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Predictive Effects of Motivation and Grit on Performance in Youth Male Football Players

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Abstract

As talents are often recruited and developed from an early age, understanding how interactions can influence the upbringing of potential new talented football players is crucial. This study investigated the relationship between motivation, grit, and performance in talented youth football players. It was hypothesized that motivation and grit would be significant predictors of performance, with grit moderating the relationship (H1), that higher levels of motivation for the training would increase performance levels at the training (H2) and that higher levels of motivation before the next match would increase performance in the next match (H3). This study included 37 participants from a youth academy of an Eredivisie football club in the Netherlands. Longitudinal data was collected over four weeks through pencil and paper questionnaires once before the data collection about their motivational type and grit levels as well as weekly before training by the players to assess their motivation and after training and after matches by the trainers to assess the players performances. This study used multilevel model analysis to investigate the hypotheses. Even though results suggest that only external motivation with introjected regulation is a significant predictor of performance in the next game, the effect is minimal. Therefore, this study does not provide significant evidence for our hypothesis of a moderation effect (H1) or motivation for training and the next game predicting corresponding performance levels (H2 and H3). Nonetheless, this study proposes a potential new methodology for future research in the field of sports psychology investigating influences in performance in youth football players in a longitudinal and within-individual approach in real-life settings. Insights from such studies can be beneficial in the understanding of talent detection, development, and maintenance in youth football players.

Keywords: performance, motivation, grit, football, multilevel analysis, talent development

Moderating Effects of Grit on Motivation and Performance in Youth Male Football Players

“Success is no accident.
It is hard work, perseverance, learning, studying, sacrifice and most of all,
love of what you are doing or learning to do.”

Pelé

*(*1940, retired Brazilian footballer)*

How do you identify who is going to be a successful football player? This question has been the topic of a lot of research in sports psychology. Performance and hence success of football players is influenced by various factors, such as technical and tactical ability, as well as physical and psychological characteristics (Almagro et al., 2020; Larkin et al., 2016; Mujika et al., 2016, Unnithan et al., 2016). Yet, interactions between those factors are not entirely understood despite their importance in maintenance of well-being (Heaney, 2021) and performance (Wulf et al., 2016; Bowman et al., 2020) and even in detection of new talent (Anshel et al., 2012). In many football clubs it is common to start scouting and recruitment of talented players from as young as 11 years old to then, ideally in Youth Academies, train and further develop their talent in their football club (Mujika et al., 2016). Understanding those factors in young football players might allow earlier detection and nurturing of talent in youth athletes. In this research, the focus will be on motivation and grit as potential factors influencing performance in a sample of young football players.

Defining performance in the football context is difficult, as there are two constructs that could be considered: relative performance and absolute performance (Mujika et al, 2016). The concept of absolute performance is a theoretical construct that refers to an “individual’s theoretical optimal performance (i.e., 100% perfect performance) in a given athletic endeavor”, which is mostly based on physiological and genetically dependent factors within the athlete (Gee, 2010). As absolute performance is such an abstract construct, it is more likely for researchers to only be able to assess an athlete’s relative performance. The concept of relative performance, on the other

hand, describes a dynamic and situationally dependent performance by the athlete relative to the athlete's absolute performance potential. Relative performance is likely to be affected by performance inhibitors, such as external factors which include environmental distractions and influences (Gee, 2010; Zhou et al., 2019) or internal factors such as psychological characteristics within athletes (Gee, 2010). Examples of such factors with an influence on performance are self-efficacy (Moritz et al. 2000), mood (Beedie et al., 2000), positive emotion (McCarthy, 2011, Pain et al., 2007), and motivation (Barte et al., 2019, Li et al, 2011).

The psychological construct of motivation has been a topic in various research over the past years, mainly in the framework of performance in education, but the focus has further expanded to the context of sport psychology (Almagro et al., 2020; Moles et al., 2017; Navarro et al., 2021; Wulf et al, 2016; Buonamano et al., 1995; Albert et al., 2021). Motivation can be described as “the force that energizes and directs behavior” (Clancy et al., 2017) which “concerns energy, direction, persistence, and equifinality” (Ryan et al., 2000). Many studies based their assessment and framework of motivation on the self-determination theory (SDT) by Deci and Ryan (1975), which provides insight into the people's motives to engage and maintain behaviors. It suggests three basic psychological needs: competence, relatedness, and autonomy, which are ought to be satisfied in order to promote self-regulation and motivation within individuals (Deci and Ryan, 2000). The framework of SDT proposes several types of motivation that people can be driven by, which range from intrinsic motivation to extrinsic motivation to amotivation.

