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## Contribution of martial arts participation to interpersonal intelligence in adolescents: An ex post facto study

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### ABSTRACT

**Background:** Adolescence is a crucial stage for identity formation and social skill development, yet many adolescents struggle with emotional regulation and building healthy interpersonal relationships. Martial arts activities are known to instill discipline, respect, and cooperation, contributing to socio-emotional growth. However, empirical studies examining the direct relationship between martial arts participation and interpersonal intelligence especially in the Indonesian adolescent context remain limited. **Objectives:** This study aims to analyze the role of martial arts activities in supporting the development of adolescent interpersonal intelligence through the values of discipline, cooperation, and respect for others. **Methods:** This study used an ex post facto method with a quantitative approach. The subjects were 87 adolescents who actively participated in martial arts training in pencak silat, karate, and taekwondo in Bandung City. The instruments used included a martial arts activity questionnaire and a validated interpersonal intelligence scale. **Findings/Results:** The results of the compare mean analysis showed that the highest average score in interpersonal intelligence was found in the empathy indicator ( $M = 17.2$ ;  $SD = 2.1$ ), while in martial arts activities the highest was found in the activity type indicator ( $M = 13.4$ ;  $SD = 2.2$ ). In addition, the results of simple linear regression showed a 36.4% contribution of martial arts activities to interpersonal intelligence ( $R^2 = 0.364$ ;  $F = 122.77$ ;  $p = 0.001$ ). **Conclusion:** The findings indicate that martial arts participation contributes positively to adolescents' socio-emotional development, particularly by strengthening interpersonal intelligence. This study provides an important contribution by offering empirical evidence for the role of sports-based character education in shaping interpersonal skills. However, the limited sample and the use of an ex post facto design reduce the generalizability and do not allow causal interpretation. Future research should involve larger and more diverse participants as well as stronger methodological designs to better understand how martial arts influence adolescents' interpersonal development.

**Keywords:** Martial arts; interpersonal intelligence; teenagers



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## INTRODUCTION

Adolescence is an age group experiencing intense social and emotional development. At this stage, individuals begin to develop skills that play a crucial role in building and maintaining interpersonal relationships (Boulze et al., 2016; Murphy & Hall, 2011). Interpersonal intelligence, or the ability to understand and interact with others, is a critical component that adolescents need to navigate these social dynamics (Merlin & Soubraanian, 2024). Verbal communication skills are not the only aspect of interpersonal skills; interpersonal intelligence also encompasses the ability to experience others' feelings, collaborate, manage conflict, and understand others' perspectives. According to research conducted by Posner and Rothbart (2020), socio-emotional skills, including interpersonal intelligence, influence a person's success in various aspects of life, such as school, family, and community. In the same way, research conducted by Denham et al. (2012) found that strong interpersonal skills have a positive correlation with adolescents' social skills and psychological adjustment. Good social relationships and leadership in adulthood are predicted by well-developed interpersonal intelligence during adolescence. A recent study by Guerra and Bradshaw (2021) found that adolescents with strong interpersonal skills are better at managing social pressure, resolving conflict constructively, and behaving prosocially than adolescents with poor interpersonal skills.

Interpersonal intelligence is crucial for adolescent social interactions, yet numerous studies show that modern children often lack this trait. Adolescents' interpersonal skills are worsening due to advances in digital technology, increased social media presence, and a lack of face-to-face social connections. A long-term study showed that as a result of the prevalence of screen-based communication, the current generation of adolescents (iGen) is losing face-to-face social skills, empathy, and conflict resolution (Twenge et al., 2019). Hannibal et al. (2021) stated that adolescence is a crucial stage in the formation of social identity and interpersonal connections. Adolescents who do not learn adaptive social skills are prone to social isolation, anxiety when interacting with others, and difficulty building healthy relationships. This is in line with the findings of Anggraeni et al. (2021), who showed that adolescents with poor interpersonal skills have difficulty forming friendships and integrating into groups, which increases their tendency towards deviant or aggressive behavior. Furthermore, research conducted by Dereli-Iman (2016) found that low interpersonal intelligence negatively impacts adolescents' ability to cope with social problems and regulate emotions. A lack of interpersonal intelligence disrupts social connections and hinders the development of moral and emotional dimensions, which are essential components of individual recognition (Derakhshan et al., 2021). This highlights the importance of developing educational frameworks and strategies that can comprehensively enhance interpersonal intelligence. Therefore, it is crucial to explore alternative educational methods that incorporate affective, cognitive, and social aspects. One example is the integration of martial arts techniques with character-building principles.

