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The Role of Resilience on Stress and Recovery of Elite Athletes in Nigeria

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Resilience is an important psychological factor in sport that contributes greatly to the ability to overcome and adapt positively to difficult and challenging situations. Elite athletes face a lot of pressure, stressor and adversity from sport and non-sport milieu which affect their psychological well-being and sport performance. Ability of the elite athletes to cope, overcome and adapt to various sources of pressures, stressors, adversities and recover quickly will make them to attain optimal health, peak performance and achieve success. The purpose of this study was to examine the role of resilience on stress and recovery of elite athletes in Nigeria. Participants were 187 subjects (118 males; 69 females), age ranged between 18years and 42years (mean=26.4; SD=4.82) were selected from various sports using purposive sampling technique to select elite athletes who participated in 2021 National Sports Festival in Nigeria. Connor-Davidson Resilience Scale-10 (CD-RISC-10) and Stress-Recovery Questionnaire for Athletes (RESTQ-52 Sport) were used for data collection. Shapiro-Wilk Test, Pearson Product Moment Correlation (PPMC) and Structural Equation Modelling (SEM) were employed for data analysis. Results of the study showed that resilience correlated with the factors of stress and recovery. Structural equation modelling results showed that resilience had significant direct effect on stress and recovery with variability of 26% and 55% respectively. Resilience negatively predicted stress and positively predicted recovery. The model invariant was not significant to gender and sport-type of the participants. It was therefore concluded that resilience plays an immense role in coping, overcoming and positively adapting to situations of stress and recovery of elite athletes.

Keywords: *resilience, stress, recovery, adversity, elite athlete*

Introduction

Elite sport is an avenue where both the training and competition are highly challenging. As a result, elite athletes experience a number of stressors, adversities, and failures. The competitive level of the game makes it difficult for elite athletes to cope and recover maximally which in turn affect well-being and performance. The stressors experienced by this unique population are not limited to sporting

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environment, but also to non-sporting milieu ranging from short form of stress (e.g., losing points in a match) to long forms of stress (e.g., severe injury, parental divorce or demise of loved ones) (Rees et al. 2016, Sarkar and Fletcher, 2014, Fletcher and Hanton 2003), and athletes may experience performance slump/ failure due to overtraining or non-functional overreaching if recovery required is inadequate over a long period of time (McCormack et al. 2015). Resilience has been found to play a significant role in enhancing athlete's psychological abilities to overcome adverse situations, recover from stress, injury and attain success (Sanni 2019, Codonhato et al. 2018, Galli and Gonzalez 2014, Fletcher and Sarkar 2012, Galli and Vealey 2008). Therefore, examining the role of resilience on stress and recovery among elite athletes is warranted.

According to Bryan et al. (2018), resilience is "a dynamic process that deals with the ability to maintain regular functioning despite various challenges or to through utilization of coping resources". Resilience is an indicator of the capacity to face and cope with difficult situations and reduces undesirable effects from the stress process (Fletcher and Fletcher 2005). Fletcher and Sarkar (2013) emphasize resilience as "the role of mental processes and behaviour in promoting personal assets and protecting an individual from the potential effect of negative stressors". Research has suggested that for athlete to achieve at higher level, he or she must experience different adversities (Howells and Fletcher 2015, Tamminen et al. 2013, Collins and MacNamara 2012, Sarkar and Fletcher 2014) and be able to manage and adapt to the situation. Therefore, for better understanding of the role of resilience in this study conceptual model of sport resilience by Galli and Vealey (2008) was used as theoretical background. The model states that an adverse condition will produce an agitation process in the athlete, characterized by series of unpleasant emotions and mental fights. The agitation can produce positive results, strengthening and fostering the athlete's psychological capacities and consequently helping future agitation processes. Galli and Vealey (2008) indicated that additional knowledge of the resilient qualities that enable sport performers to positively adapt to stressors is necessary to enhance understanding of resilience in sport.

