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PSYCHOLOGICAL CORRELATES OF PERFORMANCE IN YOUNG TAEKWONDO PARTICIPANTS
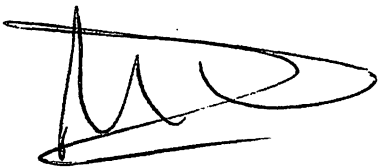
By

NIK AZMA HANIN BINTI NIK ISMAIL

Dissertation submitted in partial fulfillment of the requirements for the degree of Bachelor of Health Sciences (Exercise & Sport Science)

April 2009

CERTIFICATE

This is to certify that the dissertation entitled *'Psychological Correlates of Performance in Young Taekwondo Participants'* is the bonafide record of research work done by *Nik Azma Hanin Binti Nik Ismail [89077]* during the period of July [2008] to April [2009] under my supervision. This dissertation submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Exercise & Sport Science). Research work and collection of data belong to Universiti Sains Malaysia.
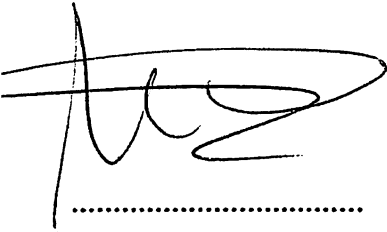
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SIJIL AKU JANJI

Diperakui bahawa disertasi yang bertajuk *'Psychological Correlates of Performance in Young Taekwondo Participants'* merupakan kerja dan penyelidikan yang asli dari *Nik Azma Hanin Binti Nik Ismail [89077]* dari tempoh Julai [2008] hingga April [2009] adalah di bawah penyeliaan saya. Disertasi ini merupakan sebahagian daripada syarat untuk penganugerahan Ijazah Sarjana Muda Kesihatan (Sains Senaman & Sukan). Segala hasil penyelidikan dan data yang diperolehi adalah hak milik Universiti Sains Malaysia.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS

LIST OF TABLES

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The purposes of this study were 1) to assess mood and state anxiety in young Malaysian taekwondo athletes prior to competition and 2) to compare mood and state anxiety of successful and less successful athletes prior to competition. The subjects were recruited from the Kelantan taekwondo athletes that participated in the 28th National Remaja Taekwondo Championship 2008 which was held in Penang. The young taekwondo athletes (22 males, 12.86 ± 2.44 years and 17 females, 14.29 ± 2.47 years) were divided into successful and less successful athletes based on the tournament win-loss record. The Brunel Mood Scale (BRUMS) and Competitive State Anxiety Inventory 2-Revised (CSAI-2R) were administered on the night before the competition day. Independent t-tests ware used to compare mood and state anxiety of successful and less successful taekwondo-in within gender. Pearson correlations were employed to assess the relationship between mood subscales. The present study found that there were no statistically significant difference between successful and less successful *taekwondo-in* in tension (3.00 ± 1.48 vs. 2.93 ± 1.92, $p = 0.906$, $eta^2 < 0.001$), depression (1.67 ± 2.35 vs. 1.00 ± 1.27, $p = 0.256$, $eta^2 = 0.035$), vigor (10.33 ± 3.26 vs. 10.33 ± 3.04, $p = 0.999$, $eta^2 < 0.001$), anger (1.25 ± 2.86 vs. 1.19 ± 1.71, $p = 0.930$, $eta^2 < 0.001$), fatigue (2.92 ± 3.48 vs. 2.89 ± 2.76, $p = 0.979$, $eta^2 < 0.001$) and confusion (2.00 ± 2.34 vs. 1.96 ± 2.38, $p = 0.964$, $eta^2 < 0.001$).), somatic state anxiety (15.36 ± 3.23 vs. 16.35 ± 3.25, $p = 0.384$, $eta^2 = 0.021$), cognitive state anxiety (17.50 ± 7.41 vs. 19.48 ± 7.74, $p = 0.455$, $eta^2 = 0.015$) and self-confidence (32.83 ± 5.36 vs. 32.15 ± 6.97, $p = 0.764$, $eta^2 = 0.002$). The successful *taekwondo-in* showed a statistically significant relationship between pre-competition tension and depression ($p = 0.028$), tension and fatigue ($p = 0.046$), as well as tension and confusion ($p = 0.014$). For

less successful *taekwondo-in*, there was a statistically significant relationship between pre-competition tension and depression ($p = 0.003$), tension and anger ($p < 0.001$), tension and fatigue ($p = 0.003$), as well as tension and confusion ($p < 0.001$). The mood profile of young Kelantan *taekwondo-in* did not resemble the iceberg profile. Successful young Kelantan *taekwondo-in* score higher in depression (1.67 ± 2.35 vs. 1.00 ± 1.27) when compared to their less successful counterparts ($p = 0.256$, $\text{eta}^2 = 0.035$). There was a statistically significant difference between the non-depressed and depressed mood participants in somatic state anxiety (14.60 ± 2.28 vs. 17.28 ± 3.47, $p = 0.008$, $\text{eta}^2 = 0.174$). Fatigue was moderately higher in the depressed mood taekwondo participants ($p < 0.001$, $\text{eta}^2 = 0.342$), while the difference in depression was also moderate ($p < 0.001$, $\text{eta}^2 = 0.456$). In the non-depressed mood *taekwondo-in*, there was a significant association between anger and confusion ($p = 0.001$). The results tend to follow the conceptual model postulated by Lane and Terry.

