

UNIVERSITI SAINS MALAYSIA



**ACUTE EFFECTS OF EXERCISE ON MOOD IN
FEMALE STUDENTS**

by

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

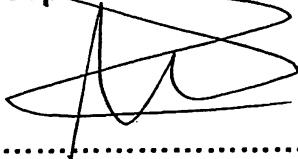
April 2009

“Acute Effects of Exercise on Mood in Female Students”

CERTIFICATE

This is to certify that the dissertation entitled ' *Acute Effects of Exercise on Mood in Female Students* ' is the bonafide record of research work done by *Noor Hapizah Binti Mamat [89078]* during the period of January [2008] to April [2009] under my supervision. This dissertation submitted in partial fulfillment for the degree of Bachelor of Health Sciences (Exercise & Sports Science). Research work and collection of data belong to Universiti Sains Malaysia.

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ACKNOWLEDGEMENTS

My personal gratification from the work on this study was much greater with the contribution of my supervisor; Assoc. Prof. Dr. Willy Pieter for his guidance, support and help during this study. I owe him a lot for all the knowledge and experiences he gave me. Actually, it was really a wonderful experience to have him as my supervisor.

I would like also to acknowledge the examiners, Dr. Yusoff Ismail, Mr. Erie Zuraidee Zulkifli and Dr. Hairul Anuar Hashim for their kindness and generosity to spend their time to examine my thesis.

Last but not least, I dedicate my greatest appreciation to all my friends who never stopped to support, encourage and always be with me throughout all the hardest times in order to finish our research projects. "Together we will be strong, divided we will fall".

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KESAN PANTAS (*ACUTE EFFECTS*) SENAMROBIK TERHADAP MOOD DI KALANGAN PELAJAR PEREMPUAN

ABSTRAK

Kajian ini adalah berkenaan kesan senamrobik terhadap perubahan mood kepada pelajar perempuan universiti. Kajian ini melibatkan subjek yang sedia ada yang menyertai kelas senamrobik tersebut. Berdasarkan kajian sebelum ini, pelajar tersebut akan menunjukkan hasil kesihatan mental yang positif yang bermaksud tinggi tahap vigor(*bertenaga*) dan berkurangnya tahap kemarahan (*anger*), depresi (*depression*), kekeliruan (*confusion*), tekanan (*tension*) dan kepenatan (*fatigue*).

Peserta terdiri daripada 16 pelajar perempuan (2.75 ± 0.71 tahun). Peserta dikehendaki mengisi soal selidik "Brunel of Mood State (BRUMS)" 15 minit sebelum dan seurus selepas sesi senamrobik tamat. Sesi senamrobik telah dikendalikan oleh seorang pengajar dan mengambil masa 60 minit terdiri daripada sesi pemanasan (*warm-up*), sesi utama dan juga sesi penyejukan (*cooling-down*).

Keputusan menunjukkan semua sub-skala mood yang negatif iaitu kemarahan (1.88 versus 1.19), tekanan (0.94 versus 0.44) , depresi (2.13 versus 0.94), kekeliruan (1.63 versus 0.25) dan kepenatan (4.19 versus 3.81) adalah menurun. Manakala, sub-skala mood yang positif; bertenaga (7.88 versus 9.81) adalah meningkat selepas sesi senaman. Walaubagaimanapun, perubahan mood tersebut hanya signifikan secara statistiknya untuk sub-skala bertenaga($p = 0.016$,

$\eta^2 = 0.328$) dan kekeliruan ($p = 0.040$, $\eta^2 = 0.252$). sahaja. Namun demikian, keputusan yang diperoleh secara keseluruhannya mewakili *Iceberg Profile* dan menunjukkan kesihatan mental yang positif.

Keputusan kajian yang dijalankan menyokong pernyataan bahawa senaman berkait dengan peningkatan mood. Justeru, senamrobik boleh dilakukan sebagai salah satu cara untuk mengawal dan mengekalkan kesihatan mental yang positif.

ACUTE EFFECTS OF EXERCISE ON MOOD IN FEMALE STUDENTS

ABSTRACT

The present study was about the acute effects of aerobic dance exercise on mood changes in female university students. It is a field study that involved volunteers who joined the aerobic dance exercise class. Based on previous research, subjects should show positive mental health (an increase in vigor and a decrease in all negative mood subscales; anger, tension, depression, confusion and fatigue) after the exercise.

