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Original Article

Striking Versus Grappling Combat Sports: Differences in Aggression and Psychological Self - Regulation

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Abstract

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Background: Striking and grappling combat sports differ substantially in their permitted techniques, but whether these modality differences correspond to aggression or psychological self-regulation remains uncertain. **Methods:** This descriptive cross-sectional study analysed 314 national-level Sri Lankan combat-sport athletes recruited between August and December 2024: 274 strikers and 40 grapplers. Six mixed martial arts athletes were excluded from the primary comparison. Aggression, emotion dysregulation, and self-control were assessed with the Buss-Perry Aggression Questionnaire (BPAQ), Difficulties in Emotion Regulation Scale-Short Form (DERS-SF), and Brief Self-Control Scale (BSCS). Welch's t-tests, Hedges' g, 95% confidence intervals (CIs), and HC3-robust regression models were used. **Results:** No statistically significant modality differences were detected for BPAQ total aggression (79.13 ± 16.74 vs. 78.54 ± 16.51 ; mean difference = 0.59, 95% CI [-5.26, 6.44], $p = .839$, $g = 0.04$), the 15-item DERS score (40.20 ± 10.06 vs. 39.74 ± 10.53 ; mean difference = 0.46, 95% CI [-3.15, 4.06], $p = .800$, $g = 0.05$), or BSCS self-control (44.74 ± 9.43 vs. 44.58 ± 7.98 ; mean difference = 0.16, 95% CI [-2.69, 3.01], $p = .909$, $g = 0.02$). Adjusted models produced the same overall pattern. **Conclusion:** Among the national-level Sri Lankan athletes represented by this convenience sample, statistically significant striking-versus-grappling differences were not detected and observed point estimates were small. The confidence intervals, however, do not establish equivalence and remain compatible with small differences in either direction.

Keywords: aggression; combat sports; emotion regulation; self-control; Sri Lanka

Introduction

Combat sports involve regulated physical confrontation, with rules governing permissible techniques, target areas, and competitive objectives. A strike, throw, or takedown performed within competition is therefore not equivalent to dispositional hostility outside sport. Systematic reviews of martial arts and combat-sport participation have reported heterogeneous findings for aggression, anger, emotional functioning, and self-related outcomes, with no consistent evidence that participation produces a uniform increase in aggression (Ciaccioni et al., 2024; Lafuente et al., 2021).

Technical modality nevertheless provides a plausible basis for psychological comparison. Grappling disciplines emphasise gripping, takedowns, throws, positional control, and pins, whereas striking disciplines emphasise punches, kicks, and other forms of offensive contact. Mixed martial arts (MMA) combines both repertoires and is analytically distinct from either category (Barley & Harms, 2021). Recent studies further suggest that aggression-related and emotion-regulation patterns may vary by discipline, competitive exposure, and athlete characteristics rather than by a single general 'combat-sport' profile (Kuśnierz et al., 2025, 2026; Patenteu et al., 2024; Predoiu et al., 2024).

Sri Lankan evidence remains limited. A previous national-level study within the same research programme found no significant difference in overall aggression between combat-sport and non-combat-sport athletes and identified the absence of sport-specific combat data as a limitation (Deva Adithiya et al., 2022). The present study used a newly recruited 2024 cohort to address that gap through a direct comparison of striking and grappling athletes.

Aggression was assessed with the BPAQ, which distinguishes physical aggression, verbal aggression, anger, and hostility (Buss & Perry, 1992). Psychological self-regulation was examined through the BSCS, reflecting

dispositional self-control (Tangney et al., 2004), and the DERS-SF, which assesses difficulties in emotion regulation (Kaufman et al., 2016). For the DERS-SF, the primary score followed recent Sri Lankan psychometric evidence supporting a five-factor structure excluding Awareness (Weerasinghe et al., 2025). The primary objective was to compare striking and grappling athletes on total aggression, emotion dysregulation, and self-control. Secondary subscale analyses were exploratory. Adjusted analyses examined whether modality associations persisted after accounting for age, sex, training years, and recent competition exposure.

