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Academic performance and self–regulatory skills in elite youth soccer players

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Abstract

Although elite athletes have been reported to be high academic achievers, many elite soccer players struggle with a stereotype of being low academic achievers. The purpose of this study was to compare the academic level (pre-university or pre-vocational) and self-regulatory skills (planning, self-monitoring, evaluation, reflection, effort, and self-efficacy) of elite youth soccer players aged 12–16 years ($n = 128$) with those of 164 age-matched controls (typical students). The results demonstrate that the elite youth soccer players are more often enrolled in the pre-university academic system, which means that they are high academic achievers, compared with the typical student. The elite players also report an increased use of self-regulatory skills, in particular self-monitoring, evaluation, reflection, and effort. In addition, control students in the pre-university system had more highly developed self-regulatory skills than those in the pre-vocational system, whereas no difference was observed within the soccer population. This suggests that the relatively stronger self-regulatory skills reported by the elite youth soccer players may be essential for performance at the highest levels of sport competition and in academia.

Introduction

        Students in The Netherlands can enter into one of two academic systems: the pre-university system, in which they are prepared for a university career, or the pre-vocational system, in which they are prepared for later vocational education. Academic success is based on the level at which students graduate and whether they have ever had to repeat class. In The Netherlands, repeating class occurs when students fail two or more relevant classes and have to repeat a complete year of study. Elite youth athletes tend to be relatively high academic achievers and are more often enrolled into the first of these two systems (Brettschneider, 1999; Jonker, Elferink-Gemser, & Visscher, 2009). They also have a higher graduation rate than students that are less engaged in sports (Watt & Moore, 2001). This has been shown to be true for elite athletes in a variety of sports, including field hockey, volleyball, judo, and tennis.

        However, despite these findings, soccer players continue to be perceived as below-average students (Kuper & Szymanski, 2009; Van Lieshout, 2002). This perception finds support in scientific literature, suggesting that many elite youth soccer players do not complete their formal educational programmes (Bourke, 2003). For decades, soccer has been one of the most popular sports across the world and it has recently grown into a multi-million pound labour market (Hoffmann, Ging, & Ramasamy, 2002; Lucifora & Simmons, 2003; Magee & Sugden, 2002). It has been proposed that elite youth soccer players may be more attracted to the high financial rewards and social status of being a professional soccer player than by the pursuit of an academic career (Bourke, 2003; Magee & Sugden, 2002). The stereotypical view that European youth soccer players are poor

academic achievers is similar to that of student athletes in the United States in sports such as basketball and American football. The generally low academic performance of these athletes has received a great deal of negative attention in the media (e.g., Engstrom, Sedlacek, & McEwen, 1995; Umbach, Palmer, Kuh, & Hannah, 2006). The question remains whether elite youth soccer players are actually inferior to typical age-matched students in terms of their academic achievements, or if these perceptions are driven strictly by prevailing social stereotypes.

        An interesting topic of study in the relationship between sport and academic performance of elite youth soccer players is related to the concept of self-regulation. Self-regulation is the degree to which learners are metacognitively, motivationally, and behaviourally proactive participants in their own learning process (Zimmerman, 1986, 1989, 2006). The metacognitive component is defined as the awareness of and knowledge about one's own thinking, and consists of several sub-components. These sub-components include planning, self-monitoring, evaluation, and reflection (Ertmer & Newby, 1996). The motivational component is defined as the extent to which learners are self-efficaciously, autonomously, and intrinsically motivated to attain a specific goal. Effort and self-efficacy are the sub-components of motivation (Hong & O'Neil, 2001; Zimmerman, 1990a; Zimmerman & Martinez-Pons, 1990).

