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**Original Article**

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# Mental Toughness and Coping Skills in Male Sprinters

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## ABSTRACT

The predictive quality of psychological skills in relation to sports and more specifically track and field athletes continues to be explored. Purpose: To profile psychological adaptations in Jamaican male sprinters and to assess the differences between elite and sub-elite athletes. Methods: A cross-sectional study of 30 male participants who were grouped based on previous athletic achievement into the elite group and sub-elite group. Following a simulated competitive run; the athletes completed the Athletic Coping Skills Inventory-28 and the Mental Toughness Questionnaire-48. Results: The elite athletes exhibited greater mental toughness than the sub-elite group and coping skills were a significant predictor of mental toughness. Conclusion: Assessment of psychological skills may distinguish elite from sub-elite athletes. **Key words:** SPRINTERS, MENTAL SKILLS, MALE ATHLETES, PERFORMANCES.

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## INTRODUCTION

A major tenet of sports psychology is that psychological skills are important determinants of performance (Smith & Christensen, 1995; Smith et al., 1995, Nicholls & Ntoumanis, 2010). The development of talent is said to be critical in the teenage years (Gould et al., 2002; Bull et al., 2005). As such, the development of the psychological framework in keeping with that talent is also important. The predictive quality of psychological skills in relation to sports and more specifically track and field athletes warrants further exploration.

When comparable, physical abilities are seen in top-tier athletes, coaches and team personnel need to identify the psychological attributes which separate these performers (Smith, 2003; Kimbrough et al., 2008). Two key mental skills associated with athletic performance are coping and mental toughness. Analyzing the combination of these two constructs and associated behaviors will enable a greater understanding of how athletes use these skills to consistently perform at the local and international level and will give insight into the selection of talent and future development. The assessment of psychological skills, when exploring for talent is said to have a significant effect on predicting future athletic success (Humara, 2000).

Coping as initially defined by Lazarus and Folkman (1984) refers to an athlete's cognitive and behavioral efforts to manage internal and or external stressors (Crocker et al., 1998). According to Crocker et al. (1998), coping is seen as an important cognitive process that occurs between stressful events and the subsequent outcome. Performance pressure, personal and family expectations and media scrutiny are just a few of the things an athlete must learn to cope with for successful performance in competition. Poor performances are said to be related to poor management of emotions (Gould et al., 1991; Holt et al., 2005). Coping skills serve as the mediator between the individual and the demand/stress (Nicholls & Polman 2007). Coping enables proper regulation and modification of perception to facilitate a more relaxed state of mind that will give rise to optimal performances (Bognar et al., 2009).

In addition, mental toughness (MT) is often associated with outstanding athletic performances (Golby & Sheard, 2004). The term mental toughness is often tossed about by athletes and coaches alike (Creasy, 2005), as it is seen as an attribute of the world's best performers (Jones et al., 2002; Jones et al., 2007). Jones et al 2002, (p. 209) defined MT as "the psychological edge that enables one to cope with competition, training, and lifestyle demands; and be more consistent and better than the opponents' coping mechanisms. It helps the athlete to remain determined, focused, confident, and in control under pressure".

Coping and mental toughness are multifaceted constructs with meaningful association. They are not mutually exclusive; as both require some degree of the other to be effectively expressed. Nicholls and Polman (2007), Nicholls et al (2008) state an obvious relationship between coping and mental toughness. However, few studies have explored this link.

This investigation used a cross-sectional study design to profile and to assess differences in coping skills and mental toughness between elite and sub-elite athletes in Jamaica. It was hypothesized that the elite athletes would possess better coping skills and mental toughness than sub-elite athletes.