Studies have shown that the pressure exerted on athletes competing at various levels leads to a reduced participation with the sport and encourage higher rate of burnout (Gould and Dieffenbach 2003). Kellmann (2002) indicates that athletes experience psychological breakdown from the effects of poor and under-recovery than from stress. Bellinger (2020) asserted that the loads or pressure exerted in form of training stress on athletes are targeted to make body stronger than recovering to previous state. Studies have shown that resilience helps to cope with stress (Codonhato et al. 2018), enhance athlete's recovery from injury (Sanni 2019), overcome all stress-related competitive factors (Sarkar and Fletcher, 2014), facilitates sport achievement, success and psychological well-being (Drury 2019, Nezhad and Besharat 2010), unveils individual's skills that protect athlete from negative influence of stress (Pedro and Veloso 2018), reduced anxiety, improved self-confidence and indicated greater positive attitude to perform at elite level (Martin-Krumm et al. 2003), lower anxiety level and depression (Lyu et al. 2022) serves as protective factor between stress and mental health (Dailey 2022)

improved emotional regulation processes (Yi et al. 2005) and predicts faster physiological recovery from stress (Tugade and Fredrickson 2004). Solomon and Becker (2004) indicated that resilient athlete has ability to overcome failures, remain confident and mindful of the present moment. Resilience has shown to correlate with the factors of stress and recovery (García Secades et al. 2016), negatively related to stress and burnout syndrome (Melguizo-Ibáñez et al. 2022), negatively associated with anxiety and depression; and positively with optimism, self-efficacy and self-esteem (Lee et al. 2013).

In regards to the crucial impact of resilience on recovery, Brown et al. (2015) demonstrated how the athletes have not only recovered from adversity, but also how they have acquired additional resilient qualities as a response to adversity. Another study by Cevada et al. (2012) showed that resilient athletes are well equipped to overcome various challenges and stressors of sport settings, which in turn increased the chance of having a great and successful career in sports. Studies have shown that there are interactions that exist between athletes, environments and goals as it is important to an athlete's ability to adjust to the dynamic process of recovery and resilience (García Secades et al. 2016, Yi et al. 2008, Richardson 2002, Kellmann and Kallus 2001).

Gender and sport-type are significant factors that play unique roles in psychological resilience of athletes. Gender personalities of male and female are important elements that distinguish athletes from developing and exhibiting resilience skill. On the other hand, sport-type that is, individual and team sports, has been shown to play a substantial role in influencing resilience ability of the athletes. Plethora studies have revealed that resilience ability of male and female are quite different with most studies indicating higher resilience among males than females, and team sport athletes reported to have higher resilience than individual sport athletes (Blanco-García et al. 2021, Onturk et al. 2020, Biricik and Sivrikaya 2020, Küçük Kiliç 2020, Codonhato et al. 2018), with the exception of few cases that reported higher resilience among female athletes (Reche-García et al. 2020)

Elite athletes experience numerous challenges which include pressure, performance failure, distractions, sleep disturbances, burnout, injuries, loss of loved ones, coach and teammates personality issues, personal and family issues among others (Fletcher and Arnold 2017). All these stressors affect performance, recovery, well-being and performance of elite athletes. Elite athletes require resilience to overcome these challenges in order to cope with the demands of competitive sport and recover maximally. Studies have shown that resilience is an integral aspect of excellence and achievement in sport (Özdemir 2019, Erim and Küçük 2017, Morgan et al. 2015). However, there is need to extend the evidence to ascertain the importance of resilience in coping with stress and recovery process in sport among elite athletes. Most of the studies conducted on impact of psychological resilience have focused on qualitative research, while there is little or dearth of studies that adopted quantitative research especially in sport settings. Therefore, the purpose of this study was to examine the role of resilience on stress and recovery of elite athletes in Nigeria. This study hypothesised that resilience would negatively affect stress; and positively influence recovery of elite athletes.

Methods

Participants

Participants in this study comprised athletes that represented Oyo State in 2021 National Sports Festival in Nigeria. A sample of one hundred and eighty-seven (n=187), (118 males; 69 females), age ranged between 18years and 42years (mean = 26.4; SD = 4.82) were purposively recruited for this study. Participants were drawn from various sports which include athletics (n=31), volleyball (n=12), handball (n=26), swimming (n=8), basketball (n=20), tennis (n=8), football (n=22), table tennis (n=13), badminton (n=6), combat (n=14), weightlifting (n=12), Cycling (n=6) and others (n=9). 107(57.2%) of the participants were drawn from individual sports and 80(42.8%) of the participants were drawn from team sports.

