport by engaging in (higher) education. However, their study is mainly qualitative and does not draw convincing conclusions about how well the players actually perform academically alongside their sport. But it does highlight a persistent dilemma they face: Even though they are expected to prepare to enter the workforce after football, this expectation is not easily managed by the players, because too much effort is put into prolonging their sporting careers as much as possible.

In a Swedish study on sixteen-year-old student-athletes from 27 sports, Stambulova, Engström, Franck, Linnér, and Lindahl (2014) deploy a mixed methods design – consisting of a survey (repeated once during the study period) and several qualitative interviews – to understand the development of an 'athlete-student identity' among those studied during their first year at national elite sport schools. The findings suggest that dual career programs are important for student-athletes to cope with the transitions and pressures in their lives and lay out some recommendations for improvement. However, no specific measurements of how the school programs add to academic performance are deployed in the study. Further, no comparisons with samples

from outside elite sport are provided to understand to what extent elite sport can contribute skills or expertise to civic careers, and no comparisons of student-athletes that are enrolled in DC programs and non-enrolled student-athletes are made to understand the impact of the DC initiatives.

Jonker et al. (2009) assess the percentage of student-athletes attending pre-university level relative to national averages in 1992/93 and 2006/2007. Applying simple chi-square difference tests, they find that the proportion of student-athletes increased significantly in the period between the two data points and argue that this indicates that the academic achievements of the athletes had risen relative to broader population. Noting that the pressure on young sporting talents also increased during the period studied, the authors conclude that improved academic performance must be connected to the competences student-athletes learn from practicing elite sport. This suggests that transferability is a possible effect.

In contrast to these findings, López de Subijana et al. (2015) identify barriers Spanish elite athletes face when studying by applying an Exploratory Factor Analysis (EFA). They conclude that students enrolled in dual career programs are less able to fit into the education system. Even though the Spanish DC program is helpful in many respects, it fails to teach the athletes the necessary time management skills, which are essential to a successful academic career. Further, and is the case with many of the other referenced studies, the research does not compare student-athletes with ordinary students to understand specifically the – positive or negative – effects of elite sport on the ability to become successful in the education system.

In Denmark, Nielsen, Nielsen, and Storm (2000) have studied a broad sample of elite sporting talents, concluding that the sample had or was progressing towards a higher educational level compared to the same age groups in the Danish population. This

conclusion was based on descriptive comparisons of elite sporting talents and average young people. In a later study on student-athletes attending high school (Danmarks Evalueringsinstitut & Idrættens Analyseinstitut, 2009), another descriptive comparison concluded that the avarage grades among student-athletes aged 16-19 years were at the same level as non-athletic students attending high school in Denmark.

Focusing on primary school students (7th-9th grade – the graduation level leading to high school), Nielsen and Olsen (2014) found that, when controlled for gender, etnicity and economic and educational background variables, an effect of being part of the Danish elite sport class program on test scores in mathematics was present, indicating transferablility of expertise. However, no effects were found on test scores in Danish [language] subjects. The study has broader scope because the sample studied was of a broader demographic than the sample examined in this study. But it is still relevant because it applies appropiate methods to single out effects from elite sport engagment.

Summing up

The above review reveals that several studies have been conducted to understand the effect of being an elite athlete on academic achievements. In general, it appears that there is an effect. However, it is also clear that the majority of studies apply descriptive comparisons (e.g. Nielsen et al., 2000), simple statistical tests (e.g. Jonker et al., 2009), qualitative approaches (e.g. Stambulova et al., 2014) or quantitative studies with no relevant comparisons to a control group (e.g. López de Subijana et al., 2015). This is a problem because multivariate regression techniques are preferable to simple statistical tests and descriptive analyses or qualitative studies that are suited to case studies (Storm & Holum, 2020). Only one study deployed appropriate controls to single out the effect of participating in elite sport, i.e. the one on Danish primary school pupils (Nielsen & Olesen, 2014). It also covers a broad range of students, of which many are outside the

Danish high performance program, but it only covers a few areas in Denmark. This is a problem in terms of generalisability, because many in the examined sample are not elite sport talents facing the same time and competitive pressure as students supported by Team Danmark.

Finally, while some of the reviewed studies have evaluated dual career initiatives, they have not tested the effects based specifically on objective data, like school grades. In the below sections, we describe our approach, which aims to address these gaps in the literature.

METHODOLOGICAL APPROACH, DATA AND EMPIRICAL MODELS

Methodological Approach

To single out potential effects of elite athletic engagement and dual career programs on academic achievements among Danish student-athletes, we deploy a multivariate regression approach. Regression analysis is a fruitful tool that can handle many factors that can impact on a given variable (Mehmetoglu & Jakobsen, 2017) – the variable in this study being high school students' graduation grades. Performing a regression design is in correspondence with the conceptual approach described earlier and adds to previous studies that have applied descriptive methods, simple bivariate correlational methods, or qualitative approaches. As mentioned above, such approaches are insufficient because other factors that can potentially affect grades are not controlled for in the comparison between high school students and high school student-athletes. Still, there are some problems with our data in terms of dealing with causality issues. As we have not been able to form panel data to study the effects – or take into consideration any longitudinal development of our data – we can only back up our findings up theoretically. We will get back to this when we present our results.

