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Self-regulation and Performance Level in Youth Soccer Players

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Abstract

In learning and development, self-regulation can be described as the degree to which individuals are metacognitively, motivationally, and behaviourally proactive participants in their learning process (Zimmerman, 1989, 2006). We examined the relationship between self-regulation and performance level in elite ($n=159$) and non-elite ($n=285$) youth soccer players aged 11 to 17 years (mean age 14.5, $s=1.4$). The players completed a questionnaire that measured planning, self-monitoring, evaluation, reflection, effort and self-efficacy. A logistic regression analysis was performed (controlling for age) to determine which self-regulatory aspects were associated with players' performance level (elite vs. non-elite). High scores on reflection and effort were associated with a higher level of performance. Findings suggest that elite players may be both more aware of their strong and weak points and they may be better able to translate this awareness into action. As well, these elite players appear to be more willing to invest effort into practice and competition. It is suggested that these better developed self-regulatory skills may translate into a more effective learning environment and ultimately result in an increased capacity for performance in elite players relative to their non-elite peers.

Keywords: Talent Development, Metacognition, Motivation, Learning, Sports

Introduction

Self-regulation involves processes that enable individuals to control their thoughts, feelings, and actions (Baumeister & Vohs, 2004). Self-regulation allows individuals to adapt to their social and physical environment and is, therefore, thought to be a key process in psychological functioning (Schmeichel & Baumeister, 2004). The processes of self-regulation have been studied across many diverse domains, including crime and violence, alcoholism, behaviour change, learning, emotional control, and attentional control (e.g., Baumeister & Vohs, 2004; Boekaerts, Pintrich & Zeidner, 2005; Percy, 2008; Scott, Beevers & Mermelstein, 2008). This study focused on learning and development. In this context, several studies have been conducted using Zimmerman's self-regulated learning theory (e.g., Clark & Ste-Marie, 2007; Cleary & Zimmerman, 2001; Schmitz & Wiese, 2006), which led us to adopt Zimmerman's (1989, 2006) definition of self-regulation.

Self-regulation is described by Zimmerman (1989, 2006) as the degree to which individuals are metacognitively, motivationally, and behaviourally proactive participants in their own learning process. This means that individuals know how to attain their goal of performance improvement; they are motivated; and they take action to reach their goal. Self-regulatory processes will not immediately produce high levels of expertise, but can assist an individual in acquiring knowledge and skills more effectively (Zimmerman, 2006). Successful learners are able to choose appropriate regulatory strategies when they notice a lack of skills necessary to attain

a goal (Ertmer & Newby, 1996). Experts have been shown to be more sensitive than non-experts to the task demands of specific problems, more flexible in their planning, and more reflective with regard to learning (Berliner, 1994).

In the present study we focused on the metacognitive and motivational processes of self-regulation in the context of performance development using the models of Ertmer and Newby (1996) and Hong and O'Neil Jr. (2001). The regulative component of the expert learner model suggested by Ertmer and Newby (1996) is comprised of the metacognitive aspects of planning, self-monitoring, evaluation, and reflection, which correspond well to the aspects Zimmerman (1989, 2006) employed in his theory. However, self-regulation in learning and development also involves motivation. Therefore, the motivational component was adopted from the trait self-regulation model of Hong and O'Neil Jr. (2001), who found support for a three-order factor model of trait self-regulation in which motivation consisted of effort and self-efficacy.

Following Ertmer and Newby's (1996) model, the metacognitive aspects of self-regulation that we examined were planning, self-monitoring, evaluation, and reflection. Before initiating actions to improve performance, individuals who self-regulate well plan how they want to improve, meaning that they compare the task demands with their personal resources and identify matches between the two. During task performance, they self-monitor what they do, indicating that they mentally check their actions relative to their goal. Following the execution of a plan, individuals who self-regulate well evaluate the process employed and the outcome

achieved. During cycles of planning, self-monitoring, and evaluation, these individuals constantly reflect upon the entire process in a continuous effort to translate thought into action and gain strategy knowledge from their actions.

Following Hong and O'Neil Jr. (2001), the motivational aspects of self-regulation assessed in the current study were effort and self-efficacy. Effort has frequently been investigated both as a component of motivation and as a separate moderating variable. To attain the maximal level of performance, maximal efforts to improve are necessary and must be sustained over years (Ericsson, Krampe & Tesch-Römer, 1993). Self-regulated learners display extraordinary effort and persistence during learning (Zimmerman, 1990).

