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The achievement goal and self-determination theories as predictors of dispositional flow in young athletes

Juan Antonio Moreno[1*], Eduardo Cervelló[1] y David González-Cutre[2]

[1] *Miguel Hernández University of Elche (Spain)*
[2] *University of Almería (Spain)*

Abstract: The purpose of this study was to analyse from the perspective of the achievement goal theory and the self-determination theory some variables which could help to promote positive motivation and to improve dispositional flow in adolescent athletes. A sample of 413 young athletes (from 12 to 16 years of age) completed the Perceived Motivational Climate in Sport Questionnaire-2, Perception of Success Questionnaire, Sport Motivation Scale and Dispositional Flow Scale. The results of the structural equation modeling indicated that the perceived motivational climates positively predicted corresponding dispositional goal orientations. Task-involving climate and task orientation positively predicted self-determined motivation, while ego-involving climate negatively predicted it. Task and ego-involving climates, task and ego orientations and self-determined motivation positively predicted dispositional flow. Task dimensions showed more prediction power over the dispositional flow than the ego dimensions. The findings are discussed with regard to enhancing athletes' motivation and dispositional flow.
Key words: Motivational climate; self-determined motivation; flow; sport; goal orientation.

Título: La teoría de las metas de logro y la teoría de la autodeterminación como predictoras del *flow* disposicional en jóvenes deportistas.
Resumen: El objetivo de este estudio fue analizar desde la perspectiva de la teoría de las metas de logro y la teoría de la autodeterminación algunas variables que podrían ayudar a promover la motivación positiva y a mejorar el *flow* disposicional en deportistas adolescentes. Se utilizó una muestra de 413 deportistas (con edades entre los 12 y 16 años) que completaron el Cuestionario del Clima Motivacional Percibido en el Deporte-2, el Cuestionario de Percepción de Éxito, la Escala de Motivación Deportiva y la Escala de *Flow* Disposicional. Los resultados del modelo de ecuaciones estructurales indicaron que los climas motivacionales percibidos predecían positivamente sus correspondientes orientaciones de meta disposicionales. El clima tarea y la orientación a la tarea predecían positivamente la motivación autodeterminada, mientras que el clima ego lo hacía de forma negativa. El clima tarea y el clima ego, la orientación a la tarea y al ego, y la motivación autodeterminada predecían positivamente el *flow* disposicional. Las dimensiones tarea mostraron mayor poder de predicción sobre el *flow* disposicional que las dimensiones ego. Los resultados se discuten en relación a la mejora de la motivación y el *flow* disposicional de los deportistas.
Palabras clave: Clima motivacional; motivación autodeterminada; flow; deporte; orientación de metas.

Introduction

The study of motivation in physical activity and sport has played an important role among researchers in the field of sport psychology, since it represents the force that determines whether a person starts and commits themselves to a specific activity, as well as the effort invested in it. During the last decades, a large number of investigations have supported two important motivation theories: the achievement goal theory (Nicholls, 1989) and the self-determination theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2007), with the aim of finding motivational strategies focused on the achievement of more positive consequences in the sport environment (e.g. the practice bond).

The achievement goal theory postulates that people can have two predominant dispositional goal orientations in achievement contexts, such as the sport context, which are created by a social influence. Task orientation is focused on personal success and improvement through effort, while ego orientation is focused on outperforming others and on reaching better results than the rest. As has been shown by different studies (e.g. Hodge & Petlichkoff, 2000), people can have the two goal orientations simultaneously. Athletes who simultaneously have a high task and ego orientation, or athletes who simultaneously have a high task orientation but low ego orientation, show the highest levels of adaptive motivational patterns than those with a low task orientation (Roberts, Treasure, & Kavussanu, 1996; Standage & Treasure, 2002).

The motivational climate is another interesting concept that the above mentioned theory establishes. Motivational climate was defined by Ames (1992) as a set of implicit and/or explicit signals, perceived in the environment, by which the keys to success and failure are defined. The motivational climate transmitted by the coach can be of two types: a task-involving motivational climate, in which effort, self-referenced personal improvement and the development of self-comparative skills are fundamental, or an ego-involving motivational climate, in which the most important aspects are victory and the demonstration of having a higher ability and performance than others. The results of the studies show a positive relation between task-involving motivational climate and task orientation and between ego-involving motivational climate and ego orientation (e.g. Flores, Salguero, & Márquez, 2008; Gano-Overway, Guivernau, Magyar, Waldron, & Ewing, 2005; Magyar & Feltz, 2003; Pensgard & Roberts, 2002).