Data

Our data have been collected from a large database of Danish elite athletes accepted for enrollment in Team Denmark's youth DC program. This program has existed since 1989 and entails that the athletes accepted for the program are entitled to complete a high school degree over an expanded duration of up to four years instead of the usual three years. Other support initiatives are also accessible to them, such as extra classes (for example online classes), extra-curricular and general counselling, and postponed exams. The students are also allowed to skip certain classes to train or participate in national or

international competitions. This flexibility is voluntary and not all student-athletes take advantage of the program's elements during their high school time – some select only a few of the program's opportunities. The accepted athletes are, according to the inclusion criteria, talents who perform at the highest national level with the potential of becoming part of the national teams in their respective disciplines.

All background information on the athletes – e.g. graduation grades, parents' highest level of education, and income – has been obtained for analysis from the national research register hosted by the Danish national bureau of statistics, Statistics Denmark. The data are described in detail below and cover all student-athletes and non-student-athletes that graduated from high school in Denmark from 2010 to 2019. This period is chosen because it corresponds with the growing Danish ambition to attain greater international competitiveness in sport, making it likely that the increased pressure on the athletes to succeed could have affected their academic performance.

Information on various support-related elements of the DC program (see above) that is not available in the national registry was obtained through a survey that was sent out to all the athletes covered by the study. These survey data were merged with all background data to obtain a detailed set of data.

In total, our dataset contains 1,005 athletes who accepted to participate in the survey and were possible to pair with background information because they answered the questions in the survey consistently. The student-athletes come from a variety of sports disciplines in the Danish high-performance program. However, they are mainly participating in sports on the summer Olympic program; 47 different disciplines in total. Data on all other Danish high school students who graduated in this period were also

accessed for comparison.[3] In total, there are more than 400,000 non-athletes among the graduated students used as a comparison dataset in our regression models.

Dependent variable

We run two Ordinary Least Squares (OLS) models to conduct our research. In our first model, we test whether being a student-athlete has any impact on academic performance, as measured by high school graduation grades *HSchoolGrade*. We use average grades on the 7-point grade scale used by the Danish education system since 2006 as our dependent variable (this independent variable is also used in Model II; see below). Its relation to other international standards, like the ECTS (European Union) or the US grading scales are displayed in Table 1.

Table 1: The Danish 7-point Scale Compared to other International Grading Scales

Denmark	European Union	US
7-point Grading Scale	*ECTS Grading Scale*	*US Grading Scale*
12	A	A+
10	B	A, A-
7	C	B+, B
4	D	B-, C+, D
2	E	C-, D+, D
0	Fx	D-, F
-3	F	F

[3] It is important to note that all European General Data Protection Regulation (GDPR) rules have been followed in the study. Only athletes who wanted to participate have participated, and individual data that can be used to trace the persons in question have been handled with care and anonymised following the data collection to meet the highest level of data security. Regarding data on non-athletes, all have been accessed on DST servers operated under the GDPR regulation and Danish law on data protection. As consequence of this, all data analyses have been conducted on DST servers and cannot be shared with others due to the GDPR rules.

Source: https://fulbrightcenter.dk/advising/grading/

Independent variables

In the regression design of Model I, being a student-athlete or being a non-athlete, *StudentAthlete,* is our prime dummy variable of interest. A range of independent variables are also entered to control for other factors that can affect academic performance. This enables us to single out the specific effect of being a student-athlete on our dependent variable.

Primary school graduation grades, *PrimeEdGrade,* are shown by several studies (*Styrelsen for IT og Læring*, 2019) to affect high school grades. We expect the same to be the case here. *Gender* (with women as reference category) is a very common control variable and is deployed to check for differences in grades between men and women. Earlier studies of graduation grades among Danish high school students (*Styrelsen for IT og Læring*, 2019) have shown that women score higher grades than men, so we expect the same to be true in our sample.

Our *EthBack* variable is coded with ethnic students – and/or those who have parents with another background than Danish – as a reference category to students with a Danish background. Prior international research (e.g. Frederickson & Petrides, 2008; Meeuwisse et al., 2013) has shown negative effects on student achievements among those with a foreign heritage, but other studies (e.g. Fuligni, 1997) have found opposite results due to strong focus on education among the ethnic groups in their sample. As ethnic minorities have advanced educationally over the years in Denmark, we do not expect a significant negative effect of having an ethnic background in our sample.

FamHous indicates the family and housing situation of the students. It encompasses three categories (with the first being our reference category): 1) Living on your own (apart from parents), 2) Living at home with parents, 3) Living at home with

one parent. We expect that living at home with both parents would provide the students with the greatest amount of resources to perform well educationally. This assumption is in correspondence with Downey (1995).