        Elite youth soccer players are considered to be highly familiar with the cognitive construct of self-regulation (Cleary & Zimmerman, 2001; Kirschenbaum, 1984). This is partly because the standard at which soccer is played has risen dramatically in recent decades (Kuhn, 2005). It appears that expert performance not only depends

on an athlete's physical training, but also on several other cognitive factors. Furthermore, the sporting environment is unique in that athletes can develop their self-regulatory skills by setting personal goals of attainment and improvement and by receiving continuous feedback from coaches on the performance process and on the action itself (Cleary, Zimmerman, & Keating, 2006; Jonker et al., 2009; Pintrich & Zusho, 2002). Previously, researchers have suggested that elite athletes are highly familiar with the need to self-regulate their own learning process and have emphasized the importance of self-regulation at these high standards of competition (Cleary & Zimmerman, 2001; Eccles & Feltovich, 2008; Kirschenbaum, 1984; Nota, Soresi, & Zimmerman, 2004). A recent study by Toering and colleagues (Toering, Elferink-Gemser, Jordet, & Visscher, 2009) showed that elite youth soccer players report using their self-regulatory skills more frequently than youth soccer players who are only involved in soccer as a leisure activity. The authors proposed that elite youth soccer players may gain greater benefits from training and competition because it affords them the opportunity to reflect more on their previous performances, allowing them to ultimately accomplish tasks with a greater degree of success.

Self-regulatory skills are suggested to be domain-general (Eccles & Feltovich, 2008; Kirschenbaum, 1984) and their importance has been emphasized in the academic setting as well. Literature suggests that the use of self-regulatory skills is predictive of an individual's academic standing, with respect to current level of education and instances of repeating class (Nota et al., 2004; Zimmerman, 1986, 2002). Thus, it may be considered an underlying characteristic of both sport and academic performance in youth

elite athletes (Jonker et al., 2009). The assessment of the role of self-regulatory skills between the academic and sporting domains is therefore an interesting topic.

We examined the academic standing of elite youth soccer players and the role of their self-regulatory skills. We compared a group of elite youth soccer players with a representative sample of age-matched typical students in The Netherlands on academic level (pre-university or pre-vocational) and their self-reported use of self-regulatory skills (planning, self-monitoring, evaluation, reflection, effort, and self-efficacy). We wished to determine whether the elite youth soccer players achieved relatively better academic standards compared with the controls, dispelling any social myths, and if they reported using their self-regulatory skills more often, perhaps because of the high cognitive factors associated with today's brand of soccer. We hypothesized that the academic achievements of the elite youth soccer players would not be inferior to those of the typical students and that they would demonstrate an enhanced level of self-regulatory skills. To our knowledge, the role of self-regulatory skills in the interaction between competitive standard in soccer and academic standing has never been assessed.

Methods

Participants

A total of 292 male students aged 12–16 years participated in this study. Of these, 128 (M_{age} = 13.9 years, SD = 1.3) were part of a talent development programme at a professional soccer club and played at the highest competitive level in The Netherlands for their respective age group. All of these players are classified as elite youth soccer players because they are rated as being in the top

1% of all players in their age category (KNVB, 2007a, 2007b). Of the soccer players, 12.5% came from neighbourhoods defined as being of low socioeconomic status.

      The remaining 164 participants (M_{age} = 14.2 years, SD = 1.3) were typical Dutch students and served as a control group. Of these, 116 (70.7%) were active in sports as a leisure activity, while 43 (26.2%) did not engage regularly in any sport-related activity. Five students (3.0%) in this group were classified as ''elite youth'' athletes in their respective sport because of their membership of a talent development program in The Netherlands (best 1% in their age category). The control group represents a typical Dutch student population in terms of the number that participate in sport (approximately 80%; Kamphuis & Van den Dool, 2008), proportionate representation in each of the educational systems (46.3% of students in pre-university education and 53.7% in pre-vocational education where the Dutch national average is 43.0% of students in pre-university education and 57.0% of students in pre-vocational education; CBS, 2009), and socioeconomic status (12.8% of students defined as having a low socioeconomic status where the national percentages defined 10.0–13.2% of the population as having a low socioeconomic status over a 5-year period; SCP, 2001, 2007). Table 1 shows the general characteristics of the two groups.