Firstly, amotivation (AM) can be described as the absence of motivation or “the state of lacking the intention to act” (Ryan et al., 2000), which is likely to result from a lack of competence within the individual, an absence of seeing value in the activity or no desired outcome expectations. It is intricately connected with extrinsic motivation, sometimes even considered to be overlapping (Ryan et al., 2000). Extrinsic motivation, on the other hand, includes the “performance of

an activity in order to attain some separable outcome” (Ryan et al., 2000). Important to notice here is that Ryan et al. (2000) identified different regulatory styles for extrinsic motivation: amotivation, external regulation, introjected regulation, and identified regulation. External regulation (ER), which can be described as performing an activity to simply comply to a demand or to receive external rewards or avoid external punishments indicates that individuals perceive external pressure to perform this activity. An individual can further experience introjected regulation (INR), where the regulation is based on the perception of self-esteem, to either avoid the of feeling guilt or anxiety, or to increase a sense of pride. The final regulatory type is called identified regulation (IDR), which includes regulation by pursuing a valued goal or behavior. This is reflected in a personal importance of the action by the individual and is thought to portray the most autonomous state of extrinsic motivation. These regulatory styles are suggested to sit on a continuum, from amotivation to identified regulation, where an individual can move on depending on changing levels of autonomy (Ryan et al., 2000). Lastly, intrinsic motivation can be defined as the “tendency to seek out novelty and challenges, to extend and exercise one’s capabilities, to explore, and to learn” (Ryan et al., 2000). A person, who is intrinsically motivated does an activity because of the inherent interest, satisfaction, and enjoyment of executing the activity itself (Ryan et al., 2000).

Understanding the underlying factors of motivation that drive athletes to perform and how these affect athletes’ performance can be immensely insightful in the context of sport psychology. For example, previous research suggests that high levels of (intrinsic) motivation are positively related to many aspects of higher levels of performance, increased reported effort, endurance during tasks (Almagro et al., 2020; Sarkar & Fletcher, 2014). Furthermore, Wulf et al. (2016) suggested that motivational factors can be influential on learning and, more specifically,

can facilitate motor learning through strengthening the pairing of goals to actions, which could be meaningful for football training and performance development.

Next to motivation, another personality characteristic that has been the focus of recent research is grit. It can be defined as “perseverance and passion for long-term goals” (Duckworth et al., 2007) and has been introduced primarily in research within the educational field. More recently it became a topic of interest in the sport-context, as it has been proposed to positively influence athletes’ approaches in training and competitions (Moles et al., 2017). It has been found to be positively related to the amount of time football players spent in training, competition, and deliberate practice as well as higher levels of effort (Albert et al., 2021; Hagger et al., 2019). This may be connected to the finding that individuals who are grittier are more goal focused and persistent to reach these goals and hence are more likely to exert higher efforts when presented with challenges, setbacks, and disappointments in order to overcome these (Duckworth et al., 2015). This often results in differences in performance and success between gritty individuals and individuals who are less gritty, despite minimal initial differences in talent (Moles et al., 2017; Larkin et al., 2016), therefore suggesting grit as a predictor for achievement when it comes to challenging domains (Duckworth et al., 2007, Hochanadel et al., 2015).

Moreover, studies found that grit in individuals is likely to be connected with motivational types within the individuals. Duckworth et al. (2007) noted that grit is focused on the pursuit of intrinsic goals and passions. In a study by Moles et al. (2017), a sample of athletes with varying levels of grit was investigated and performance was measured on a kicking task after the athletes had received feedback. Interestingly, they found grit had an influence on the athletes’ actual performances. Firstly, they reported that the type of feedback had much higher impact on actual performance in less-gritty individuals, specifically, they were found to perform 33% better after receiving mastery-involving feedback compared to other low-grit athletes who had received ego-

involving feedback. Moreover, high-grit athletes were found to be less perceptible to the negative effects of ego-involving feedback and suggesting grit as a potential protective factor in athletes (Moles et al., 2017). Therefore, grit was proposed to have moderating effects on the relationship between motivation and performance in athletes.

However, there are still some gaps and limitations in literature on motivation, grit, and performance and their relationship to one another. To begin with, most studies that assess complex variables and constructs use questionnaires that are rather elaborative and complicated. While self-report questionnaires represent the most-used measurement tool when conducting motivation research (Clancy et al., 2017) and have been found to provide meaningful information, there are often quite lengthy, which can be problematic when trying to assess motivational-affective constructs (Gogol et al., 2014). Besides, when targeting young participants, one should consider that elaborate and complex questionnaires may not be as understandable for this age group as they would be for adult participants and that participants are more likely to participate when the questionnaire is less time-consuming (Gogol et al., 2014). Despite lengthy-questionnaires being the traditional route to assessments of complex constructs in research, single-item questionnaires have been found to be equally effective (Abdel-Khalek, 2006, Duignan et al., 2020).

