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Practice and Play in the Development of Elite Football Players

by

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A thesis submitted in Partial Fulfillment of the Requirements for the Degree of European Master of Sport and Exercise Psychology at The University of Thessaly in July 2015

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Abstract

This study investigates the relationships of psychological variables that are associated with the theory of deliberate practice and deliberate play on performance level and performance improvement of young elite football players. The variables associated with the theory of deliberate practice are goal-commitment, problem focused coping and seeking social support. In relation to the theory of deliberate play enjoyment during different training elements has been measured. It was expected that these variables combined would have a predictive value on the players' improvement over the course of the season and their average performance. In the study 87 youth football players, 11 to 18 years old from a professional club in the Netherlands participated (M = 14.4, SD = 2.0). Seeking social support and problem focused coping were measured using the Ways of Coping Questionnaire, goal-commitment by using 5 items suggested by (Hollenbeck, Klein, O'Leary, & Wright, 1989) and enjoyment using the interest-enjoyment subscale of the Intrinsic Motivation Inventory. The assessment of performance improvement and average playing level was based on grades given by the coaches. Regression analyses showed that (a) for players performance the model predicted 10% of the variance, with goal commitment, enjoyment during video analysis and enjoyment during friendly games, being significant predictors, and (b) for players improvement the model explained 7% of variance, with enjoyment during endurance training and enjoyment during friendly games being significant predictors. The most important implication of the current study is that psychological variables related to the theory of deliberate practice and deliberate plays explain some variance early on in players' career, but these effects on performance will probably be more visual later in time.

Introduction

Within the area of talent development practice has always been a topic that received great attention. A theory that has been popular for quite some time is the 10 year rule (Chase & Simon, 1973), suggesting that 10 years of practice are required to become an expert in a certain field. In their prior study Chase and Simon (1973) demonstrated that differences between elite chess players and novice chess players where mostly attributed to training effects instead of differences in general cognitive capacity. Elite chess players proved to have better knowledge about complex chess patterns, but when the chess pieces where placed randomly on the board, elite players did not perform better than their non-elite colleagues. This 10 year rule has held up in multiple different domains such as music (Ericsson, Krampe, & Tesch-Roemer, 1993), chess and in sports (Helsen, Starkes, & Hodges, 1998). Within sports a claim like this leads elite youth sport clubs to start practice and selection as young as possible to maximize the chance of talented players to make it to the top.

A limitation of this 10 year rule is that there is not always a linear relation between practice and skill acquisition (Howard, 2014; Newell & Rosenbloom, 1981). Over time the effect of training normally diminishes. Performance increase is higher in the first couple of years of engagement than it is during the later years. A model that describes this relationship is the power law of practice, proposed by Newell and Rosenbloom (1981). An example of the power law is the logarithmic function that describes the learning curve for chess players (Howard, 2014). However, the chess players in the study from Howard (2014) differed from player to player in how steep the learning curve was and how fast the effects of training decreased. Within the literature there is an ongoing debate about how fast the effects of practice wear off, what the conditions of practice are for it to be effective and if there are any differences in personalities that might predict the effectiveness of practice. The current study tries to contribute to this discussion.

Deliberate practice

Lots of studies have focused on examining the relationship between practice and skill acquisition. One of these studies that has been very influential is that of Ericsson et al. (1993) on violin players, introducing the topic of deliberate practice, a form of practice that is undertaken to increase performance and which requires high effort and concentration. According to this study the way in which practitioners engage in training activities influences the performance outcomes. In this study all expert violin players spend about the same time in practice activities, but the two best groups spend more time on solitary practice, a form of practice where concentration is high and the aim is solely on improving performance.

The original theory of deliberate practice, describing that a monotonic relationship between hours of deliberate practice and level of expertise is possible (Ericsson et al., 1993; Ericsson & Starkes, 2003), has found support in the sport psychological literature. For top elite football and field hockey players it was found that, when compared to their less elite colleagues, they made more individual- and team practice hours from their 13^{th} up to their 16^{th} (Helsen et al., 1998). This finding is line with Ericsson's original observation in violin players; however there are two differences between the violin players and the football players. First, the football players started making more hours of practice once they were thirteen, whereas the elite musicians started making more hours of practice when they were eight. Secondly, one of the findings of Helsen et al. (1998) contradicts Eriksson's original theory of deliberate practice: the activities that where rated as being most important for performance improvement were also rated as more enjoyable. This contradicts the description of deliberate practice, which according to Ericsson et al. (1993) is not enjoyable by itself, only the effect of improvement is.

In more recent sport psychological literature the concept of enjoyment has received a considerably amount of attention, especially because it is closely linked to intrinsic motivation and its positive cognitive, behavioral and emotional outcomes (Duda, Papaioannou, Appleton, Quested, & Krommidas, 2014). When intrinsically motivated someone is engaged in a certain task just because the task itself is enjoyable (Deci & Ryan, 1985). There have been multiple studies that link intrinsic motivation to prolonged engagement (Wall & Côte, 2007) and to performance (Cerasoli & Ford, 2014). Taking into account that the enjoyable parts of practice contribute to performance increase (Helsen et al., 1998) and that enjoyment by itself has positive outcomes, enjoyment is definitely something that has to be taken into account when looking at talent development.

Deliberate play

A theory that acknowledges the importance of enjoyment for talent development in youth sport is the Developmental Model of Sport Participation (DMSP) (Côté, Baker, & Abernethy, 2003). The DMSP states that children first come into contact with sports by playing unorganized forms of sport. Côté (1999) introduced the term of deliberate play, referring to children playing self-organized forms of sport that are adapted from normal sport rules, but monitored and created by children themselves. Deliberate play is a form of sports that is designed to maximize enjoyment and that is intrinsically motivated. As mentioned earlier intrinsic motivation is sport has been linked to prolonged participation (Wall & Côte, 2007) which, especially in youth sports, is an important outcome both for involvement in recreational sports later on but also for increasing chances of talented athletes making it to the top.

The DMSP describes three different pathways that young athletes can follow leading to elite performance, recreational participation or dropout (Côté et al., 2003). The model

describes that especially for sports where athletes reach their peak after adolescence, which is the case for football; the early sampling pathway leads to the highest amount of participation in recreational sports and to the highest amount of players progressing into elite sports. Within this pathway early sampling and a lots of deliberate play is the norm for children from six to twelve years old. Engagement in deliberate play in a broad domain of sports in the age of six to twelve contributes to the development of perceptual-cognitive and perceptual-motor skills, which has a positive transfer to the main sport that players specialize in later on (Côté, Baker, & Abernethy, 2007). Another positive effect of deliberate play over deliberate practice on a sport where creativity is highly valued is that playing triggers children to recombine behaviors and develop flexible strategies (Pellegrini & Smith, 1998). The sampling phase is followed by the specializing phase which, according to the DMSP, starts from around 13 year old and prepares for the investment years that start from the age of 16 years old. The specializing phase is characterized by a balance between deliberate play and deliberate practice and a reduction in involvement in multiple sports. In the investment years there is only one sport and the main focus is on deliberate practice (Côté et al., 2007).

This early sampling pathways of the DMSP have been supported by multiple different studies in the field of sport psychology. For example a retrospective study from Soberlak and Cote (2003) showed that many elite Canadian ice hockey players have in common that they started their career with a period where they played multiple different sports with the aim to maximize enjoyment. Similar results have been found for triathlon athletes (Baker, Côté, & Deakin, 2005), where early specialization did not predict expert development.

Within the context of football however research is inconclusive. Both the early specialization hypothesis and the early specializing hypothesis have been supported by research. Support for the early specialization hypothesis, the pathway described by the DMSP that is most closely linked to the framework of deliberate practice and suggest that early

specialization in the main sport at an early age is most important in order to develop expert performance, comes from Helsen et al. (1998) and later from Ward, Hodges, Starkes, and Williams (2007). In the later study, comparing elite youth football players with non-elite young football players, Ward et al. (2007) found that the hours of football team practice were the only variable that could successfully predict the performance level of the players. On the other hand there is support for the early sampling hypothesis. This is the pathway in the DMSP that predicts that especially sampling and deliberate play are important for young children in order to develop a broad set of skills that eventually transfer into expert performance in the main sport. According a to study by Ford, Ward, Hodges, and Williams (2009) successful elite soccer players differed in their early sport participation from their less successful elite colleagues in the amount of ours they spend in football play in the age between 6 and 12.

An alternative hypothesis, that better seems to fit for football players is the early engagement hypothesis (Ford et al., 2009). In this study Ford et al. (2009) found mixed results partly supporting the early sampling hypothesis and the partly supporting the early specialization hypothesis. Young elite athletes that were still elite athletes at their sixteenth spend more hours in soccer play, but not in play activities related to different sports, than those who dropped out after their twelfth. This supports the claim that play in the main sport in an important factor, but not that play in different sports is important for athletes further careers as suggested by Côté et al. (2007). On the other hand Ford et al. (2009) found that the hours of practice made by elite athletes, those who were still elite at the age of 16 and those who were not, differed significantly from the amount of practice hours made by non-elite athletes. This would be in line with the early specialization theory (Ericsson et al., 1993; Ericsson & Starkes, 2003). The early engagement hypothesis, that predicts that just

engagement in the main sport by itself, deliberate play and deliberate practice (Ford et al., 2009) will be further investigated in the current study.

The present study

As mentioned in the previous section, support for the theory of deliberate practice and deliberate play mainly comes from retrospective designs. According to Durand-Bush and Salmela (2001) the need for retrospective studies comes from the lack of results from studies in the field of talent development. Since there are no unanimous conclusions about factors that predict future talent Durand-Bush and Salmela (2001) note that the best way to make predictions about psychological variables that predict talent is to use a retrospective design. The aim of the current study will be to take the results from these retrospective designs and use these variables in order to predict football success, or at least look at the improvement that players make during the timespan of a season. The goal of the current study therefore will be to predict improvement of young football players during a season based on psychological skills that are related to the execution of deliberate practice and deliberate play.

According to Ericsson et al. (1993) there are three constraints on deliberate practice that, under the right conditions, can be dealt with. These three conditions that are important for deliberate practice to be effective are: motivation, which needs to be high; effort needs to be given; the required resources have to be available.

In line with these requirements for deliberate practice to be effective Van Yperen (2009) decomposed these conditions in psychological variables and looked at their predictive value over future football performance. The variable that he identified within these constraints was goal-commitment under the motivational constraint, recovery after training and coping behavior for the effort constraint and the availability of a coach, school, homework support, training facilities and social support for the resources constraint. In this longitudinal study

data that was collected while the athletes were still in the academy has been used to compare between player progressing into professional football and those who did not. The variables that where significant where: goal-commitment, problem-focused coping and seeking social support. These variables were also included in the present study.

In relation to the theory of deliberate practice athletes enjoyment during different training parts will be used as predictor variable, based on the findings of Ford et al. (2009). The theory of deliberate play includes more than just enjoyment during practice. The way deliberate play is organized is a very important and according to the DMSP especially early sampling is an important predictor for future talent (Côté et al., 2003). However, the present study will only focus on enjoyment since all participants were elite football players already following the early specializing pathway; so there would have been little variance in the amount of hours that players spend playing other sports. Furthermore all training programs within the football club have been standardized, so focusing on difference in the organization of the practices would not be meaningful.

Summarizing the above, the research question for the present study was whether youth players who possess a set of psychological skill that are related to overcome constraints of deliberate practice and perceive different training parts to be more enjoyable improve more over the course of the season. All variables have been proven to be of great impact in the early development of athletes by retrospective designs (Ford et al., 2009; Van Yperen, 2009). The goal of the current study is to see if these variables already have a predictive value over the improvement of football players during the season and/ or if they contribute to the players' performance level at a young age.

