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Dispositional Flow in Physical Education: Relationships With Motivational Climate, Social Goals, and Perceived Competence

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The purpose of this study was to analyze the mediating effects of social goals and perceived competence on students' perceptions of motivational climates and dispositional flow in physical education. At the beginning of the physical education unit, 779 students, 12 to 16 years old, were asked to complete four questionnaires: Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2), which measured the perception of task- and ego-involving climates; the Social Goal Scale–Physical Education (SGS-PE); the sport competence factor of the Physical Self-Perception Profile; and the Dispositional Flow Scale-2 (DFS-2). The results of the structural equation model showed that the task-involving climate positively predicted students' social goals (i.e., relationship and responsibility goals) as well as their perceived competence. In turn, social goals and perceived competence positively predicted their dispositional flow. Of the total effects of task-involving climate on dispositional flow, 50% of them were direct whereas the other 50% were indirect. The ego-involving climate positively predicted dispositional flow through perceived competence. The results are discussed with reference to the ability of the teacher to create a high degree of motivation for the students so as to help them achieve optimal psychological states and continue to participate in physical activity.

Keywords: relationship goal, responsibility goal, structural equation modeling

The analysis of factors that encourage an optimal psychological state or flow state to occur (Csikszentmihalyi, 1990) have become especially important in the area of physical activity in recent years (e.g., Fortier & Kowal, 2007; Jackson & Csikszentmihalyi, 1999; Jackson, Thomas, Marsh, & Smethurst, 2001). Experiencing this positive state of mind while participating in physical activity can lead

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to improved performance (Jackson & Marsh, 1996; Jackson et al., 2001) and an increased engagement in physical activity (Jackson, 1996; Kimiecik, 2000). People who achieve the flow state when participating in physical activity reach high levels of enjoyment, fun, and achievement and hence will want to repeat the activity again and again to continue to experience these feelings (Kimiecik, 2000). Furthermore, some scholars (Csikszentmihalyi, 1997; Jackson & Csikszentmihalyi, 1999) emphasize that physical activity provides a special opportunity for the flow state to appear because physical activity is associated with high levels of involvement, desire, challenge, and pleasure. According to the findings, it follows that researching the variables that have an influence on people's flow during physical activity might be of interest to researchers and the public.

Flow: Definition and Components

Flow is a state in which individuals become totally absorbed by what they are doing, even managing to exclude any other thought or emotion. Furthermore, it is a harmonious experience in which, as mind and body work together effortlessly, the person feels that something special is happening (Jackson & Csikszentmihalyi, 1999). Flow tends to be experienced when the individual is practicing his or her favorite activity. Actually, almost any activity, be it at work or at school, can produce flow if the required elements are present (Csikszentmihalyi, 1997).

Csikszentmihalyi (1990) considers that the flow state has nine fundamental components: balance between skills and challenge, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness (worries and negative thoughts disappear), distorted sense of time, and *autotelic* experience (i.e., intrinsically rewarding, fun). How often an individual tends to experience flow is conceptualized as dispositional flow (Jackson et al., 2001). Csikszentmihalyi (1990) also suggests that experiencing flow depends both on environmental and genetic stimuli, and considers that achieving flow depends both on external (e.g., contextual and social) and internal (e.g., the individual's temperament, ability to pay attention, fear of ridicule, and selfishness) factors. Concerning the external factors, Csikszentmihalyi (1990) suggests that flow is enhanced in *autotelic contexts*—enjoyable environments characterized by clear goals and feedback, empathy for the subject's feelings and experiences, freedom of choice, existence of challenge, and self-confidence. Therefore, paying attention to the environment, including that within physical education, may yield important information about whether individuals will experience flow.

Although most of the research on flow in physical activity has focused on competitive sport (e.g., Jackson, 1996; Kowal & Fortier, 2000), flow in noncompetitive physical activity ought not to be disregarded. In fact, Cervelló, Moreno, Alonso, and Iglesias (2006) found that students who are physically active outside school showed more dispositional flow in physical education classes than those who did not. Although no firm conclusions can be made from these findings, the authors believe that experiencing flow in physical education might be a predictor of participation in physical activity outside school. As such, it seems worthwhile to find out and apply the factors that influence the appearance of flow in physical

education classes because these factors may not only enhance student enjoyment of physical education, but also motivate voluntary participation in physical activity (Ntoumanis, 2005).

