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Effects of extracurricular martial arts practice on the trait of anger among boys and girls aged 9-12 years old

Efectos de la práctica de artes marciales en el ámbito extraescolar sobre el rasgo de ira de niños y niñas entre 9 y 12 años

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Abstract

Nowadays, aggression in children is an alarming problem and there are more and more programs carried out with students in order to reduce violence and aggressive behaviour. Martial arts have been used, on occasions, in these programs due to the values of respect and self-control that give it. However, they have not always obtained the expected results. The purpose of this paper is to observe if martial arts like judo and karate are a successful method to decrease anger levels in children. To evaluate this, a quasi-experimental longitudinal study during a period of 6 months in which 82 children took part, divided in a control group and an experimental group (karate and judo). State-Trait Anger Expression Inventory for Children and Adolescents (STAXI-NA) was used.

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Meaningful differences were found only in some of the anger components, between anger-in expression pre-tests of the control and experimental group and between anger-out expression pre-tests and post-tests of the karate group. The results obtained in this study suggest that the martial arts training has no effect about global anger management in children students. Common aspects are pointed out in interventions that have decreased the levels of anger (traditional aspects, design of a specific program, subjects with behavior problems, school context) and it is shown with the results obtained, how a habitual intervention carried out in a context of sports clubs, in a normal population and without a specific program, have difficulties in reducing the anger of the participants.

Keywords: STAXI-NA; judo; karate; aggression; sport health

Resumen

Hoy en día la agresión en los/as niños/as es un problema preocupante, donde se ha utilizado en algunos programas, las artes marciales para disminuir los niveles de violencia, debido a los valores de respeto y autocontrol que se le otorgan. Sin embargo, no siempre se ha obtenido los resultados esperados. El objetivo de este artículo es observar si las artes marciales, como el judo y el karate, son un método adecuado para disminuir los niveles de ira en los/as niños/as. Se realizó un estudio longitudinal cuasi-experimental durante un período de seis meses en el que participaron 82 niños/as, divididos en grupo control y experimental (kárate y judo). Fue utilizado el Inventario de Expresión de Ira Estado-Rasgo para Niños y Adolescentes (STAXI-NA). Se encontraron diferencias significativas sólo en algunos de los componentes de ira, en las pruebas previas de expresión de ira del grupo control y experimental, y en las pruebas previas y posteriores de expresión de ira del grupo de karate. Los resultados obtenidos en este estudio sugieren que el entrenamiento en artes marciales no tiene efecto sobre la gestión global de la ira en niños/as. Se señalan aspectos comunes en las intervenciones que han disminuido los niveles de ira (aspectos tradicionales, diseño de un programa específico, sujetos con problemas de conducta, contexto escolar) y se muestra con los resultados obtenidos, cómo una intervención habitual realizada en un contexto de club deportivo, en una población normal y sin un programa específico, tienen dificultades para reducir la ira de los participantes.

Palabras clave: STAXI-NA; judo; karate; agresión; deporte saludable.

Introduction

Childhood aggression has long been a focus of research due to its importance, as if aggressive behaviour does not stop in early childhood and persists into elementary school, during adolescence the risk of continued violence increases (Williford et al., 2011). Due to this, it is necessary to develop programs that help reduce the levels of anger and aggressiveness in young people and thus avoid, according to Veijalainen et

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al., (2021), behaviour problems in the classroom, which related with different components of negative emotionality (anger, fear) and self-regulation.

On the other hand, the loss of values could lead to high rates of violence in young people (Pinto-Archundia, 2016). In this way, practices that develop philosophies, ethical codes and values of respect could help reduce levels of violence. Martial arts and combat sports (MA&CS) not only promote these values (Martinkova et al., 2019) related to mental or spiritual aspects, but also, are forms of self-defence or attack that have been adapted to current needs, with greater social, emotional and recreational awareness, having health benefits for wide groups of population (Harris, 2021; Moore, & Woodcock, 2020; Mozcarel, 2016). These benefits are closely related to the type of physical practices typical of the MA&SC, based on "fight" and "combat". In this line the Rough and Tumble Play (RTP) is a method which can be understood as a "fighting game" (Pellis & Pellis, 2007), characterized by vigorous and physical behaviours accompanied by positive emotions between the participants. The RTP has been implemented in the school reducing physical and verbal aggression, hostility and anger (Carraro & Gobbi, 2018). The MA&CS are related more than any other practice to the concept Rough-and-Tumble Play (RTP) (Mickelsson, & Stylin, 2021). Mickelsson and Stylin (2021) establish that, in general, the literature agrees with the positive effects of the RTP and, in turn, of the MA&CS. All of the above, could show the MA&CS as an ideal practice on a physical, mental and spiritual level to reduce aggression and anger.