The hypotheses that were developed are in line with the DMSP (Côté et al., 2013), the theory of deliberate practice (Ericsson et al., 1993), and the self-determination theory (Deci &

Ryan, 1985), suggesting that for young players to become professional athletes it is important to possesses the right coping strategies, to be committed to the goal they set themselves, to enjoy different training parts that they have to participate in. The first hypothesis was related to the theory of deliberate practice and suggests that young athletes that score higher on problem focused coping, seeking social support and goal commitment improve more over the course of the season (1a) and are the better players of the team (1b). The second hypothesis is related to deliberate play and focuses on enjoyment during different training elements. It is expected that those children that score high on enjoyment of different training elements improve their performance more over the course of a season (2a) and are the better players of the team (2b). Finally it is predicted that a combination of the variables related to deliberate practice and to deliberate play together explain an additional amount of variance. The final hypotheses are that athletes that score high on goal-commitment, problem focused coping, seeking social support and enjoyment during different parts of training improve more over the course of the season (3a) and that these players score the highest on average performance (3b).

Method

Sample

Eighty-seven youth players from a Dutch premiere league football club (N = 87, M age = 14.36, SD age = 2.04) participated in the current study. The oldest player was almost 19 years old, the youngest just over 11. All players where male and played in one of the following youth teams: U12 (n =14), U13 (n = 14), U14 (n =*13*), U15 (n = 10), U16 (n = 15), U17 (n = 10) or U19 (n = 11). All players who participated had a Dutch nationality or a double nationality of which one was Dutch. Players who did not speak Dutch where excluded since all the questions in the questionnaire where in Dutch.

The study was conducted in collaboration with the club, so the children were asked to fill out the questionnaires by their own team leaders. Before the children started the questionnaire they were informed that the results would be used for research purposes only. Also, in case of indistinctness of questions, the phone number and e-mail address of the authors was mentioned so that they could contact him whenever needed.

A statistical a-priori power analysis was performed for sample size estimation. The predicted effect size (f^2 = .38) has been estimated based data by Van Yperen (2009), who used similar variables. According to the Cohen (1988) criteria this is a large effect size. With alpha = .05 and power = 0.80, the projected sample size needed with this effect size (GPower 3.1.7) (Erdfelder, Faul, & Buchner, 1996) is approximately (N =) 43. For a medium or small effect size (f^2 = .15 and f^2 = .02; Cohen, 1988) respectively (N =) 92 participants or (N =) 641 participants would be needed. Since the expected effect size was large the minimum amount of participants for this study would have been 43, but the aim was to get at as many as possible to decrease the chance of a type two error. The final sample consisting of 81 participants met the requirements according to the power analysis.

Measurement

In the current study an online questionnaire (see appendix 1) has been designed to collect data for the constraints of deliberate practice (goal-commitment, problem focused coping and seeking social support) and for enjoyment. Also the age of the players, the age when they started playing football and the team they were playing in has been asked. Below a brief description for all the variables will be given:

Goal-commitment*:* The players got three football related goals that, according to the board of the club, were realistic and challenging (e.g.; I would like to play for the first team of Vitesse). For all these statements the participants had to answer one question related to goal importance: 'How important is this goal for you?' and five related to goal-commitment (e.g.; it's hard to take this goal seriously). These items are suggested by and derived from Hollenbeck et al. (1989). These items were also used by Van Yperen (2009). The responses ranged from (1) "totally disagree" to (5) "totally agree". Cronbach's alpha was .85.

Problem-focused coping*:* The players got three realistic football related problems that they might have experienced before or can easily imagine; being injured which interferes with your performance; being criticized by one of your teammates; you had a bad assessment interview. For each of these football related problems the players were asked to answer five questions related to problem focused coping derived from the Ways of Coping Questionnaire (e.g.; I just concentrated on what I had to do next – the next step) (Folkman & Lazarus, 1985). These items were scored on a four point scale ranging from "does not apply or not used" to "used a great deal". Cronbach's alpha was .92.

Seeking social support: Related to the same issues that were mentioned under problem-focused the players were asked to answer five questions related to seeking social support derived from the Ways of Coping Questionnaire (e.g.; I talked to someone to find out more about the situation) (Folkman & Lazarus, 1985). Also these items were scored on a four point scale ranging from "does not apply or not used" to "used a great deal". Cronbach's alpha was .93.

Enjoyment: To measure relative enjoyment for different accessories of practice the Intrinsic Motivation Inventory (IMA; Ryan, 1982) has been used. The original IMI was developed to capture participants' intrinsic motivation in certain tasks. The original IMI consist of six

subscales covering different aspects of intrinsic motivation. A factor analysis covering four of these subscales; intrinsic enjoyment, perceived competence, effort importance and tension pressure (McAuley, Duncan, & Tammen, 1989) revealed that a model with these four subscales as firs order factors, and intrinsic motivation as a second order factor provided an adequate fit. According to these researchers it is possible to use as many or as few subcategories of the inventory without losing the psychometric properties of the scale. Both McAuley et al. (1989) as well as Tsigilis and Theodosiou (2003), who studied a Greek version of the IMI, rated the validly and reliability of the inventory as good. Since the focus of the current study is on enjoyment within different areas of football, only the subscale for interest-enjoyment has been used. According to McAuley et al. (1989) the reliability for this subscale is acceptable (Cronbach's α = 78). The scale consists of five items that have to be answered for different practice activities. All items had to be answered on a seven point Likert scale; ranging from "(1) strongly disagree" to "(7) strongly agree". In total there were five items (e.g.; I enjoy (specific activity) very much). The football specific activities that the players had to judge were established in accordance with the football club and are based on the different training units. The athletes' enjoyment has been measured for endurance training (Cronbach's alpha = .83), strength training (Cronbach's alpha = .81), playing a game during practice (Cronbach's alpha = .69), a friendly match (Cronbach's alpha = .77), a competition match (Cronbach's alpha = .64) and during video analysis (Cronbach's alpha = .75).

Performance level: All the coaches of the teams gave their players a mark from 1 to 10 for every competition game they played. The scores were given by the coaches after the game, which was a standard procedure at the club. All grades were given using an online portal were every players had his own dossier. These coaches' ratings were used to calculate the average performance of the players over the season, but also the improvement of the players during the season. Improvement over the season has been investigated by looking at

the average marks given by the coach for the games before the winter break versus the games after the winter break.

Procedure

In accordance with the board of the club and the team leaders the link of the questionnaire has been send to all the players. This has been done by each team leader for his own team. After two weeks the researchers communicated to the team leaders which players did not finish the questionnaire and the team leaders send those players a reminder. All players received a maximum of three reminders. In the questionnaire there was informed consults mentioning that the data would be used for research purposes only.

Statistical analysis

Multiple hierarchical multiple regression analysis was performed to find out if the variables linked to the constrains of deliberate practice and enjoyment linked to deliberate play have any predictive value over players improvement over the course of the season and their average grades. Starting age, goal-importance and team were entered in the model as control variables. For every hypothesis a regression analysis has been done with the control variables in the first phase and the relative independent variables in the second phase. For the final model related to the early involvement hypothesis the control variables (goal-importance and team) have been entered in block 1, the scores for goal-commitment, problem-solved coping and help seeking behavior in block 2 and all the averages for enjoyment been entered in block 3.

Results

Descriptive statistics

All players have been given a mark from 1 to 10 by their coach for each game they played. The average mark for the first part of the season (M = 6.12, SD = .34) has been compared to the average mark for the second part of the season (M = 6.26, SD = .41). The average scores of the players on the three items on goal-importance, which were added as a control variable, were high (M = 13.4 out of 15, SD = 1.74). The average for goal commitment was M = 65.49 out of 75, SD = 7.94, Cronbach's alpha = .85. For problem focused coping the mean was M = 45.47 out of 72, SD = 12.77, Cronbach's alpha = .92. For seeking social-support the average score was M = 38.47 out of 72, SD = 12.99, Cronbach's alpha = .93. For enjoyment during endurance training M = 15.72 out of 25, SD = 3.94, Cronbach's alpha = .83; for strength training M = 18.49 out of 25, SD = 3.44, Cronbach's alpha = .81; for playing a game during practice M = 21.94 out of 25, SD = 3.17, Cronbach's alpha = .69; for a friendly match M = 20.40 out of 25, SD = 3.45, Cronbach's alpha = .77, for a competition match M = 22.78 out of 25, SD = 2.64, Cronbach's alpha = .64 and for during video analysis M = 18.84 out of 25, SD = 3.06, Cronbach's alpha = .75. For an overview of the correlations between the dependent and independent variables see table 1 and 2.

Table 1.

Correlation table dependent and independent variables

	Grade improvement	Average grades	Problem focused coping	Seeking social support	Goal commitment	Enjoyment endurance training	Enjoyment strength training	Enjoyment video analysis	Enjoyment game during practice	Enjoyment friendly game
Grade improvement										
Average grades	.24*									
Problem focused coping	.02	-.02								
Seeking social support	.05	-.09	.83**							
Goal commitment	.00	.29**	.21	.13						
Enjoyment endurance training	.10	-.04	.17	.16	.07					
Enjoyment strength training	.-.07	.16	.13	.11	.15	.50**				
Enjoyment video analysis	-.03	.23*	.41**	.32**	.36**	.47**	.50**			
Enjoyment game during practice	-.06	.12	.25*	.17	.46**	.23**	.23**	.72**		
Enjoyment friendly game	-.14	.12	.17	.14	.35	.46**	.46**	.36**	.49**	
Enjoyment competition game	-.06	.28*	.24*	.20	.51**	.33**	.33**	.48**	.72**	.67**

Note. Correlations marked with one star are significant at the .05 level. Correlations marked with two stars are significant at the .01 level.

Deliberate practice

The first hypothesis was that players who scored higher on the constraints related to deliberate practice; goal-commitment, seeking social-support and problem focused coping improve more over the course of the season. To test this hypothesis a hierarchical multiple regression analysis has been conducted with the improvement over the course of the season as the dependent variable, see table 2a. First a check on assumptions has been done (see appendix 2). Except for two outliers, all criteria were met. One subject has been removed from the data file because of its odd score on multiple variables. A second outlier on goal-commitment has been adjusted to the mean minus twice the standard deviation (Field, 2000). In the first phase goal importance has been added as a control variable, in the second phase goal commitment, seeking social support and problem focused coping have been added. The model as a whole did not explain any significantly variance over performance improvement (F (4, 81) = .12, p > .05).

The second hypothesis was that players who scored higher on the constraints related to deliberate practice; goal-commitment, seeking social-support and problem focused coping get higher grades from their coaches. A second two step hierarchical regression was used to test this. But first an ANOVA has been conducted to see if there were any differences between the average grades that the coaches gave to their players. The result showed significant differences in average scores for players amongst teams, F (6, 79) = 9.125, p < .001. Post hoc analyses (Bonferroni) showed that players in the under 13 team got significant higher grades than those playing in under 14, under 15, under 16, under 17 and under 19. To correct for this low inter rater reliability team has been added in the first step of the hierarchical multiple regression analysis as a second control variable next to goal importance. The second two-way hierarchical multiple regression analysis was conducted with the average grades as the dependent variable. In the first stage goal importance and team where entered as control

variables, in the second stage also goal commitment, problem focused coping and seeking social support were added to the equation. The first model explained 23 % of variance, F (84, 1) = 26.29, $p < .001$. The second model explained 27% of variance of the total regression model, F (81, 4) = 8.66, $p < .001$, but the F change was not significant ($p = .78$). In the final model only team and goal commitment were statistically significant, with team having a higher beta value (t = -5.01, beta = -.49) than goal commitment (t = 2.38, beta = .224).

Table 2a.

Results hierarchical regression analysis of goal-commitment, problem focused coping and seeking social support on improvement.

Step	Measurement	B	SE (B)	β	*F*	*R2*	*DR2*
1					.20	.00	
	Goal-importance	.01	.02	.05			
2					.12	.01	.01
	Goal-commitment	.00	.01	-.04			
	Problem focessed coping	.00	.01	-.06			
	Seeking social support	.00	.01	.09			

Note: B = regression weight, β = standardized regression weight. None of the models or beta values of the variables was significant.

