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Relationship between stress components in brazilian judo athletes

Manuella Colin Brazão[a], Rafael Moreno Castellani[b*]

Keywords:
Cognitive Assessment;
Coping;
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ABSTRACT

This study aimed to describe the relationship between the main components of stress in 93 male and female competitive level athletes of judo. The participants filled out four forms: the Positive and Negative Affect Schedule (PANAS); the Brief COPE (related to coping strategies); the Primary Appraisal Adjective Checklist (PAAC) and the Wrestling Coping Resources Questionnaire (WCRQ). The results showed a positive relationship between threat, damage, and negative affection, as well as between challenge, benefit, and positive affection. We found a negative relationship between secondary cognitive assessment and refusal strategies and behavioral divestment. This study confirmed the relationship between the components of the theory of Lazarus and Folkman.

Palavras Chave:
Avaliação cognitiva;
Coping;
Afeto;
Judô.

RESUMO

Este estudo teve como objetivo descrever a relação entre os principais componentes do estresse em 93 atletas do judô masculino e feminino de nível competitivo. Os participantes preencheram quatro formulários: Positive and Negative Affect Schedule (PANAS), o Brief COPE (referente às estratégias de coping), o Primary Appraisal Adjective Checklist (PAAC) e Wrestling Coping Resources Questionnaire (WCRQ). Os resultados mostraram uma relação positiva entre ameaça, dano e afeto negativo, bem como entre desafio, benefício e afeto positivo. Encontramos uma relação negativa entre avaliação cognitiva secundária e estratégias de recusa e desinvestimento comportamental. Este estudo confirmou a relação entre os componentes da teoria de Lazarus e Folkman.

Palavras Chave:
Estrés;
Coping;
Afecto;
Judo.

RESUMEN

Este estudio objetivó describir las relaciones entre los componentes del éstres em 93 atletas de judo de ambos sexos, de alto nivel competitivo. Los sujetos completaron cuatro cuestionarios: Positive and Negative Affect Schedule (PANAS), el Brief COPE relacionado con las estrategias de coping y el Primary Appraisal Adjective Checklist (PAAC) y Wrestling Coping Resources Questionnaire (WCRQ). Los resultados mostraron una relación positiva entre la amenaza, daño y afecto negativo, así como entre desafío, beneficio y afecto positivo. Encontramos una relación negativa entre las evaluaciones cognitivas secundarias y estrategias de negación y desinvención comportamental. Los resultados confirman la relación entre los diferentes componentes de la teoría de Lazarus y Folkman.

[a] Universidade do Porto, Faculdade de Desporto, Sorocaba, SP, Brasil.
[b] Universidade de São Paulo, Instituto de Psicologia, Campinas, SP, Brasil.

Autor correspondente: Rafael Moreno Castellani
E-mail: rafael.moreno@usp.br

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INTRODUCTION

The participation of athletes in combat sports such as judo, for instance, can generate high levels of physical and mental stress (Belem et al, 2017). Hardy et al. (1996) argue that elite athletes commonly have high levels of stress from factors such as lesions, performance decrease, career transition, time management, and high expectations from others or from themselves. And, by adopting more adequate strategies, the athletes have higher chances of achieving a better performance (Rogaleva et al, 2019).

By studying stress in the context of combat sports, Belem et al. (2016) point that lesions can be a factor causing stress because as a result of the lesion, the athlete has to stop attending to the training and competitions, which leads to income loss and career interruption. In more recent studies from Belem et al. (2017), which investigated the association between resilience, stress, and coping strategies in MMA, the authors concluded that more resilient athletes have lower stress levels as they are more prepared to cope with stress.

However, despite the issues attributed to high-performance sports, it is also necessary to consider the personal circumstances, such as those related to family, as well as social and professional factors that affect athletes (Coimbra et al, 2013). The sum of all these factors supports the statements brought by Rogowska and Kúsnierz (2012) when they argue that it is impossible to dissociate stress and sportive competition.

The strategies that athletes use to deal with such stress are denominated as "coping". Coping has been one of the most frequently studied subjects in psychology of sport (Miranda et al 2015; Nicholls et al 2016; Rossi et al 2016; Arnold et al, 2017; Belem et al, 2017; Moreno et al, 2017; Kent et al, 2018; Rogaleva et al, 2019). However, Kent et al (2018) wrote that only 3 studies, after a proper quality control analysis (clear objective, research plan, and statistical analysis) and further selection criteria (peer-reviewing, written in English, aim interventions that will promote sports performance) address emotional regulation strategies, such as coping.

