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**MOTIVATIONAL PROFILES AND FLOW IN PHYSICAL EDUCATION
LESSONS**

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1 *Summary.* The purpose of this study was to examine the solutions of the cluster
2 analysis procedure for studying differences in goal orientation and motivational climate
3 profiles. A secondary purpose was to examine whether there were differences among
4 the various goal and climate profile groups on perceived flow experiences. Nine
5 hundred and eighty-three students of 14 to 15-year-olds ($M = 14.8$, $SD = 0.91$) from a
6 large Spanish metropolitan school district were participants in this study and completed
7 questionnaires assessing goal orientations (POSQ), motivational climates (PMCSQ-2)
8 and perceived flow (DFS). Results revealed three distinct clusters with 40.28% of the
9 sample with a 'high motivational' profile, 27.57% in a 'low motivational' cluster and
10 32.15% in a 'mastery' cluster. These three clusters differed significantly in their
11 perceived flow experiences. Clusters also showed different composition according to
12 gender. The implications of these results with regard to teaching instructional actions in
13 physical education classes are discussed.

14 *Key words:* goal orientation, motivational climate, flow, physical education.

INTRODUCTION

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For the past 20 years, achievement goal theory (Ames, 1984; 1992a, b; Dweck, 1986; Elliot & Dweck, 1988; Nicholls, 1984, 1989) has evolved into one of the most common theoretical approaches for understanding students' motivation and their experiences within physical education classes (Goudas, Biddle, & Fox, 1994; Papaioannou, 1995, 1998a; Duda, 1996; Spray & Biddle, 1997; Treasure, 1997; Carpenter & Morgan, 1999; Treasure & Roberts, 2001; Xiang & Lee, 2002; Xiang, Bruene & McBride, 2004; Xiang, McBride & Guan, 2004). This social-cognitive theory assumes that children's motivation to learn is influenced by their judgments about their competence, i.e., how a child defines success and failure in an achievement setting. These judgments are presumably determined by achievement goals that are influenced by one's goal orientation, perceptions of the motivational climate, and cognitive maturity levels (Nicholls, 1984, 1989). It also contends that the goal of action in achievement settings, such as physical education lessons, is to demonstrate ability. Nevertheless, in the research literature there are two dominant achievement goals that define the concept of ability: task or learning and ego or performance (Nicholls, 1984, 1989; Dweck & Leggett, 1988). These goal perspectives, also known as dispositional goal orientations, refer to the way a student construes his/her level of competence and, consequently, define success in specific settings. Students with a task orientation use self-referenced criteria to judge their own competence, strive to demonstrate mastery, seek ways to improve their abilities and endeavor to learn new abilities, so that they feel successful after high levels of effort and mastery of a task. Conversely, students with an ego orientation tend to orient themselves to achieve a positive evaluation of their current abilities and base their performance on social comparison, i.e. after demonstrating more ability than the reference group or equal performance with less

40 effort (Nicholls, 1984, 1989; Ames, 1992a, b; Duda, 2001). Studies have shown
41 correlation among cognitive, affective and behavioral patterns of these two goal
42 orientations in physical education settings (Duda & Hall, 2000). Students whose goals
43 are task-related usually choose challenging tasks and focus on effort more than ego-
44 oriented students do (Solmon & Boone, 1993; Duda, 2001; Roberts, 2001). Generally,
45 ego-involved goals have been associated with fewer adaptive motivational patterns,
46 such as attributing success or failure to natural ability, while task-involved goals have
47 been associated with the belief that success is a consequence of effort and with a
48 positive attitude towards physical education classes (Goudas et al., 1994; Goudas,
49 Biddle, & Underwood, 1995; Papaioannou, 1995; Treasure, 1997; Carpenter & Morgan,
50 1999; Spray, 2002; Gano-Overway & Ewing, 2004).