To address the problem of low interpersonal intelligence among adolescents, educational methods that consider not only cognitive but also affective, social, and moral aspects are needed. Self-defense has been shown to be effective in building adolescents' social and emotional skills (Kozdras, 2019; Lakes & Hoyt, 2021; Thornberg & Oğuz, 2013). When taught through a reflective and values-based approach, self-defense can be a social learning tool that encourages self-control, empathy, cooperation, and discipline, all essential elements of interpersonal intelligence. Studies show that conventional self-defense training that emphasizes moral principles such as respect and responsibility improves self-regulation and prosocial behavior in children and adolescents. Furthermore, Zivin et al. (2022) found that adolescents' participation in a values-based self-defense program can help them communicate better, solve problems better, and strengthen social relationships at school. Martial arts training provides a structured social experience through direct interaction between trainers and fellow participants, creating a learning space conducive to interpersonal development. Activities such as emotionally controlled sparring, partner activities involving trust, and group discussions about moral values are concrete examples of the natural interpersonal learning process in martial arts (Vertonghen et al., 2014). Previous studies have shown that martial arts can positively contribute to the development of character and social behavior in adolescents. Lakes and Hoyt (2021) in their experimental study revealed that "traditional martial arts training promoted self-regulation and behavioral self-control in children." Furthermore, Vertonghen and Theeboom (2012) in their systematic review concluded that "martial arts participation has the

potential to promote psychosocial outcomes such as increased self-confidence, respect, and reduced aggressiveness among youth.”

However, the majority of these studies are still limited to aspects of self-regulation, aggressiveness, or prosocial behavior in general, and have not specifically examined how martial arts activities can support the comprehensive development of interpersonal intelligence (Harrison & Stockwell, 2014; Lakes & Hoyt, 2023). Despite increasing evidence linking martial arts to socio-emotional outcomes, no studies have specifically examined how martial arts participation contributes to multidimensional interpersonal intelligence including empathy, collaboration, social perspective-taking, and conflict resolution particularly within the Indonesian adolescent population. In fact, interpersonal intelligence, as the ability to build relationships, understand others' emotions, cooperate, and resolve conflicts, is a crucial skill in the social life of modern adolescents (Bornstein, 2020). Furthermore, most approaches used in previous research are quantitative and focus on outcomes, rather than the socio-pedagogical processes that occur in martial arts activities. Studies examining interpersonal learning mechanisms, such as trainer-participant interactions, teamwork-based training, or the internalization of social values in martial arts, are still very limited (Derakhshan et al., 2021).

Unlike previous studies that focused on aggression reduction, self-regulation, or prosocial behavior, this research specifically examines the contribution of martial arts activities to interpersonal intelligence using multidimensional indicators encompassing empathy, social perspective, collaboration, and conflict resolution skills (Laible et al., 2014). This approach provides a more comprehensive picture than previous studies, which tended to only assess a single interpersonal aspect. Furthermore, the context of Bandung City provides added value, as it has a strong community martial arts ecosystem and sociocultural characteristics that shape adolescent interactions within the training space. These conditions allow the research to explore how group dynamics and pedagogical practices within the martial arts community can function as a unique and relevant interpersonal learning space in the Indonesian context. In other words, there is still a gap in the literature explaining how martial arts, through their practices, values, and social interactions, can serve as a means of holistically developing adolescent interpersonal intelligence (Emfield, 2016; Paulino et al., 2016). Therefore, this study aims to fill this gap through a psychosocial approach that examines the role of martial arts activities as a value-rich interpersonal learning space.

## METHOD

### Design

This study used a quantitative approach with an ex post facto method. This approach was chosen because the researcher did not manipulate the independent variable but rather observed the relationship between martial arts activities and adolescents' interpersonal intelligence. The ex post facto design was chosen because the intensity, duration, and experience of martial arts participation cannot be controlled or manipulated by the researcher, so the study can only explain the relationship as it exists in the field. Therefore, the causal claims in this study are limited, and the findings should be considered as associations, not deterministic effects. This method is relevant for explaining cause-and-effect relationships in events that have already occurred (Cresswell & Cresswell, 2018; Wallen & Fraenkel, 2012).

Furthermore, this study controlled for a number of confounding variables (confounding variables) that could potentially influence the relationship between martial arts activities and interpersonal intelligence, such as age, gender, length of training, and frequency of attendance. Control of these variables was achieved through participant selection, group categorization, and statistical analysis that considered covariate variables.

### Procedures

To provide a clearer picture of the research procedure, a flowchart is presented as a visual explanation of the research stages, from population gathering and data collection to analysis and conclusion drawing. This diagram clarifies the rationale for using an ex post facto design, explains the handling of confounding variables, and emphasizes the non-manipulative nature of the study, where variations in martial arts participation occur naturally among adolescents.

