

## Emotional education in Social Inclusion Projects: the expression of emotions in karate

### ARTICLE

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### Abstract

Understanding the effects of sports practice in Social Inclusion Projects (SIP) on the expression of students' emotions can provide support to teachers for planning and conducting the teaching process. Thus, this comparative study aimed to identify the expression of emotions of 30 public school students (male = 18; female = 12), aged 11 to 15 years (M age = 12.9), who were beginners in karate in SIP. The subjects answered the Games Emotion Scale II after a kata class and a kumite class. According to the statistical analysis, positive emotions were significantly higher than negative emotions in both kata and kumite practice. Positive emotion in kata was significantly higher than the same emotion in kumite practice, while expression of the negative emotions anger and sadness were significantly higher in kumite practice than in kata practice.

**Keywords:** Emotional education. Emotions. Social inclusion. Sports.

### Educação emocional em Projetos de Inclusão Social: a expressão das emoções no karatê

### Resumo

A compreensão dos efeitos da prática de esportes em Projetos de Inclusão Social (PIS) sobre a expressão das emoções dos alunos pode fornecer subsídios ao professor para o planejamento e condução do processo de ensino. Assim, este estudo comparativo teve como objetivo identificar a expressão das emoções de 30 alunos de escolas públicas (Male = 18; Fem = 12), na faixa etária de 11 a 15 anos (M idade = 12,9), iniciantes no karatê em PIS. Os investigados responderam ao Games Emotion Scale II após uma aula de kata e uma aula de kumite. Conforme a análise estatística, as emoções positivas foram significativamente superiores às emoções negativas, tanto na prática do kata quanto no kumite. A emoção positiva no kata foi significativamente superior à mesma emoção na prática de kumite, enquanto a expressão das emoções negativas, raiva e tristeza, foi significativamente superior na prática de kumite do que na prática do kata.

**Palavras-chave:** Educação emocional. Emoções. Inclusão social. Esportes.

## 1 Introduction

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Social Inclusion Projects through sport (PIS) emerged in the 1980s as a form of socialization complementary to formal education (Vianna *et al.*, 2021). Despite the growth in the number of PIS in Brazil, there remains a gap that requires greater investment in research in order to better understand the phenomenon of physical and sports activities within these projects. Specifically, there is a need to evaluate the impact of sports, combat sports, and dance activities on the development of children, adolescents, and young people living in situations of social vulnerability (Vianna; Arruda; Araújo, 2022). The lack of evaluation tools capable of providing scientific evidence to teachers and managers about the effects of the dynamics of these activities, whether on students' development as socially responsible citizens or on their motor conduct, was pointed out over a decade ago and remains an issue to this day (Vianna *et al.*, 2021), particularly in relation to emotional self-control. Considering that Brazilian research on emotional education is still incipient (Arantes, 2019; Marques; Cordeiro; Ferreira, 2023), examining the effects of physical and sports activities on practitioners' emotions is a field in need of further investigation.

Physical effort, decision-making, emotion, and communication are learning elements that can be assessed (Lavega *et al.*, 2013) as reflections of relevant internal and external factors that shape the development of children, adolescents, and adults, as well as their sociomotor changes, and these areas deserve greater exploration. Among the many effects that bodily practice can have on practitioners' holistic development, emotional education also stands out as a means of fostering self-control during different physical and sports activities, an aspect often neglected in the teaching-learning process both in schools and in other environments.

By recognizing the expression of emotions in the development of various motor activities, whether in school or sports environments, Physical Education teachers can devise teaching strategies that enable students to recognize and educate their emotions.

This educational process will accompany them not only in these environments but also in their daily lives.

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The theoretical assumptions of Motor Praxeology (Parlebas, 2001), which introduced the domains of psychomotor and sociomotor action, and within the latter the motor practices of cooperation, opposition, and cooperation-opposition, as well as the conceptual and typological assumptions of Emotions (Bisquerra, 2003), allowed us to frame a set of physical and sports activities developed within PIS, and particularly karate, as practices to be observed in relation to the expression of emotions in their various forms.