ABSTRAK

Kajian ini dijalankan dijalankan bertujuan untuk 1) menilai tahap mood dan kegelisahan di kalangan atlit muda taekwondo Malaysia sebelum pertandingan dijalankan serta 2)membandingkan mood dan kegelisahan sebelum pertandingan bermula antara atlit yang berjaya dengan atlit yang tidak berjaya. Subjek terdiri dari atlit muda taekwondo Kelantan yang terlibat dalam pertandingan Kejohanan taekwondo Remaja Kebangsaan kali ke 28 yang diadakan di Pulau Pinang. Atlit muda taekwondo ini (22 lelaki, 12.86 ± 2.44 tahun and 17 perempuan, 14.29 ± 2.47 tahun) dibahagikan kepada berjaya dan tidak berjaya berdasarkan kepada keputusan menang-kalah pertandingan tersebut. Skala Mood Brunel (BRUMS) and Competitive State Anxiety 2-Revised (CSAI-2R) diberikan kepada atlit pada malam sebelum hari pertandingan. Independent t-test digunakan untuk membandingkan mood dan kegelisahan antara atlit yang berjaya dengan atlit yang tidak berjaya. Korelasi Pearson digunakan untuk menilai hubungkait antara subskala mood. Keputusan kajian ini mendapati bahawa tiada hubungkait antara mood (ketegangan (3.00 ± 1.48 vs. 2.93 ± 1.92, $p = 0.906$, $eta^2 < 0.001$), depresi (1.67 ± 2.35 vs. 1.00 ± 1.27, $p = 0.256$, $eta^2 = 0.035$) , tenaga (10.33 ± 3.26 vs. 10.33 ± 3.04, $p = 0.999$, $eta^2 < 0.001$), kemarahan (1.25 ± 2.86 vs. 1.19 ± 1.71, $p = 0.930$, $eta^2 < 0.001$), kelesuan (2.92 ± 3.48 vs. 2.89 ± 2.76, $p = 0.979$, $eta^2 < 0.001$) dan kekeliruan (2.00 ± 2.34 vs. 1.96 ± 2.38, $p = 0.964$, $eta^2 < 0.001$).), kegelisahan somatik (15.36 ± 3.23 vs. 16.35 ± 3.25, $p = 0.384$, $eta^2 = 0.021$), kegelisahan kognitif (17.50 ± 7.41 vs. 19.48 ± 7.74, $p = 0.455$, $eta^2 = 0.015$) dan keyakinan diri (32.83 ± 5.36 vs. 32.15 ± 6.97, $p = 0.764$, $eta^2 = 0.002$) antara atlit yang berjaya dengan tidak berjaya. Atlit taekwondo yang berjaya menunjukkan hubungkait antara ketegangan dan depresi ($p = 0.028$), ketegangan dan kelesuan ($p = 0.046$) serta ketegangan dan kekeliruan ($p = 0.014$). Bagi atlit yang tidak berjaya, terdapat hubungkait antara ketegangan dan depresi ($p =$

0.003), ketegangan dan kemarahan (p <0.001). Profil mood bagi atlit muda taekwondo Kelantan tidak menyerupai profil 'iceberg'. Atlit taekwondo yang berjaya menunjukkan skor yang tinggi dalam depresi (1.67 ± 2.35 vs. 1.00 ± 1.27) apabila dibandingkan dengan atlit yang tidak berjaya (p = 0.256, eta^2 = 0.035). Terdapat perbezaan statistik antara atlit yang mengalami depresi dan yang tidak mengalami depresi pada kegelisahan somatik 14.60 ± 2.28 vs. 17.28 ± 3.47, p = 0.008, eta^2 = 0.174). Terdapat sedikit perbezaan statistik untuk kelesuan (p < 0.001, eta^2 = 0.342) dan depresi (p < 0.001, eta^2 = 0.456) bagi atlit taekwondo yang mengalami depresi. Bagi atlit taekwondo yang tidak mengalami depresi, terdapat perhubungan antara kemarahan dan kekeliruan (p = 0.001). Kajian ini juga mendapati bahawa keputusan yang diperolehi menyerupai model konsep oleh Lane dan Terry.

1. INTRODUCTION

1.1 Background of the problem

Mood and anxiety have been widely known to affect sport performance (Fazackerly, Lane, and Mahoney, 2003), including in taekwondo. Taekwondo is a Korean combat sport. It is popular with people of both sexes and of many ages. Physically, taekwondo aids in the development of strength, speed, balance, flexibility, and stamina. There are also studies that dealt with the use of psychological parameters to help improve the athlete's performance (Seabourne, Weinberg, Jackson and Suinn, 1985).

There are many emotions that go through an athlete's mind before, during and after competition. These emotions may help or block the athletes from giving their best effort during the game. Sometimes, even though the athletes were prepared physically and technically, their lack of mental control contributed to the deterioration of their performance. For instance, research has been done into mood and anxiety experienced before sport competition. Some competitors feel extremely anxious prior to their performance, while others are not so concerned (Thomas, Maynard and Hanton, 2004).

The relationship between self-confidence, mood, anxiety and sport performance is not a new topic among researchers. Several studies have been conducted in relation to the aforementioned concepts.

