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## PSYCHO-PHYSIOLOGICAL FACTORS AS PREDICTORS OF SPORT PROMINENCE AND EXCELLENCE AMONG STUDENT-ATHLETES IN SOUTHWESTERN, NIGERIA

Oluwatoyin M. Jaiyeoba (Ph.D.)

Department of Human Kinetics and Health Education,  
Faculty of Education, University of Ibadan  
oizajaiye@yahoo.com

### Abstract

*This study investigated psycho-physiological factors as predictors of sport prominence and excellence among student-athletes in Southwestern, Nigeria. Psychological factors are goal setting and self-efficacy, while physiological factors are muscular strength, muscular endurance and body composition. Expost-facto research design was used for the study. Purposive sampling technique was used to select 1604 university athletes' matriculated students who have represented the institutions in NUGA. The instruments used were Goal Setting in Sport Questionnaire (GSISQ), Sport Self Confidence Questionnaire (SSCQ), ICHPER.SD Children/Youth Fitness Test. Five hypotheses were tested at 0.05 level of significance. Data were analysed using inferential statistic of regression. The combined effect of the independent variables (both psychological and physiological factors) yielded coefficient of  $R^2$ : 0.43 and 0.46 respectively and this translated into 43% and 46% of the total variance on sport prominence and excellence. The  $F$ -value ( $F_{(3, 1600)} = 25.49$ ,  $P < 0.05$ ) was found to be significant. Four out of five independent variables tested had significant contributions ( $P < 0.05$ ): goal setting ( $\beta = .18$ ,  $t=6.68$ ), self-efficacy ( $\beta = .058$ ,  $t= 2.19$ ), muscular strength ( $\beta = .06$ ,  $t=2.07$ ) and muscular endurance ( $\beta = .19$ ,  $t=6.94$ ) to sport prominence and excellence. However, body composition had no significant contribution. Based on the result of the findings, it was recommended that both psychological and physiological factors intervention support be given student-athletes in order to enhance sport performance, prominence and excellence.*

**Key words:** Psychological, Physiological, Goal setting, Self-efficacy, Muscular Strength, Endurance and Body Composition, Sport Prominence and Excellence

### Introduction

Behind any successful athlete or team is a well-prepared coach or management team, who, with their athletes, has carefully plotted their campaign towards success. The quest for sporting prominence and excellence requires an understanding of the planning process. Athletic performance is made up of a complex blend of a number of factors which include physical, physiological, psychological, social and ecological indices. The relative importance of each will depend on the demands of the sport and needs of the individual.

Many youth sport programmes worldwide are trying to discover and detect gifted athletes in early ages (Abernethy, 2008). Holt and Dunn (2004) pointed out that the selection approach of player into a team is based on the assumption of existing prerequisites, such as psychological and physiological variables to predict young athlete's future success.

It is clear that psychological skills play an important role at an elite level but can also be critical in helping athletes reach the top of their sporting disciplines (Gould, Dieffenbach & Moffett 2002; Orlick & Partington, 1988; Williams & Krane, 2001). Recognising the importance of developing and using such psychological traits, Abbot and Collins (2004) investigated the usefulness and practicality of psychological characteristics of developing excellence (PCDEs). PCDEs can aid the learning of new skills (e.g., focus, distraction control) but also enable athletes to gain the most out of each training session (e.g., goal-setting, realistic performance evaluations). Psychological Characteristics of Developing Excellence (PCDEs) enable athletes to remain on their pathway to excellence by investing the necessary time for training in addition to staying committed to the learning process, particularly when their peers may be engaging in perceivably more joyful activities.

The act of goal setting has always been an important part of daily life for people everywhere, whether that goal was getting to work on time, acing that calculus test, or being a good parent. People need or want to get things done during their lives, and these things are often accomplished through setting goals. A goal is defined as the aim or objective of an action generally limited by time (Baghurst, Bradford, & Mulekar, 2012). The term goal has been defined as a level of performance proficiency that one wishes to attain, usually within a specified time period (Latham & Locke, 2006). A goal is a target, or a specific standard or an accomplishment that a person strives to attain. (Vealey, 2007)