Despite the broad social phenomenon of combat sports in contemporary society, which has driven the increasing inclusion of fighting workshops in PIS, scientific production in this field has not kept pace (Franchini; Del Vecchio, 2011). This aligns with the conclusions of Vianna *et al.* (2021), who argued that such expressions justify further investment and deeper research to better understand the phenomenon.

In seeking studies that addressed the analysis of emotions in combat sports, we found in Araújo *et al.* (2021) such an approach within Capoeira, across different expressive formats including game, workout, and cooperative practice between two individuals. This quasi-experimental investigation sought to identify, describe, and interpret trends in the emotional expression of practitioners using a research protocol designed specifically for this purpose.

We also identified studies by Schmidt and Oliveira (2020) and by De Oliveira Schmidt and Ribas (2023) on combat sports and fights, framed within the praxeological perspective and the understanding of the internal logic of combat sports. Both carried out bibliographic and exploratory research on fighting modalities, aiming to provide insights with implications for the teaching-learning process of these practices.

From this database search, we concluded that there are few studies focusing on combat sports, particularly those associating them with the praxeological perspective and with tools for analyzing emotional expression, prediction, and control, similar to the Games Emotion Scale I (Lavega; March; Fillela, 2013) and Games Emotion Scale II (Lavega;

March; Moya, 2018), and even fewer applied specifically to combat sports and Social Inclusion Projects through sport (PIS).

More specifically regarding the internal logic of fighting practices, Parlebas (2001) added an important consideration for the teaching-learning approach of these modalities: the distances of opposition between opponents in different types of fighting. The author categorized them accordingly as duels at almost no distance (Canary Wrestling, Greco-Roman, Olympic Freestyle, and Judo), medium distance (Foil, Épée, Kendo, Staff), long-distance confrontations (Tennis, Table Tennis, Badminton), and close-range encounters (Boxing, Karate, Taekwondo).

In other words, the forms of contact defined by each sport's regulations allow for a certain degree of competitive ritualization, which in turn determines the degree of permitted violence. From this perspective, given that combat sports and fights involve the opponent's body as the target, knowledge and self-regulation of emotions appear to be crucial factors for overcoming challenges and fostering relational well-being among practitioners, both in training and in competition.

Considering that the internal logic of sociomotor games reflects practitioners' sociomotor and emotional intelligence, research that expands and deepens understanding of this phenomenon in combat sports and fights can provide teachers, coaches, and group leaders with tools to act more effectively and foster greater student engagement in PIS activities (Vianna; Arruda; Araújo, 2022). By linking motor activity to its internal logic, PIS teachers can promote the holistic development of practitioners, bearing in mind that "affectivity is the key to learning" while simultaneously enhancing "motor intelligence" (Parlebas apud Araújo *et al.*, 2021).

Through engaging in various motor activities in general, and combat sports in particular, practitioners learn to cooperate, take social responsibility, relate to others, show respect, make decisions, and resolve conflicts. They can also be emotionally educated to self-manage, direct, express, and better understand their emotions. Considering the development of diverse motor activities in PIS, and combat sports in particular, this study focused on karate. This combat sport falls within the sociomotor opposition perspective in

the expression of kumite (fighting against a real opponent), but also within the psychomotor perspective in the practice of kata (imaginary combat). Since kumite and kata entail different risks for practitioners, we acknowledge that these activities may generate different effects on the emotional expression of students enrolled in this combat sport.

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Thus, this study established two objectives: a) to identify the emotional expression of beginner karate practitioners in PIS after practicing kata and kumite; b) to determine whether there are differences in emotional expression after practicing kata and kumite.

## 2 Theoretical context

Motor Praxeology focuses on the specific actions of a playful expression or sport, which, in the case of combat sports, fall on the inherent strikes of attack and defense actions. Kicks, punches, dodges, feints, and throws, among other techniques, when executed by each practitioner, reveal a certain degree of identity, considering the systemic formative aspects of the individual expressed in motor conduct: biological, cognitive/affective, and social. Parlebas (2001) explains these motor actions as the expression of a grammar unique to each game or sport, identified by him as the internal laws governing each form of expression. These laws are referred to as internal logic and are accepted by all participants as the guiding framework of the activity.