## MATERIALS AND METHODS

The study participants were male track and field sprinters ( $N = 30$ ), who represented their respective schools at the national secondary school championships. The participants were grouped based on previous athletic achievement into the Elite Group (EG), and sub-elite group (SEG), with the following demographics

respectively ( $n = 15$ ,  $Mage = 17.40$ ,  $SD = 1.40$ , and  $n = 15$ ,  $Mage = 17.0$ ,  $SD = 1.40$ ). The EG consisted of athletes who made the finals at the secondary school championship for their respective sprint events or were national representatives, while the SEG consisted of athletes who did not make the finals of their respective events nor were they national representatives. Schools across the island with established track and field programs were approached for participants after assessing the results for the sprint events at the annual High School Championships. Sampling was conducted during the outdoor track and field season from January to early April in keeping time with the annual high school championship.

Institutional and ethical approval was granted by the Institutional Review Board. All participants provided written assent if they were younger than 18 years old, along with parental consent, or informed consent for those greater than or equal to 18 years of age. Participation was voluntary and subject to school administration and team coaches cooperation.

Coping was measured using The Athletic Coping Skills Inventory (ACSI-28), providing an athlete psychological framework using seven sport specific subscales: coping with adversity (COPE), peaking under pressure (PEAK), goal setting and mental preparation (GOAL), concentration (CONC), freedom from worry (FREE), confidence and achievement motivation (CONF), and 'coachability' (COACH). It consists of seven subscales/skills which are measured by four questions each. Each question is measured using a 4-point Likert scale ranging from 0 to 3 with choices of "almost never", "sometimes", "often" and "almost always", whereby athletes are asked to recall their experience in relation to the situation posed on the questionnaire. A score for each subscale/skill can range from 0 to 12, while the summation of all the scores for each skill creates a value ranging from 0 to 84 called the Personal Coping Resource (composite score). Higher scores are indicative of the ability to cope with the demands of the sport and greater psychological skills or constructs. Validation of the ACSI instrument was done by Smith et al. (1995), using confirmatory factor analysis and was found to possess good factorial validity for both males (.84) and females (.88). The ACSI-28 exceeded the goodness of fit criteria and all factor loadings were significant at  $p < .001$  (Waples, 2003).

Mental toughness (MT) was measured using the 48 item Mental Toughness Questionnaire (MTQ-48) (Clough et al., 2002), a 4C's model measuring Control (CONT), Challenge (CHA), Commitment (COMMIT), and Confidence, (CONF-MT), essentially an eight factor structure, where Control is further divided into Emotional (ECONT) and Life Control (LCONT), while Confidence is further divided into Confidence in one's Ability (CONF-AB) and Interpersonal Confidence (CONF-IP). This 48 item questionnaire measures four factors/skills addressed by a 5 point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This questionnaire is finely scored using software provided by AQR, with scores ranging from 1 to 10 for each factor, with an overall mental toughness score also ranging from 0 to 10. Higher scores are indicative of greater mental toughness and its associated factors. Clough's et al. (2002) instrument which is said to be reliable and sound. Construct validity was demonstrated by Clough et al. (2002) and Horsburgh et al. (2009) using exploratory and confirmatory factor analyses (Clough et al., 2010).

Under the guidance of our research team and the school coaching personnel, the participants completed a simulated competitive run of 350metres. Following this, we asked the coaching staff to recuse themselves; and under passive recovery mode, athletes were given a clipboard with both questionnaires to complete-ACSI-28 and MTQ-48. Questionnaires were completed by the athletes on their own without the help or oversight of research team, coaches or team personnel. The athletes were expressly told they should feel free to answer truthfully as coaches would not see their answers.

The responses of the questionnaires were rated in accordance with the scales provided. The ACSI-28 was done manually while the MTQ-48 was entered online at the providers website [mtqtest.com](http://mtqtest.com) scored and a report was generated. Data analysis was done using means, standard deviation, independent t-test, regression analysis and Pearson's correlations. Computations were done using IBM SPSS version 21.0 (NY, USA), with significance set at  $p \leq .05$ .

## RESULTS

The data profiled coping skills and mental toughness in youth and junior level Jamaican male athletes. For this study both the ACSI-28 and MTQ-48 demonstrated internal consistency, Cronbach  $\alpha = 0.740$ , and  $0.907$  respectively.

