

Mood Changes in Response to Fighting Among Mixed Martial Arts Fighters; A Pre and Post-Fight Analysis

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Abstract

Background: Understanding mood changes before and after a fight is crucial for optimizing performance and ensuring fighters' mental well-being. This study aimed to analyze mood changes among Pakistani mixed martial arts (MMA) fighters in a pre-and post-fight context, exploring the psychophysiological underpinnings of these shifts and their implications for the fighters' mental health and performance.

Methods: This observational cross-sectional study was conducted among 50 healthy male MMA fighters, aged between 10 and 30 years, from various ethnic backgrounds, who were engaged in a daily routine of 90 minutes of MMA fighting. Mood analysis was carried out using the Brunel Mood Scale (BRUMS) questionnaire, the State-Trait Anxiety Inventory (STAI), and the Profile of Mood States (POMS) questionnaire pre- and post-fight.

Results: The psychological variations were observed, and significant differences were noted in the scores for anger (P-value=0.012), tension (P-value=0.001), vigor (P-value=0.000), confusion (P-value=0.014), and overall BRUMS score (P-value=0.029) in the winners while only vigor (P-value=0.000) was significantly increased among the individuals who lost the fight. The mean STAI score decreased significantly among both winners and losers (P-value=0.002 and 0.004, respectively). Further, the mean POMS score decreased among winners while it drastically increased for the losers but insignificantly.

Conclusion: The study revealed that MMA fighters experience significant psychological changes post-fight, with winners showing reduced anger, tension, and confusion, and a marked decrease in anxiety and vigor. In contrast, losers primarily exhibited a significant drop in vigor and increased confusion and TMD scores, indicating a more negative psychological impact.

Keywords: Mood changes, fighting, mixed martial arts, MMA fighters, analysis

Introduction

Mixed martial arts (MMA) have seen a significant rise in popularity in Pakistan, with an increasing number of fighters emerging from various regions. As a highly demanding combat sport that combines techniques from various martial arts disciplines [1], MMA not only challenges the physical limits of its participants but also has profound effects on their psychological states [2]. Understanding mood changes before and after a fight is crucial for optimizing performance and ensuring the mental well-being of fighters. This is particularly relevant in the Pakistani context, where cultural factors, societal expectations, and the relatively nascent stage of MMA as a professional sport add unique dimensions to the psychological experiences of fighters [3].

From a psychophysiological perspective, the anticipation of a fight can trigger a complex interplay of emotional responses, including anxiety, excitement, and aggression [4]. These mood states are influenced by various factors, such as the perceived importance of the match, previous experiences, and the fighter's mental preparedness [5]. The stress associated with the fight can lead to physiological changes, such as increased heart rate, cortisol levels, and adrenaline, which can affect mood and cognitive functioning [6-8]. Post-fight, the psychological state of a fighter can vary widely depending on the outcome of the match. Victory may lead to feelings of euphoria and relief, while defeat can result in frustration, disappointment, or even depressive symptoms. These mood fluctuations are further influenced by the physical toll of the fight, including injuries, fatigue, and pain [9-12]. In Pakistan, the pressure on fighters to succeed is often amplified by societal expectations and the desire to gain recognition in a sport that is still gaining mainstream acceptance [13, 14]. This study aimed to analyze mood changes among Pakistani MMA fighters in a pre- and post-fight context, exploring the psychophysiological underpinnings of these shifts and their implications for the mental health and performance of the MMA fighters. This analysis would contribute to the development of targeted interventions that can support the psychological resilience and well-being of fighters in this challenging sport.

Materials and Methods

This observational cross-sectional study was conducted at a _____ from May to August 2024, with ethical approval obtained from the institutional review committee. A total of 50 male MMA fighters participated, each providing written informed consent. The study included healthy male fighters, aged between 10 and 30 years, from various ethnic backgrounds, who were engaged in a daily routine of 90 minutes of MMA fighting. Regular assessments of basic vitals were conducted by paramedical staff before each fight session. Fighters who engaged in less than 90 minutes of routine MMA fighting or who had known serious medical conditions or injuries were excluded from the study.