51 Goal perspective may represent a dispositional tendency towards judging one's
52 competence or it may be fostered within the situational context creating a perceived
53 motivational climate (Nicholls, 1984, 1989; Dweck & Leggett, 1988; Ames, 1992a, b).
54 Students' perceptions of achievement goals are affected by situational factors, such as
55 teachers. These situational factors can influence students' conceptions of ability.
56 According to the two dominant goal orientations, there are two dominant perceived
57 motivational climates in classroom contexts. In a task-involving climate, teachers
58 emphasize effort and evaluate students on mastery and skill improvement, whereas in an
59 ego-involving climate, teachers emphasize social comparison and evaluate students on
60 performance outcomes. Teachers have an influence on the perceived motivational
61 climate in the classroom using factors such as task purposes, evaluation, rewards and
62 student relationships (Ames & Archer, 1988). Students' perceptions of a motivational
63 climate have proved to be stronger predictors of cognitive and affective responses after
64 controlling for dispositional goal orientations. In particular, perception of a task-

65 involving climate was associated with a strong intrinsic motivation, preference for
66 challenging tasks and the belief that success resulted from effort and motivation instead
67 of external factors (Cury, Biddle, Famose, Goudas, Sarrazin, & Durand, 1996; Treasure
68 & Roberts, 2001).

69 The Achievement Goal Theory framework has normally been used to understand
70 how the climate created by teachers to enhance motivation might impact a student's
71 goal orientations and achievement strategies. This theoretical framework was used in
72 this study to understand how a student's goal orientations and the climate created by the
73 teacher to enhance motivation might be associated with perceived flow experiences in
74 physical education classes.

75 The flow concept was originally introduced by Csikszentmihalyi (1975, 1997) and
76 applied in the sport and physical activity contexts by Jackson (1996) and Jackson and
77 Marsh (1996). According to Csikszentmihalyi (1975), flow is an enjoyable
78 psychological state that is reflected by a holistic sensation that people feel when they
79 are totally involved in the activity they are doing. Optimal experiences or flow can be
80 defined by a set of dimensions or factors, including a merging of action and awareness,
81 clear goals, unambiguous feedback, focused attention, loss of self-consciousness,
82 altered sense of time, a sense of control, and perceived challenge-skill balance
83 (Csikszentmihalyi & Csikszentmihalyi, 1988; Csikszentmihalyi, 1990, 1993, 1997). The
84 set of these factors would be the global flow state (Jackson & Marsh, 1996; Marsh &
85 Jackson, 1999; Vlachopoulos, Karageorghis, & Terry, 2000)

86 Research so far has examined flow experiences in different contexts, suggesting
87 that people who experience flow usually want to be engaged in the activity (Deci &
88 Ryan, 1985; Pelletier et al., 1995; Csikszentmihalyi, 1990), they consider the activity as
89 an optimal and enjoyable experience (Csikszentmihalyi, 1997; Jackson, 1992, 1996)

90 and have positive feelings after exercise (Karageorghis, Vlachopoulos, & Terry, 2000).
91 Researchers have also tried to identify flow antecedents (Csikszentmihalyi &
92 Csikszentmihalyi, 1988). One of the antecedents that emerged from the research was
93 motivation (Jackson, 1992, 1995). In fact, there has been a clear association between the
94 flow concept and intrinsic motivation. Csikszentmihalyi (1988, 1990) described flow as
95 an intrinsically rewarding experience, since it is an immediate subjective experience and
96 an emotional state that occurs when a participant is engaged in an activity. Similarly,
97 Deci & Ryan (1985) made a reference to flow as a moment of high intrinsic motivation.
98 In addition, the importance of motivation in flow experiences has been widely
99 highlighted in research (Jackson, 1992, 1995; Kowal & Fortier, 1999).

100 Past studies on flow have found that goal orientations are related to the
101 experience of this psychological state. A high level of motivation to engage in the task
102 has been described as a facilitator of perceiving flow in elite sportspeople. In the study
103 by Jackson & Roberts (1992) a positive and significant connection was discovered
104 between task orientation and frequency of flow when the latter was assessed at a
105 situational level. Specifically, athletes who showed a disposition to focus on the task
106 more than on the results to be achieved were more likely to perceive flow experiences.
107 Later, Jackson, Kimiecik, Ford & Marsh. (1998) studied how certain psychological
108 factors were related with flow. However, the authors did not find any relation between
109 perceived flow experiences and goal orientations. Contrary to Jackson & Roberts
110 (1992), Jackson et al. (1998) assessed all of the variables at a contextual level.
111 Accordingly, the relationship between motivational antecedents and flow has not yet
112 been understood.

113 Nevertheless, the importance of motivation in flow experiences also seems to be
114 critical in situations of play and in non-competitive settings. In fact, Stein, Kimiecik,

115 Daniels, & Jackson (1995) found that the perceived difficulty of the challenge
116 dimension was associated with the perception of flow more strongly for participants in
117 recreational than in competitive settings. The connections that have been found between
118 the perception of challenge and flow experiences in artistic activities and in everyday
119 situations seem to back this hypothesis (Moneta & Csikszentmihalyi, 1996; Voelkl &
120 Ellis, 1998; Martin & Cutler, 2002).