Weinberg and Gould (2010) note that goal-setting is a very powerful technique to increase performance. García-Adrianzén and Refoyo-Román (2014) conclude that in collective sports, in addition to setting individual goals, it is key to establish team goals, since they promote group motivation, enhancing relationships and group cohesion. When athletes have to face difficulties, if their expectations are favourable, players increase their efforts with a higher possibility of reaching their stated goals, whereas unfavourable expectations reduce such efforts, sometimes to the extent of completely ignoring the task (García and Díaz, 2010). Stoeber, Stoll, Pescheck and Otto (2008) studied the importance of goal setting and showed that goal setting, alone or in combination with other training methods, has positive effects on improving performance. Wang and Haddleston (2003) studied the psychological skills used by Chinese swimmers in 52 women and 54 men and found that over 50% of participants always used positive goal-setting techniques and performance analysis. Burton, Pickering, Weinberg, Yukelson, and Weigand (2010) reported that 40 percent of Olympic athletes were very committed to goal setting and athletes believed in all aspects of effectiveness. In a study by Adeyeye and Adekoya (2014) it was concluded that when an exerciser sets a goal, it gives focus, thus, any achievement of the goal will be a morale booster and one is motivated to continue, and once one achieves, he or she continues performing the exercise.



Self-efficacy, or the belief in one's own ability to perform a specific task successfully, is one of the most influential psychological concepts thought to affect achievement endeavors in sport performance (Singer, Hausenblas, & Janelle, 2001). According to Kiremit (2006), self-efficacy beliefs determine thoughts, behaviours and the way of motivation of the people. Self-efficacy belief has an impact on the performance by selecting the task, using strategy and the persistency related with the task of the learner (Kiremit, 2006). Feltz and Magyar (2006) added that self-efficacy is belief in the capability to learn or perform motor skills or a sport task to achieve a specific outcome. One of the greatest Olympic athletes of all-time, Carl Lewis, demonstrated his belief about self-confidence as a vital factor for his plethora of successes by stating, —If you don't have confidence, you'll always find a way not to win|| (Machida, 2008)

Hays, Thomas, Maynard and Bawden (2009), in their research on a variety of world-class athletes of multiple ages, contended that —confident [i.e., efficacious] individuals tend to be more skilled and effective for sporting success. The researchers also found that all athletes involved in their study performed more successfully when their feelings of sport confidence were high and much less successfully when experiencing low sport confidence. Rattanakoses, Omar-Fauzee, Geok, Abdullah, Choosakul, Nazruddin&Nordin,(2009) posited the following: successful athletes exhibit higher self-confidence than unsuccessful athletes, athletes who have higher self-confidence during competitions are more likely to be successful, confident athletes believe in their ability to perform well, and personal self-confidence strongly contributes to success or failure.

Sporting performance is highly influenced by physiological factors and health related fitness components. Physical fitness is composed of five key components which allow the athlete to compete with the demands of the sport without fatigue; muscular endurance, flexibility, cardiovascular fitness, muscular strength and body composition,

Pescatello & ACSM, (2014) define muscular strengths “the muscle's ability to exert force”. ‘Muscular strength is defined as the maximum force that can be exerted by a muscle or muscle group against a resistance’ (Aquatic Exercise Association, 2010). In a study by Buchheit, Mendez-Villanueva, Delhome, Brughelli and Ahmaidi, (2010), it was revealed that explosive strength training increase maximal sprinting speed and vertical jumping in soccer players. Gorostiaga, Granados, Ibanez, Gonzalez-Badillo and Izquierdo(2006) also showed that strength training in elite handball players increased throwing velocity in addition to other capacities such as vertical jumping and sprinting. The role of maximal strength in sprint speed and vertical jump height in international soccer players revealed a high correlation between 1RM squat and 10 m sprint time, 30m sprint time and jump height. In addition, vertical jump height was correlated with both the 10 m and 30 m sprint (Wisloff, Castagna, Helgerud, Jones and Hoff, 2004)

Muscular endurance is described as “the muscle's ability to continue to perform successive exertions of many repetitions” (Pescatello & ACSM, 2014). Lerwill (2009) states that endurance fitness is the muscles ability to resist fatigue whilst performing prolonged exercise. Muscular endurance is defined as the ability of the muscles to sustain

repeated productions of force at low to moderate intensities over an extend amount of time. Aagaard and Andersen (2010) on the effects of strength training on endurance capacity of top level endurance athletes, strength training can lead to enhanced long-term and short-term endurance capacity both in well trained individuals and highly trained top-level endurance athletes, especially when high-volume, heavy-resistance strength training protocols are applied.