Mood plays a fundamental role in most sports, especially those that require a great deal of concentration, such as golf, tennis, shooting and combative sports (Terry and Slade, 1995). Morgan's (1985) iceberg profile predicts that successful athletes tend to be vigorous and have little tension, depression, confusion, anger and fatigue. This means that successful athletes tend to have a positive mental profile when compared to unsuccessful counterparts. Lane and Terry (2000) proposed that symptoms of depressed mood were positively associated with anger, confusion, fatigue and tension and inversely related to vigor. Participants with stronger depressed mood will show higher anger, confusion, fatigue and tension.

For instance, Totterdell (1999) found that professional cricket players performed better when they were in a more positive mood. They performed better when they were happier, more focused, more energetic and more enthusiastic. Beedie, Terry and Lane (2000) showed that mood was a better predictor of performance when the latter was self-referenced. Lane's and Terry's (2000) model proposed that depressed mood leads to an increase in tension by increasing the perception of task difficulty, which impairs performance. Fazackerley, Lane and Mahoney (2004) reported that the depressed mood group among wakeboarding athletes scored higher on anger, fatigue and confusion. They performed worse than the non-depressed mood group. Lane, Terry, Beedie, Curry and Clark (2001) found that the depressed mood group scored higher on anger, confusion, fatigue and tension and lower on vigor in children who participated in running events. Covcosin and Pero (2004) also revealed that winning tennis players showed lower scores on tension, depression, anger and confusion.

Stress and anxiety often accompany the athlete's preparation and performance. The literature on the competitive anxiety and performance relationship is dominated by the arousal-based explanation in the form of drive theory by Hull (1943) and the inverted U hypothesis by Yerkes and Dodson (1908) (in Weinberg and Gould, 2003). The drive theory states that an increase in arousal, stress and anxiety, which are collectively called drive, will increase performance. As the drive increases, the more psyched-up the athlete is, the better he or she will perform. If people perform a task that they know well or a simple one, they will do better but if they perform a less familiar or complex task, their performance seems to be staggered (Weinberg and Gould, 2003).

The drive theory was subsequently replaced by the inverted U hypothesis, because some researchers claimed that it is too simple to explain sport performance and it does not take into account the effects of complex tasks (Graham, 1995). The inverted U hypothesis states that as arousal increases, performance will increase too, up to an optimal point where best performance and a further increase in arousal could lead to a decline (Weinberg and Gould, 2003). In other words, high performance has an optimal level of arousal and lesser performance has either a low or a very high level.

Covcosin and Pero (2004) found that winning tennis players displayed lower cognitive and somatic state anxiety. Thout, Kavouras and Kenefick (1998) reported that cognitive state anxiety decreased against a perceived weaker opponent compared to a perceived moderate or tougher one. Somatic state anxiety increased when facing opponents of all perceived ability levels. Martin and Hall (1997) found that skaters experienced

greater cognitive and somatic state anxiety prior to an individual competitive event compared to the team event.

Self-confidence, mood disturbance, cognitive and somatic state anxiety have all been identified as factors that could contribute to the effectiveness of sport performance (Covassin and Pero, 2004). It is known that self-confidence is characterized by a high expectancy of success (Hanton and Connaughton, 2002). Confidence arouses positive emotions, facilitates concentration, increases effort and it could affect the goal. Weinberg and Gould (2003) related that self-efficacy theory, which was proposed by Bandura, suggests that if someone has the required skills and sufficient motivation, their major determinant of the performance is self-efficacy. Self-efficacy, according to Weinberg and Gould (2003), is "the perception of one's ability to perform the task successfully" (p.316). Self-efficacy affects the athlete's choice of activity and level of effort. The individual's degree of self-efficacy influences performance via emotions and cognitions. Athletes who believe in themselves will tend to keep trying and give their best effort, while those who have low self-esteem tend to have less self-confidence.

Parfitt and Pates (1999) found the relationship between self-confidence with somatic and cognitive state anxiety to be positive, with higher confidence being associated with more successful passes and assists in basketball players. Thout, Kavouras and Kenefick (1998) revealed that athletes, who are low in self-confidence against opponents perceived as toughest compared to those perceived as moderate or weakest. It means that athletes with low self-confidence will perform worse against opponents perceived as toughest.

4

There is growing evidence that mood, self-confidence and state anxiety are inter-correlated and that they have been recognized to affect sport performance (Covassin and Pero, 2004). Although much research has been conducted in relation to mood, state anxiety and sport performance, most researches were only focused on Caucasian athletes and little research has been done on their Asian counterparts.

1.2 Statement of the problem

Much research on mood, state anxiety and performance has focused on individual sports or individual skills for team sports, such as cricket, basketball and tennis (Covcosin and Pero, 2004; Totterdell, 1999). There are a number of studies that specifically dealt with performance in martial arts. Most of the research on mood and performance in martial arts has focused on adult Caucasian subjects. For instance, Terry and Slade (1995) found that winning karate athletes had higher levels of vigor and anger and scored lower on tension, depression, fatigue and confusion. Stevens, Lane and Terry (2006) did mood profiling of a European international judo player, while there are also some studies on mood, anxiety and performance on Asian martial arts athletes. For instance, Pieter, Wong and Ampongan (2006) found that successful Philippine boy and girl taekwondo athletes had more taekwondo and competition experience. The authors reported that taekwondo experience and anger predicted performance in the boys, while in the girls competition experience and anger were predictive.