Taking a high school degree in Denmark can be done in four different ways – STX, HTX, HHX, or HF – and our *SchoolForm* variable indicates which. STX (our reference category) is the standard and most common high school degree that entails a broad set of mathematical, social science, culture and language courses. HTX is more technically oriented and HTX focuses on commerce, sales and trade/export. HF is a two-year variant of STX with a more limited set of courses designed for older students who have previously been working and want to upgrade their educational skills to qualify for a bachelor's or master's degree. We have no specific expectations in regard to this variable, but it is included to control for potential differences across the different high school degrees that could affect average grades.

We also deploy a *10thGraders* dummy variable to test the effect of an extra year of primary education. In Denmark 10th grade is voluntary but students often enroll in it to be better prepared for high school, because they are looking for vocational training, or because they are yet to decide where to proceed from primary school. As shown by other studies (e.g. Berlinski et al., 2009; Calsamiglia & Loviglio, 2020), maturity affects academic performance positively, so we expect that the extra year makes students better prepared for high school graduation and that it will have a positive effect on our dependent variable.

The variables, *FatherAge, MotherAge, FatherEd, MotherEd* (parents'/guardians' education)*, FatherJob, MotherJob* (parents'/guardians' occupational status) and *PAverageIncome* (parents'/guardians' average income) are all socio-economic variables that we expect to have an effect on high school student grades; i.e. higher values, higher

grades. Several studies have deployed such variables, finding that the socio-economic status of the parents has a positive effect on their children's career (Björklund & Salvanes, 2011; Ermisch & Francesconi, 2001) and academic aspirations (Connolly et al., 2016); i.e. grades. We except the same to be the case in relation to our dependent variable.

Finally, we control for the student-fellow effect (*StudFeEfct*). This variable controls for the effect of going to high school with other high (or low) performing students, and is added because this type of effect has been evident in earlier Danish studies (*Styrelsen for IT og Læring*, 2019). The variable is calculated by taking an average of all students' grades at the specific high schools the students attended in the year in which the students graduated. The assumption underpinning this approach is that attending high school with other high performing students can affect one's own educational performance.

In our second model (Model II), we compare student-athletes who have made use of the flexible options offered by dual career programs with student-athletes who have not. Our regressions are run by adding a dummy variable to a data subset of 1,005 student-athletes indicating the use of a DC program or not (*DC Program*). The same variables as presented above are deployed as controls. The aim is – in accordance with our research endeavour – to test the potential effect of the DC programs on student-athletes' grades. Because only very few respondents in our sample have used all the services offered by DC programs, we have chosen to categorise the respondents that have used one or two of the most significant services – extension of the study period to four years and additional classes – as students that are enrolled in the program. Under these conditions, it has been possible to identify 498 persons that have used services in the DC program and 507 who have not despite qualifying for them.

Specifications

Our two models can be expressed in the following equations. Descriptive statistics are displayed for all variables in the two models in Table 2.

[1]

$$\text{HSchoolgrade}_i = \beta_0 + \text{StudentAthlete}_i\beta_1 + \text{PrimeEdGrade}_i\beta_2 + \text{Gender}_i\beta_3 + \text{EthBack}_i\beta_4$$
$$+ \text{FamHouse}_i\beta_5 + \text{SchoolForm}_i\beta_6 + \text{10thGraders}_i\beta_7 + \text{FatherAge}_i\beta_8$$
$$+ \text{MotherAge}_i\beta_9 + \text{FathersEd}_i\beta_{10} + \text{MothersEd}_i\beta_{11} + \text{FatherJob}_i\beta_{12}$$
$$+ \text{MotherJob}_i\beta_{13} + \text{PAverageIncome}_i\beta_{14} + \text{StudFeEfct}_i\beta_{15} + \epsilon_i, i = 1, \dots, 408,630$$

[2]

$$\text{HSchoolgrade}_i = \beta_0 + \text{DCPrograms}_i\beta_1 + \text{PrimeEdGrade}_i\beta_2 + \text{Gender}_i\beta_3 + \text{EthBack}_i\beta_4$$
$$+ \text{FamHouse}_i\beta_5 + \text{SchoolForm}_i\beta_6 + \text{10thGraders}_i\beta_7 + \text{FatherAge}_i\beta_8$$
$$+ \text{MotherAge}_i\beta_9 + \text{FathersEd}_i\beta_{10} + \text{MothersEd}_i\beta_{11} + \text{FatherJob}_i\beta_{12}$$
$$+ \text{MotherJob}_i\beta_{13} + \text{PAverageIncome}_i\beta_{14} + \text{StudFeEfct}_i\beta_{15} + \epsilon_i, i = 1, \dots, 1,005$$

Table 2: Descriptive Statistics

	N	Mean	SD	Min	Max
High School Graduation Grades (*HSchoolGrade* (7-point Scale))	408,630	6.981	2.403	2	12
Primary School Graduation Grades (*PrimeedGrade* (7-point Scale))	391,003	7.502	2.041	-3	12
Men (women as reference category; *Gender* (%))	408,438	0.453	0.498	0	1
Ethnical Background (students with other background than Danish as reference category; *EthBack* (%))	408,438	0.906	0.292	0	1
Family and Housing Situation (*FamHous* (%))					
Living on your own (apart from parents)	408,348	0.090	0.286	0	1
Living at home with parents	408,348	0.711	0.453	0	1
Living at home with one parent	408,348	0.188	0.390	0	1
High School Form (*SchoolForm* (%))					