Measures

Resilience

Participants' resilient characteristics were measured using the 10-item Connor-Davidson Resilience Scale (CD-RISC) developed by Campbell-Sills and Stein (2007). The focus of the CD-RISC is on personal resources deemed appropriate for positive adaptation to adversity. The 10-item version of the CD-RISC is a revised version of the original 25-item scale (Connor and Davidson 2003). Examples of items in CD-RISC include "I am able to adapt when changes occur", "under pressure, I stay focused and think clearly", "I am not easily discouraged by failure". The scale is rated on a 5-point scale (0-4), range from not true at all (0), rarely true to true nearly all of the time (4) with higher scores reflecting greater resilience. The scale has been found to be psychometrically superior in a sport context (Gucciardi et al. 2011). In the current study, the scale is internally consistent ($\alpha = 0.91$).

Stress-recovery

The Recovery and Stress Questionnaire for Sports (RESTQ-52 Sport) was used to assess stress and recovery level of the participants. The REST-Q 52 Sport was used over that of the RESTQ-76 items, because information in the general scales (RESTQ-76) are not the focus of interest (Kellman and Kallus 2001). It consists of 12 basic scales, with seven additional sports specific scales which is using a self-report approach, attempts to evaluate physical, subjective, behavioural and social aspects of stress and recovery. The RESTQ-52 Sport consists of 52 items grouped into 19 scales, which consists of 10 stress subscales (general stress, emotional stress, social stress, conflicts/pressure, fatigue, lack of energy, physical complaints, disturbed breaks, emotional exhaustion and injury) and 9 recovery subscales (success, social recovery, physical recovery, general well-being, sleep quality, being in shape, personal accomplishment, self-efficacy and self-regulation).

The 52 items are self-rated on a 7-point Likert scale and indicated how often the subject has participated in various activities during the past three days/nights. The internal consistencies and reliability of the RESTQ-Sport have previously been reported with Cronbach's alpha (0.67–0.88) and the test-retest reliability (r=0.51–0.81) (Kellmann and Kallus 2001). The internal consistencies and reliability of the RESTQ-52 in this present study ranged from Cronbach's alpha (0.63–0.79)

Procedures

Ethical clearance was obtained from the first author's institution. Athletes were then invited to participate in the survey after meeting with the respective authorities and head coaches of various sport units within Oyo State Sports Council, Adamasingba, Ibadan, Nigeria. The aims of the study were clarified to the participants. Upon securing informed consent from the participants, the questionnaire was administered in a quiet and conducive environment before their usual training sessions commenced. The participants were informed that participation in the study was voluntary and they have the right to withdraw at any time. The participants were also informed that there were no wrong or right answers for their responses as data collected was assured with great confidentiality. The filling of the questionnaires was about 20 minutes.

Data Analysis

Shapiro-Wilk test was used for data normality distribution. Descriptive statistics of frequency count, percentage and mean was used to analyse demographic information of the participants. Pearson product moment correlation was used to determine the correlations among the variables at $p<0.05$ significance level.

Main analyses were conducted through Structural Equation Modelling (SEM) using Analysis of moment and structure (AMOS) 24 program. The model was tested using maximum likelihood estimate (MLE) to test initial hypothesis that resilience has a direct influence over athletes' stress and recovery. Besides, the resilience as an observed variable, two latent variables were theorized after the 19 subscales from RESTQ-52. Latent variables were composed by the questionnaire's respective subscales named "Stress" and "Recovery".

SEM was tested by the 2-Step method, verifying measurement variables' adequacy and models identification with latent variables before performing the structural equations. Step 1 – Confirmatory factor analysis of the measurement model, and Step 2 – Identify and specify the structural model, establishing paths for the latent variables. Confirmatory factor analysis of a two-factor measurement model was performed with "stress" and "recovery" as latent variables.

Results

Descriptive Analysis

Results on table 1 reveals the relationship that exist between resilience and the factors of stress and recovery; resilience negatively correlated with the factors of stress; conflict (r=-0.225), burnout (r=-0.205), lack of energy (r=-0.238), but positively correlated with physical compliant (r=146*). On the other hand, resilience positively correlated with the factors of recovery; general well-being (r=0.372**), sleep quality (r=0.343**), physical recovery (r=0.372**), be in shape (r=0.240**), social recovery (r=0.313**), success (r=0.444**), personal accomplishment (r=0.457**), self-efficacy (r=0.426**) and self-regulation (r=0.322**). By implication, increase in athlete's resilience will reduce stress and increase recovery.