There is not much literature in relation to mood, state anxiety and sport performance in the context of young Malaysian athletes aside from the work done by Wong, Thung and Pieter (2006) in relation to young Malaysian karate athletes (*karateka*). Based on this study, Asian athletes may respond to their feelings more openly when compared to their Caucasian colleagues. Thus, the current research is aimed at analyzing the relationship between mood, state anxiety and performance in young Malaysian taekwondo athletes.

1.3 Objectives

1.3.1 General Objective

The general objective of this research was to assess mood and state anxiety in young Malaysian taekwondo athletes prior to competition.

1.3.2 Specific Objective

The specific objective of this research was to compare mood and state anxiety of successful and less successful young Malaysian taekwondo athletes.

1.4 Research questions

1. What is the mood profile of young Malaysian taekwondo athletes?

2. Do mood, anxiety and self-confidence affect the performance of young Malaysian taekwondo athletes?

1.5 Definition of terms

1.5.1 Mood

Lane and Terry (2000) defined mood as "a set of feelings, ephemeral in nature, varying in intensity and duration and usually involving more than one emotion" (p. 5). There are six subscales of mood which are anger, confusion, fatigue, tension, depression and vigor.

1.5.2 Anxiety

Weinberg and Gould (2003) defined anxiety as "a negative emotional state with feelings of nervousness, worry and apprehension associated with activation or arousal of the body" (p. 79). There are two types of anxiety, which are trait anxiety and state anxiety. Trait anxiety refers to "an acquired disposition that predisposes a person to perceive a wide range of objectively non-dangerous circumstances as threatening and to respond to these with disproportionate state anxiety levels" (Weinberg and Gould, 2003, p. 80), while state anxiety refers to "moment to moment changes in feelings of nervousness, worry and apprehension associated with arousal of the body" (Weinberg and Gould, 2003, p. 80).

Anxiety has a thought component, such as worry and apprehension, called cognitive anxiety and a somatic anxiety component, which is a degree of physical activation perceived by someone. Cognitive anxiety involves the degree to which one worries or has negative thoughts. Cognitive anxiety refers to negative self-talk, concern about oneself and

7

situation and having images of failure. Cognitive anxiety is defined as "the cognitive elements of anxiety, such as negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences" (Graham, 1995, p. 454). Somatic anxiety may be felt through muscle tension, rapid heart rate and butterflies in the stomach. Somatic anxiety refers to 'moment to moment changes in perceived physiological activation' (Weinberg and Gould, 2003, p.80). Somatic anxiety also is defined as "one's perception of the physiological-affective elements of the anxiety experience such as indications of autonomic arousal and unpleasant feelings" (Graham, 1995, p. 454).

1.5.3 Self-confidence

Self-confidence has been recognized as one of the components of state anxiety. Self-confidence is interrelated with anxiety. The more confident the person, the less anxiety he or she feels. Self-confidence, according to Weinberg and Gould (1978), means the "belief that a person can successfully perform a desired behavior" (p. 309).

1.6 Significance of the study

This research was done to assess the state anxiety and mood profiles of young Malaysian taekwondo athletes. No research has been done in this area in Malaysia. The relationship between state anxiety, mood and performance in martial arts in general and taekwondo in particular has only recently been started as opposed to that in other sports. This research may also assist the coaches in preparing their athletes for competition. It was

carried out as part of a sports science support project with the Kelantan Taekwondo

Association.

2. LITERATURE REVIEW

2.1 Mood

Mood has been widely known to affect performance. There are two types of moods which are depressed and non-depressed mood. The more depressed the athletes are, the more their performance will be staggered. Lane and Terry proposed that symptoms of depressed mood are positively associated with anger, confusion, fatigue and tension and inversely associated with vigor.

There are 6 subscales of mood, which are tension, anger, confusion, depression, fatigue and vigor. Terry, Lane, Lane and Keohone (1999) described the meaning of each mood subscale. Confusion is proposed to be "a feeling state characterized by uncertainty and associated with a general failure to control attention and emotions" (p. 10). Terry, Lane, Lane and Keohone (1999) cited that Spielberger (1991) defined anger as "a feeling that varies in intensity from mild annoyance or aggravation to fury or rage" (p. 10). Terry, Lane, Lane and Keohone (1999) cited that Beck and Clark (1988) defined depression as "associated with negative self-schema characterized by feelings of hopelessness, personal deficiency, worthlessness and self-blame" (p. 10). Fatigue is typified as "feelings of mental and physical tiredness while tension is typified as feelings of nervousness, apprehension and worry" (p. 10). Vigour refers to "feelings of excitement, alertness, and physical energy" (p. 10).

There are two types of models which explain the relationship between mood and performance: the mental health model (Morgan, 1985) and the conceptual model (Lane & Terry. 2000).