STX	406,288	0.592	0.492	0	1
HTX	406,288	0.143	0.350	0	1
HHX	406,288	0.178	0.383	0	1
HF	406,288	0.087	0.282	0	1
10th Grade (*10thGraders* (%))	391,216	0.425	0.494	0	1
Age of Father (*FatherAge* (years))	402,193	31.941	4.595	15	62
Age of Mother (*MotherAge* (years))	407,151	29.253	4.621	11	54
Fathers' Education (*FathersEd* (%))					
Primary school	408,360	0.161	0.367	0	1
General and vocational upper secondary					
education	408,360	0.475	0.499	0	1
Short-cycle higher education	408,360	0.091	0.287	0	1
Medium-cycle higher education	408,360	0.176	0.381	0	1
Long-cycle higher education	408,360	0.167	0.373	0	1
Mothers' Education (*MothersEd* (%))					
Primary school	408,360	0.129	0.335	0	1
General and vocational upper secondary					
education	408,360	0.424	0.494	0	1
Short-cycle higher education	408,360	0.060	0.237	0	1
Medium-cycle higher education	408,360	0.301	0.461	0	1
Long-cycle higher education	408,360	0.122	0.327	0	1
Employment of Father (*FatherJob* (%))					
Employed	390,803	0.656	0.474	0	1
Unemployed	390,803	0.017	0.129	0	1
Outside the labour force	390,803	0.324	0.468	0	1
Employment of Mother (*MotherJob* (%))					
Employed	399,670	0.625	0.484	0	1
Unemployed	399,670	0.014	0.118	0	1
Outside the labour force	399,670	0.361	0.481	0	1
Parents'/Guardians' Average Income (*PAverageIncome* (kr., log-transformed))	406,231	12.903	0.513	-2.398	18.738

RESULTS AND DISCUSSION

Model I: Student-athletes, non-student-athletes and academic achievements

The results of our estimations can be read from Table 3. Our main result regarding student-athletes' grades, *HSchoolGrades*, reveals a significant effect of 0.27 grade points at the 0.01 percent level when controlled for other relevant variables. This corresponds with contemporary research – for example (Jonker et al., 2009) and (Conzelmann & Nagel, 2003) – and indicates that there is a transfer of learning and expertise from engaging in elite sport to the academic context which has a positive effect on grades. This is also in accordance with our theoretical underpinning described earlier.

However, and as mentioned in the methods section, it is important to stress that our data are not fully capable of dealing with such causality issues – e.g. that engaging an elite sporting career automatically leads to higher grades. This would entail a different empirical design. However, based on existing research (e.g. Jonker et al., 2009) and our theoretical underpinning it is reasonable to suggest that the student-athletes' chosen career pathways in elite sport give them the discipline and skills to achieve academically, and that they may also be higher achievers than their non-athletic student peers overall.

Table 3: OLS Estimation of the Effect of Being a Student-Athlete and of the use of DC Programs on High School Grades respectively

	Model I		Model II	
	Estimate	SE	Estimate	SE
Student Athlete (*StudentAthlete*)	0.27***	0.05	-	-
Dual Career Program Enrollment (*DC Program*)	-	-	0.01	0.12
Primary School Graduation Grades (*PrimeEdGrade*)	0.82***	0.01	0.86***	0.03

Men (Women as reference category; *Gender* (%)	-0.44***	0.01	-0.49***	0.10
Ethical Background (*EthBack* (%))	-0.04***	0.01	0.38	0.49
Family and Housing Situation (*FamHous* (%))				
Living on your own (apart from parents)	0		0	
Living at home with parents	-0.95***	0.02	0.24	0.23
Living at home with one parent	-1.03***	0.02	0.22	0.26
High School Form (*SchoolForm* (%))				
STX	0		0	
HTX	0.26***	0.01	0.44*	0.23
HHX	0.15***	0.01	0.01	0.20
HF	0.46***	0.01	0.57*	0.31
10th Grade (*10thGraders* (%))	0.31***	0.01	0.47***	0.16
Age of Father (*FatherAge* (years))	0.01***	0.01	0.01	0.01
Age of Mother (*MotherAge* (years))	0.02***	0.01	0.02	0.02
Fathers' Education (*FathersEd* (%))				
Primary school	0		0	
General and vocational upper secondary education	-0.02***	0.01	-0.14	0.19
Short-cycle higher education	-0.02**	0.01	-0.23	0.24
Medium-cycle higher education	0.10***	0.01	-0.17	0.20
Long-cycle higher education	0.32***	0.01	0.10	0.21
Mothers' Education (*MothersEd* (%))				
Primary school	0		0	
General and vocational upper secondary education	-0.03***	0.01	0.12	0,18
Short-cycle higher education	-0.03**	0.01	0.60***	0,23
Medium-cycle higher education	0.14***	0.01	0.52***	0,17
Long-cycle higher education	0.39***	0.01	0.68***	0,18
Employment of Father (*FatherJob* (%))				
Outside the labour force	0		0	
Employed	0.07***	0.01	0.09	0.13
Unemployed	0.01	0.02	-0.42	0.69
Employment of Mother (*MotherJob* (%))				
Outside the labour force	0		0	
Employed	0.07***	0.01	0.03	0.12
Unemployed	-0.06***	0.02	-0.81**	0.39