Participants were 16 female students (21.75 ± 0.71 years). They completed the Brunel of Mood Scale (BRUMS) 15 minutes before and immediately after exercise. The aerobic dance exercise session lasted for about 60 minutes including the warm-up, main session and cool-down.

The results indicated that the negative mood subscales of anger (1.88 versus 1.19), tension (0.94 versus 0.44), depression (2.13 versus 0.94), confusion (1.63 versus 0.25) and fatigue (4.19 versus 3.81) were lower, while vigor (positive mood) was higher (7.88 versus 9.81) after the exercise session. However, the changes were only statistically significant for vigor ($p = 0.016$, $\eta^2 = 0.328$) and confusion ($p = 0.040$, $\eta^2 = 0.252$). On the other hand, the results also resembled the Iceberg Profile and may be classified as positive mental health.

Findings lend support to the notion that the exercise is associated with improved mood. Thus, the aerobic dance exercise can be used to maintain and regulate positive mental health.

Acute Effects of Exercise on Mood in Female Students

1.0 INTRODUCTION

1.1 Background

Obesity is associated with many health problems, such as diabetes mellitus type II, hypertension, heart disease, stroke and certain types of cancer (Shariff & Khor, 2005). A sedentary lifestyle and dietary changes have been associated with an increasing rate of obesity in Malaysia (Moy, Sallam & Wong, 2006).

Shariff & Korr (2005) mentioned in their article that Malaysian women were more overweight and obese than men. Malaysians are also exposed to a high risk of chronic diseases due to obesity. The first and second surveys in Malaysia in 1986 and 1996 entitled "Malaysian National Health and Morbidity Survey" showed a significant increase in percent of adults with elevated blood pressure (from 14.4% to 24.0%) over the period of study. Increased elevation of blood pressure can cause hypertension. Besides, diabetes is also prevalent among Malaysians. Statistics by the Ministry of Health in 1998 and 1999 indicate that the prevalence of diagnosed and undiagnosed diabetes was 8.3% (Shariff & Korr, 2005).

Malaysians should take into account their health. It should start from their childhood to avoid it becoming serious at the later stages of their lives. According to Ismail et al. (1995), the prevalence of obesity in urban Malaysians with a BMI>25 and age between 18-60 years was 29% for males and 26% for females. Similar trends were observed in the rural areas where prevalence of obesity was high in both males (15%) and females (20%). It is suggested this is due to a change in dietary habits (junk food is easily available) and sophisticated technology that induces a sedentary lifestyle with a decrease in physical activity.

1.2 Exercise and Mood Changes

The benefits of habitual physical activity for both physical and mental health are well established. Physical activity and exercise are also used as preventive measures for cardiovascular diseases and as a treatment for depression. Exercise may also be used as a preventive and corrective tool for chronic diseases (Carron et al., 2003).

Aerobic exercise is one of the modes of physical activity that mostly affects a reduction of stress. Kravitz (2001) mentioned that moderate intensity exercise, which is performed 3 times a week (each session lasting for 20 minutes or more) for up to 12 weeks has the most influence on stress management. Aerobics and

anaerobic exercise can positively affect different mood states, including tension, fatigue, anger and vigor in normal and clinical populations (Lane & Lovejoy, 2001).

On the other hand, acute bouts of exercise may improve a person's present mood state. Lane, Crone-Grant & Lane (2002) mentioned that a single bout of 25 to 60 minutes of aerobic exercise (at either low, moderate or high intensity) increases positive mood and decreases negative mood.

Exercise is not only beneficial physiologically but also psychologically (Weinberg & Gould, 2003). Different authors define mood in different ways. According to Carron et al. (2003), "Mood is a complex construct to operationally define. It falls under the category of mood-like states" (p.38). Anxiety, depression, fatigue, anger and confusion were classified under the negative affect of mood. On the other hand, feelings of vigor, pleasantness and euphoria are the positive affects of mood (Carron et al., 2003). Mood and affect are different. Mood is more transient and less stable, while affect is more enduring. Thus, anxiety is an affect, while vigor is a mood (Carron et al., 2003).

Landers (1996) revealed that reductions in anxiety are related to more aerobic types of physical activities that involve continuous and rhythmic exercises instead of those that involve resistive intermittent activities. In other words, aerobic activities will have more of an effect in reducing anxiety than non-aerobic exercise.