2.1.1 Morgan's Mental Health Model

Morgan's (1985) mental health model proposed that successful athletes exhibit greater positive mental health than less successful or unsuccessful counterparts. Basically, the model suggests that positive mental health is directly related to the athletes' success in sport performance. According to Morgan (1985), successful athletes tend to be more vigorous and have little tension, depression, confusion, anger and fatigue, the combination of which is known as the iceberg profile (see Figure 1). The iceberg profile refers to the graphic picture that the T-scores on the Profile of Mood States (POMS) create when they are plotted on a sheet. The POMS is a scale that measures how the athlete is feeling at the time the test is taken (McNair, Lorrr and Droppleman, 1971 in Terry, Lane, Lane and Keohane, 1999).
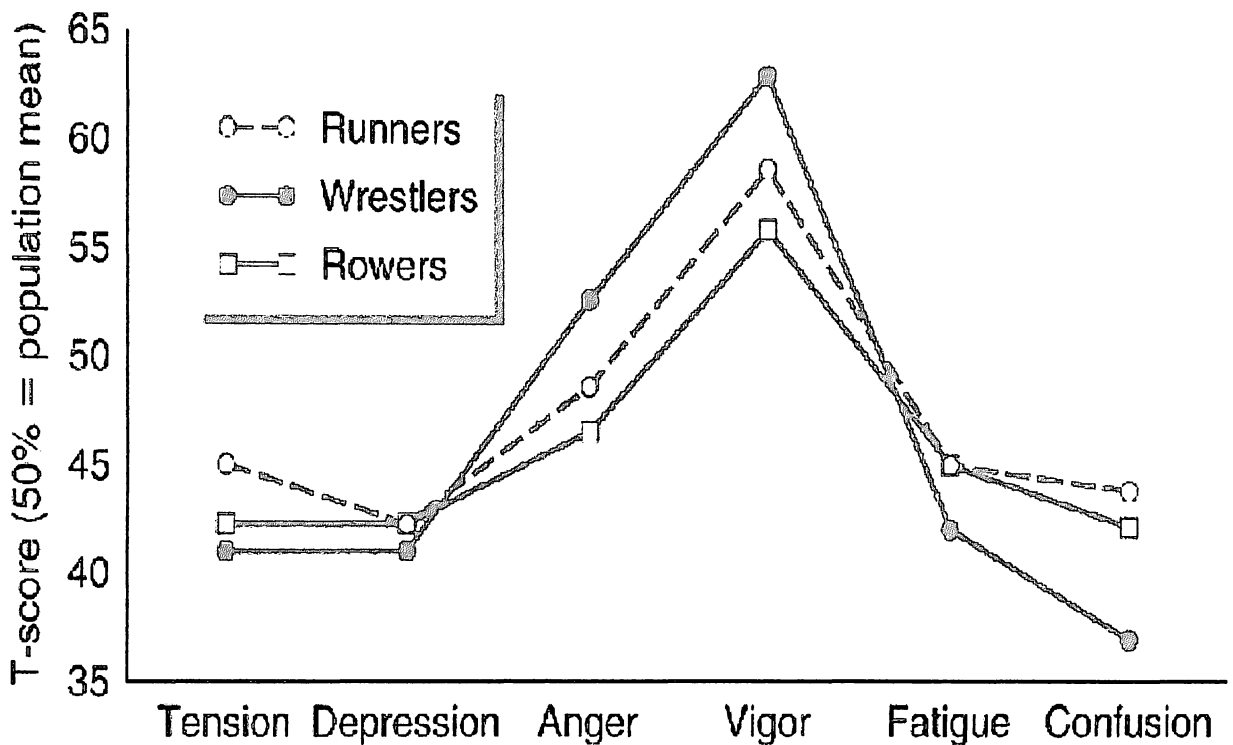
Figure 1: The iceberg profile of elite runners, wrestlers and rowers as measured by

the Profile of Mood States (Morgan, 1985)

The Profile of Mood States (POMS), which was created by McNair, Lorr, and

Droppleman (1971) (in Terry, Lane, Lane and Keohane, 1999), is a 65-item inventory that

assesses six mood dimensions. Originally there was a 65-item questionnaire, but it was

reduced in the 1990's by McNair and his colleagues (1992) to a 30-item questionnaire. The

norm value for the POMS is derived from groups of adult and psychiatric patients. The

POMS is only recommended for use with subjects aged 18 and older with at least some

high school education. The POMS is believed to be a versatile test because it may be

adapted to a variety of settings, sports and exercise psychology. It is used to evaluate the

athletes' mood change when introducing a new training program, or before, during, and after competition to predict performance.

The POMS subscales consist of tension, depression, anger, vigor, fatigue, and confusion. Morgan (1985) claimed that the POMS scale is the most predictive inventory used to predict athletes' success in sport among the different personality inventories. His early research was very convincing at predicting the athlete's performance: successful athletes possessed more of an iceberg profile than their less successful colleagues (Morgan, 1985).

Morgan's mental health model is used to predict the maximal physical performances in sport settings. The model proposes that positive mental health is directly correlated with success in sports and is inversely correlated with psychopathology. The mental health model predicts that negative components, such as anxiety, depression, tension, fatigue and confusion will cause the athletes to be less successful in sport (Morgan, 1985).

In order to clarify the model, Morgan conducted several studies using various inventories, including the Profile of Mood States (McNair, Lorrr and Droppleman, 1971). The studies on university rowers and elite freestyle wrestlers seemed to suggest that positive mental health was an asset in sports such as rowing and wrestling and success happened in the absence of psychopathology (Morgan, 1985).

The study on heavyweight elite rowers (Morgan, 1985) predicted that those who scored average or below average on state anxiety, trait anxiety, somatic perception, tension, depression, anger, fatigue, confusion, neuroticism and conformity but above average on vigor and extroversion would be successful and vice versa. The prediction accuracy for failure was 84% (31 of 37) and prediction accuracy for success was 50% (10 of 20). Successful lightweight elite rowers scored lower on variables judged to be negative and higher on anger. It was also found that successful freestyle elite wrestlers scored higher on vigor as the model predicted. Successful runners scored below the population average on tension, depression, anger, fatigue and confusion and above average on vigor (Morgan, 1985).