Parents'/Guardians' Average Income				
(*PAverageIncome, log*)	0.21***	0.01	0.06	0.11
Student-fellow Effect (StudFeEfct)	-0.24***	0.01	-0.06	0.10
N		408,630		1,005
R^2		48		55

Note: *Significant at 10%; **significant at 5%; ***significant at 1%. Standard errors are robust.

Further, and in accordance with our expectations, our estimations indicate a positive effect from *PrimeEdGrade* on high school grades, while *gender* reveals a negative effect for males seen in relation to females – a finding that also meets our expectations based on earlier studies.

Also consistent with our expectations are the effects of *EthBack.* The regression output indicates that having a Danish ethnic background has a negative effect in comparison to having an ethnic background other than Danish, when controlled for other background variables. Earlier studies (e.g. Fuligni, 1997) have shown that some ethnic groups have a strong focus on education and this can explain the good results in this sample.

In relation to the variable *FamHous*, we find a negative effect from living at home with one or both parents compared to living away from home, which contrasts with earlier studies (e.g. Downey, 1995). The negative effect is greater if the student lives with one parent only.

Regarding *SchoolForm*, our estimations reveal that compared to STX (reference category) there is a significant positive effect from taking the HTX, HHX, and HF variant of a high school degree. Taking the results at face value, the estimations suggest that the three alternative variants exercise positive influence on the students in our sample compared to those taking a STX degree. It is difficult to say why this is the case and did not have any particular expectations connected to this variable. Therefore, future studies could look into explanatory factors.

The results from our estimations of the variables *FatherAge, MotherAge, FatherEd, MotherEd* (parents' education)*, FatherJob, MotherJob* (parents' occupational status) and *PAverageIncome* are all as expected and in correspondence with existing research (e.g. Björklund & Salvanes, 2011; Ermisch & Francesconi, 2001), with parents' age (higher), education (higher) and occupational status (working) affecting grades positively. The $10^{th}Graders$ variable is also significant and positive, as expected.

However, inconsistent with previous findings (*Styrelsen for IT og Læring*, 2019), we do not identify any positive effects from the variable *StudFeEfct* on students' grades.

Model II: Student-athletes and DC initiatives

In Model II, where we ran an OLS estimation on a data subset of student-athletes only, we find no effect from engaging in DC programs on the students' grades, as shown in Table 3 (Model II). Despite the regressions being run on a significant different dataset, most of the parameter estimates of the controls are similar to the ones from the Model I estimates. However, the missing effect from DC programs is surprising because one would expect an additional effect from prolonging your education (one year) and receiving extra tuition.

However, it is reasonable to assume that the athletes who choose to make use of the DC program are under more pressure to perform athletically. According to our data, a higher percentage of the student-athletes using the DC program have participated in senior tournaments like the Olympics, World Championships or European Championships than the student-athletes who have not received DC support. It is likely that this affects the amount of time they have needed to spend on their athletic careers (positively), and their sporting performance has therefore benefitted from the flexibility of the DC program. In this sense, it is reasonable to argue that the DC program has had a

compensating effect on the student-athletes in the sample. This finding is supported by other data from our survey indicating that the athletes' weekly time spent related to their sports are greater than student athletes that are not using the DC program. Put differently, student-athletes using the DC program have had been able to add more hours to sport related activities thus reaching a higher level of sporting performance. Further, 19 percent of the student-athletes who use the DC program answered that they would not have been able to graduate without DC support. This implies that had they not used the DC program, it could have affected their educational performance negatively. Finally, it is worth noting that the DC group of student-athletes (still) performs better than ordinary students – as is shown in the Model I output.

Overall, it is reasonable to conclude that having access to DC support programs, seems to support the student athletes in achieving a high level of sporting performance without compromising their academic achievements. Put differently, while the DC programs might not affect their academic achievements in a significantly positive way, they seem to have a positive impact on their sporting achievements without having a (connected) negative effect on their educational performance. In the concluding section, we briefly touch on the implications of these findings.

CONCLUSION, IMPLICATIONS AND FUTURE RESEARCH

Summary

This paper has aimed to understand the effects of elite athletic engagement on academic achievements, and it has tested whether dual career (DC) programs make a difference in this regard. As suggested by our model output, we identify an effect from being a student-athlete on grades, compared to ordinary students, when other relevant covariates are taken into account. In regard to DC programs, we cannot find any effects from our estimations on grades. However, as pointed out in the discussion, DC programs seem to enable the athletes to perform at the highest level possible in their sports without compromising their educational achievements.

Seen from this perspective, it is fair to say that the Danish DC programs are beneficial and are in correspondence with the Danish law on elite sport which, as mentioned in the introduction, demands that Danish elite sport is developed and supported in a socially acceptable manner.