Self-determination theory establishes the existence of different types of motivation, depending on the level of self-determination (i.e. if the origin of the motivation is more or less from within the person), which form a continuum ranging from intrinsic motivation (the most self-determined type of motivation) to amotivation (the less self-determined

* **Dirección para correspondencia [Correspondence address]:** Juan Antonio Moreno Murcia. Universidad Miguel Hernández de Elche. Centro de Investigación del Deporte. Avda. de la Universidad s/n. 03202 Elche (Alicante, Spain). E-mail: j.moreno@umh.es

type). The hierarchical model of intrinsic and extrinsic motivation (HMIEM; Vallerand, 2001, 2007) indicates that positive consequences decrease from intrinsic motivation to amotivation, at an affective, cognitive and behavioural level. This corollary has been demonstrated by several studies, which have found a positive relation between self-determined motivation and pleasure (Goudas, Biddle, & Underwood, 1995), interest (Li, 1999), effort (Chian & Wang, 2008; Ferrer-Caja & Weiss, 2000), positive emotions (Brière, Vallerand, Blais, & Pelletier, 1995), performance (Gillet, Vallerand, & Rosnet, 2009), exercise adherence (Oman & McAuley, 1993; Ryan, Frederick, Lepes, Rubio, & Sheldom, 1997) and flow (Jackson, Kimiecik, Ford, & Marsh, 1998; Kowal & Fortier, 1999, 2000), and between non self-determined motivation and anxiety (Brière *et al*., 1995) and sport dropout (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002).

Intrinsic motivation is characterised by participation in search of pleasure and enjoyment (Deci & Ryan, 1985), where the activity is an end in itself. Vallerand and his collaborators (e.g. Brière *et al*., 1995; Pelletier *et al*., 1995) proposed three types of intrinsic motivation called intrinsic motivation to know (doing the sport for the pleasure of knowing more about that sport), intrinsic motivation to accomplish (doing the sport for the pleasure of improving one's skills) and intrinsic motivation to experience stimulation (doing the sport for the pleasure of having stimulating experiences).

Extrinsic motivation refers to a commitment to activity as a way of achieving something, but not as end in itself. It has different forms depending on the type of regulation, which are, from less to more self-determined: external regulation, introjected regulation, identified regulation and integrated regulation. External regulation means doing a not very interesting activity for the simple fact of obtaining a reward or avoiding punishment and, therefore, is due to an external incentive (Deci & Ryan, 2000) (e.g. "I do sports because it allows me to be well regarded by the people I know"). Introjected regulation is characterised by an action searching for self-approval, initiated by feelings of guilt and anxiety and, therefore, it would reflect the fact that something "should" or "has to" be done (Ryan & Deci, 2000; Sarrazin *et al*., 2002) (e.g. "I must do sports to feel good about myself"). In the case when the subject identifies with the importance that the activity has for him/her, this would be identified regulation, representing more self-determination. For example, when a person identifies with the importance physical activity may have for health, s/he will be more willing to go to a sports centre regularly, but doing this will continue to be instrumental (to improve his/her health) and not for pleasure and inherent satisfaction (Deci & Ryan, 2000). The most self-determined form of extrinsic motivation is integrated regulation, in which several factors are assimilated and organized hierarchically. These are evaluated and brought into congruence with one's other values and needs and there is therefore an awareness and synthesis with self (Ryan & Deci, 2000). An example of this kind of regulation would be a person who practices sport because this is a part of his/her active and healthy lifestyle.

Finally, completely at the opposite of intrinsic motivation, there is amotivation, which involves lack of motivation (Vallerand & Rousseau, 2001) and is characterised by not having any intentions of doing anything and by feelings of frustration (Deci & Ryan, 1991; Ryan & Deci, 2000) (e.g. "I used to have good reasons for doing sports, but now I am asking myself if I should continue doing it").

The HMIEM also establishes that the different types of motivation are determined by social factors. Vallerand and Rousseau (2001) consider that the motivational climate is one of them, thus relating the self-determination theory with one of the constructs established by the achievement goal theory. Different studies have found a positive relation between a task-involving motivational climate and self-determined motivation (Cox & Williams, 2008; Parish & Treasure, 2003) and between an ego-involving motivational climate and non self-determined motivation (Ntoumanis & Biddle, 1999; Parish & Treasure, 2003). The results of the studies also show a positive relation between task orientation and self-determined motivation (Boyd, Weinmann, & Yin, 2002; Georgiadis, Biddle, & Chatzisarantis, 2001; Standage & Treasure, 2002), while ego orientation is negatively related with it (Duda, Chi, Newton, Walling, & Catley, 1995; Ferrer-Caja & Weiss, 2000; Li *et al*., 1998).