Methods

Study design, sampling and participants

This descriptive cross-sectional study was conducted from August to December 2024 as an extension of the earlier Sri Lankan research programme (Deva Adithiya et al., 2022). No data from the 2020 parent-study sample were reused. National-level combat-sport athletes were recruited by convenience sampling. Eligibility criteria were age 18 years or older and at least one national-level medal during the preceding three years. Training experience was recorded as a study variable but was not an eligibility criterion in 2024. Athletes reporting a diagnosed mental disorder were excluded to maintain a non-clinical athletic sample and to reduce potential confounding of aggression, emotion-regulation, and self-control scores by psychiatric conditions or treatment. This exclusion limits generalisability to athletes with diagnosed mental disorders.

The original recruitment target for the broader 2024 study was estimated using Cochran's formula with a 50% assumed prevalence, consistent with the parent-study sampling approach. This prevalence-based calculation was not a statistical power calculation for the present two-group comparison of continuous outcomes. The striking and grappling group sizes arose from the distribution of recruited

disciplines; accordingly, the present analysis was not designed as an equivalence or non-inferiority study and no minimum between-group effect was prespecified.

A total of 320 eligible athletes were recruited. Boxing, karate, kickboxing, Muay Thai, taekwondo, and Wushu/Sanda were classified as striking disciplines; judo and wrestling were classified as grappling disciplines. Six MMA athletes were retained for discipline-level descriptive reporting but excluded from the primary striking-versus-grappling analyses because MMA combines both technical modalities. The primary analytic sample therefore comprised 314 athletes: 274 strikers and 40 grapplers.

Data collection, language adaptation and ethics

Participants were recruited face-to-face and completed a self-administered online questionnaire accessed through a QR code. All administrations were online. Electronic informed consent was obtained before participants could proceed to the questionnaire. The original English versions of the BPAQ, DERS-SF, and BSCS were used and pilot tested. Sinhala and Tamil versions were translated specifically for this study using forward translation, back-translation, expert review, pilot testing, and face/content validation. Formal measurement invariance across the three language versions was not tested. Ethical approval was granted by the KIU Ethics Review Committee (KIU/ERC/24/181).

Measures and score construction

Aggression was measured with the 29-item BPAQ (Buss & Perry, 1992). The Physical Aggression, Verbal Aggression, Anger, and Hostility subscales were prorated only when at least 8/9, 4/5, 6/7, and 7/8 items, respectively, were present; BPAQ total was calculated only when all four subscales were available. Emotion dysregulation was measured with the 18-item DERS-SF (Kaufman et al., 2016). Each three-item subscale was prorated when at least two

items were present; the 18-item total required at least 15 items, and the Sri Lanka-oriented 15-item five-factor score excluding Awareness required at least 12 items (Weerasinghe et al., 2025). Self-control was measured with the 13-item BSCS, with the total prorated when at least 11 items were present (Tangney et al., 2004). Higher BPAQ and DERS scores indicate greater aggression and emotion dysregulation, whereas higher BSCS scores indicate greater self-control. Internal consistency in the striking/grappling sample was $\alpha = .91$ for BPAQ total, $\alpha = .89$ for the 15-item DERS score, $\alpha = .87$ for DERS-SF total, and $\alpha = .88$ for BSCS.

Outcome missingness was modest: 22/314 (7.0%) participants lacked BPAQ total, 7/314 (2.2%) lacked the 15-item DERS score, and 16/314 (5.1%) lacked BSCS total; subscale missingness ranged from 0.3% to 4.1%. Available-case analysis was used for each outcome.

Statistical analysis

Continuous variables were summarised using means and standard deviations, and categorical variables using frequencies and percentages. Welch's independent-samples t-tests compared striking and grappling groups because of unequal sample sizes; mean differences, 95% CIs, and Hedges' g were reported. Pearson chi-square tests examined categorical variables. Expected-count assumptions were met for sex and injury status; for competition level, 2 of 14 expected counts (14.3%) were below 5 and none was below 1.

Three separate ordinary least-squares models examined BPAQ total, the 15-item DERS score, and BSCS total using HC3 heteroskedasticity-robust standard errors. Striking was coded 1 and grappling 0; male was coded 1 and female 0. Age, training years, and competitions in the previous 12 months were entered as continuous covariates. The three primary outcomes were prespecified for interpretation. BPAQ subscales, the DERS-SF total and subscales, and discipline-level descriptives were exploratory; no multiplicity adjustment was applied to these secondary

analyses. All tests were two-tailed with $\alpha = .05$, and interpretation emphasised effect estimates and CIs rather than statistical significance alone.