Although it has been said that when teenagers are in class, they generally experience less flow that in other contexts (Csikszentmihalyi & Larson, 1984), particular school activities can produce flow. For instance, Shernoff, Csikszentmihalyi, Schneider, and Steele-Shernoff (2003) have shown that, in the so-called nonacademic subjects such as computer science, art, and vocational studies, students reached higher levels of flow than in other "academic subjects" such as math, English, science, foreign language, and history. In the "non-academic" subjects the students' concentration, interest, enjoyment, and commitment were visibly higher. Although Shernoff et al. (2003) did not analyze physical education, it is fair to assume that, given the similar characteristics of this subject matter to those of "non-academic" subjects, students may also achieve flow quite readily in physical education.

Motivational Climates and Perceived Competence

Research on sport has shown that the perceived motivational climate is one of the contextual elements that triggers the appearance of flow (Cervelló, Santos-Rosa, García Calvo, Jiménez, & Iglesias, 2007; Kowal & Fortier, 2000; Moreno, Cervelló, & González-Cutre, 2008). Another recent study has revealed the key role the physical education teacher may play in developing flow among students by establishing an appropriate motivational climate (Sicilia, Moreno, & Rojas, 2008).

Motivational climate is defined as a set of implicit and/or explicit environmental signals determining success or failure (Ames, 1992). According to the achievement goal theory (Nicholls, 1989), there are two dominant types of motivational climate: (a) the *task-involving* climate, wherein personal improvement, effort, and learning predominate, and (b) the *ego-involving* climate, which encourages comparison and rivalry among group members. Along these lines, research has shown that task-involving climate is positively related to flow (Kowal & Fortier, 2000; Papaioannou & Kouli, 1999). These studies also have shown the importance of perceived competence as a mediator of the relation between social factors (e.g., motivational climate, perception of success) and flow. In this sense, Ntoumanis and Biddle (1999) have proved a positive relation between task-involving climate and perceived competence, as well.

Other studies (Cervelló et al., 2007; Moreno et al., 2008; Sicilia et al. 2008) have also shown that ego-involving climate can be positively related to flow. Specifically, Moreno et al. (2008) believe that the positive relation between the ego dimension and flow may be due to the mediating effect of perceived competence. In this respect, individuals who perceive themselves as being in an ego-involving climate and feel competent are highly prone to experiencing flow. On the contrary, those whose perception of competence is low find it difficult to experience the flow state (Kowal & Fortier, 1999, 2000). The results of all these studies lead one to think that the motivational climate may be related to dispositional flow through perceived competence. Thus, it seems necessary to create a motivational climate

geared to provoking feelings of competence among individuals, which, in turn, may foster flow.

Social Goals

Social goals are cognitive representations about desired results in the social domain, and their consequences depend on the type of goals one chooses (Urdan & Maehr, 1995). For instance, a particular physical education student may wish to behave responsibly by following the norms established by the teacher, whereas another student may aspire to have fun with his or her friends. Both goals motivate students and influence their learning (or lack thereof) in different ways (Urdan & Maehr, 1995). Social goals may influence flow in physical education classes because it encompasses a whole set of cognitive, behavioral, and affective factors that, in turn, affect academic achievement (e.g., Anderman & Anderman, 1999; Urdan & Maehr, 1995; Wentzel, 1991). By the same token, one's social relations have been identified as an important part of the structure in physical education classes (Tinning & Siedentop, 1985).

As such, it is also reasonable to assume that social goals are related to different psychological states. Yet, in physical education, research has focused mainly on the effect of achievement goals on the flow state (e.g., Papaioannou & Kouli, 1999; Sicilia et al., 2008), neglecting the effect of social goals. The few studies on social goals undertaken in physical education have basically identified two types: "responsibility" goals and "relationship" goals (Guan, McBride, & Xiang, 2006). The *responsibility goal* relates to the individual's desire to respect social rules and the established role (Wentzel, 1991), while the *relationship goal* refers to the individual's desire to establish a social network with peers (Ryan, Hicks, & Midgley, 1997). Similar to achievement goals, social goals are shaped by the perceived motivational climate (Papaioannou, Tsigilis, Kosmidou, & Milosis, 2007). In this regard, depending on what types of goals the teacher emphasizes (responsibility or relationship), the students' perception of the motivational climate will vary, and this, in turn, will affect their performance and learning. The perception of external signals influences the activation of various goals, and these, in turn, lead to different behavioral, cognitive, and affective outcomes (Carver & Scheier, 1998). According to Maehr and Nicholls (1980), social approval goals (being liked by peers) describe task involvement conditions because the behaviors that accompany them are related to earnest effort, clear purpose, and personal commitment. Although the social approval goal is not quite the same as the relationship goal, both are closely related when it comes to establishing affective ties among peers. Given the lack of studies relating the motivational climate with relationship goals, it seems appropriate to take into account the existing research on social approval goals.