Parlebas (2001) argues that internal logic codifies motor behaviors that define each practice. In the specific case of combat sports, it establishes the rules of confrontation between participants, either through body-to-body interaction at varying distances depending on the modality, or through the use of an instrument, as in fencing, kobudô, and other similar practices.

Thus, each motor situation can be categorized according to parameters such as space, time, materials (when applicable), and type of relationship between the protagonists, understood as the individuals who exclusively produce the motor situation. The type of relationship in a motor situation depends on the presence or absence of

teammates and/or opponents. When interaction occurs among teammates or opponents to construct the motor situation, it is framed as a practice of the sociomotor domain. When no interaction is involved, it is classified as a practice of the psychomotor domain.

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In the context of combat sports in general and karate in particular, both types of motor situations addressed in this study can be identified. Kumite (fighting against a real opponent) falls within the sociomotor logic, as it involves interaction between two contenders where attack and defense strikes are applied against an opponent in a defined space and time. The winner is generally the fighter who scores the highest number of points or reaches the maximum allowed within the match duration, through strikes that land on the opponent's body, while the latter seeks to defend and counterattack. The other modality of training and competition is kata (imaginary fight), characterized by psychomotor logic and performed without any form of motor interaction. In karate, kata can be understood as an imaginary fight against multiple opponents, in which the performer follows a set pattern of defensive and offensive movements in predetermined directions and rhythms.

It is worth noting that the praxeological analysis of combat sports considers all aspects of the internal logic of each modality. This includes not only the conception of space as the designated area for the competition but also the opponent's body as the space to be targeted and the object of strikes and counterstrikes. It therefore becomes crucial to understand the expression of emotions in practitioners of combat sports, as they are inevitably engaged in a sociomotor relationship of opposition in kumite and a psychomotor expression in kata, both framed within the ethics inherent to the discipline.

Understanding the specificity of the internal logic of combat sports and the systems it activates in practitioners through motor conduct supports decision-making in planning and conducting teaching or training processes. The classification system of sports proposed by Parlebas (2020) enables teachers to make informed decisions about "what" and "how" to teach when designing and implementing instructional planning based on the internal logic of sports, while being aware of the impact of these choices on the holistic development of students. In the particular case of karate, it can be assumed that in kumite,

where the practitioner is exposed to the risk of being struck by the opponent, emotional perception may differ from that in kata, where there is no risk of physical contact.

Knowing in advance the internal logic of playful or sports practices, and thus their structural text, allows teachers, coaches, or group leaders to act with precision regarding what a motor situation requires and what it produces. This awareness makes it possible to apply such practices in varied contexts (external logic) to support personal development. In this study, the affective/cognitive dimension, specifically the study of emotions, is considered a fundamental factor in the development of combat sports and in the emotional education of practitioners, following Parlebas's (2001) view that affectivity is the key to motor conduct.

Taking into account the components of motor conduct – biological/motor, affective/cognitive, and social – it is believed that the holistic development of individuals can be achieved. Based on this perspective, and through the thoughtful guidance of teachers or coaches, motor actions can be designed with meaningful impact, capable of positively shaping performance and conscious human agency.

A Praxiologia Motriz, que considera os conhecimentos procedimentais como conhecimentos comportamentais e destrezas motoras derivadas da ação motora consciente por meio da experiência motriz (Largardera, 2017), propõe entender que, na sociedade contemporânea, a sistematização coerente do esporte pode colaborar para a aquisição de um conhecimento a ser alcançado por meio de uma prática motriz consciente, sistemática e equilibrada, que conduz à felicidade e ao prazer. Assim, as práticas motoras podem criar as condições mais adequadas para que o indivíduo otimize suas condutas motoras no que se refere à regulação pessoal, à expressividade criativa, à consciência de si mesmo, à autodeterminação, à autonomia e ao exercício livre de suas ações.