Despite these positive effects that have usually been attributed to martial arts, Lafuente et al. (2021), in their systematic review of the effects of AM&CS on anger and aggression, observed how the results of the studies do not support the idea that the practice of MA&CS will reduce anger and aggression, finding differences according to the participants, the type of practice or the context where the intervention is carried out. Making evident a reasonable need to present more and more solid scientific evidence.

In relation to the context where the MA&CS practice is carried out, in general those interventions carried out outside the school context do not usually achieve a decrease in the levels of anger or aggression in the practitioners (Reynes & Lorant, 2004). However, studies carried out in the school environment tend to have better results (Fung & Lee, 2018; Trulson, 1986). These good results obtained by the MA&CS

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programs in schools, should be considered by the educational administrations, since in the school environment youth violence has become a growing concern and prevention programs, that attempt to address aggressive and violent behaviours in children have been implemented by schools (Mytton et al., 2002). And in general, most of the programs used in schools to prevent or address aggression have positive but moderate effects (Waschbusch et al., 2019). Therefore, the implementation of MA&CS programs in the school could have more positive results. Despite this, Baar and Wubbels (2011) propose to continue implementing programs in other social contexts such as sports clubs, these being the places where MA&CS is usually practiced.

Regarding the type of MA&CS, those that emphasize traditional aspects such as meditation, kata or philosophy have proven to be more effective in reducing aggression and anger (Fung & Lee, 2018).

Finally, in relation to the subjects, the studies that have focused on participants with behavioural problems (Trulson, 1986; Zivin et al., 2001) have obtained the greatest decreases in the level of anger and aggressiveness.

Considering the exposed literature and to contrast the results in the studies in relation to the context, the subjects and the type of martial art, it is proposed to carry out a longitudinal study, outside the school context, in judo and karate sports clubs, with primary school students without relevant behavioural problems. The purpose of this study was to assess the effects of habitual and regular, during six months Martial Arts (MA) training in anger levels, in a sample of youngsters and compare these effects in two of the most popular martial arts, judo and karate, in the context where they are usually practiced, the sports clubs. Based on the research outlined above, we hypothesized that: a) Merely practicing MA for a time may not increase or decrease anger levels in children. b) Children who practice MA would not have greater decreases in the level of anger than non-practitioners. c) Martial arts, such as karate and judo, if they do not emphasize traditional aspects, will not obtain differences in the levels of anger of their practitioners.

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Materials and methods

Sample

One hundred and one participants were initially recruited, from which eighty-two (27 females and 52 males), aged between 9 and 12 years old ($M_{age} = 10.21$; $SD_{age} = 1.06$) completed the six-month follow-up (dropout rate = 18.8%). A natural control group ($n = 45$) formed by 15 females and 30 males ($M_{age} = 10.18$; $SD_{age} = .86$) was compared to an experimental group ($n = 37$) formed by 12 females and 25 males ($M_{age} = 10.18$; $SD_{age} = 1.28$). Participants in the control group were students from a local public school and a semi-private school who did not practice MA&CS; however, it wasn't controlled if any other sports or leisure activities were practiced. For the experimental group, participants were also students from public and semi-private schools who were regularly involved in MA&CS training in local clubs ($n = 1$ for judo and $n = 2$ for karate). The experimental group consisted of judo ($n = 19$) and karate athletes ($n = 18$) and their experience in practicing these martial arts ranged from 2 months to 8 years ($M = 3.5$ years, $SD = 2.1$), being a natural group, this variable was not isolated. We also compared judo (5 females and 14 males) to karate practitioners (7 females and 11 males).