Hypothesis Testing

Direct Effect of the Variables

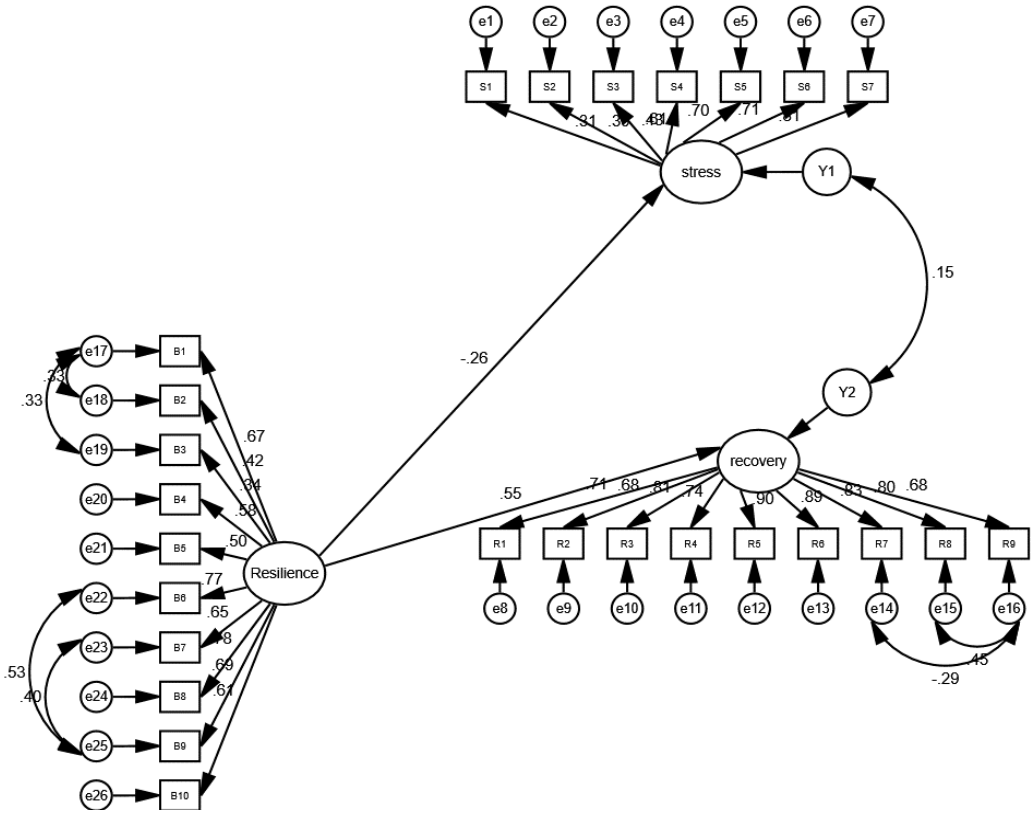
From the adjusted SEM (i.e., Figure 1), resilience had significant direct effect on stress (β=-0.26). This indicates that for every 1% increase in the standard deviation of resilience will reduce athletes' stress by 26%. While resilience had significant direct effect on recovery (β=0.55). This implies that 1% increase in athletes' resilience will increase their likelihood in achieving recovery by 55%.

Table 1. *Maximum Likelihood Estimate showing Fitness Indexes of Resilience on Stress and Recovery Model*

Model	χ^2	df	P	GFI	NFI	CFI	RMSEA	RMR
Initial model	1931.259	594	0.000	0.605	0.543	0.626	0.110	2.414
Adjusted model	1758.295	580	0.210	0.789	0.850	0.892	0.061	0.094

Notes: χ^2, chi-square; df, degree of freedom; P, significance; GFI, goodness-of-fit index; NFI, normed fit index; CFI, comparative fit index; RMSEA, root mean square error of approximation; RMR, root mean square residual.

Figure 1. *Adjusted Model Showing Direct Influence of Resilience on Stress and Recovery*



Where: Y- Disturbance; e- error.