Aerobic exercise is beneficial physically and psychologically. But, if aerobic exercise leads to positive effects on mood, such as reduced depression and anxiety, then students should be encouraged to engage in aerobic exercise. Recreational activities, such as jogging, rope skipping and walking, are among those that are easy and simple to do by people during their leisure time (Weinberg & Gould, 2003).

A meta-analysis by Yeung (1996) shows that exercise intensity of about 60-80% of maximal oxygen uptake is considered as moderate and can cause changes in mood states. The impact of physical activity on mood changes was found to indicate that all 6 of the mood states were influenced by physical activity. There were also significant reductions in the 5 negative mood states that were assessed, while an increase in vigor was reported after exercise (Carron et al., 2003).

Exercise might be more effective to enhance positive mood state. For example, Yeung (1996) revealed that the effects of walking and relaxation on mood showed that both reduced tension scores. However, only walking produced significant increases in subjective energy. Thus, exercise may be equivalent to relaxation to reduce negative mood but it may greatly enhance positive mood.

Exercise may be used as a strategy to improve mood. It has been found that 44% of a sample from the general population reported that exercise was used

frequently and considered the most effective strategy to regulate mood (Lane, Milton & Terry, 2005).

In addition, it has been shown that both acute and chronic mood enhancement following exercise and several factors that maximized its mood-enhancing effects have been identified (Kravitz, 2001). These factors included a duration of 20-30 minutes, moderate intensity exercise, regular exercise (3 times a week), rhythmic breathing, predictable, repetitive movement without interpersonal competition (Berger&Owen,1988 ; Kravitz, 2001).

Lane, Jackson and Terry (2005) mentioned moderate exercise to be associated with greater mood enhancement, which is based on balanced evidence (more studies that support their proposal than those that oppose them). Landers (1996) indicated that larger effects of exercise on state anxiety reduction are shown when exercise is aerobic (running, swimming, cycling) as opposed to non-aerobic (handball, strength, flexibility).

According to Landers (1996), the research on exercise and depression has a long history of investigators since the early 1900s which leads to the suggestion of a relationship between exercise and decreased depressed mood. Lane and Terry (2000) proposed that depressed mood is associated with increased anger, confusion, fatigue and tension with a reduction in vigor. Exercise is an alternative treatment for depression, which is cost effective and provides health benefits, such

as an increase in muscle tone and a decreased incidence of heart disease and obesity (Weinberg & Gould, 2003).

1.3 Hypothesis

There is no effect of aerobic dance exercise on mood in female students.

1.4 Limitations

Due to the nature of the selection of the sample, no generalizations are warranted.

1.5 Assumptions

The students palpated their own heart rate. They were assumed to know how to palpate their heart rate because they have taken anatomy and physiology during the first year of their studies. The heart rate is needed to estimate the intensity of the exercise, and is expected to be in the range of 50-70% of estimated maximum heart rate to enhance positive mood changes. The aerobic dance exercise was free of interpersonal competition and was designed to give enjoyment to the participants (Lane & Lovejoy, 2001).

1.6 Definition of Terms

(1) Aerobic dance exercise – “exercises to music that requires the participants to follow the movements of the instructor (external of the individual). It consists of 3 main continuous sessions: warm-up, main session and cool-down. The warm-up comprised exercises designed to raise heart rate (marching, dance steps etc.) followed by main session (like stepping, lunges, knee lifts, biceps curls in addition to basis dance steps) which was designed to raise heart rate so that individuals exercised between 50% to 70% of their heart rate maximum. The cool-down included a series of stretching and rhythmic breathing exercises”. (Lane & Lovejoy, 2001, p. 6, 8).

(2) acute effects – “immediate and possibly, but not necessarily, temporary effects arising from a single bout of exercise” (Weinberg & Gould, 2003, p. 385).

The following definitions are based on Terry, Lane & Fogarty (2003), p. 127:

(3) Anger – “typified by feelings that vary in intensity from mild annoyance or aggravation to fury and rage and is also associated with the arousal of autonomic nervous system”.

(4) Confusion = “a feeling state that is characterized by bewilderment and uncertainty, also associated with a general failure to control attention and emotions”.

(5) Depression – “a negative self-schema characterized by themes such as hopelessness, personal deficiency, worthlessness and self-blame”.

(6) Tension – “typified by feelings such as nervousness, apprehension, worry and anxiety”.

(7) Fatigue – “feelings of mental and physical tiredness”.

(8) Vigor – “characterized by feelings of excitement, alertness and physical energy”.