Implications

The implications of our study are twofold: Regarding the question of transferability, sport federations, elite sport organisations and people working on elite sport performance programs can promote elite sport as a potential educational performance enhancer. This potential is connected to the second implication, namely that DC programs offered to talented student-athletes can assist them in allocating more time to performing athletically. This supports the notion that DC programs are beneficial and should be promoted to all athletes in correspondence with the Danish law on elite sport.

Limitations and Future Research

The findings presented in this paper have some limitations that point towards future research opportunities. First, this study is the first published paper that applies regression modelling to study the relationship between academic achievement and DC programs. This approach could be expanded to studies conducted in other nations. As pointed out by Stambulova, Ryba, and Henriksen (2020), national elite sport systems and DC programs differ across countries, raising questions of generalisability and calling for additional studies to enhance the knowledge base on sport, educational performance and DC programs.

Second, future studies should aim to answer some of the questions raised by our findings. For example, why is it that people with another ethnic background than Danish seem to perform better educationally than people with Danish backgrounds? Or why is it that students who take different variants of the high school degree from the standard (STX) degree seem to perform better when measured by grades? What are the factors behind this?

Third, and finally, it would be interesting for future studies to examine the potential effects of education and DC programs on sporting performance. In this paper we have only examined this one way around. However, gaining additional information from another angle can assist sports managers and people working with DC initiatives in understanding the potential of being a student-athlete.

DECLARATION OF INTEREST STATEMENT

The authors declare that they have no relevant or material financial interests that relate

to the research described in this paper. It should be stressed, though, that the data

presented were collected and analysed as part of a larger evaluation project on the

Danish dual career high performance program financed by the Danish elite sport

organisation Team Denmark. The results have thus been presented previously in a

Danish policy report ███████████ [blinded for review]. However, the paper

represents a significant reworking of the report's findings.

REFERENCES

Adler, P., & Adler, P. A. (1985). From Idealism to Pragmatic Detachment: The Academic

    Performance of College Athletes. *Sociology of Education*, *58*(4), 241–250.

Aquilina, D. (2013). A study of the relationship between elite athletes' educational

    development and sporting performance. *International Journal of the History of*

    Sport, *30*(4), 374–392. https://doi.org/10.1080/09523367.2013.765723

Berlinski, S., Galiani, S., & Gertler, P. (2009). The effect of pre-primary education on

    primary school performance. *Journal of Public Economics*, *93*(1–2), 219–234.

    https://doi.org/10.1016/j.jpubeco.2008.09.002

Björklund, A., & Salvanes, K. G. (2011). Education and Family Background.

    Mechanisms and Policies. In *Handbook of the Economics of Education* (Vol. 3).

    Elsevier. https://doi.org/10.1016/B978-0-444-53429-3.00003-X

Brettschneider, W.-D. (1999). Risks and Opportunities: Adolescents in Top-Level Sport

    - Growing Up with the Pressures of School and Training. *European Physical*

    Education Review, *5*(2), 121–133. https://doi.org/10.1177/1356336x990052004

Brown, D. J., Fletcher, D., Henry, I., Borrie, A., Emmett, J., Buzza, A., & Wombwell, S.

    (2015). A British university case study of the transitional experiences of student-

    athletes. *Psychology of Sport and Exercise*, *21*, 78–90.

    https://doi.org/10.1016/j.psychsport.2015.04.002

Calsamiglia, C., & Loviglio, A. (2020). Maturity and school outcomes in an inflexible

    system: evidence from Catalonia. *SERIEs*, *11*(1), 1–49.

    https://doi.org/10.1007/s13209-019-0196-6

Christensen, M. K., & Sørensen, J. K. (2009). Sport or school? Dreams and dilemmas for talented young Danish football players. *European Physical Education Review*, *15*(1), 115–133. https://doi.org/10.1177/1356336X09105214

Commission of the European Communities. (2012). *EU Guidelines on Dual Careers of Athletes: Recommended Policiy Actions in Support of Dual Careers in High-Performance Sport*. https://ec.europa.eu/assets/eac/sport/library/documents/dual-career-guidelines-final_en.pdf

Condello, G., Capranica, L., Doupona, M., Varga, K., & Burk, V. (2019). Dual-career through the elite university student-athletes' lenses: The international FISU-EAS survey. *PLoS ONE*, *14*(10), 1–19. https://doi.org/10.1371/journal.pone.0223278

Connolly, D. J., Allen-Collinson, J., & Evans, A. B. (2016). A level playing 'field'? A Bourdieusian analysis of the career aspirations of further education students on sports courses. *Sport, Education and Society*, *21*(8), 1144–1160. https://doi.org/10.1080/13573322.2014.994175

Conzelmann, A., & Nagel, S. (2003). Professional Careers of the German Olympic Athletes. *International Review for the Sociology of Sport*, *38*(3), 259–280. https://doi.org/10.1177/10126902030383001

Curtis, J., & Ennis, R. (1988). Negative Consequences of Leaving Competitive Sport? Comparative Findings for Former Elite-Level Hockey Players'. *Sociology of Sport Journal*, *5*, 87–106.