Self-efficacy, on the other hand, is one's belief to be able to successfully execute the behaviour required to attain a certain goal (Bandura, 1977), and is concerned with judgments of what a person can do with his or her skills rather with than the skills themselves. Bandura (1993) suggested that self-efficacy beliefs determine the goals individuals set for themselves, how much effort they expend, their perseverance, and their resilience to failure. In other words, individuals need to believe they can execute a task successfully in order to be motivated to perform that task successfully (Bandura, 1977).

Researchers focusing on self-regulation and sport performance have shown that self-regulation can affect sport performance positively (e.g., Anshel & Porter, 1996; Kirschenbaum, Ordman, Tomarken & Holtzbauer, 1982; Kirschenbaum & Bale, 1986). Successful athletes exhibit an ability to detect differences between

where they are and where they can, and want, to be (Chen & Singer, 1992). Athletes who fail to self-regulate in this manner are less likely to perform at their best (e.g., Anshel & Porter, 1996; Kirschenbaum *et al.*, 1982). Therefore, the tendency to self-regulate could make it more likely for some athletes to reach the elite status than others (Anshel & Porter, 1996). As has been pointed out by Ericsson and colleagues (1993), deliberate practice activities (i.e., those activities that are designed to improve performance) are needed to attain the highest levels of performance, which supports the idea that being selected for a talent programme may increase the chance to become an elite athlete in the future, because such programmes enable access to factors such as better training facilities, coaches, and medical guidance. To become selected for a talent programme, athletes need to perform successfully to catch the eye of a talent scout. Furthermore, when athletes are part of a talent programme, it is important that they are successful as well; otherwise they will be released from the programme. Thus, youth athletes who self-regulate well may improve their performance faster and perform more successfully, meaning they have a greater chance of becoming selected for and staying in such a talent programme.

However, little is known about self-regulation and the performance development of youth athletes. To be able to benefit optimally from practice and competition, self-regulation seems to be crucial for youth talented athletes. Future elite athletes constantly have to improve their performance, thus they need to be motivated and continuously focused on those performance aspects that need improvement. For example, Kitsantas and Zimmerman (2002) assessed self-

regulation in the practice context comparing the self-regulation processes of expert, non-expert, and novice volleyball players as they practiced the volleyball serve. The manner in which expert plan daily practice routines were shown to have greater structure than the strategies used by non-experts or novices. Experts also employed more self-regulatory strategies and self-evaluated more, than did non-experts or novices. In another study on self-regulation during practice, Cleary and Zimmerman (2001) observed differences among basketball experts, non-experts, and novices in the quality of self-regulation. Experts were found to set more specific goals, select more technique oriented strategies, and display higher levels of self-efficacy than non-experts or novices. These studies indicate that athletes who self-regulate well may benefit more from practice than others.

In their review on talent identification and development in soccer, Williams and Reilly (2000) claimed that a talented player possesses personal characteristics that facilitate learning, training, and competition. Self-regulation with respect to performance development can be a process that facilitates learning, training, and competition, since it is a process that makes it possible for individuals to develop their knowledge and skills more effectively (Zimmerman, 2006). Thus, self-regulation may be associated with faster performance improvement and better performance, which in turn leads to becoming selected for a youth team of a professional soccer club, and which increases the chance of becoming a professional in the future.

The purpose of the present study was to identify the self-regulatory aspects that were associated with youth soccer players' performance level (elite vs. non-elite). Elite youth soccer players were members of youth teams of professional soccer clubs playing in a year-round competition at the highest national level in the Netherlands, while non-elite youth soccer players played in regular year-round competitions at a regional level. The following aspects of self-regulation were assessed: planning, self-monitoring, evaluation, reflection, effort, and self-efficacy.

Methods

Participants

A total of 444 youth male soccer players aged 11 to 17 years participated. The mean age of the players was 14.4 years ($s=1.4$). The participants' age and soccer characteristics are presented in Table 1. The participants were classified as elite ($n=159$) or non-elite ($n=285$). Elite players were members of youth soccer teams of professional soccer clubs at the highest national competition level in the Netherlands, whereas non-elite players played in regional competitions several levels lower.

