

The Impact of Emotional Self-Regulation on Performative Success for Professional Male Fighters

Original Research

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Abstract

Introduction: Emotional self-regulation has been determined to be an important factor regarding outcomes for athletes. Previous research has examined strategies athletes use to regulate their emotions and their motivations for doing so. However, little research has examined how professional fighters utilize emotional self-regulation strategies and their impact on performance. Fighters have been perceived as aggressive and impulsive; hence it is important to examine how they regulate their emotions. The present study investigates the association of emotional self-regulation in professional fighters versus college-aged male nonfighters. The study also evaluates the relationship between emotional self-regulation and winning percentages in professional fighters.

Methods: The study used a sample of professional male fighters ($n = 36$) and college-aged nonfighters ($n = 29$). Participants completed measures examining difficulties with emotional self-regulation amongst other measures.

Results: Despite no differences with professional fighters and the comparison group, difficulties with emotion regulation were negatively correlated with winning percentages (DERS-18 total scores $p = .003$; Awareness $p = .036$; Goals $p = .005$, and Nonacceptance $p = .005$). Findings also suggest significant differences ($p \leq .05$) for professional fighters based upon promotion, concussions, and education level.

Conclusions: These findings may contribute to understanding how emotional self-regulation factors into professional fighters' performative success.

Key Words: emotion regulation; athletic performance; winning percentage

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Introduction

Emotion regulation is a process that attempts to influence and control emotions of ourselves as well as others that is time-limited, situationally bound, and through positive or negative reactions.¹ The ability to successfully self-regulate emotions is an important skill that can positively impact one's life in all aspects. How an athlete regulates their emotions is often thought to be related to their performative success and wellbeing.² Professional fighting and mixed martial arts (MMA), in particular, is often viewed as one of the most physical sports that one can compete in. With the increased risk that comes with the sport, one may expect that fighters have increased levels of impulsiveness. Research conducted with Polish professional skydivers, a

sport with a high level of assumed risk, showed high levels of impulsiveness.³ Fighters must be mindful and carefully control their emotions, especially impulsivity and fear, to be successful. While fear has served as an adaptive emotion in an evolutionary sense as it can lead to decision-making that will keep one safe, it also can serve as a negative emotion when considering development and performance.⁴ A study with nine MMA participants across various fighting



promotions found the use of behavioral processes of change, the development of embodied emotions, and the use of psychological strategies all impacted not only the fighter's self-regulation processes but also their performance.⁵

Athletes often perceive pleasant emotions such as happiness with negative performance and unpleasant emotions such as anger with positive performance.⁶ It was found that collegiate athletes reported higher levels of self-restraint, repressive defensiveness, and denial of distress compared to college non-athletes suggesting that they were more adept at dealing with increased pressure.⁷ With runners, it was found that based upon the individual athlete's beliefs related to performance and emotions, they will attempt to regulate either positive or negative emotions.⁸ Attempting to regulate emotions during competition can lead to greater use of physiological resources than those experiencing positive emotions.⁹ Similarly, those experiencing positive emotions coupled with positive feedback resulted in lower metabolic cost of performance.¹⁰ Findings align with many psychophysiology theories that suggest that emotional self-regulation impairment has a perceived effect on pacing, physical effort, and overall sports performance.¹¹

Athletes who used more general strategies at both pre-and post-game displayed lower emotional intensity and fewer difficulties in emotion regulation.¹² Perfectionistic responses of competitive junior athletes participating in combat sports (e.g., taekwondo, judo, karate, boxing) were measured, and researchers found that these athletes produced lower scores for general impulsiveness than those participating in endurance and team sports and were more likely to develop resources such as functional impulsiveness and perfectionism than individuals competing in other sports.¹³ A significant correlation was found between an elite athlete's world ranking and their overall ability to self-regulate suggesting the better the athlete was at self-regulating, the higher the athlete was ranked in the world.¹⁴ Researchers examined the use of psychologically-oriented basketball drills and effects on self-regulation for basketball players in Germany. They found that compared to the control group, members of the intervention group improved significantly with self-motivation and coping with negative cognitions suggesting that learning and practicing emotional self-regulation strategies are beneficial for players.¹⁵ While current research exists studying emotional self-regulation in many sports, little research has been conducted that specifically looks at the use of emotional self-regulation by professional fighters. The current study aimed to analyze differences between professional fighters compared to a comparison group of nonfighters. Based on previous research, it was hypothesized that professional fighters would have fewer difficulties regulating emotions than nonfighters.