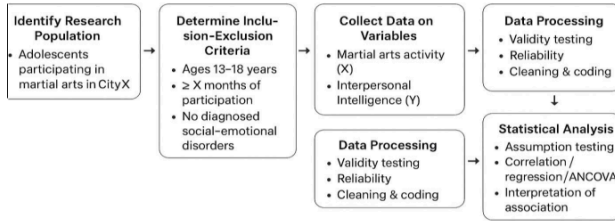


Figure 1. Research Flow Diagram

### Participant

The study subjects consisted of 87 adolescents aged 13-18 who actively participated in martial arts training (taekwondo, pencak silat, karate) in Bandung City. The sampling technique used purposive sampling with the following criteria: (1) adolescents actively participated in training for at least the past 6 months, (2) attended training at least twice per week, and (3) were willing to complete a questionnaire with parental/guardian consent.

### Instruments

There are two main scales in this research instrument. The first is the martial arts activity scale, which is structured based on three metrics: frequency of practice, duration of involvement, and type of activity. Examples of items on this scale are "How many times per week do you participate in martial arts training?" and "How long, on average, do you spend each time practicing?" The initial scale consisted of fifteen items (Gubbels et al., 2016). Three sports education lecturers conducted expert assessments, assessing the relevance and clarity of the statements using a content assessment form. Two items were removed due to redundancy, resulting in a final scale of thirteen items. The second is the interpersonal intelligence scale, developed based on indicators of empathy, social communication, and group cooperation. This scale is an adaptation of Gardner's standard interpersonal intelligence instrument, adapted to the context of sports learning. Examples of items on this scale include: "I can feel my friends' feelings when they are experiencing difficulties" and "I am able to cooperate with other group members during practice." The initial scale consisted of 20 items. After expert review by two educational psychologists, four items were removed due to their incongruence with the indicator construct, resulting in a final scale of 16 items.

Empirical validity was tested through item-total correlation using Pearson Product Moment. The test results showed that the r-value for the self-defense activity scale ranged from 0.418 to 0.703 ( $p < 0.05$ ), while for the interpersonal intelligence scale it ranged from 0.432 to 0.712 ( $p < 0.05$ ). These results indicate that all items have good construct validity. In addition, the reliability test using the Cronbach Alpha coefficient showed an  $\alpha$  value  $> 0.7$  on both scales, thus the instrument was declared reliable (Wallen & Fraenkel, 2012).

### Data analysis

The data analysis technique used descriptive statistics to determine the average of each indicator (compare means), and simple linear regression analysis to examine the contribution of martial arts activities to interpersonal intelligence. Significance testing was conducted at a 95% confidence level ( $\alpha = 0.05$ ). All data was processed using the latest version of SPSS software.

**RESULTS AND DISCUSSION**

**Result**

The results of the regression analysis showed that martial arts activities contributed 36.4% to interpersonal intelligence ( $R^2 = 0.364$ ). This indicates that martial arts activities significantly contribute to adolescents' socio-emotional development.

**Table 1. Mean Scores and Standard Deviations of Interpersonal Intelligence**

Indicators	Mean	Standard Deviation
Empathy	17.2	2.1
Social Communication	14.8	2.5
Group Work	15.9	2.3

Table 1 shows that the highest score on the interpersonal intelligence indicator was for empathy ( $M = 17.2$ ), followed by group cooperation ( $M = 15.9$ ), and social communication ( $M = 14.8$ ). This indicates that involvement in martial arts tends to be the strongest factor in developing empathy in adolescents.

**Table 2. Mean Scores and Standard Deviations of Martial Arts Activities**

Indicators	Mean	Standard Deviation
Exercise Frequency	10.3	1.8
Duration of Engagement	9.8	1.9
Type of activity	13.4	2.2

Table 2 shows that the activity type indicator has the highest average score ( $M = 13.4$ ), which indicates that the variety of activities in martial arts training has the most prominent impact compared to the frequency or duration of training.

**Table 3. Results of Simple Linear Regression Analysis**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.603	0.364	0.357	2.572

The results of the regression analysis indicate that martial arts activities significantly influence interpersonal intelligence in adolescents. The coefficient of determination (R-square) of 0.364 indicates that 36.4% of the variation in interpersonal intelligence can be explained by involvement in martial arts activities, while the remaining 63.6% is explained by factors outside the model. The adjusted R-square of 0.357 strengthens the stability of the model, even considering the number of variables analyzed.