Other studies have shown that the task-involving climate helps develop responsibility (Newton, Watson, Kim, & Beacham, 2006; Ommundsen & Roberts, 1999). Therefore, task-involving climate may positively influence the acquisition of both relationship and responsibility goals. Hence, if a teacher looks for the active implication of students in, say, decision making, and he or she engages them in activities geared toward discovery and short-term and long-term goal setting, it is fair to assume that students will learn responsibility. Moreover, if the

teacher sets up group activities in which he or she ensures the same opportunities for all, providing similar rewards and avoiding malicious comparisons, it is most likely that students will set relationship goals.

Despite the lack of studies connecting social goals with the flow state, some research on physical education and sport has shown a positive correlation not only between (a) responsibility goals and (b) particular desirable consequences, such as effort or persistence (Guan, Xiang, McBride, & Bruene, 2006), but also between (c) relationship goals and (d) interest, enjoyment, intrinsic motivation, and satisfaction (Allen, 2003; Papaioannou et al., 2007). Bearing in mind that these desirable consequences are also found in the flow state, and especially with two of its dimensions (i.e., challenge-skills balance and autotelic experience), one could infer that social goals may have a positive relationship with flow.

More concretely, according to Jackson and Csikszentmihalyi (1999), if individuals perceive a balance between their skills and the challenge level of the task, they will invest considerable effort and be more persistent in their efforts to achieve success. In contrast, when the perceived skills level is considerably higher than the challenge at hand, boredom may set in and performance may decrease. Similarly, if the level of the challenge is visibly superior to the perceived skill level, anxiety and even stress may result. Finally, apathy tends to emerge when the perception of both the skills and the challenge levels is low.

The autotelic dimension of flow also presents a strong relationship with such constructs as enjoyment and intrinsic motivation. Indeed, some authors place flow theory within theories of intrinsic motivation (Eccles & Wigfield, 2002). Yet, the autotelic experience by definition is rewarding in and of its own, for it is a comforting, valuable, and joyful experience that people want to repeat (Jackson & Csikszentmihalyi, 1999).

Purposes of the Study

To foster the practice of future physical activity among students, it seems valuable to find out what leads to an optimal psychological state. As pointed out above, most of the related studies in physical education have centered on students' achievement goals, leaving aside social goals. This is surprising, considering the fact that social goals are particularly important during adolescence (Urdan & Maehr, 1995). In view of all this, the current study has been designed to analyze an exploratory model of the personal and contextual factors that could relate to dispositional flow in physical education classes. More concretely, the purpose of the study was to investigate how social goals and perceived competence could mediate the relation between the motivational climates and dispositional flow. It was hypothesized that the task-involving climate would positively predict social goals of relationship and responsibility and perceived competence. In turn, social goals and perceived competence would positively predict dispositional flow. The ego-involving climate would positively predict dispositional flow through perceived competence.

Method

Participants

A sample of 779 students (358 boys and 421 girls), aging from 12 to 16 (M = 13.95, SD = 1.44), was used in physical education classes in different urban public schools in the Region of Murcia (Spain). The students belonged to four courses of mandatory secondary schooling in the Spanish educational system. All the participants were Caucasian and had a middle-class socioeconomic status. The physical education classes were coeducational and the content centered exclusively on sport.

Measures

Motivational Climate. The Spanish version (Cecchini, González, López Prado, & Brustad, 2005) of the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2, Newton, Duda, & Yin, 2000) was implemented with small adaptations to physical education (i.e., the words "coach," "athlete," and "training session" were replaced by "teacher," "student," and "class," respectively). This questionnaire was composed of 33 items grouped into two factors: (a) perception of an ego-involving motivational climate (16 items) and (b) perception of a task-involving motivational climate (17 items). The ego-involving climate factor consisted of the following subscales: punishment for mistakes (e.g., "the teacher yells at students for messing up"), unequal recognition (e.g., "the teacher has his or her favorites"), and intragroup member rivalry (e.g., "students are encouraged to do better than the other students"), whereas the task-involving climate grouped the cooperative learning (e.g., "the teacher encourages students to help each other"), effort/improvement (e.g., "the teacher makes sure students improve on skills they're not good at"), and important role subscales (e.g., "students at all skill levels have an important role in the group"). The instrument began with statements such as, "During physical education classes . . ." and it used a 5-point Likert-type scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The reliability analysis showed a Cronbach alpha value of .91 for the ego-involving climate (.77 for punishment for mistakes, .87 for unequal recognition, .61 for rivalry) and .86 for task-involving climate (.64 for cooperative learning, .74 for effort/improvement, and .71 for important role).

