

Associations of motivation, self-concept and resilience with the competitive level of Chilean judokas

Authors' Contribution:

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Manuscript Preparation
- E Funds Collection

**Félix Zurita-Ortega^{1ABCDE}, José-Joaquín Muros-Molina^{2ABDE},
Sonia Rodríguez-Fernández^{3C}, Edson-Orlando Zafra-Santos^{4AB}, Emily Knox^{5D},
Manuel Castro-Sánchez^{1ABE}**

¹ Área de Corporal de la Universidad de Granada, University of Granada, Granada, Spain

² School of Medicine, University of Nottingham, Nottingham, United Kingdom

³ Departamento de Métodos de Investigación de la Universidad de Granada, University of Granada, Granada, Spain

⁴ Departamento de Fisiología, University of Santo Tomás, Santiago de Chile, Chile

⁵ School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, United Kingdom

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Abstract

Background & Study Aim:

At achievement goal theory states that the way in which individuals demonstrates competence can influence their motivation to enact behaviour in training, or in performance. The general aim of this study is the relationship between motivational climate, physical self-concept and resilience based on the competitive level of judo athletes.

Material & Methods:

Research was conducted with a representative sample of 148 judokas (86 males and 62 females) from Santiago de Chile. We used the 33-item PMCSQ-2 alongside the Spanish validation form to assess the motivational climate, the CD-RISC to assess resilience and one of the five dimensions of self-concept from the AF-5 to measure self-concept of the judokas.

Results:

There was negative correlation between task-involved climate and ego-involved climate at semi-professional and amateur performance levels. The task involved climate perceived by individuals performing at different levels how a stronger correlation at semi-professional level (−0.63) followed by amateur level (−0.42). The relationship between ego-involved climate and physical self-concept was particularly prominent at the professional performance level in relation to the other levels. The positive relationship between task-involved climate and physical self-concept is only significant at the amateur performance level. We found a positive relationship between physical self-concept and resilience at the professional, semi-professional and amateur performance levels (0.52, 0.50 and 0.52, respectively).

Conclusions:

The findings of this study have practical implications especially for the role of the psychologist in sport that may benefit the athletes they work with by targeting approaches to the physical self-concept of the judo athletes.

Key words:

ego-involved climate • judo • martial arts • motivational climate • physical self-concept • task-involved climate

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The study was approved by the Human Research Ethics Committee of the University of Santo Tomás, Chile (CE UST N°80/2014).

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Author's address:

Manuel Castro-Sanchez, Universidad de Granada, Facultad de Ciencias de la Educación, Campus Universitario de Cartuja C.P. 18071 Granada, Spain; e-mail: manue87@correo.ugr.es

Competitive level – level which competing athletes, classified in amateur, semi-professional and professional [65].

Self-concept – the tags that a person is attributed related to physical, behavioural and emotional parameters [66].

Resilience – the ability to overcome adverse situations [67, 68].

Motivational climate – the environment made by explicit and implicit signals in an environment, which allow constitute patterns of success [69].

Climate-ego – climate promoted by the coach in which predominates the demonstration of skills and overcoming the adversary, no matter the effort [69].

Climate-task – climate that promotes the coach, which predominates the effort and cooperation [70].

Combat sport – *noun* a sport in which one person fights another, e.g. wrestling, boxing and the martial arts [71].

Martial arts – *plural noun* any of various systems of combat and self-defence, e.g. judo or karate, developed especially in Japan and Korea and now usually practised as a sport [71].

INTRODUCTION

Global rates of participation in martial arts are rising, specifically for the practice of judo. The creation of spaces and new infrastructure are promoting the realization of this sport in Chile. Further, growing interest in aspects such as physical, technical and tactical competence, discipline and social interaction which characterise martial arts may attract more people to the sport.

In the past 15 years, more and more martial arts specific studies have been and conducted, especially concerning judo [1]. Dominating with judo issues of published papers published in the *Archives of Budo* was the main reason for splitting up in 2013 the new branch journal *Archives of Budo Science of Martial Arts and Extreme Sports* [2]. A number of studies have recently investigated outcomes relating to combat sports such as technical and tactical [3-7], anthropological and motoric (physical fitness) aspects [8-13], biomechanical [14-15] or physiological variables [16-21], psychological [22-25] or sports injuries [26-28].