	Elite youth soccer players (n = 128)	Mainstream students (n = 164)[1]	Total (N = 292)
Age (yrs)	13.87 ± 1.32	14.17 ± 1.28	14.04 ± 1.30
Training (hrs/week)**	7.38 ± 1.95	2.29 ± 2.75	4.52 ± 3.50
Matches (hrs/week)**	1.85 ± 0.71	0.53 ± 0.84	1.10 ± 1.02
Sport experience (yrs)**	8.17 ± 1.93	7.01 ± 2.71	7.61 ± 2.41
Academic level**			
Pre-university (n [%])	87 (68.0)	76 (46.3)	163 (55.8)
Pre-vocational (n [%])	41 (32.0)	88 (53.7)	129 (44.2)
SES			
Low SES (n [%])	16 (12.5)	21 (12.8)	37 (12.7)
Middle or high SES (n [%])	112 (87.5)	143 (87.2)	255 (87.3)
Repeating class			
Never (n [%])	107 (83.6)	138 (84.1)	245 (83.9)
Once (or more often) (n [%])	21 (16.4)	26 (15.9)	47 (16.1)

Table 1. Mean Age, Number of Training Hours per Week, Number of Matches per Week, Sport Experience (± standard deviations), Academic Level (n [%]), SES (n [%]), and Repeating Class (n [%]) for the Elite Youth Soccer Players, the Mainstream Students and the Total Population

Note. The Dutch national average of students at pre-university academic level is 43.0% and at pre-vocational academic level is 57.0% (CBS, 2009).

[1]121 students were engaged in sports, 43 were not engaged in sports.

* P < 05. ** P < .01.

Instrument

To obtain the demographic details of the participants and to assess their involvement in sports and self-regulatory skills in a standardized manner, all participants completed a questionnaire designed specifically for the purpose of the study.

General questions. In the first part of the questionnaire, participants provided their date of birth and the four-digit zip code of their place of residence. These provided respective measures of age and socioeconomic status. This information was obtained because previous studies reported that differences in the use of self-regulatory skills exist between older and younger students (Al-Hilawani, 2003), and that socioeconomic status may be related to sport participation, self-regulation, and academic performance (Kamphuis et al., 2008; Nota et al., 2004; Sirin, 2005). In the present study, socioeconomic status refers to an aggregate standard of the household family income, education, occupation, and residential neighbourhood (Brooks-Gunn, Denner, & Klebanov, 1995). The four-digit zip code provided by the participants was compared with a list published by the Dutch Ministry of Housing, Spatial Planning and Environment (VROM) that specifies neighbourhoods low in socioeconomic status in The Netherlands. This list is based on four types of indicators: socioeconomic (income, employment, education), physical (small or old housing), social problems (vandalism, social inconvenience, unsafe), and physical problems (excessive noise, pollution, traffic, safety) (VROM, 2009). Since it is assumed that those families in The Netherlands with middle and high socioeconomic status have an equal opportunity to participate in sports and tend to have similar choices regarding the academic system, we

decided to amalgamate these two strata and to use dichotomous ranking for socioeconomic status (low vs. middle to high socioeconomic status). Participants also noted the sport(s) in which they were involved, the number of hours spent training each week, the number of training sessions per week, and the number of years that they had been active in the sport(s).

Data on whether participants were enrolled in the pre-university or pre-vocational educational systems were drawn from school databases. We decided to use current academic level as the standard for academic performance because in the Dutch educational system, graduation level (or future graduation level) is the most important determining factor of future career prospects (Education Inspectorate, 2008). As "strong" and "weak" students exist within each academic system, we also asked the participants to note whether they ever had to "repeat class", which means that they had to repeat a full academic year. In the present study, repeating class was a dichotomous variable and we simply asked the participants whether this happened or not.