Social Goals. The Spanish version (Moreno, González-Cutre, & Sicilia, 2007) of the Social Goal Scale–Physical Education (SGS-PE) by Guan, McBride, and Xiang (2006) was used. This scale was formed by a total of 11 items grouped into two factors: relationship goal (six items; e.g., "I would like to have a friend I can confide in") and responsibility goal (five items; e.g., "It's important to me that I follow class rules"). The items began with statements such as, "In my physical education class . . ." and they were answered using a 7-point Likert-type scale, from 1 (*not at all true for me*) to 7 (*very true for me*). In this study, alpha values of .72 were obtained for the responsibility goal and of .78 for the relationship goal.

Perceived Competence. The sport competence factor of the Spanish version (Moreno & Cervelló, 2005) of the Physical Self-Perception Profile (Fox & Corbin, 1989) was used. There were six items (e.g., "I think I am always one of the best when taking part in sport activities"), which headed by the statement "When I participate in physical activity . . ." and were answered on a 4-point Likert-type scale, from 1 (*totally disagree*) to 4 (*totally agree*). The instrument yielded a Cronbach alpha value of .83 in this study.

Dispositional Flow. The translation into Spanish of the Dispositional Flow Scale-2 (DFS-2) by Jackson and Eklund (2002) was used to measure students' disposition to experience a flow state in physical education classes. The scale translation was undertaken following the back-translation procedure (Hambleton & Patsula, 1998). In this procedure, the original scale was translated to Spanish by a bilingual person; afterward, another bilingual person without knowledge of the original scale translated it back to English. The final version was compared with the original one by both translators, who considered both versions to be equivalent. In addition, the content validity of the resulting scale was further analyzed by three sport-psychology experts. This scale had 36 items (e.g., "I am challenged, but I believe my skills will allow me to meet the challenge," "Things just seem to happen automatically," "My attention is focused entirely on what I am doing," "I have a sense of control over what I am doing," "I really enjoy the experience"), which were answered using a 5-point Likert-type scale, from 1 (*never*) to 5 (*always*). The DFS-2 consisted of nine factors (four items for each factor) that made reference to the dimensions leading to the flow state or lack thereof (i.e., challenge-skills balance, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience). It also led to a global score for dispositional flow using the scores obtained from all the items, which was used in this study. Dispositional flow was analyzed as a unit, given that analyzing its nine dimensions separately would have considerably increased the degrees of freedom and jeopardized the integrity of the structural equation model.

Procedure

The head teachers of the different schools were informed about the project and their permission to conduct the study was requested. The parents were asked for written authorization for their children to take part in the research. In addition, all the required institutional and school approvals were obtained before the start of the study. After informing the students about the anonymity of their responses and emphasizing that their participation was voluntary, the primary investigator instructed them on how to complete the questionnaires and asked them to give sincere responses. The questionnaire took approximately 25 min to complete.

Data Analysis

First, an analysis of the psychometric properties of the DFS-2 questionnaire was conducted. Its factor structure was tested using the confirmatory factor analysis (CFA), and its internal consistency was analyzed using Cronbach's alpha index. It

was necessary to replicate the structure of the DFS-2 across different countries to ensure that the construction of the concept of flow was not distorted by the use of colloquialisms and other language idiosyncrasies (Fournier et al., 2006; Moneta, 2004).

Next, descriptive statistics and the bivariate correlations of all variables were calculated to design a structural equation model, which, subsequently served to establish the relations among the variables. As recommended by Anderson and Gerbing (1988), a two-step process was followed. First, a measurement model was performed, which gave construct validity to the instruments and corresponded to a confirmatory factor analysis. Second, a structural model was carried out to examine the mediating effects of social goals and perceived competence on students' perceptions of both motivational climate and dispositional flow in physical education. The analyses were conducted with the statistical packages SPSS 15.0 and AMOS 7.0.

Results

Psychometric Properties of the DFS-2 in Physical Education

In line with the study of Jackson and Eklund (2002), two CFAs were conducted to test the factor structure of the DFS-2 in physical education. Jackson and Eklund (2002) showed that the DFS-2 can indeed be used to measure various dimensions of flow, either separately or as a whole. As such, in this study, the factorial validity of the scale was analyzed through two different models. The first model hypothesized that all nine first-order factors (representing the nine dimensions of the flow state described above, each one consisting of four items) would correlate with each other. The second model proposed nine first-order factors and one second-order factor (dispositional flow). Given that Mardia's coefficient was high (217.77), the maximum 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, pointing out the level of bias. According to confidence intervals (i.e., differences between the highest and lowest estimated values from the different bootstrap samples) of the regression weights and the standardized regression weights, 0 was not within the confidence limit, pointing out that estimated values were significantly different from 0. In view of this, the findings of the estimates were not affected by lack of normality and, hence, were considered to be solid enough (Byrne, 2001).