To the most interesting and important issues belong various aspects of motivation the persons training martial arts [29-33] and relations between athletes and coach [34]. Motivation of the athlete is a key factor relating to athletic performance. At achievement goal theory states that the way in which individuals demonstrate competence can influence their motivation to enact behaviour [35] in training [36], or in performance [37].

Individuals with a task orientation are more likely to have high intrinsic motivation to engage in physical activity for instance for the cooperation, fun, satisfaction, interest or personal improvement [38] that it may bring. This is likely to increase engagement with physical activity [39, 40]. On the other hand, individuals with an ego orientation are more likely to set goals which relate to attaining social status, recognition, or increasing economic wealth etc., all of which are related high risk of perceiving failure and leading to dropout from the sport [41, 42]. achievement goal theory has been studied widely in the context of sport [43-45] and physical education [46].

Few studies have explored other derivatives of martial arts. Consequently this area is a fertile field for research. We are aware of research into

judo conducted in Spain [47], Poland [48], Czech Republic [20] and South Korea [27], but this is mostly focused on high performance sport.

The present study focuses instead on the relationship between competitive level and resilience, self-concept and motivation. Very few studies have previously integrated these three psychological factors and even fewer have compared across different levels of competition. One of the recent studies defined the psychosocial characteristics of martial arts athletes [23].

The general aim of this study is the relationship between motivational climate, physical self-concept and resilience based on the competitive level of judo athletes.

The specific aims is 1) model of motivational climate in judo; 2) prevailing motivational climate, physical self-concept and resilience at professional, semi-professional and amateur levels of judo.

MATERIAL AND METHODS

Subjects

The present research reports a cross-sectional study on a representative sample (95% confidence interval) of 176 Chilean judokas from Santiago (Chile) with different competitive levels (23.09 ± 6.73 years) from seven random clubs. The subjects participated voluntarily after receiving a detailed explanation of the aims and implications of the research. Written informed consent was provided. We excluded from the analysis 28 participants that did not complete the inclusion criteria correctly (i.e., incomplete questionnaires, did not hand informed consent forms), thus the final sample comprised of 148 subjects (86 males and 62 females): professional ($n = 58$); semi-professional ($n = 47$); amateur ($n = 43$).

Instruments

We used the 33-item Revised Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2) [49] alongside the Spanish validation form [50] to assess the motivational climate of the athletes. For each item participants responded using a five-point scale ranging from 1, strongly disagree to 5 strongly agree. The questionnaire comprised of two higher-order scales, each containing three subscales (task: cooperative learning, effort/improvement, important role; ego: intra-team member rivalry, unequal recognition,

punishment for mistakes). Internal consistency of the data was assessed using Cronbach's alpha and was acceptable for both perceived task and perceived ego climate subscales ($\alpha = 0.86$ and 0.89 , respectively).

We used the Connor-Davidson Resilience Scale (CD-RISC) [51] to assess resilience for athletes. These questionnaire contains 25 items, and participants record on a 5-point scale as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). Participants respond based on how they have felt over the past month. The total score ranges from 0-100, with higher scores reflecting greater resilience. This questionnaire has been used in a sport context in previous studies [52-53]. Internal consistency measured using Cronbach alpha was $\alpha = 0.84$.

We used one of the five dimensions of self-concept from the Five-Factor Self-Concept Questionnaire (AF-5) [54] to measure self-concept. This questionnaire was designed to measure five dimensions of self-concept: academic, social, emotional, family and physical. It consists of 30 items which are answered on a 99-point scale, ranging from 1:

complete disagreement to 99: complete agreement. As we used on the physical dimension of self-concept we summed items 5, 10, 15, 20, 25 and 30. Internal consistency for this dimension was $\alpha = 0.80$.