Results

Of the 320 recruited athletes, 314 entered the primary modality analysis (274 strikers [87.3%] and 40 grapplers [12.7%]); the six MMA athletes were excluded from that comparison. Discipline frequencies and descriptive primary-outcome scores are shown in Table 1. The striking group was 72.6% male (199/274) and the grappling group 65.0% male (26/40), $\chi^2(1) = 0.66$, $p = .417$. No statistically significant group differences were detected for age, training years, weekly training frequency, session duration, competitions in the previous 12 months, injury status, or competition level (Table 2).

Table 1
Participant Distribution and Descriptive Primary Outcomes by Combat Sport

Combat sport	Modality	n	BPAQ total, M $\pm$ SD (n)	DERS-15, M $\pm$ SD (n)	BSCS total, M $\pm$ SD (n)
Boxing	Striking	55	80.88 $\pm$ 18.69 (49)	39.00 $\pm$ 9.26 (55)	43.76 $\pm$ 9.24 (55)
Karate	Striking	73	78.61 $\pm$ 17.31 (70)	41.24 $\pm$ 10.35 (72)	43.87 $\pm$ 9.10 (71)
Kickboxing	Striking	39	78.68 $\pm$ 16.29 (37)	38.26 $\pm$ 9.45 (38)	47.86 $\pm$ 8.43 (36)
Muay Thai	Striking	36	81.88 $\pm$ 17.98 (33)	40.77 $\pm$ 10.78 (35)	46.13 $\pm$ 9.38 (31)
Taekwondo	Striking	54	77.10 $\pm$ 14.07 (52)	41.50 $\pm$ 10.42 (52)	42.98 $\pm$ 10.34 (53)
Wushu/Sanda	Striking	17	77.93 $\pm$ 15.39 (14)	38.81 $\pm$ 10.23 (16)	48.57 $\pm$ 8.88 (14)
Judo	Grappling	21	83.74 $\pm$ 15.18 (19)	41.00 $\pm$ 10.81 (20)	42.58 $\pm$ 6.77 (19)
Wrestling	Grappling	19	73.06 $\pm$ 16.46 (18)	38.42 $\pm$ 10.35 (19)	46.58 $\pm$ 8.76 (19)
MMA	Mixed	6	84.67 $\pm$ 18.32 (6)	41.33 $\pm$ 8.76 (6)	47.67 $\pm$ 10.56 (6)

Note. Values in parentheses after M $\pm$ SD are the available n for that outcome. MMA = mixed martial arts; BPAQ = Buss-Perry Aggression Questionnaire; DERS-15 = 15-item five-factor Difficulties in Emotion Regulation Scale score excluding Awareness; BSCS = Brief Self-Control Scale. MMA athletes were excluded from the striking-versus-grappling inferential analyses.

Table 2
Participant Characteristics by Combat-Sport Modality

Characteristic	Striking (n = 274)	Grappling (n = 40)	p
Age, years	24.77 $\pm$ 4.36	24.68 $\pm$ 3.85	.887
Male, n (%)	199 (72.6)	26 (65.0)	.417
Training years	8.95 $\pm$ 5.40	8.48 $\pm$ 5.62	.621
Sessions/week	3.73 $\pm$ 1.41	3.65 $\pm$ 1.63	.775
Session duration, min	102.88 $\pm$ 26.16	103.08 $\pm$ 25.59	.964
Competitions, previous 12 months	5.57 $\pm$ 2.83	5.49 $\pm$ 3.32	.877
Injury in previous 12 months, n (%)	73 (26.6)	12 (30.0)	.695

Note. Values are M $\pm$ SD unless otherwise indicated. Continuous variables were compared with Welch's t-tests; sex and injury status were compared with Pearson chi-square tests.

For BPAQ total, strikers scored 79.13 $\pm$ 16.74

(n = 255) and grapplers 78.54 $\pm$ 16.51 (n = 37), yielding a mean difference of 0.59 points, 95% CI [-5.26, 6.44], $p = .839$, $g = 0.04$. For the primary 15-item DERS score, the corresponding means were 40.20 $\pm$ 10.06 (n = 268) and 39.74 $\pm$ 10.53 (n = 39), mean difference = 0.46, 95% CI [-3.15, 4.06], $p = .800$, $g = 0.05$. BSCS totals were 44.74 $\pm$ 9.43 (n = 260) and 44.58 $\pm$ 7.98 (n = 38), mean difference = 0.16, 95% CI [-2.69, 3.01], $p = .909$, $g = 0.02$. No exploratory BPAQ or DERS-SF subscale comparison reached $p < .05$; point estimates and CIs are presented in Table 3.