Scientific Methods

Participants

Interested participants in the study were recruited between January 2020 and April 2021 through an anonymous hyperlink provided to students, trainers, coaches, and fighters. Flyers with a QR code were also placed in training gyms that athletes could access to complete the survey. Our control group was recruited on a university campus. A total of 84 people completed the measures, with a total of 17 of the participants being female. Due to a low number of female fighters ($n = 2$) that completed the measures, all females including control participants were excluded from the analyses. Two male individuals from the control group were also excluded as their age made them significant outliers compared to the other male participants in the control group. A total of 65 male participants comprised the final sample for the analyses.

For our participant sample, the professional fighters consisted of 32 male athletes competing in MMA, two in boxing, one in kickboxing, and one in judo. At the same time, 29 college-aged male nonfighters were also included as participants in the control group who experience non-physical stress. The 36 male fighters ranged in age from 20 to 38 ($M = 30.03$, $SD = 3.873$) while the members of the comparison group varied in age from 19 to 34 ($M = 23.83$, $SD = 3.536$). A large percentage of the fighters identified as White or Caucasian (47.2%), while 19.4% identified as Black or African American, 11.1% as Asian or Asian American, and 22.5% as other. 13.9% of the fighters identified as Hispanic, Latino, or of Spanish Origin. A majority of the comparison group identified as White or Caucasian (62.1%), 13.8% as Black or African American, 13.8% as Asian or Asian American, and 10.3% as other; 31% of the comparison group identified as Hispanic, Latino, or of Spanish Origin. Of the professional fighters, 50% actively competed in one of the larger promotions (UFC, Bellator, and ONE Championship), while the other 50% competed in smaller promotions (Titan FC, LFA, etc.). Participants were provided with information about the study during informed consent. The university's institutional review board approved all study procedures.

Protocol

Participants were asked to follow a hyperlink to complete our survey through the online software provided by Qualtrics. The battery consisted of four questionnaires, including the Difficulties in Emotional Regulation Scale



(DERS-18), totaling 125 items. Participants were also asked to complete a demographic questionnaire that included the fighter's professional status, fight record, prior disciplines, weight class, etc., and a self-efficacy question. Understanding that the athlete's and the college-aged control participant's time is valuable and limited, the aim was to keep the battery at a reasonable number of items. It was estimated that it would take participants approximately 15 to 20 minutes to complete the whole survey and three to five minutes to complete the DERS-18 portion of the survey. However, participants were not restricted to time constraints to complete the measure and could do so on their own time. Upon completion, participants were thanked for their participation and debriefed. The participants did not receive any financial compensation, and participation in the study was voluntary.

Researchers conducted a study across five samples validating the DERS-18. Participants were asked to complete the full DERS (36 items) in which the subset of 18 questions for the DERS-18 was taken from the original DERS.^{16,17} Participants did not complete the DERS-18 separately. Participants ranged from adolescents to adults, and there were 1,624 participants across the five samples.¹⁶