Data analysis

Descriptive statistics (mean and standard deviation) were analysed using the statistical software IBM-SPSS® version 22.0 for Windows. The association between variables is determined by Chi-square test of Pearson, establishing the significance level of 0.05. In order to analyse the research model, a modelling approach with instructive equations at the latent variable level was applied and the AMOS version 22.0 software was used. GFI index was used to calculate the goodness of fit of the model, which indicates whether the model is acceptable. To develop the statistical model confirmatory factor analysis was first used to check the reliability and validity of the research tool. Next relationships between all the latent variables and the categories of the model were identified.

Structural Equation Modelling (SEM) was used to analyse the relationships between

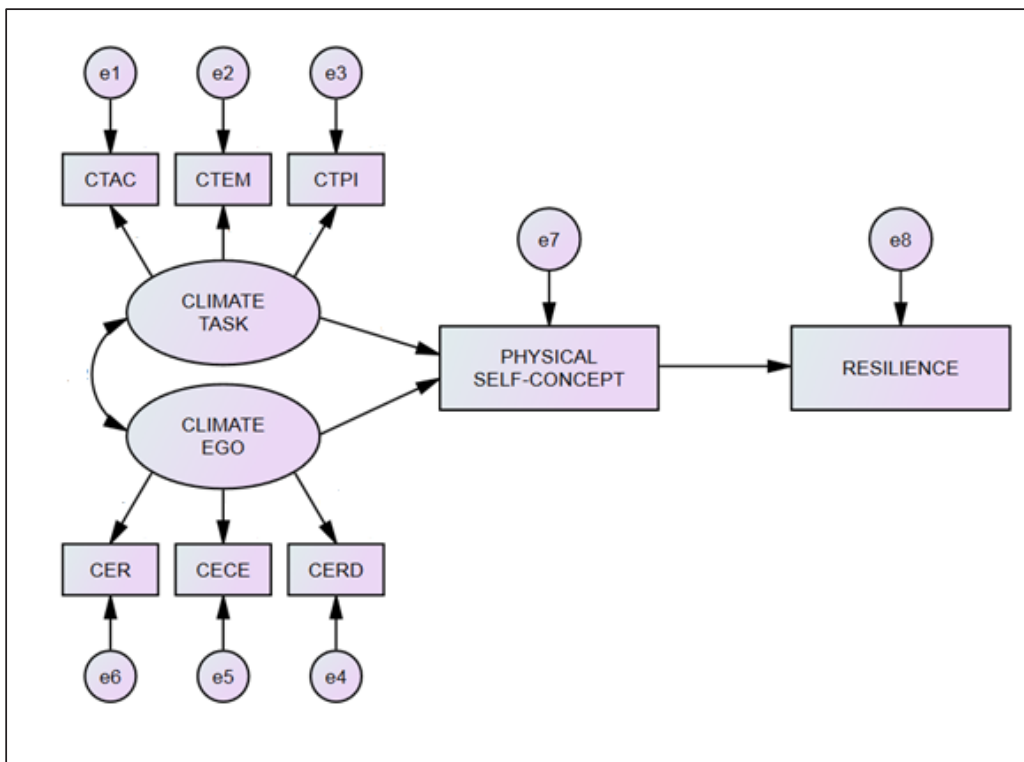


Figure 1. Model theories: climate-task, climate-ego, self-concept and resilience.

task-ego-involved climates, physical self-concept and resilience at professional, semi-professional and amateur levels of judo (Figure 2).

The SEM for this data is characterised by eight observed variables and two latent variables. This model makes causal explanations of the latent variables from the observed relationships between indicators. The squares represent the observed variables and the circles represent the error terms. Ovals are used to indicate the latent variables.

Note: CTAC: climate-task cooperative learning; CTEM: climate-task effort/improvement; CTP: climate-task important role; CER: climate-ego intra-team member rivalry; CECE: climate-ego unequal recognition; CERD: climate-ego punishment for mistakes; e: observed variables (from 1 to 8).

The variables task-involved climate and ego-involved climate are exogenous latent variables and they are each inferred using three indicators (task: cooperative learning, effort/improvement, important role; ego: intra-team member rivalry, unequal recognition, punishment for mistakes). Physical self-concept and resilience are observed endogenous variables. The method of maximum likelihood (ML) was used to estimate the variables.

We chose this method because it is consistent, unbiased and invariant to types of scale considering that all variables have a normal distribution.

