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Psychological skill training to enhance sports performance among undergraduate athletes in Kogi State

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Abstract
The line between winning and losing in sports these days is becoming thinner. Athletes – especially those at the intermediate level of competition require the right psychological skill training (PST) to achieve these due to the psychological demands of sports on athletes varying between teams, sport type, age, gender and level of competition. PST intervention was frame worked on Cognitive Behavioural Therapy. Experimental research design was employed for the study. Twenty two male and female athletes voluntarily participated in the intervention. ANCOVA was used to test the significance of intervention and moderating variable (age) on performance at 0.05 alpha level. Findings indicate that goal-setting and imagery ($F=0.62$ and $F=1.42$ at $p\ 0.014 < 0.05$) were significant. It also indicates significant interaction with age ($p\ 0.95 > 0.05$). It is concluded that applying psychological skill training program alongside physical training is effective to provide the needed psychological skills among high intensity sport athletes.

Keywords: Goal setting, imagery, psychological skill training, sport performance

1. Introduction
Globally, scholars agree on the significance of psychological skills training (PST) in developing sporting performance. This study employed PST in enhancing performance university sports athletes, with a special focus on high-intensity sports (HIS). In sports today, the line between winning and losing is closely contested as upsets have been on the rise in recent times, making bookies consider allocation of odds to supposedly underdogs. Sports performance is the yardstick for measuring sports participation. The athlete's biomechanical, somatic, tactical, technical and mental attributes influence performance in most sports [1]. It implies that for movement sports, athletes will have to display a mix of conditioning, skill, strength and speed. Most times, the psychological aspects of performance are ignored by athletes, coaches and trainers [2]. Sports cannot be completely understood without the proper application of exercise philosophy principles and the optimal of nutrition and training loads [3]. Athletic performance can be induced by altering the injury-prone tissues to be less likely damaged during physical performance. According to a study [4], athletes measure success in sports progressively towards excellence. It is therefore necessary that athletes set their goals right and create a steady mindset both at trainings or practice and in competition to achieve these goals. When athletes and coaches set proper goals by mapping out areas on which to improve in training, the ultimate result is improved [5]. Conversely, athlete's alertness and mental clarity during competition depends on a variety of variables which are not limited to physical fatigue, personal circumstances, and education or employment pressures among others [5, 6, 7] Psychological skills training (PST) is the systematic and continuous practise of psychological abilities with the aim of enhancing enjoyment, raising sport and physical ability levels and achieving higher self-satisfaction. Due to the positive influence psychological interventions have on the psyche and sporting outcomes of athletes, they are widely utilized [8–11]. Psychological skill training does not only improve mental variables such as arousal, motivation, attentional focus, and self-efficacy it also assists the acquisition of skills and techniques required to maintain performance [12–15].

Evidence exists showing the use of traditional principles to aid performance but close to no study has concentrated on using psychological strategies to enhance performance among high intensity athletes. There seems to be limited empirical evidence supporting the effectiveness of traditional psychological methods in handling HIS [16]. While psychological abilities on their own do not enhance athletes' sporting outcomes, when combined with physical, technical and tactical training, they can contribute to athletes achieving greater levels of performance. Therefore, factors like motivation, focus, stress management, and mood regulation have been suggested as crucial for understanding variations in athletes' sport performance [17–19]. There is however, no general approach (strategy) to PST. Therefore, for this study's objective to be met, goal setting and imagery techniques were employed.

The psychological demands on athletes vary between teams, age, gender, level of competition, and sport type [20]. Young athletes, particularly those in the intermediate competition stage, often require motivation to stay committed to sports practice (including matches and training) and need proper mental preparation to handle the stress of competing. Athletes aiming to excel in high-intensity sports need to manage rigorous training loads and intensities while ensuring regular development. Hence, fostering psychological growth in young athletes enhances their success and equips them with crucial psychological abilities like efficacy, arousal management, motivational and recovery skills. These skills aid in achieving goals and experiencing satisfaction in sports [21, 22].

Research [23, 24] shows that, goal setting is a widely favoured technique in sports psychology, crucial for optimizing athletic performance through mental training programmes. It is perhaps the foundation of psychological learning for coaches and athletes, which serves as a basis for various strategies like boosting confidence and increasing motivation. Creating more specific and ambitious goals lead to improved performance than setting general goals [25]. It is well established that goals facilitate performance through motivational effects, making the transition from mere dreams, aspirations and realization of set objectives seamless.