Beyond that, most studies investigating motivation, grit and performance in athletes have been carried out in non-sport contexts or through isolated, specific skills tests and performance at set pieces, such as kicking and dribbling (Ali, 2011; den Hartigh et al., 2018;) while focusing on inter-individual differences and collective system behaviors after few assessments in time (Sarmiento, 2018). While this ensures a relatively controlled trial that can be assessed, it should be considered that football is most-predominantly a complex “open-skill” game where players have to use multiple skills to adapt to the changing environment, for example during a football game (Ali, 2011) and therefore requires an integrated approach (Sarmiento, 2018). Furthermore, a focus

on inter-individual differences with few assessments does not allow for the researcher to investigate intra-individual changes over time that can be insightful about dynamic processes and interactions between the variables that are being investigated (den Hartigh et al., 2018). Therefore, studies should be conducted not only in a comparable real-life environment, but also apply a longitudinal and ideographical approach to be able to draw conclusions from the findings to an athlete's real environment.

For these reasons, the current study will examine the research question of how grit is related to motivation and performance in youth football players using longitudinal data from young football athletes. It is hypothesized that motivation and grit have a predictive effect on performance, specifically, grit is thought to function as a buffering moderator in the relationship between motivation and performance, hence limiting the effects of motivation on performance levels (H1), which will be investigated in *Part 1*. Furthermore, if *Part 1* obtains significant evidence for grit and motivation being predictive factors of performance, then *Part 2* will investigate the relationship of motivation and performance closer with the assessment of longitudinal data, proposing higher levels of motivation in training in players will be associated with higher levels of performance in training (H2) and higher levels of motivation for the next game will be associated with higher levels of performance in the next game (H3). Findings of this study could provide useful insights into the within individual and between individual processes that influence performance in young football athletes. This can be useful not only for future research to increase their understanding on the relationship between those variables, but furthermore lead to enhanced insights for practitioners as potentially useful future bases for interventions and training exercises. Moreover, understanding the importance of psychological characteristics can offer a potential new focus points for sports psychologists, scouts, and coaches in talent identification, recruitment choices, and development of young players.

The Present Research

This research investigated the relationship between grit and motivation in youth football performance. Therefore, the dependent variable is performance, and the independent variables are grit and motivation. Particularly, we explored whether motivation influences performance of male youth soccer players in, and more specifically, whether grit moderates the relationship between motivation and performance levels.

Method

Participants

This study included $N \sim 37$ participants, of which $N \sim 35$ are players of the under-11 and under-12 Youth Academy Team of an Eredivisie football club. $N \sim 2$ participants are the corresponding trainers of the under-11 and under-12 Youth Academy teams. No participants received any compensation for participating in this study.

Research Design and Procedure

This research has been reviewed by the Ethics Committee of Psychology (ECP) and was approved by the ethics committee of the Faculty of Behavioral and Social Sciences of the University of Groningen (the Netherlands, research code project: PSY-2122-S-0238). Before the start of the research project, it was made sure that participants (and caregivers of participants under the age of 16) got fully informed about the content, goals of the study and their rights to decline to participate as well as the option to withdraw participation at any given time. Participants, as well as caregivers, gave consent to participate in the study by signing consent forms. Mentionable for this study is that the youth academy players ($N \sim 35$) received a personalized identification number as identifier, which they were asked to fill into the questionnaires instead of their names.

Part 1

This study investigated the relationship between grit and motivation and performance. It was hypothesized that motivation and grit have a predictive effect on performance in young football players (H1). Specifically, grit is thought to act as a buffering moderator on the effects of motivation on performance. Hence, motivation and grit will act as independent variables in this study and performance over time (4 weeks) is the dependent variable.

The players (N ~ 35) were firstly asked to fill out designated questionnaires about their motivational type and grit once before the start of data collection in the locker room. The trainers (N ~ 2) were then asked to assess the performance in training once per week, as well as the game performance. The performance ratings were collected over 4 weeks.

Part 2

This study investigated the hypothesis that higher levels of motivation in training in youth players will lead to higher levels of performance in training (H2). Moreover, we hypothesize that higher levels of motivation for the next game will lead to increased performance in the next game (H3). Therefore, motivation for training (MotT) and motivation for the next game (MotG) will be the independent variables and performance will be the dependent variable.

The data was collected longitudinally over a period of 4 weeks. Then, for the weekly assessments, players were asked to fill out two single-item questionnaires about their motivation before the training session in the locker room. The trainers (N~2) were asked to fill out a questionnaire about each players performance after the training sessions as well as the performance after the game.