1.7 Purpose of the Study

The primary question that arose was: what are the acute effects of aerobic dance exercise on mood in female university students?

1.8 Significance of the Study

The significance of this study is to assist in encouraging students to exercise and be physically active to enhance positive mood. In addition, this research is significant because there are no studies on exercise and mood in Malaysia.

2.0 LITERATURE REVIEW

2.1 Introduction

More and more sport psychologists have focused on the psychological factors involved in exercise, developing strategies to encourage sedentary people to exercise or assessing the effectiveness of exercise as a treatment for depression. Thus, the broadening field is called sport and exercise psychology with some individuals focusing only on the exercise aspects (Weinberg and Gould, 2003).

Several studies have been done to investigate the psychological factors related to exercise, such as those by Lane, Whyte et al. (2005) about mood changes following exercise, Lane et al (2001) about mood and performance which is focused on depressed mood and also Lane & Lovejoy (2001) about the effects of exercise on mood changes and the moderating effect of depressed mood.

2.2 Mood

In the sport and exercise setting, mood changes have been measured using several instruments but the Profile of Mood States (POMS, McNair, Lorr &

Droppleman, 1971), is the most common inventory used to assess mood changes due to its reliability, validity, ease administration and also widely used.(Frazier, 1988).

According to Terry et al. (2003), the original POMS consisted of a list of 65 words or phrases that described moods or feelings. It was the primary instrument to measure changes in mood in sport and exercise before the Profile of Mood States for Adolescents (POMS-A, Terry et al., 1999) or Brunel Mood Scale (BRUMS, Terry & Lane, 2003) were developed (see below). The POMS assesses 6 subscales: tension, depression, anger, vigor, fatigue, and confusion.

2.2.1) Iceberg Profile

Morgan (1985) developed the Iceberg Profile based on his previous research. By using the POMS as a psychological parameter to assess mood, Morgan successfully introduced a Mental Health Model that was reported to be effective in predicting athletic success (Morgan, 1980; Morgan, 1985; Morgan et al., 1987).

Morgan (1980 & 1985) proposed that successful athletes in a variety sports (runners, wrestlers and rowers) may be characterized by what he called the 'Iceberg Profile' as shown in Figure 2.1 (Morgan, 1980, 1985). This profile was also reported in female distance runners (Morgan et al., 1987).