Besides utilizing a covariance matrix to analyze the data, the following indices were used to check the congruence of the model in relation to the data: the chi-square (χ^2), the chi-square to degrees-of-freedom ratio (χ^2/df), the comparative fit index (CFI), the incremental fit index (IFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Because χ^2 is very sensitive to sample size and p tends to be significant with high samples (Jöreskog & Sörbom, 1989), the coeffi-

cient χ^2/df was also calculated (this coefficient is acceptable when it is less than 5; Bentler, 1989). The CFI, IFI, and TLI demonstrate an acceptable fit when values of .90 or higher are obtained (Schumacker & Lomax, 1996). Values equal to or lower than .06 for RMSEA and .08 for SRMR are considered acceptable (Hu & Bentler, 1999).

The results of the nine first-order factor model showed some minimally acceptable fit indices: χ^2 (558, N = 779) = 1370.71, p = .00; χ^2/df = 2.45; CFI = .92; IFI = .92; TLI = .91; RMSEA = .04; SRMR = .04. Standardized regression weights fluctuated between .48 and .82, and they were statistically significant, with a satisfactory error variance. The correlations between the nine factors fluctuated between .28 and .92. High correlations were obtained between "challenge-skills balance" and "unambiguous feedback" (.90), "unambiguous feedback" and "sense of control" (.92), and "sense of control" and "concentration on the task at hand" (.92), respectively.

The fit indices for the higher-order factor model (nine first-order factors and one second-order factor) were slightly worse, although also acceptable: χ^2 (585, N = 779) = 1523.60, p = .00; χ^2/df = 2.60; CFI = .91; IFI = .91; TLI = .90; RMSEA = .04; SRMR = .04. In this model, standardized and significant regression weights were obtained of .93 for challenge-skills balance, .80 for action-awareness merging, .82 for clear goals, .93 for unambiguous feedback, .90 for concentration on the task at hand, .96 for sense of control, .37 for loss of self-consciousness, .51 for transformation of time, and .79 for autotelic experience.

The internal consistency analysis revealed Cronbach's alpha values of .74 for challenge-skills balance, .73 for action-awareness merging, .72 for clear goals, .73 for unambiguous feedback, .71 for concentration on the task at hand, .73 for sense of control, .85 for loss of self-consciousness, .69 for transformation of time, .76 for autotelic experience, and .92 for global dispositional flow.

Descriptive Statistics and Bivariate Correlations

Table 1 shows the means, standard deviations, skewness, kurtosis, and correlations among the variables. Students showed a score in the perception of a task-involving climate (M = 3.82) above the middle point of the scale. The score on the perception of an ego-involving climate (M = 2.26) was below the midpoint. Furthermore, students showed similar scores in the social goals of responsibility (M = 5.44) and relationship (M = 5.46). The scores in perceived competence (M = 2.59) and dispositional flow (M = 3.52) were moderated, taking as a reference the range of measurement scales.

Task-involving climate was positively correlated with social goals, perceived competence, and dispositional flow. Ego-involving climate was positively correlated with perceived competence. In addition, social goals and perceived competence positively correlated with dispositional flow.

Structural Equation Modeling

The maximum likelihood estimation method with bootstrapping procedure (Mardia's coefficient = 29.02) and the covariance matrix were used among the items to start the data analysis. The mean scores of the different subscales were used for

Table 1 Descriptive Statistics, Cronbach's Alphas, and Bivariate Correlations Among All Variables

Variables	*M*	*SD*	Skewness	Kurtosis	α	1	2	3	4	5	6
1. Ego-involving climate	2.26	.83	.44	−.68	.91	—	−.26**	−.17**	−.05	.25**	.04
2. Task-involving climate	3.82	.61	−.40	.13	.86	—	—	.43**	.31**	.18**	.37**
3. Responsibility goal	5.44	1.07	−.83	.67	.72	—	—	—	.53**	.20**	.29**
4. Relationship goal	5.46	1.08	−1.02	1.35	.78	—	—	—	—	.11**	.15**
5. Perceived competence	2.59	.74	−.09	−.70	.83	—	—	—	—	—	.54**
6. Dispositional flow	3.52	.56	−.12	.43	.92	—	—	—	—	—	—

**$p < .01$.

the latent variables of ego-involving climate and task-involving climate. The mean scores of the responsibility goal and the relationship goal were used as indicators for the latent social goals variable. As far as the perceived competence and dispositional flow variables are concerned, their items were respectively parceled into three and four homogeneous groups to maintain some reasonable degrees of freedom. Moreover, following the example of previous studies that used structural equation models to study sport motivation (Guillet, Sarrazin, Fontayne, & Brustad, 2006; Ntoumanis, 2001), the ensuing arithmetic means were used as indicators. Hau and Marsh (2004) proposed the use of more than two parcels, if at all possible, to avoid problems in the model identification. In the current study, all the items in the "perceived competence" category were randomly assigned to three groups, and the nine of dimensions of "dispositional flow" were randomly assigned to four groups.