Self-regulation items. All six aspects of self-regulation were assessed using the subscales of various existing questionnaires (see below). The subscales were translated from the original in accordance with the procedures described by Pelletier and colleagues (1995). First, two native Dutch speakers who were also proficient in English translated the original English subscales into Dutch. The Dutch translations were then re-translated back into English by two other bilingual individuals who had no prior knowledge of the original subscales. The resultant translations were evaluated by all translators and a Professor in Human Movement Sciences, which led to some minor linguistic modifications.

This version was tested on forty-eight 11-to-14-year-old children, the youngest age band in our target group, who were asked to express what they thought was too difficult. Based on their comments we made some final linguistic modifications to increase the intelligibility of the items.

With respect to the reliability and validity of the questionnaire, we performed a confirmatory factor analysis among 1,201 adolescents aged 11–17 years. The factor analysis supported the reliability and the construct validity of the instrument and showed satisfactory results for an adjusted six-factor model (presenting the details of the factor analysis was beyond the scope of this paper). Cronbach's alpha for the scales in the current study ranged from .72 for self-monitoring to .86 for effort. These alpha values are considered acceptable and are also in line with the original studies, where alpha ranged from .72 for evaluation and reflection to .85 for self-efficacy (Herl et al., 1999; Hong & O'Neil, 2001; Howard, McGee, Sia, & Hong, 2000; Peltier, Hay, & Drago, 2006).

Planning, self-monitoring, effort, and self-efficacy. The subscales for planning, self-monitoring, effort, and self-efficacy were originally formulated by Hong and O'Neil (2001) and Herl et al. (1999). All subscales consisted of 7–12 items and participants rated each item on a 4-point Likert scale that ranged from 1 (*almost never*) to 4 (*almost always*). High scores on these four self-regulation subscales indicated high metacognitive and motivational self-regulation in general task situations. The "planning" subscale was used to gauge the respondent's awareness of the task demands prior to its execution. An example of an item from this scale is *"I determine how to solve a problem before I begin"*. The "self-monitoring" subscale evaluated the respondent's awareness of their actions during task execution. An example from this scale is *"I keep track of my progress"*. The "effort" subscale measured the respondent's willingness to attain the task goal. An example from this scale is *"I work as hard as possible on all tasks"*.

Self-efficacy, which is how the respondent judges his or her capability to organize and execute required actions, was assessed using the Generalized Self-Efficacy Scale. An example response on this scale would be: "No matter what comes my way, I am usually able to manage it" (Hong & O'Neil, 2001; Schwarzer & Jerusalem, 1995). While the authors are aware that domain-specific self-efficacy scales separately exist for sports and academics (Bandura, 1997), we used a general measure so as to remain consistent with the subscales used for self-regulation.

Evaluation. The 8-item Inventory of Metacognitive Self-Regulation (IMSR) subscale, developed by Howard and colleagues (2000), was used to examine evaluation. Evaluation is the ability of respondents to assess both the processes employed and the end product after task completion. An example question is *"I go back and check my work"*. Participants responded to each item on a 5-point Likert scale that ranged from 1 (*never*) to 5 (*always*). A high score on the evaluation subscale indicated that the respondent often evaluated their performance.

Reflection. The 5-item Reflective Learning Continuum (RLC), developed by Peltier and colleagues (2006), was used to measure the extent to which respondents are able to appraise what they have learned and adapt their past knowledge and experiences to improve performance. An example question is *"I often reappraise my experiences so I can learn from*

them". Because the items in the original subscale were written in past simple tense, we changed the subscale into present simple tense to maintain consistency with the other five subscales. Items were rated on a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Accordingly, low scores on the RLC indicated a high level of reflection. Scores were reversed for our analyses, such that high scores indicated a high level of reflection.