The DERS-18 is composed of the strongest questions from each of the six subscales from the original DERS.^{16,17} The subscales include awareness, clarity, goals, impulse, nonacceptance, and strategies. The 'awareness subscale,' which is reverse scored, is focused on the individual's ability to recognize their emotions. For example, "I pay attention to how I feel." The 'clarity subscale' involves an individual's ability to make sense of their emotions and an example question from the scale is "I have no idea how I am feeling." The 'goals subscale' evaluates an individual's ability to achieve desired goals even when experiencing distressing emotions. For instance, "when I am upset, I have difficulty getting work done." The 'impulse subscale' measures an individual's ability to control their behaviors, and an example question is "when I am upset, I become out of control." The 'nonacceptance subscale' is focused on determining whether an individual can accept distressing emotions. A question from this subscale includes, "when I am upset, I become embarrassed for feeling that way." Lastly, the 'strategies subscale' evaluates the individual's beliefs about reacting and feelings when experiencing a distressing emotion. For instance, "when I am upset, I believe I will remain that way for a while." Each subscale is composed of three questions, and the scores from these subscales are summed up to create a total score. Based on the results of the validation study, they found that the DERS-18 demonstrates both excellent reliability ($\alpha = .91$) and validity ($r = .98$) and performed similarly to the original DERS despite only having half of the items. The researchers concluded that the DERS-18 is an appropriate measure that continues the assessment of emotional regulation while lowering the chances of participant fatigue.¹⁶

The DERS-18 was administered to a group of professional fighters and our comparison group of college-age male nonfighters. The DERS-18 was completed as part of a battery consisting of three other measures; the current study focused on the results associated with the Difficulties in Emotional Regulation Scale (DERS-18). The DERS-18 is a self-report measure consisting of 18 questions that follow a Likert scale from one (Almost Never 0-10%) to five (Almost Always 91-100%). Based on the relative recency of the DERS-18, it is apparent that the DERS-18 has not been used with many athletes, let alone professional fighters. Current research, including the use of the DERS-18, has explored emotional self-regulation difficulties related to chronic pain disability and opioid misuse, and findings showed greater difficulties with emotion regulation were related to a higher incidence of opioid misuse and increased rates of chronic-pain disability.¹⁸

Statistical Analysis

All data were analyzed using IBM SPSS Statistics, Version 27 for Mac. All p -values $\leq .05$ were considered statistically significant, and two-tailed p -values were reported. Mean scale scores were calculated by taking the mean score of the items and reverse scoring when necessary. To test our first hypothesis, the analysis method utilized was an independent-samples t -test comparing difficulties with emotion regulation in male professional fighters and the college-aged control group of male nonfighters. To test our second hypothesis, bivariate correlations were used to examine the relationships between variables, including difficulties with emotion regulation and winning percentages for the fighters. Analyses were also conducted utilizing an independent samples t -test to compare professional fighters and DERS-18 scores to whether they participated in the big three promotions. An independent samples t -test comparing professional fighters was also used to assess DERS-18 scores related to whether they reported at least one diagnosed concussion. An ANOVA was conducted to compare professional fighters' level of education and their DERS-18 scores.

Results

An independent-samples t -test was conducted to compare DERS-18 total scores and subscale scores between professional male fighters and college-aged male non-fighters. Results showed no significant differences for the DERS-

18 total scores or subscale scores between the professional fighters and the college-aged control group of male nonfighters. These results suggest that the professional fighters and the comparison group of the college-aged control group of male nonfighters are similar regarding their emotional regulation capabilities.

Secondly, the relationship between DERS-18 total and subscale scores and winning percentages for the professional fighters was examined. Based upon the results of the study, a moderately negative correlation was found between DERS-18 total scores $r(34) = -.48, p = .003$; Awareness $r(34) = -.35, p = .036$; Goals $r(34) = -.45, p = .005$, and Nonacceptance $r(34) = -.45, p = .005$. These results suggest that those fighters who are better at regulating their emotions and thus producing lower scores on the DERS-18 have higher winning percentages than those with higher scores.

Analyses were also completed that compared the fighter's DERS-18 total scores and subscale scores independently from the control group based upon promotion, comparing those in the big three promotions (UFC, Bellator, ONE Championship) to the fighters who compete in lower promotions using an independent-samples t-test. Results showed a significant difference for the nonacceptance subscale scores between the professional fighters in the big three promotions, ($M = 4.44, SD = 2.06$) and those professional fighters who compete in other promotions ($M = 6.61, SD = 3.93$); $t(34) = -2.07, p = 0.046$. According to Cohen's d , this effect is considered medium-to-large, $d = .70$. This finding suggests that those fighters who compete in the big three promotions have fewer difficulties accepting the emotions they are experiencing compared to the fighters in the other promotions.