Researchers, coaches and psychologists are especially interested in the practical application of coping in high-performance sports, aiming to minimize the stress related to performance, while maximizing the competitive outcomes. The efficiency of the process of coping affects important emotional, cognitive, and somatic aspects of individuals (Dugdale et al, 2002).

Coimbra et al. (2013), in a study that evaluated 375 athletes, suggested that coping abilities are essential for athletes to successfully deal with adverse situations and that these abilities, in fact, allow athletes to achieve better competitive levels. They also highlight that this process can be perfected and optimized through learning and preparation, similarly to arguments brought by Rossi et al. (2016). Likewise, Belem et al. (2016) and Rogaleva et al (2019) point out that strategies to face stress can be presented as an advantage in achieving good results and sportive success.

One of the main models used to study coping nowadays in phycology of sport is the perspective of Lazarus and Folkman (1984), the Motivational-Relational theory. This theory defines coping as constant changes in cognitive efforts and behaviors to manage specific internal and external demands that normally tend to exceed the personal resources of the individual (Lazarus, 1995). Therefore, coping consists of the relationship between the perception of the stressful experience and its respective response.

The cognitive evaluation is considered a key component in the Lazarus and Folkman's (1984) theory and it was defined as the evaluation of the stressful event in reference of the personal well-being. We can divide it into primary and secondary cognitive evaluations. While the primary evaluation refers to the importance that a person attributes a certain event/phenomenon, the secondary includes the selection of possibilities to exclude or minimize a threatening situation and/or promote well-being trough the evaluation of what can be done concerning what is happening. The cognitive evaluation will then determine the quality and the intensity of the stressor and the resources necessary to manage the stress (Lazarus, 1995).

To go beyond the relationship between cognitive evaluation and coping, some researchers have suggested that a reciprocal relationship between coping and emotions exist during a stressful situation (Lazarus & Folkman, 1984). When a person experiences a stressful situation, specific coping responses can be associated with the current emotional changes. The initial cognitive evaluation (threat, harm, challenge, and benefit) creates an emotion that influences the process of coping (Crocker & Graham, 1995).

The affection, in turn, is the most fundamental expression of value related to an emotional experience. In the context of sports, affection is the topic of interest of most investigations. It was included by several researchers, along with other topics, to explain behavioral and cognitive aspects in sports (Crocker & Graham, 1995; Ntoumanis, et al. 1999).

Studies that include the relation between affection and coping, in general, have consistently demonstrated an assertive association between positive affection and problem-centered strategies, as well as between

negative affection and emotion-centered strategies (Crocker & Graham, 1995; Ntoumanis, et al. 1999). Gaudreau and Blondin (2002) verified that affection and some strategies of coping changed in different competition phases.

On the other hand, researchers have also been examining the relationship between coping strategies and cognitive evaluation in the context of sports competition (Dugdale et al., 2002). Many areas of research have included the primary cognitive evaluation (threat-harm/benefit-challenge) (Lazarus, 2000) and the secondary cognitive evaluation (control perception) (Hammermeister & Burton, 2001).

Although most of the researches on cognitive evaluation are related to the process of coping, some investigations that explore cognitive evaluation itself have associated it with affection (Lazarus, 1999; Ntoumanis & Bidle, 1998; Adie et al., 2008).

Regarding the sports context, investigations seem to suggest that cognitive evaluation, coping strategies, and affection are closely related. Despite this, it is worth to highlight that the majority of the studies do not relate all the components of the theory of Lazarus and Folkman, the cognitive evaluation, affection, and coping, in a single investigation. Even so, investigators usually study individual and collective sports modalities simultaneously, and only a few studies have included martial arts, even though judo is one of the main modalities of sports fight in Brazil. In our literature review, we found only two studies with sports fight, one with mixed martial arts (Belem et al., 2016;) and another with judo (Rogowska & Kuśnierz, 2012).

Thus, the present study aimed to verify the relation between cognitive evaluation, coping strategy, and affection among Brazilian judo athletes by analyzing not only the correlation between them, but also by verifying if athletes with different degrees and valences of affection evaluate and deal with the stress in a similar manner.