Imagery (mental rehearsal) is the visualization of ideas, events and skills clearly in the mind without them actually being there. According to [5, 26] it is an experience mimicking real life experiences which involves the use of different sensory acumens without actual perception. With purposeful imagery use, athletes are able to create and recreate experiences in their minds to seem like reality [27]. Imagery uses all senses; visual, tactile, auditory, gustatory and olfactory for sports participation to achieve optimum performance by decreasing anxiety and enhancing autonomy and focus [28, 29]. It is making use of all senses by creating a mental picture of what an athlete wants to achieve. When athletes achieve a state of flow, they can easily create a picture of tasks before competition. Imagery is also a tool that can help athletes to maintain a vision of their goals by improving athletes' performance in motor tasks [5, 30]. Also, the utilization of mindfulness techniques seems beneficial for HIS athletes by helping them focus on external cues, open to performance-improving choices, and adapt to different situations. Literature shows a much more improved efficacy when mental strategies are combined with physical training as opposed to only employ one strategy [31].

Researches exist [2, 32-34] to understanding the effect of anxiety on sports performance before and during competition. The nature of competitive sports has shown it to always pose high levels of stress and anxiety [35], where anxiety inhibits performance and increases the likelihood of sports injuries. According to the Williams and Andersen model of stress and athletic injury [34], when an athlete's face stress cues, the brain gives a feedback that results in increased strain, narrowing of visual field and increased distraction that results in injury. Injured players cannot perform at their peak. More anxious athletes achieved low performance while under pressure thereby loosing enthusiasm and positive attitudes that could make them bounce back from mistakes and failures [2, 35]. This attitude also mostly results to a negative perception of coach's constructive criticism. People with anxiety experience distressing thoughts and emotions, along with difficulty controlling their attention, leading to problems in tasks due to a lack of attentional resources [36]. Mental control and associated psychological aspects significantly impact an athlete's performance by influencing the final outcome of their efforts. Mastering these mental elements are challenging, often demanding substantial athletic experience and maturity to fully develop [35, 37]. Irrespective of the skill level, the possibility to choke or fold under pressure is likely, because the athlete did not display autonomy over stressors during competition [37, 38]. Intrinsic motivation is essential to success both in competition and training as it would help allay anxiety [5, 37]. There is need therefore, to employ strategies that will help check anxiety, which this study tries to prove.

The intervention is hinged on the Cognitive behavioural therapy (CBT), a therapy that helps people learn how to identify and change destructive thoughts which negatively influence response to stress cues [39]. It seeks to alleviate mental health issues like depression and anxiety by addressing negative though patterns and behaviours. It believes that modifying unhelpful thoughts can bring about behavioural and emotional improvement. CBT aims to observe individuals, making necessary adjustments to achieve desired outcomes. This involves learning to recognize and replace distorted thoughts and emotions with more positive and adaptive ones.

1.1 Justification of Problem

Satisfaction and accomplishment in sport is achieved when individual and team – long and short term – goals are met with very little physical effort but high precision. Motivation and motivational strategies have been employed throughout literature in enhancing performance. Proving that, with the application of the right techniques are put in place, winning is inevitable [2, 24, 25]. Proper goal setting, relaxation, positive reinforcement and imagery techniques have proven to provide optimum performance when combined with physical training. They have been proven very efficient in high intensity sports. In Nigerian universities' sporting outfits, there seems to be a preference for team sports to high intensity sports – with more medals - as evident most recently in the last concluded Nigerian University Games (NUGA) in Lagos [40]. The only team that featured from Kogi state, Prince Abubakar Audu University and fourteen (14) others were bottom of the NUGA 2022 medals table [40] at 58th position. Federal University Lokoja and Salem University Lokoja were not represented. High intensity sports however, requires closer supervision and monitoring to be able to inculcate proper wining strategies. It is on this premise that the researcher aims to employ psychological skill training to enhance sports performance among athletes in Kogi State.

1.2 The specific objectives of the study were as follows

- To assess the effect of goal setting on the performance of athletes in Kogi State.
- To assess the effect of imagery techniques on the

performance of athletes in Kogi State.