Results were analyzed using an independent samples t-test, with reported concussions (zero concussions and one or more concussions) as the independent variable and difficulties with emotion regulation [DERS-18 scores] as the dependent variable. Results of Levene's test indicated that the assumption of equal population variances is tenable, $F = 4.11, p = .05$ with the level of significance set at $\alpha = .05$, the t-test revealed significantly greater difficulties with impulse for those in the one or more concussions condition ($M = 5.33, SD = 2.36$) as compared to the zero concussions condition ($M = 3.65, SD = 1.73$) $t(34) = -2.40, p = .02$. According to Cohen's d , this effect is considered large, $d = .80$. This finding suggests that those fighters who reported one or more concussions have increased impulse control difficulties compared to those who denied having any concussions.

Lastly, results were analyzed using a one-factor ANOVA design, with the education level of the fighters (some high school, graduated from high school, some university/college/trade school, graduated from university/college/trade school, and some graduate school) as the independent variable and DERS-18 total and subscale scores as the dependent variable. Results of Levene's Test indicate that the assumption of equal population variances is tenable, $F(4,31) = 1.84, p = .145$. With the level of significance set at $\alpha = .05$, the ANOVA revealed a significant effect for education level, $F(4,31) = 3.07, MS = 6.63, p = .031, \eta^2 = .285$. The Tukey HSD post hoc procedure was conducted using a familywise error rate of $\alpha_{FWE} = .05$. Participants in the same graduate school group had significantly higher DERS-18 total scores compared to the university/college/trade school group ($p = .043$; 95% CI: [.417, 37.68]). In addition, participants in the some graduate school group had significantly higher goals scores than those who graduated from the university/college/trade school group ($p = .013$; 95% CI: [.839, 9.661]). No other significant results were observed.

Table 1. Correlations between winning percentage, DERS-18 total scores, and DERS-18 subscale scores

Winning Percentage correlated to:	Pearson's r	p -value
DERS-18 Total	-.481	.003*
Awareness	-.351	.036*
Clarity	-.288	.088
Goals	-.457	.005*
Impulse	-.275	.105
Nonacceptance	-.453	.005*
Strategies	-.239	.160

*Statistically significant at $p \leq .05$

Table 2. Comparing means of fighters in large promotions and reported concussions

	Large Promotions (n = 18)	Small Promotions (n = 18)	Zero Concussions (n = 17)	One or More Concussions (n = 19)
DERS-18	32.94 ± 10.33	36.94 ± 12.86	31.18 ± 8.95	38.32 ± 12.97
Awareness	7.67 ± 3.13	7.50 ± 3.11	7.12 ± 2.55	8.00 ± 3.50
Clarity	4.83 ± 1.86	5.94 ± 2.67	5.06 ± 2.59	5.68 ± 2.11
Goals	6.50 ± 2.66	7.83 ± 2.98	6.53 ± 2.74	7.74 ± 2.92
Impulse	4.89 ± 2.54	4.17 ± 1.86	3.65 ± 1.73	5.33 ± 2.36**
Nonacceptance	4.44 ± 2.06	6.61 ± 3.93*	4.65 ± 2.74	6.32 ± 3.59
Strategies	4.61 ± 1.69	4.89 ± 2.11	4.18 ± 1.24	5.26 ± 2.23

Data are Means ± SD

*Significantly greater than participant fighters in large promotions, $p = 0.046$ **Significantly greater than participant fighters with zero reported concussions, $p = 0.022$ **Table 3.** Comparing means of fighter's scores with education level

