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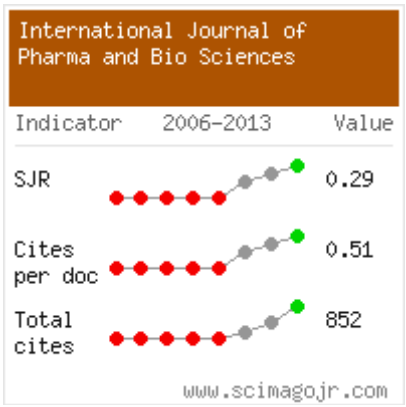

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PSYCHOLOGICAL AND PSYCHOBIOLOGICAL FACTORS AS A MEASURE OF IRRITABILITY IN THE ATHLETES.

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ABSTRACT

Present study was undertaken to identify the confounding associations between mood disorders and concomitant psychobiological precursors of inner emotional hindrances observed in high performing athletes of Malaysia. Altogether one-hundred nine male young competitive athletes young competitive athletes volunteered as participants, who were subjected to evaluation of projective analyses of emotionality (in the form of indices of irritability and suspicion); inner psychobiological status (autonomic indices of tonic and phasic skin conductance response habituation paradigm components). Findings of multiple linear regression analyses revealed corroborative relationships between differential psychobiological and inner feelings of suspicion in predicting inner core emotionality. Different Sc indices, such as - tonic and phasic components of skin conductance activity were found to contribute onto the changes observed in the extent of feeling of irritability. Corroborative psychophysiological markers for innate psychological make-up was attempted to be established as differential models in multiple linear regression analyses suggested varied ranges of direct, inverse and supportive relationships between decomposition of autonomic orienting activity components related to affective-motivational aspects of sports behaviour.

KEYWORDS: **Irritability; Moods; Psychobiology; Athletes**

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INTRODUCTION

Compared to emotions which are subjective and conscious state of mind, mood usually refers to a less specific and intense emotional state, which is susceptible to have either a negative or a positive valence. Mood is characteristically more varying in nature, could be broadly distinguished by either manic or hippomanic episode. While manic states are characterized as having abnormally elevated arousal or energy level hippomanic episodic phases may be referred to as having persistent disinhibition and pervasive elevated irritable mood, which may be identified as a feeling of agitation that can occur with or without any provocation. Uncertainties in the field of sport may give rise to this feeling of agitation, which disrupts optimal performance which in course interfere with learning and adequate processing of sports skills, and may also lead to catastrophic performance outcomes[1,2,3,4]. Mood is generally portrayed as a transitory and irregularly changeable affective state that reflects an individual's general feeling at a particular moment in time. The relationship between mood and sport performance has been examined intensively by researchers, and according most of them Brunel's Mood Scale is universally accepted as suitable self-report inventory for monitoring mood responses and examining mood–performance relationships[5, 6]. Since mood could be an important predictor of sport performance outcomes, player's ability to control mood would be a significant issue in performance research[5]. Internalised or deep-seeded feeling of irritability thus could have valid contribution of perceived mood components, which may in turn aggravate the feelings of irritability. With such a background, the present study was aimed:

- To identify whether autonomic indices of emotionality and mood states can predict changes in feelings of irritability in the young adult athletes;
- To justify the relationship between different mood states and emotional feelings of suspicion as predictor of feelings of irritability.
- To observe whether differential mood variations predict feelings of irritability in the young adult athletes.

2. METHODOLOGY

2.1. Participants

One-hundred nine consistently high performing young male athletes (age –range = 18.4 – 23.6 years) from Malaysia were recruited as participants for this study. The sample size was calculated using G power 3.0.10. The power of the study is set at 80% with 95% confident interval and the effect size F at 0.15. They were mostly state –level high-performance trainee athletes and based on their low-level of RHR (mean resting heart rate was lower than 55 BPM & mean VO_2 max higher than 52.5 ml/kg/min) and based on their consistency in high performance, they were selected unanimously by their expert coaches.