METHODS

The study was conducted on 93 judo athletes of both sexes, between 13 and 34 years old (mean 23.0 ±4.4 years); 49 were male (52.7%) and 44 were females (47.3%). All the athletes that participated in this study were registered in the Brazilian Judo Confederation. Their competitive level was classified as state (n=44; 48%), national (n=25; 27%), and international (n=23; 25%), based on the titles obtained in the last five years.

The athletes filled out a questionnaire that included a section designated to obtain demographic data (e.g., age and gender) and sport-related data (e.g., years practicing and titles). In addition, they filled out four forms: The PANASp-rd (Alves, Augusto & Oliveira, 2008), summarized Portuguese version of Positive and Negative Affect Schedule (PANAS), including five items to positive affection and five to negative affection; the Brief COPEp (Dias, Cruz & Fonseca, 2009), Portuguese version adapted from Brief COPE (Carver, 1997), survey constituted by 28 items divided by 14 subscales to report coping strategies; and two other forms for cognitive assessment, the Primary Appraisal Adjective Checklist (PAAC) (Folkman & Lazarus, 1985) and the Questionário de Recursos de Coping (QRC) (Dias & Fonseca, 2010), Portuguese version adapted from Wrestling Coping Resources Questionnaire (WCRQ) (Hard & Jones, 1996), which comprehends six items that evaluates two components from the secondary cognitive evaluation (three items to control and other three for coping potential).

Data were collected during the Regional Open Games, in Brazil. Questionnaires were conducted after authorization of the responsible coaches, and the confidentiality and the anonymity of all information were assured. In order to meet the ethical requirements for research involving humans, we followed the guidelines outlined in the Declaration of Helsinki. As a prerequisite to participate in this study, we asked the participants to read and sign a consentient term (Termo de Consentimento Livre e Esclarecido - TCLE). For those with less than 18 years-old an assent was asked to the legal guardians. It is important to underline that, in order to guarantee the dispositional nature of the research, even though data was collected during the games, only athletes who had already played (e.g., on the previous day) or athletes who were not playing on the next couple of days answered the questionnaires.

The Statistical Package for the Social Sciences SPSS software (v22.0, SPSS Inc., Chicago, WI, USA) was used to analyse data. All data were tested for Gaussian distribution using the Shapiro-Wilk test. An alpha level of $p < 0.05$ was used for all analyses while data was expressed as median and interquartile range. To evaluate the relationship between cognitive evaluation, affection and coping strategies, we used Spearman correlation coefficient (ρ). Criteria for the degree of correlation were set to: 0 zero correlation, 0-0.3 weak correlation, 0.4-0.6 moderate correlation, 0.7-0.9 strong correlation, 1 perfect correlation (Dancey & Reidy, 2004). Later, we conducted another analysis to investigate if athletes with distinctive levels and valences of affection differed in their cognitive evaluation and coping strategies.

For this, we crossed different types of affective experiences, accounting for its intensity (low and high) and type (positive and negative). These crossings

created four affection groups: low-intensity negative and positive affection (ANB and APB; n=27); low-intensity negative affection and high-intensity positive affection (ANB and APE; n=22); high-intensity negative affection and low-intensity positive affection (ANE and APB; n-20); and high-intensity positive and negative affection (ANE and APE; n=24).

To examine the existence of different cognitive evaluation and coping strategies between athletes of these groups, we used the non-parametric test of Kruskal-Wallis. Then, we used Mann-Whitney's test to compare each pair of samples (subscales) in which differences were significant.

RESULTS AND DISCUSSION

The Spearman correlation coefficient found between the different dimensions of primary cognitive evaluation and affection revealed that harm and threat perceptions are not only positively inter-correlated but are also associated with negative affection. On the other hand, our data also indicated a positive relationship between challenge, benefit, and positive affection. We also found a negative relationship between secondary cognitive evaluation and threat evaluation.

Arnold et al. (2017) investigated the coping strategies of athletes from several sportive modalities, and they noticed that problem-solving coping strategies have a significant positive effect on athletes' positive affection, whether emotion-based coping strategies usually drive negative affections.

In our study, the correlation between coping, cognitive evaluation, and affection revealed that active coping strategies, planning, and self-blaming were positively associated with the evaluation of challenge and benefit; and that ventilation was also positively correlated with benefit (table 1). Additionally, self-distraction, drug usage and denial, were positively associated with harm evaluation. We found a negative relationship between secondary cognitive evaluation and denial strategies, drug usage, and behavioral disinvestment. Lastly, regarding the relationship between affection and coping strategies, we verified that positive affection was positively related to instrumental support and to planning; whereas negative affection was positively correlated with denial strategies, ventilation, and self-blaming.