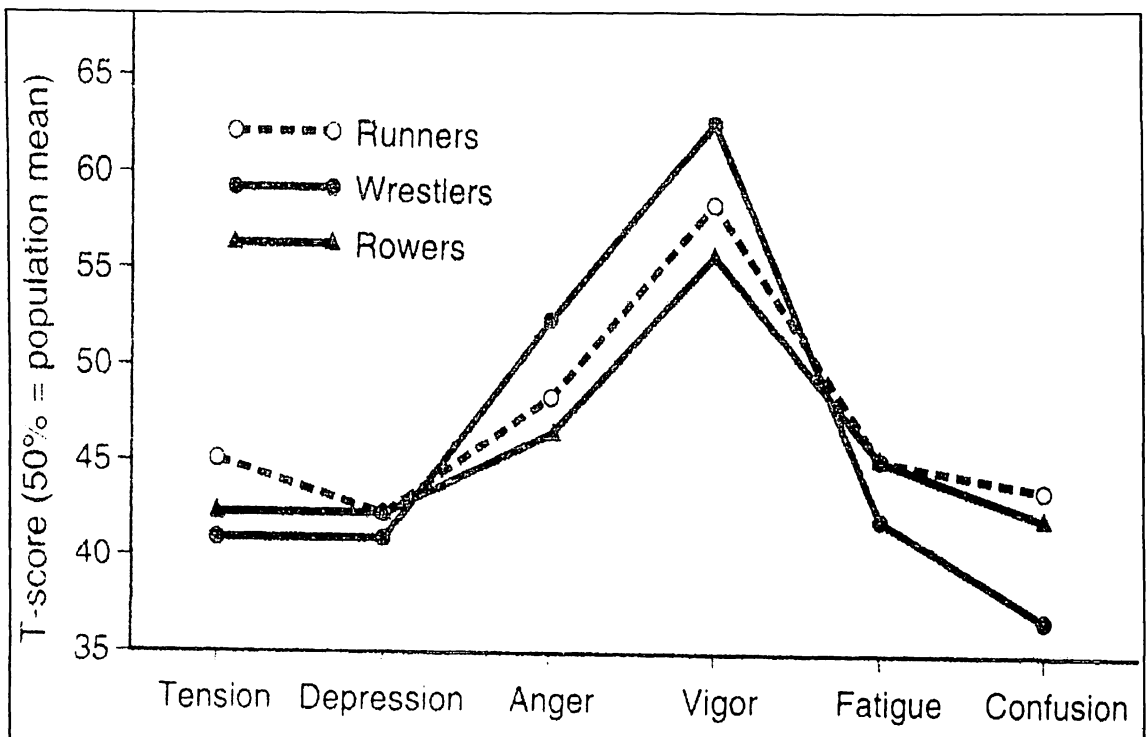


Figure 2.1: Summary of the Profile of Mood States for elite runners, rowers and wrestlers

The iceberg profile shows that, in comparison with the average population, more successful athletes tend to score higher on vigor and lower on tension, depression, anger, fatigue and confusion (Morgan, 1980 & 1985). According to Figure 2.1, successful elite athletes show vigor above the mean of the general population but tension, depression, anger, fatigue and confusion are below this mean. It is called the 'Iceberg Profile' due to its graphical shape. All the negative traits (tension, depression, anger, fatigue and confusion) are below the surface (population norms) and only one positive trait (vigor) is above the surface.

In contrast, less successful athletes have a flattish profile with scores at or below the 50th percentile on all psychological factors (Figure 2.2). Morgan classified this situation as negative mental health. However, his model has been criticized in the 1990's by other researchers (Weinberg and Gould, 2003).

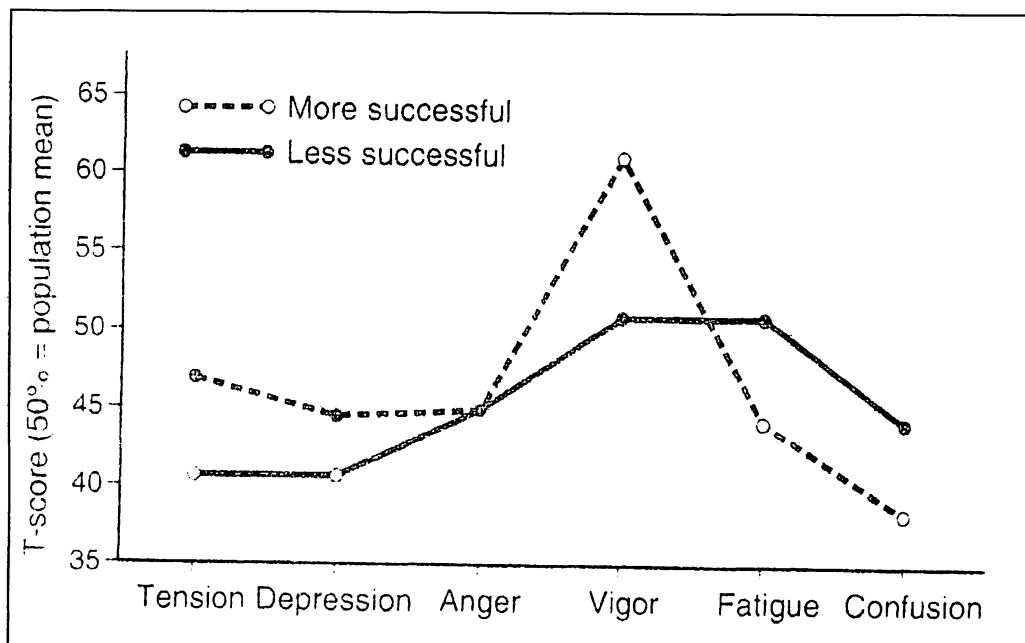


Figure 2.2: Profile of Mood States for successful and unsuccessful athletes

2.2.2 Criticism of the Iceberg Profile

Morgan (1980) mentioned that he had psychologically tested 16 candidates for the 1974 U.S heavyweight rowing team using the POMS. He correctly predicted 10 out of 16 finalists. This finding and those of similar studies led him to conclude that more successful athletes exhibit the iceberg profile that shows their positive mental health compared to those who are less successful (Morgan, 1985).

Most sport psychologists opposed the use of the psychological test for team selection because the results of testing are far from perfect (10 of 16 rowers were correctly predicted). Besides, the use of the psychological test for selection might unfairly select or cut athletes from a team (Weinberg & Gould, 2003). Renger (1993) mentioned that the results were misinterpreted because there was insufficient evidence to conclude that the profile differentiated athletes of varying abilities. Instead, it only distinguished athletes from non-athletes.