Flow is another positive consequence of good motivation that has been analysed by different researchers (e.g. Kowal & Fortier, 1999, 2000; Moreno, Cano, González-Cutre, Cervelló, & Ruiz, 2009). Flow is a term that appeared in 1975 in Csikszentmihalyi's book *"Beyond Boredom and Anxiety"*. It is a brief way of expressing the sensation of a movement apparently without any effort, which is typical of this experience (Jackson, 1996). Jackson and Marsh (1996) define flow as the optimal psychological state that occurs when the athlete is totally connected with what s/he is doing. These authors also mention that this is the psychological process behind maximum performance. The individual that attains it will want to exercise again and again to obtain this positive state of mind (Kimiecik, 2000). According to Csikszentmihalyi (1990, 1993) the flow state consists of nine elements: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on task at hand, sense of control, loss of self-consciousness, transformation of time and autotelic experience. But it seems that there are elements that are more important than others in flow experience in sport (Jackson, 1996; Jackson *et al*., 1998). Csikszentmihalyi (e.g. Csikszentmihalyi & LeFevre, 1989) has mainly relied on the challenge-skill balance to measure the flow state, while Jackson (1996) and Jackson and Marsh (1996) consider that the autotelic experience is fundamental for flow. Moreover, not all athletes experience the time perception transformation because all this depends on whether we consider that paying attention to time is part of the sport task (e.g. in a swimming race where the athlete monitors the

time to be able to keep energy for the appropriate moment) (Jackson & Csikszentmihalyi, 1999). In relation with the characteristics which define flow, Csikszentmihalyi, Abuhamdeh, and Nakamura (2005), in a recent study, establish challenge-skill balance, clear goals and unambiguous feedback as preconditions for flow and not as characteristics themselves.

Csikszentmihalyi (1988) considers that there are individual differences with regard to the ability to experience the flow state, so there are people more prone to it, who have an "autotelic personality", thus introducing the concept of dispositional flow. According to this author the disposition to experience a flow depends not only on the innate conditions but on the learning process, as a consequence it is very interesting to analyse the related factors with the dispositional flow in sport.

The present study tried to analyse certain factors which could help to promote positive motivation and to increase dispositional flow in adolescent athletes. To this end connections were established between perceived motivational climates, dispositional goal orientations, self-determined motivation and dispositional flow. We decided to analyse a sample of adolescent athletes because many studies point out that the highest a drop-out rate occurs at this age (Caspersen, Pereira, & Curran, 2000; Telama & Yang, 2000). Moreover, the attitudes developed towards physical and sport practice will have a strong influence on adolescents' commitment and adherence to practice at the adult stage (Malina, 2001). As a result, it will be interesting to find strategies to increase motivation in adolescent athletes.

Our hypothesis was that the task-involving motivational climate would positively predict the task orientation, while the ego involving-motivational climate would positively predict the ego orientation (H_1). Moreover, the task-involving climate and task orientation would have a positive prediction on self-determined motivation, whilst the ego-involving climate and ego orientation would do so negatively (H_2). Self-determined motivation, in turn, would positively predict dispositional flow (H_3). Similarly, previous research in the Spanish context (Cervelló, Santos-Rosa, García Calvo, Jiménez, & Iglesias, 2007; García Calvo, 2004; García Calvo, Cervelló, Jiménez, Iglesias, & Santos-Rosa, 2005; Moreno *et al.*, 2009) has hypothesized that task-involving and ego-involving climates and task and ego orientations would positively predict dispositional flow, with task dimensions showing more prediction power than ego dimensions (Kimiecik & Jackson, 2002; Kowal & Fortier, 2000; Moreno *et al.*, 2009) (H_4).

Method

Participants

The sample consisted of 413 athletes (322 boys and 91 girls), aged between 12 and 16 (M = 13.74, SD = 1.34), covering both individual (Athletics, Gymnastics, Wrestling, Taekwondo, Swimming, Canoeing, Tennis) and group sports (Basketball, Handball, Soccer, Volleyball). They belonged to 28 sports schools which took part in competitions in the Region of Murcia (Spain) and 72.2% practised sport between 2 and 3 days a week whereas 27.8% practised more than 3 days a week. The sports schools visited and the coaches and athletes took part voluntarily in the research.

Measures

Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2). The Spanish version (Balaguer, Mayo, Atienza, & Duda, 1997) of the Perceived Motivational Climate in Sport Questionnaire-2 (Newton & Duda, 1993; Newton, Duda, & Yin, 2000) was used, which had two dimensions, perception of an ego-involving motivational climate and perception of a task-involving motivational climate. This questionnaire was formed by 29 items, 14 of them for the perception of an ego-involving motivational climate (e.g. "the coach gets mad when a team-mate makes a mistake", "the coach praises athletes only when they are better than team-mates") and the other 15 for the perception of a task-involving motivational climate (e.g. "athletes are encouraged to work in their weaknesses", "the coach encourages us to help each other"). It was headed by the phrase "During training sessions in my team or training group…" and a Likert-type scale ranging from 0 (*totally disagree*) to 10 (*totally agree*) was used. This questionnaire had alpha values of .85 for task-involving climate and .91 for ego-involving climate in the present study.