Table 2b

Results hierarchical regression analysis of goal-commitment, problem focused coping and seeking social support on average performance.

Step	Measurement	B	SE (B)	β	*F*	R^2	ΔR^2
1					26.29	.23**	
	Goal-importance Team	-.07	.01	.49**			
2					2.36	.27**	.06
	Goal-commitment	.01	.00	.22*			
	Problem focessed coping	.00	.00	.14			
	Seeking social support	.00	.00	-.16			

Note: B = regression weight, β = standardized regression weight. Correlations marked with one star are significant at the .05 level. Correlations marked with two stars are significant at the .01 level.

Deliberate play

For the third hypothesis, related to deliberate play, another regression analysis has been done to see if enjoyment during the different practice components has any predictive value over player's improvement according to the coaches, see table 3a. Again preliminary analyses were conducted (see appendix 2). For enjoyment during practice games and enjoyment during competition games an outlier has been corrected to the mean minus two times the standard deviation (Field, 2000). In the model all training elements on which enjoyment has been measured have been added in the model; endurance training, strength training, playing a competition game, playing a practice game during training and free play. The total variance explained by the final model was 7%, F (3, 82) = 2.02, $p < .05$. In the final model enjoyment during training games, competition games and video analysis have been removed from the model by backwards selection. In the model only enjoyment during endurance training and enjoyment during friendly games were statistically significant. The beta value for endurance training was positive (t = 2.29, beta = .30, $p < .05$) while the beta value for friendly games was negative (t = -2.43, beta = -.28, $p < .05$).

Also for the enjoyment components it has been tested if it explained some variance from the average grades that players got, see table 3b (for a check on assumptions see appendix 2). Again a hierarchical multiple regression analysis has been conducted with players average ratings as the dependent variable. In the first phase team has been added as a control variable. In the second phase all training elements on which enjoyment has been measured have been added in the model; endurance training, strength training, playing a competition game, playing a practice game during training and playing a friendly match. The first model explained 23% of variance of the total regression model, F (84, 1) = 26.29, $p < .001$. The second model explained 30% of variance of the dependent variable, F (78, 7) = 6.26, $p < .001$, the F change was significant ($p < .05$). In the second model only team, enjoyment during video analysis and enjoyment during friendly games were significant. The beta values were t = -5.21, beta = -.56 for team, t = 2.072, beta = .23 for enjoyment during video analysis and t = -2.75, beta = -.35 for enjoyment for friendly games.

Table 3a.

Results hierarchical regression analysis of enjoyment on improvement.

Step	Measurement	B	SE (B)	β	*F*	R^2
1					2.02	.07*
	Enjoyment during endurance training	.02	.01	2.29*		
	Enjoyment during practice games	-.03	.01	-.28*		

Note: B = regression weight, β = standardized regression weight. Correlations marked with one star are significant at the .05 level.

Table 3b.

Results hierarchical regression analysis of enjoyment on average performance.

Step	Measurement	B	SE (B)	β	*F*	R^2	ΔR^2
1					26.29	.23**	
	Team	-.07	.01	.49**			
2					6.26	.30**	.06*
	Enjoyment during video analyse	.03	.01	.23*			
	Enjoyment during friendly games	-.04	.01	-.35*			

Note: B = regression weight, β = standardized regression weight. Correlations marked with one star are significant at the .05 level. Correlations marked with two stars are significant at the .01 level.

Early engagement

The final hypotheses of the study were related to early engagement hypothesis and suggested a predictive value of both the constraints of deliberate practice and the constraints of deliberate play on both the improvement and the absolute performance of the elite football players. For the final two models only those variables that significantly predicted the improvement of players in the previous analyses have been added.

For improvement of the players no additional analysis has been done, since none of the variables related to deliberate practice explained any variance.

An additional three level hierarchical multiple regression analysis has been done with players' average grades as a dependent variable, see table 4. For the final model only those variables that proved to be significant in the earlier analyses have been added. The sample size would have been too small to find an effect, according to the suggested 20:1 ration (Stevens, 2012), if all variables would have been added to the model simultaneously. In the first phase team and goal importance have been added as control variables, in the second phase the significant variable related to deliberate practice; goal-commitment has been added and in the third phase the significant variables related to deliberate play; enjoyment during video analysis and enjoyment during friendly games, have been added (see appendix 2 for

check of assumptions). In the first model 24% of variance has been explained, F (83, 2) = 14.51, $p < .001$. The second model explained 27% of variance, F (82, 3) = 11.68, $p < .001$. The F change was significant ($p < .05$). The final model explained 34% of variance of the dependent variable, F (80, 5) = 9.93, $p < .001$. Also this F change was significant ($p < .05$). For the final model al variables, except for the control variable goal importance, were significant. The standardized beta coefficients where: t = -6.40, beta = -.60 for team, t = 2.23, beta = .21 for goal commitment, t = 2.37, beta =.23 for enjoyment during video analysis and t = -2.81, beta =-.28 for enjoyment during friendly games.

Table 4.

Results hierarchical regression analysis of goal-commitment, enjoyment during video analysis and enjoyment during friendly games.

Step	Measurement	B	SE (B)	β	F	R^2	ΔR^2
1					14.51	.24**	
	Team	-.09	.01	-.60**			
2					11.68	.27**	.03*
	Goal commitment	.01	.02	.21*			
3					9.94	.34**	.07*
	Enjoyment during video analysis	.03	.01	-.23*			
	Enjoyment during friendly games	-.03	.01	-.28*			

Note: B = regression weight, β = standardized regression weight. Correlations marked with one star are significant at the .05 level. Correlations marked with two stars are significant at the .01 level.

Furthermore some post-hoc analyses have been done. A multiple regression used to predict the relative playing time of players, the time players were in the field divided by the total game time over the season, out of the different categories of enjoyment. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity (see appendix 2). In the final model, using backward selection, only enjoyment during practice games remained in the model. The total variance

explained by the 8%, F (1, 85) = 7.64, $p < .01$. Enjoyment during practice game had a positive beta value (t =.41, *beta* =.29). The model including all the categories of enjoyment explained 13 % of variance, but this model was only marginally significant (p = .07).

Discussion

The goal of the present study was to investigate the predictive value of psychological variables related to deliberate practice and deliberate play that have proved their value in retrospective designs (Ford et al., 2009; Van Yperen, 2009) in a cross-sectional design. The hypothesis that where related to improvement of football performance over the course of the season and average game ratings by coaches as dependent variables and goal commitment, seeking social support, problem focused coping and enjoyment of different training elements as independent variables has only partly been supported.

The first hypotheses, related to the psychological variables associated with the constraints of deliberate practice, have partly been supported by the data, but only for the average grades. The final model explained 27 percent of variance of the player's average grades, but when team was added as a control variable the model only added 4 percent of variance. The only variable that significantly contributed to players' average grades was goal-commitment. Interesting is that most players scored high on the control variable goal importance but that this did not account for any variance. This is in line with the hypothesis and means that not the importance of the goal contributes to players' performance, but the willingness of someone to invest in achieving a certain goal. This suggests that those players that are more goal-committed have a higher chance of getting higher grades from their coaches. Similar results have been founded in a qualitative study on soccer success (Holt & Dunn, 2004). In this study commitment was reported as one of the four most important psychological variables that contribute to football talent. Also here caution is advised when drawing conclusion about causality.

The hypothesis related to deliberate play has also partly been supported. When looking at improvement over the course of the season only enjoyment during endurance training and enjoyment during friendly games were statistically explaining some variance. According to the model these two variables explained 7 percent of the variance in players' improvement. The higher people score on enjoyment during endurance training the more they improved during the season. The direction of the effect of enjoyment during friendly games however was contradicting the hypothesis. The lower people scored on this enjoyment dimension, the higher the chance that they improved more during the course of the season. It could be that players who are not chosen for a starting position during competition games get more chances during friendly games, explaining the higher enjoyment of the players with lower scores on competition games by their coaches. However an examination of the data shows otherwise. Athletes who played relatively more minutes also scored higher on enjoyment during friendly matches.

Then for the effect of the enjoyment dimensions on the average grades, also this hypothesis has been partly supported. The final model explained a total variance of 30 percent, but the added value of the enjoyment categories was only 7 percent. The higher people scored on enjoyment during video analysis, the higher their average grades. Also here the negative beta weight of video analysis was contradicting the hypothesis. The lower people scored on enjoyment during video analysis, the higher their average grades.

Than finally the total model related to the early engagement hypothesis, including all the psychological variables related to deliberate play and to deliberate practice was also only partly supported. For the final model only those variables that proved to be significant in the earlier analyses have been added. The sample size would have been too small to find an effect, according to the suggested 20:1 ration (Stevens, 2012), if all variables would have been added to the model simultaneously. The total variance explained by the model was 34%,

but the added variance when controlling for the differences in grades related to the coaches 10% of variance was explained by the variables goal commitment, enjoyment during video analysis and enjoyment during friendly games.

These results can be interpreted in multiple ways. Because the model explained some variance in both improvement over the course of the season as well as average grades it can be concluded that those players who poses some of the psychological variables that are related to deal with the constraints of deliberate practice and enjoy different training elements, making them more intrinsically motivated already accounted for some of the differences in performance level at a very young age and helps them to improve faster than their team mates. This conclusion would be in line with earlier studies suggesting the importance of the measured variables (Ford et al., 2009; Van Yperen, 2009). However, because of the used statistical analyses cautions is advised when drawing conclusions about causality. It is very well possible that players' performance effects their enjoyment. Especially since all psychological variables have been measured at the end of the season it is possible that these are already affected by the players' perceived performance and progress. This direction of the relationship between performance and enjoyment has for example been found for people playing a computer game (Trepte & Reinecke, 2011). The data in the current study also supports the relationship between enjoyment and players relative playing time.

An explanation for why not more of the hypotheses variables explained some variance might be the small effect size (Cohen, 1988). The a-prior power analysis revealed that the final 87 participants would be enough to find a large effect size and almost enough to find a medium effect size. A large effect size was expected, but this was based on the results of a longitudinal design. It might be possible that the examined psychological variables do explain some variance, but that the effect size this early in the career of the young athlete's is only small. This makes sense taking into account that that all the variables were obtained from

longitudinal studies. The time span of one season might just be too short to observe some performance improvement.

In addition to the sample size some other limitations should be considered. To start with an ANOVA showed that there was a significant difference between the average grades that coaches gave to their players. This low inter-rater reliability, although controlled for, might have influenced the data. Also the grades were rather subjective. The strong part of the used dependent variable is that it was an average of multiple different games and not a snapshot of players' improvement. Only for further research it might be useful to have a standardized format for the coaches on how to judge their players. Another limitation related to coaches grading is that it is not known if the grades are relative of absolute. A coach might for example give a high grade to a weaker player when he plays a good match for his standard. As mentioned before, a standardized procedure for further research might help to overcome these limitations.

Another constraint is that only a section of variables that might be associated with overcoming constraints for deliberate practice and variables related to deliberate practice have been taken into account for this study. For deliberate play more variables related to the tree constraints (Ericsson et al., 1993) could have been taken into account. For deliberate play it might be useful further research to look more in depth into how different training parts are organized and if the ownership of development of assignments lays more with the athletes or at the coaches (Côté et al., 2003).

To summarize one of the major implications of the current study is that goal-commitment and enjoyment, related to deliberate practice and deliberate play, have a predictive value over early football success and improvement over the course of the season. This might be useful for clubs to take into account when selecting or assessing young players, but also when

developing a training program. However it has to be noted that the effect of these variables probably will be more visual over a longer time span.