Procedure

All of the students were informed of the study's procedures prior to their participation and provided their verbal consent to participate. Informed consent was also obtained from the parents of the participants and the schools at which the participants attended. The control group of students and the group of elite youth soccer players were both randomly selected from the same schools. The questionnaire was implemented to all participants in a classroom setting during their regular school activities while in the presence of test leaders. The assessment took place in the period March–May, which is during the competitive soccer season. The procedures were in accordance with the standards of the local medical ethics committee at the lead institution.

Analyses

Descriptive statistics were calculated for both groups of students for academic standing and performance on the six subscales of self-regulation (planning, self-monitoring, evaluation, reflection, effort, and self-efficacy). To interpret the scores, effect sizes (d) were calculated. An effect size of approximately 0.20 was considered small, 0.50 moderate, and 0.80 large (Cohen, 1988).

A χ^2-test was conducted to compare the elite youth soccer players with the control students on academic level (pre-university or pre-vocational). A multivariate analysis of covariance (MANCOVA) was used to examine differences in the six aspects of self-regulation for both study groups. The six aspects of self-regulation served as the dependent variables, whereas involvement in elite youth soccer (elite youth soccer players vs. control students) and academic level (pre-university vs. pre-vocational) were the independent variables. Since the self-regulatory skills may be related to repeating class, socioeconomic status, and age (Table 1), repeating class, socioeconomic status, and age were used as covariates. A univariate analysis of covariance (ANCOVA) was performed on each of the six aspects of self-regulation. An alpha of $P < .05$ was adopted for all tests of significance and the Bonferroni method was used to correct for multiple testing.

Results

The χ^2-test revealed significant differences in academic level between the two groups [χ^2 (1, $N = 292$) = 13.64, $P < 0.001$]. Specifically, a significantly higher percentage of elite youth soccer players were enrolled in the pre-university system (Table 1) than were control students. Table 2 presents the mean scores and standard deviations of self-regulation as well as corresponding effect sizes across performance levels and academic levels.

The MANCOVA (Table 3) revealed a significant main effect for involvement in elite youth soccer as well as a significant interaction between involvement in elite youth soccer and academic level (discussed below). No significant main effect was observed for academic level. In addition, age was significant as a covariate ($P < .001$).

	Elite youth soccer players	d	Main-stream students	Elite youth soccer players				Mainstream students		
				Pre-uni		Pre-voc		Pre-uni		Pre-voc
	(n = 128)	d	(n = 164)	(n = 87)	d	(n = 41)	d	(n = 76)	d	(n = 88)
Planning (Range 1-4)	2.55 (0.51)	0.26+	2.42 (0.48)	2.53 (0.51)	-0.08+	2.57 (0.50)	0.28+	2.44 (0.43)	0.08+	2.40 (0.51)
Self-monitoring (Range 1-4)	2.57 (0.44)	0.45°	2.36 (0.50)	2.54 (0.43)	-0.20+	2.63 (0.47)	0.29+	2.49 (0.48)	0.49°	2.25 (0.50)
Evaluation (Range 1-5)	3.46 (0.49)	0.37°	3.25 (0.63)	3.43 (0.49)	-0.20+	3.53 (0.48)	0.28+	3.39 (0.53)	0.43°	3.13 (0.68)
Reflection (Range 1-5)	4.00 (0.69)	0.48°	3.68 (0.63)	3.99 (0.65)	-0.06+	4.03 (0.78)	0.46°	3.71 (0.60)	0.10+	3.65 (0.66)
Effort (Range 1-4)	2.94 (0.46)	0.73^	2.58 (0.53)	2.91 (0.43)	-0.24+	3.02 (0.50)	0.65^	2.69 (0.51)	0.38°	2.49 (0.53)
Self-efficacy (Range 1-4)	2.77 (0.38)	0.17+	2.70 (0.44)	2.78 (0.37)	0.05+	2.76 (0.40)	-0.10+	2.80 (0.43)	0.44°	2.61 (0.44)

Table 2. Mean Scores (Standard Deviations) and Effect Sizes on all Self-Regulation Subscales for the Elite Youth Soccer Players and the Mainstream Students Streamed into either the Pre-University or Pre-Vocational Level

Note. Pre-uni = pre-university level, Pre-voc = pre-vocational level. *d* = 0.20 (small+), *d* = around 0.50 (moderate°), *d* = around 0.80 (large^).