121 A high performance and motivation in the student would have theoretical and
122 practical benefits. Understanding the relationship between motivation and flow can
123 enable us to discover the motivational factors that disrupt and facilitate flow
124 experiences in physical education classes. In addition, guidance for teachers in creating
125 settings that promote optimal experiences during physical activity classes should be
126 encouraged.

127 So far, we have not heard of studies that have related motivation and flow within
128 the context of physical education. However, factors such as the autotelic experience of
129 flow seem to be key concepts within the study of motivation in educational scenarios. In
130 this respect, different studies in the context of physical education have shown that task
131 orientation and the perception of a task-oriented motivational climate are related to
132 having more fun (Ames & Archer, 1988; Kavussanu & Roberts, 1996; Ntoumanis &
133 Biddle, 1999), a positive attitude towards class and more satisfaction (Solmon & Boone,
134 1993; Goudas *et al.*, 1994; Goudas *et al.*, 1995; Papaioannou, 1995, 1997, 1998a; Cury
135 *et al.*, 1996; Solmon, 1996; Treasure, 1997; Cervelló & Santos-Rosa, 2000; Treasure &
136 Roberts, 2001). Theoretically, an individual who is intrinsically motivated should be
137 more prepared to experience flow because he will be interested in the task he is doing
138 (Deci & Ryan, 1985).

139 In contrast, boredom in PE classes has been associated with the student's
140 perception of an ego-involving climate (Duda & Nicholls, 1992; Seifriz, Duda, & Chi,
141 1992; Cervelló & Santos-Rosa, 2000). When participants are ego-oriented and the key
142 factors in the setting reward aspects related to the demonstration of superior
143 competence, then the participants can have less fun, as they do not have much control
144 over the key factors in the setting. High ego-oriented individuals are less likely to
145 perceive high flow levels, since success is based on normative comparison and,
146 therefore, personal improvement is not enough to satisfy the goal of demonstrating
147 superior ability (Xiang *et al.*, 2004). In addition, ego-involved students must pay more
148 attention to their peers than to the task due to the fact that they have to outperform
149 others to perceive a sense of achievement. This could lead to more levels of anxiety
150 (Ntoumanis & Biddle, 1998; Papaianou & Kouli, 1999), a psychological factor that
151 has been described as precisely the opposite to what the flow experience represents
152 (Csikszentmihalyi, 1975, 1988; Jackson *et al.*, 1998). As Jackson *et al.* (1998)
153 described, participants that perceive a high challenge are more likely to increase their
154 concentration and involvement. However, they tend to relate negatively to the desire to
155 do the activity and the enjoyment while doing it.

156 Finally, students would tend to perceive high levels of flow when the emphasis in
157 the classes is based on personal improvement and effort levels than performance and
158 comparison with the rest of their peers. In fact, the perception of a task-involving
159 climate has been associated with strong intrinsic motivation, preference for challenging
160 tasks and the belief that success resulted from effort and motivation instead of external
161 factors (Cury *et al.*, 1996; Treasure & Roberts, 2001). The development of students'
162 personal goals in conjunction with the challenge-skill balance might facilitate the
163 perception of flow (Karageorghis *et al.*, 2000).

164 Both task and ego goal orientations and task- and ego-involving motivational
165 climates are dispositional and situational variables that are reasonably orthogonal –not
166 bipolar. To date, only a few studies have specifically paid attention to the orthogonality
167 of goal states and motivational climates (Hodge & Petlichkoff, 2000; Smith &
168 Harwood, 2002; Gernigon, D-Arripe-Longueville, Delignières, & Ninot, 2004).
169 Nevertheless, because the subscales are independent, Duda (2001) suggested the
170 usefulness of measuring goal orientation and perceived climate profiles. Research
171 maintains that individuals can be “high” or “low” in both task and ego subscales, or
172 high in one subscale and low in the other in both motivational disposition and in climate
173 perception (see Roberts, 2001; Duda, 2001). The interaction between ego and task
174 subscales in both the goal orientation variable and motivational climate provides useful
175 information to analyze the relationship between motivation and flow beyond what can
176 be explained when each subscale is considered separately.