In the age categories that were examined in the current study (Under 13, 15 and 17 years), 236,768 youth soccer players were playing in year-round competitions in the 2006/2007 soccer season (Koninklijke Nederlandse Voetbal Bond, 2007a). A total of 96 teams played at the highest national competition level (Koninklijke Nederlandse Voetbal Bond, 2007b). About 16 to 20 players are selected for each youth team of professional soccer clubs at the highest national

competition level each year (e.g., FC Groningen, 2007), which means that the players at the highest national competition level belong to the best 1.0% of youth soccer players of their age in the Netherlands. There were either 10 or 11 levels of competition in each youth age category in the Netherlands in the 2006/2007 soccer season (Koninklijke Nederlandse Voetbal Bond, 2007b). All elite players in the current study played at the highest level, while, on average, the non-elite players were members of teams at the 6th level. Thus, on average, elites played five divisions higher than non-elites. In addition, elites played at least three levels higher than non-elites. All players had at least three years of competitive soccer experience.

****Table 1 near here****

Instrument

General questions. The general questions asked about personal and sports characteristics. Participants filled in their name, birth date and the number of soccer training hours per week they attended at their club. In addition, participants filled in the number of competitive soccer matches they played per week, the number of hours of competitive sports besides soccer they engaged in per week, and how many years they had been playing competitive soccer.

Self-Regulation Questionnaire Development. The aspects of self-regulation that we examined were planning, self-monitoring, evaluation, reflection, effort, and self-efficacy. These aspects were assessed with a questionnaire that was based on

English-language questionnaires (Herl *et al.*, 1999; Hong & O'Neil Jr., 2001; Howard, McGee, Shia, & Hong, 2000; Peltier, Hay & Drago, 2006; Schwarzer & Jerusalem, 1995). The procedures as described by Pelletier and colleagues (1995) were followed translating the questions into Dutch. First, two bilingual individuals translated the items from English into Dutch. Then, these translations were translated back into English by two other, independent, bilingual individuals without the help of the original scale. After that, the translations of all items were assessed by the translators and their supervisor, who is a professor in human movement sciences, and some minor translation modifications were made. This version of the questionnaire was pretested on a group of adolescents of the same age as the target population. Participants were asked to mark the words or phrases they found difficult to understand. Thereafter, some items were rephrased in order to make the questionnaire comprehensible to the youngest participants in the study.

A confirmatory factor analysis was performed with data of 1201 adolescents aged 11 to 17 years, which indicated satisfactory results for an adjusted six-factor model. We considered that discussing the factor analysis in detail was beyond the scope of this paper, because this would warrant more elaborate discussion in a separate paper. However, the Cronbach's α of the subscales in the current study and the Spearman correlations are presented in Table 2. In summary, some questionnaire items were changed for intelligibility and the items were the same for all participants.

Planning, self-monitoring, effort, and self-efficacy. Planning, self-monitoring, and effort were measured with items based on the self-regulatory inventory by Hong and O’Neil Jr. (2001) and the Self-Regulation Trait Questionnaire by Herl and colleagues (1999). Since the internal consistency of the self-monitoring subscale was below 0.70 in Hong and O’Neil Jr.’s (2001) study, we decided to adopt the self-monitoring items from the questionnaire by Herl and colleagues (1999). Self-efficacy was assessed with items based on the Generalized Self-efficacy Scale (Hong & O’Neil Jr., 2001; Schwarzer & Jerusalem, 1995). Examples of the items are: “I determine how to solve a problem before I begin” (planning, 9 items); “I correct my errors” (self-monitoring, 7 items); “I work as hard as possible on all tasks” (effort, 9 items); “I can solve most problems if I invest the necessary effort” (self-efficacy, 12 items). Participants responded on a 4-point rating scale: (1) *Almost never*, (2) *Sometimes*, (3) *Often*, and (4) *Almost always*. High scores indicated high levels of planning, self-monitoring, effort, and self-efficacy in general task situations.

Evaluation. This measure was assessed with items based on the evaluation subscale of the Inventory of Metacognitive Self-Regulation (Howard *et al.*, 2000). The evaluation subscale consists of 8 items. An example of an item is: “I make sure I complete each step”. Participants responded on a 5-point rating scale: (1) *Never*, (2) *Seldom*, (3) *Sometimes*, (4) *Often*, and (5) *Always*. High scores on the evaluation scale indicated a high level of evaluation after executing tasks.