	Wilks' lambda	F	Hypothesis df	Error df	P
Involvement in elite youth soccer	0.836	9.138	6	280	.000
Academic level	0.972	1.362	6	280	.230
Involvement in elite youth soccer x academic level	0.948	2.546	6	280	.020
Repeating class	0.971	1.410	6	280	.211
Socioeconomic status	0.982	0.848	6	280	.534
Age	0.901	5.121	6	280	.000

Table 3. Results of MANCOVA for Involvement in Elite Youth Soccer, Academic Level, their Interaction, and for the Covariates

= pre-vocational students ◆ = pre-university students

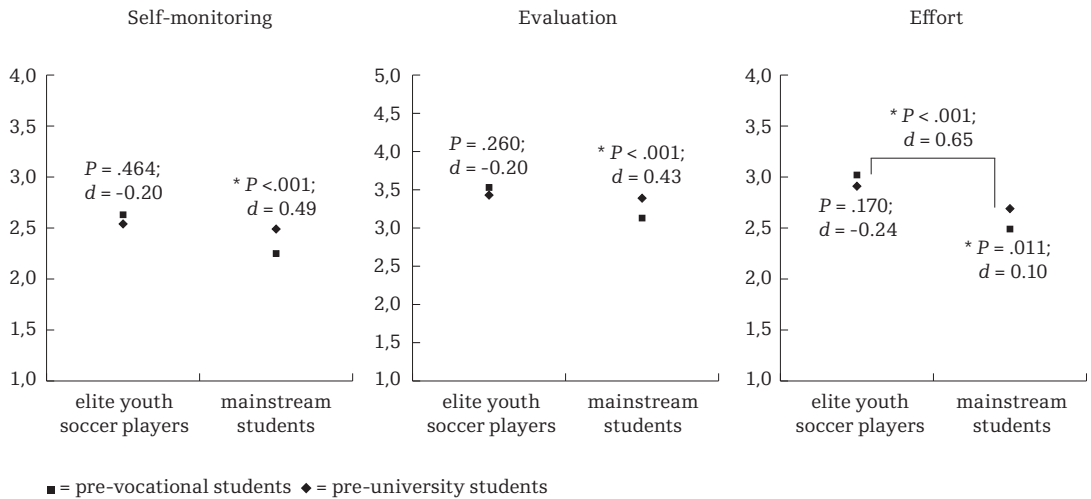*Figure 1*. Interaction between Involvement in Elite Youth Soccer and Academic Level on Self-Monitoring, Evaluation and Effort.

*P > 0.05.

Interaction of Involvement in Elite Youth Soccer and Academic Level (Figure 1)

The univariate analyses showed a significant interaction between involvement in elite youth soccer and academic level for self-monitoring [$F(1,285) = 7.78$, $P = .006$], evaluation [$F(1,285) = 7.09$, $P = .008$], and effort [$F(1,285) = 6.89$, $P = .009$]. Within the control population, the students in the pre-university system reported an increased use of self-monitoring [$t(179) = 3.96$, $P < .001$, $d = 0.49$], evaluation [$t(179) = 3.89$, $P < .001$, $d = 0.43$], and effort [$t(179) = 2.56$, $P = .011$, $d = 0.10$] compared with those in the pre-vocational system. Within the elite soccer population, there was no significant effect of education on self-monitoring [$t(129) = 0.74$, $P = .464$, $d = -0.20$], evaluation [$t(129) = 1.13$, $P = .260$, $d = -0.20$], or effort [$t(129) = 1.38$, $P = .170$, $d = 70.24$]. In addition, the elite youth soccer players enrolled in the pre-vocational system had higher scores on effort than the students in the control group enrolled in the pre-university system ($t(127) = 3.80$, $P < .001$, $d = 0.65$) (Table 2).