Motor Praxeology, which views procedural knowledge as behavioral knowledge and motor skills derived from conscious motor action through motor experience (Largardera, 2017), argues that in contemporary society the coherent systematization of sport can contribute to the acquisition of knowledge attainable through conscious, systematic, and balanced motor practice, leading to happiness and enjoyment. Motor practices thus create

the conditions for individuals to optimize their motor conduct with respect to self-regulation, creative expressiveness, self-awareness, self-determination, autonomy, and the free exercise of their actions.

Kata can therefore be considered a model of psychomotor expression that enables practitioners to achieve the personal gains described above. However, it is equally important to acknowledge kumite, the sociomotor opposition practice of karate, which, due to its internal logic of duel between players, demands not only self-knowledge but also the ability to read the opponent and make instantaneous decisions during combat. The importance of the present study therefore lies in its aim to understand the expression of emotions in karate practitioners through both psychomotor (kata) and sociomotor (kumite) formats.

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### 3 Methodology

In this comparative study, 30 public school students of both genders (Male = 18; Female = 12), aged between 11 and 15 years ( $M = 12.9$ ), enrolled in a karate class within a Social Inclusion Project through sport (PIS) located in a favela in the city of Rio de Janeiro, were investigated. All participants were beginners in karate (white belt) with up to four months of training. The students were randomly assigned by simple randomization into two independent groups with the same number of participants: one for kata practice (kata group – G1) and the other for kumite practice (kumite group – G2).

The instrument used to assess emotional expression was the Games Emotion Scale II (GES II) (Lavega; March; Moya, 2018), based on the biopsychological model of five basic emotions. This instrument allowed for the examination of both positive and negative emotional intensity experienced by participants during each activity. The GES II measures the intensity of emotions on a Likert scale from 1 to 7, designed to evaluate five emotions in the following categories: Positive (joy) and Negative (anger, fear, sadness, and rejection).

To standardize the response criteria for the identification of the five emotions investigated, participants received initial training that provided theoretical information on emotions. This included explaining the basic elements underlying emotional education: concept, components, classification, and meaning of emotions in the context of Physical Education, in order to facilitate the accurate expression of emotions recorded in the GES II.

Immediately after completing each karate class (kata – imaginary fight without the presence of opponents – and kumite – simulated fight with an opponent), participants filled out the GES II (Lavega; March; Moya, 2018). The Likert scale application (1 to 7) indicated that a score of 1 corresponded to the minimum emotional intensity felt, while a score of 7 corresponded to the maximum emotional intensity experienced by each participant. These values were recorded on the GES II grid, which included one positive emotion (joy) and four negative emotions (anger, fear, sadness, and rejection).

Each group (G1 and G2) participated in a 90-minute karate training session. Group 1 (G1) completed a training session on the first kata of the Shotokan style (heian shodan), selected according to the students' skill level.

The stages of the kata class were as follows: after an introduction to the lesson objectives and warm-up, students practiced the selected kata in a didactic sequence, divided into five sets of four consecutive movements. Each set of four movements was repeated until assimilated. The kata was then progressively integrated until it was performed in its entirety. In the final part of the session, pairs were formed according to skill level and experience to simulate a competition situation in the kata modality, during which each participant performed the kata simultaneously with an opponent. At the end of the session, students completed the GES II.

Group 2 (G2) completed a kumite (sparring) training session with the following stages:

1. Introduction to the lesson objectives and preparatory phase: individually, under teacher supervision, students executed strikes without an opponent. These strikes were then applied in the subsequent stages.

2. Striking against an object: after training without an opponent, pairs were formed according to performance level to apply the selected strikes against a striking pad. While one student held the pad, the other executed the strikes.
3. Attack and defense against an opponent: students faced each other in fighting position. One acted as the attacker and performed the selected strikes, while the opponent executed the defense. The attacks alternated according to the training protocol.
4. Simulated fight: in the final stage of the session, pairs were again formed according to skill level and experience for a simulated fight (handori) with free application of the trained strikes.
5. Completion of the GES II following the simulated fight.