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Appendix 1 Online Questionnaire

Vragenlijst Vitesse

De volgende vragenlijst is alleen bedoeld voor wetenschappelijke doeleinden en zal anoniem behandeld worden. Vul de vragen alsjeblieft zo veel mogelijk naar waarheid in. Als je niet zeker bent van een antwoord, kies dan het antwoord dat het meest van toepassing is voor jou.

*Vereist

1. **Naam** *

2. **Geboortedatum** *

   Voorbeeld: 15 december 2012

3. **In welk team speel je?** *

4. **Hoe oud was je toen je begon met voetballen?** *

   (Bij Vitesse of bij een andere club)

Doelstellingen

Het eerste gedeelte van de vragenlijst gaat over voetbal doelen. Er worden drie doelen genoemd, gevolgd door enkele vragen. Je kunt antwoorden op een schaal van 1 tot 5. Klik het antwoord aan, dat het beste bij je past.

5. **Doel: Ik wil graag in het eerste team van Vitesse spelen** *

Markeer slechts één ovaal per rij.

	Helemaal niet belangrijk	Niet belangrijk	Niet onbelangrijk/ niet belangrijk	Belangrijk	Erg belangrijk
Hoe belangrijk is dit doel voor jou?	◯	◯	◯	◯	◯

6. *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Het is moeilijk om dit doel serieus te nemen	◯	◯	◯	◯	◯
Eerlijk gezegd, maakt het me niet uit of ik dit doel wel of niet bereik	◯	◯	◯	◯	◯
Ik ben erg toegewijd in het na streven van dit doel	◯	◯	◯	◯	◯
Er is niet veel voor nodig om mij dit doel op te laten geven	◯	◯	◯	◯	◯
Ik denk dat dit een goed doel is om naar te streven	◯	◯	◯	◯	◯

7. **Doel: Ik wil graag voor een top drie eredivisie club spelen** *

Markeer slechts één ovaal per rij.

	Helemaal niet belangrijk	Niet belangrijk	Niet onbelangrijk/ niet belangrijk	Belangrijk	Erg belangrijk
Hoe belangrijk is dit doel voor jou?	◯	◯	◯	◯	◯

8. *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Het is moeilijk om dit doel serieus te nemen	◯	◯	◯	◯	◯
Eerlijk gezegd, maakt het me niet uit of ik dit doel wel of niet bereik	◯	◯	◯	◯	◯
Ik ben erg toegewijd in het na streven van dit doel	◯	◯	◯	◯	◯
Er is niet veel voor nodig om mij dit doel op te laten geven	◯	◯	◯	◯	◯
Ik denk dat dit een goed doel is om naar te streven	◯	◯	◯	◯	◯

9. **Doel: Ik wil graag voor een professionele club in het buitenland spelen** *

Markeer slechts één ovaal per rij.

	Helemaal niet belangrijk	Niet belangrijk	Niet onbelangrijk/ niet belangrijk	Belangrijk	Erg belangrijk
Hoe belangrijk is dit doel voor jou?	◯	◯	◯	◯	◯

10. *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Het is moeilijk om dit doel serieus te nemen	◯	◯	◯	◯	◯
Eerlijk gezegd, maakt het me niet uit of ik dit doel wel of niet bereik	◯	◯	◯	◯	◯
Ik ben erg toegewijd in het na streven van dit doel	◯	◯	◯	◯	◯
Er is niet veel voor nodig om mij dit doel op te laten geven	◯	◯	◯	◯	◯
Ik denk dat dit een goed doel is om naar te streven	◯	◯	◯	◯	◯

Omgaan met problemen

De volgende vragen gaan over voetbal gerelateerde problemen, die je bent tegengekomen en hoe je daarmee om bent gegaan. Mocht je zo'n probleem nog niet zijn tegengekomen, dan probeer je je voor te stellen in hoeverre jij de genoemde strategieën zou gebruiken.

11. **Je hebt een blessure waardoor je minder goed presteert** *

Markeer slechts één ovaal per rij.

	Niet van toepassing of niet gebruikt	Enigszins gebruik	Redelijk veel gebruikt	Veel gebruikt
Ik heb me gewoon geconcentreerd op wat ik moest doen – de volgende stap				
Ik heb met iemand gepraat over hoe ik me voelde				
Ik heb iets veranderd zodat het wel goed zou komen				
Ik heb professionele hulp gekregen				
Ik heb met iemand gepraat om meer te weten te komen over de situatie				
Ik heb verschillende oplossing voor het probleem bedacht				
Ik wist wat er gedaan moest worden, ik ben extra hard gaan werken om zaken tot een goed einde te brengen				
Ik kreeg sympathie en begrip van iemand				
Ik wist wat ik moest doen omdat ik heb eerder vergelijkbare situaties heb mee gemaakt				
Ik ben met iemand gaan praten die mij bij mijn probleem kon helpen				
Ik heb advies gevraagd van familie of vrienden die ik respecteer				
Ik heb een plan van aanpak gemaakt dat ik heb gevolgd				

12. **Je krijgt kritiek van de trainer of medespelers** *

Markeer slechts één ovaal per rij.

	Niet van toepassing of niet gebruikt	Enigszins gebruik	Redelijk veel gebruikt	Veel gebruikt
Ik heb me gewoon geconcentreerd op wat ik moest doen – de volgende stap				
Ik heb met iemand gepraat over hoe ik me voelde				
Ik heb iets veranderd zodat het wel goed zou komen				
Ik heb professionele hulp gekregen				
Ik heb met iemand gepraat om meer te weten te komen over de situatie				
Ik heb verschillende oplossing voor het probleem bedacht				
Ik wist wat er gedaan moest worden, ik ben extra hard gaan werken om zaken tot een goed einde te brengen				
Ik kreeg sympathie en begrip van iemand				
Ik wist wat ik moest doen omdat ik heb eerder vergelijkbare situaties heb mee gemaakt				
Ik ben met iemand gaan praten die mij bij mijn probleem kon helpen				
Ik heb advies gevraagd van familie of vrienden die ik respecteer				
Ik heb een plan van aanpak gemaakt dat ik heb gevolgd				

13. **Je hebt een slecht beoordelingsgesprek gehad** *

Markeer slechts één ovaal per rij.

	Niet van toepassing of niet gebruikt	Enigszins gebruik	Redelijk veel gebruikt	Veel gebruikt
Ik heb me gewoon geconcentreerd op wat ik moest doen – de volgende stap				
Ik heb met iemand gepraat over hoe ik me voelde				
Ik heb iets veranderd zodat het wel goed zou komen				
Ik heb professionele hulp gekregen				
Ik heb met iemand gepraat om meer te weten te komen over de situatie				
Ik heb verschillende oplossing voor het probleem bedacht				
Ik wist wat er gedaan moest worden, ik ben extra hard gaan werken om zaken tot een goed einde te brengen				
Ik kreeg sympathie en begrip van iemand				
Ik wist wat ik moest doen omdat ik heb eerder vergelijkbare situaties heb mee gemaakt				
Ik ben met iemand gaan praten die mij bij mijn probleem kon helpen				
Ik heb advies gevraagd van familie of vrienden die ik respecteer				
Ik heb een plan van aanpak gemaakt dat ik heb gevolgd				

Plezier

Tot slot zijn er nog een aantal vragen die betrekking hebben op verschillende trainingsonderdelen en hoe veel plezier jij hier aan beleeft. Je kunt antwoorden op een schaal van 1 tot 5. Klik het antwoord aan, dat het beste bij je past.

14. **Conditietraining** *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Ik geniet veel van conditietrainingen					
Een conditietraining is leuk					
Ik zou condititetrianingen als erg interessant beschrijven					
Tijdens een conditietraining denk ik aan hoe veel ik ervan geniet					
Tijdens een conditietraining kan ik mijn aandacht er moeilijk bij houden					

15. **Krachttraining** *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Ik geniet veel van krachttrainingen					
Een krachttraining is leuk					
Ik zou krachttrainingen als erg interessant beschrijven					
Tijdens een krachttraining denk ik aan hoe veel ik ervan geniet					
Tijdens een krachttraining kan ik mijn aandacht er moeilijk bij houden					

16. **Video analyse** *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Ik geniet veel van video analyse training					
Video analyse is leuk om te doen					
Ik zou video analyse als erg interessant beschrijven					
Tijdens video analyses denk ik aan hoe veel ik ervan geniet					
Tijdens video analyses kan ik mijn aandacht er moeilijk bij houden					

17. **Partijtje spelen** *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Ik geniet veel van het spelen van een oefen partijtje tijdens de training					
Een oefenpartijtje spelen is leuk					
Ik zou partijtje spelen als erg interessant beschrijven					
Tijdens het spelen van een partijtje denk ik aan hoe veel ik ervan geniet					
Tijdens een partijtje kan ik mijn aandacht er moeilijk bij houden					

18. **Oefenwedstrijd spelen** *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Ik geniet veel van het spelen van een oefenwedstrijd					
Een oefenwedstrijd spelen is leuk					
Ik zou oefenwedstrijd spelen als erg interessant beschrijven					
Tijdens het spelen van een oefenwedstrijd denk ik aan hoe veel ik ervan geniet					
Tijdens een oefenwedstrijd kan ik mijn aandacht er moeilijk bij houden					

19. **Competitie wedstrijd spelen** *

Markeer slechts één ovaal per rij.

	Helemaal niet mee eens	Niet mee eens	Niet mee eens/ niet mee oneens	Mee eens	Helemaal mee eens
Ik geniet veel van het spelen van een competitie wedstrijd					
Een competitie wedstrijd spelen is leuk					
Ik zou competitie wedstrijd spelen als erg interessant beschrijven					
Tijdens het spelen van een competitie wedstrijd denk ik aan hoe veel ik ervan geniet					
Tijdens een competitie wedstrijd kan ik mijn aandacht er moeilijk bij houden					

20. **Buiten Vitesse om, hoeveel uur in de week ben je bezig met voetbal of andere sporten? Geef een inschatting van het aantal uren per week.** *

.....