Reflection. This variable was assessed with 5 items based on the reflection subscale of the Reflective Learning Continuum (Peltier *et al.*, 2006). An example of an item is: “I try to think about my strengths and weaknesses”. Participants responded to the items on a 5-point rating scale: (1) *Strongly agree*, (2) *Agree*, (3) *Neutral*, (4) *Disagree*, and (5) *Strongly disagree*. Low scores on the reflection subscale indicated a high level of reflection on previous actions in order to learn from these actions and do things better next time.

****Table 2 near here****

Procedure

The soccer clubs or schools that participants attended were approached in an effort to recruit participants for the current study. In the Netherlands, there are a number of secondary schools that have extra facilities for elite youth athletes (LOOT schools). Part of the Dutch elite youth soccer players were also attending these schools. We approached the governing bodies of professional soccer clubs and LOOT schools to help recruit participants. Thus, elite players were either approached via their soccer clubs or their LOOT schools. The non-elite players were part of youth teams of regular soccer clubs. These players were approached via their secondary schools. After permission of the governing body of the clubs or schools, the parents were asked for permission for the study to proceed. Then, participants were informed about the procedures of the study, before providing permission to

participate. Participants filled in the questionnaire in a group setting with test leaders present. The procedures were in accordance with the ethical standards of the Medical Faculty of the University of Groningen.

Data Analysis

A logistic regression analysis in accordance with Hosmer & Lemeshow (1989) was performed to identify the self-regulatory aspects that were associated with performance level. Because the age range could be considered wide given the developmental changes that occur in adolescence, age in years was included as a possible confounder. The variables were checked on linearity of the logits, and if the logits were not linear, the variables were split into categories. To check the linearity of the logits, the predictor variables were divided into groups, creating dummy variables. Thereafter, a logistic regression analysis was performed with the lowest group as a reference point. The midpoints of the groups, on the x-axis, were plotted against the regression coefficients (the β of the reference group being 0).. If appropriate, the variables were split at a cut-off point where the curve of the logits showed a clear decrease or increase. From the plot the shape of the curve (e.g., linear, quadratic) could be derived. This robust eye-ball method was considered accurate enough (see also Frankena & Graat, 1997; Hosmer & Lemeshow, 1989). After the logits were checked, the self-regulatory aspects were divided into three categories (low, moderate, high score), while age in years was considered a linear variable. Spearman correlations between the predictor variables were calculated

(Table 2), but no correlations above 0.60 were found, meaning the model did not need reconsideration (Hosmer & Lemeshow, 1989).

The logistic regression analysis was performed using the enter procedure and involved two steps. First, age in years was included; second, the self-regulatory aspects were added. We decided that, to be considered a confounder, the relative change of the β of age after the first step compared with the β after the second step had to be at least 25% when β was larger than 0.40 or -0.40, and the absolute change had to be at least 0.1 when $-0.40 < \beta < 0.40$ (Frankena & Graat, 1997). The accuracy of the model was assessed with the Hosmer and Lemeshow Goodness-of-Fit Test (Hosmer & Lemeshow, 1989). A significance level of $\alpha=0.05$ was used and the Bonferroni correction was applied.

Results

Table 3 shows means and standard deviations of the scores on the self-regulatory aspects of elite and non-elite youth soccer players. Overall, elite players had higher scores on all self-regulatory aspects than non-elite players.

****Table 3 near here****

Performance level was associated with the self-regulatory aspects of reflection and effort (Table 4). After correction for multiple testing, the results showed that for both reflection and effort the differences between the high and low scoring groups were significant. For players scoring high on reflection (4.00-5.00),

the odds ratios indicated that they had a 4.90 times greater chance to belong to the elite group than players scoring low (1.00-3.50). The proportion of elite players scoring high on reflection was 49.7%, compared to only 22.5% of the non-elite players (Figure 1).

****Table 4 near here****

The same trend was visible for the aspect of effort (Table 3). For players scoring high on effort (3.00-4.00), the odds ratios showed that there was a 7.07 times greater chance they belong to the elite group than players scoring low (1.00-2.25). The proportion of elite players in the group that scored high on effort was 49.1%, while only 18.5% of the non-elite players had a high score (Figure 1).