Similarly, Rowley et al. (1995) conducted a meta-analysis of all iceberg profile research and they found that the profile did differentiate the successful from the less successful athletes. However, it is only expected for a very small percentage of their performance variation (less than 1%). Thus, Rowley and others do not agree with the use of the instrument as a basis for team selection (Rowley et al., 1995).

The POMS was not meant to be a test to identify a 'champion' as Morgan (1980) proposed in his Iceberg Profile Model for mental health. The findings by Frazier (1988) also suggested that the mental health model may not be an accurate predictor of athletic performance. However, it is still relevant to be used because the optimal mood profile is sport dependent. Thus, mood changes in athletes should be compared with their previous mood levels and not with large-group norms. Hence, the POMS can be used as a tool for prediction but not for selection (Weinberg & Gould, 2003).

POMS test data have some useful purpose in which such data may help sport and exercise psychologists to disclose the kinds of psychological traits and states that are associated with successful athletes and effective exercisers. For example, sports and exercise psychologists may develop psychological skills from the POMS data which can help exercisers and athletes to cope effectively with their anger and anxiety (Weinberg & Gould, 2003).

2.2.3 Conceptual Model

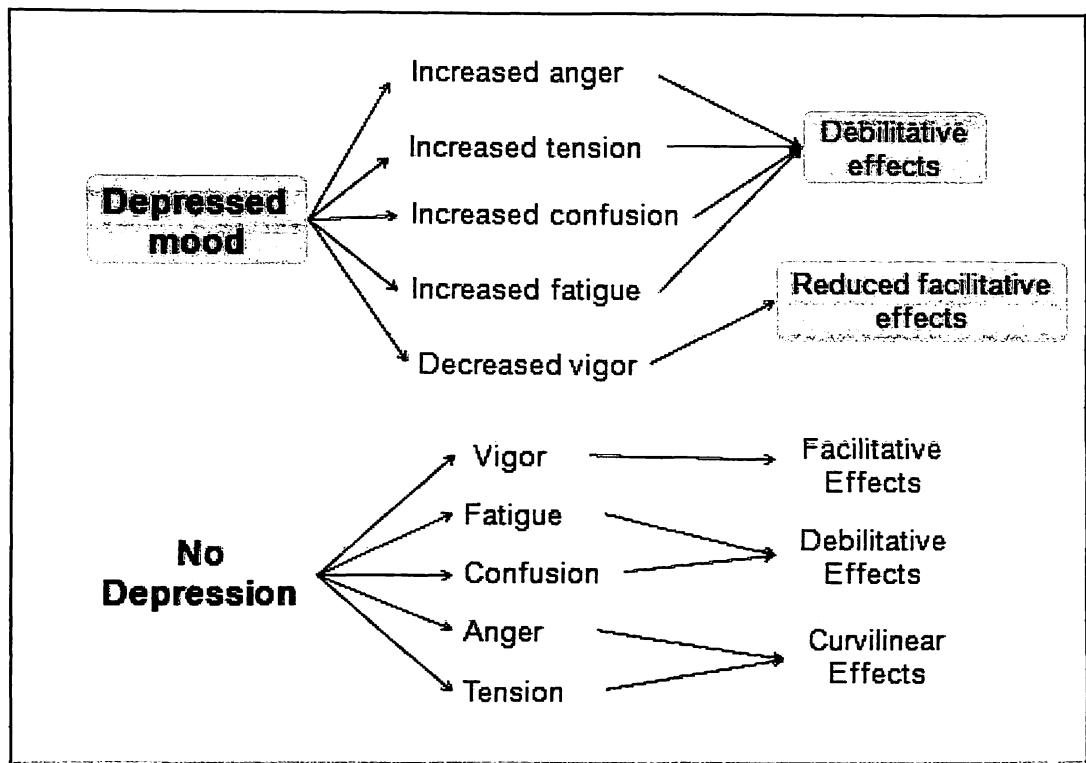


Figure 2.3 : Lane's & Terry's (2000) Conceptual Model for the mood and performance relationship

Lane's and Terry's Model in Figure 2.3 above, assesses the mood and performance relationship. They emphasize the influence of depressed mood and hypothesized that:

- a) participants with depressed mood will score higher on tension, anger, fatigue, and confusion, but lower on vigor compared to non-depressed mood counterparts;
- b) the relationship among tension, anger, vigor, fatigue, and confusion will be stronger for participants with depressed mood;

c) regardless of depressed mood score, vigor will be associated with facilitated performance, while fatigue and confusion will be associated with debilitated performance;

d) depressed mood will moderate the anger-performance and tension-performance relationships. This means that, according to the Figure 2.3, anger and tension will be associated with debilitated performance for participants, who report symptoms of depressed mood.