The purpose of this research was to use psychological skill training (goal setting and imagery) to enhance sports performance among athletes in Kogi State. By employing the psychological training, it arm the athletes in Kogi state with adequate skills to tackle stressors that come with the competitive nature of sports. As it has been observed that, most sports outfits within the region employ basically physical training and concentrate more on team sports, this intervention while concentrating on individual sports –with more medals to compete for- and achieve success in the near future.

2. Materials and Methods

2.1 Participants

The study was carried in three universities in Kogi State. High intensity (athletics) athletes were part of the research. Experimental research design was employed for the study to assess the effect of psychological skill training to enhance sports performance among athletes in Kogi state. The study population included all high intensity sports athletes of the three universities in the study area. 150 respondents were purposively selected but randomly assigned. 50 respondents made up the final sample for the intervention, as participation was voluntary but delimited to individual high intensity sports. Participants were assigned tags (A01, A02…, B010).

2.2 Measures

The first instrument was the Motivation Goal Setting Questionnaire which is a 30-item questionnaire scored on a 5-point Likert format ranging from 1 (Almost never) to 5 (almost always). The second instrument will be the Sport Imagery Ability Questionnaire Manual (SIAQ) a 15-item questionnaire scored on a 7-point Likert type scale ranging from 1 (very hard to image), to 7 (very easy to image). The rating from SIAQ is a combination of how well the athlete can see the image and feel the image. Sports performance will be measured with stopwatches, distance covered. All the measurements would be based on accepted measures for their (intermediate) category. The respondents were be given sufficient time to answer the questions in the instrument. Timing was recorded with the JZK Professional PC2810 multi-function Handheld Stop watch. The data collected was collected over 2 weeks and analyzed using descriptive statistics of frequency counts, percentages, and standard deviation (SD). Furthermore, ANCOVA was used to test the significance of intervention and moderating variable (age) at 0.05 alpha level of significance. All analyses were performed using the SPSS software, version 25.

2.3 Procedure

The research team introduced the objective of the intervention to the management of each university. After approval was given to meet with the school athletes, the intervention was explained to coaches and a schedule was drafted for the intervention, not to interfere nor halt athletes' regular training sessions. Participation was by voluntary admission.

The intervention program began after the approval of the TETFund for 2017-2020 (merged) Intervention (Batch 8) grant. Permission was then sought from the university's Research and Ethics Committee. Athletes and coaches were contacted through the sports council. The researchers briefed the coaches and parents/guardians of objectives, significance of participant's involvement, strategies to be employed and information to be obtained from participants. Students of the athletics and swimming teams were allowed to join voluntarily after meeting with their coaches and guardians, although the swimming team did not eventually participate due to the availability of facilities. Volunteers and their guardians signed an informed consent form.

The psychological intervention program was implemented, based on the framework of the Cognitive-Behavioral Therapy. The intervention employed an educational approach in four stages. This psychological training program lasted twelve weeks of eight sessions and approximately 50 minutes per session. Imagery was based on the PETTLEP Model of Imagery [41], while the psychological session was structured based on previous therapy programs with similar cohorts of athletes [14, 42]. Pretest and posttest scores were collected in the first and twelfth week of the intervention.

2.4 The Psychological Skill Training Program

The PST program focused on improving confidence, setting clear goals and increasing focus. To improve these skills, athletes completed sessions using goal setting and imagery. The intervention program followed an educational approach as suggested in literature [43]. The program consisted of four main phases: Psychological Assessment: Assessing the strengths of athletes and pretest scores are taken. Reconceptualization - generating a list of possible solutions, setting goals (long and short term). Skills acquisition/ consolidation – athletes learn goal setting and imagery skills. Application training – athletes apply skills learnt and post test data is collected here. These findings support the use of psychological techniques to optimize performance as suggested [43].

2.4.1 Goal Setting Sessions

Participants were taught goal setting, and with the assistance of the coaches and researchers, were able to set different goals (process, outcome, performance). The gains of setting smart goals and the use of outcome, process and performance goals was taught and implemented. All equipment was inspected and participants were taught the best ways to utilize them. Minor practice and time (boundary) goals were set by participants.

2.4.2 Imagery Sessions

Sessions focused solely on optimal performances. Imagery included internal and external visualization. Video clips of major athletics meet were played (external imagery) accompanied with athletes' ability to visualize (internal imagery). The participants were encouraged to use the imagery in real-time and in slow motion. Competitive sessions were taught to the participants to be imagined at training and at meets.