Table 1 reveals that the initial (hypothesized) model recorded a fitness value; χ^2 (594)=1931.259, p>0.001, but inferior to the reduced model which recorded χ^2 (580)=1758.295, p<0.05. The non-significant chi-square here indicates that the fit between the model and the data is not significantly worsened. This inference is made based on the affinity goodness of fit estimate have for sample size. Based on the recommendation by Cohen (2013) and Tabachnik and Fidell (2007) the p-value notwithstanding the lesser the chi-square value the better the model. To further ascertain the fitness of the reduced model over the initial model other fit indexes were considered: Normed fit index (NFI)=0.850<0.95; Comparative fit index (CFI)=0.892<0.90; Root mean square error of approximation (RMSEA)= 0.061=0.06. However, root mean square residual (RMR)=0.094; indicates the amount by which the estimated model variance and covariances (i.e., re-produced) differ from the observed variance and covariances=0.094. This implies that the reduced model gained an incremental fitness over the initial (hypothesized) model, partially satisfying all the criteria for a good model. This indicates that significant path ways are possible paths that predict the variation observable in stress and recovery. Therefore, the reduced model is a close representation of the data

Table 2. *Models Invariance Analysis as a Function of Gender and Sport Type*

Groups	**Stress**		**Recovery**	
	B	**r^2**	**B**	**r^2**
Gender				
Male (1)	-0.250	-0.137	0.531	0.380
Female (2)	-0.224	0.033	0.566	0.482
Sport type				
Individual (1)	-0.243	-0.106	0.672	0.657
Team (2)	-0.372	-0.145	0.732	0.221

Table 2 reveals the variation that exists in the pathways based on group variance. It shows that across the group, resilience negatively predicted stress and positively predicted recovery with slight variances in their beta weights contributing between -0.224 (-) -0.372, that is resilience accounts for between 22.4% to 37.2% reduction in stress, while resilience accounts for between 53.1% to 73.2% recovery. This indicates that variation between groups is not significant enough to declare variance in the model. Therefore, resilience on stress and recovery model are invariant to gender and sport-type.

Discussion

The purpose of this study was to examine the role of resilience on stress and recovery of elite athletes in Nigeria. In the present study, the results presented an immense contribution to the understanding of resilience role in sports setting, confirming initial hypothesis as expected that resilience would negatively affect stress, while positively influence recovery. This suggests that psychological resilience has an important role in coping with stress and recovery of elite athletes.

The present finding is consistent with the conceptual model of sport resilience by Galli and Vealey (2008) adopted for this study. The model states that an adverse situation will produce an agitation process in the athlete, characterized by a wide range of unpleasant emotions and mental struggles. The agitation can have positive outcomes, strengthening and improving the individual's psychological capacities and consequently benefiting future agitation processes. Moreover, resilience will have positive outcomes to overcome and manage stress successfully, contributing to improvement in athlete's ability to cope and overcome future stress and adversities encountered in sports; and also maintain optimal well-being. With this, resilient elite athletes are expected to have more coping resources to stress and recovery.

The present finding is further consistent with the study of Fletcher and Sarkar (2012) that an athlete's ability to deal with and overcome all stressors associated with the competitive environment, and in particular their ability to use these opportunities to elevate their performance would be reflective of their psychological resilience. The authors further indicated that the importance of exposure to stress is something that generated successive levels of coping and adaptation, with this being one of the possible differences between higher and lower-level-performance athletes put forward. Similarly, Codonhato et al. (2018) found that psychological

resilience helps to relieve stress and determine success in sports. Dailey (2022) indicated that resilience is significant and serves as a protective factor between stress and mental health. Nezhad and Besharat (2010) showed that resilience has positive correlation with sport achievement and psychological well-being; and negative correlation with psychological distress. The authors added that the increase in the level of resilience brings about an increase in sport achievement and psychological well-being level of athletes. In addition, Pedro and Veloso (2018) found that athletes' resilience shows personal skills that protect individuals from the negative effects of stressful events. These unique skills allow athletes to have better and easier adaptation to negative and stressful circumstances often experienced in environment/individual interaction events

Moreover, the finding of this study indicates that resilience negatively correlated with the factors of stress; conflict, burnout, lack of energy, but positively correlated with physical compliant. These relationships corroborate with the results obtained in the previous research by García Secades et al. (2016) that scores for the various stress factors in the RESTQ-Sport correlate negatively with resilience, whereas recovery factors correlate positively. This is also in accordance with the study of Nezhad and Besharat (2010) that resilience is correlated with various psychological variables closely linked to performance, in such a way that there are positive correlations with psychological well-being or sporting achievement and negative correlations with psychological distress. Similarly, Melguizo-Ibáñez et al. (2022) revealed negative relationship between stress and resilience; and the same between resilience and burnout syndrome, while Lyu et al. (2022) confirmed significant inverse relationship between resilience and both somatic and cognitive anxiety and further demonstrated negative relationship between resilience and depression. A meta-analysis conducted by Lee et al. (2013) also confirmed the existence of negative associations of resilience with anxiety or depression and positive ones with optimism, self-efficacy and self-esteem.