Table 3
Psychological Outcomes in Striking and Grappling Athletes

Outcome	Striking, M $\pm$ SD	Grappling, M $\pm$ SD	Mean difference (95% CI)	p	Hedges' g
BPAQ total	79.13 $\pm$ 16.74	78.54 $\pm$ 16.51	0.59 [-5.26, 6.44]	.839	0.04
Physical aggression	22.01 $\pm$ 6.83	21.41 $\pm$ 6.00	0.60 [-1.51, 2.70]	.572	0.09
Verbal aggression	15.19 $\pm$ 4.38	15.15 $\pm$ 3.72	0.04 [-1.25, 1.34]	.947	0.01
Anger	20.80 $\pm$ 5.43	20.50 $\pm$ 5.34	0.30 [-1.52, 2.12]	.744	0.05
Hostility	21.21 $\pm$ 6.25	21.47 $\pm$ 5.54	-0.26 [-2.22, 1.70]	.789	-0.04
DERS-15	40.20 $\pm$ 10.06	39.74 $\pm$ 10.53	0.46 [-3.15, 4.06]	.800	0.05
DERS-SF total	47.63 $\pm$ 10.79	47.18 $\pm$ 10.79	0.45 [-3.27, 4.16]	.810	0.04
DERS	8.04 $\pm$ 2.58	8.23 $\pm$ 2.83	-0.19 [-1.15, 0.78]	.699	-0.07
Nonacceptance	8.25 $\pm$ 2.46	7.62 $\pm$ 2.79	0.63 [-0.31, 1.58]	.184	0.25
DERS Goals	7.93 $\pm$ 2.85	7.82 $\pm$ 2.73	0.11 [-0.83, 1.06]	.812	0.04
DERS Impulse	7.44 $\pm$ 2.57	7.43 $\pm$ 2.55	0.01 [-0.85, 0.88]	.973	0.01
DERS Awareness	7.93 $\pm$ 2.60	7.54 $\pm$ 2.36	0.39 [-0.43, 1.22]	.340	0.15
DERS Clarity	8.16 $\pm$ 2.66	8.68 $\pm$ 2.87	-0.52 [-1.48, 0.45]	.287	-0.19
BSCS total	44.74 $\pm$ 9.43	44.58 $\pm$ 7.98	0.16 [-2.69, 3.01]	.909	0.02

Note. Mean difference = striking minus grappling. BPAQ = Buss-Perry Aggression Questionnaire; DERS-SF = Difficulties in Emotion Regulation Scale-Short Form; DERS-15 = five-factor score excluding Awareness; BSCS = Brief Self-Control Scale. Secondary subscale analyses were exploratory and were not adjusted for multiplicity.

In HC3-robust regression models, striking modality was not statistically associated with BPAQ total (B = 0.44, 95% CI [-5.54, 6.41], $p = .886$), DERS-15 (B = 0.47, 95% CI [-3.22, 4.16], $p = .804$), or BSCS total (B = 0.26, 95% CI [-2.65, 3.17], $p = .861$) after adjustment for age, sex, training years, and recent competition exposure. Full model coefficients are reported in Table 4. Across these models, male sex was associated with a lower DERS-15 score and greater recent competition exposure was associated with a higher BSCS score; these covariate findings were not primary hypotheses and should be interpreted cautiously.

Table 4
HC3-Robust Regression Models for Primary Psychological Outcomes

Outcome / predictor	B	SE	95% CI	p	n
BPAQ total					279
Striking modality	0.44	3.05	[-5.54, 6.41]	.886	
Age	-0.03	0.39	[-0.80, 0.74]	.942	
Male sex	-2.24	2.33	[-6.81, 2.33]	.337	
Training years	-0.12	0.31	[-0.73, 0.49]	.704	
Competitions, previous 12 months	0.07	0.36	[-0.64, 0.78]	.843	
DERS-15					294
Striking modality	0.47	1.88	[-3.22, 4.16]	.804	
Age	-0.00	0.22	[-0.44, 0.44]	.999	
Male sex	-3.46	1.39	[-6.18, -0.73]	.013	
Training years	-0.08	0.18	[-0.43, 0.27]	.649	
Competitions, previous 12 months	-0.20	0.22	[-0.63, 0.22]	.347	
BSCS total					286
Striking modality	0.26	1.48	[-2.65, 3.17]	.861	
Age	0.10	0.20	[-0.29, 0.49]	.621	
Male sex	0.91	1.23	[-1.50, 3.32]	.457	
Training years	0.07	0.16	[-0.24, 0.39]	.636	
Competitions, previous 12 months	0.54	0.20	[0.15, 0.92]	.006	