3. Results

Table 1: Mean and Standard deviation of Pretest and Posttest scores

Tag	Age	Sex	Event	Pre-Test (Sec)			Post-Test (Sec)			
				PB (Pre-Test)	Mean	SD	PB (Post-Test)	Mean	SD	% change
A01	22	M	100 m	14.09	14.10	0.02	13.62	13.84	0.19	1.84
A02	20	M		12.95	13.02	0.08	11.97	12.01	0.04	7.76
A03	21	M		13.34	14.21	0.97	12.16	12.76	0.52	10.20[a]
A04	22	M		16.00	16.91	0.86	14.96	15.00	0.04	11.30[a]
A05	20	M		14.70	15.15	0.39	14.01	14.13	0.13	6.73
A06	21	F		14.21	14.32	0.13	13.11	13.22	0.16	7.68
A07	18	F		16.61	16.67	0.05	15.97	16.10	0.12	3.42
A08	19	F		14.34	15.14	0.70	13.10	13.66	0.48	9.78
A09	17	F		20.13	20.34	0.18	18.86	19.68	0.80	3.24
A010	24	F		19.87	20.38	0.57	16.32	16.67	0.49	18.20[a]
A011	18	F		20.62	20.71	0.09	18.04	18.08	0.036	12.70[a]
A012	20	M		16.45	16.74	0.48	15.38	15.45	0.12	7.71
B01	19	M	200 m	27.10	27.28	0.16	27.20	26.63	1.05	2.38
B02	22	M		25.24	25.71	0.41	24.10	25.17	0.92	2.10
B03	19	M		29.08	29.28	0.19	26.27	28.27	1.73	3.45
B04	18	F		35.01	35	0.02	31.86	31.88	0.02	8.91
B05	18	F		28.97	29.10	0.12	27.10	27.14	0.04	6.74
B06	19	F		35.09	34.87	0.38	33.37	33.763	0.34	3.17
B07	20	M		27.43	27.52	0.08	25.06	25.093	0.03	8.82
B08	28	F		39.7	39.76	0.06	38.15	38.21	0.05	3.90
B09	21	M		28.43	28.63	0.2	27.68	27.81	0.16	2.86
B010	20	F		30.10	30.14	0.04	30.73**	30.9	0.14	-2.52*

[a] Percentage increase above 10%, *decrease in performance, **personal best time in post-test lower than pre-test PB: Personal Best

Timing was recorded for each athlete. The average of the three (3) attempts were recorded at pre-test and post-test. The personal best (PB) times were also recorded. 100m athletes significantly improved compared to the 200m sprinters. The table also reveals that, athletes showed improvement after the intervention and recorded most of their personal best times at the post-test. Only one athlete showed a decrease (-2.52s) in performance and recorded their PB (30.73s) at the pre-test. Male and female athletes improved equally.

Table 2: Tests of Between-Subject Effects

Source	Type III Sum of Squares	DF	Mean Square	F	Sig.
Corrected Model	8.917*	32	.28	1.47	.25
Intercept	4.034	1	4.034	21.30	.00
Motivation	.12	1	.12	.62	.44
Imagery	8.23	31	.27	1.41	.28
Group *Age	138.68	21	4.474	.468	.952
Error	2.08	11	.19		
Corrected Total	11.00	43			

*R Squared = .811 (Adjusted R Squared = .280)

The table 2 shows the ANCOVA table with the covariance included. Looking at the motivation and imagery intervention packages, it is clear that the result of F-test support the effect after the intervention, obtained F=0.62 at p 0.014 < 0.05 and F=1.42 at p 0.014 < 0.05. The table further indicates the interaction with age, p is 0.95 > 0.05.

4. Discussion

The aim of this study was to determine the effect of a psychological skills training on the sports performance of HIS athletes of universities in Kogi state. 22 male and female athletes in the institution's athletics-team volunteered to be part of the intervention program. Consideration of the sample composition revealed equal number of male female athletes were part of the intervention programme. The athlete's ages were from 17-28 years (Mean = 20.3years, S.D = ±2.4). Sprinters, 100 m (56%) and 200 m (44%) were also part of the study. Results indicated a general improvement in the timing of athletes after the intervention program; thus, variations in the goal setting and imagery variables.