177 Research employing goal profiles has usually used either a median or mean-split
178 procedure to create groups. Nevertheless, although these procedures are efficient
179 methods to create four goal profiles groups, they force the data into “high” or “low”
180 grouping, eliminating any attempt to examine effects of “average” responses on either
181 the task or the ego orientation and climate scales. Furthermore, the number of groups in
182 the mean-split procedure is created arbitrarily and the group labels are predetermined.
183 More recently, cluster analysis has gained in popularity as an analytical procedure to
184 examine varying goal profiles in sport (Hodge & Petlichkoff, 2000; Vlachopoulos *et al.*,
185 2000; Wang & Biddle, 2001; Wang, Chatzisarantis, Spray & Biddle, 2002; Moreno,
186 Cervelló, González-Cutre, 2007) and physical education psychology (Ntoumanis,
187 2002). It is designed to derive a classification scheme for grouping a number of
188 individuals into clusters, so that individuals within clusters are similar in some respect

189 and unlike those from other clusters (Aldenderfer & Blashfield, 1984; Hair, Anderson,
190 Tatham, & Black, 1998). This procedure also affords researchers the opportunity to
191 combine the study of orientation and climate and examine different solutions rather than
192 solely imposing an arbitrary four-group structure on either the orientation or climate
193 data.

194 The objective of this research was to examine the solutions of the cluster analysis
195 procedure for studying differences in goal orientation and motivational climate profiles.
196 A secondary purpose was to then examine whether there were differences among the
197 various goal and climate profile groups on perceived flow experiences.

198 METHOD

199 *Participants and procedure*

200 Our study sample consisted of 983 students ($M = 14.8$, $SD = 0.91$). There were
201 498 boys and 485 girls, all members of physical education classes in schools in a large
202 Spanish city. All participants volunteered to participate in the study. Twenty-six
203 educational centers were used, where all the participants had Spanish nationality with
204 an age range from 14 to 16.

205 Permission to conduct this research was received from head teachers. The pupils
206 were told the purpose of the research, their rights as study participants and asked to sign
207 a consent form. The instruments for measuring the different variables were administered
208 in a classroom to the chosen participants when the teacher was not present. The
209 measures were given to all students in the same order. Each participant took 15-20
210 minutes to complete the questionnaires and responses to the instrument were kept
211 anonymous. The participants were told to ask for help if confused concerning either
212 instructions or the clarity of particular items. No problems were encountered in
213 completing either of the inventories or understanding the nature of the questions.

214 *Measures*

215 *Perception of Success Questionnaire (POSQ)*. To measure students' dispositional
216 goal orientation in physical education classes, the Spanish version (Cervelló, Escartí, &
217 Balagué, 1999; Cervelló & Santos-Rosa, 2000, 2001; Martínez Galindo, Alonso, &
218 Moreno, 2006) of the Perception of Success Questionnaire was used (Roberts, Treasure,
219 & Balagué, 1998). This questionnaire has 12 items, of which six measure Task
220 Orientation (e.g. "In physical education classes, I feel successful when I reach a goal")
221 and six measure Ego Orientation (e.g. "In physical education classes, I feel successful
222 when I win"). The replies are rated on a Likert-type scale, in which each item has a
223 response range from 1 to 10 (anchors: 0 = strongly disagree and 10 = strongly agree).
224 The Spanish version of this questionnaire showed a factor distribution and internal
225 consistency coefficients similar to those obtained for American athletes and physical
226 education students (Cervelló *et al.*, 1999; Escartí, Roberts, Cervelló, & Guzmán, 1999;
227 Cervelló & Santos-Rosa, 2000, 2001). Likewise, the inventory for this study showed
228 adequate internal consistency for each subscale, with Cronbach alpha coefficients from
229 .92 for the ego orientation subscale and .89 for the task orientation subscale.