The quantitative data collected through the GES II for both kata and kumite were processed and analyzed using *GraphPad Prism 8.0.2* (2019), providing information on both the general and specific aspects of emotions for groups G1 and G2. To determine whether significant differences existed between the independent groups, a Student's t-test was applied, with a significance level set at  $p < 0.05$ .

This study complied with the guidelines and regulations of Resolution No. 466/2012 of the Brazilian National Health Council concerning research involving human beings and adhered to the Declaration of Helsinki (WMA, 2008). Ethical approval was granted by the Research Ethics Committee of the State University of Rio de Janeiro under protocol number CAAE 80438124.5.0000.5282.

## 4 Results and discussion

The following section presents the results that allowed for the identification of emotional expression among beginner karate practitioners in PIS after practicing kata and kumite, as well as the verification of differences in emotional expression between the two practices.

### 4.1 Emotional expression after kata practice in G1

In kata, the practitioner performs a task whose operative resolution depends solely on themselves, without establishing communication with others. The practitioner executes movements without any contact, either with teammates or opponents. This activity is classified by Parlebas (2001) as belonging to the psychomotor domain. In kata competitions, two competitors perform either separately or simultaneously with their opponent, but without direct interference in each other's actions.

When considering the set of sports without interaction between opponents, the evaluation criteria in karate kata can be regarded as similar to those of technical-combinatory sports, in which performance is assessed by the degree of difficulty and the standard of execution of movements, comparing the motor performances of the individuals to determine the best performer (Gonzalez, 2017).

In this study, Table 1 highlights the emotional expression evidenced in the overall G1 sample. Positive emotions were predominant, with a mean score of 6.7 and  $SD \pm 0.5$ , while negative emotions presented a mean score of 2.0 and  $SD \pm 1.5$ . Statistical comparison between these values revealed a significant difference between positive and negative emotions ( $p < 0.0001$ ), considering the significance threshold of  $p < 0.05$ .

Table 1 – Comparison between positive and negative emotions in G1

	Mean $\pm$ SD	p < 0,05
Positive	<b>6,7 <math>\pm</math> 0,5</b>	
Negative	<b>2,0 <math>\pm</math> 1,5</b>	<b>0,0001</b>

S.D.: standard deviation

p < 0,05: Student's t-test significance level

Source: Prepared by the authors.

As an effect of the intervention carried out, Table 2 presents the results regarding the specificity of the sample for the emotional expression of G1 participants after the kata class. The positive emotion joy ( $M = 6.7$ ) stood out with the highest mean value among all emotions, while among the negative emotional expressions, fear ( $M = 2.4$ ) was the most prevalent.

Table 2 – Emotional expression after kata practice in G1

Gender	Feelings				
	Joy	Rejection	Sadness	Anger	Fear
Male	5	2	1	1	1
Male	6	5	1	4	7
Male	7	1	1	1	1
Male	7	2	3	2	1
Male	7	1	1	1	2
Fem	7	2	1	2	3
Fem	7	1	1	3	4
Fem	7	6	3	2	5
Fem	7	1	1	3	1
Fem	7	1	1	1	1
Male	7	2	1	5	1
Male	5	3	4	5	5
Male	7	1	1	1	1
Male	7	1	1	1	1
Fem	7	1	1	1	2
<b>Totals</b>	<b>100</b>	<b>30</b>	<b>22</b>	<b>33</b>	<b>36</b>
<b>Means</b>	<b>6,7</b>	<b>2,0</b>	<b>1,5</b>	<b>2,2</b>	<b>2,4</b>

Source: Prepared by the authors.

Among the 15 participants engaged in kata practice, within the context of the positive emotion joy, the absolute maximum value of 7 was recorded for a total of 12 individuals, while the absolute minimum value of 5 was observed in only two participants, resulting in a mean score of 6.7. This indicates that for the positive emotion, values were consistently expressed above the midpoint of the scale.

For the negative emotions, the absolute maximum value of 7 was recorded for the emotion fear (1 participant). The absolute minimum value of 1 was observed for sadness (12 participants), rejection (8), fear (8), and anger (7). The highest mean score among the negative emotions was fear (2.4), while the lowest was sadness (1.5).