Consequently, the results of this present study demonstrate that resilience has a direct positive influence on recovery. This coincides with the finding of Brown et al. (2015) that the winter sports athletes indicated how they have not only recovered from adversity, but also how they have acquired additional resilient qualities as a response to adversity. Cevada et al. (2012) showed that more resilient athletes are better prepared to overcome the challenges and stress of sporting environments, a fact that increases the probability of having a successful career in sport. Richardson (2002) and Yi et al. (2008) showed that interactions between athletes', environments, and goals play a pivotal role in an athlete's ability to adapt and/or optimise the dynamic process of recovery and promote resilience

Furthermore, the findings of the present study indicated that resilience positively correlated with the factors of recovery; general wellbeing, sleep quality, physical recovery, be in shape, social recovery, success, personal accomplishment, self-efficacy and self-regulation. The positive relationship between resilience and recovery could be attributed to the personal, social, environmental, psychological resources and other factors that being employed by the athletes to promote their general well-being, integrate with team members, believing in oneself on executing a particular task successfully and having control on personal decisions are all

elements of psychological resilience. This is in accordance with the study of Kellmann and Kallus (2001) that resilience had positive relationship with recovery in general, and more specifically with self-regulation and personal accomplishment, showing that resilient individuals make better and improved use of psychological skills abilities to prepare, stimulate, motivate and establish goals for themselves, having enjoyment with their sport, feeling integrated and unified with their teams. Similarly, García Secades et al. (2016) found that resilience correlates positively in athletes that their coping style focused on the present moment task, whereas there was negative association with those whose coping focused on emotions or distraction.

In addition, the model in this study reveals that the variation between groups across gender and sport-type is not significant. This shows that there is no significant difference between male and female personality; and likewise, there is no significant difference between individual and team sport in the role of resilience on stress and recovery. This is contrary to the findings of Codonhato et al. (2018) who found predictive association between models of general, gender and sport-type. The authors found significant difference between gender of male and female with male having higher resilience than their female counterparts; and sport-type (i.e., individual and team sports athletes). Blanco-García et al. (2021) reported higher level of resilience among males than female counterparts, and that the more experienced the athletes, the higher the level of resilience. Similarly, Onturk et al. (2020) and Küçük Kiliç (2020) found that perception and scores of resilience was higher among male than female participants, and team athletes reported higher level of resilience than individual athlete. This was a different case in the study of Reche-García et al. (2020). The authors indicated gender difference on level of resilience with women reported to have higher level of resilience than their men counterparts among team sports practitioners.

Limitations

The study had a number of limitations that should be considered. First, the sample size in this study was small and this could affect the generalizability of the data. The future studies should consider larger sample size and cover more regions in the country. Also, this study focused only on elite athletes from various sports that participated in the National Sports Festival 2021. The future studies should consider other levels of participation in sports, sport specificity and not just only elite athletes. The data collected in the study was based on the psychological aspects of stress and recovery. Further studies should consider the measurement of physiological parameters that compliment with the levels of stress and recovery and association with psychological resilience.

Conclusion

This study supports the significant role of resilience in coping with stress and recovery of elite athletes. Resilience seems to influence the athlete's stress and

recovery. Therefore, this can be considered a vital demanding characteristic that athletes should possess in order to be able to deal with and adapt to adversities experience in competitive sports and non-sport settings. Coaches, sport psychologists and other sports professionals should consider resilience as a great quality to be possessed by athletes and employ different psychological interventions that can help to develop and enhance athletes' resilience ability to cope with stress and recovery in order to achieve great success and well-being. Significant others can as well help elite athletes to develop resilience by providing adequate supports as they face numerous challenges as this could influence their coping with stress and recovery.

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