De Bosscher, V. (2007). *Sports Policy Factors Leading to International Sporting Succes: Dissertation presented in partial fulfillment of the requirements for de degree of Doctor in Physical Education*. VUBPRESS.

De Bosscher, V., Shibli, S., Westerbeek, H., & Van Bottenburg, M. (2015). *Successful Elite Sport Policies: An International Comparison of the Sports Policy Factors Leading to International Sporting Success (SPLISS 2.0) in 15 Nations*. Meyer and Meyer Sports.

Debois, N., Ledon, A., & Wylleman, P. (2015). A lifespan perspective on the dual career of elite male athletes. *Psychology of Sport and Exercise*, *21*, 15–26. https://doi.org/10.1016/j.psychsport.2014.07.011

Downey, D. B. (1995). When Bigger Is Not Better: Family Size, Parental Resources, and Children's Educational Performance. *American Sociological Review*, *60*(5), 746–761. https://www.jstor.org/stable/2096320

Elder, G. H. (1996). Life Course and Developmental Insights. In R. B. Cairns, G. H. Elder, & J. E. Costello (Eds.), *Developmental Sciences* (pp. 31–62). Cambridge University Press. https://doi.org/https://doi.org/10.1017/CBO9780511571114.004

Ermisch, J., & Francesconi, M. (2001). Family matters: Impacts of family background on educational attainments. *Economica*, *68*(270), 137–156. https://doi.org/10.1111/1468-0335.00239

Frederickson, N., & Petrides, K. V. (2008). Ethnic, gender, and socio-economic group differences in academic performance and secondary school selection: A longitudinal analysis. *Learning and Individual Differences*, *18*(2), 144–151. https://doi.org/10.1016/j.lindif.2005.09.001

Fuligni, A. J. (1997). The Academic Achievements of Adolescents from Immigrant Families: The Roles of Familiy Background, Attitudes, and Behavior. *Child Development*, *68*(2), 351–363.

Guidotti, F., Cortis, C., & Capranica, L. (2015). Dual Career of European Student-Athletes: a Systematic Literature Review. *Kinesiologia Slovenica*, *21*, 5–20. https://www.senato.it/application/xmanager/projects/leg17/attachments/documento _evento_procedura_commissione/files/000/003/851/revisione_della_letteratura_sul la_doppia_carriera.pdf

Gustafsson, H., Hassmén, P., Kenttä, G., & Johansson, M. (2008). A qualitative analysis of burnout in elite Swedish athletes. *Psychology of Sport and Exercise*, *9*(6), 800–816. https://doi.org/10.1016/j.psychsport.2007.11.004

Hickey, C., & Kelly, P. (2008). Preparing to not be a footballer: Higher education and professional sport. *Sport, Education and Society*, *13*(4), 477–494. https://doi.org/10.1080/13573320802445132

Huml, M. R., Bergman, M. J., Newell, E. M., & Hancock, M. G. (2019). From the playing field to the classroom: The academic challenges for NCAA Division I athletes. *Journal for the Study of Sports and Athletes in Education*, *13*(2), 97–115. https://doi.org/10.1080/19357397.2019.1578609

Ibsen, B., Hansen, J., & Storm, R. K. (2011). Elite Sport Development in Denmark. In B. Houlihan & M. Green (Eds.), *Routledge Handbook on Sport Development* (pp. 386–398). Routledge.

Jonker, L., Elferink-Gemser, M. T., & Visscher, C. (2009). Talented athletes and academic achievements: a comparison over 14 years. *High Ability Studies*, *20*(1), 55–64. https://doi.org/10.1080/13598130902863691

Kårhus, S. (2016). What limits of legitimate discourse? The case of elite sport as 'thinkable' official knowledge in the Norwegian national curriculum. *Sport,*

Education   and   Society,   *21*(6),   811–827.
https://doi.org/10.1080/13573322.2014.975112

Küttel, A. (2017). *A Cross-Cultural Comparison of the Transition out of Elite Sport An investigation across the Swiss, Danish, and Polish elite sports contexts* [Syddansk Universitet]. https://doi.org/10.13140/RG.2.2.34888.72961

Küttel, A., Christensen, M. K., Zysko, J., & Hansen, J. (2020). A cross-cultural comparison of dual career environments for elite athletes in Switzerland, Denmark, and Poland. *International Journal of Sport and Exercise Psychology*, *18*(4), 454–471. https://doi.org/10.1080/1612197X.2018.1553889

López de Subijana, C., Barriopedro, M., & Conde, E. (2015). Supporting dual career in Spain: Elite athletes' barriers to study. *Psychology of Sport and Exercise*, *21*, 57–64. https://doi.org/10.1016/j.psychsport.2015.04.012

Meeuwisse, M., Born, M. P., & Severiens, S. E. (2013). Academic performance differences among ethnic groups: Do the daily use and management of time offer explanations? *Social   Psychology   of   Education*,   *16*(4),   599–615. https://doi.org/10.1007/s11218-013-9231-9

Mehmetoglu, M., & Jakobsen, T. G. (2017). *Applied Statistics Using Stata: A Guide for the Social Sciences*. Sage Publications.