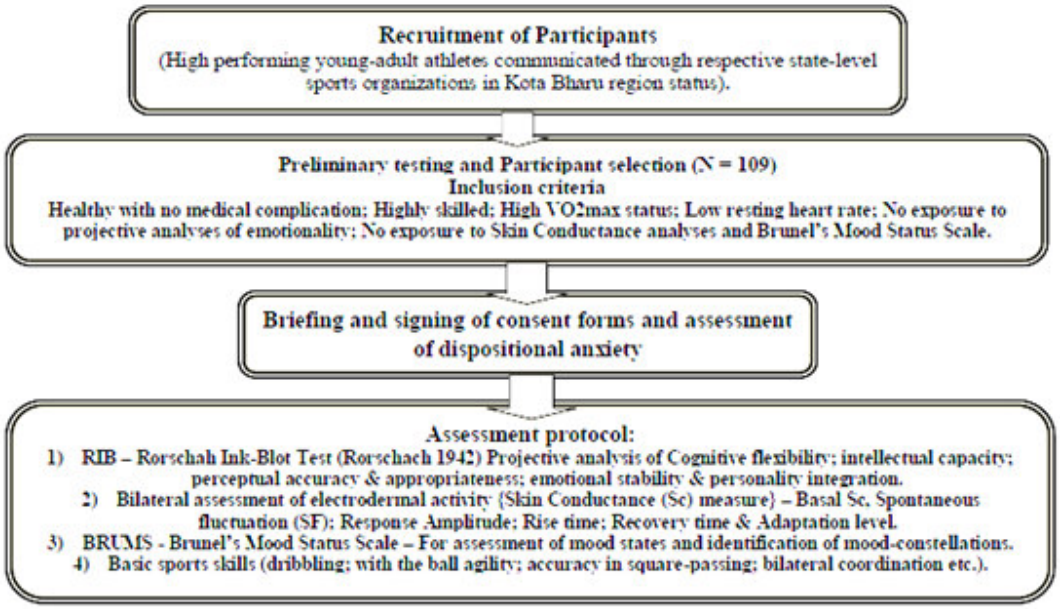

Figure 1 - Flow chart of the experiment

2.2. Materials Used

1. Brunnel Mood Scale[7] was employed to measure mood state of participants.
2. Rorschach inkblot test[8] was administered to evaluate the personality and emotionality of the participants.
3. Skin Conductance Apparatus (ProComp5 Infinity, Thought Technology Corp. USA) - was used to assess the extent of tonic as well as phasic i.e., habituation paradigm component of autonomic regulation as indices of emotionality of the participants.

2.3. Procedure

For this study data were collected at the laboratory of the Exercise & Sports Science programme of the School of Health Science, of the Universiti Sains Malaysia. Upon receiving ethical approval from Research Ethical Platform of Universiti Sains Malaysia, participants were invited to participate in the experiment and upon receiving signed consent from them, they were recruited for the study, which was carried out in a counterbalanced, double-blind randomized fashion, with each assessment was separated by at least 15 minutes. Participants were randomly assigned for the assessments following the Research Randomizer v4.0, software[9]. The order of tests was administered using a Latin-square design. At the end of every evaluation, the obtained data was handled with optimal care to maintain confidentiality and privacy, and for further analyses to obtain differential indices of potential causes of performance hindering disruptive emotionality. All of the participants upon arrival at the laboratory of the Exercise & Sports Science programme of the School of Health Science, of the Universiti Sains Malaysia were at first subjected to assessment of their mood status by administering the BRUMS – Brunnel Mood Scale[7], followed by projective evaluation of emotionality (employing the Rorschach Inkblot test) following standard method of administration[3,4,10]. Finally they were subjected to evaluation of psychobiological indices of emotionality (both tonic and phasic skin conductance assessments were done)[1,2]. On the basis of the scores obtained from the projective analyses of emotionality (employing RIB), emotional measures of feelings of Suspicion and Irritability were derived. Tonic and phasic Sc (Sc) activity data were decomposed as – basal or tonic Sc; SF or NS-SCR (non-specific Sc response, which is also termed as spontaneous fluctuation or SF); and, phasic Sc, and stimulus-specific orienting response measures (viz. latency; amplitude and recovery time).

3. RESULTS AND DISCUSSION

Table 1a represented the descriptive information pertaining to mood variables, which revealed somewhat consistency in the data; since lower extents of standard deviation indices clarified that the data were considerably free from inconsistencies.

Table 1a
Descriptive Reports on Different measures of mood-states (N = 109)

Variables	Mean	Std. Deviation
Tension	46.6667	6.91599
Depression	51.6952	8.40383
Anger	49.8810	6.81401
Vigour	51.0524	6.87427
Fatigue	52.8905	5.18762
Confusion	54.9857	9.16592

Table 1b however represented the descriptive reports concerning to positive- negative and facilitative-inhibitive mood variables, which also revealed somewhat consistency in the data; since moderate and lower extents of standard deviation indices clarified that the data were considerably free from huge dispersions.