Coping skills as measured by the ACSI-28 with its seven subscales and composite score- Personal Coping Resource (PCR) are presented in Table 1. The EG scored higher on six of the seven subscales, and the PCR compared to the SEG. The SEG outscored the EG on the subscale Coachability (COACH). Mean values of each subscale for both the EG and SEG were at mid-point or higher on the score scale.

Table 1. Mean scores of ACSI-28 for male athletes

ACSI-28 Subscale	Elite (EG) n = 15			Sub-elite (SEG) n = 15			p value
	M	SD	95% C.I.	M	SD	95% C.I.	
COPE	7,86	2,5	[6.48,9.25]	6,06	2,57	[4.63,7.49]	0,06
COACH	9,46	2,06	[8.32,10.61]	10,33	1,44	[9.53,11.13]	0,19
CONC	6,8	1,85	[5.77,7.82]	6,33	2,35	[5.03,7.63]	0,55
CONF	8,73	2,01	[7.61,9.85]	7,6	1,84	[6.57,8.62]	0,12
GOAL	8,86	1,5	[8.03,9.70]	7,93	2,31	[6.65,9.21]	0,2
PEAK	7,46	2,32	[6.17,8.75]	6,33	3,13	[4.59,8.06]	0,27
FREE	6,33	2,94	[4.70,7.96]	5,86	3,29	[4.04,7.68]	0,68
PCR	55,53	8,9	[50.60,60.46]	50,46	10,92	[44.41,56.51]	0,17

Legend:

CI = Confidence Interval

COPE = Coping with Adversity

COACH = Coachability

CONC = Concentration

GOAL = Goal Setting & Mental Preparation

PEAK= Peaking Under Pressure

FREE = Freedom from Worry

PCR = Personal Coping Resource

Mental toughness as measured by the MTQ-48 with its four subscales and overall Mental Toughness score (MT) are presented in Table 2.0. The EG scored higher on all subscales and the overall MT score compared to the SEG. Mean values of each subscale for both the EG and SEG were at mid-point or higher on the score scale.

Table 2. Mean scores for the MTQ-48 for male athletes

MTQ-48 Subscale	Elite (EG) n = 15			Sub-Elite (SEG) n = 15			<i>p</i> value
	M	SD	95% CI	M	SD	95% CI	
CONT	5	2,03	[3.87,6.12]	4,8	1,85	[3.77,5.82]	0,78
LCONT	4,6	2,09	[3.43,5.76]	4,66	2,19	[3.45,5.88]	0,93
ECONT	5,4	2,26	[4.14,6.65]	5,06	1,62	[4.16,5.96]	0,65
CHA	6,4	1,99	[5.29,7.50]	4,4	2,29	[3.13,5.66]	0.02*
COMMIT	6,26	2,31	[4.98,7.54]	4,93	1,79	[3.94,5.92]	0,09
CONF-MT	6,73	2,12	[5.55,7.90]	5,4	2,06	[4.25,6.54]	0,09
CONF-AB	7,13	1,95	[6.04,8.21]	5,86	1,99	[4.76,6.97]	0,09
CONF-IP	5,6	2,32	[4.31,6.88]	4,2	1,74	[3.23,5.16]	0,07
MT	6,46	1,8	[5.46,7.46]	5,06	1,9	[4.01,6.12]	0.05*

Legend:

CI=Confidence Interval

CONT=Control

LCONT=Life Control

ECONT=Emotional Control

CHA=Challenge

COMMIT=Commitment

CONF-MT=Confidence

CONF-AB=Confidence in one's Ability

CONF-IP=Interpersonal Confidence

MT=Mental Toughness

\*  $p < 0.05$ 

Levene's independent t-test was completed to compare scores of Coping and Mental Toughness. Scores for the ACSI-28 failed to distinguish between the two groups of athletes. The EG score for PCR, ( $M = 55.53$ ,  $SD = 8.90$ ) was not significantly higher compared to the SEG score ( $M = 50.46$ ,  $SD = 10.92$ ). Mental Toughness as measured by the MTQ-48 indicated some differences. The subscale of Challenge (CHA) was significantly different between the two groups of athletes ( $t(28) = 2.55$ ,  $p = .017$ ) with scores of the EG being ( $M = 6.40$ ,  $SD = 1.99$ ) and SEG ( $M = 4.40$ ,  $SD = 2.29$ ). The overall MT score also proved to be significantly different between the two groups ( $t(28) = 2.06$ ,  $p = .048$ ), with a higher score for the EG ( $M = 6.46$ ,  $SD = 1.80$ ) than the SEG ( $M = 5.06$ ,  $SD = 1.90$ ).