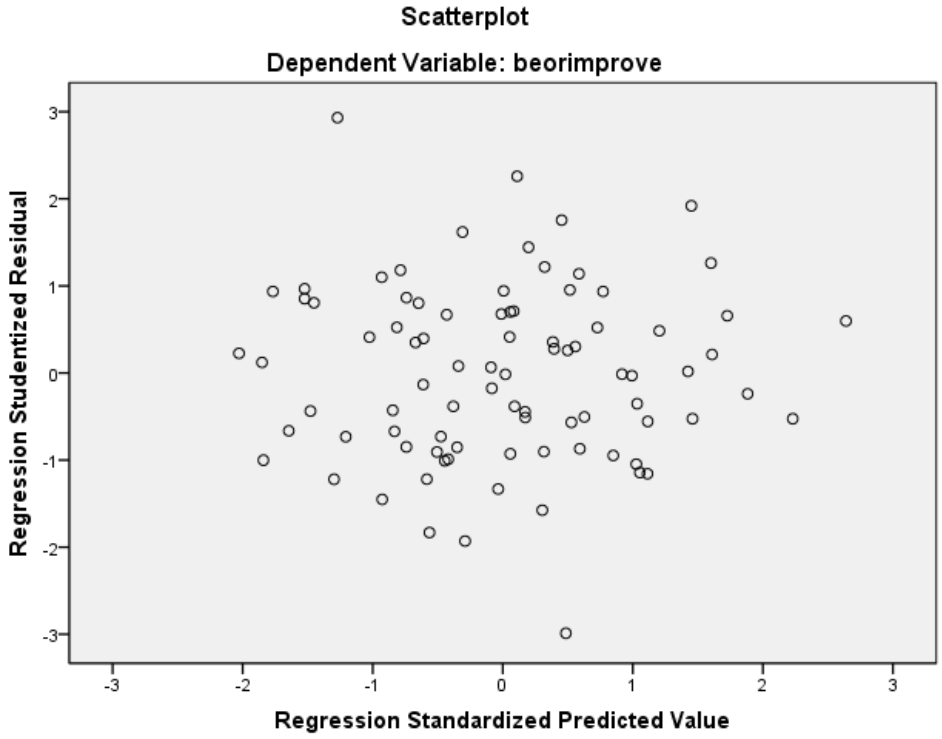
Appendix 2 Check of assumptions

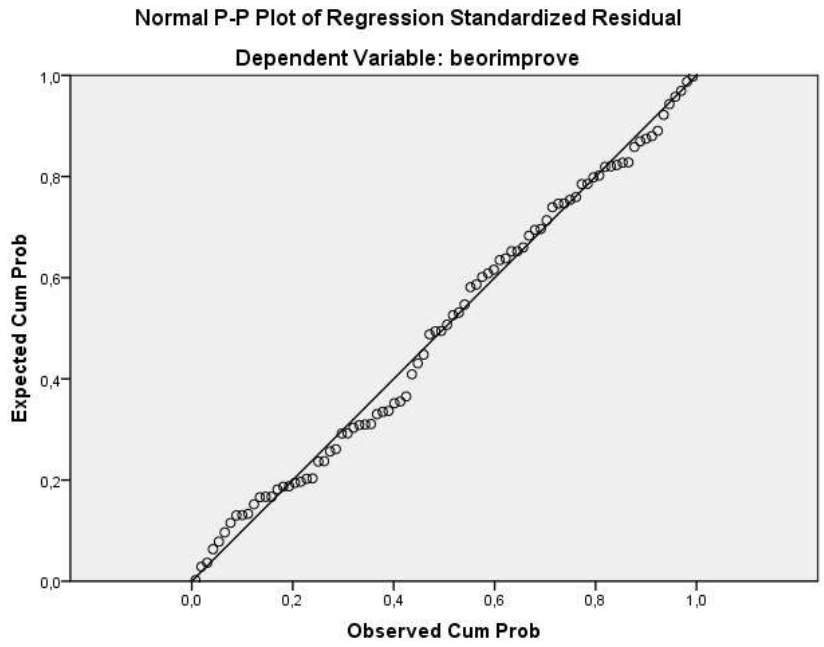
Hypothesis 1a

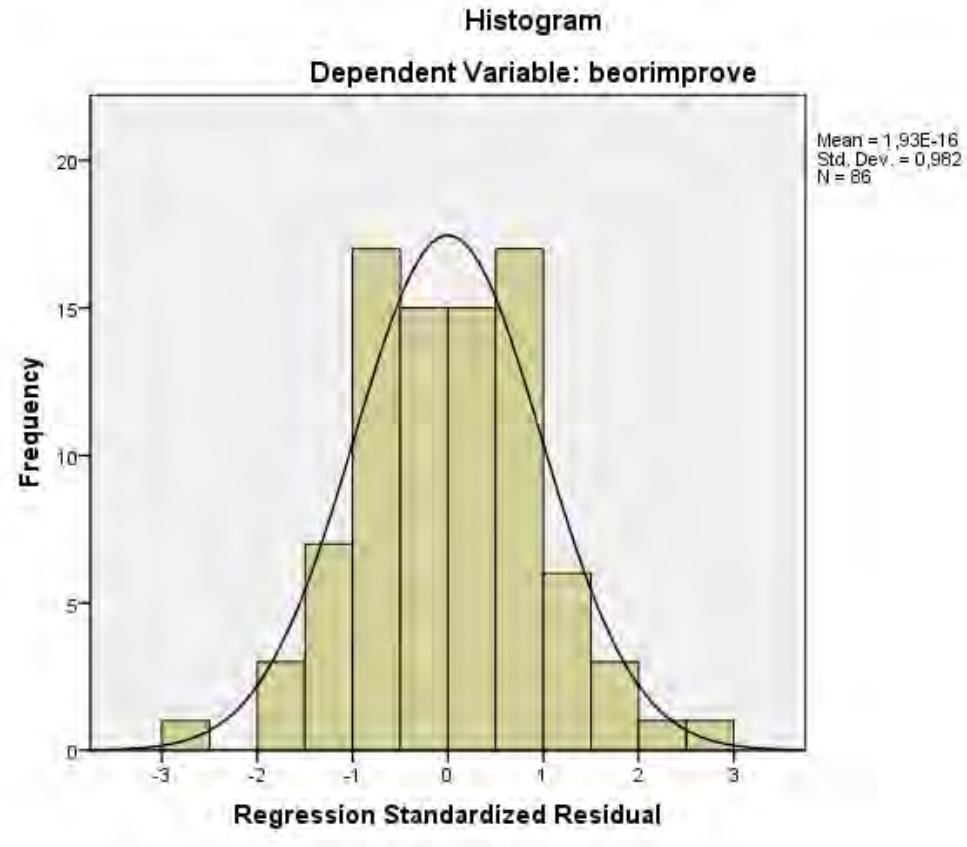
Number of participants.

The amount of participants exceeds the recommended ratio of 20:1 for participants per independent variable (Stevens, 2012). Also a statistical a-priori power analysis was performed for sample size estimation. The predicted effect size (f^2 = .38) has been estimated based data by (Van Yperen, 2009), who used similar variables. According to the Cohen (1988) criteria this is a large effect size. With alpha = .05 and power = 0.80, the projected sample size needed with this effect size (GPower 3.1.7) (Erdfelder et al., 1996) is approximately (*N* =) 43. For a medium or small effect size (f^2 = .15 and f^2 = .02; Cohen, 1988) respectively (*N* =) 92 participants or (*N* =) 641 participants would be needed. The final 81 subjects met the criteria according to the power analysis (Field, 2005).

Normality, linearity, homoscedasticity and independence of residuals.







Multicollinearity.

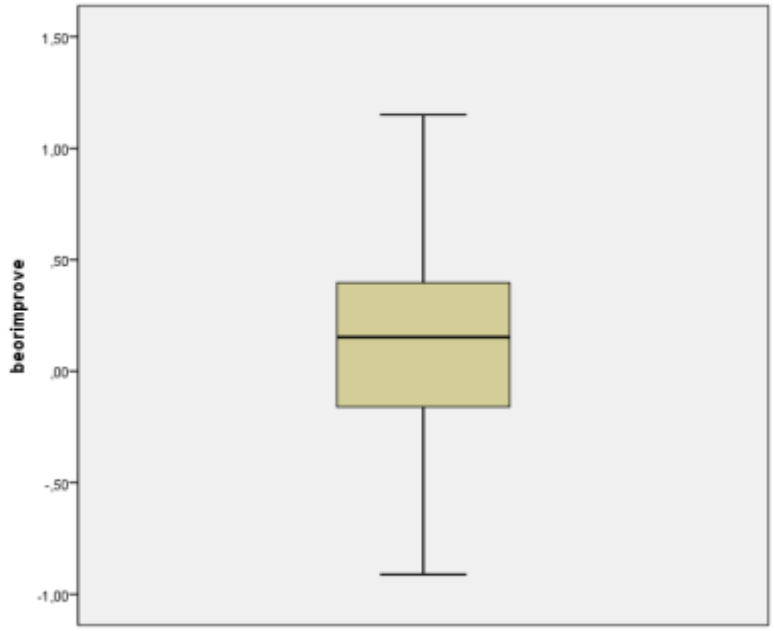
Correlations

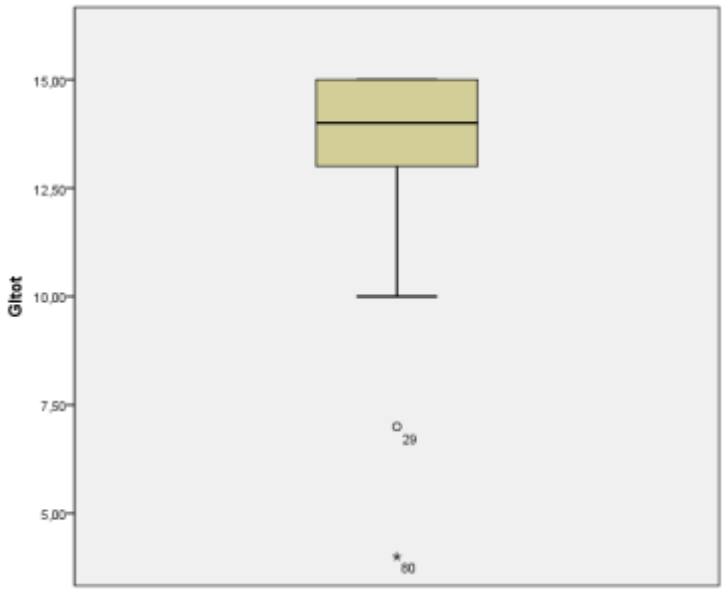
		GItot	GCtot	PFCtot	SSStot
GItot	Pearson Correlation	1	,536**	,149	,089
	Sig. (2-tailed)		,000	,167	,411
	N	87	87	87	87
GCtot	Pearson Correlation	,536**	1	,207	,131
	Sig. (2-tailed)	,000		,055	,228
	N	87	87	87	87
PFCtot	Pearson Correlation	,149	,207	1	,825**
	Sig. (2-tailed)	,167	,055		,000
	N	87	87	87	87
SSStot	Pearson Correlation	,089	,131	,825**	1
	Sig. (2-tailed)	,411	,228	,000	
	N	87	87	87	87

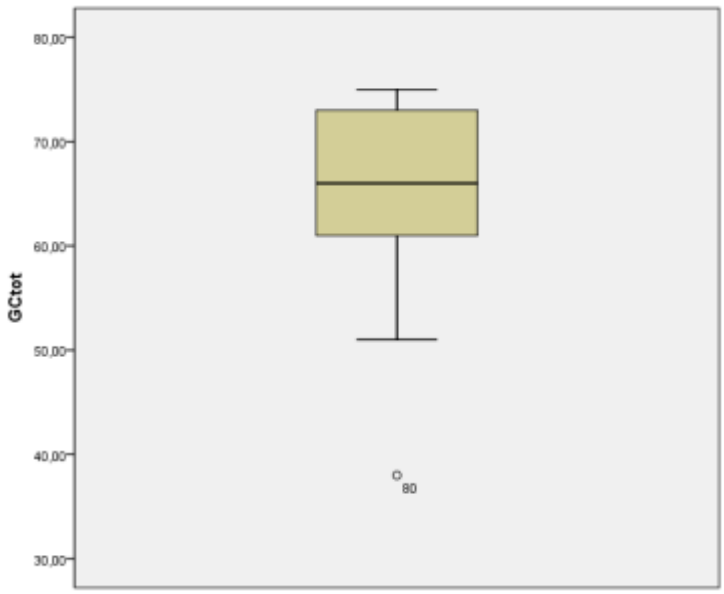
**. Correlation is significant at the 0.01 level (2-tailed).