Perception of Success Questionnaire (POSQ). We used the Spanish version (Cervelló, Escartí, & Balagué, 1999) of the Perception of Success Questionnaire (Roberts, Treasure, & Balagué, 1998) to measure goal orientations in young athletes. This inventory had 12 items, six of them for the dispositional task orientation (e.g. "I feel I am successful when I demonstrate a clear personal improvement", "I feel I am successful when I overcome difficulties") and the other six for the dispositional ego orientation (e.g. "I feel I am successful when my performance is better than others", "I feel I am successful when I am the best"). This questionnaire used Likert-type answer scale ranging from 0 (*totally disagree*) to 10 (*totally agree*). This questionnaire showed alpha values of .84 for the task subscale and .91 for the ego subscale in this study.

Sport Motivation Scale (SMS). The Spanish translation (Núñez, Martín-Albo, Navarro, & González, 2006) of the Sport Motivation Scale by Brière *et al.* (1995) and Pelletier *et al.* (1995) was used. This scale was headed by the phrase "I participate and I make an effort in doing my sport…" and measured amotivation (e.g. "I don't know anymore; I have the impression that I am incapable of succeeding in this sport"), external regulation (e.g. "for the prestige of being an athlete"), introjected regulation (e.g. "because I would feel bad if I was not taking time to do it"), identified regulation (e.g. "because it is one of the best ways I have chosen to

develop other aspects of myself") and intrinsic motivation to know (e.g. "for the pleasure of discovering new training techniques"), stimulation (e.g. "for the intense emotions that I feel while I am doing a sport that I like") and accomplishment (e.g. "because I feel a lot of personal satisfaction while mastering certain difficult training techniques"). There were four items for each factor, thus 28 in total. They were rated with a Likert-type scale ranging from 0 (*totally disagree*) to 10 (*totally agree*). The scale showed alpha values of .74 for intrinsic motivation to know, .75 for intrinsic motivation to experience stimulation, .74 for intrinsic motivation to accomplish, .70 for identified regulation, .64 for introjected regulation, .67 for external regulation and .74 for amotivation. Two factors showed a reliability or alpha value less than the recommended .70 (Nunnally, 1978). Given the small number of items forming the factors, the internal validity observed can be marginally accepted (Hair, Anderson, Tatham, & Black, 1998; Nunnally & Bernstein, 1994).

Dispositional Flow Scale (DFS). The Spanish version (Santos-Rosa, 2003) of the Dispositional Flow Scale (Jackson *et al*., 1998) was used to measure dispositional flow. The inventory had 36 items headed by the sentence "When practising my sport…" (e.g. "I make the correct movements without thinking about trying to do so", "My attention is focused entirely on what I am doing", "I have a feeling of total control"). Answers were closed and rated on a Likert-type scale, ranging from 0 (*never*) to 10 (*always*). This inventory showed an alpha value of .91 for the flow factor including the nine dimensions established by Csikszentmihalyi (1990, 1993).
All the instruments we have worked with use a Likert scale ranging from 0 to 10 because in Spain school marks range from 0 to 10 points and as a consequence everybody is used to this scale marks.

Procedure

We chose sports schools all over the different geographical areas of the Region of Murcia (Spain). We contacted both the head and the coaches of the chosen sports schools to inform them about our intention of carrying out a study about the athletes' motivation and to ask for their collaboration. The questionnaires were administered with the main researcher present to give a general explanation of the study, how to fill in the instruments and answer any questions that may have arisen in the process. Emphasis was placed on the anonymous nature of the answers and on answering sincerely and reading all the items. The time required to fill in the scales was approximately 25 minutes, varying slightly depending on the athlete's age.

Data analysis

The data were analysed in two parts. Firstly, we calculated the descriptives, means and standard deviations, and the bivariate correlations between the variables. Secondly, we carried out structural equation modeling in two steps to test the predictive relations between the variables.

Results

Descriptive statistics and correlation analysis

This section demonstrates the means, standard deviations and correlations between dispositional goal orientations, the perceptions of motivational climate, self-determined motivation and dispositional flow. In order to evaluate self-determined motivation we decided to use the Self-Determination Index (SDI). This index has proved to be valid in different studies (Chantal & Bernache-Assollant, 2003; Chantal, Robin, Vernat, & Bernache-Asollant, 2005; Kowal & Fortier, 2000; Losier & Vallerand, 1994) and is calculated with the following formula: (2 x (IM to know + IM to accomplish + IM to experience stimulation) / 3 + Identified Regulation) – ((Introjected Regulation + External Regulation) / 2 + 2 x Amotivation) (Vallerand & Rousseau, 2001). In this study the index fluctuated between -11.95 and +25.33.