****Figure 1 near here****

The β of age did not change significantly because of the addition of the self-regulatory aspects in the second step of the analysis. Therefore, age could not be considered a confounder since age did not affect the relationship between the scores on the self-regulatory aspects and performance level. The Hosmer and Lemeshow test revealed that the model fitted the data [$\chi^2(8, n=444)=12.12, P=.15$]. The Nagelkerke R Square indicated that the variance the model explained was 25.3%.

Discussion

In the present study, the relationship between self-regulation and performance level in youth soccer players was investigated. Self-regulation consisted of the aspects of planning, self-monitoring, evaluation, reflection, effort, and self-efficacy. The results revealed that the aspects of reflection and effort were associated with performance level. A higher score on these aspects indicated a greater chance of players belonging to the elite group. Almost half of the number of elite players scored high on reflection and effort, whereas only one fifth of the non-elites scored high. Furthermore, just a small number of the elite players scored low on reflection and effort. Thus, a high score on reflection and effort seems to be associated with a high performance level.

Reflection is the key process of expert learning, which translates knowledge into action, making it possible to gain strategy knowledge from specific activities (Ertmer & Newby, 1996). Experts are not only able to perform effectively, but they also have the ability to reflect on their thought processes and methods (Glaser & Chi, 1988; Zimmerman, 2006). The higher scores on reflection by elite compared to non-elite players indicated that elite players may be more aware of previous actions in order to learn from these actions and do things better next time. This finding means elite players may be more engaged in improving their performance.

Reflection helps future experts to develop tools they can use to improve their performance. Future experts constantly adapt the way they use and process information, which helps them to acquire higher levels of control over performance aspects deemed relevant (Ericsson, 1998). These tools assist them to attain the

highest performance level and to keep improving their performance during practice and competition (Ericsson, 2003). Previously, researchers have suggested that children who become experts at a relatively young age have benefited more from practice and competition than their peers (Thomas, Gallagher, & Lowry, 2003). Since they seem to reflect more on their previous actions in order to learn, elite players may benefit more from practice and competition than non-elite players. One cannot become an expert by practicing mindlessly (Ericsson *et al.*, 1993). This is also in line with the findings of Cleary and Zimmerman (2001) and Kitsantas and Zimmerman (2002), who found that experts use better strategies during practice.

Elite players reported that they invested more effort into executing tasks than non-elite players, which indicated that elites compared to non-elites tended to try harder to succeed when performing tasks, also in adverse conditions. Elite players seem to be more persistent when executing tasks, implying that they learn more because they try harder. One characteristic of experts is that they put extreme effort into improving their performance (Feltovich, Prietula & Ericsson, 2006).

Youth soccer players who develop discipline, commitment, resilience, and social support have the best chance to make the transition to professional adult soccer (Holt & Dunn, 2004). Self-regulation could play a role in the development of these four factors. If players self-regulate more, it means they take more responsibility for their own learning (e.g., Ommundsen & Lemyre, 2007; Zimmerman, 1989, 2006). This could mean they are disciplined, committed, resilient, and they seek social support when necessary. Holt and Mitchell (2006)

examined these four factors in youth soccer players who were to be released from the English professional youth soccer system. One of their conclusions was that players who failed to make the transition to professional adult soccer lacked volitional behaviour and the determination to succeed. It seems that these players were not willing to invest enough effort into soccer to reach their goal of becoming a professional soccer player. Thus, effort could be the basis of certain factors that have been found to distinguish between youth soccer players who make the transition to professional adult soccer and their less successful peers.

Furthermore, in the current study, effort was considered a component of motivation (Hong & O'Neil, 2001), and motivation has been identified to distinguish between elite (the best) and sub-elite (very good, but not the best) youth athletes in previous studies (e.g., Elferink-Gemser, Visscher, Lemmink, & Mulder, 2004, 2007; Ward, Hodges, Starkes & Williams, 2007). According to Baker and Côté (2003), the variable that most consistently distinguished the most successful athletes from their less successful counterparts, was hours of training. Sustaining commitment was considered the key variable in continuing to invest large amounts of time into training (Baker & Côté, 2003). Helsen, Starkes and Hodges (1998) estimated that the amount of accumulated practice that was needed to become a professional soccer player 10 years ago was 9332 hours (18 years into their careers). Williams and Hodges (2005) pointed out that these data indicate how committed youth soccer players must be to become professionals. Obviously, the number of soccer training hours in the current study is determined by performance level. However, we do not

know whether self-regulatory skills are developed because elite players trained more or more specifically, or whether the elite players already possessed high-quality self-regulatory skills before they were part of a talent program. This could be investigated by studying the development of self-regulation with age. If the differences in self-regulation between performance levels are already apparent at a young age and these differences remain over age, it is likely that the elite players already possessed well-developed self-regulatory skills before they were part of a talent program. In that case, self-regulation could be used as a selection tool.