Murdock, J. L., Strear, M. M., Jenkins-Guarnieri, M. A., & Henderson, A. C. (2016). Collegiate athletes and career identity. *Sport, Education and Society*, *21*(3), 396–410. https://doi.org/10.1080/13573322.2014.924920

Nagel, S. (2002). *Medaillen im Sport: Erfolg im Beruf? Berufskarrieren von*

Hochleistungs- sportlerinnen und Hochleistungssportlern. Hofmann Verlag.

Nielsen, J. C., & Olesen, J. S. (2014). *Idrætselevers erfaringer med idrætsklasser.* http://pure.au.dk/portal/files/75146625/Idr_tselevers_erfaringer_med_idr_tsklasser _JCN_og_JEO_DPU_AU_22_01_2014.pdf

Nielsen, K., Nielsen, A. G., & Storm, R. K. (2000). *Den danske subelites vilkår år 2000: Undersøgelse af danske subeliteidrætsudøveres sociale og idrætslige vilkår.* http://www.idan.dk/vidensbank/downloads/den-danske-subelites-vilkaar-aar-2000- —-bind-i/a6ae5f4b-428e-471f-b103-96d700000000

Park, S., Lavallee, D., & Tod, D. (2013). Athletes' career transition out of sport: A systematic review. *International Review of Sport and Exercise Psychology*, *6*(1), 22– 53. https://doi.org/10.1080/1750984X.2012.687053

Purdy, D. A., Eitzen, D. S., & Hufnagel, R. (1982). Are Athletes Also Students ? The Educational Attainment of College Athletes Author(s). *Social Problems*, *29*(4), 439– 448. https://www.jstor.org/stable/800032

Stambulova, N. B., Engström, C., Franck, A., Linnér, L., & Lindahl, K. (2014). Searching for an optimal balance: Dual career experiences of Swedish adolescent athletes. *Psychology of Sport and Exercise*, *21*, 4–14. https://doi.org/10.1016/j.psychsport.2014.08.009

Stambulova, N. B., & Ryba, T. V. (2013). *Athletes' Careers Across Cultures*. Routlegde.

Stambulova, N. B., Ryba, T. V., & Henriksen, K. (2020). Career development and transitions of athletes: the International Society of Sport Psychology Position Stand Revisited. *International Journal of Sport and Exercise Psychology*, *0*(0), 1–27.

https://doi.org/10.1080/1612197X.2020.1737836

Stambulova, N. B., & Wylleman, P. (2019). Psychology of athletes' dual careers: A state-of-the-art critical review of the European discourse. *Psychology of Sport and Exercise*, *42*(November 2018), 74–88. https://doi.org/10.1016/j.psychsport.2018.11.013

Storm, R. K. (2012). Danish Elite Sport and Team Danmark: New Trends? In S. Andersen & L. T. Ronglan (Eds.), *Nordic Elite Sport: Same Ambitions, Different Tracks* (pp. 224–236). Universitetsforlaget.

Storm, R. K., Eske, M., Nielsen, K.-J., & Rask, S. (2020). *Evaluering af Team Danmarks tilbud og ordninger på ungdomsuddannelsesområdet. Delrapport 2: Det gymnasiale uddannelsesområde*. https://idan.dk/vidensbank/downloads/evaluering-af-team-danmarks-tilbud-og-ordninger-paa-ungdomsuddannelsesomraadet-delrapport-2/ed6b0b2f-4186-4256-9004-ac3200f04203

Storm, R. K., & Holum, M. L. (2020). Does local sporting success affect sport participation? An examination of Danish professional soccer's effect on club membership. *European Sport Management Quarterly*. https://doi.org/10.1080/16184742.2020.1739726

Storm, R. K., & Nielsen, K. (2010). In a peak fitness condition? the Danish elite sports model in an international perspective: Managerial efficiency and best practice in achieving international sporting success. *International Journal of Sport Management and Marketing*, *7*(1–2). https://doi.org/10.1504/IJSMM.2010.029715

Storm, R. K., & Nielsen, K. (2019). *Danske eliteresultater 2018: Frem tilbage eller ligevægt? Danmarks aktuelle niveau i international elitesport [The Competitiveness*

of Danish Elite Sport 2018]. Danish Institute for Sports Studies. http://www.idan.dk/vidensbank/downloads/danske-eliteresultater-2017/28049968-70d1-4bf0-8f0d-a863008d4670

Storm, R. K., Nielsen, K., & Thomsen, F. (2016). Can a small nation be competitive in the global sporting arms race? The case of Denmark. *Managing Sport and Leisure*, *21*(4), 181–202. https://doi.org/10.1080/23750472.2016.1243993

Styrelsen for IT og Læring. (2019). *De socioøkonomiske referencer for gymnasiekarakterer 2019*. https://uvm.dk/-/media/filer/uvm/stat/pdf16/161219-de-sociooekonomiske-referencer-for-gymnasiekarakterer-2016.pdf?la=da