On the other hand, participants who have no symptoms of depressed mood will show a curvilinear relationship between tension and anger with performance. The authors propose a curvilinear relationship because the physiological arousal associated with tension and anger will tend to facilitate performance till an optimum point. After the optimum point, performance will deteriorate progressively or catastrophically as mentioned by Lane et al. (2001).

2.3 Physical Activity and Mood Changes

Weinberg & Gould (2003) mentioned that mood is defined as “a host of transient, fluctuating affective states that can be positive or negative” (p.388). Examples of moods are such feelings as elation, happiness or sadness lasting a few hours. According to Carron et al. (2003), “mood is also defined as a complex construct to operationally define” (p. 38). It falls under the category of mood-like states. They classified anxiety, depression, fatigue, anger and confusion under the

negative affects or mood. On the other hand, feelings of vigor, pleasantness and euphoria are the positive affects or mood.

Mood has been studied in various fields. In sports, much research has been done using the POMS. In 1983, Berger et al. used the POMS as their primary tool to study the relationship in between swimming and aerobic activity and the mood changes. The results showed that swimming enhanced positive mood changes because the swimmers reported less tension, anxiety, depression, anger and confusion and also increased in vigor after exercise. The results closely resembled the Iceberg Profile. In addition, both the intermediate swimmers (strenuous exercise) and beginners (leisurely paced) showed positive mood changes where they reported less tension, anxiety, depression, anger and confusion but high vigor after swimming.

In the following years, Miller & Miller (1985) assessed a squad of elite netballers (20 players, 12 successful players and 8 unsuccessful players). They used the POMS to measure mood. However, the results failed to reveal any differences between the 2 groups. It is opposed to what was claimed by Morgan (1980) as far as the POMS being the most highly predictive tool that he and his colleagues had successfully used with sporting groups.

2.4 Mood and Aerobic Dance

According to Lane & Lovejoy (2001), if mood enhancement is the goal, the exercise session should be free of inter-personal competition. Aerobic exercise is free of interpersonal competition. Thus, aerobic dance exercise is believed to result in mood enhancement.

Lane and Lovejoy (2001) tested the effects of exercise (aerobic dance) on mood changes. However, they also compared the pattern of changes between depressed and non-depressed groups. The results indicated that tension, anger, confusion, and fatigue were reduced, while vigor was higher after exercise in both groups. The mood changes were greater in the depressed mood group. Thus, the findings supported the hypothesis that aerobic dance exercise enhanced mood.

On the other hand, research done by Lane, Jackson and Terry (2005) assessed whether preferred exercise modality influenced mood changes. They used the BRUMS to assess mood. The results showed that both preferred exercises (most and least preferred exercise) produced significant mood enhancement. However, most of the preferred exercise modality led to greater enhancement than the least preferred exercise.

Exercise-mood enhancement depends more on familiarity of the participants with the exercise performed. Aerobic dance exercise is suggested to offer mood

enhancement. Berger and Motl identified several factors to maximize its mood-enhancing effects, such as the duration of the exercise (about 20-30 minutes), at moderate intensity, regular frequency (3 times a week), rhythmic breathing, predictable and repetitive movements and with the absence of interpersonal competition (Lane, Jackson & Terry, 2005).

Lane , Jackson et.al (2005) mentioned that perceived satisfaction with performance during exercise had a significant influence on mood enhancement. The aerobic dance exercise consisted of 3 phases: warm-up, main session and cool-down, with a duration of about 60 minutes. The intensity of the aerobic dance was predicted at regular intensity (50 to 70% of MHR), which was estimated based on their maximal heart rate (MHR) for pre- and post-exercise. The formula to estimate intensity, which was used by McInnis et al. (2003) is as below:

$$\text{Maximum heart rate (MHR)} = 220 - \text{age}$$

$$\text{Intensity} = (\text{Exercise HR} / \text{MHR}) \times 100$$

To get greater achievement in mood enhancement, participants should have sufficient experience with the instructor so that they will move more easily and smoothly with him or her. They should not perceive any difficulty in completing the task. Besides, the enjoyment when they complete the task is also beneficial because it can cause greater mood enhancement (Lane, Jackson & Terry, 2005).