230 *Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2)*. To
231 measure students' perception of a motivational climate in physical education classes,
232 the version translated into Spanish by Balagué, Guivernau, Duda, & Crespo (1997) of
233 the Perception of Motivational Climate in Sport Questionnaire-2 (Newton & Duda,
234 1993; Newton, Duda, & Yin., 2000) was adapted. The Spanish version of this
235 questionnaire has two higher-order factors, which measure the Perception of a Task-
236 Involving Motivational Climate and the Perception of an Ego-Involving Motivational
237 Climate. In the Spanish version, the task-involving climate factor is composed of 11
238 items. Examples of the items included: "In physical education classes, students feel

239 good when they try their best” and “In physical education classes, students help each
240 other learn”. The ego-involving climate factor includes 13 items (e.g. “In physical
241 education classes, the teacher has his/her favorites”). The replies to the questionnaire
242 were indicated on a Likert-type scale with a range response of 0 to 10 (0 = strongly
243 disagree to 10 = strongly agree). Studies carried out with Spanish athletes have shown a
244 factor distribution and internal consistency coefficients similar to those found in athletes
245 and students in other countries (Balaguer *et al.*, 1997; Cervelló & Santos-Rosa, 2000).
246 This inventory has indicated adequate internal consistency for each subscale, with
247 Cronbach alpha coefficients from .77 for the ego-involving motivational climate
248 subscale and .73 for the task-involving motivational climate subscale.

249 *Dispositional Flow Scale (DFS)*. We used the Spanish version (García Calvo,
250 Jiménez, Santos-Rosa, Reina & Cervelló, 2007) of the Dispositional Flow Scale
251 (Jackson *et al.*, 1998) for measuring the variable of dispositional flow. As stated
252 previously, this scale assesses nine dimensions of flow based on theory and qualitative
253 research: challenge-skill balance (csflow), action-awareness merging (aafLOW), clear
254 goals (cgflow), unambiguous feedback (uffLOW), concentration on the task at hand
255 (ctflow), sense of control (scflow), loss of self-consciousness (lsflow), transformation of
256 time (ttflow), and autotelic (intrinsically rewarding) experience (aefLOW) (see Jackson
257 and Marsh, 1996, for the wording of the items). Taking into account the
258 multidimensional and hierarchical structure of the DFS, the different dimensions as a
259 whole perform reasonably good flow experiences (Jackson & Marsh, 1996; Marsh &
260 Jackson, 1999; Vlachopoulos *et al.*, 2000). The activity related questions were designed
261 to ground the respondent in the experience of physical education to which he or she was
262 responding. The version of the DFS used was composed of 36 items. Examples of items
263 included: “I really enjoy the experience (autotelic); it is really clear to me how my

264 performance is going” (unambiguous feedback)...”. The replies to the questionnaire
265 were indicated on a Likert-type scale with a range response of 0 to 10 (0=strongly
266 disagree to 10=strongly agree). The Dispositional Flow Scale has received
267 psychometric support through confirmatory factor analyses (Jackson & Marsh, 1996;
268 Marsh & Jackson, 1999; García Calvo *et al.*, 2007). Likewise, the DFS for this study
269 showed adequate internal consistency for global flow state, with a Cronbach alpha
270 coefficient from .94. There was also adequate internal consistency for the nine flow
271 dimensions, with a minimum value of the Cronbach alpha coefficient of .74, except for
272 the ttfow dimension, which obtained a value of .65. Nevertheless, the internal validity
273 observed for ttfow can be considered marginally acceptable, given the small number of
274 items which comprise the subscale (Nunnally & Bernstein, 1994; Hair *et al.*, 1998).

275 RESULTS

276 In this section, firstly, the descriptive statistics, the estimated reliability
277 coefficients and the correlations of the variables analyzed are shown. Secondly, in order
278 to study the relation among motivational climates, goal orientations and perceived flow
279 in more depth, the students were classified on the basis of their motivational climates
280 and goal orientations using a cluster analysis. Later, a MANOVA was performed with
281 the profiles resulting from the cluster analysis as an independent variable and the
282 perceived flow dimensions as dependent variables. Next, specific ANOVAs were
283 performed to check whether there were differences in both global dispositional flow and
284 in the different flow subdimensions on the basis of those profiles.

285 *Descriptive Statistics, Reliability and Correlations*

286 The descriptive statistics of the instruments used in the research, the estimated
287 reliability coefficients and the correlations between the variables analyzed in the study
288 are shown in Table 1.

289 (TABLE 1 HERE)

290 The means of the factors show that our physical education students had moderate
291 ego orientation and high task orientation. They also perceived a low ego-involving
292 climate and a moderate task-involving climate. Moreover, the students had moderate
293 levels of perception of global flow.