RESULTS

Figure 2 shows the direct effects between variables as well as the bi-directional effect between climate task and climate ego on the independent variable at the professional level. Table 1 shows the standardised weights of saturation between the latent variables and their indicators as well as with the variables for physical self-concept and resilience at the professional performance level of judo.

Note: CTAC: climate-task cooperative learning; CTEM: climate-task effort/improvement; CTP: climate-task important role; CER: climate-ego intra-team member rivalry; CECE: climate-ego unequal recognition; CERD: climate-ego punishment for mistakes; e: observed variables (from 1 to 8).

There is negative correlation between task-involved climate and ego-involved climate at semi-professional (Figure 3, Table 2) and amateur (Figure 4, Table 3) performance levels; however we did not find this correlation at the professional

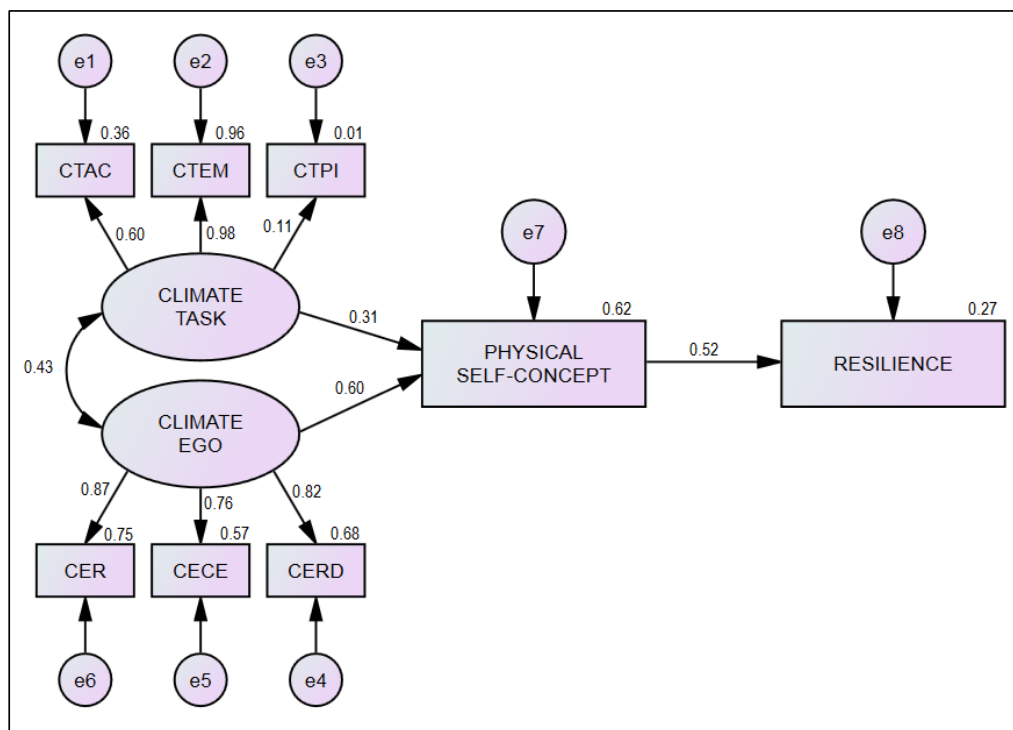


Figure 2. Multigroup structural equation model: professional (n = 58).

Table 1. Weights and standardized regression weights regression of level: professional (n = 58).

Relationship between variables	Estimations	S.E.	P.R.				P.E.R.
			C.R.	p	Estimations		
PSF	<--	CLIMATE –TASK	0.651	0.268	2.433	0.015	0.308
PSF	<--	CLIMATE-EGO	0.398	0.091	4.390	***	0.605
CTAC	<--	CLIMATE –TASK	1.000				0.603
CTEM	<--	CLIMATE –TASK	1.514	0.508	2.982	0.003	0.982
CTPI	<--	CLIMATE –TASK	0.236	0.316	0.748	0.455	0.110
CERD	<--	CLIMATE- EGO	1.000				0.824
CECE	<--	CLIMATE-EGO	0.604	0.107	5.630	***	0.756
CER	<--	CLIMATE-EGO	0.886	0.136	6.517	***	0.865
RESILIENCE	<--	PSF	5.717	1.353	4.226	***	0.521
CLIMATE -TASK	<-->	CLIMATE-EGO	0.148	0.077	1.910	0.056	0.428

Note: P.R.: regression weights; P.E.R.: standardized regression weights; S.E.: estimation of error; C.R.: critical ratio; PSF: physical self-concept; *** is p <0.001; <-- unidirectional; <--> bidirectional.