	Some High School (n = 2)	High School (n = 8)	Some Post-secondary (n = 12)	Post-secondary (n = 10)	Some Post- graduate (n = 4)
DERS-18	32.50 ± 3.54	37.00 ± 12.70	33.70 ± 9.72	29.70 ± 7.79	48.75 ± 17.71*
Awareness	5.50 ± 7.71	7.50 ± 3.42	7.50 ± 1.93	7.30 ± 3.86	9.75 ± 3.86
Clarity	5.50 ± 2.12	6.38 ± 3.29	4.83 ± 1.47	4.70 ± 2.11	6.75 ± 2.75
Goals	7.50 ± 0.71	7.63 ± 2.83	7.00 ± 2.73	5.50 ± 1.84	10.75 ± 3.50**
Impulse	7.00 ± 2.83	4.13 ± 2.10	4.50 ± 2.47	3.60 ± 0.97	6.50 ± 2.65
Nonacceptance	3.50 ± 0.71	6.50 ± 3.55	5.17 ± 2.25	4.50 ± 2.59	8.25 ± 6.18
Strategies	3.50 ± 0.71	4.88 ± 1.81	4.75 ± 2.30	4.10 ± 0.88	6.75 ± 2.06

Data are Means ± SD

*Significantly greater than participant fighters who completed post-secondary education, $p = 0.043$ **Significantly greater than participant fighters who completed post-secondary education, $p = 0.013$

Discussion

Based on the results of the study, the importance of emotional self-regulation for professional fighters related to their respective promotions and performative success was highlighted. Being that professional fighting involves a great deal of difficulty, athletic talent, and mental toughness, fighters benefit from a level of emotional composure that will lead to success. One might expect professional fighters to have fewer difficulties with emotion regulation compared to non-athletes as a result of being better equipped to handle all the stress they are exposed to throughout their careers.

However, the results showed that both the professional fighters and the college-aged nonfighters are relatively well-adjusted individuals with minor difficulties with emotion regulation. These results contradict prior research that has found significant differences between athletes and non-athletes, with athletes reporting higher levels of self-restraint, repressive defensiveness, and denial of distress and suggesting that athletes were more adept at dealing with increased pressure.⁷ It could be assumed that the age window for the comparison group is often during a time of transition into adult life. As a result, the comparison group must ensure that they can regulate their emotions to reach their desired goals, like the professional fighters. It can also be hypothesized that at the mean age of the comparison group, the brain is reaching its full development stage, and stabilization of the prefrontal cortex is associated with executive functioning, which helps regulate emotions.¹⁹ While the findings could not be confirmed with the samples, differences between genders may be expected for those in both the professional fighters and the comparison group.

Results from the study also showed moderate negative correlations between winning percentages for the professional fighters and DERS-18 total scores, awareness, goals, and nonacceptance. These results suggest that as winning percentages increase, overall difficulties with emotion regulation decrease. This finding is relevant to the professional fighters as it indicates that the ability to manage and regulate emotions successfully is linked to performative success, as highlighted in previous research.⁵ Mixed martial artists are often perceived as mentally tougher than those who do not participate in combat sports which has shown to be advantageous in their respective sport.²⁰



As part of regulating emotions, athletes must be aware of their emotions. Showing awareness of the emotions experienced can lead to dealing with distressing emotions in a timely and productive manner. Being able to deal with strong negative emotions productively is beneficial in reducing these emotions over time which is similar to a framework laid out indicating that athletes must identify the emotions they are experiencing and deal with them accordingly to prevent them from negatively impacting their performance.²¹ As results show, the fighter's ability to regulate their emotions was correlated with their winning percentages. As winning percentages increase, fighters can expect more success, including moving to the top ranks of their competitions, leading to increased pay and more significant bouts.

Another finding of relevance was how the promotion competed was related to DERS-18 scores, with results showing that those in the larger promotions had fewer difficulties with nonacceptance than those in smaller promotions. Based on the findings, the fighters in the big three promotions are better able to accept the negative emotions that they are feeling without feeling guilty, embarrassed, or shameful. Considering the potential psychological and performance benefits of accepting distressing emotions for professional fighters based on the results of the study, interventions that are tailored to focus on improving the fighter's ability to accept negative emotions may prove valuable as fighters progress through their career. Similarly, previous research has found that with elite freestyle skiers, the better they were at self-regulating their emotions, the higher their world ranking was.¹⁴ Results from the current study suggest that improved emotion regulation capabilities factor into reaching the pinnacle of the sport.