Table 1 shows a moderately high score in the perception of a task-involving climate (M = 7.78), low in the perception of an ego-involving climate (M = 4.32), moderately high in task orientation (M = 8.67) and moderate in ego orientation (M = 6.72). In addition, the athletes showed a moderate SDI (M = 9.39) and a moderately high dispositional flow (M = 7.19).

It can be observed that the perception of an ego-involving climate was positively and significantly related to ego orientation (r = .34, p < .01) and dispositional flow (r = .15, p < .01) and negatively related to task orientation (r = -.11, p < .05) and SDI (r = -.38, p < .01). On the other hand, the perception of a task-involving climate was positively and significantly associated with task orientation (r = .35, p < .01), the SDI (r = .29, p < .01) and dispositional flow (r = .43, p < .01).

Ego orientation was positively and significantly associated with task orientation (r = .32, p < .01) and dispositional flow (r = .26, p < .01) and negatively correlated with the SDI (r = -.12, p < .05), while task orientation was positively connected with the SDI (r = .33, p < .01) and dispositional flow (r = .38, p < .01). The SDI was positively and significantly related to dispositional flow (r = .20, p < .01).

Table 1: Mean, standard deviation and correlations among variables.

	M	*SD*	1	2	3	4	5	6
1. Ego-involving climate	4.32	2.32	-	-.05	.34**	-.11*	-.38**	.15**
2. Task-involving climate	7.78	1.34	-	-	.00	.35**	.29**	.43**
3. Ego orientation	6.72	2.72	-	-	-	.32**	-.12*	.26**
4. Task orientation	8.67	1.48	-	-	-	-	.33**	.38**
5. SDI	9.39	6.86	-	-	-	-	-	.20**
6. Dispositional flow	7.19	1.28	-	-	-	-	-	-

*$p < .05$; **$p < .01$

Structural equation modeling

Structural equation modeling (SEM) was used to analyse the predictive relations between the different variables. The model was tested with a covariance matrix. Given that Mardia's coefficient was high (29.63), the maximun likelihood estimation method was used together with the bootstrapping procedure. This procedure provides an average of the estimates obtained from bootstrap samples and its standard error. In addition, the bootstrapping procedure compares estimated values without bootstrapping with averages obtained from bootstrap samples, indicating the level of bias. Confidence intervals (differences between the highest and lowest estimated values from the different bootstrap samples) of the regression weights and standardized regression weights showed that estimated values were significantly different from zero. It was therefore assumed that the estimates were robust and not affected by lack of normality (Byrne, 2001). Due to the high number of variables, the fact that the sample is not very large, and in line with studies carried out by Ntoumanis (2001) and Sarrazin *et al.* (2002), we decided to reduce the model to maintain some reasonable degrees of freedom. Therefore, the items forming each of the factors in the different scales were divided homogeneously into two parts (MacCallum & Austin, 2000), so that, for example, the factor "perception of a task-involving climate" was subdivided into two parts, one formed by eight items and another by seven, and the factor "dispositional flow" was subdivided into two groups of eighteen items each. As we divided the items forming the SMS factors into two groups, two self-determination indexes were obtained.

A two-step approach was used, as recommended by Anderson and Gerbing (1988). First, we implemented a measurement model, which allows construct validity to be given to the scales and which corresponds to a confirmatory factor analysis. Second, we used a structural model, which analyses the predictive relations between perceived motivational climates, goal orientations, the self-determination index and dispositional flow. Motivational climates were included at the first level, goal orientations at the second, SDI at the third and dispositional flow at the last level. Our hypothesis was that the task-involving motivational climate would positively predict the task orientation, while the ego involving-motivational climate would positively predict the ego orientation. Moreover, the task-involving climate and task orientation would have a positive prediction on self-determined motivation, whilst the ego-involving climate and ego orientation would do so negatively. Self-determined motivation, in turn, would positively predict dispositional flow. In this same sense, we believed that task-involving and ego-involving climates and task and ego orientations would positively predict the dispositional flow.

Step 1: Measurement model

The model was formed by six latent variables, which correlated freely, and twelve observed measurements (Figure 1). In order to test the model, the statistical programme Amos 7.0 was used and different adjustment indexes were taken into account: χ^2, $\chi^2/d.f.$, CFI (Comparative Fit Index), NFI (Normed Fit Index), TLI (Tucker Lewis Index), RMSEA (Root Mean Square Error of Approximation) and SRMR (Standardized Root Mean Square Residual). The model adjustment is suitable if $\chi^2/d.f.$ is less than 5 (Bentler, 1989), if the incremental indexes (CFI, NFI and TLI) are more than .90 (Schumacker & Lomax, 1996) and if the error indexes (RMSEA and SRMR) are less than .08 (Browne & Cuddeck, 1993; Hu & Bentler, 1999).