**Table 4. Results of ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	812.36	1	812.36	122.77	0.000
Residual	1419.52	85	16.70		
Total	2231.88	86			

Testing the model's significance using the F-test yielded an F-value of 122.77 with a significance value (Sig.) of 0.000, significantly less than the 0.05 threshold. This indicates that the overall regression model is significant, indicating that martial arts activities do have a significant effect on increasing interpersonal intelligence. The Standard Error of the Estimate of 2.572 represents the average deviation between the actual value and the model's prediction, indicating that the model's predictions are quite accurate. Overall, these findings support that involvement in martial arts not only impacts physical fitness, but also plays an important role in the development of adolescents' social-emotional aspects, particularly their interpersonal intelligence.

**Discussion**

Martial arts activities have been shown to be an effective medium for developing adolescents' interpersonal intelligence because they combine social interaction, self-control, and the internalization of moral values.

During training, adolescents not only engage in physical exercise but also build interpersonal relationships that require them to understand their roles, responsibilities, and ethical conduct toward coaches and fellow participants. Chinkov and Holt (2016) demonstrated that martial arts provides an experiential context that fosters direct social-emotional learning, particularly in the areas of empathy and cooperation. Similarly, Richman and Rehberg (2019) as well as reported that structured, values-based martial arts training can enhance adolescents' ability to form healthy social relationships. Cecchini (2021) also found that martial arts participation positively contributes to improvements in adolescents' interpersonal skills and emotional regulation.

Interpersonal intelligence develops through interaction and reflection, and martial arts provides a structured environment that supports both processes. Regular partner- or group-based practice encourages adolescents to improve communication skills, active listening, and mutual trust. Wargo et al. (2015) explained that consistent participation in martial arts can increase social sensitivity and enhance responsiveness to group dynamics. Zivin et al. (2022), in their experimental study, reported significant improvements in social skills and conflict-resolution abilities among adolescents following martial arts training. These findings are supported by Durlak et al. (2011), who emphasized that activity-based social interventions, including sports, have a positive impact on the development of social and emotional competencies.

Psychologically, martial arts provides adolescents with valuable opportunities to recognize and manage their emotions through principles of discipline and self-control. This process is closely related to interpersonal intelligence, as individuals who can regulate their emotions are generally better equipped to build healthy relationships with others. Lakes and Hoyt (2021) found that adolescents involved in martial arts training showed improvements in executive function and self-control. Martial arts has also been shown to reduce aggressive behaviors and enhance social awareness among adolescents with prior tendencies toward problematic behavior (Abrahams, 2021; Vertonghen et al., 2014). In line with this, Bandura (2017) stressed that social learning occurs through observing and imitating relevant behavioral models, with coaches and senior practitioners serving as influential role models in the development of interpersonal intelligence.

Another distinguishing strength of martial arts is the integration of moral values into training. Values such as respect, integrity, and responsibility are explicitly taught and reinforced during practice, contributing to the development of interpersonal competence. Values-based sports education allows adolescents to internalize constructive social norms, particularly when guided by instructors committed to character development (Alif et al., 2024). This aligns with Harwood-Gross et al. (2021), who found that a humanistic approach in martial arts training enhances empathy and openness among youth participants. Similarly, Lotfian et al. (2011) and Ziaee et al. (2012) concluded that martial arts plays a meaningful role in shaping adolescents' social and emotional identities through reflective and dialogic learning processes.

However, the effectiveness of martial arts in fostering interpersonal intelligence depends heavily on the training context and the instructor's approach. When training emphasizes competition or physical strength alone without integrating values or facilitating social interaction the developmental benefits become limited. Vertonghen et al., (2014) warned that highly authoritarian and competition-focused teaching styles can undermine the social benefits that martial arts is intended to promote. Harwood et al. (2015) further showed that coaching approaches that prioritize competitive pressure may increase social stress and interpersonal conflict among adolescent athletes. For these reasons, trainers are encouraged to apply a developmentally appropriate practice (DAP) approach, which adapts training strategies to the psychosocial needs and developmental stages of adolescents (Bailey et al., 2013).

## CONCLUSION

This study demonstrates that participation in martial arts positively contributes to the development of adolescents' interpersonal intelligence, particularly through experiences that foster discipline, cooperation, empathy, and effective communication. These results provide empirical support for the role of martial arts as a form of social-emotional character education and extend previous research by offering evidence from Indonesian adolescents, an under-researched group in this area. Educational institutions are encouraged to integrate structured martial arts programs into character development initiatives, supported by coaches who

employ pedagogical methods that emphasize values and social interaction. However, this study is limited by its ex post facto design, use of self-report instruments, and sample size limited to a single city, which limits generalizability. Future research should employ longitudinal or experimental designs, involve more diverse populations, and examine how different martial arts styles or training approaches influence interpersonal development.

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#### CONFLICT OF INTEREST

The authors affirm that no conflicts of interest are associated with the publication of this manuscript.

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