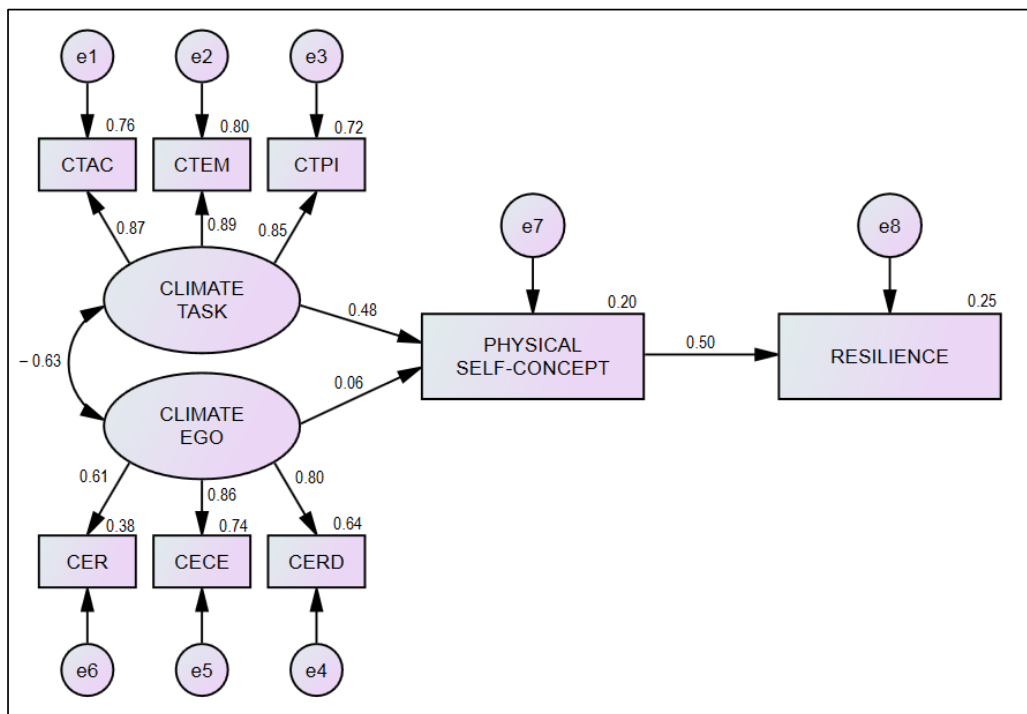


Figure 3. Multigroup structural equation model: semi-professional (n = 47).

performance level (Figure 2, Table 1). The task involved climate perceived by individuals performing at different levels shows a stronger correlation at semi-professional level –0.63 (Table 2) followed by amateur level –0.42 (Table 3). Both levels establish a clear distinction between those who value and/or reward efforts at cooperation

(climate-task) and those who value only the recognition of a positive result (task-ego).

The relationship between ego-involved climate and physical self-concept particularly prominent at the professional performance level in relation to the other levels (with a critical ratio of less

Table 2. Weights and standardized regression weights regression of level: semi-professional (n = 47).