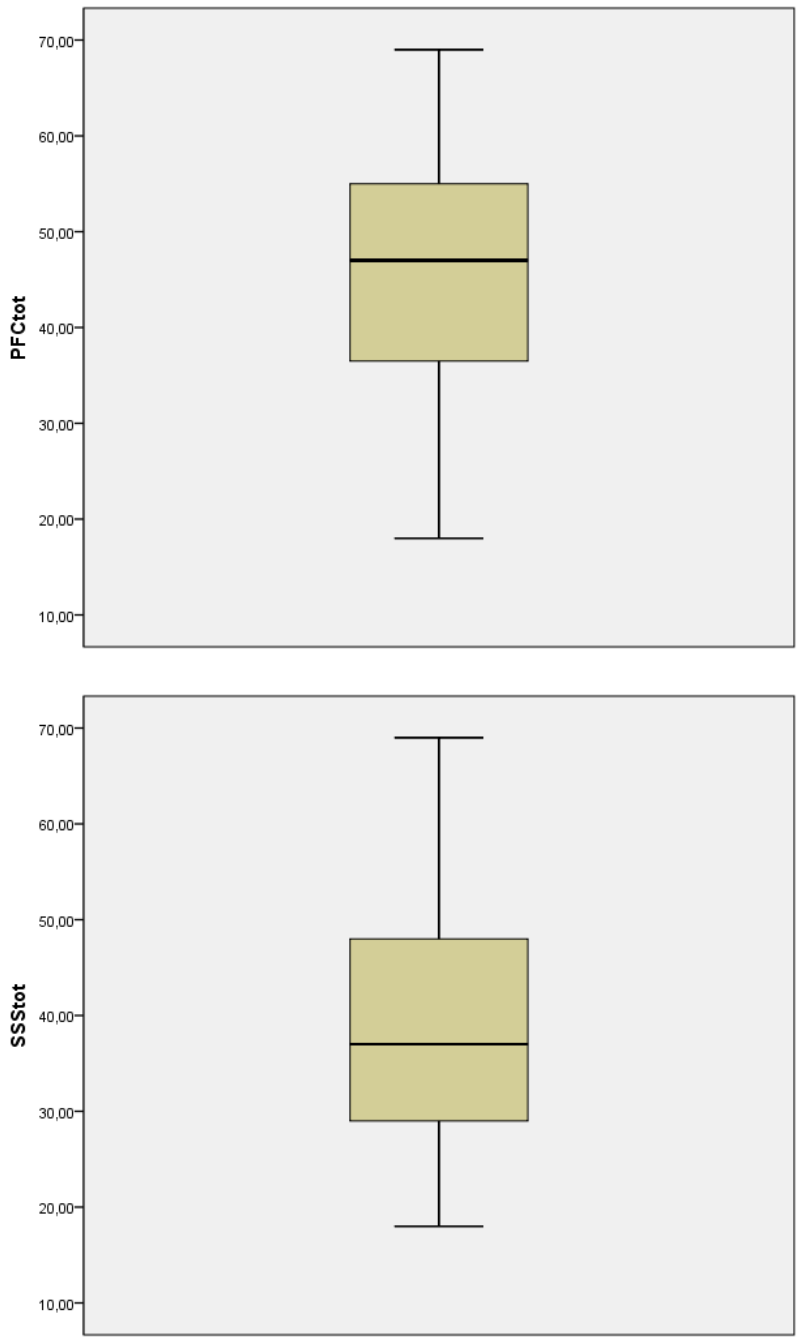
Although there some independent variables are correlated, muticollinearity has not been violated since none of the correlations are strong ($r > .9$) (Field, 2000).

Outliers.









Following from the boxplots above there were two outliers in the measurement of goal importance and one in goal-commitment. Since one player (case number 80) scores more than 3.29 standard deviations below average on goal-importance, goal-commitment and enjoyment this player has been taken out of the data set because there is reason to believe that this person does not properly represent the population. A reason might be that he did not understand the questions in the questionnaire or that he is very much demotivated because of an external cause which has not been included in

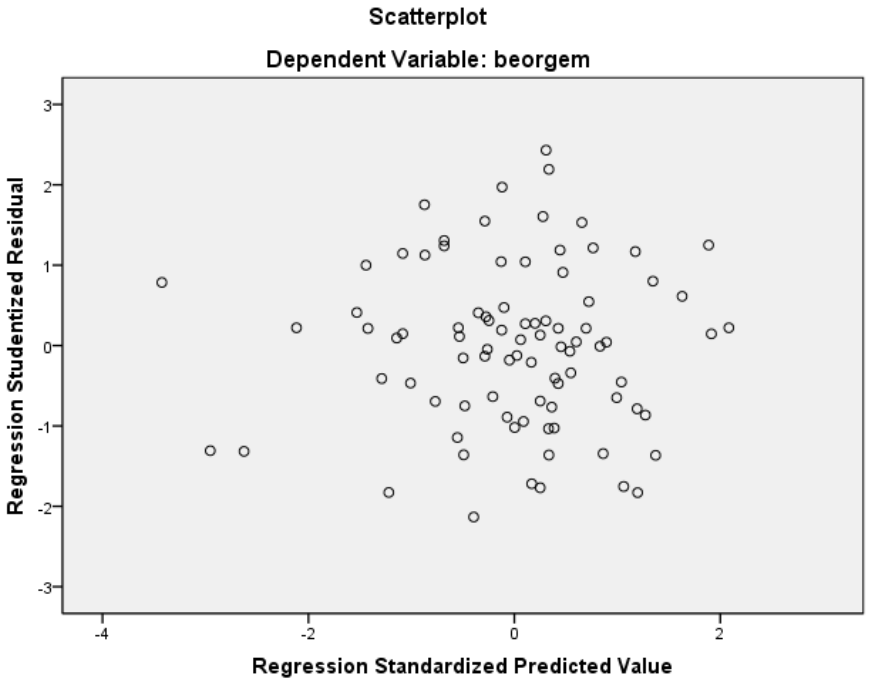
this study. The second outlier (case number 29) in the measurement of goal-importance has been adjusted to the mean score (M = 13.52) minus two standard deviations (SD = 1.53). For enjoyment during competition games and enjoyment during training games one outlier (case number 73) has been adjusted to the mean score (M = 22.83 and M = 22,09) minus twice the standard deviation (SD = 2.65 and SD = 2.86). This method has been retrieved from Field (2005).

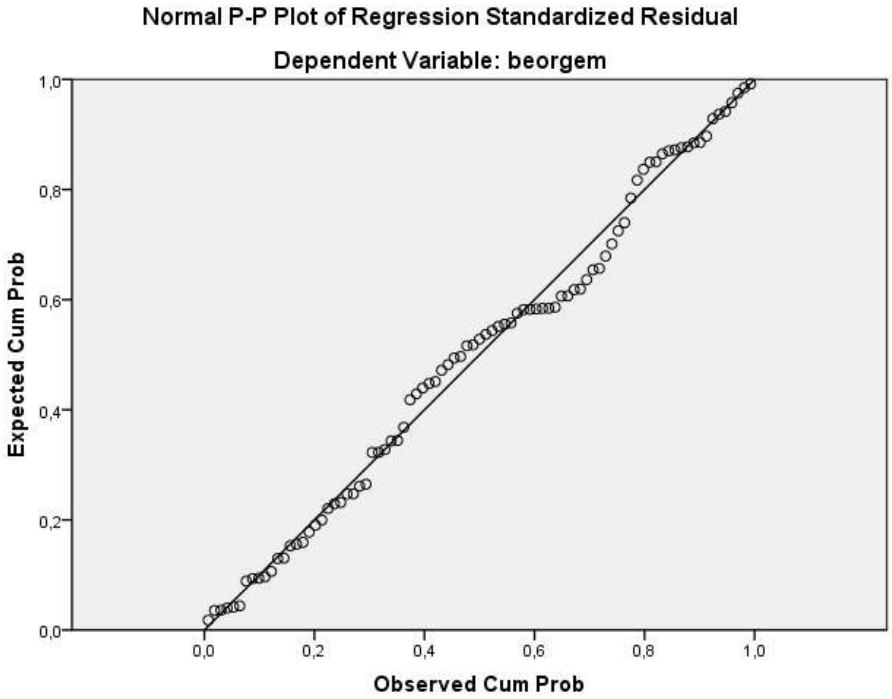
Hypothesis 1b

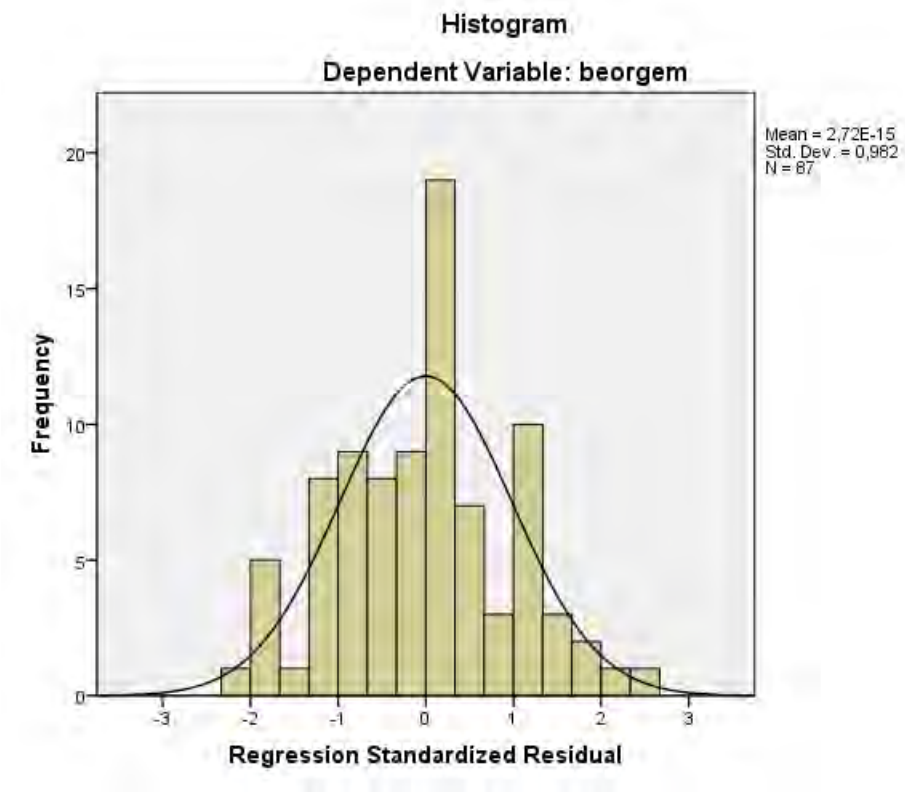
Number of participants.

The amount of participants exceeds the recommended ratio of 20:1 for participants per independent variable (Stevens, 2012).

Normality, linearity, homoscedasticity and independence of residuals.