In this sense, Arnold et al. (2016) affirm that individuals that use strategies to scape the problem, avoiding stressful situations in general, do not experience control domain, nor the positive emotions that arise after solving the problems, decreasing positive affections and, as a consequence, satisfaction.

While analyzing if groups of athletes with distinct degrees and valences of affection also have different cognitive evaluation and coping strategies, we found differences in all of the analyzed dimensions of primary cognitive evaluation, self-distraction strategies, active coping, and self-blaming (table 2).

A significant effect between groups (ANB + APB vs BAN + EAP vs EAN + BAP vs EAN + EAP) for variables threat ($X^2(4) = 29,26$, $p = 0,001$), challenge ($X^2(4) = 26,38$, $p = 0,001$), damage ($X^2(4) = 40,01$, $p = 0,001$), benefit ($X^2(4) = 25,54$, $p = 0,001$), self distraction ($X^2(4) = 11,47$, $p = 0,003$), active coping ($X^2(4) = 8,98$, $p = 0,012$), ventilation ($X^2(4) = 6.,62$, $p = 0,009$) and planning ($X^2(4) = 7,15$, $p = 0,008$) was observed. From the Mann-Whitney tests, we also verified differences between athletes, which were mainly related to primary cognitive evaluation ($U = 29,000$, $Z = -0,810$, $p = 0,001$), but also included differences in secondary cognitive evaluation and two coping strategies.

In regard of the challenge and benefit evaluations, athletes with high positive affection presented significantly higher scores than athletes with low positive affection. These differences were more pronounced when we compared these groups with the groups with high negative affection (that presented lower scores for challenge and benefit). Contrarily, when we analyzed threat and harm, the main differences were found in the groups with high negative affection, which presented higher scores for these dimensions.

More specifically, the results revealed a positive relationship between challenge and benefit, as well as between threat and harm, which is consistent with a previous study with martial art athletes (Holt, 2004). Contrarily, the negative relationship found between secondary cognitive evaluation and threat perception, suggests that athletes' evaluation of a situation as threatening is higher when the control perception and their potential to deal with it are lower. Ntoumanis et al. (1999) affirm that those athletes that experience high positive affection scores usually also have higher levels of control perception than those that experience high negative affection. Finally, we found differences between two coping strategies: self-blaming and self-distraction. The group of athletes with low positive and negative affection and the group with high positive and negative affection differed in these two coping strategies. It is important to notice that these two groups presented differences in all of the analyzed variables.

While analyzing the relationship between primary cognitive evaluation and affection, we verified that challenge and benefit correlated with positive

Table 1: Spearman correlation coefficient (ρ) between primary cognitive evaluation (threat, harm, challenge, and benefit), secondary evaluation, affection, and coping strategies.

	Threat	Damage	Challenge	Benefit	secondary evaluation	positive affection	negative affection
self distraction	0,259	0,344*W	0,297	0,277	0,192	0,297	0,382
active coping	0,120	0,104	0,488*M	0,367*W	0,204	0,388	0,129
Denial	0,288	0,379*W	0,202	0,185	-0,509*M	0,125	0,472*M
drug usage	0,015	0,246	0,162	0,039	-0,416*M	0,108	0,192
emotional support	0,202	0,294	0,204	0,188	0,035	0,201	0,233
instrumental support	0,245	0,271	0,194	0,194	0,048	0,407*M	0,282
behavioral divestment	0,133	0,189	0,102	0,118	-0,708*S	-0,124	0,194
Ventilation	0,243	0,302	0,299	0,380*W	0,272	0,282	0,289
positive revaluation	0,308	0,208	0,286	0,230	0,079	0,272	0,202
Planning	0,251	0,144	0,483*M	0,456*M	0,102	0,445*M	0,244
Mood	0,032	0,127	0,247	0,094	0,194	0,288	0,102
Acceptance	0,139	0,262	0,202	0,156	0,106	0,284	0,188
Religion	0,292	0,179	0,292	0,276	0,196	0,293	0,293
self-blaming	0,308	0,292	0,391*W	0,292	0,188	0,290	0,388*W

W = weak correlation M = moderate correlation; S = strong correlation. * Significant values for p ≤0,01. Source: elaborated by the authors

affection, whereas threat and harm correlated with negative affection, as expected (Bouffard & Crocker, 1992). Folkman (2008) sustained that threat and harm evaluations are followed by negative emotions such as anxiety, fear (threat), angry, and sadness (harm), which reinforces our findings. The relationship between threat evaluation, low coping expectations, and anxiety has already been reported in a previous study (Lazarus & Folkman, 1984). In opposition to threat, researchers verified that challenge evaluation can be considered as a facilitator of positive emotion, such as the pleasure of striving to overcome difficulties and to feel better for anticipating a good outcome (Lazarus & Folkman, 1984).