Relationship between variables	Estimations	S.E.	P.R.			P.E.R.	
			C.R.	p	Estimations		
PSF	<--	CLIMATE -TASK	0.385	0.245	2.886	***	0.477
PSF	<--	CLIMATE-EGO	0.060	0.209	0.287	0.774	0.058
CTAC	<--	CLIMATE -TASK	1.000				0.874
CTEM	<--	CLIMATE -TASK	0.749	0.094	7.970	***	0.894
CTPI	<--	CLIMA_TAREA	0.936	0.126	7.402	***	0.849
CERD	<--	CLIMATE-EGO	1.000				0.800
CECE	<--	CLIMATE-EGO	0.814	0.156	5.233	***	0.862
CER	<--	CLIMATE-EGO	0.635	0.157	4.042	***	0.614
RESILIENCE	<--	PSF	5.504	1.405	3.917	***	0.500
CLIMATE -TASK	<-->	CLIMATE-EGO	-0.285	0.096	-2.965	***	-0.629

Note: P.R.: regression weights; P.E.R.: standardized regression weights; S.E.: estimation of error; C.R.: critical ratio; PSF: physical self-concept; *** is $p < 0.001$; <-- unidirectional; <--> bidirectional.

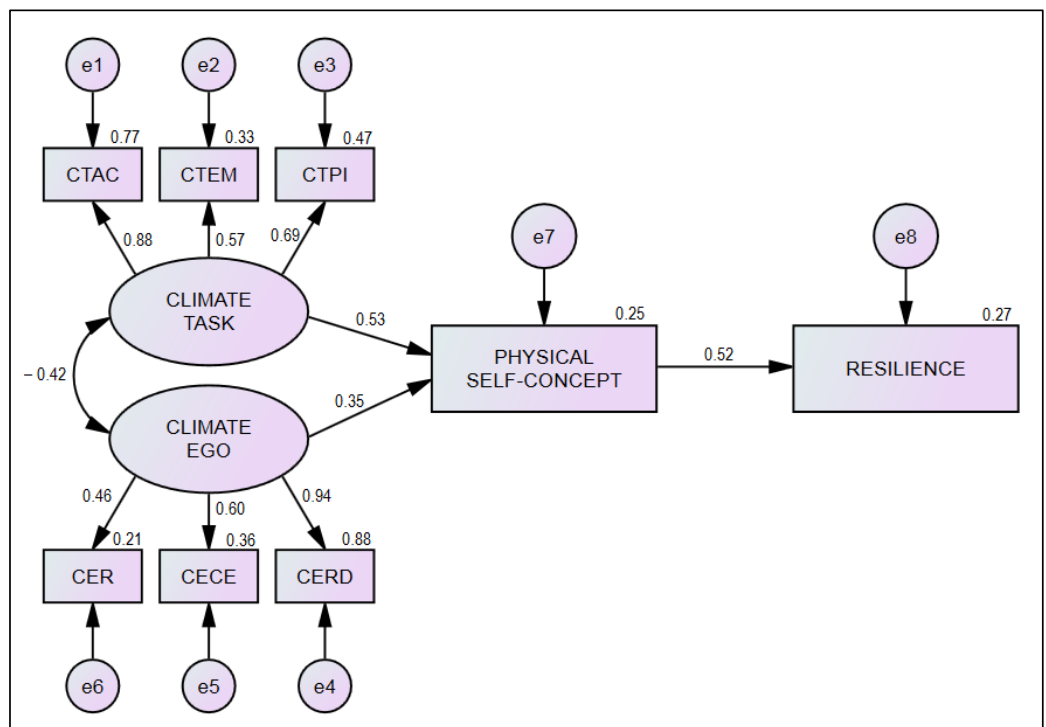


Figure 4. Multigroup structural equation model: amateur (n = 43).

than 2). Thus, increasing public recognition based on positive social comparisons will raise physical self-concept and increase the sense of satisfaction felt by professional athletes.

However, this relationship between task-involved climate and physical self-concept is only significant at the amateur performance level (Figure 4,

Table 3). Amateur tend to value effort and cooperation, and consider mistakes to be part of learning. This has positive direct effects on their perceptions of performance.

We found a positive relationship between physical self-concept and resilience at the professional, semi-professional and amateur performance levels

Table 3. Weights and standardized regression weights regression of level: amateur (n = 43).