The body composition in athletes is a conditioning factor influencing their performance, particularly in jumping ability and in the capacity to execute specific tasks rapidly, independently of gender, age and ethnicity (Copic, Dopsaj, Ivanovic, Nestic, and Jaric, (2014). The assessment of body composition can provide valuable information about the changes observed in athletes during the season (Kyle, Piccoli and Pichard, 2003). Obtaining a type-specific body composition is directly associated with individual performance, and it is currently recognized as a significant challenge to individualize and periodize the athlete's development process (Thomas, Erdman and Burke, 2003). Garret, Donald and Kirkendall (2000) say 'body fat negatively influences athletic ability performances involving agility, speed, endurance, running and jumping.' Body composition is measured by the amount of cartilage, muscle, bone and fat that makes up the human body. A healthy amount of fat for a man is between 15-18% and for women is 20-25%. Although a great body of research about the advantages of physically matured players has been developed, there are also disadvantages that players face due to anthropometric factors. Players with greater rates of height and body mass index perform better in factors such as vertical jump, speed and VO2max (Fink and Mikesky, 2015)

A study carried out by Gil, Badiola, Bidaurrezaga-Letona, Zabala-Lili, Gravina, Santos-Concejero, Lekue and Granados (2014) on relationship between both height and weight with performance factors there was not any significant relationship for most of the age groups. However, the most important factor that was related to performance was primarily body fat and secondarily body mass index (Sporis, Jukic, Ostojic and Milanovic, 2009). Furthermore, body fat that affects the performance in early ages is not a constant variable, which in contrast changes through training.

Tertiary institutions in Nigeria organize intramural, interscholastic and intercollegiate competition every season for the students to be able to balance their holistic education. In the selection process of student-athletes for competition, it is noted that the psychological and physiological indices for selection to encourage sport prominence and excellence are not really put into consideration. It is on this premise that this study is aimed at finding out the psycho-physiological factors predicting sport prominence and excellence among student-athletes in southwestern tertiary institutions in Nigeria.

### **Hypotheses**

1. Goal setting is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria
2. Self-efficacy is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria

3. Muscular strength is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria
4. Muscular endurance is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria
5. Body composition is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria

### **Methodology**

The population for this study comprises all student-athletes in the Southwest universities. The sample size for this study was One thousand six hundred and four (1604) student-athletes male and female from tertiary institutions in southwestern states, Nigeria. Simple random sampling technique was used to select nine tertiary institutions. These are University of Ibadan, Obafemi Awolowo University Ile-Ife, University of Lagos, Federal University of Technology, Akure, Ibadan Polytechnics, Adekunle Ajasin University, Akungba, Adeyemi College of Education, Ondo, Tai Solarin University of Education, Ogun and Federal College of Education Oyo (Special). Purposive sampling technique was used to select matriculated student-athletes for the study who represents the school in one game or the others. Ex post-facto research design was used for the study.

Goal Setting in Sport Questionnaire (GSISQ) by Weinberg, Burton, Yukulson and Weigand (1993) was utilized to better understand the student athletes' goal setting practices and strategies. Sport Self Confidence Questionnaire (SSCQ) by Vealey, Hayashi, Garner-Holman and Giacobbi (1998) was used to assess self-efficacy of the student-athletes, while ICHPER.SD Children/Youth Fitness Test by International Council for Health, Physical Education, Recreation, Sport and Dance (2013) was used to measure the student-athletes physiological parameters.

Five hypotheses were tested at 0.05 level of significance. Data were analysed using inferential statistic of regression. The validity of the instrument was ascertained by some experts from cognate unit of this study who assisted in content and construct validity. Cronbach alpha was used for reliability of the instrument; a correlation coefficient value of 0.86 was obtained.

## Results

**Table 1:** Parameter Estimates of Relative contributions of independent variables of psychological factors to sport prominence and excellence

| Variables     | Unstandardized coefficient |                | Standardized coefficient |       | t-value | Sig. |
|---------------|----------------------------|----------------|--------------------------|-------|---------|------|
|               | $\beta$                    | Std. E $\beta$ | B                        | e t a |         |      |
| Goal setting  | 8.531E-02                  | 0.13           | . 1                      | 7 7   | 6.686   | .000 |
| Self-efficacy | 2.563E-02                  | 0.12           | . 0                      | 5 8   | 2.189   | .029 |

Significance at 0.05 level

**Ho 1.** Goal setting is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria

Table 1 shows the unstandardized and standardized regression weight of the  $\beta$ , standard error, the Beta, the t-value and the alpha level of the significance of the t-value for the psychological factors predicting the sport prominence and excellence among student-athletes.

The result in Table 1 shows that goal setting was a significant psychological factor predicting sport prominence and excellence among student-athletes because of the relationship revealed between the associations. The regression coefficient is 8.531 and the t-value is 6.686 which is significant at  $P < .05$ . The null hypothesis is therefore rejected.