According to previous research, greater mood enhancement will result after exercise (Lane, Jackson & Terry, 2005). Lane, Crone-Grant and Lane (2002) confirmed this when they found that single bouts of exercise at low, moderate or high intensities increased positive mood and reduced negative mood. They claimed that there was a reduction in anger, confusion, fatigue, tension, depression and increased in vigor after exercise.

Szabo (2003) assessed university students in his pilot study consisting of a field and laboratory experiment. He gave the POMS questionnaire before and after an exercise session to assess mood changes. The exercise that he used was jogging or running, while walking was not permitted because it could act as a confounder. There was a reduction in anger, confusion, depression and tension but an increase in fatigue and vigor after exercise. In the laboratory experiment, he found a reduction in anger, confusion, depression, fatigue and tension after exercise. However, there was an increase in vigor after exercise.

The purpose of the present research, then was to assess the effects of aerobic dance exercise on mood changes in female university students.

3.0. METHODS

3.1 Participants

The participants (n = 16, 21.75 ± 0.71 years) comprised a non-probability purposive sample and were recruited from a dance exercise class at USM. The instructor was certified as an aerobic dance instructor by the National Fitness Centre (NFC). A consent form and a pre-exercise BRUMS questionnaire (Terry & Lane, 2003) were given to them about 15 minutes before the exercise started. Immediately after exercise, the BRUMS was administered again. They were given an explanation before completing the forms and asked to palpate their heart rate before (resting heart rate) and after exercise but before the cool-down.

The participants knew how to palpate their own heart rates because all USM students take anatomy and physiology during the 1st year of their studies. They also were requested to report the kind of exercise and the frequency (how many days per week and how many hours per session) they were engaged in physical activities during their leisure time to assess whether they were recreationally active or not.

3.2 Procedures

The aerobic dance exercise session lasted 60 minutes. It consisted of 3 sessions: warm-up (15 minutes), main session (30 minutes) and cool-down (15 minutes). The warm-up consisted of basic movements like marching (dance steps) and walking that aimed to raise the heart rate. The main session involved other rhythmic movements, such as stepping, lunges, biceps curls, knee curls, knee lifts, butterfly and other basic dance movements. The intensity of exercise for the participants was estimated to be between 50-70% of their maximal heart rate to induce mood changes. Their maximal heart rate was calculated as below:

$$\text{Max HR} = 220 - \text{age}$$

The cool-down session started with sentimental songs, followed by slow exercise movements and simple aerobic dance steps. It also included a series of stretching and rhythmic breathing exercises.

3.3 Measure of Mood

Mood was assessed using the Brunel Mood Scale (BRUMS, Terry & Lane, 2003). The BRUMS was formerly known as Profile of Mood States for Adolescents (POMS-A, Terry, Lane & Fogarty, 2003). The BRUMS is a short form of the original Profile of Mood States (POMS, McNair et al., 1971). The BRUMS contains 24

items to assess 6 subscales of mood: tension, depression, anger, vigor, confusion, and fatigue. The items are rated on a 5-point scale ranging from “not at all” (0) to “extremely” (4). The participants rated their feelings using the “How are you feeling right now?” format (Terry & Lane, 2003; Lane, Jackson & Terry, 2005).

3.3.1 Validity and Reliability of the Brunel Mood Scale

Although the BRUMS assesses the same mood dimensions as the original POMS by McNair et. al., 1971), Terry et al. (1999) argued that there was a need to develop a new inventory for two reasons. First, the original POMS was developed and validated for use with a psychiatric population. Hence, its validity for use in an achievement setting is unknown (Terry, Lane & Keohane, 1999; Lane & Whyte et al., 2005). Secondly, Terry et al. (2003) found that the original POMS was criticized for having items that are not necessarily understood by other cultures except the North American. It has become problematic to use it in a research environment where brevity is important (Lane, Whyte et al., 2005).

POMS-A uses 24 items that asks respondents to rate how they feel “right now” on 6 dimensions of mood: anger, confusion, depression, fatigue, tension and vigor. The items are rated on a 5-point scale anchored by “0” (not at all) to “4” (extremely). Terry, Lane & Fogarty (2003) concluded that POMS-A showed evidence of construct validity for use with adolescents.