The indexes obtained were appropriate, χ^2 (39, N = 413) = 55.69, p = .04; $\chi^2/d.f.$ = 1.42; CFI = .99; NFI = .97; TLI = .98; RMSEA = .03; SRMR = .02. Furthermore, the discriminant validity of the model was examined, taking into account that the correlation between the latent variables, lessened by the measurement error (+/- 2 times the measurement error), was less than 1.0. The different results indicated that the measurement model was suitable.

Step 2: Structural model

Three models were tested with the objective of determining which of them better explained the relationships between the variables of the study. First a model non-mediated by goal orientations was evaluated (Motivational climates → SDI → Dispositional flow). The results revealed that the data did not adequately fit the model: χ^2 (16, N = 413) = 122.62, p = .00; $\chi^2/d.f.$ = 7.66; CFI = .92; NFI = .92; TLI = .87; RMSEA= .12; SRMR = .12. Secondly a full mediated model was evaluated (Motivational climates → Goal orientations → SDI → Dispositional flow), obtaining indices of poor fit: χ^2 (48, N = 413) = 314.96, p = .00; $\chi^2/d.f.$ = 6.56; CFI = .89; NFI = .87; TLI = .85; RMSEA= .11; SRMR = .15.

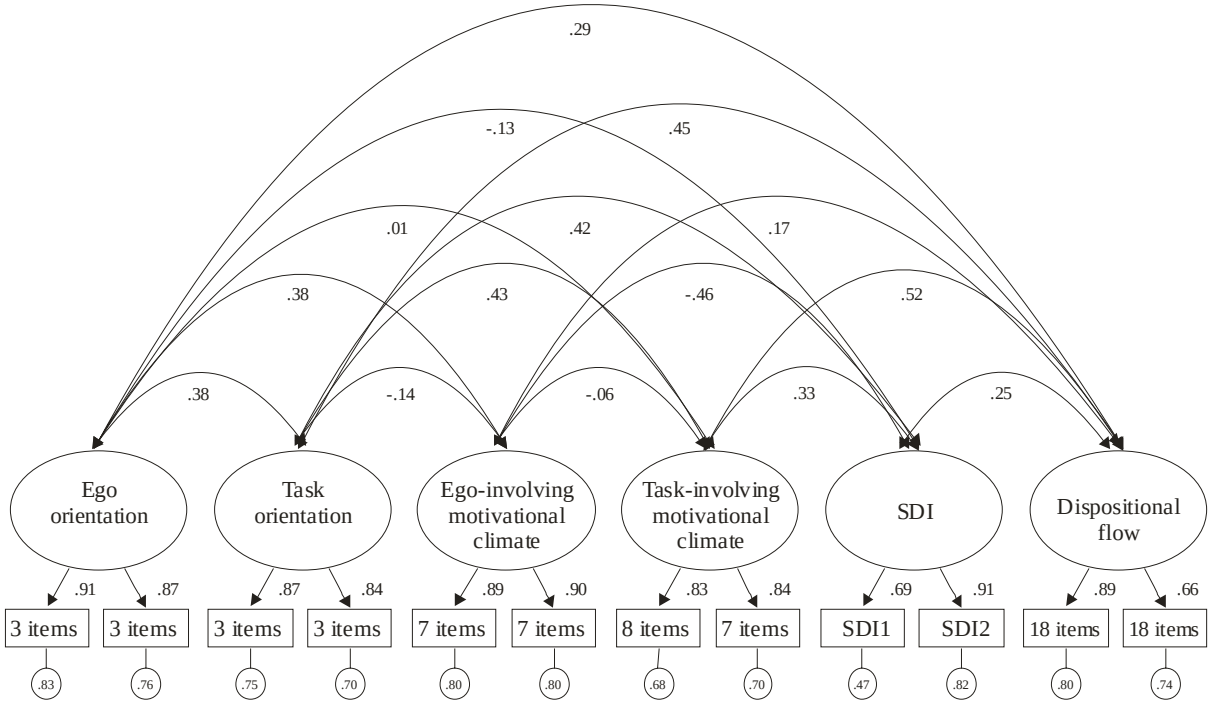

Figure 1: Measurement model (CFA) of the hypothesized six-factor structure. Circles represent latent construct and squares represent measured variables (composite scores). All parameters are standardized and significant at $p < .05$. Explained variances are shown in small circles.