One of the limitations of the present study was the use of self-report questionnaires. What we know now is that elite and non-elite players judge their self-regulation skills differently. If or how this is reflected in behaviour remains unclear. This would be an interesting topic to study in the future. Another limitation was that no other soccer performance characteristics were measured. Performance in sports is influenced by many performance characteristics, such as, for example, physiological, technical and tactical skills (e.g., Elferink-Gemser *et al.*, 2004, 2007; Reilly, Williams, Nevill & Franks, 2000). The explained variance found in the current study was 25.3%, and Figure 1 indicates that still half of the elite players did not score high on reflection and effort, meaning that there were other factors influencing the elite versus non-elite differences as well. Therefore, more research is needed to better understand how self-regulation relates to specific soccer performance characteristics, since youth soccer players who are the best self-regulators may be the ones who make the most progress in their performances. It

would also be interesting to find out whether differences in self-regulation exist between elite (the best) and sub-elite (very good, but not the best) players within a group of talented players, because making progress is especially important in this group. Elite coaches could use such information to help youth players to benefit optimally from practice and competition. Furthermore, players who score low on reflection and effort may be trained on these aspects, which benefits the youth soccer players as well as the soccer clubs. Currently, little is known about training self-regulatory skills in soccer players, indicating that future research should address this issue.

The present study has some practical implications for coaches as well. In addition to motivation, which has been found to be important to attain optimal levels of performance in many previous studies (e.g., Baker & Côté, 2003; Elferink-Gemser *et al.*, 2004, 2007; Helsen *et al.*, 1998; Williams and Hodges, 2005), reflection seems to play a significant role in reaching the elite level in soccer. Therefore, coaches should emphasise this aspect in practice and competition. They should encourage their players to reflect on their performances in order to improve, instead of telling players which aspects they have to work on without making the players themselves think about their strong and weak points. The current study is in line with the deliberate practice theory (Ericsson *et al.*, 1993), because it also makes clear to coaches that what players derive from practice is important combined with a large number of training hours.

In conclusion, the outcomes of the present study are in line with the suggestion that young athletes who become an expert at a relatively young age have benefited more from practice and competition than their peers (Thomas *et al.*, 2003). In addition, the results support the deliberate practice concept (Ericsson *et al.*, 1993), because they emphasise the importance of motivation and practice in the development of expertise. Elite youth soccer players seem to reflect more on their previous actions to learn and try harder to execute their tasks successfully, which means they may benefit more from practice and competition, and which could be one of the reasons they play at a higher level. Thus, self-regulation could be a key process in the development of youth soccer players.

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Table 1

Means and Standard Deviations of Age and Soccer Characteristics across Performance Levels

	Elite players (<i>n</i> =159)	Non-elite players (<i>n</i> =285)	Total (<i>n</i> =444)
Age (years)	14.3±1.6	14.4±1.3	14.3±1.4
Soccer training hours per week*	7.6±1.8	2.9±1.0	4.6±2.7
Soccer matches per week*	1.3±0.4	1.0±0.2	1.1±0.3
Hours of other competitive sports per week*	0.5±1.1	1.3±2.2	1.0±1.9
Years of competitive soccer experience	8.4±1.9	8.2±2.0	8.2±2.0

* $P < .01$

Table 2

Cronbach's α and Spearman Correlations of the Self-Regulatory Aspects

	Cronbach's	1	2	3	4	5	6
	α						
1.Planning	.80	-	.43	.46	.28	.41	.39
2.Self-monitoring	.74		-	.55	.35	.49	.30
3.Evaluation	.83			-	.34	.47	.30
4.Reflection	.82				-	.29	.20
5.Effort	.87					-	.36
6.Self-efficacy	.80						-

Table 3

Means and Standard Deviations of the Scores on the Self-Regulatory Aspects across Performance Levels