**Ho 2.** Self-efficacy is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria

The result in table 1 also shows the regression coefficient of 2.563 and the t-value of 2.189 for self-efficacy attribute as a significant (0.05) predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria. The result also revealed positive association between the independent variable of self-efficacy attribute and the dependent variable of sport prominence and excellence

### Composite effect of psychological factors as predictors of sport prominence and excellence among student-athletes in Southwest, Nigeria

**Table 2:** ANOVA showing composite effect of the psychological factors predicting sport prominence and excellence among student-athletes

|                     |         |
|---------------------|---------|
| R =                 | .206    |
| R <sup>2</sup> =    | .043    |
| AdjR <sup>2</sup> = | .041    |
| St. Error =         | 1.36447 |

| Source of variance | Sum of squares  | d    | f | Mean square | F      | Sig. |
|--------------------|-----------------|------|---|-------------|--------|------|
| Regression         | 1 3 2 . 7 5 9   | 2    |   | 66.379      | 35.654 | .000 |
| Residual           | 2 9 8 0 . 6 8 8 | 1601 |   | 1.862       |        |      |
| Total              | 3 1 1 3 . 4 4 6 | 1603 |   |             |        |      |

Significance at 0.05 level

Table 2 shows the composite effect of the independent variables of goal setting and self-efficacy attributes as predicting factors of sport prominence and excellence among student-athletes in Southwestern, Nigeria.

The result in Table 2, shows the combination of the two psychological factors predicting sport prominence and excellence among student-athletes. The table also revealed that the psychological factors of goal setting and self-efficacy attributes accounted for 41% of the variance in sport prominence and excellence among student-athletes in Southwestern, Nigeria.

**Table 3:** Parameter estimates of relative contributions of independent variable of physiological factors to sport prominence and excellence

| Variables          | Unstandardized coefficient |                | Standardized coefficient | t-value | Sig. |
|--------------------|----------------------------|----------------|--------------------------|---------|------|
|                    | $\beta$                    | Std. E $\beta$ | B e t a                  |         |      |
| Muscular Strength  | 7.493E-02                  | .011           | . 1 9 4                  | 6.936   | .000 |
| Muscular endurance | 3.081E-02                  | .015           | 0 . 5 7                  | 2.067   | .039 |
| Body Composition   | 8.366E-03                  | .018           | . 0 1 3                  | .457    | .648 |

Significance at 0.05 level

**Ho 3: Muscular strength is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwestern, Nigeria**

Table 3, shows that the unstandardized and standardized regression weight of the standard error, the Beta, the t-value and level of significance of the t-value for the physiological factors predicting sport prominence and excellence among students-athletes

The result in Table 3 shows that muscular strength was a significant physiological factor predicting sport prominence and excellence among student-athletes in Southwest, Nigeria. The table reveals a positive relationship between the association of muscular strength as a physiological factor of sport prominence and excellence among student-athletes. The regression coefficient is 7.493 and the t-value is 6.936 which is significant at  $P < .05$ . Hence, the null hypothesis was therefore rejected.

**Ho 4: Muscular endurance is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria**

The result in Table 3, also shows that muscular endurance is a significant physiological factor as predictor of sport prominence and excellence among student-athletes in Southwestern, Nigeria. There was also a positive relationship between the association of the variable of sport prominence and excellence among student-athletes. The regression coefficient is 3.081 and the t-value is 2.067 which is significant at  $P < .05$ . Hence, the null hypothesis was therefore rejected.

### **Ho 5: Body composition is not a significant predicting factor of sport prominence and excellence among student-athletes in Southwest, Nigeria**

The result in Table 3, shows that body composition is not a significant physiological factor predicting sport prominence and excellence among student-athletes in Southwest, Nigeria. Though, a level of relationship was revealed in the association of the dependent and independent variables. The relationship was not significant enough to predict the student-athletes to sport prominence and excellence. The regression coefficient is 8.366 and the t-value is .457, which was not significant at  $P > .05$ , hence, the null hypothesis was accepted.

### **Composite effect of physiological factor predicting sport prominence and excellence among student-athletes in Southwestern, Nigeria**

**Table 4:** Composite effect of the physiological factors predicting sport prominence and excellence among student-athletes showing ANOVA summary of the regression analysis

|                   |   |         |
|-------------------|---|---------|
| R                 | = | .214    |
| R <sup>2</sup>    | = | .046    |
| AdjR <sup>2</sup> | = | 1.36276 |

| Source of variance | Sum of squares  | D f  | Mean square | F      | Sig. |
|--------------------|-----------------|------|-------------|--------|------|
| Regression         | 1 4 2 . 0 4 1   | 3    | 47.3 4 7    | 25.493 | .000 |
| Residual           | 2 9 1 . 4 0 5   | 1600 | 1 . 8 5 7   |        |      |
| T o t a l          | 3 1 1 3 . 4 4 6 | 1603 |             |        |      |

Significant at 0.05 level

**Table 4** shows the composite effect of the independent variables of muscular strength, muscular endurance and body composition as predictors of sport prominence and excellence among student-athletes in Southwestern, Nigeria.