Measures

Part 1

Grit. Grit within the players was assessed once before the start of the data collection through the Short Grit Scale (Grit-S) by Duckworth et al. (2009). The Grit-S scale consists of 8

items, four items on a 5-point likert-scale from 5 (very much like me) to 1 (not like me at all) and four items with a reversed scoring on a 5-point likert-scale from 1 (very much like me) to 5 (not like me at all). One example statement is “I often set a goal, but later choose to pursue a different one”. The scores are added up and then divided by 8 to calculate the overall score, which will be between a maximum of 5 (extremely gritty) and 1 (not at all gritty). The overall score will be the outcome measure that is used in the analysis. The scale has been shown to have an adequate internal consistency ($\alpha = .73-.83$) (see Duckworth et al., 2009).

This questionnaire has been translated into Dutch, as most participants are not proficient in English and therefore could not provide reliable responses otherwise. The players were asked to fill out the questionnaires in the locker rooms before the training session, which took about fifteen minutes to complete.

Motivation. Motivation was assessed through multiple assessment methods. Firstly, the players were asked to fill out the Situational Motivation Scale (SMS-15) by Skalski (2019) before the start of the data collection. The SMS-15 consists of one question (“Why are you doing this activity?”) with 15 items in the form of statements, such as “Because I enjoy this activity”, to which the respondent is asked to state their agreement with the item on a 7-point likert scale from 1 (I definitely disagree) to 7 (I definitely agree). The questionnaire includes five subscales to assess the respondent’s identification with the different types of motivation, respectively intrinsic motivation (IM), extrinsic motivation (external regulation (EM-ER), introjected regulation (EM-IR), identified regulation (EM-IDR)), and amotivation (AM), based on the concept of internalization by Deci et al. (2000; 2008) The higher the score per scale, the higher the assumed identification with that type of motivation, thus a minimum score of 3 would indicate the least possible identification and a maximum score of 21 would indicate the maximum possible identification. The score per scale will be used as the outcome measure in this study. The subscales of the

SMS-15 are thought to have high intrinsic reliabilities with Cronbach's $\alpha = .84$ for introjected motivation and regulation by identification, and Cronbach's $\alpha = .82$ for intrinsic motivation, external regulation, and amotivation (see Skalski, 2019).

The SMS-15 had been manually translated to Dutch for the purpose of facilitating the understanding of the questions. The players were asked to fill this questionnaire out once in the locker rooms before the first training session at the start of the data collection, which took approximately fifteen minutes to complete.

Performance. The assessment of performance was based on the subjective observations assessment by the trainers during the training sessions as well as during the matches. The trainers were asked to rate the performance of each individual player on a scale from 0 (not very good) to 100 (very, very well) after each training session and after each match. As the trainers' assessment is subjective, the outcome measures have been discussed to entail the physical performance based on skills such as sprint and pass accuracy, as well as engagement in the game and communication with teammates. Important to mention here is that the trainers rated each players performance in comparison to that player's previous performance and not in comparison with other team members.

Part 2

Motivation. For the longitudinal data of motivation, players were given two single-item questions ("On a scale from 0-100, how motivated are you to perform today?" and "On a scale from 0-100, how motivated are you to perform in the upcoming game?"). Participants were asked to give their response on a scale from 0 (not at all motivated) to 100 (very much motivated). As the participants were native-Dutch speakers with a limited understanding of English at this point in time, those questions and answer options were translated to Dutch to facilitate the understanding of the questions.

Performance. Performance has been assessed through observation by the coaches after each training session and each match. The trainers are asked to indicate how well each player performed in the training session (“Please indicate on a scale from 0-100 how well each player performed in the training”), as well as how well each player performed in the past game (“Please indicate on a scale from 0-100 how well each player performed in the game”). Here, the performance is based on the subjective assessment of the trainers, however, outcome measures have been discussed to be based on the following mental and physical factors: engagement in the game, physical performance based on skills, such as sprints and accuracy of passes, and communication with teammates. The trainers are asked to give their response on a scale from 0 (not very good) to 100 (very, very good).

Data Set and Analysis

Part 1

Data Set. There were 643 data points of 35 players and 2 trainers used in this study. For the assessment of grit, there were 35 total data points, with one data point per player. The minimum score of the grit assessment calculated was 1.75 and the maximum score received by a player was 5, indicating a mean score of 3.94 throughout. Considering the data collected on the SMS-15 questionnaire, there were in total 175 data points, consisting of 35 data points per subscale.

For the assessment of performance per training and per game, there were 193 total data points, with an average of 6 data points per player. While the maximum of data points included per player was 7, the minimum of data points was 2, forming the cut-off score for this variable. The minimum score of performance indicated was 60 and the maximum score was 100, with an overall mean of 81.36 for performance at training and 82.56 for performance in the game.