Mood analysis was carried out for each participant both before the start of the fight and after its conclusion. Participants were asked to complete the Brunel Mood Scale (BRUMS) questionnaire, the State-Trait Anxiety Inventory (STAI), and the Profile of Mood States (POMS) questionnaire to assess their mood pre- and post-fight. The BRUMS questionnaire, which includes 32 items, measures both positive and negative emotions. Participants responded on a numerical rating scale from zero to four (0 = not at all, 1 = a bit, 2 = moderate, 3 = enough, 4 = extremely). Scores were calculated for various mood dimensions such as anger, confusion, depression, fatigue, tension, vigor, calmness, and happiness. After the fight, participants completed the BRUMS questionnaire again to assess their post-fight mood [15].

The STAI scale, consisting of 20 statements, requires participants to indicate how they feel at a specific moment. Each statement is rated on a 4-point scale (not at all, somewhat, moderately so, very much so), with scores ranging from 20 to 80 [16].

The POMS is a 40-question modified version developed by Grove and Prapavessis (1992) [17]. Scores for each item range from 0 for 'Not at all' to 4 for 'Extremely,' with the Esteem-related effect subscales reverse-scored before combining with the other items. A Total Mood Disturbance (TMD) score is calculated by summing the negative subscale totals (tension, depression, fatigue, confusion, anger) and subtracting the positive subscale totals (vigor and esteem-related affect).

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics, including mean and standard deviation, were used to summarize the variables. A paired sample t-test was applied to compare pre-test and post-test values, with statistical significance defined as $P < 0.05$. Further, post-analysis was conducted for mood evaluation based on the results of fighting either loss or win.

Results

A total of 50 MMA fighters were included with a mean age of 16.71 ± 4.027 , majorly representing Pashtun ethnicity (85.71%), with a mean weight and height of 50.2 ± 10.124 and 5.1 ± 0.606 , respectively.

The psychological variations were observed before and after the fighting comparing both winning individuals with the individuals who lost the fight and detailing of the mean scores and standard deviations for various mood sub-scales were presented. Significant differences were noted in the scores for anger (P-value=0.012), tension (P-value=0.001), vigor (P-value=0.000), confusion (P-value=0.014), and overall BRUMS score (P-value=0.029) in the winning group while only vigor (P-value=0.000) was significantly increased among the individuals who lost the fight (Table 1).

Table 1: Comparison of psychological variation among winners and losers before and after the fight using the various mood dimensions of the Brunel Mood Scale (BRUMS) (n=50)

Mood Scales	Winners (n=39)			Losers (n=11)		
	Pre-Fight	Post-Fight	P-value	Pre-Fight	Post-Fight	P-value
Anger	3.21±4.75	1.15±1.56	0.012*	7±7.56	4.36±3.64	0.306
Tension	3.23±4.58	0.56±0.68	0.001*	6±6.35	5.82±4.68	0.933
Depression	1.95±3.99	1±1.83	0.216	4.91±3.64	5±4.66	0.969
Vigor	14.95±1.23	12.44±3.87	0.000*	15.45±0.93	11.45±1.29	0.000*
Fatigue	4.62±4.77	5.36±2.56	0.230	6.45±6.17	8.73±2.72	0.200
Confusion	2.97±4.24	1.21±1.34	0.014*	4.27±5.44	6.55±4.00	0.271
Happy	13.38±2.27	14.08±2.01	0.152	15.09±0.38	13.18±2.82	0.055
Calmness	9.62±2.89	10.33±3.92	0.322	12.45±1.21	10.27±3.97	0.054
Overall BRUMS Score	53.92±23.16	46.13±8.75	0.029*	71.63±31.63	65.36±19.85	0.473

* $p < 0.05$ was considered statistically significant.

The mean STAI score decreased significantly among both winners and losers (P-value=0.002 and 0.004, respectively) from before to after the fight, indicating the level of anxiety decreased after the fight (Table 2).

Table 2: Comparison of anxiety levels before and after the fight among winners and losers using the State-Trait Anxiety Inventory (STAI) (n=50)

STAI Score	Pre-Fight	Post Fight	P-Value
	Mean ± SD	Mean ± SD	
Winners (n=39)	55.64±10.87	49.26±8.75	0.002*
Losers (n=11)	69.73±15.94	57.27±15.44	0.004*

*p<0.05 was considered statistically significant.

Further, the mean POMS score decreased from before to after the fight for the winners while it drastically increased for the losers but insignificantly, indicating that the level of TMD decreased after the fight in the winning individuals (Table 3).