The secondary cognitive evaluation, in turn, demonstrated a negative correlation with negative affection. Thus, the experienced levels of negative affection is lower as control perception and coping potential increases. Holt (2004), on the contrarily, verified a positive relation between secondary cognitive evaluation and positive affection; and affirmed that athletes experience high levels of positive emotions when they feel that they have the internal resources to deal with uncertainties. In addition, a high level of control may facilitate this situation.

In respect to coping strategies, our data also has a theoretical consistency, since active coping strategies and planning, both problem-centered, were positively related to challenge and benefit. On the contrary, strategies related to harm were emotion-centered, which included self-distraction, drug usage, denial, and self-blaming. Crocker and Graham (1995) affirmed that challenge is associated with problem-centered strategies, while threat is associated with emotion-centered strategies. Additionally, challenge perception is associated with positive emotions and, therefore, helps the athlete to face the situation in a more active way.

Holt (2004) sustains that athletes who feel that they have potential to deal with stressful situations and have a high degree of control tend to use more problem-centered strategies than athletes that do not have such perception. Although we have not yet found a relationship between secondary evaluation and problem-centered strategies, our results seem positive, since the use of less adaptive strategies are lower when control perception and coping potential are higher.

Finally, consistently with the sport psychology's literature on coping and emotions, corroborating to several studies (Crocker & Graham, 1995; Ntoumanis & Biddle 1998), we found a relationship between some coping emotion-centered strategies and negative affection (denial and self-blaming).

Furthermore, Crocker and Graham (1995) also found a relationship between self-blaming strategies and negative affection. According to these authors, this strategy is associated with emotions such as

Table 2. Cognitive evaluation and coping strategies in function of the degree of affection. Data presented Median and (interquartile range).

	ANB + APB	BAN + EAP	EAN + BAP	EAN + EAP	Chi Square	MD	Sig.
Threat	2,14 (0,66)	2,26 (0,63)	2,88 (0,52)	3,31 (0,76)[A]	29,26	1,17	0,001*
Challenge	3,45 (0,77)	4,08 (0,60)	3,29 (0,63)	4,18 (0,61)[C]	26,38	0,89	0,001*
Damage	1,40 (0,38)	1,32 (0,46)	2,47 (0,66)[A,B]	2,22 (0,86)[B]	40,01	1,15	0,001*
Benefit	3,33 (0,63)	3,87 (0,57)[C]	2,96 (0,68)	3,91 (0,52)[C]	25,54	0,95	0,001*
secondary evaluation	3,18 (0,56)	3,23 (0,58)	3,14 (0,52)	2,72 (0,94)	5,68	0,51	0,168
self distraction	4,24 (1,02)	4,18 (1,22)	4,15 (1,65)	5,39 (1,49)[A,B,C]	11,47	1,24	0,003*
active coping	6,08 (1,12)	6,44 (1,19)	6,12 (1,28)	6,81 (1,11)[A,B]	8,98	0,73	0,012*
Denial	3,65 (1,28)	3,51 (1,42)	4,56 (1,59)	4,64 (1,12)	6,32	1,13	0,085
use substances	2,57 (0,98)	3,26 (1,83)	2,88 (1,51)	2,62 (1,68)	2,33	0,69	0,482
emotional support	6,07 (1,32)	5,79 (1,55)	5,87 (1,86)	6,33 (1,29)	2,00	0,54	0,525
instrumental support	5,66 (1,71)	5,68 (1.31)	5,83 (1,89)	6,49 (1,08)	5,52	0,83	0,822
behavioral divestment	3,44 (1,52)	3,02 (1,45)	3,59 (1,70)	3,08 (1,70)	3,54	0,57	0,288
Ventilation	5,13 (1,33)	5,11 (1,23)	4,98 (1,11)	5,22 (1,43)[C]	6,62	0,24	0,009*
positive revaluation	5,98 (1,48)	6,52 (1,08)	5,89 (1,46)	6,56 (1,34)	4,48	0,67	0,214
Planning	5,66 (1,52)	6,52 (1,15)[A]	5,92 (1,47)	6,53 (1,23)[A]	7,15	0,87	0,008*
Mood	5,09 (1,86)	5,81 (1,96)	5,31 (1,25)	5,77 (1,86)	4,57	0,72	0,182
Acceptance	5,35 (1,62)	5,84 (1,55)	5,66 (1,21)	5,79 (1,63)	1,65	0,49	0,523
Religion	4,87 (2,01)	4,79 (1,72)	4,79 (1,69)	5,82 (1,31)	5,98	1,03	0,108
self-blaming	4,94 (1,29)	5,33 (1,38)	5,62 (1,58)[A]	6,24 (1,32)[A,B]	9,20	1,3	0,001*