Note. Striking = 1, grappling = 0; male = 1, female = 0. Age, training years, and competitions were entered as continuous variables. B = unstandardised regression coefficient; SE = HC3-robust standard error; CI = confidence interval.

Discussion

No statistically significant striking-versus-grappling differences were detected for the three primary outcomes, and the observed standardised effects were small ($g = 0.02$ - 0.05). The same general pattern was seen across exploratory aggression and emotion-regulation subscales and after covariate adjustment. These findings do not demonstrate equivalence. Rather, they indicate that the present sample provided little evidence of a large modality-related difference while remaining compatible with small effects in either direction, as reflected by the confidence intervals.

The aggression results are consistent with the broader literature cautioning against equating combat-sport participation with dispositional aggression (Lafuente et al., 2021) and with the earlier Sri Lankan parent study, which did not detect higher overall aggression among national-level combat-sport athletes than non-combat athletes (Deva Adithiya et al., 2022). The present comparison extends that work within combat sport. In particular, the Physical Aggression point estimate was only 0.60 points higher in strikers ($g = 0.09$), despite striking disciplines making direct impact a central competitive mechanism. This supports a distinction between rule-governed sporting behaviour and trait aggression, while not excluding smaller population differences.

The self-regulation findings were similarly modest. DERS-15 and BSCS group differences were less than half a scale point, and the largest exploratory DERS subscale effect concerned difficulty maintaining goal-directed behaviour under distress ($g = 0.25$), with a CI that included zero. Recent discipline-specific research also suggests that relations between emotion regulation and aggression may be nuanced rather than uniform across combat sports; Kuśnierz et al. (2026), for example, found discipline moderation for hostility in one emotion-regulation model but not for total aggression, physical aggression, or anger. Together with broader adult evidence (Ciaccioni et al., 2024), this supports examining discipline, training context, and athlete characteristics rather than assuming a single modality effect.

Several limitations constrain interpretation. The groups were markedly imbalanced (274 strikers vs. 40 grapplers), and the original Cochran calculation was not designed to power this specific continuous-outcome comparison or an equivalence test. Consequently, precision was lower for the grappling group. Broad modality categories also combined disciplines with different rules and training cultures, although discipline-level descriptives are now reported for transparency. The cross-sectional design cannot separate self-selection from training effects,

and self-report measures remain vulnerable to response biases. The translated Sinhala and Tamil instruments underwent forward/back-translation, expert review, pilot testing, and face/content validation, but measurement invariance across language versions was not established. Excluding athletes with diagnosed mental disorders supported the intended non-clinical sampling frame but further limits generalisability.

The findings therefore apply specifically to the national-level Sri Lankan athletes represented by this convenience sample. Coaches, clinicians, and sporting organisations should avoid using broad combat modality alone as a proxy for aggression or self-regulatory functioning. Future longitudinal research should recruit larger and more balanced discipline-specific samples, evaluate measurement equivalence across language versions, and incorporate training climate, contact intensity, sparring exposure, and behavioural indicators.

Conclusion

Among national-level Sri Lankan combat-sport athletes in this convenience sample, no statistically significant differences were detected between striking and grappling groups in total aggression, emotion dysregulation, or self-control, and observed point estimates were small. These results should not be interpreted

as evidence of equivalence because the confidence intervals remained compatible with small differences and the grappling sample was comparatively limited. The findings support cautious, individual-level psychological assessment rather than assumptions based on combat-sport modality alone.

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Conflicts of Interest

The authors declare no conflicts of interest.

Ethical Statement

Ethical approval was granted by the KIU Ethics Review Committee (KIU/ERC/24/181). Electronic informed consent was obtained from all participants before they accessed the questionnaire through the QR-linked online form.

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