

The Effect of Martial Arts Training on Adolescent Aggression and Social Behavior

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 4 February 2026 and was last updated on 4 February 2026.

INTRODUCTION

Review question / Objective To evaluate the effect (positive or negative) of Martial Arts training on the modulation of aggression levels and the development of social behavior among adolescents, and to propose a framework for differentiating Martial Arts from other sports practices as well as non-practice.

Rationale Aggression is conceptualized as a forceful, goal-directed action (verbal or physical) and is typically categorized into two forms: hostile (reactive) and instrumental. Hostile aggression is primarily motivated by the goal of inflicting harm or pain (reactive), while instrumental aggression is premeditated and driven by the attainment of an external goal (proactive). Martial Arts (MA), although originally from Asia, now represent a global system that integrates physical combat with philosophy and tradition, distinguishing them from general physical exercise. They are commonly initiated to develop self-regulation skills, manage aggressive impulses, provide self-defense,

enhance physical proficiency, and mitigate fear responses. However, sub-disciplines vary (striking for speed/precision vs. grappling for strength/endurance). The fundamental inquiry remains whether martial arts promote self-control and reduce aggression, or endorse violence, necessitating comparative studies across MA practitioners, combat sports practitioners, other sports practitioners, and non-practitioners.

Condition being studied The investigation aims to study the chronic regulatory effect of prolonged Martial Arts practice on various levels of psychological competencies in adolescents, specifically, examining the reduction of reactive and proactive aggression, hormonal reactivity (e.g., aggression and self-esteem), and cognitive measures (e.g., inhibition, flexibility, processing speed, and attention). Furthermore, the research aims to identify the cultural and identity factors that distinguish martial arts from other sports practices and to assess their role in adolescents' psychological and character development beyond physiological growth.

METHODS

Search strategy The advanced search strategy process across various platforms such as PubMed, SciELO, BASE (Bielefeld Academic Search Engine), Web of Science, Scopus, and open scientific repositories is designed to be as comprehensive and specific, focusing on three main stages: concept expansion, strategic combination, and term optimization. The first step involves breaking down the question into three central concepts (Aggression, Martial Arts, and Adolescence) and seeking the most comprehensive set of synonyms for each. This is followed by the strategic combination of terms, resulting in the optimized search formula: (Aggress* OR Hostil* OR Violenc*) AND (Martial Art* OR Combat Sport* OR Karate OR Taekwondo OR Judo OR Jiu-Jitsu) AND (Adolescen* OR Youth).

Participant or population The aim is to identify articles and scientific literature reporting on participants within the specified age range, specifically adolescents aged 10 to 19 years (according to the definition from the World Health Organization), who are practitioners of martial arts.

Intervention Martial Arts practice, with a minimum of 1 year of experience, and a minimum frequency of 2 training sessions per week.

Comparator Practitioners of other sports, combat sports practitioners (differentiated from martial arts), and non-practitioners of any sport.

Study designs to be included The aim is to find comparative and longitudinal designs (implicit in the idea of chronic effect), through Randomized Controlled Trials (RCTs) as the highest priority for determining causality; Longitudinal and Cohort Studies, as a high priority for capturing the chronic effect; Cross-Sectional Comparative Studies, as a secondary priority, but still essential for the comparative component of the study; and analytical observational studies.

Eligibility criteria Population: Participants classified as adolescents (aged 10-19 years old, OMS); Intervention: Martial Arts practitioners with an emphasis on disciplines that integrate elements of philosophy and discipline, with a minimum of 1 year of experience and a minimum frequency of 2 training sessions per week; Comparison: Primary data studies with comparative and/or longitudinal study designs, including Randomized Controlled Trials (RCTs), cohort and comparative cross-sectional studies, and analytical observational studies, all with peer-review; Outcomes:

Assessment of at least one of the following: aggression levels (reactive/proactive), social behavior, hormonal reactivity, or cognitive measures (inhibition, attention).