Table 1b
Descriptive Reports on Different measures of mood orientations. (N = 109)

Variables	Mean	Std. Deviation
Positive mood	50.9810	6.84830
Facilitative mood	48.8346	10.42379
Negative mood	51.2124	5.67375
Inhibitive mood	52.6385	8.98669

Result tables from Tables 2 to 4, however explained the relationships existing between different mood and Sc parameters in explaining their relative contributions on the extent of changes observed in the feeling of irritability observed in the athletes. Multiple linear regression analyses were done to identify predictive associations between the self-reported mood-states, psychobiological Sc indices of emotionality as well as emotionality evaluated by projective analyses. The Table 2 however explained that, the model a emerged significant as inner emotional feeling of suspicion along with different measures of mood-states and the psychobiological Sc measures such as latency; amplitude; recovery etc., could explain 80.8% variance of changes in the extent of emotional feeling of irritability.

Table 2
Summary of multiple linear regression analysis when Mood and Sc variables were assessed.

Model *a* Dependent Variable – Irritability	Unstandardized Coefficients		Standardized Coefficients			Correlations Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
(Intercept)	-6.445	1.106		-5.825	.000					
Suspicion	.190	.031	.247	6.070	.000	.272	.399	.184	.555	1.800
Tonic SF	-.365	.040	-.468	-9.142	.000	.144	-.549	-.277	.350	2.857
Tonic Adaptation	.016	.003	.266	4.608	.000	.362	.314	.140	.275	3.632
Phasic Adaptation	-.049	.004	-.549	-13.350	.000	-.264	-.692	-.405	.543	1.841
Latency	.823	.082	.740	10.063	.000	.152	.586	.305	.170	5.880
Amplitude	-.071	.016	-.307	-4.373	.000	.018	-.300	-.133	.186	5.369
Recovery	.052	.008	.559	6.476	.000	-.077	.422	.196	.123	8.099
Tension	.144	.019	.516	7.490	.000	-.158	.474	.227	.193	5.171
Anger	-.277	.019	-.980	-14.591	.000	-.236	-.723	-.442	.204	4.908
Vigour	.026	.012	.094	2.249	.026	-.246	.159	.068	.527	1.897
Fatigue	.408	.026	.967	15.784	.000	.119	.750	.478	.190	5.255
Confusion	-.140	.011	-.667	-13.183	.000	-.336	-.687	-.400	.359	2.785

[a] (F (6, 102) = 59.650, P < 0.000)) Model Adj.R2 = 80.8%.

The Table 3 that means model c emerged significant as the self-reported mood-constellations such as, facilitative-inhibitive moods and negative-positive moods along with the influence of emotional feelings of suspicion could explain 29.8% variance of changes in the extent of emotional feeling of irritability.

Table 3
Summary of multiple linear regression analysis when Mood variables were assessed.

Model *b* Dependent Variable – Irritability	Unstandardized Coefficients		Standardized Coefficients			Correlations Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
(Intercept)	5.133	1.218		4.213	.000					
Suspicion	.310	.051	.403	6.065	.000	.272	.391	.351	.760	1.316
Positive mood	-.055	.018	-.194	-2.998	.003	-.248	-.205	-.174	.802	1.247
Facilitative mood	.061	.011	.331	5.470	.000	.222	.358	.317	.915	1.093
Negative mood	-.163	.029	-.481	-5.552	.000	-.228	-.362	-.322	.447	2.235
Inhibitive mood	.060	.018	.281	3.412	.001	-.093	.232	.198	.495	2.020

[b] (F (6, 101) = 18.743, P < 0.000)) Model Adj.R2 = 29.8%.

In the Table 4 the model d emerged significant as the self-reported observations from different mood states along with the influence of emotional feelings of suspicion could explain 43.7% variance of changes in the extent of emotional feeling of irritability.

Table 4
Summary of multiple linear regression analysis when impact of different mood states were assessed.

Model *c* Dependent Variable – Irritability	Unstandardized Coefficients		Standardized Coefficients			Correlations Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
(Intercept)	-.924	1.215		-.761	.448					
Suspicion	.345	.043	.449	7.944	.000	.272	.486	.412	.844	1.184
Tension	.109	.020	.390	5.457	.000	-.158	.357	.283	.527	1.897
Anger	-.180	.022	-.638	-8.248	.000	-.236	-.500	-.428	.450	2.222
Fatigue	.204	.025	.549	8.016	.000	.119	.489	.416	.573	1.744
Confusion	-.109	.015	-.519	-7.513	.000	-.336	-.466	-.390	.565	1.771

[c] (F (5, 103) = 33.469, P < 0.000)) Model Adj.R2 = 43.7%.