Following Morgan's mental health model, Frazier (1988) did a study on male and female long distance runners. The results indicated that a positive mental health state was characteristic of these athletes. Frazier (1989) also investigated male and female intercollegiate cross-country runners during the competition season and found that male cross-country runners had high levels of tension, depression, anger, fatigue and confusion, while their female counterparts had a higher level of vigor. However, they scored lower on the negative states. The results indicated that the female runners had a mood profile similar to that of successful athletes, while that of the males was characteristic of that of unsuccessful ones. Frazier's (1989) study seemed to confirm what Morgan had proposed, because the female runners won first place, while the males failed to qualify for national competition. Based on these two studies, it is concluded that there are many factors that may influence mood states and success rate in sport performance (Frazier, 1989) and that

mood scores might be influenced by the degree of the athlete's training type and time (Frazier, 1988).

Prapavessis, Berger and Grove (1992) reported that swimmers who qualified for the Olympic team scored lower on tension, anger, fatigue, depression and confusion but higher on vigor. Totterdell (1999) found that professional cricket players performed better when they were in a more positive mood. Covcosin and Pero (2004) also reported that winning tennis players showed lower scores on tension, depression, anger and confusion.

2.1.2 Morgan's Mental Health Model: Combat Sports

In the context of combat sports, McGowan & Miller (1989) revealed that there were no differences in the POMS mood subscales between winning and losing *karateka*. The successful karate performers scored higher on anger than less successful competitors when the year-long competition was taken into account. They may have used anger imagery to psych up themselves for the competition (McGowan and Miller, 1989). The karate athletes reported that whenever they used angry imagery, they felt stronger and this feeling may have influenced their self-confidence and facilitated their performance.

Black belt *karateka* were reported to score higher on fatigue than novice counterparts (McGowan, Miller & Henschen, 1990). The authors also found that novice karate performers scored higher on tension and lower on depression, anger, and fatigue compared to more experienced colleagues. The study indicated that successful athletes did

not necessarily show the traditional iceberg profile that Morgan (1985) had proposed as they might exhibit high levels of fatigue and tension 24 hours prior to the competition. McGowan, Miller and Henschen (1990) suggested that a high level of fatigue occurred due to the homeostatic response to high tension or anxiety. McGowan, Pierce and Jordan (1992) found that experienced *karateka* with first degree black belts scored higher on anger. However, both studies (McGowan, Miller and Henschen, 1990; McGowan, Pierce and Jordan) could not differentiate pre-competition mood scores of semifinalists and those of lower-placed athletes.

According to Terry and Slade (1995) winning *karateka* had higher levels of vigor and anger and lower levels of tension, depression, fatigue and confusion. They found that the pre-competition scores of the profiles of mood states seemed similar to Morgan's (1985) mental health model, except that the high anger score led to a winning performance.

2.1.3 Problems with Morgan's Model

Although there are consistencies in Morgan's studies regarding the mental health model (Morgan, 1985), which proposed that successful athletes possess positive mental health that resemble the iceberg profile, there were many questions raised such as whether the relationship between mental health and athletic performance is correlated high enough to differentiate between athletes that have the same psychological profiles and between successful and less successful athletes (Rowley, Landers, Kyllo and Etnier, 1995).

The validity of the POMS by McNair, Lorr, and Droppleman (1971) that was used in Morgan's earlier research to measure athletes' mental health was also being questioned. The subjects might fake the answers to be selected in a team or to qualify for competition (Rowley, Landers, Kyllo and Etnier, 1995).

The original 65 items of the POMS were also criticized for taking too long to complete (Prapavessis, Berger and Grove, 1992). Morgan also failed to directly assess the true meaning of success in performance. According to Morgan's studies, success entails the athletes managing to qualify for the team or placement in a competition. Comparisons between subjects in terms of performance do not really determine how well the athletes actually did perform (Rowley, Landers, Kyllo and Etnier, 1995). Rowley, Landers, Kyllo and Etnier (1995) also mentioned that the time span between the assessment of mental health and performance was not consistent as Morgan had administered the POMS from 1 week to 4 years prior to performance instead of the athlete's pre-competition preparatory period. Frazier (1989) indicated that there were many factors that influence mood states and success rate in sport performance. Thus, to get the athletes' actual mood state during competition, it is better to administer the test 1 hour prior to the competition.

Lane's and Terry's Conceptual Model

Lane's and Terry's conceptual model proposed that depressed mood leads to an increase in tension by reducing the ability of perceptions, while increasing that of task difficulty thereby leading to impaired performance. According to Lane and Terry (2000),