Involvement in Elite Youth Soccer

A significant main effect for involvement in elite youth soccer was observed, such that the elite youth soccer players had higher scores than the control group on self-monitoring [$F(1,285) = 14.51$, $P < .001$], evaluation [$F(1,285) = 9.323$, $P = .002$], reflection [$F(1,285) = 16.48$, $P < .001$), and effort [$F(1,285) = 35.49$, $P < .001$], irrespective of academic level. Corresponding effect sizes varied from small-to-moderate on self-monitoring ($d = 0.44$) to moderate-to-large on reflection ($d = 0.69$; Table 2). No significant differences were observed for planning [$F(1,285) = 4.52$, $P = .034$, $d = 0.26$] or self-efficacy [$F(1,285) = 1.39$, $P = .240$, $d = 0.17$].

Discussion

　　We compared enrolment into the pre-university and pre-vocational education systems for a group of elite youth soccer players and a group of typical student controls, both aged 12–16 years. We also compared the two groups' reported use of self-regulatory skills (planning, self-monitoring, evaluation, reflection, effort, and self-efficacy). Our results show that more of the elite youth soccer players are enrolled in the pre-university system than in the pre-vocational system (68.0% vs. 32.0%; Table 1), and that the opposite is true for the group of controls (46.3% vs. 53.7%). This relatively high percentage of elite youth soccer players enrolled at the pre-university level is consistent with previous studies reporting that elite athletes are high academic achievers (Brettschneider, 1999; Jonker et al., 2009; Watt & Moore, 2001). We propose that elite youth soccer players are not performing poorly at school, but are actually performing better than the typical student. This is further demonstrated by the fact that the percentage of elite youth soccer players that had to repeat class was similar to that of the control students (Table 1). Participating in higher types of education is not accompanied by academic difficulty in the elite youth soccer player.

　　The question remains as to how these high academic standards are achieved by elite youth athletes. The answer may well be related to the standard of competition at which the players are competing. Elite soccer is a constantly changing environment in which players are required to make fast and accurate decisions (Kannekens, Elferink-Gemser, & Visscher, 2009). As a result, cognitive abilities are being developed. Furthermore, research has suggested that today's elite youth soccer

players can only be successful by deliberately engaging in time-intensive training sessions aimed at performance enhancement (Ford, Ward, Hodges, & Williams, 2009; Ward, Hodges, Williams, & Starkes, 2007). The development of self-regulatory skills in this manner may benefit athletes academically, and perhaps reflects the high percentage of elite youth soccer players enrolled into pre-university education system.

　　That the soccer players scored higher on the self-monitoring, evaluation, reflection, and effort measures than the control students is in general agreement with the self-regulation literature (Cleary & Zimmerman, 2001; Kitsantas & Zimmerman, 2002). Regarding the role of self-regulation in the interaction between sport and academic achievement, our results show that within the control population, students in the pre-university system scored higher on self-monitoring, evaluation, and effort than students enrolled into the pre-vocational system (Ertmer & Newby, 1996; Zimmerman, 1990b). Within the elite soccer population, where all players are considered to have a relatively high sense of self-regulation (Toering et al., 2009), the difference between the students at the two educational levels was rather small (see small effect sizes in Table 2). Moreover, our results show that the elite youth soccer players in the pre-vocational system had significantly higher scores on effort than the mainstream students in the pre-university system (see moderate-to-large effect size in Table 2). Although not statistically significant, a similar pattern has been found for reflection, such that soccer players in the pre-vocational system report more frequent use of reflective skills than their pre-university mainstream peers (see moderate effect size in Table 2).