Ordinary Least Square Regression analysis of Mental Toughness and the independent variables of age and ACSI-28 PCR indicated that only PCR emerged as a factor of Mental Toughness, ACSI-28 PCR ( $p < .01$ ). Furthermore, the ACSI-28 PCR accounted for ( $R^2 = 38\%$ ) of the Mental Toughness score. All the assumptions of OLS were met for this model  $F(4, 25) = 8.43$ ,  $p < 0.01$ . Details of the regression model are found in Table 3.

Table 3. Ordinary Least Square Regression of Mental Toughness and selected independent variables

	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>	95% CI
	B	S.E.	$\beta$			
Constant	12,88	6,54		1,97	0,05	[-0.23,25.98]
Age	-0,03	0,09	-0,04	-0,38	0,71	[-02.20,0.14]
ACSI-28 PCR	0,47	0,08	0,59	5,56	0**	[0.30,0.63]

Legend:

CI = Confidence Interval

PCR = Personal Coping Resource

 $R^2 = 0.380$ , Adjusted  $R^2 = 0.335$  $F(4, 25) = 8.43$ ,  $p < 0.01$ \*\*  $p < 0.01$ , \*  $p < 0.05$ 

Disaggregation of the composite variable ACSI-28 was also entered into the regression model, however, not all the subscales of the ACSI-28 were correlated with Mental Toughness. In fact, only Concentration, Confidence, and Freedom from worry were associated with Mental Toughness. Subscales of Confidence, Concentration, and Freedom from worry ( $R^2 = 65\%$ ) were statistically significant predictors of mental toughness. In addition using the Beta weights, Confidence ( $\beta = .413$ ,  $p = .002$ ) contributed the most to Mental Toughness of the sample followed by Freedom from worry ( $\beta = .285$ ,  $p = .04$ ), and Concentration ( $\beta = .253$ ,  $p = .005$ ). All the assumptions of OLS were met for this model. Details of this regression model are in Table 4.

Table 4. Ordinary Least Square (OLS) regression of Mental Toughness and components of ACSI-28

	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>	95 % CI
	B	S.E.	$\beta$			
Constant	-1,03	1,94		-0,53	0,6	[-4.91,2.86]
COPE	0,04	0,11	0,04	0,33	0,75	[-0.18,0.25]
COACH	0,02	0,1	0,02	0,23	0,82	[-0.16,0.20]
CONC	0,23	0,11	0,25	2,1	0.04 *	[0.01,0.44]
CONF	0,37	0,11	0,41	3,27	0**	[0.14,0.60]
GOAL	-0,02	0,09	-0,02	-0,21	0,84	[-0.20,0.16]
PEAK	0,1	0,08	0,13	1,22	0,23	[-0.06,0.25]
FREE	0,2	0,07	0,29	2,95	0.01*	[0.07,0.34]

Legend:

CI = Confidence Interval

COPE = Coping with Adversity

COACH = Coachability

CONC = Concentration

CONF = Confidence &amp; Achievement Motivation

GOAL = Goal Setting & Mental Preparation

PEAK= Peaking Under Pressure

FREE = Freedom from Worry

$R^2 = 0.38$ , Adjusted  $R^2 = 0.34$

$F(4,25) = 8.42$ ,  $p < 0.01$

\*  $p < 0.05$  \*\* $p < 0.01$

Pearson's product moment correlations of the subscales of the ACSI-28 and MTQ-48 proved to be significant. With all subscales of the MTQ-48 being significantly correlated with the ACSI-28 PCR score ( $p < .05$ ). The overall mental toughness score and the PCR were also significantly correlated ( $r = .718$ ,  $N = 30$ ,  $p < .01$ ). The correlation data is presented in Table 5.