there are two types of moods: depressed and non-depressed mood. The more depressed the athletes are, the more their performance will be staggered. The authors proposed that symptoms of depressed mood are positively associated with anger, confusion, fatigue and tension and inversely associated with vigor.
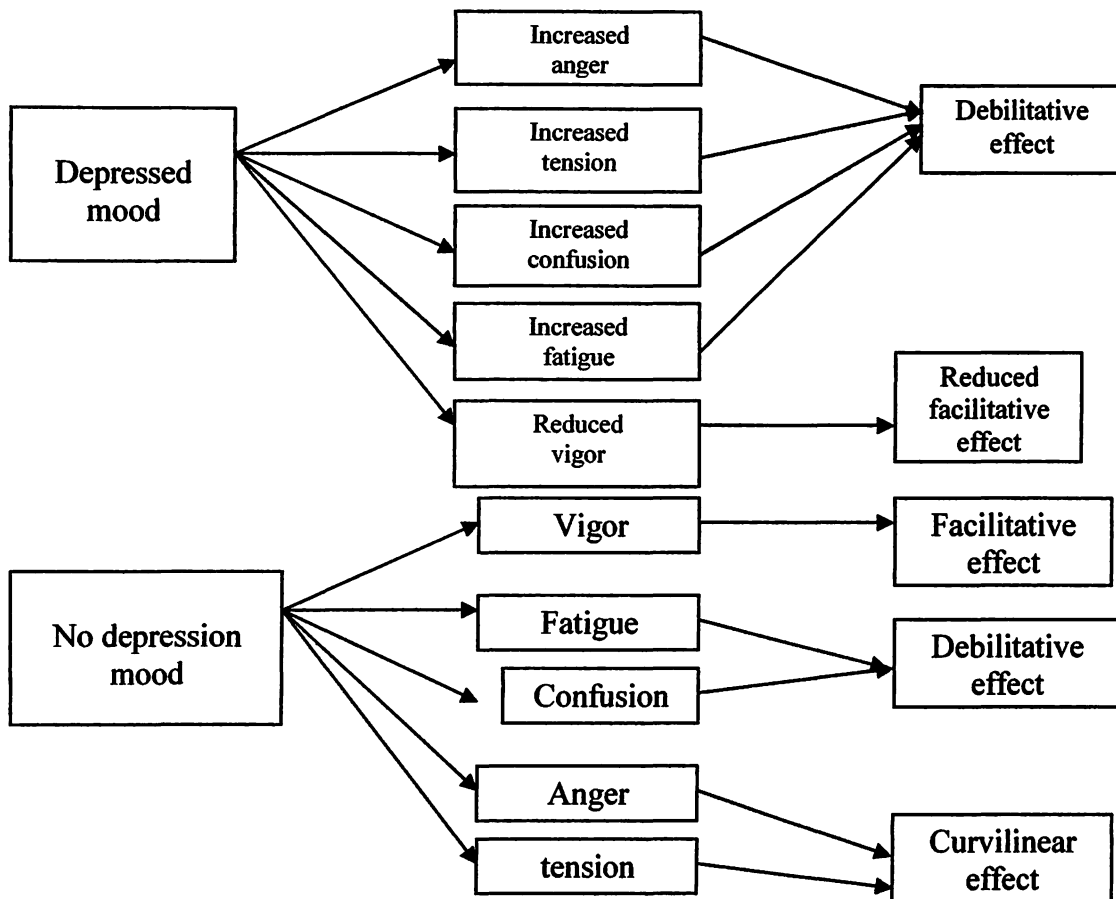

Figure 2: A conceptual model to predict performance from pre-performance mood

(Lane and Terry, 2000)

Based on Figure 2 above, mood dimensions interact to influence performance. According to the Lane and Terry (2000), depression will act as a catalyst for anger,

confusion, fatigue and tension. Therefore, it will increase the strength of intercorrelations among them. Lane's and Terry's conceptual model predicts that depressed mood leads towards reduced vigor and increased anger, confusion, fatigue and tension. Thus, it will debilitate performance. It is proposed that the effects of anger and tension upon athletic performance are moderated by depressed mood (Lane and Terry, 2000).

In the presence of depressed mood, tension is proposed to be associated with debilitated performance. Tension reduces the ability of perceptions and increases the perception of task difficulty. If tension increases above an optimum level for the task difficulty, performance will decline. The mechanisms to explain this effect are twofold. Tension causes a negative effect of depressed mood on effort. Thus, it makes people perceive their task to be difficult and they make only half attempts to reach their goal (Lane and Terry, 2000). Another mechanism suggested by Lane and Terry (2000) is that increased tension will cause the narrowing of attentional control, thereby contributing to impaired performance.

An increase in depressed mood will also affect the anger-performance relationship. Depressed mood will increase anger and thus will debilitate performance. Depressed mood reduces the ability of people to perceive their task correctly and in turn causes their perceived goal to be staggered. Frustration will occur, which subsequently leads to anger. Anger tends to be focused internally, leading towards feelings of frustration, self-blame and debilitating performance (Lane and Terry, 2000). According to Lane and Terry (2000), anger which is directed internally is associated with confusion, fatigue and depression. If

anger intercorrelates with depression, there is a tendency to bottle it up and thus to debilitate performance.

In the absence of depressed mood, tension and anger should show a curvilinear relationship with performance. Lane and Terry (2000) proposed that anger is more readily directed toward a productive course of action in the absence of negative self-thoughts. When anger is directed outwardly, it tends to move to another object or person. The whole process would not itself benefit performance, but it helps in channeling anger into increasing determination and effort toward goal achievement.

Based on the conceptual model by Lane and Terry (2000), fatigue appears to be debilitative of performance either in the presence or absence of depressed mood. Fatigue tends to impair the physical ability to perform and at the same time, reduces self-efficacy perceptions. According to Bandura, "self-efficacy is the beliefs regarding individuals' capabilities to produce performance that will lead to anticipated outcomes" (Weinberg and Gould, 2003, p. 316). Self-efficacy theory suggests that "if someone has the required skills and sufficient motivation, the major influence of their performance is self-efficacy" (Weinberg and Gould, 2003, p. 316). Self-efficacy affects the athletes' choice of activity and level of effort. Hence, good performance from a fatigued athlete would probably occur despite rather than because of the fatigue (Lane and Terry, 2000).