In this data set, one player had to be excluded due to missing data of motivation and performance, resulting in a total of 34 players and 637 remaining data points that were included for the research analysis.

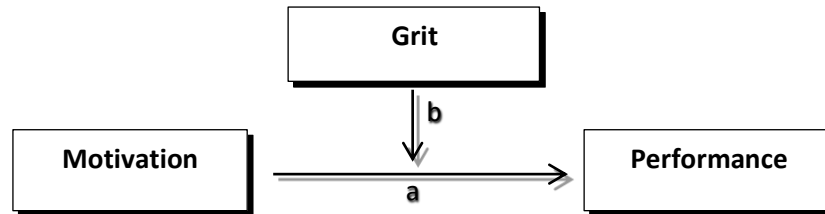
Data Analysis. To test for the hypothesis of the predictive effects of grit and motivation on performance in this study, a multilevel analysis was conducted, which allows for insights on the individual level and between individuals. All collected scores on the questionnaires of the SMS-15, Grit-S scale, and performance per player (PerfT and PerfG) were used for the analysis.

Firstly, we created two basic empty models (Model 1 and 2) that predict performance. In each model, the repeated measures were nested within the individuals. Model 1 includes performance in the training (PerfT) as the outcome variable, whereas, in Model 2, performance in a game (PerfG) is the outcome variable. Potential predictive factors, motivation and grit, were added separately to each model. After adding a factor to the empty model, random intercepts and slopes were evaluated. Whether a factor improved the slopes in the random intercept model was determined by looking at the -2 Log-Likelihood (IGLS deviation), where a decreased number compared to the basic model indicates an increased fit. A factor was accepted as a significant predictive variable in the model if the estimated mean coefficient was at least more than twice the standard error of the estimate ($\text{estimate} > 2 \times SE$), resulting in $p < .05$. If this criterion was not met, then the potential factor was left out of the model. The process was repeated with each potential predictive factor. If significant predictive effects of grit and motivation on performance are found, a moderation analysis will be conducted using the moderation model by Aiken & West (1991), adapted to the framework of this study (Figure 1). It proposes three different pathways: *pathway a* being between motivation (independent variable) and performance (dependent variable) and *pathway b* for the assumed moderation effect between grit (moderation variable) and

performance as the dependent variable. A linear regression model will be created in order to assess whether grit acts as a moderator in the relationship between motivation and performance.

Figure 1.

Proposed moderation model



The analysis in this research was conducted with the statistical software IBM SPSS (Version 28.0.1.1) and the statistical program *MLwiN* (Version 3.0.4).

Part 2

Data Set. There was a total of 643 data points of 35 players and 2 trainers used with 433 data points used in this study. For the weekly assessment of motivation per training and per game, there were 240 total data points, with an average of 6 data points per player. While the maximum of data points included per player was 6, the minimum of data points was 2, forming the cut-off score for this variable. For the assessment of performance, there were 193 total data points provided from the 2 trainers. The maximum number data points provided for a player was 7, while the minimum amount of data points for a player was 2, therefore forming the cut-off score. In this data set, one player had to be excluded due to missing performance assessments as he stopped playing before the start of the data collection, resulting in a total of 34 players that were considerable for the research analysis.

Data Analysis. This study used multilevel modeling with repeated measures. This analysis allows the assessment of longitudinal data and therefore for the ideographical assessment of within-player data for two variables. The analysis in this study was conducted with the statistical

program IBM SPSS Statistics (Version 28.0.1.1) and the statistical program *MLwiN* (Version 3.0.4). At the start of the analysis, we build two separate empty models that predict performance in training (Model 1) and performance in games (Model 2). The two-hierarchy model, which includes repeated measurements on level 1 and individual players on level 2 allows to add the predictive factor, MotT for Model 1, and MotG for Model 2, to the empty model and examine corresponding the statistical model fit through changes in the -2 Log Likelihood and the value of the estimated mean coefficient. Therefore, we can assess the hypothesis whether higher levels of motivation in training lead to higher levels of performance in training young football players (H2) and whether higher levels of motivation for the next game will lead to increased levels of performance in the next game in young football players (H3).

Results

Preliminary Analysis

This research was carried out with initially 37 participants (N = 35 players and N = 2 trainers). However, one participant was excluded from the analysis due to missing data. Hence, the analysis was conducted with the data from the remaining 36 participants (N = 34 players and N = 2 trainers) and the corresponding data points. The table below (Table 1) shows the descriptive statistics from the preliminary data analysis.