Information sources The advanced literature search will be conducted across electronic reference databases, specialized search engines, and scientific repositories, covering the biomedical, psychological, and sports science domains. The platforms to be consulted include: PubMed, SciELO, BASE (Bielefeld Academic Search Engine), Web of Science, Scopus, and other open scientific repositories.

Main outcome(s) Assessment of the psychological and cognitive parameters of interest (reactive/proactive aggression, self-esteem, and cognitive measures such as inhibition and attention), utilizing standardized and validated instruments. This encompasses self-report or hetero-report questionnaires such as: BPAQ (assessment of four main sub-scales: physical aggression, verbal aggression, anger, and hostility, providing a detailed profile of the individual's propensity for aggressive behaviors), Buss-Durkee (aims to measure categories such as physical aggression, verbal aggression, indirect hostility, irritability, negativism, resentment, or suspicion), and other Aggression Scales; self-esteem scales such as the Rosenberg Self-Esteem Scale (assessment of global self-esteem, feelings of competence and feelings of inadequacy, using 10 statements with a Likert-scale response format); neuropsychological tests such as the CANTAB (Non-verbal digital tool that measures cognitive functioning, focusing on specific cerebral areas such as episodic and associative memory, executive functions and planning, attention and processing, and decision-making), or tasks like Stroop (It measures selective attention, inhibitory control, processing speed, and cerebral function using three typical tasks: word reading, color naming, and the interference condition) and Go/No-Go (measures inhibitory control and impulsivity, selective or sustained attention, processing speed, and consistency); and biological assessment methods such as the measurement of hormonal markers (Activity of specific endocrine axes that influence emotional reactivity and impulse control: testosterone, cortisol, serotonin, oxytocin, adrenaline/noradrenaline).

Additional outcome(s) Measures that assess the ability to follow rules and maintain calm in stressful situations, empathy towards others, adherence to training in terms of frequency and longevity, as well

as the measurement of the reduction of stress and anxiety levels.

Data management Data will be extracted into an Excel spreadsheet, in a format that includes study identification, population characteristics, intervention characteristics, comparator characteristics, study design, and results. All data will be stored in a secure folder on an external storage drive, with weekly backups. The extracted data will be standardized to ensure comparability, particularly with respect to units of measurement and assessment tools. The final report will include a detailed table listing the characteristics of all included studies to ensure maximum transparency.

Quality assessment / Risk of bias analysis To establish whether participants were chosen fairly, without interference, or if there was a high percentage of dropouts; whether the training/practice conditions were equal for everyone, or if, besides the primary intervention, they received any other complement that contributes to the final result; whether the results were obtained correctly, in their totality, or only the positive ones.

Strategy of data synthesis Data management will commence with preparation and cleaning (data cleaning), including the numerical coding of data, and the exclusion of incomplete or patterned questionnaires. The instruments will be validated for their reliability on the specific sample. Descriptive statistics will be performed, followed by inferential statistics involving group comparison, correlations, and dimensional analysis. Data synthesis and discussion will conclude the process. The data synthesis strategy will be guided by the nature and homogeneity of the included studies to provide a robust estimate of the effect of MA practice on the primary and secondary outcomes. Qualitatively, a descriptive summary of the studies' characteristics (population, intervention, comparator, study design); quantitatively, if the included data are considered sufficiently homogeneous in terms of design, population, intervention, and outcome measurement; sub-group analysis; sensitivity analysis; publication bias.

Subgroup analysis Segment by martial arts style (striking vs. grappling); differentiate between disciplines; participant characteristics by age group and gender; and intervention characteristics by practice experience and training frequency.

Sensitivity analysis Exclusion of studies that do not meet the criteria of a minimum duration of 1 year of practice and a minimum frequency of 2

training sessions per week, and the exclusion of interventions classified as combat sports from the primary analysis, focusing solely on disciplines that integrate elements of philosophy and discipline.

Language restriction All primary studies published in Portuguese, English, and Spanish will be eligible for inclusion; studies published in other languages will be excluded.

Country(ies) involved Portugal.

Keywords Aggression; hostility; violence; martial arts; combat sports; karate; taekwondo; judo; jiu-jitsu; adolescence; youth.

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