MD = Median Difference; **ANB + APB** = low-intensity negative and positive affection; **ANB + APE** = low-intensity negative affection and high-intensity positive affection; **ANE + APB** = high-intensity negative affection and low-intensity positive affection; ANE + APE = high-intensity positive and negative affection. * Significant values for p ≤0,01. [A] = Significantly different from ANB + APB ($p < 0.05$); [B] = Significantly different from BAN + EAP ($p < 0.05$); [C] = Significantly different from EAN + BAP ($p < 0.05$); [D] = Significantly different from EAN + EAP ($p < 0.05$).

blame and shame. About the denial strategy, which is an emotion-centered strategy, its relationship with negative affection was already found in previous studies (Ntoumanis & Biddle, 1998).

We found that positive affection is associated with planning strategies and instrumental support, both centered on active problem-solving. Ntoumanis et al. (1999) verified that athletes experience higher levels of positive affection when they deal with stressful situations using problem-centered strategies, which reinforces our findings. A possible explanation for this is that the described positive affections, such as being active, determined, inspired, alert, and enthusiastic, are reflexes of problem-centered strategies, and that, even though, performance goals were not yet achieved, the struggle to achieve them is still there, creating some positive feelings (Crocker & Graham, 1995). On the other hand, when we classified athletes according to the different intensity and valence of affection that they experience in their sports modality, we found differences in relation to primary cognitive evaluation in all of its dimensions, supporting the supposed relationship between these variables.

The primary cognitive evaluation was the variable that we found differences in all of its dimensions. This data suggests that the way that athletes evaluate stressful situations is associated with their emotional experiences, which is in accordance to what Lazarus and Folkman (1984) proposed. We verified that athletes who present higher scores for challenge and benefit were those with high positive affection associated with low negative affection or with a high positive and negative affection. Groups with low levels of positive and negative affection presented lower levels of challenge. The contrary happened with the evaluation of threat and harm. Athletes with higher levels of threat and harm evaluations were also those who presented high levels of negative affection, predominantly when associated with low positive affection. However, we also found differences between

athletes with high positive and negative affection and the group with opposite characteristics (with low positive and negative affection); and between athletes with high positive and negative affection and those with low negative affection and high positive affection. The first group (athletes with high positive and negative affection) had higher scores. Athletes with high threat score always presented high negative affection.

Lazarus and Folkman (1984) suggest that the quality of the coping process under threatening and challenging situations should influence and be influenced by the affection responses. Nonetheless, the relationship between cognitive evaluation and affection was evident in our study. Threat and challenge were associated with high intensities of positive and negative affection, consecutively.

Furthermore, when we evaluate each affection group separately, in relation to primary cognitive evaluation, we verified some curious data between specific groups. When we compare all distinct groups and analyze those with significant differences, the results of the group with low positive and negative affection demonstrated lower scores than other groups in all variables.

The contrarily was observed in groups with high positive and negative affection. These groups showed higher scores of threat, harm, and benefit. Given our results, we can suggest that high negative affection intensities should not always be considered dysfunctional or harmful. Although they are related to threat and harm, this result shows that the association with high positive affection can lead to benefit evaluation. Thus, even though the situation may be threatening, it still can be seen with beneficial outcomes.