Table 1

Number of Participants, Means of Minimum, Maximum, Means and Standard Deviations of the Measured Variables

	N	Min.	Max.	Mean	SD
Grit-S	34	1.75	5.0	3.93	.71
IM	34	14	21	20.12	1.41
EM-ER	34	3	19	9.35	4.89

SMS-15	EM-IDR	34	10	21	19.21	3.11
	EM-INR	34	3	21	16.35	4.68
	AM	34	3	13	5.18	2.92
<hr/>						
Weekly Questionnaires	MotT	95	80	100	97.69	4.96
	MotG	95	80	100	98.25	3.95
	PerfT	95	60	100	81.84	10.21
	PerfG	95	60	100	81.11	9.03

Note. Ratings for Grit-S on a likert scale from 1-5, for the SMS-15 on a likert scale from 1-7, and for weekly questionnaires were on a VAS scale from 0-100.

Part 1

In order to assess the predictive properties of grit and motivation on performance, we used multilevel modeling, specifically, a two-hierarchy model with repeated measurements (level 1) within individual players (level 2).

After conducting the multilevel analyses, grit, MS;IM, MS;EM-ER, MS;EM-IDR, MS;AM did not predict significant changes in either performance in training, or performance in games. Only the model including PerfG showed a small, yet significant effect of MS;EM-INR as a predictor on performance ($p = 0.02$) and improved the statistical fit of the empty model from 684.58 to 249.28 when taking the intercept 69.56 and adding MS;EM-INR \times 0.7192. This results in a final model of:

$$\text{PerfG}_{ij} = \beta_{0ij}\text{const} + 0.7192(0.3521) \times \text{MS;EM-INR}_j$$

$$\beta_{0ij} = 69.56(5.98) + u_{0j} + e_{0ij}$$

Moderation Analysis. Given the insignificant predictive effect of grit on performance, a moderation model would not meet the basic model assumptions of a moderation analysis. Therefore, no moderation analysis was conducted. Therefore, there was no evidence for the hypothesis that grit would be a moderator in the relationship between motivation and performance (H1).

Part 2

In order to assess the hypothesis whether motivation in training will lead to increased levels of performance in training and whether motivation for the game will lead to increased levels of performance in the game, a multilevel analysis was conducted.

After conducting the multilevel analyses, both prediction models, PerfT with MotT and PerfG with MotG, were indicated non-significant (estimates $< 2 \times SE$, $p > 0.05$). Therefore, we found no support for our hypothesis that increased levels of motivation for the training will lead to increased levels of performance in training (H2) and higher levels of motivation for games will lead to increased levels of performance in games (H3).

Discussion

This study investigated the psychological constructs of motivation and grit that are hypothesized to influence performance in youth football players. More specifically, the suggested relationship between motivation and performance was investigated through multilevel modelling analysis. Enhancing the understanding of the interactions and relationships between motivation, grit and performance enables an increased insight into how performance changes may happen and what factors may be predictive.

Part 1 of this study investigated grit and motivation as potential predictors of performance as well as grit as a moderator in the relationship between motivation and performance. Grit was proposed to have a moderating role that would buffer the potentially negative effect of lower levels of motivation on performance (H1). Results of the multilevel analysis indicated only extrinsic motivation with an introjected regulatory type to have a small, yet significant effect on the performance in games. However, a model including grit as explanatory variable did not indicate any significance predictive effect of grit on performance. Therefore, a moderation analysis was not

conducted, and the data did therefore not provide support for our hypothesis. This finding is specifically mentionable, as it is not consistent with the findings of previous research investigating grit as a moderator and potential protective factor in the relationship between motivation and performance (Moles et al., 2017).

Furthermore, *Part 2* of this study assessed the relationship between motivation in training and performance in training as well as motivation for the next game and game performance. Results that were yielded in this analysis indicated that neither motivation in training nor motivation for the next game predicted the corresponding performance in training or the next game. In more detail, there was no support found for the hypothesis that higher levels of motivation in training will increase levels of performance in training (H2) and that higher levels of motivation for the next game will lead to higher levels of performance in the game (H3). Notably, this finding is not consistent with previous research on this topic that suggested that motivation has a significant influence on athletes' performance (Almagro et al., 2020; Sarkar & Fletcher, 2014).

Important to mention is the relevance to consider the players' excitement of being (relatively) new in the Youth Academy, which is thought to affect their motivation greatly. This is assumed to be a major reason for the overall mean response of 97.69 and 98.25 on their motivation for training and games, respectively, across all players. While we tried to prevent this effect through using a virtual analog scale instead of a likert scale (Voutilainen et al., 2015) and counterbalance it through an explanation at the beginning of the data collection, stating that a "100 out of 100" means that "there is nothing in the world that they would rather do", it seemed to do little to prevent and reduce this ceiling effect on the data.