Initially, a measurement model was performed to give construct validity to the instruments, in which the latent variables freely correlated. The same fit indices described in the CFA of the DFS-2 were taken into account to assess the model. The indices obtained were: χ^2 (80, N = 779) = 251.12, p = .00; χ^2/df = 3.13; CFI = .97; IFI = .97; TLI = .97; RMSEA = .05; SRMR = .04. The correlations among latent variables oscillated between −.33 and .62. These findings indicated that the measurement model was suitable.

The second step was to test the hypothesized structural model. This model is represented in Figure 1. Here, it can be seen that the fit indices of the model are within acceptable ranges: χ^2 (84, N = 779) = 296.81, p = .00; χ^2/df = 3.53; CFI = .97; IFI = .97; TLI = .96; RMSEA = .05; SRMR = .05. The task-involving climate positively predicted social goals (β = .60) and perceived competence (β = .41), whereas the ego-involving climate only predicted perceived competence (β = .40). Social goals (β = .23) and perceived competence (β = .58) positively predicted dispositional flow, with a total explained variance of 43%.

To analyze the effects of both mediation of social goals and perceived competence, the criteria established by Baron and Kenny (1986) were taken into account. Given that, in the initial model, the effects of the mediators on the dependent variable were evident, a nonmediated model in which the motivational climate preceded the dispositional flow also was tested. The aim of this alternative model was to see the effect of the independent variables on the dependent variable. The results showed that both task-involving (β = .49) and ego-involving climates (β = .20) positively preceded the dispositional flow. The fit indices were acceptable: χ^2(32, N = 779) = 139.66, p = .00; χ^2/df = 4.36; CFI = .98; IFI = .98; TLI = .97; RMSEA = .06; SRMR = .04. Finally, it was tested whether controlling the effect of the independent variables on the mediators and the effect of the mediators on the dependent variable would diminish the effect of the independent variables on the dependent variable. In this regard, a partially mediated model in which the motivational climates preceded both social goals and perceived competence and these, in turn, preceded dispositional flow. Moreover, a direct relation between the motivational climates and the dispositional flow was also tested. The results in this model showed adequate fit indices: χ^2(82, N = 779) = 263.69, p = .00; χ^2/df = 3.21; CFI = .97; IFI = .97; TLI = .96; RMSEA = .05; SRMR = .04. Task-involving climate positively predicted the dispositional flow (β = .25), while ego-involving climate was not significant.