With an anticipation in the improvement in the performance of high intensity athletes, a combination of psychological skill training (goal setting and imagery) was developed into an 8-week program. From the review of literature, it is evident that most interventions employed single psychological skill training method [31, 44], but the present study included two strategies alongside the regular physical training of athletes, to improve performance that athletes could use at practice and competition. Findings showed that there was an overall improvement in the return time of athletes after the intervention program. Over 95.45% of the athletes improved in their times in high intensity sports. Only one athlete experienced a negative change by 2.52% after the intervention. Social and economic variables would have been responsible for this change. The finding aligns with those obtained from the researches [5, 10, 45] which showed the psychological intervention initiatives can improve athletes' ability to learn and apply psychological strategies, which aids in handling stress from competition and boosting athletic performance. This underscores the significance of such programs in enhancing both athletes' mental wellbeing and their overall achievements in sports [12]. The psychological intervention from this study, focused on variables such as motivation, goal setting, attention, self-efficacy, relaxation, and optimized visualization via imagery.

The extent to which psychological skill training had on the performance of athletes is reported on table 1. Out of a participant sample of 22, 55% improved above 5% when comparing their pretest and posttest scores. Significantly, four participants (18%) – male and females- improved above 10% better than their pretest scores. Agreeing with literature that engaging athletes in Cognitive Behaviour Therapy (CBT) which this study inculcated into the intervention package, have shown effectiveness among university athletes by reducing anxiety, increasing psychological flexibility than those who concentrated physical skills [8, 10, 46]. The psychological skill training intervention alongside physical

training was effective.

Findings also indicated that the intervention was significant across age (F = 0.95, p 0.014 < 0.05). Older athletes (above 21 years), improved significantly compared to younger ones. This aligns with Findings on from literature that the length of experience or sports participation determines how well individuals learn psychological skills [6, 47]. However, there was no significance in the performance of athletes after intervention across gender. Nevertheless, female participants improved more, although it was not statistically significant.

5. Conclusion

5.1 Based on findings from the study, the following conclusion is drawn

1. Four participants showed significant improvement (over 10%) after the intervention. 100m sprinters performed significantly than 200m athletes. Anaerobic sports, requiring sharp burst of energy over a short period will significantly improve when PST is applied.
2. Female athletes who were part of the study significantly improved 10.25% more than male participants. Disregarding gender stereotyping and assigning sports to various sexes is proven to be false as female athletes improve significantly when the right environment is created for training.
3. Applying psychological skill training program (goal setting and imagery) alongside physical training for eight weeks was effective to provide the needed psychological skills to high intensity sport athletes at the intermediate (university) level of competition. The intervention will arm athletes in Kogi state universities with the psyche to manage stress, improve attention and reduce anxiety during practice sessions and at competitions.

5.1 Implications of the Study

The implication of the study is summed up as; firstly, providing more empirical evidence on the significance of including psychological aspects to the training regimen of sport teams. Also, athletes that qualify for competitions have met the qualifying criteria, possessing psychological skills might be the deciding factor especially in sports requiring rapt attentional focus within a short period.

Secondly, it points out the fact that female athletes can be as competitive as males when given the right environment to compete. More female athletes would be encouraged to participate in university sports as they have equal chances of winning laurels.

Lastly, University sport teams will be exposed to the significant need to employ experts to cater for the psychological aspects of their training and preparations.

6. Recommendations

6.1 Based on findings of the study it is recommended that

1. Psychological strategies should be embraced at all levels of sports competition in addition to physical training. Other strategies that would boost the psyche of athletes should be employed.
2. Adequate and qualified experts should be employed to administer psychological strategies. Physical training is never sufficient to win and stay at the top.
3. Psychological strategies should be reviewed to always be in adherence and up to date with modern techniques.
4. Facilities and equipment should be provided for various sports to enable athletes meet up with international standards that would enable a fair competition.

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8. Author Contributions

AMN and OVB conceptualized the study. AMN, OVB, AKB and ARO organized the database as well as collected data. OVB, ARO administered the imagery intervention. OVB, AMN and AKB administered goal setting intervention. OVB and AMN performed the statistical analysis. OVB drafted the first manuscript. All authors contributed to the revising, reading and approving the final presented version.

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10. Conflict of Interest

The authors declare no potential conflict of interest related to the study.

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