#### 4.1.1 Discussion of results – kata practice

The first consideration regarding the development of kata in karate practice lies in its framing, within the context of motor praxeology, as both a psychomotor expression with competition and at the same time as an expressive activity. These frameworks may elicit different emotional manifestations from practitioners but remain highly relevant for the process of emotional education among young people.

The data presented in this study, concerning the psychomotor domain with competition, show that the discrepancy observed between positive and negative emotions in kata practice confirms the findings of other studies. These indicate that, regardless of the motor domain, motor games generate relational and emotional well-being (Niubó-Seló; Lavega; Sáenz-Lopez, 2022; Muñoz-Arroyave *et al.*, 2020; García; Lopez; Eslava-Suanes, 2018; Lavega *et al.*, 2013), and that positive emotions consistently present higher mean values in the practice of physical and sports activities in general, across all domains of expressiveness (Moya-Higueras *et al.*, 2023; Duran; Costes, 2018).

The results expressed by participants in kata practice showed balance in their distribution between positive and negative emotions, with positive emotions presenting values above the midpoint of the scale. However, it is worth highlighting some values reported for the negative emotions rejection (6) and fear (7), especially the latter, whose mean value (2.4) was the highest among all negative expressions. Since kata does not involve direct confrontation with an opponent and is instead a psychomotor activity with an expressive character (Vico; Izquierdo, 2021), such absolute and mean values of emotional externalization deserve particular attention.

The findings of this study, regarding negative emotions showing very low absolute and mean values, are also consistent with results reported in numerous studies across different motor domains (Niubó-Seló; Lavega; Sáenz-Lopez, 2022; Cifo-Izquierdo *et al.*, 2023; Moya-Higueras *et al.*, 2023).

## 4.2 Emotional expression after kumite practice in G2

Karate competition in the kumite modality is classified as a sociomotor activity (Parlebas, 2001), in which the duel between two players predominates. In this practice, participants may directly interfere with the opponent's actions throughout the match, constantly adapting their strategies in accordance with the opponent's movements.

Within the context of combat sports, where interaction between opponents occurs through counter-communication – opposition (De Oliveira Schmidt; Ribas, 2023), kumite is linked to the tactical principles of an athlete's performance, as they decide on the most

appropriate attack, defense, and counterattack techniques to apply according to the dynamics of the fight (González, 2017).

The data presented in Table 3 highlight the emotional expressions of the overall G2 sample after kumite practice. The highest mean value was found for the positive emotion (5.8;  $SD \pm 1.3$ ), while negative emotions presented a mean value of 3.8 with  $SD \pm 2.2$ . A statistical comparison between positive and negative emotions revealed a significant difference ( $p = 0.0014$ ), considering a significance level of  $p < 0.05$ . These results are similar to those found in cooperative, playful, and expressive activities (Roque *et al.*, 2019).

Table 3 – Comparison between positive and negative emotions in G2

	Média $\pm$ SD	$p < 0,05$
Positive	<b><math>5,8 \pm 1,3</math></b>	
Negative	<b><math>3,8 \pm 2,2</math></b>	<b>0,0014</b>

S.D.: standard deviation

$p < 0,05$ : Student's t-test significance level

Source: Prepared by the authors.

Among the 15 participants engaged in kumite practice, in the context of the positive emotion joy, the absolute maximum value of 7 was recorded for seven individuals, while the absolute minimum value of 4 was observed in four participants. Thus, for the positive emotion, values were consistently above the midpoint of the scale, with a mean score of 5.8.

For these individuals, regarding negative emotions, the absolute maximum value of 7 was distributed among sadness (2 participants), fear (4), and anger (7). The absolute minimum value of 1 was recorded for rejection (3 participants), sadness (3), anger (2), and fear (5). The highest mean score was found for the emotion anger (5.0), while the lowest was for rejection (2.8).