Measurements

Anger was measured using a Spanish version of the *State-Trait Anger Expression Inventory for Children and Adolescents* (STAXI-NA) (Miguel-Tobal et al., 2009). This self-report psychological assessment tool is aimed at evaluating anger in children aged between 8 and 17 years old. It is composed of 32 items distributed in 4 scales and 8 subscales derived from these: The *State Anger* scale (8 items, subdivided into *Feeling of anger* and *Expression of verbal and physical anger*), the *Trait Anger* scale (8 items, subdivided into *Anger temperament* and *Anger reaction*), the *Expression of Anger* scale (8 items, divided into *Anger expression-in* and *Anger expression-out*), and the *Control of Anger* scale (8 items, divided into *Anger control-in* and *Anger control-out*). The first scale evaluates the intensity of the participants' feelings (3-point Likert scale: very mild – moderate – much; e.g., “I am angry”), while the others evaluate the frequency of their feelings or behaviours (3-point Likert scale: very rarely – sometimes – very often; e.g., “I have a temper”, “I want to cry”). Particularly, we used

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the *Trait Anger (temperament and reaction)*, the *Anger Expression (in and out)* and the *Anger Control (in and out)* scales and subscales, as we looked for changes at trait level due to martial arts training. The internal consistency (Cronbach's α) for these scales was .798 (.716 and .704), .677 (.623 and .792) and .876 (.867 and .823), respectively.

Procedure

Participants and participants' parents, school teachers and martial arts club coaches were informed on the study purposes and gave their informed consent. Participants filled out the questionnaire in the first twenty minutes of two regular training or physical education sessions – at the beginning of December and at the end of May. A member of the research team was available during the completion of the questionnaire to provide any information or clarification. All research team member were independent agents, i.e., were not the participants' teacher or martial arts coach.

Intervention Program

In order to obtain data on common martial arts interventions in sports clubs, a prospective cohort study was carried out. It did not imply any pre-established specific intervention based on anger management but the regular disciplinary or educational procedures used by instructors in their classes. All participants regularly attended 60-minutes karate or judo lessons twice or three times per week, distributed over six months. Participants who did not attend regularly to lessons, as informed by their martial arts coaches, were excluded from the study. In order to get information on the martial arts programs, two training sessions at each of the three sports clubs participating in this study were attended by one member of the research team.

Judo group

Judo lessons began with the traditional judo bow (*rei*), followed by a 15 minutes warm-up based on fundamental skills related to judo (e.g., twisting, crawling, creeping, gripping, pulling, pushing, balancing / unbalancing, etc.), falls (*ukemi*), and repetition of techniques (*uchi-komi*). The next 15 minutes were devoted to ground fighting; first, a new technique or attack or defense movement was explained and practiced, then free ground combat or sparring (*randori*) was developed. The following 20 minutes were focused on standing fighting. Similarly to the previous part, participants learned a new technique or movement during the first 5-10 minutes, followed by 10 to 15 minutes of

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randori. Both ground and standing work were performed in pairs. In the next 5 minutes, all class together played a motor game involving judo fundamental skills and tactics. Finally, a new *rei* marked the end of the lesson. The attitude of the coach during these lessons was not very authoritarian but rather enhancing the playful dimension of judo practice, although always maintaining a basic level of discipline. Forms (*kata*) and periods of calm or meditation were not performed during the observed lessons.

Karate group

The two karate clubs collaborating in this study (club A and club B) developed similar structures in their training sessions. First, participants performed a 15 minutes warm-up composed of fundamental skills related to karate (e.g., standing displacements, twisting, bending, turning, etc.), followed by stretching exercises and repetition of some basic punching and kicking techniques. Club A coach focused very much on stretching exercises, which were conducted in a directed and silent way during ten minutes, being a moment of calm, very important in the class. After warming-up, students practiced techniques and *kata* for about 25 minutes. The next 5 to 10 minutes were focused on free combat or sparring (*kumite*). Finally, in club B a short group game was played while in club A participants stretched silently again for five to ten minutes. The attitude of the coach in club A was rather authoritarian, leading the exercises and maintaining discipline in a strict manner. On the other hand, the attitude of the coach in club B was intermediate between the judo coach and club A coach, i.e., he maintained considerable discipline all along the session but not as strictly as club B coach.

Whit regard to criteria used by Nosanchuk and MacNeil (1989) to classify the type of martial arts instruction (traditional versus modern). One of the three clubs, we considered like as a traditional, because in these is more importance the *kata* compared to technical instruction, drill and *kumite*. It negatively sanctioned important contact to the head or other vital areas during *kumite*. There are measures of respect to the sensei, dojo, and fellow students and to the uniform, and in this club is important calm and philosophy in the training program. The rest of two sports clubs can be considered modern because they do not meet these criteria. The other karate club modern in a educative sense, because it does not put emphasis on competition or combat, if not that they focus more on techniques and playful aspects. However, the judo club could be

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considered modern in a competitive sense, since the combat and competition part has a prominent place in the classes.