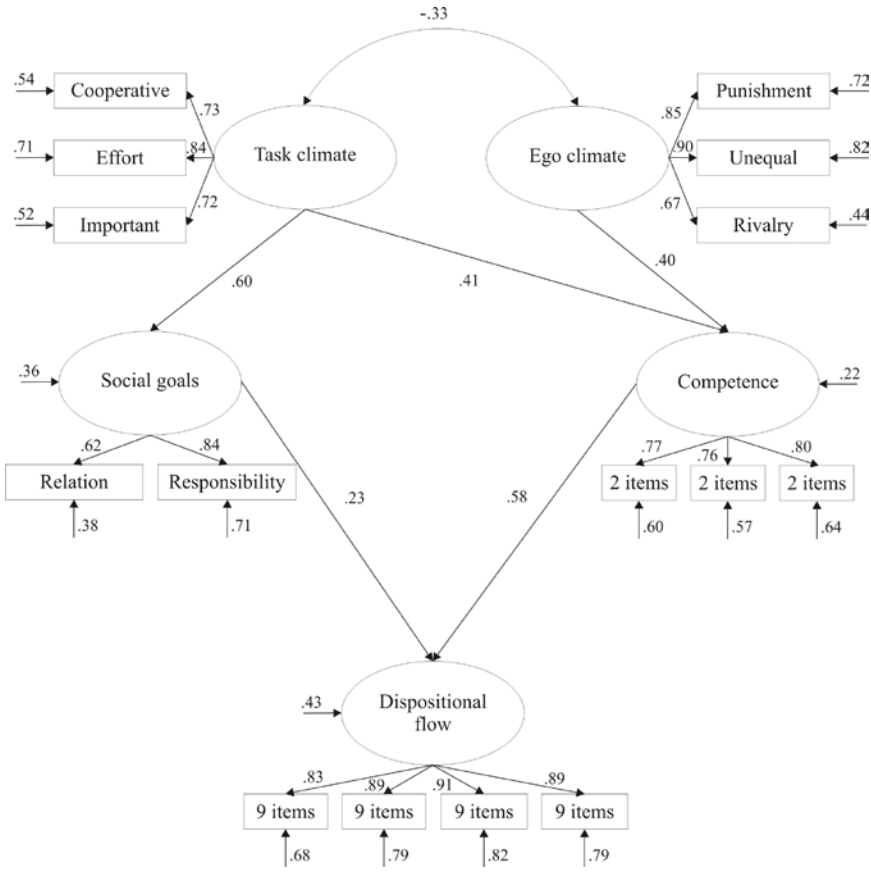

Figure 1 — Structural equation model showing the relations between perceived motivational climates, social goals, perceived competence, and dispositional flow. All the parameters are standardized and statistically significant. The explained variances are shown on the small arrows.

Such results indicate that the relation between the ego-involving climate and dispositional flow is mediated through perceived competence, whereas the relation between task-involving climate and dispositional flow is partially mediated through social goals and perceived competence. Brown (1997) pointed out that to test the mediation in structural equation modeling, and given that the existing software allows for doing so, it is better to analyze the total effects, splitting them into direct and indirect effects. Of the total effects of task-involving climate on dispositional flow, 50% of them were direct and the other 50% indirect. Regarding the total effects of the ego-involving climate on dispositional flow, 1% of them were direct and 99% were indirect.

Discussion and Recommendations

The purpose of this study was to analyze the mediating effects of social goals and perceived competence on students' perceptions of motivational climates and dispositional flow in physical education. Given that DFS-2 had not been validated in Spain, the psychometric properties had to be analyzed before the beginning of the study.

The Dispositional Flow Scale-2 Applied to the Spanish Context

The analysis of the internal consistency of the nine dimensions of the DFS-2 was satisfactory. Moreover, Jackson and Eklund's (2002) analysis of two confirmatory models (i.e., the first-order factor model and the higher-order factor model) yielded acceptable indices, although the results of the first-order factor model slightly better. Nonetheless, there were excessively high correlations between challenge-skills balance and unambiguous feedback, unambiguous feedback and sense of control, and sense of control and concentration on the task at hand. This would indicate some discrimination validity problems. Two reasons could be given for the high correlation found among some of the dimensions of flow. On one hand, although other studies of validation have not presented this problem (e.g., Fournier et al., 2006; Jackson & Eklund, 2002; Kawabata, Mallet, & Jackson, 2008), it must be taken into account that the current study has been undertaken with physical education adolescent students who might not be able to distinguish among some of the flow characteristics, whereas in previous studies the subjects were sporting adults. On the other hand, it has been suggested that challenge-skills balance, clear goals, and unambiguous feedback could be *preconditions* of flow and not *characteristics* of it (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005). This could explain the high correlation obtained in this study between some of these preconditions and the dimensions of flow.

The Mediating Effects of Social Goals and Perceived Competence

The results of the structural equation model showed that the task-involving climate positively predicted social goals of relationship and responsibility, and perceived competence; in turn, the latter positively predicted dispositional flow. As pointed out by previous studies, the task-involving climate helps students to achieve goals of relationship and responsibility (Maehr & Nicholls, 1980; Newton et al., 2006; Ommundsen & Roberts, 1999) and it promotes the perception of competence (Ntoumanis & Biddle, 1999). These results highlight the importance for physical education teachers of giving priority to cooperative learning, effort, and personal improvement, while giving each student a key role to play in their classes. Doing so may compel students to have good relationships with peers and try to behave responsibly (i.e., respecting class rules). It is logical for relationship and responsibility goals to develop in an atmosphere of cooperation where there is no rivalry and conflict and all the students have an allocated role. Similarly,

establishing effort and personal improvement as the criteria for success helps the student to feel competent becuase it is an attainable objective.

In line with the research by Kowal and Fortier (1999, 2000), this study's results showed a positive relationship between perceived competence and dispositional flow. Meeting this basic psychological need plays an important part in managing to experience flow. Feeling confident about having enough skill to do the task at hand is an essential condition for feeling more prone to achieving flow states (Csikszentmihalyi et al., 2005).

Furthermore, social goals of relationship and responsibility also proved to be positive predictors of dispositional flow in this study. Although, to date, no studies have been published relating social goals with flow, previous research on physical education and sport (Allen, 2003; Guan, Xiang, et al., 2006; Papaioannou et al., 2007) showed that social goals of relationship and responsibility were related with other positive motivational consequences. As such, fostering a climate in physical education classes in which students try to be a responsible, establish clear values, and develop relationships with trusting friends with whom to share their experiences could foster flow.