Outcomes of descriptive statistics (Tables 1a and 1b) revealed that, the observations based on evaluation of BRUMS as a structured self-report inventory for assessment of mood states of the participants were evidentially consistent. Table 1a represented outcomes of the mood states separately as it came out from direct outcomes[7], and Table 1b depicted scores obtained on mood-constellations which were developed based on differential combinations of mood-state scores obtained by the participants. Outcomes, however indicated that the scores were free from substantial extent of dispersions. Focus of this study was chiefly concerned with impact of variations in mood states of the athletes on their inner feelings of irritability, and hence descriptive information obtained on both the feelings of suspicion and irritability and also pertaining to psychobiological make-up of the participants were not detailed herewith, contributory impacts of those aspects along with the mood variables onto the feelings of irritability were regarded as the vital issue of concern. Findings of the prediction analysis however suggested that the emotional feelings from the inner unconscious core of irritability in the participants indexed from the projective analysis were aptly predicted by emotional feelings of suspicion; autonomic Sc indices and mood states of the athletes. Table 2 depicts that the model ***a*** emerged significant implying the fact that if the direct contribution of inner feelings of suspicion (tolerance was 55.5%) is regressed from the extent of feelings of irritability, the autonomic measures of skin conductance tonic and phasic activity along with differential aspects of variations in mood could explain 80.8% extent of variance changes in inner emotional feelings of irritability. That means, if the observed direct impact of feelings of suspicion is controlled for or hold constant (i. e., remains unchanged), participants who were evident with relative lack of psychobiological competence had lower regulation of inner feelings of irritability. Now, a question may be raised as to what prompted the researchers to hypothesize about lowering of psychobiological competence? Our previous studies have reported relationships between delayed recovery and heightened inner emotionality[2,11,3] and delayed latency[12,4]. Close scrutiny of Beta coefficients however signify that, irrespective of the contributory impact of all other Sc variables, every 1% reduction in feelings of fatigue would lead to almost similar i.e., .967% (refer to the beta coefficient of Fatigue, as in psychological and psychobiological research standardized coefficients are considered) of corresponding reduction in feelings of emotional irritability. Present findings of corroborative relationship found adequately supported in the previous research literatures [12,1,2,3,10]. Model ***b*** & ***c*** (in Tables 2 and 3) represented that, both of the models were conceived with the mood variables as independent predictors emerged significant. Both of the outcomes however implied the fact that if the direct contribution of inner feelings of suspicion is regressed from the extent of feelings of irritability, mood-

constellation (such as positive-facilitative and/or negative-inhibitive moods) could explain 29.8% extent of variance changes (in Table 3, model ***b***) and different mood states (viz., tension, anger, fatigue and confusion) could explain 43.7% extent of variance changes (refer to Table 4, model ***c***) in the inner emotional feelings of irritability. That means, if the observed direct impact of feelings of suspicion is controlled for or hold constant (i. e., remains unchanged), participants who had lesser negative mood (every 1% reduction in feelings of negative mood would lead to .481% of increment) would have higher feelings of irritability (Table 3). Contrary to that, the model ***c*** however revealed that if direct impact of suspicion is controlled for, those who had higher extent of anger, were susceptible to have lesser extent of irritability (every 1% increased feeling of anger would lead to .638% of reduction in the feelings of irritability). Thus these two models signified that, if the feelings of suspicion was controlled for the feelings of irritability, inner emotional make-up of the participants observed as having sense of unhappiness could have been aptly explained either by reduction in feeling of fatigue (which might lead to feelings of boredom) or by increased anger (could have been observed as a source of catharsis or release of violent feelings)[13,3]. Our previous findings and also from the researches of others could confirm similar outcomes [12,1,2,11,3]. Contrary to that, our previous researches on observed fatigability could only confirm predictive relationship between psychobiological indices of emotion and muscular fatigability observed in rectus femoris muscles, and not on emotional feelings[10]. In sum it could be stated that, role of feeling of suspicion was evidentially instrumental and if it is regressed or controlled for the feelings of irritability, participants having adequate control over their feelings of suspicion would have differential natures of mood-constellation (as lowering of negative mood resulted in increased irritability) and variations in mood states (since increased feelings of anger was observed as release of sense of hostility, which might have resulted in reduction in feelings of irritability).

4. CONCLUSION

The present study highlights

1. Mood variables along with the autonomic indices of emotionality were observed associated with emotional feelings of suspicion in predicting changes in the feelings of irritability in the athletes.
2. Negative mood as well as facilitative mood was observed to have influences over inner feelings of irritability observed amongst the subjects.
3. Heightened level of anger was observed to have inhibitive impact onto changes in the feelings of irritability.

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