	Elite (<i>n</i> =159)	Non-Elite (<i>n</i> =285)	Total (<i>N</i> =444)
Planning (Range 1-4)	2.59 ± 0.48	2.41±0.49	2.48±0.49
Self-Monitoring (Range 1-4)	2.68± 0.49	2.40±0.51	2.50±0.51
Evaluation (Range 1-5)	3.50±0.52	3.25±0.60	3.34±0.58
Reflection (Range 1-5)	4.09±0.58	3.69±0.64	3.83±0.65
Effort (Range 1-4)	3.05±0.53	2.62±0.52	2.77±0.56
Self-efficacy (Range 1-4)	2.85±0.40	2.72±0.42	2.76±0.42

Table 4

Results of the Logistic Regression Analysis of the Self-Regulatory Aspects as Potential Predictors of Performance Level

Self-regulatory Aspect	$\beta \pm se$	OR	95% CI for OR ^a	P value
Planning				
Low		1.00		
Moderate	-0.12±0.34	0.89	0.46 – 1.72	.72
High	-0.27±0.45	0.77	0.32 – 1.86	.56
Self-monitoring				
Low		1.00		
Moderate	0.14±0.28	1.16	0.67 – 2.00	.61
High	0.93±0.36	2.54	1.25 – 5.18	.01
Evaluation				
Low		1.00		
Moderate	0.31±0.31	1.36	0.74 – 2.49	.32
High	-0.66±0.37	0.52	0.25 – 1.07	.08
Reflection				
Low		1.00		
Moderate	0.78±0.33	2.17	1.13 – 4.17	.02
High	1.59±0.36	4.90	2.43 – 9.86	.00

Effort				
Low		1.00		
Moderate	0.84±0.38	2.32	1.11 – 4.86	.03
High	1.96±0.34	7.07	3.00 – 16.67	.00
Self-efficacy				
Low		1.00		
Moderate	0.14±0.39	1.14	0.44 – 2.96	.78
High	-0.07±0.55	0.93	0.32 – 2.74	.90
Age	0.06±0.08	1.06	0.91 – 1.24	.47

^a 95% CI for OR = 95% Confidence Interval for the Odds Ratio

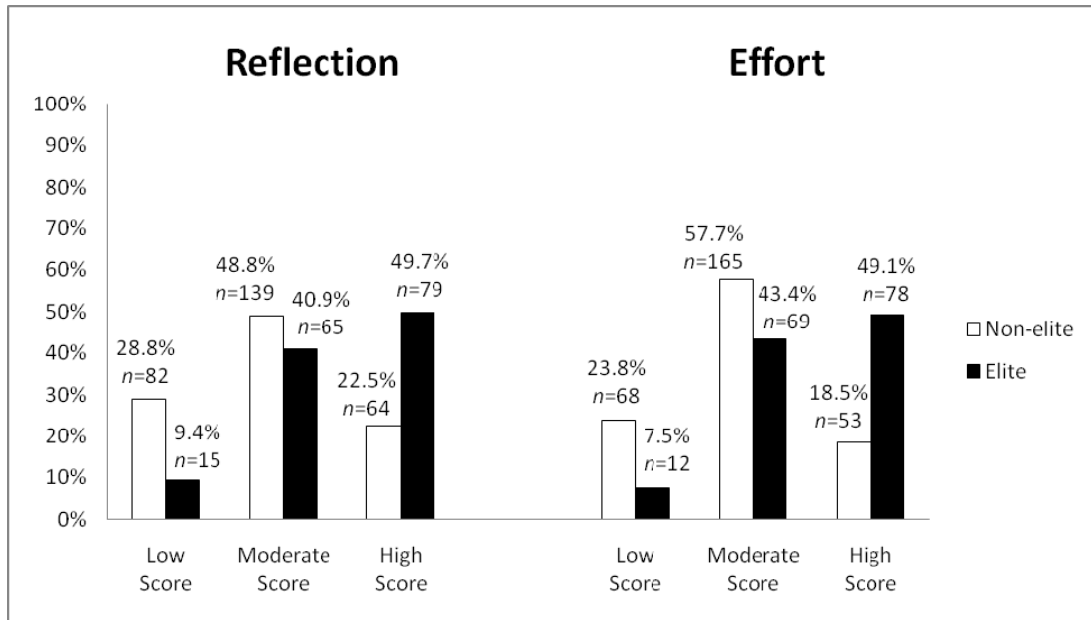


Figure 1

Proportion and Number of Elite (n=159) and Non-Elite (n=285) Players in each Score Group for Reflection and Effort