At last, when we evaluate high positive affection with low positive affection and the group with low positive affection and high negative affection (groups with opposite valences and degrees), we observed that the first seems to have the most positive association among the four groups. This is because, in the comparisons between groups, these athletes always presented higher scores for challenge and benefit and lower scores for threat and harm. The contrarily happened with the second group, which seems to be the most dysfunctional of them, given that it always had high scores for threat and harm and low scores for challenge and benefit.

When we analyzed the secondary cognitive evaluation, we did not find differences between the evaluated groups, but those athletes who had higher secondary evaluation scores also had lower negative affection scores. Such result also supports our finding of a negative relationship between secondary cognitive evaluation and negative affection.

Additionally, we verified that when low negative affection was associated with high positive affection, the athletes showed higher control and potential for coping, suggesting once more that this association seems to be more advantageous under stressful situations. These data also agreed with previous findings of Ntoumanis et al. (1999), in which positive affection was more related to an elevated perception of situational control than negative affection experiences.

The group that presented the lowest scores for secondary cognitive evaluation was the group with high positive and negative affection. These athletes showed higher scores for threat, challenge, and benefit; suggesting that these athletes evaluate situations in a more intense manner than other groups, but they are not able to obtain high levels of control or coping potential. These groups also use more emotion-centered strategies than other groups.

Despite the fact that positive affection is associated with problem-centered strategies (Crocker & Graham, 1995), in this case, high levels of positive and negative affection, together, can orientate athletes under low control perception to also use emotion-centered strategies while trying to minimize the effects of these high levels of affection in performance, which later facilitates the use of such strategies that are more adaptive.

Only two coping strategies showed differences between groups of affection: self-distraction and self-blaming. Differences were found between the group of athletes with low positive and negative affection and the group with high positive and negative affection. The group with low affection uses these strategies less than the group with high affection. When self-blaming was related with negative affection, it seems that this strategy, which is often used, highly creates negative affection, even when associated with positive affection.

Regarding self-distraction strategy, we found similar results to those found for self-blaming. Our results partially support the previous findings of Ntoumanis et al. (1999), because their study suggested that trying to divert attention from a situation was a strategy with high negative emotion results and low positive emotion results. However, differently from these authors, our results pointed out the presence of a high positive affection, similarly to that found by Nicholls et al (2016). Moreover, they affirmed that this type of strategy usually indicates lack of control and inability to take direct actions, being regularly related with negative emotional outcomes.

On the other hand, although we have found other differences related to coping strategies, we should emphasize that, in general, problem-centered strategies were always more frequently used by groups of athletes with high positive affection. This is similar to what previous studies found and corroborates our correlation data, which indicated an association between positive affection and problem-centered strategies. Indeed, several authors (Crocker & Graham, 1995; Ntoumanis et al., 1999) affirm that being active, determined, inspired, and alert reflect problem-centered strategies. The more these descriptors are found, the more likely it is for an athlete to appeal to strategies that facilitate success.

Nevertheless, even that an object is not concretized, the struggle to achieve it may produce some positive feelings (Crocker & Graham, 1995). Ntoumanis et al. (1999) also sustain that direct attempts to deal with the source of threat or challenge, and the feeling that one is actively dealing with the situation, may produce positive emotional outcomes. Problem-centered strategies are, therefore, usually related to more positive emotional experiences, better performances, and higher levels of self-effectiveness.

CONCLUSIONS

The present study has an important role in the development of the theme, since we could not find any other study with judo athletes that relates the three components of the Transactional Relational theory of Lazarus and Folkman (1984).

Our results showed theoretical consistency, once we were able to find relationships between the components of the Transactional Relational theory of Lazarus and Folkman (1984). We revealed that affection was associated with the way that athletes evaluate stressful situations and with their coping expectations. This reinforces the idea that the evaluation that athletes make in specific situations can influence the emotional experiences resulted from this process. We also verified associations between cognitive evaluation and affection, and between cognitive evaluation and coping strategies.

We could notice that the problem-centered strategies and emotion-centered strategies are correlated. However, our results do not allow us to determine under which coping strategies the intervention is more efficient.

A limitation from our study is that it does not investigate the relationship between athlete age, gender and length of time in which athletes have been practicing strategies to cope with stress, as reported by Miranda et al (2015), Moreno et al. (2017) and Rogoleva (2019).

Even though we have included the three components of the Lazarus and Folkman's theory (1984), our research could only evaluate part of this process, because self-report, in part, limits the information obtained. Therefore, we suggest that new investigations on the relationship between these components use different qualitative and quantitative methodologies.

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