Finally a partially mediated model was evaluated (Figure 2). The results of the hypothesized model were acceptable, χ^2 (43, N = 413) = 139.51, p = .00; $\chi^2/d.f.$ = 3.24; CFI = .96; NFI = .94; TLI = .94; RMSEA= .07; SRMR = .07. We examined the contribution made by every one of the factors to the prediction of other variables using standardized regression weights. The t value associated with every weight was taken as a measurement to check the contribution. Therefore, values above 1.96 were considered to be significant. All the relations were significant, except that of ego orientation with the self-determination index. Therefore, we can see that the perception of a task-involving climate positively predicted task orientation (β = .44), while the perception of an ego-involving climate positively predicted ego orientation (β = .39). Furthermore, the perception of a task-involving climate (β =.18) and task orientation (β = .31) positively predicted the self-determination index, while the ego-involving climate negatively predicted it (β = -.43). Lastly, flow was positively predicted by the perception of a task-involving climate (β = .41) and an ego-involving climate (β = .23), by task orientation (β = .17) and ego orientation (β = .16) and by the SDI (β = .17)

Discussion

The purpose of this study has been to analyse from the perspective of the achievement goal theory and the self-determination theory some variables which could help to promote positive motivation and increase dispositional flow in adolescent athletes. The present study is the first approach to the joined analysis of those constructs, because some previous studies have analysed a part of the proposed model in this study, but not the whole model. Moreover, the majority of the studies carried out about the flow have focused on a situational analysis of it.

The results from the structural equation analysis show that the partially mediated model is acceptable, although we have not found significant relations between ego orientation and self-determined motivation. Similar to the study carried out by Ferrer Caja and Weiss (2000), in physical education classes, our study shows that task-involving climate predicts task orientation whereas ego-involving climate predicts ego orientation. Moreover, the task-involving motivational climate and task orientation positively predict self-determined motivation, whilst the ego-involving climate does this negatively. Ferrer Caja and Weiss (2000) also found out a negative and meaningful relation between the ego orientation and the intrinsic motivation. Perhaps the athletes' moderately high score in task orientation of our study may diminish the negative effect of the ego orientation over the self-determined motivation.