Table 4 – Emotional expression after kumite practice in G2

Gender	Feelings				
	Joy	Rejection	Sadness	Anger	Fear
Male	4	3	1	3	1
Male	5	3	2	7	4
Fem	7	4	7	7	7
Male	6	2	1	1	1
Male	7	1	3	4	1

Fem	4	2	3	7	4
Fem	4	2	5	5	3
Fem	7	5	7	7	7
Male	4	1	5	6	3
Fem	7	2	5	7	7
Male	6	4	6	3	7
Male	7	4	2	7	6
Male	7	5	1	7	2
Fem	7	1	3	1	1
Male	5	3	5	4	1
Totals	87	42	56	76	55
Means	5,8	2,8	3,7	5,0	3,6

Source: Prepared by the authors.

#### 4.2.1 Discussion of results – Kumite practice

In discussing the results obtained after kumite practice by PIS students, it is important to emphasize that this format of expression is classified as a sociomotor opposition practice. This framework may elicit different emotional manifestations from practitioners regardless of gender. We believe this occurs due to the proximity of motor confrontation, which in some combat sports takes place in what Parlebas (2001) describes as the “white space,” defined as the opponent’s body itself, regulated by “interactions in close space” and intermittent, forceful contacts directed at the adversary.

The results expressed for kumite practice reveal wide variation between the maximum and minimum values recorded on the scale, both for positive and negative emotions. Positive emotions, however, presented mean scores higher than negative emotions, which is consistent with findings for the psychomotor format of karate (kata) and for sports activities in general across different domains of expression, as previously noted by the authors referenced in this study.

Nevertheless, it is important to highlight the most relevant results within this format: the negative emotions anger, sadness, and fear, which presented values above the midpoint of the scale. This may be attributed to the face-to-face confrontational nature of kumite, which can trigger such emotions either due to the nature of the activity itself or the experience of failure during combat. These findings suggest the need for teachers to exercise particular care in minimizing the effects of kumite on practitioners’ negative

emotions, as these may lead to student dropout from PIS programs (Vianna; Arruda; Araújo, 2022).

These results are also consistent with findings reported by Jaqueira (1999) in studies on aggressive behavior in *capoeira* during the *roda* game, where negative emotional expressions were significant due to factors identified by the author, such as desire for revenge, personal frustration, personality traits, nervousness, and practitioner posture. Such factors may be associated with the negative emotional expressions of anger, sadness, and fear observed in kumite in this study, whether due to its internal logic or its classification within the sociomotor domain of opposition.

### 4.3 Comparison of emotional expression between groups G1 and G2

When comparing the mean values expressed by participants in groups G1 and G2, it was found that the mean score for the positive emotion in kata (6.7; SD  $\pm$  0.5) was higher than that observed in kumite (5.8; SD  $\pm$  1.3). A significant difference was found between the two groups ( $p = 0.0340$ ) using a Student's t-test (Table 5).

Table 5 – Comparison of Positive Emotions in G1 and G2

Group	Mean $\pm$ SD	p < 0,05
G1 kata	<b>6,7 <math>\pm</math> 0,5</b>	
G2 kumite	<b>5,8 <math>\pm</math> 1,3</b>	<b>0,0034</b>

S.D.: standard deviation

p < 0,05: Student's t-test significance level

Source: Prepared by the authors.

In the analysis of negative emotions, G2 presented a higher mean score (3.8; SD  $\pm$  2.2) compared to G1 (2.0; SD  $\pm$  1.5). The difference between the groups was statistically significant ( $p = 0.0001$ ) at the  $p < 0.05$  level (Table 6).

Table 6 – Comparison of negative emotions in G1 and G2

Group	Mean $\pm$ SD	p < 0,05
G1 kata	<b>2,0 <math>\pm</math> 1,5</b>	
G2 kumite	<b>3,8 <math>\pm</math> 2,2</b>	<b>0,0001</b>

S.D.: standard deviation       $p < 0,05$ : Student's t-test significance level  
Source: Prepared by the authors.

The most notable finding in Table 7, when comparing emotional expression after kata and kumite, is the higher mean value for the positive emotion joy (G1 = 6.7; G2 = 5.8). In both modalities, mean values for joy were above the midpoint of the scale and higher than those recorded for any of the negative emotions.