The results of the present study suggest that taking part in elite-level soccer may foster the development of self-regulation, independent of one's education. This is because self-regulation was more pronounced in the elite youth soccer players than it was in the control group students, and that the soccer players in the pre-vocational system had higher scores on effort than the control group of students enrolled in the pre-university system. However, caution is needed regarding this proposition, as it may also be the case that the elite youth soccer players are high achievers in sport and education because of an inherent ability to self-regulate. In other words, do the elite youth soccer players compete at a high level because their self-regulatory skills were developed through sport, or because these skills were inherent? Unfortunately, this question cannot be answered based on the current study. However, it is interesting to consider that, on the one hand, the elite youth soccer players are already experts in their age-category and consequently report more frequent use of their self-regulatory skills (than similarly aged typical students). On the other hand, they still need to improve their soccer skills to perform in senior elite soccer, in which the use of self-regulatory skills may serve them well (Ertmer & Newby, 1996; Toering et al., 2009).

The current study is not without its limitations. Since our aim was to investigate the self-regulatory skills of elite youth soccer players enrolled into the pre-university or pre-vocational education system, we decided to use a self-report instrument. Although self-report questionnaires are widely used in sport psychology research, results must always be interpreted with caution. Besides the fact that self-report questionnaires are generally sensitive to socially desirable answers (Young & Starkes, 2006), limitations occur in the ability for participants to accurately report their cognitions (Eccles, in press; Nisbett & Wilson, 1977). Nevertheless, other researchers have validated this form of assessment (Eccles, in press). For example, Nolen (1988) reported agreement of 70–96% between behavioural measures and self-report in the assessment of study strategies and motivational orientations in students.

Another shortcoming of the present study relates to the composition of the sub-groups, as one could argue that the heterogeneity of the control (typical) sample may have interfered with the self-regulatory analyses. Specifically, it may have been a risk comparing a group that is known to have something in common (high level of performance in soccer) with a group that is considered not to have anything in common. Nevertheless, the samples are considered appropriate for the purpose of the present study, since our conclusions were based on the self-regulatory scores of the elite youth soccer players and the scores of the control group were only used as a reference.

The final limitation of the study relates to our cultural comparison. A similarity was drawn between European soccer players and American athletes (in revenue-producing sports) regarding the stereotype of being low academic achievers. However, the cultures in which the athletes are educated are quite different. In most European countries, including The Netherlands, top-level sports and education are two separate domains. The ultimate focus of the school is for student-athletes to graduate by realizing their highest academic potential (Metsä-Tokila, 2002; Stichting LOOT & Sardes, 2001). In the USA, sports and education are more intertwined and many

schools offer scholarships to students simply because of their athletic ability. The focus of this culture is more on athletic performance and not on academia (Miller, 2003; National Collegiate Athletic Association, 2009; Yasser, 1993). It is not our intent here to debate the differences between or purposes of these two educational systems, but is to high-light the fact that these differences might influence how an athlete is motivated, performs, and uses self-regulatory skills in the academic environment.

We conclude that elite youth soccer players in The Netherlands are not academically inferior to their mainstream peers, but are actually better. Our results show that a higher percentage of elite youth soccer players are enrolled in pre-university level education. With respect to the role of their self-reported use of self-regulatory skills, our results show that elite youth soccer players in The Netherlands expressed a higher sense of self-regulation compared with the control group, irrespective of their level of education. Our results support previous research in that the frequent use of well-developed self-regulation skills may be essential for elite youth soccer players to compete at a high competitive standard (Toering et al., 2009) and to achieve academic success. It is, however, not yet clear whether the elite youth soccer players inherently possess these self-regulatory skills and used

them from their early participation in soccer or if they are a result of their participation in high-level sport. This question of causality is an interesting avenue to investigate in future research. Nonetheless, our results have some preliminary implications for parents, teachers, trainers, and coaches of athletes and typical students. Supporting athletes and students to utilize their self-regulatory skills within and between performance domains may help them to balance their activities better and may also foster their achievements.

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