Summarizing the aforementioned findings, this study did not find significant support for the stated hypothesis and therefore could not produce evidence for motivation influencing performance in youth football athletes and grit as a moderator in this relationship.

Strengths and Limitations

This study obtained insignificant results, nonetheless, there are still meaningful strengths that this study offers which could provide useful guidance and information for future research.

Firstly, this research was conducted in a real-life environment as opposed to a clinical setting. This not only provides more meaningful information about the investigated constructs in this study as one can see them unfold in a dynamic and uncontrolled environment but further it offers better applicability and replicability of the results in real-life sports environments.

Moreover, the data collection in this study was conducted in a longitudinal design, which, primarily for *Part 2*, allows for deeper insights into the intra-individual processes of the athletes. This enables a greater understanding of the interactions between the variables in question as one has direct insight into the processes that happen within the individual.

Lastly, this study used a sample of football players at an early age. This is relevant for the potential insights and application of the results, as young players are the focus of talent detection and development in most football clubs and organizations. Therefore, having a young sample of Youth Academy football players may provide relevant insight that can be meaningful for a) future research in this domain and b) football clubs that are looking for more information to improve their talent detection and development strategies with young players.

Nonetheless, there are several limitations in this study that need to be discussed. To begin with, this study is limited in its generalizability. As there are only 35 participants who are players of the Youth Academy, more participants would be needed to enhance the power of this study. Moreover, the generalizability and applicability of the results of this study are limited to only male youth football players, whereas it would be interesting to investigate a female or mixed sample to broaden understanding across different genders. Moreover, despite obtaining significant results that indicate an external motivation type with introjected regulation as predictive of

performance in games one has to consider the estimate in the multilevel equations which resulted in a rather small range that predicted performance was rather small (0.72). Therefore, it is doubtful, whether such an effect would be noticeable in a real-life environment, given the dynamic nature of football.

Next to that, it is relevant to consider that this study used self-report measures in the longitudinal data collection for motivation and performance. While self-report measures have been found to be a valid tool in data collection for complex constructs (Abdel-Khaled, 2006; Duignan et al., 2020), there may be some aspects that need to be considered when evaluating the collected data. Most predominantly, it is necessary to consider the high level of subjectivity that is involved in self-report measures, both for the assessment of motivation in a youth sample and also in the assessment of performance from the trainers. While we tried to counterbalance the high subjectivity in the latter assessment through the agreement upon unified standards for both trainers that should be considered in the performance assessment, variations in their perception of these standards cannot be ruled out.

Finally, this research was conducted in a narrow timeframe, therefore, the amount of data collected is limited. This affects specifically the results from the longitudinal data of motivation and performance, as more data could potentially retrieve more diverse responses. As the timeframe of the data collection overlapped with the start of the competitions and matches, it could be assumed that the motivation of the players is higher than the motivation towards the end of the season or during a time of less or no competitions. A longitudinal data collection throughout a season with the same players could provide assumably more insight into the motivation and performance of the youth academy players.

Implications for Future Research and Practice

The outcome of this research poses several implications for researchers and practitioners in the field of sports psychology. Primarily, this study provides a potential model for interactions between motivation, grit, and performance. As there is limited literature that includes all three constructs in a non-clinical sports environment, this could pose an interesting pathway for future research to gain further understanding of the potential interactions between these constructs and how these affect processes within the athlete. Moreover, future research should investigate the effects of motivation, grit, and performance in a greater and mixed-gender sample to fill the gap in current research. Ideally, this would include a longer timeframe for data collection to enhance the number of data points per player to have a better insight into the idiosyncratic processes between the variables (den Hartigh et al., 2018, van der Sluis et al., 2019) and allow higher group-to-individual generalizability (Fisher et al., 2018). An interesting approach for future research, given the insights from *Part I* that introjected regulated motivation could be a predictive factor of performance in games, could be to investigate whether questions that specifically target an introjected regulatory type of motivation would yield more significant results in the association to performance in games. Furthermore, it could be interesting to investigate why and how introjected regulated motivation has a greater effect on performance compared to intrinsic motivation, which has been a bigger focus in research (Deci et al., 1975; Ryan et al., 2000; Almagro et al., 2020).

Beyond that, acknowledging the importance of psychological factors, such as motivation and grit, can be beneficial in the scouting and recruitment process of potential new players in football clubs. Understanding that these factors may be just as valuable as physical characteristics and skills to be able to maintain high levels of performance in football training and matches, may be useful for scouts to consider when making decisions on whom to recruit. Moreover, this should also be considered in the process of talent development of such youth players. Integrating

the training of mental properties and guiding players towards a more meaningful, intrinsic motivation as well as increasing their sense of grit may benefit their performance in the long term. Future studies could hence investigate how to increase a sense of grit and motivation in youth players based on findings investigating possible positive effects of functional imagery training (Rhodes et al., 2018), the principle of the “Power of Yet” (see TEDx Talks, 2015) and influences the trainers and their attitudes have on the players (Chase, 2010).