Table 5, shows the combinations of the physiological factors predicting sport prominence and excellence among student-athletes. The table also shows physiological accounted for 44% of the variance. The findings further reveal that the combination of the physiological factors significantly predicted the variables to affect the sport prominence and excellence among student-athletes; hence, the hypothesis was therefore rejected

### **Discussions of Findings**

The results in table 1, showed that goal setting is a significant factor predicting sport prominence and excellence among student-athletes in Southwestern Tertiary Institutions. This corroborates with the study of Stoeber, Stoll, Pescheck and Otto (2008) on the importance of goal setting and showed that goal setting, alone or in combination with other training methods, has positive effects on improving performance. Also, Yukelson, and Weigand (2010) reported that 40 percent of Olympic athletes were very committed to goal setting and athletes believed in all aspects of effectiveness. In a study by Adeyeye and Adekoya (2014) it was concluded that when an exerciser sets a goal, it gives focus,

thus, any achievement of the goal will be a morale booster and one is motivated to continue, and once one achieves, he or she continues performing the exercise

The results in table 1, revealed that self-efficacy is a significant factor predicting sport prominence and excellence among student-athletes in Southwest Tertiary Institutions. This coincides with the study of Hays, Thomas, Maynard and Bawden (2009), who in their research on a variety of world-class athletes of multiple ages, contended that confident [i.e., efficacious] individuals tend to be more skilled and effective for sporting success. The researchers also found that all athletes involved in their study performed more successfully when their feelings of sport confidence were high and much less successfully when experiencing low sport confidence. Also, Rattanakoses, Omar-Fauzee, Geok, Abdullah, Choosakul, Nazruddin & Nordin,(2009) posited the following: successful athletes exhibit higher self-confidence than unsuccessful athletes, athletes who have higher self-confidence during competitions are more likely to be successful, confident athletes believe in their ability to perform well, and personal self-confidence strongly contributes to success or failure.

The result of hypothesis three in Table 3, showed that muscular strength is a significant factor predicting sport prominence and excellence among student-athletes in Southwest Tertiary Institutions. This is in line with the study of Buchheit, Mendez-Villanueva, Delhome, Brughelli and Ahmaidi, (2010), who revealed that explosive strength training increase maximal sprinting speed and vertical jumping in soccer players

The result of hypothesis four in Table 3, showed that muscular strength is a significant factor predicting sport prominence and excellence among student-athletes in Southwestern Tertiary Institutions. This is in agreement with the study of Aagaard and Andersen (2010 ) on the effects of strength training on endurance capacity of top level endurance athletes, strength training can lead to enhanced long-term and short-term endurance capacity both in well trained individuals and highly trained top-level endurance athletes, especially when high-volume, heavy-resistance strength training protocols are applied.

The result of hypothesis five in Table 3, showed that body composition is not a significant factor predicting sport prominence and excellence among student-athletes in Southwest Tertiary Institutions. This corroborates the study carried out by Gil et al (2014) on relationship between both height and weight with performance factors there was not any significant relationship for most of the age groups. However, the most important factor that was related to performance was primarily body fat and secondarily body mass index (Sporis, Jukic, Ostojic and Milanovic, 2009). Furthermore, body fat that affects the performance in early ages is not a constant variable, which in contrast changes through training.

## **Conclusion**

The result of the study revealed that goal setting and self-efficacy as psychological factors predicting sport prominence and excellence among student-athlete in Southwest Tertiary

institutions were significant. Muscular strength and muscular endurance as physiological factors were significant, while body composition was not significant. It is therefore, imperative to appreciate that psycho-physiological parameters of the student-athletes predict sport prominence and excellence as these student-athletes later become professional athletes which in turn help long term athlete development and peak performance.

### Recommendations

Based on the findings of this study, the following recommendations were made:

1. Sport psychologists, coaches and exercise trainers should inculcate goal setting in their training programmes and in competitions to elevate their approaches to teaching student-athletes in order to encourage sport prominence and excellence
2. Self-efficacy psychological skill should be included in the training and competition scheme of student-athletes in order to elevate their level of self-confidence in sport and discourage intimidations and anxiety from sport competitions
3. There should be a complete guide in the process of developing student-athletes physiologically which could promote long term effect on sport performance, prominence and excellence among student-athletes
4. Psychological skills physiological parameters should be well designed into the athletic programme of developing student-athletes for sport prominence and excellence.

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