The comparative data in Table 7, concerning negative emotions, show that the most relevant mean value was observed for anger (5.0) during kumite practice. When comparing the two modalities, kumite generally showed mean values above the midpoint of the scale for most negative emotions, with the exception of rejection (2.8). Significant differences were also observed for sadness ( $p = 0.0008$ ) and anger ( $p = 0.003$ ), considering  $p < 0.05$  (Table 7).

Table 7 – Comparison of emotional expression in G1 (kata) and G2 (kumite)

Group	Mean Values of Emotions									
	Joy	$p < 0,05$	Rejection	$p < 0,05$	Sadness	$p < 0,05$	Anger	$p < 0,05$	Fear	$p < 0,05$
G1	6,7		2,0		1,5		2,2		2,4	
G2	5,8	0,0340	2,8	0,1470	3,7	0,0008	5,0	0,0003	3,6	0,1359

$p < 0,05$ : Student's t-test significance level

Source: Prepared by the authors.

#### 4.3.1 Discussion on the comparison between application formats

It is important to note that these data should not be interpreted as classifying kata and kumite as either good or bad practices for the development of karate practitioners or for their emotional education. More importantly, this information provides evidence that can guide teachers in adopting appropriate didactic procedures in the process of emotional education for their students (Parlebas, 2001), whether in Social Inclusion Projects or in school settings (Vasques; Mariante Neto; Freitas, 2023). Such data may contribute to refining pedagogical strategies and inclusion policies through physical and sports activities, aiming to reduce dropout and increase student adherence in PIS programs (Medeiros; Vianna, 2021; Vianna; Arruda; Araújo, 2022).

These findings highlight the relevance of this research in addressing a gap in strategies that may offer teachers diagnostic insights into the effects of combat sports on students' emotional education (Borges; Fernandes; Cisne; Ferreira, 2021). Another important consideration, concerning the mean values obtained for negative emotions in G2, is that kumite practice, because of its face-to-face combat characteristics, may create situations of physical risk due to the exchange of strikes. This imminent and natural risk associated with kumite suggests that negative emotions are more likely to manifest compared to kata.

## 5 Final considerations

Studies addressing emotional expressions in combat sports and practitioners' emotional education are still incipient in terms of understanding emotional reactions during the specific events of these activities. It is therefore crucial to develop new scientific approaches that fill this gap and provide teachers and coaches with diagnostic tools to assess the effects of combat sports on the emotional education of students and practitioners alike, aiming at their multidimensional development. In this context, the present study sought to identify the emotional expressions of beginner karate practitioners in PIS after kata and kumite practice, and to verify whether differences in emotional expression occurred between these modalities.

Specifically, the results obtained in this study regarding karate practitioners' emotional expression in kata and kumite revealed, on the one hand, satisfaction derived from success, as participants predominantly expressed joy in both activities, thereby experiencing emotional and relational well-being. On the other hand, the significant manifestation of negative emotions such as anger, sadness, and fear indicates the need to address practitioners' emotional education in kumite, which involves physical risk through the exchange of strikes or failure in combat, and to a lesser extent in kata practice.

Whether in psychomotor practices, as represented by kata, or in sociomotor opposition practices such as kumite, characterized by the internal logic of a duel between

two players, karate can be considered a laboratory for motor experiences and also for emotional learning when appropriately integrated into practitioners' training or into other forms of combat sport practice.

The context of motor practices in combat sports, when accompanied by pedagogical strategies consistent with the objectives set by teachers and coaches working with young practitioners, can foster emotional and relational well-being. Such practices stimulate and promote a multidimensional process at cognitive, social, motivational, and physiological levels.

In light of the above, it is imperative to expand studies, projects, and initiatives on this subject and on different modalities within this motor spectrum, in order to generate new approaches that can assist Physical Education professionals and coaches in fostering multidimensional development among those involved in these practices.

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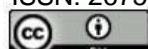
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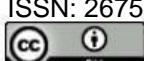
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