Confusion is proposed to be closely associated with irrational thinking and a determination to maintain a negative self-image. Confusion is also proposed to be

debilitative of performance in the presence of depressed mood. It occurs mostly due to attentional inefficiencies and poor information processing (Lane and Terry, 2000).

On the other hand, depressed mood is proposed to reduce the intensity of vigor while with no depressed mood, vigor tends to be facilitative of performance. According to Lane and Terry (2000), there are at least two potential mechanisms that explain the above effect. When someone is depressed, a person will not be able to perform well because the memory process has been restricted to recall negative information, which indicates failure and poor performance that could lead to reduced vigor. Depressed people cannot rationalize themselves to be alert and have high energy. These feelings will lead them to think about the outcome goal, such as whether they will be successful or not. According to Weinberg and Gould (2003), focusing on the outcome goals just before or during competition often leads to an increase in anxiety as well as irrelevant and distracting thoughts. For example, worrying too much about the score of the game or winning may cause the athletes not paying enough attention or concentrating on the task at hand.

2.1.5 Lane's & Terry's Conceptual Model: Combat Sports

Few studies have been conducted applying the Lane & Terry conceptual model. Pieter, Mateo and Bercades (2000) compared Philippine national taekwondo athletes with winning varsity counterparts. They found that there were no differences in anger between the groups although the varsity athletes were expected to score lower due to their inexperience in competition. They also compared the winning and losing varsity taekwondo

athletes and found that the winning group scored lower on depression with no differences in other moods.

Wong, Thung and Pieter (2006) found that tension, fatigue and confusion in young female Malaysian *karateka* were higher in the depressed mood group, while the depressed mood group in young male *karateka* displayed higher scores in tension, anger, fatigue and confusion. However, there were no differences in anger and vigor in the female depressed mood group.

Pieter, Wong and Ampongan (2006) revealed that successful Philippine boy and girl taekwondo athletes had more general taekwondo and competition experience. This is suggested to positively influence their self-confidence and facilitate their performance. They also found that the girls' winners scored higher on tension and anger when controlled for general taekwondo and competition experience. They proposed that anger may have a positive effect on performance in taekwondo.

2.2 State Anxiety

2.2.1 Introduction

Anxiety also often accompanies athletes during sport performance. According to McNair and Droppleman (1971), anxiety is an unpleasant emotion brought on by misfortune that could lead to tension. Weinberg and Gould (2003) defined anxiety as "a

negative emotional state with feelings of nervousness, worry and apprehension associated with activation or arousal of the body" (p. 79). Nordell and Sime (1993) defined anxiety as an emotional reaction to a variety of stimuli.

Nordell and Sime (1993) differentiated between trait and state anxiety. Trait anxiety refers to "the stable individual differences in anxiety proneness, while state anxiety is a temporary emotional state that could change by time and situation" (p. 19). In sport, some athletes perceive the competition as motivating and they enjoy it, while others experience the competition as threatening or difficult. Finkerberg, Pinucci, McCune and McCune (1992) defined competitive trait anxiety as "the relatively situational-specific modification of trait anxiety of an individual to perceive certain environment in competitive situations" (p. 239). State anxiety is then further classified into cognitive state anxiety and somatic state anxiety.

According to Graham (1995), the literature on the competitive anxiety and performance relationship is dominated by the arousal-based explanation in the form of Hull's drive theory and Yerkes' and Dodson's inverted U hypothesis. Drive theory states that an increase in drive, such as arousal, stress and anxiety will increase performance. The more psyched-up the athletes, the better they perform. The inverted U hypothesis states that as arousal increases, performance will increase too, up to an optimal point where arousal may no longer facilitate performance. A further increase in arousal could lead to a decline in performance.

Then, the anxiety-performance relationship was dominated by Hanin's individualized zone of optimal functioning (IZOF). Hanin found that top athletes have a zone of optimal state anxiety in which their best performance occurs. Poor performances will occur outside of this zone. "The optimal level of state anxiety is not a single point but a bandwidth" (Weinberg and Gould, 2003, p. 87). However, the IZOF was criticized because it offers no underlying explanation, the measuring instrument such as the state-trait anxiety inventory (STAI) is not sport specific and it is based upon a one-dimensional as opposed to the currently favored multidimensional approach of examining IZOF (Graham, 1995). According to Weinberg and Gould (2003), IZOF does not address whether the components of state anxiety, either somatic or cognitive, affect performance in the same way.

Next, a multidimensional approach was introduced. Multidimensional anxiety theory predicts that cognitive state anxiety is negatively related to performance, which means, an increase in cognitive state anxiety leads to a decrease in performance. Somatic state anxiety is related to performance in an inverted U pattern. An increase in somatic anxiety will facilitate performance, up until a certain optimal point after which any additional anxiety causes performance to be staggered (Weinberg and Gould, 2003).

2.2.2 State Anxiety – Martens et al.'s model

Martens et al. (1977) proposed the theory of competitive stress as they thought that sport performance causes anxiety and stress. The competitive stress theory relates the stress producing stimuli in a competitive situation to performance. Martens et al. (1977) predicted