Table 3: Comparison of total mood disturbance (TMD) levels before and after the fight among the winners and losers using the Profile of Mood States (POMS) questionnaire (n=50)

POMS Score	Pre-Fight	Post Fight	P-Value
	Mean ± SD	Mean ± SD	
Winners (n=39)	-1.15±21.59	-6.87±6.58	0.106
Losers (n=11)	4.36±46.76	17.18±16.25	0.436

Discussion

The findings of this study reveal significant psychological changes among MMA fighters before and after their fights, with notable differences between winners and losers. Specifically, significant reductions in anger (P=0.012), tension (P=0.001), vigor (P=0.000), confusion (P=0.014), and overall BRUMS score (P=0.029) were observed in the winning group, whereas only vigor (P=0.000) significantly decreased in the losing group. Additionally, anxiety levels decreased significantly for both winners and losers, as evidenced by the STAI scores (P=0.002 and P=0.004, respectively). However, while the Total Mood Disturbance (TMD) score decreased for winners, it increased, albeit insignificantly, for losers.

These results align with previous research on the psychological effects of competitive sports. For instance, studies have shown that successful athletes often experience reductions in negative mood states such as anger and tension after a competition, likely due to the relief and satisfaction of achieving victory [18-20]. The decrease in confusion among winners also supports the idea that winning provides a sense of clarity and mental focus, as noted in studies on the cognitive effects of sports success [21-23]. The significant decrease in vigor observed in both groups, however, highlighted the physically taxing nature of MMA, which often results in diminished energy levels regardless of the fight's outcome. This finding is consistent with the previous study, which noted that intense physical exertion commonly leads to reduced vigor due to fatigue [18, 21]. The uniform decrease in vigor underscores the demanding physical requirements of MMA, which can impact fighters' energy levels and overall mood post-fight. The discrepancy between these studies and the current study may be attributed to cultural factors, the unique psychological profiles of Pakistani MMA fighters, or the specific conditions under which this study was conducted.

Interestingly, the anxiety reduction observed in both winners and losers reflects a common phenomenon in competitive sports, where the resolution of pre-fight stress often leads to a post-fight decrease in anxiety [24, 25]. This decrease might be attributed to the psychological release following the intense focus and anticipation leading up to the fight. The release of physical and emotional tension post-competition could explain the significant decrease in anxiety observed in this study. This anxiety reduction can have positive implications for recovery and overall mental well-being, emphasizing the importance of post-fight interventions that support mental health [26, 27].

The contrasting changes in TMD scores between winners and losers highlighted the complex emotional responses associated with competition outcomes. While winners experienced a reduction in overall mood disturbance, losers saw an increase, suggesting that losing a fight might exacerbate negative mood states, as has been suggested in similar studies [28, 29]. The increase in TMD among losers, though not statistically significant, indicates a need for further research into the psychological support necessary for athletes after a loss. The decrease in the POMS TMD score, though not significant, indicated a trend toward improved mood states post-fight among winners. The non-significance of the POMS results in this study might be due to the sample size or the variability in individual responses to the fight experience.

This study highlighted the complex psychological responses of MMA fighters to competition, with significant differences observed between those who win and those who lose. The findings underscore the importance of addressing both the physical and psychological aspects of recovery, particularly for fighters who experience defeat, as their psychological well-being appears to be more adversely affected. These insights can inform targeted interventions to support the mental health and performance of MMA fighters, helping them to manage both the highs and lows of competitive combat sports.

One limitation of this study is the relatively small sample size of 50 participants, which might not fully represent the broader population of MMA fighters, particularly given the cultural and ethnic homogeneity (85.71% Pashtun) of the sample. Additionally, the study only included male fighters aged 10 to 30 years, limiting the generalizability of the findings to other age groups or female fighters. The self-reported nature of mood assessments might introduce bias, as participants could be influenced by social desirability or inaccurate self-perception. Moreover, the study's focus on immediate pre- and post-fight mood changes does not account for longer-term psychological effects or the influence of external factors such as fight outcomes, training intensity, and personal stressors.

Conclusion

The study revealed that MMA fighters experience significant psychological changes post-fight, with winners showing reduced anger, tension, and confusion, and a marked decrease in anxiety and vigor. In contrast, losers primarily exhibited a significant drop in vigor and increased confusion and TMD scores, indicating a more negative psychological impact. These findings highlight the importance of addressing both the mental and physical aspects of recovery in MMA fighters, especially for those who lose. Future research should explore tailored psychological interventions to support MMA fighters, particularly focusing on post-fight recovery strategies for those who experience defeat. Additionally, expanding studies to include diverse populations and longer-term mood assessments could provide deeper insights into the psychological dynamics of combat sports and enhance fighter well-being and performance.

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