With an understanding of the high level of stress that comes with the sport, such as intense and physical training camps and dieting, one might expect that an athlete's emotions may be impacted. The fighters who can deal with their emotions adequately are likely to be more successful. Researchers have found that an optimal psychological state leads to higher performance levels by improving attentional and emotional self-regulation abilities.²²

When conducting analyses, two other findings were of note. The first is that the professional fighters who reported one or more concussions showed significantly greater difficulties with impulse than those with zero reported concussions. This finding suggests that individuals who have had one or more concussions struggle with impulse control related to their emotions compared to those fighters who denied ever having experienced a concussion. While research has shown changes related to structures involved with emotion regulation following a mild traumatic brain injury, this finding should be taken with caution.^{23,24} As a result of the highly physical aspect of professional fighting that includes strikes and blows to the head and knockouts, there may have been some underreporting. While the question was framed in the survey as "number of diagnosed concussions," it is possible that some of these concussions were not diagnosed.

Another interesting finding with the professional fighters is that there was a significant difference in DERS-18 scores based on the level of education that the fighters had. The results showed that fighters who had completed some graduate school had significantly higher scores on the goals subscale than those who had graduated from university, college, or trade school. This suggests that those who had started graduate school but did not complete an advanced degree had greater difficulties completing goal-directed activities when experiencing negative emotions than those who completed university, college, or trade school degrees. When examining previous research, this comes as somewhat of a surprise as it has been found that those who are able to regulate their emotions properly have successful learning outcomes.²⁵ Considering that those who completed some graduate training have the highest education levels for those in the fighters sample and therefore have experienced learning success, we would expect better emotion regulation capabilities out of this group. However, while the fighters who had completed some graduate school had to have achieved an undergraduate degree, pursuing an advanced degree appears to be related to more significant emotional regulation difficulties than those with other education levels.

While there are many different factors considered during research, it is understood that there are limitations and additional factors that may impact a study. The first limitation that is of note is the relatively low sample size. This was likely impacted by the COVID-19 pandemic as training was put on hold, limiting our recruitment of professional fighters. Another limitation that was considered is the average age of fighters in their respective promotions. Despite no significant differences in emotional self-regulation after grouping fighters based on the age with groups of fighters aged 20-29 and 30-39, there was a significant difference in the mean age of fighters in the big three promotions ($M = 31.56$, $SD = 3.518$) and those in the other promotions ($M = 28.50$, $SD = 3.682$). As a result of the finding of fighters in the big three promotions having fewer difficulties accepting their emotions, results should be taken and interpreted



with caution as age and experience may factor into their ability to accept the negative emotions they are experiencing. A third limitation that was considered for this study is the mixed martial artists' availability to complete the battery. A fighter in the middle of a training camp is expected to have far less free time than a fighter who is not actively training for a fight. Therefore, while the hope was to get as many fighters as possible to complete the questionnaire, it is understood that the fighter's schedule at the time we distributed the battery likely impacted participation rates.

Conclusions

Overall, the findings suggest that professional fighters and college-aged nonfighters are relatively well-adjusted individuals and can self-regulate their emotions. However, findings show that those athletes in the big three promotions of MMA are better able to accept the negative emotions they are experiencing and that scores on the DERS-18 total score and awareness, goals, and nonacceptance scales are negatively correlated with winning percentages. Education levels and diagnosed concussions also appear to be related to the fighters' ability to regulate emotions. Despite these unexpected findings when comparing professional fighters across promotions, the results should be considered preliminary and replicated in the future. Research should be continued focusing on how emotional self-regulation differs amongst fighters and its relationship with performative success.

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