Therefore, this study has shown a positive relationship between task-involving climate and dispositional flow by means of social goals and perceived competence in physical education classes. Still, the results of the analysis of mediation showed that the task-involving climate not only predicted dispositional flow in an indirect way, but also in a direct one. Other studies also have found that the task-involving climate is related to flow in a specific sport situation (Kowal & Fortier, 2000; Papaioannou & Kouli, 1999). Although the task-involving climate could create dispositional flow among students, one must take into account that part of its effects could be due to the increase of perceived competence and social goals of relationship and responsibility. Interestingly enough, given the relation that it seems to have with the responsibility and relationship goals, higher perceived competence, and dispositional flow in the student, the implementation of strategies on the physical education teacher's part to foster a task-involving climate is recommended.

The results of the structural equation model also showed that the ego-involving climate positively predicted dispositional flow through perceived competence. Previous studies on young sport had already found a positive relation between ego-involving climate and flow and had suggested a possible mediating effect of perceived competence (Cervelló et al., 2007; Moreno et al., 2008). In this respect, those students that perceive an ego-involving climate and feel competent could be prone to experiencing flow. However, if a student's perception of competence is low in an ego-involving motivational climate, this seems to have a negative relation to dispositional flow.

Recommendations to Foster Perceived Competence, Social Goals, and Dispositional Flow

The present study has shown that the task-involving climate can be positively related to an increase in perceived competence, relationship and responsibility goals, and dispositional flow in physical education classes. The results also

indicate that, since the ego-involving climate relates positively to dispositional flow only if the students' perceived competence is high, creating a task-involving climate may be useful to directly or indirectly increase dispositional flow. In this regard, Ames (1992) established different areas, concerning both the structure of the session and the actions of the teacher that must be taken into account to create a task-involving climate. These areas were identified under the acronym TARGET (which stands for task, authority, recognition, grouping, evaluation, and time). Attending to these different TARGET areas, one could find premises directly related with the constructs of the current study. For instance, to develop responsibility goals, one could adopt the following strategies: involve students actively in the decision-making process, allow for choosing among different activities with similar pedagogical objectives, help students to be realistic and practice self-control and self-direction, and introduce activities geared toward discovery and problem solving.

Likewise, the social relationship goal could be fostered by positively recognizing and evaluating personal development, avoiding comparisons, providing the same reward opportunities, and grouping students heterogeneously. In relation to the perception of competence and dispositional flow, it seems logical to know the ability level of each student so as to plan, as much as possible, activities suited to their characteristics. In the same vein, it is necessary to establish short-term objectives in order for students to perceive improvement and allow the appropriate time for skill acquisition. Furthermore, it seems key to establish new and varied activities to achieve autotelic experiences.

Limitations, Future Research, and Conclusions

The main limitation of the study was using a cross-sectional design with self-reported measures that does not allow for the establishment of causal relations among the analyzed variables. Although causal inferences cannot be established from this study, the model that emerged from it may be useful to physical educators who want to help their students to foster dispositional flow.

In future studies, it would be interesting to analyze the effect of diverse motivational climates on dispositional flow in physical education classes, and of dispositional flow on voluntary participation in extracurricular physical activities. Similarly, future studies should integrate the analysis of achievement goals and social goals so as to develop alternative models to explain flow. In this sense, addressing the perspective of 2×2 achievement goals, both from the standpoint of motivational climate (Papaioannou et al., 2007) and students' attained goals (Guan, Xiang et al., 2006), so as to obtain a better explanation for the causes of flow in physical education. In addition, it would be useful to analyze the mediating effect of the perception of relatedness between the relationship goal and dispositional flow. It is probable that a student with relationship goals but who does not succeed in establishing ties with peers would be less likely to experience flow than another student who is successful at doing so.

To sum up, this study provides a fair amount of information that can be used to understand the relation between motivational climate and dispositional flow, and the mediating effects of social goals and perceived competence. This information can be used by physical educators to not only to create classroom and gym

environments with a higher flow potentially, but also to foster higher levels of physical activity outside of school. As such, besides seeking to obtain high levels of achievement and enjoyment in physical education classes, students who attain flow in this subject matter will also tend to participate in physical activity outside school (Cervelló et al., 2006; Kimiecik, 2000). Furthermore, the current study has helped to show (a) that the task-involving climate positively predicts social goals of relationship and responsibility, on the one hand, and perceived competence on the other; (b) that social goals and perceived competence positively predict dispositional flow; and (c) that the ego-involving climate positively predicts dispositional flow through perceived competence. All in all, these results point to the importance of the physical education teacher in providing optimal psychological states for students during his or her classes.

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