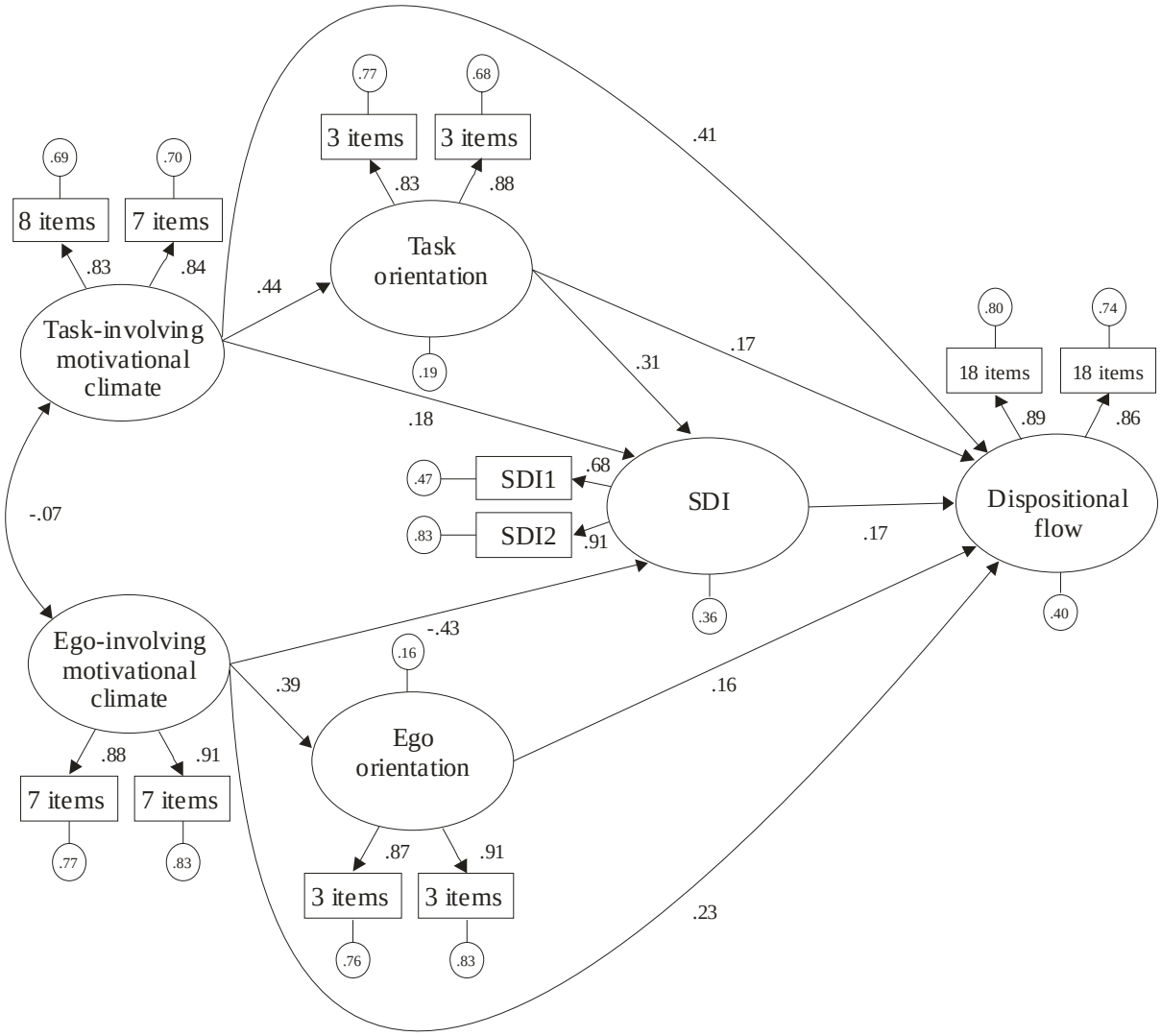

Figure 2: Structural equations analysis. All parameters are standardized and significant at $p < .05$. Explained variances are shown in small circles.

The results of the structural model also show that the self-determined motivation positively predicts dispositional flow. Kowal and Fortier (2000) found the same result with adult swimmers at a situational level. Moreover, dispositional flow is predicted by the different types of motivational climates and goal orientations with the task-involving climate showing more power of prediction. These results are in the same line than those obtained by Cervelló *et al.* (2007) with young tennis players, García Calvo (2004) with adolescent footballers and Moreno *et al.* (2009) with lifesavers.

Therefore, there is a clear connection between the goal orientation the subject acquires and the motivational climate perceived in the coach, as well as an important influence of the task-involving climate and task orientation in the development of self-determined motivation. These results indicate that in order to achieve more self-determined motivation in athletes in training stages and, therefore, more positive consequences (Vallerand, 2001, 2007), the coach has to prioritise effort and personal progress over performance. This statement is further reinforced by the relation found between self-determined motivation and dispositional flow and the greater regression weight found in the task-involving motivational climate in the prediction of flow.

Furthermore, the model shows a negative relation between the perception of an ego-involving motivational climate and self-determined motivation, which shows that when the coach conveys this type of climate, the more positive type of motivation for sport commitment tends to decrease. If the coach shows an authoritarian style of direction, public recognition and social comparison (s/he has his/her favourite athletes and s/he only praises the best ones) are predominant and s/he looks exclusively for the attainment

of results, which will provoke a decrease of the self-determined motivation of the adolescent athletes. This can be the main reason for abandoning sport practice, because normally if the athlete does not enjoy the activity, finally s/he will probably abandon it.

Nevertheless, we cannot forget that dispositional flow is also predicted by the ego-involving climate and ego orientation. Therefore to produce better dispositional flow it appears important that the coach also tries the best performance of the sports participants and the sports results, since sport is a competitive affair but it must always taken into account that in education one must recognise effort and personal improvement and the main objective should be learning. Santos-Rosa (2003) found that goal orientations, besides directly predicting dispositional flow, predicted it indirectly by means of the perception of compared skill. This variable could explain the connection between the perception of an ego-involving climate and ego orientation with dispositional flow (González-Cutre, Sicilia, Moreno, & Fernández-Balboa, 2009), as those subjects that perceive themselves as having high levels of skill tend to have adaptive motivational patterns in competitive environments.

Future investigations should continue the analysis of the different factors which favour a higher disposition to experience flow in athletes, because as Csikszentmihalyi (1988) points out, the ability to reach an optimal psychological state is partly innate and partly the product of the learning process. In this sense, it could be possible to give some pieces of information to the coaches about how they might contribute to increase the dispositional flow of their athletes, getting a better performance (Jackson & Marsh, 1996) and a desire to continue practising to feel again those very good experiences (Kimiecik, 2000). It would be interesting that future research take into account the 2 X 2 achievement goal framework in the study of dispositional flow in sport. The present study was carried out before 2 X 2 Achievement Goal Questionnaire (Elliot & McGregor, 2001) was validated in Spain (Moreno, González-Cutre, & Sicilia, 2008). This is the reason why the distinction between approach and avoidance in achievement goals has not been considered in the present study.

To sum up, this study integrates the achievement goal theory and the self-determination theory and connects them with dispositional flow as a positive consequence. The results obtained support some postulates and corollaries established by Vallerand's HMIEM (2001, 2007) and emphasise the importance of coaches conveying task-oriented motivational climates. Nevertheless, this study has certain limitations and more investigations are necessary in order to generalise the model, including invariance analysis across gender, age or type of sport. Moreover, in this study a correlational design has been used and although the structural equation analysis is a powerful statistical tool, these variables have to be studied longitudinally or experimentally to be able to establish more definitive conclusions and thus further our knowledge of motivation in sport and physical activity. In this same sense it will be interesting to analyse if the task-involving climate transmission by the coach satisfies the basic needs of autonomy, competence and relatedness, in this way reaching an increase of the self-determined motivation and a higher disposition to obtain optimal psychological execution experiences which lead the athlete to a higher practice adherence and performance.

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