	Relationship between variables		P.R.				P.E.R.
	Estimations	S.E.	C.R.	p	Estimations		
PSF	<--	CLIMATE-TASK	0.889	0.337	2.642	***	0.532
PSF	<--	CLIMATE-EGO	0.320	0.182	1.756	0.079	0.351
CTAC	<--	CLIMATE-TASK	1.000				0.876
CTEM	<--	CLIMATE-TASK	0.576	0.170	3.376	***	0.571
CTPI	<--	CLIMATE-TASK	0.784	0.199	3.937	***	0.687
CERD	<--	CLIMATE-EGO	1.000				0.936
CECE	<--	CLIMATE-EGO	0.622	0.211	2.943	***	0.599
CER	<--	CLIMATE-EGO	0.552	0.222	2.487	0.013	0.532
RESILIENCE	<--	PSF	6.347	1.624	3.908	***	0.351
CLIMATE-TASK	<-->	CLIMATE-EGO	-0.226	0.058	-2.163	***	-0.420

Note: P.R.: regression weights; P.E.R.: standardized regression weights; S.E.: estimation of error; C.R.: critical ratio; PSF: physical self-concept; *** is $p < 0.001$; <-- unidirectional; <--> bidirectional.

(0.52, 0.50 and 0.52, respectively) (Figures 2, 3, 4 and Tables 1, 2, 3). Improving individuals perceptions of personal competence at all levels of competition, significantly increase their ability to cope with risks and adversity, and to recover in a positive way.

The chi-square test statistic is not significant at 0.05 ($\chi^2 = 124.759$; gl. = 54; $p = 0.001$), which suggests that the model fit is acceptable. This statistic, as an index, has no upper limit, which cannot be interpreted in a standardised way, and may also be sensitive to sample size. Other standardised rates are less sensitive to sample size, for instance Jöreskog [55].

The goodness of fit index (GFI) is 0.944 and the comparative fit index is 0.943, which indicates a good fit [56]. The Incremental Fit Index is also acceptable (0.853) [57]. The adjusted goodness of fit index (AGFI) has higher values than 0.888 and the root mean square error of approximation (RMSEA) is less than 0.1 which indicates an acceptable fit. In general, a good fit of the model to empirical data is observed.

DISCUSSION

The main finding of the present study is that perceiving oneself to highly content enables judo athletes at all levels of competition to cope better with risks and to recover from adversity in a more positive way.

The present study replicates findings found in other contexts [58, 59]. Our results show that amateur and semi-professional athletes generally value cooperation and rewarding effort more highly (i.e. they are task-involved), whereas professional athletes tend to value the outcome and reward only those who excel in their physical performance (i.e. they are ego-involved). How athletes respond in a given motivational climate therefore seems to be related with their performance level. This has also been found in the results of other studies [60, 61]. The task-involved climate plays a major motivating role when the practice of sport is focused on promoting physical activity and positive values. However, the task-involved climate becomes even more important when the athlete's own sense of identity is more pronounced and when they possess the technical and tactical abilities capable of achieving success [62].

Our results show a positive relationship between the ego-involved climate and physical self-concept at professional and semi-professional levels of performance. At a professional level the more an athlete receives public recognition based on social comparisons with others the more their physical self is likely to increase alongside the feeling of satisfaction [23]. The present research also found a positive relationship between a task-involved climate and physical self-concept at amateur level. Amateur tend to rewarding effort over outcome, value cooperation and consider making mistakes as

a part of learning. This has a positive direct influence on their personal perception.

These data shows that judoka's with a strong interest in practicing judo and who experience pleasure in the practice of the sport and developing both the technical and tactical aspects will develop a stronger competitive edge than those who do not. This allows the proper development of individual skills and specialisation of sports [63].

Our study has a number of limitations. While we recruited a representative sample from Santiago (Chile) it would be interesting to increase the sample and include other cities across Chile, where judo is also popular. In subsequent studies it will be interesting to examine disciplines of martial arts and to compare them with these findings for judo. Finally, it would be useful to deliver

an intervention to examine strategies to prevent adverse physical, technical, tactical and psychological outcomes [64].

CONCLUSIONS

The study demonstrates a positive correlation between task-involved climate and physical self-concept at amateur and semi-professional levels of judo performance, athletes and between ego-involved climate and physical self-concept at the professional level. Levels of resilience also increase across the three levels of competition.

The findings of this study have practical implications especially for the role of the psychologist in sport that may benefit the athletes they work with by targeting approaches to the physical self-concept of the judo athletes.

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