Data analysis

Descriptive statistics (means and standard deviations) as well as non-parametric procedures (Mann-Whitney *U* test for inter-group comparison and Wilcoxon signed-rank test for intra-group comparison) were used for data analysis, as STAXI-NA scores were not normally distributed. The significance level was set at $p < .05$. Rosenthal's *r* (1991) was used to calculate the effect sizes, which were interpreted as 'trivial' ($r < .20$), 'small' ($r \geq .20 < .50$), 'moderate' ($r \geq .50 < .80$), or large ($r \geq .80$) (Cohen, 1988).

Results

Table 1 shows the scores obtained by the experimental and control groups for each of the anger components analysed. Intra-group (pre-post-test comparison) and inter-group comparison (pre-test and post-test comparison) only showed significant differences in anger-in expression ($p = .042$; $r = .225$, small), for the inter-group pre-test comparison, with the control group achieving higher scores than the experimental group.

Table 1. Experimental and control groups mean scores (SD) for the selected STAXI-NA scales and subscales.

Measure	Pre-test		Post-test
	Experimental (<i>n</i> = 37)	Control (<i>n</i> = 45)	Experimental (<i>n</i> = 37)
T-ANG	12.30 (3.17)	12.67 (3.74)	12.89 (3.60)
<i>T-Ang/T</i>	5.65 (1.55)	6.02 (1.99)	5.95 (1.97)
<i>T-Ang/R</i>	6.65 (2.08)	6.64 (2.15)	6.95 (2.39)
AX	13.05 (2.97)	14.04 (2.99)	13.38 (2.94)
<i>AX-I</i>	6.41 (2.01)	7.29 (1.95)	6.51 (1.89)
<i>AX-O</i>	6.65 (1.96)	6.76 (2.25)	6.86 (2.24)
AC	18.11 (4.39)	17.51 (4.50)	17.78 (4.38)
<i>AC-I</i>	8.89 (2.52)	9.38 (2.76)	8.70 (2.94)
<i>AC-O</i>	9.22 (2.58)	8.13 (2.55)	9.08 (2.29)

T-Ang (T/R) = Trait anger (temperament / reaction); AX = Anger expression; AX-I = Anger expression-in; AX-O = Anger expression-out; AC = Anger control; AC-I = Anger control-in; AC-O = Anger control-out.

Table 2 shows the scores achieved by judo and karate practitioner groups. Inter-group comparison (pre-test and post-test comparison) showed no significant differences, while inter-group comparison (pre-test and post-test comparison) showed significant

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differences in anger-out expression ($p = .025$; $r = .374$, medium) for karate group, which achieved higher scores in the post-test.

Table 2. Judo and karate mean scores (SD) for the selected STAXI-NA scales and subscales.

Measure	Pre-test		Post-test
	Judo (n = 19)	Karate (n = 18)	Judo (n = 19)
T-ANG	12.63 (3.55)	11.94 (2.78)	12.74 (2.96)
<i>T-Ang/T</i>	5.74 (1.56)	5.56 (1.58)	5.68 (1.73)
<i>T-Ang/R</i>	6.89 (2.26)	6.39 (1.91)	7.05 (2.01)
AX	12.53 (2.72)	13.61 (3.20)	12.84 (2.79)
<i>AX-I</i>	5.84 (1.64)	7.00 (2.22)	6.53 (1.93)
<i>AX-O</i>	6.68 (1.89)	6.61 (2.09)	6.32 (1.89)
AC	18.11 (3.83)	18.11 (5.03)	18.21 (4.77)
<i>AC-I</i>	8.95 (2.41)	8.83 (2.71)	9.00 (3.21)
<i>AC-O</i>	9.16 (2.22)	9.28 (2.99)	9.21 (2.32)

T-Ang (T/R) = Trait anger (temperament / reaction); AX = Anger expression; AX-I = Anger expression-in; AX-O = Anger expression-out; AC = Anger control; AC-I = Anger control-in; AC-O = Anger control-out.

Discussion

The purpose of this study was to assess the effects of six-months MA training in anger levels in youngsters, and if there were differences between judo and karate. The results obtained in this longitudinal research showed that six-month of MA training produced practically no effect on trait anger.