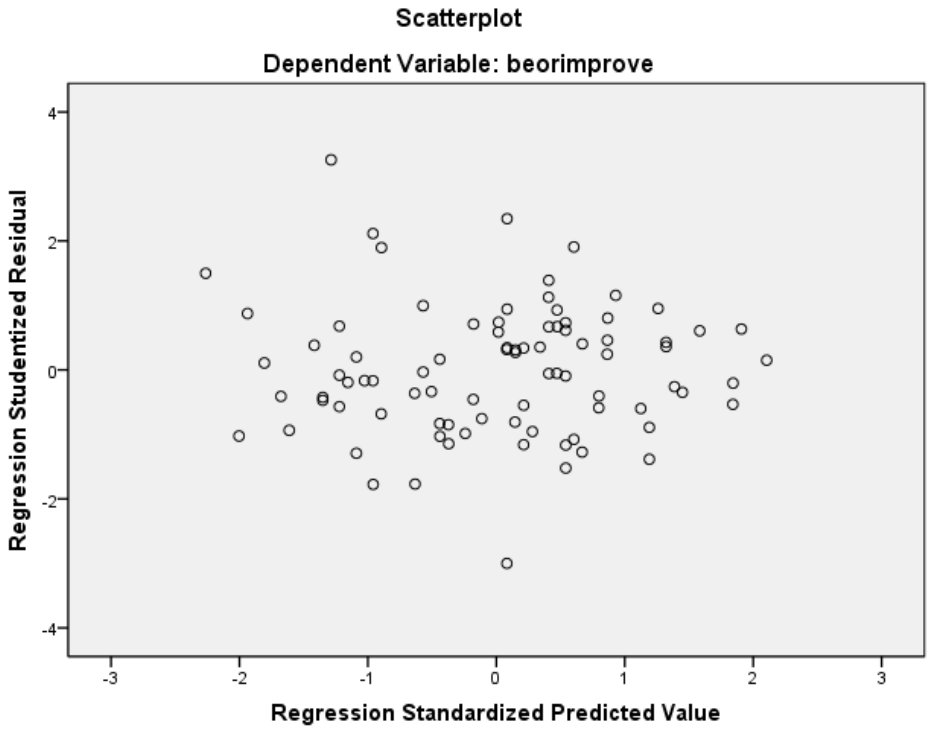


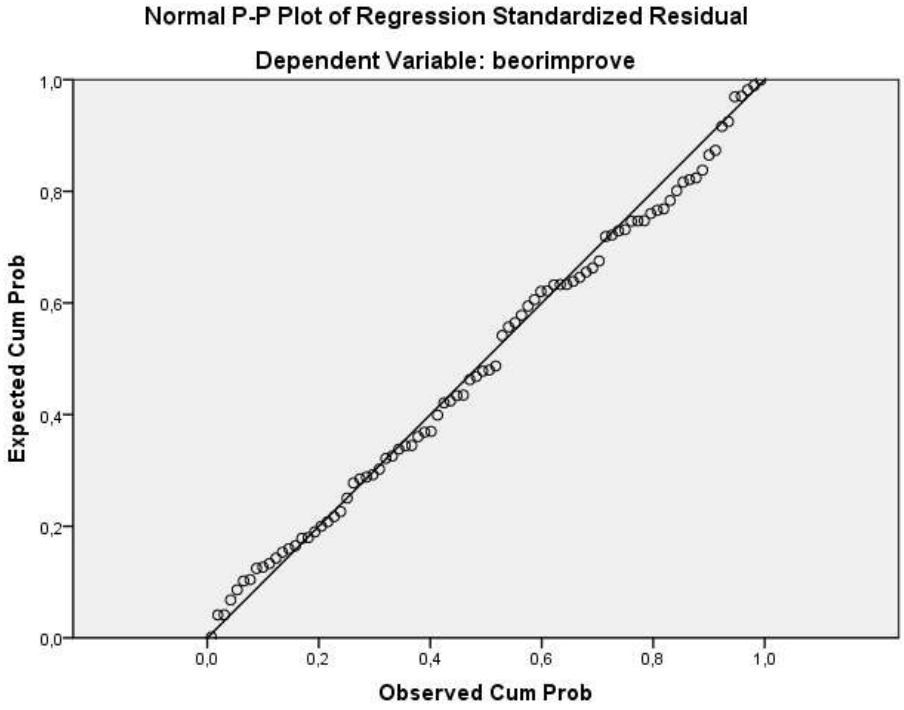


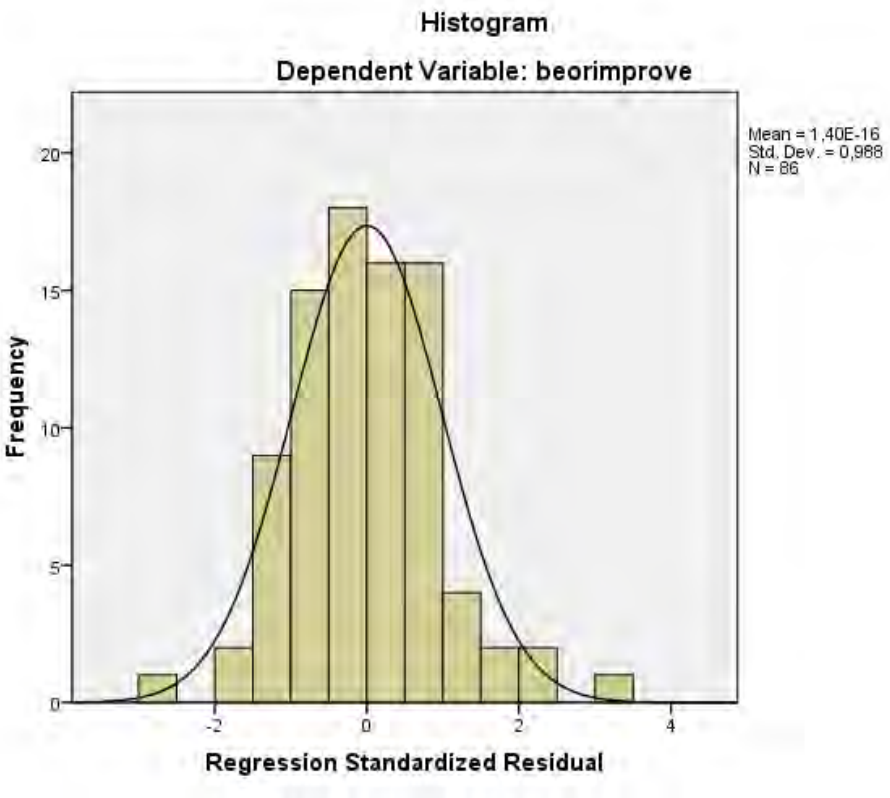
Hypothesis 2a

Number of participants

The amount of participants does not meet the recommended ratio of 20:1 for participants per independent variable (Stevens, 2012). This indicates that the there is a chance of a type II error.







Multicollinearity.

Correlations

		enjcon	enjkra	enjpar	enjcom	enjvid	enjoef
enjcon	Pearson Correlation	1	,478**	,220*	,272*	,445**	,433**
	Sig. (2-tailed)		,000	,042	,011	,000	,000
	N	86	86	86	86	86	86
enjkra	Pearson Correlation	,478**	1	,374**	,320**	,275*	,204
	Sig. (2-tailed)	,000		,000	,003	,011	,059
	N	86	86	86	86	86	86
enjpar	Pearson Correlation	,220*	,374**	1	,634**	,244*	,394**
	Sig. (2-tailed)	,042	,000		,000	,024	,000
	N	86	86	86	86	86	86
enjcom	Pearson Correlation	,272*	,320**	,634**	1	,371**	,603**
	Sig. (2-tailed)	,011	,003	,000		,000	,000
	N	86	86	86	86	86	86
enjvid	Pearson Correlation	,445**	,275*	,244*	,371**	1	,270*
	Sig. (2-tailed)	,000	,011	,024	,000		,012
	N	86	86	86	86	86	86
enjoef	Pearson Correlation	,433**	,204	,394**	,603**	,270*	1
	Sig. (2-tailed)	,000	,059	,000	,000	,012	
	N	86	86	86	86	86	86

**. Correlation is significant at the 0.01 level (2-tailed).

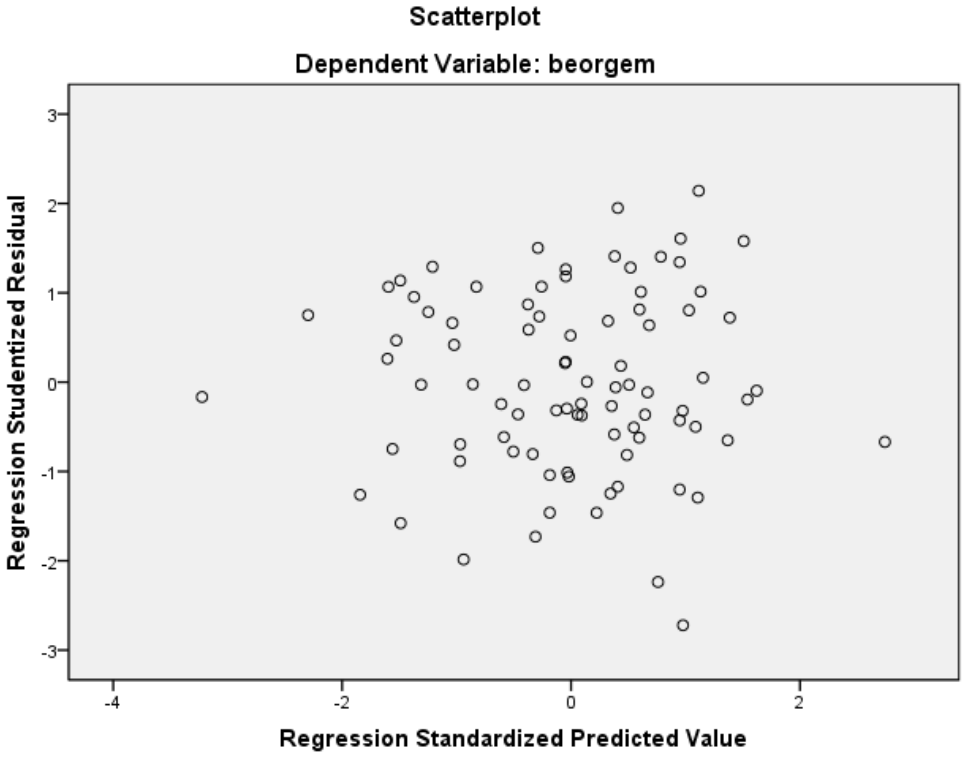
*. Correlation is significant at the 0.05 level (2-tailed).

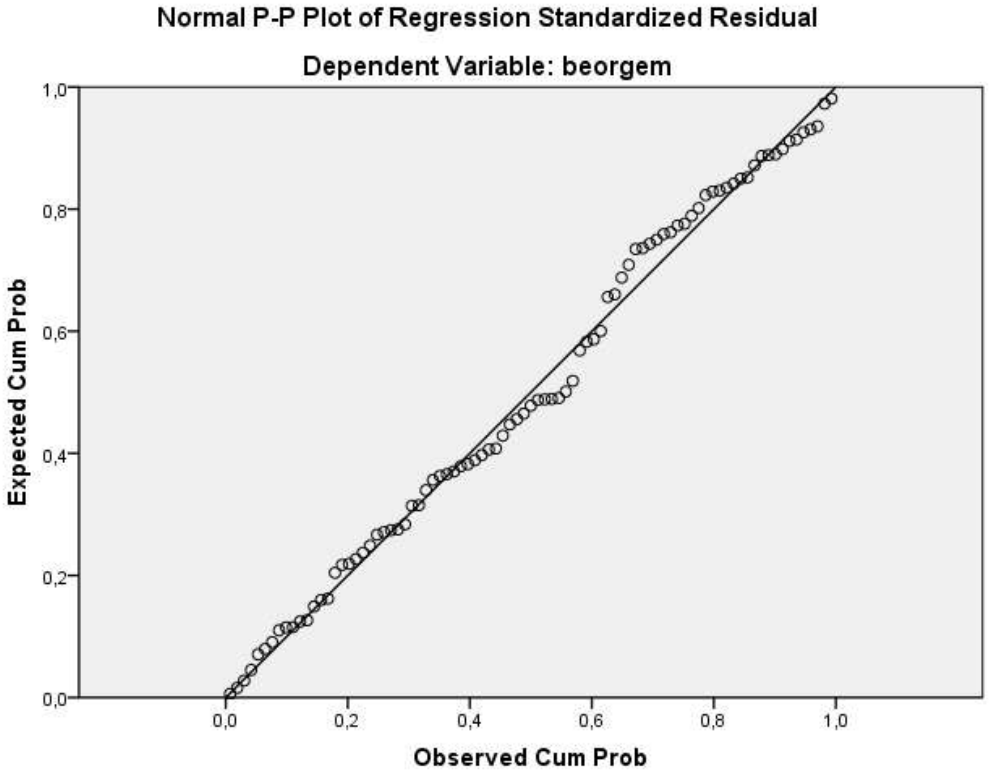
Also for enjoyment during different football related activities the assumptions for multicollinearity has been met.