Table 5. Pearson's Product Moment Correlations of MTQ-48 and ACSI-28 PCR

MTQ-48 Subscale	ACSI-28 Personal Coping Resource (PCR)	$\rho$
Control	0.65**	0
Life Control	0.56**	0
Emotional Control	0.51**	0
Challenge	0.42*	0,02
Commitment	0.58**	0
Confidence	0.65**	0
Confidence in Abilities	0.70**	0
Confidence Interpersonal	0.40*	0,03
Mental Toughness Score	0.72**	0

Legend: \*\*  $p < 0.01$ , \*  $p < 0.05$

## DISCUSSION

The psychological characteristics of Jamaican youth and junior level were examined in male track and field athletes. The psychological skills of coping and mental toughness; and their respective subscales were assessed for two groups of athletes whose previous athletic achievement was used as group classification. We hypothesized that athletes placed in the two groups EG and SEG would be distinguishable from each other by psychological scores of coping skills and mental toughness. Our results indicated a significant difference for mental toughness between the two groups of athletes but not for coping skills. We also hypothesized, successfully, that mental toughness and coping scores would be correlated for both groups of athletes.

The results of our study add to the literature following studies done by Anshel (1996) as adolescent athletes employed similar coping strategies and Mallet & Harahan (2004) and Lawless (2013) where elite athletes were distinguished from sub-elite athletes in track and field.

Coping as measured by the ACSI-28 did not indicate any statistically significant differences between the two groups, however, the EG scored consistently higher than the SEG for six of the seven subscales and the overall PCR score. Only the subscale of Coachability was averaged higher for the SEG. Coachability for the

ACSI-28 refers to an athlete's ability to be open to and learn from instruction; while accepting constructive criticism without taking it personally or becoming upset. This finding may suggest that the SEG are more open to learning so as to develop; while the EG may feel a certain level of confidence in their ability and may be less inclined to listen to the coaches' instructions.

The MTQ-48 questionnaire proved to be more divisive as the EG not only consistently scored higher on this questionnaire; but statistically significant differences emerged between the EG and SEG for the subscale of Challenge (CHA) and overall MT score. Overall scores for the MTQ-48 were at mid-point or higher on the scale.

Challenge as defined by the creator of the MTQ-48 is being able to adapt and cope with obstacles (Clough *et al.*, 2002). Thus, we may reason that when self-reporting, the EG see themselves as being better able than their peers to handle challenges and cope with the demands of athletics. The EG score of overall mental toughness was also significantly higher, thus they may see themselves as possessing the characteristics of a mentally tough person as they could think they possess that psychological edge (Jones *et al.*, 2002).

The study investigated the relationship between Coping and Mental Toughness. Scores from the MTQ-48 were significantly correlated with the ACSI-28. The regression model designed proved that Coping is a significant part of the Mental Toughness characteristic, as the PCR contributing close to one third (38%) of the MT score suggests.

Three subscales of the ACSI-28 were more potent in their combined contribution to mental toughness than the overall score PCR; concentration, freedom from worry, and confidence were significant predictors of the mental toughness score; with confidence as the most significant contributor. The literature points to confidence being related to mental toughness and highly associated with successful sport performances (Golby & Sheard, 2004). Confidence, concentration, and freedom from worry are explanatory variables of Mental Toughness; hence the disaggregated variables may be employed over the composite PCR score of the ACSI-28.

## CONCLUSIONS

This study pointed to differences between athletes classified as EG and SEG in relation to their scores on coping and mental toughness questionnaires. The general trend presented suggests that athletes who are considered elite have better coping strategies and are more mentally tough than their sub-elite counterparts.

Coping and Mental Toughness are important psychological skills where their expressions in track and field athletes may be inter-related. The assessment of Coping and Mental Toughness can provide insight into training and performance mindset at the youth and junior levels.

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