Conclusion

In conclusion, this research was performed to investigate the effects of motivation and grit on performance. After conducting two multilevel model analyses, this study could not provide significant evidence for the hypothesis that motivation affects levels of performance at an influential level, and that grit has a moderating role in the relationship between motivation and performance. Nonetheless, it shows potential for future research through proposing a model and framework that could be applied to future studies in the field of sport psychology.

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Appendix I

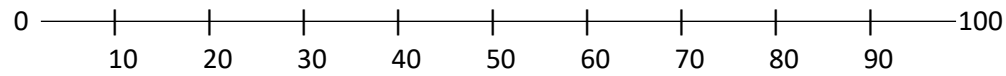
Wekelijkse vragenlijst

ID: _____

Wat vind je van onderstaande uitspraken?

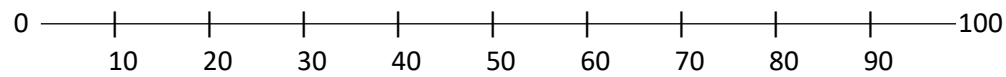
„Op een schaal van 0-100, hoe gemotiveerd ben je om vandaag te presteren?“

Zet een kruisje en vul het getal in.



„Op een schaal van 0-100, hoe gemotiveerd ben je om te presteren tijdens de komende wedstrijd?“

Zet een kruisje en vul het getal in.



Doorzettingsvermogen Vragenlijst

ID: _____

Geef aan in hoeverre de onderstaande uitspraken jou beschrijven.

	1 = helemaal niet zoals ik	2 = niet zoals ik	3 = lijkt een beetje op mij	4 = vind ik vooral leuk	5 = lijkt erg veel op mij
1. Ik stel vaak een doel, maar kies er later voor om een ander doel na te streven.	1	2	3	4	5
2. Ik ben korte tijd geobsedeerd geweest door een bepaald idee of project, maar verloor later mijn interesse.	1	2	3	4	5
3. Ik heb moeite om mijn focus te houden op projecten die meer dan een paar maanden in beslag nemen.	1	2	3	4	5
4. Nieuwe ideeën en projecten leiden me soms af van eerdere.	1	2	3	4	5
5. Ik maak af wat ik begin.	1	2	3	4	5
6. Tegenslagen ontmoedigen me niet. Ik geef niet snel op	1	2	3	4	5
7. Ik ben ijverig.	1	2	3	4	5
8. Ik ben een harde werker.	1	2	3	4	5

Motivatie Vragenlijst

ID: _____

Waarom speel je voetbal? Geef aan in hoeverre u het eens bent met onderstaande stellingen.

	1 = helemaal mee eens	2 = mee eens	3 = een beetje mee eens	4 = neutral	5 = een beetje mee oneens	6 = mee oneens	7 = helemaal mee oneens
1. Omdat voetbal interessant is.	1	2	3	4	5	6	7
2. Omdat mijn familieleden (bijvoorbeeld ouders) het verwachten.	1	2	3	4	5	6	7
3. Omdat ik van voetbal geniet.	1	2	3	4	5	6	7
4. Ik doe het voor mijn eigen bestwil.	1	2	3	4	5	6	7
5. Ik weet het niet. Persoonlijk ben ik er niet van overtuigd dat het de moeite waard is om te doen.	1	2	3	4	5	6	7
6. Omdat ik mezelf kan bewijzen dat ik harder kan werken dan anderen.	1	2	3	4	5	6	7
7. Omdat voetbal mijn vaardigheden ontwikkelt.	1	2	3	4	5	6	7
8. Omdat ik reken op een beloning.	1	2	3	4	5	6	7
9. Persoonlijk ben ik er niet van overtuigd dat ik het nodig heb.	1	2	3	4	5	6	7
10. Omdat ik wil straf vermijden.	1	2	3	4	5	6	7
11. Omdat ik mezelf kan bewijzen dat ik beter ben dan anderen.	1	2	3	4	5	6	7
12. Omdat voetbal mij voldoening geeft.	1	2	3	4	5	6	7
13. Omdat voetbal belangrijk voor me is.	1	2	3	4	5	6	7
14. Omdat ik mezelf kan bewijzen dat ik succesvoller kan zijn dan anderen.	1	2	3	4	5	6	7
15. Ik denk dat voetbal tijdverspilling is.	1	2	3	4	5	6	7