Regarding the type of the subjects, in the research carried out, possible behaviour problems of the subjects have not been considered. Mickelsson (2020) suggests that modern martial arts may not be suitable for at-risk youth, whereas traditional martial arts may be effective in reducing antisocial. In the same way, there are longitudinal studies conducted with boys deemed to be at high risk for violence and delinquency (Zivin et al., 2001) and with delinquency youth (Trulson, 1986), which obtained significant decreases in anger levels after an MA's intervention. This positive effect in this typology of subjects could be related to what was stated by Blomqvist (2020), which indicates that the martial arts intervention moderately reduced criminal behavior. When comparing our results with those reported in these studies, it is observed that young people with behavior problems could have more benefits, reducing their anger to a greater extent, through to an martial arts program.

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With respect to the type of martial arts, no differences have been found between karate (striking MA) and judo (grappling MA). In other similar quasi-experimental studies (Reynes & Lorant, 2004) carried out during 2 years of training, groups of children practicing of MA (karate and judo), have been compared with a control group, finding on the one hand, significant differences in the levels of anger between the judo group and the control group. However, when comparing the karate group with the control group, no differences were found. These authors, based on the results obtained, point out that practicing competitive MA (in the judo group) in which kata and meditation have little presence, could decrease the acquisition of self-control.

Traditional martial arts that emphasize aspects such as meditation, kata or philosophy have been shown to be effective in reducing anger levels (Fung and Lee, 2018; Kostorz & Sas-Nowosielski, 2021; Morvay-sey, 2019; Trulson, 1986; Zivin et al. 2001). In the present study, the clubs that have taught martial arts, in general, have not given special emphasis to traditional aspects, so the decrease in anger levels associated with them does not occur. Considering those results, it is important to note that the traditional aspects of a martial art is a variable to consider in following researches for the study of anger in children.

With regard to the context, with the results obtained we cannot establish that an intervention in sports clubs, outside the school context, will have positive effects. The results obtained follow the same line as other longitudinal studies (Reynes & Lorant, 2004) in which an intervention was made in sports clubs and no positive effects were found in the students. Other investigations have carried out interventions within the educational context (Fung & Lee, 2018; Greco et al., 2019; Trulson, 1986). In one of them no effect was found, but in the other two the results obtained were positive. This could show a tendency where the school context would be more conducive to performing interventions through MA in order to reduce student anger. Despite this, the small number of studies found makes more scientific evidence necessary on the subject.

Another important aspect to consider in relation to the school context is the fact that all the subjects who have participated in this research must went to school every morning (25 hours a week). So, the difference between the control group and the MA group were only 2-3 hours per week of training in karate or judo. We see in this way, the

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greater importance of the school context compared to the few hours they receive from MA. In addition, the study did not control other activities than AM that the children of the control group could performed, which could influence. A systematic review and meta-analysis (Singla et al., 2020) studied the effects of carrying out different life skills programs, carried out by young people from 10 years old, obtaining that these interventions were effective in reducing anger. Therefore, other activities carried out by the participants could be considered in future studies.

After analysing the context, the subjects and the type of martial arts, it is observed that in some of the studies that have reported positive effects in relation to anger and aggression, had designed specific programs aimed at reducing their levels (Fung & Lee, 2018; Greco et al., 2019; Trulson, 1986; Zivin et al. 2001). In addition, in these, the instructors were selected context, subjects and they were told what they should teach. Van der Kooi (2020) in her review, points out how the main effects of martial arts practice are attributed to the coach. However, the intervention carried out by the clubs and coaches participating in the study has not been previously designed with the aim of producing a decrease in anger. The interventions carried out in the present study are framed in an extracurricular activity, whose objective did not go beyond that of teaching the martial art in question. In this sense, martial arts have behaved like any other extracurricular activity, which has not been designed to reduce anger. Showing thus, as those interventions that are not specifically designed to reduce anger levels, do not achieve this objective.

Conclusions

The results obtained in this study suggest that martial arts training in sport clubs per se has no effect on anger management in children. In the same vein, Vertonghen and Theeboom (2010) concluded in their review that the mere martial arts participation does not guarantee the achievement of positive social-psychological outcomes.

This study is considered of interest because it points out key factors, common in interventions that have decreased levels of anger (traditional aspects, design of a specific program, subjects with behaviour problems, school context) and shows how an intervention that does not take these into account, have difficulties to reduce the anger

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of the participants. The carrying out of case studies developed in a research context are proposed as lines of research.

Despite our study having some limitations (mainly small sample size, differences in MA training experience or variety in the types of clubs, modern, traditional and mixed), it is important to note the difficulties in carrying out these studies and the importance of accumulating evidence on the psychological effects of MA&CS training.

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