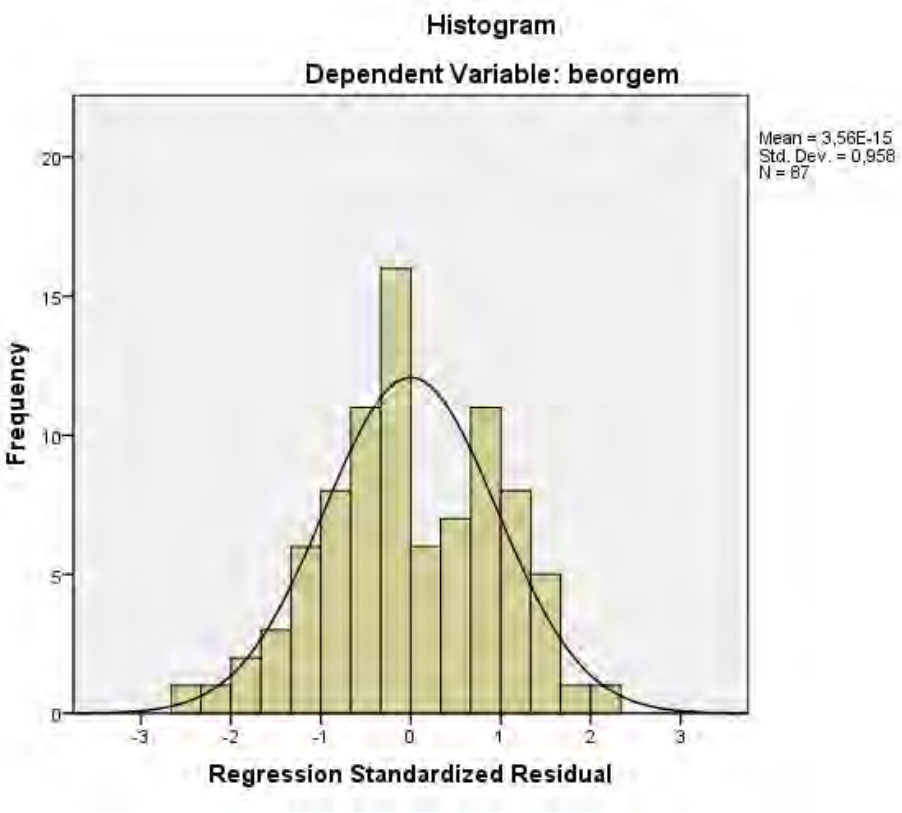
Hypothesis 2b

Number of participants

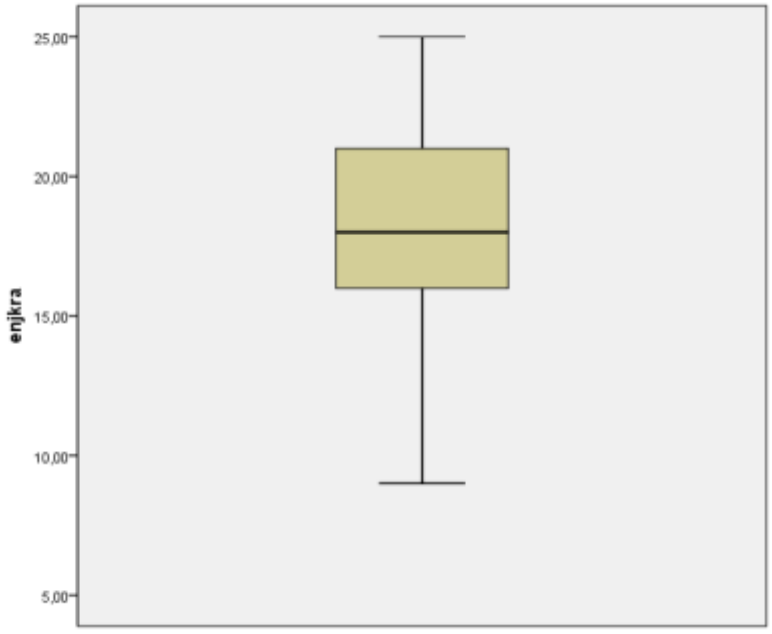
Also for this hypothesis the amount of participants does not meet the recommended ratio of 20:1 for participants per independent variable (Stevens, 2012). This indicates that the there is a chance of a type II error.

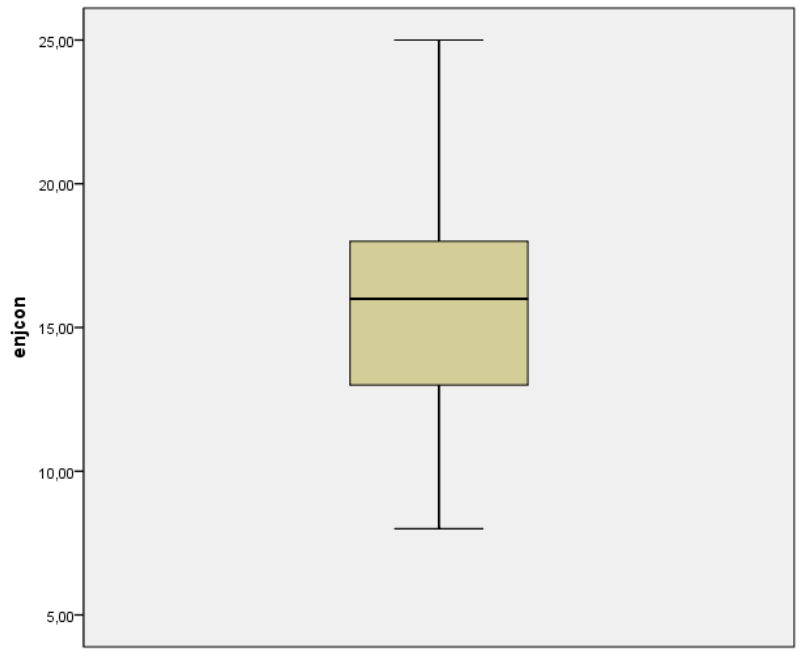


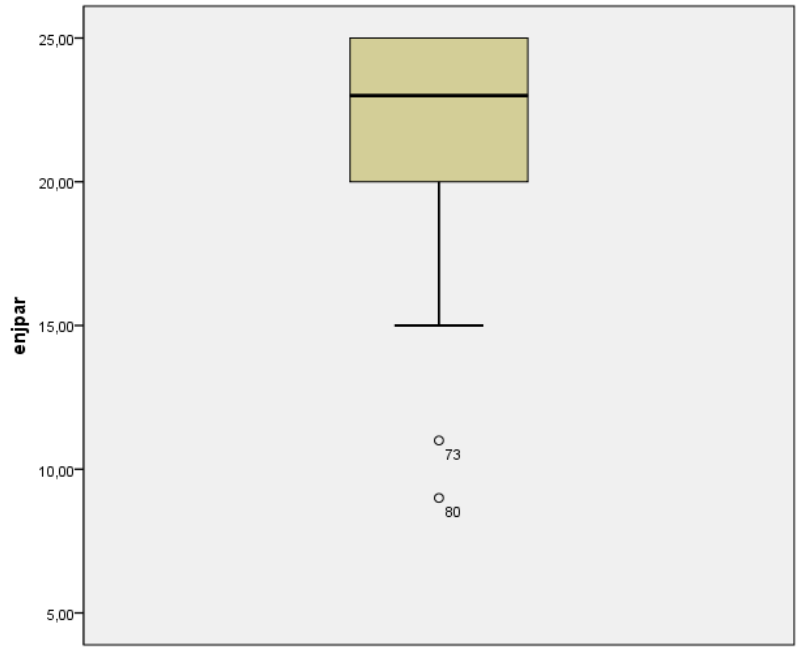


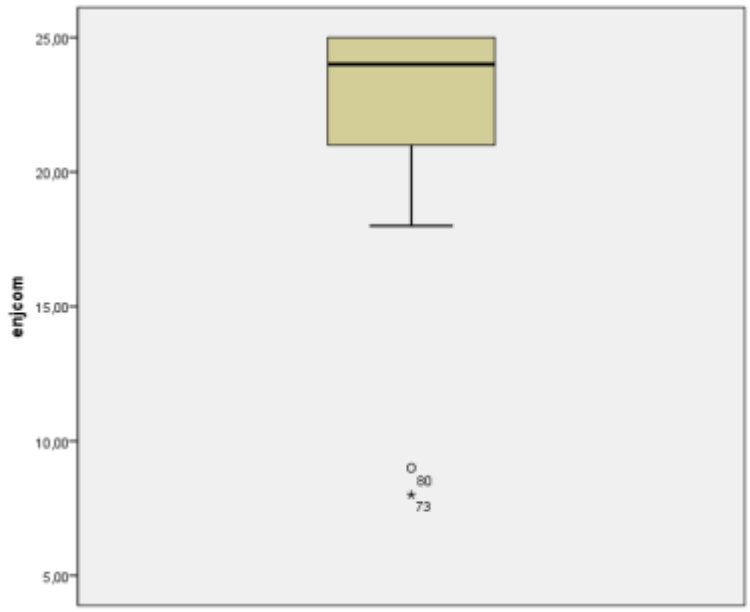


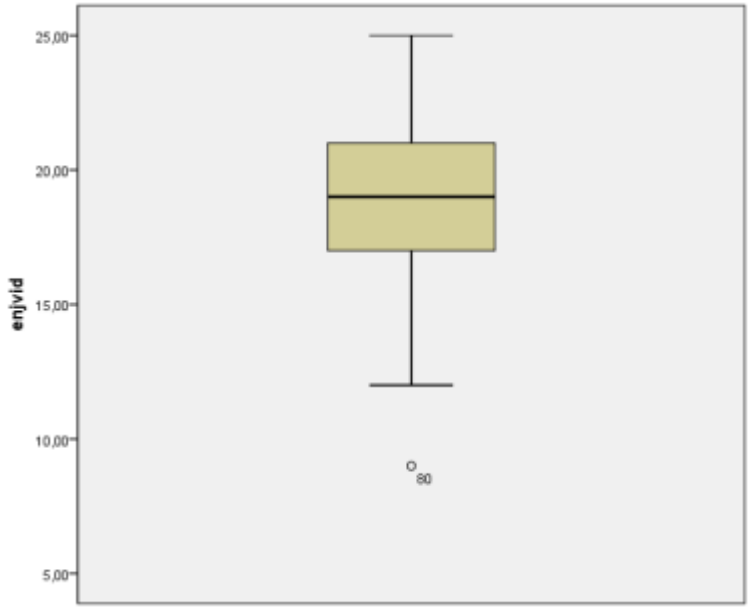
Outliers.

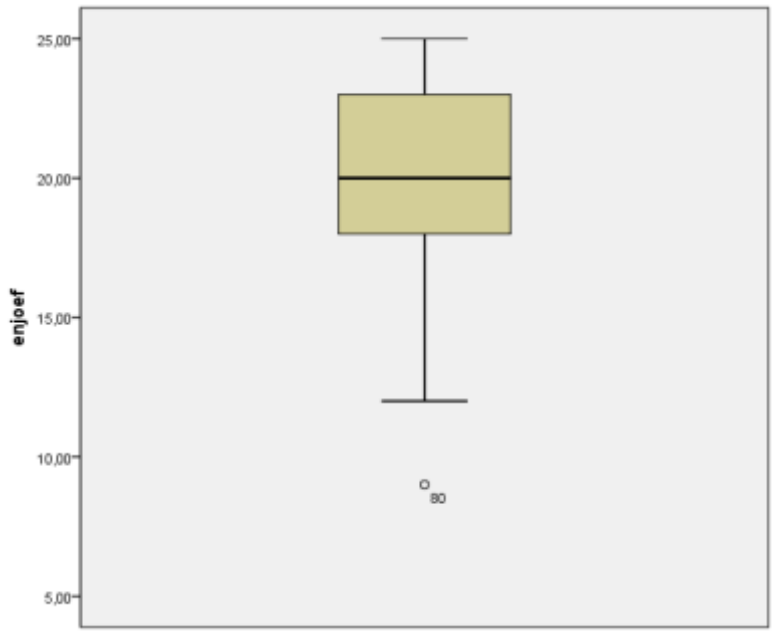












For enjoyment during competition games and enjoyment during training games one outlier (case number 73) has been adjusted to the mean score (M = 22.83 and M = 22,09) minus twice the standard deviation (SD = 2.65 and SD = 2.86). This method has been retrieved from Field (2005).

Hypothesis 3b

Normality, linearity, homoscedasticity and independence of residuals.