294 Reliability was adequate, with the values in all the scales exceeding .70
295 (Nunnally, 1978). There were positive and significant correlations between the
296 perception of ego orientation and an ego-involving motivational climate and between
297 the perception of task orientation and a task-involving motivational climate. Similarly,
298 there were negative and significant correlations between the perception of task
299 orientation and an ego-involving motivational climate and between the latter and a task-
300 involving motivational climate. Nevertheless, positive and significant correlations
301 between the perception of ego orientation and the perception of task orientation were
302 also found.

303 On the other hand, there were positive and statistically significant correlations
304 between the perception of flow, and all its nine dimensions, and both ego and task
305 orientation. Moreover, the perception of a task-involving motivational climate was
306 positively associated with flow and its nine dimensions. On the contrary, no significant
307 correlation was found between the global flow dimension and an ego-involving
308 motivational climate. This last variable only showed statistically significant correlations
309 with four of the nine flow dimensions (aaflow, ctflow, ttflow and aeflow), although
310 these correlation coefficients are low.

311 *Physical education motivational profiles*

312 To identify the different patterns in physical education classes, a cluster analysis
313 using motivational climates and goal orientations (four variables: ego and task-

314 involving climate and ego and task orientation) was performed. All the variables were
315 standardized using Z scores (mean of 0 and standard deviation of 1).

316 The best solution found was the three cluster one, because when the number of
317 clusters was increased, some of them lost psychological significance and stability when
318 they were calculated in subsamples and it was, therefore, not possible to interpret them.
319 Table 2 shows the three-cluster solution obtained using the K-means cluster analysis. In
320 Table 3 you can see that all the variables contribute significantly to the formation of
321 clusters (Ego-involving climate $F_{2,980} = 133.03, p < .001$; Task-involving climate $F_{2,980}$
322 $= 151.54, p < .001$; Ego orientation $F_{2,980} = 305.21, p < .001$; Task orientation $F_{2,980} =$
323 $222.94, p < .001$).

324 (TABLE 2 AND 3 HERE)

325 The characteristics of each cluster are shown in Table 2 and Figure 1 (“100%
326 sample”). The first cluster (396 participants, 40.28% overall) tended to be moderate in
327 ego and task-involving climate and high in ego and task orientation. This cluster was
328 labeled as the “high motivational profile” group. The second cluster (271 participants,
329 27.57% overall) tended to be high in ego-involving climate, and low in task-involving
330 climate and ego and task orientation. This group was called the “low motivational
331 profile”. Lastly, the third cluster (316 participants, 32.15% overall) was called the
332 “mastery motivational profile” group because participants scored higher in the variables
333 that involve task (task-involving climate and task orientation) than in the variables that
334 involve ego (ego-involving climate and ego orientation).

335 Solutions from cluster analyses can be unstable. It is, therefore, advisable to use
336 additional analyses to check the solutions. In order to validate the stability of the cluster
337 solution, three K-means cluster analyses were performed with different sized samples
338 chosen randomly from the original sample: with 75% of the participants of the total

339 sample, with 50% of the sample and with 25% of the sample. The results confirmed the
 340 consistency (Figure 1) of the three cluster solution in terms of size of the profiles and
 341 size of the clusters.

342 (FIGURE 1 HERE)

343 *Differential profiles and flow*

344 A MANOVA was performed to check whether the three profiles found (high,
 345 mastery and low motivational profile) differed in the values of the different dimensions
 346 of perceived flow (csflow, aaflow, cgflow, ufflow, ctflow, scflow, lsflow, ttflow,
 347 aeflow). The results showed that the global MANOVA produced statistically significant
 348 differences depending on the profiles used (Wilk's lambda of .79; $F_{18,1944} = 13.52$; $p <$
 349 $.001$). ANOVAs were performed for every one of the flow dimensions, as well as for
 350 Global Flow, in order to specify which independent variable values produce the
 351 differences found. The results are shown in Table 4.

352 (TABLE 4 HERE)

353 Statistically significant differences appeared in both global flow and in the
 354 different dimensions that form it depending on the cluster. The mean value in global
 355 flow for cluster 1, "high motivational profile", was 6.58 ($SD = 1.57$). For cluster 2, "low
 356 motivational profile", the mean value of global flow was 5.09 ($SD = 1.43$). Cluster 3,
 357 "mastery motivational profile", had a mean flow value of 6.15 ($SD = 1.43$). These
 358 differences in global flow were statistically significant ($F_{2,980} = -82.24$; $p < .001$). After
 359 completing post hoc comparisons using the Scheffé test, there were statistically
 360 significant differences ($p < .002$) between all the two-by-two comparisons of the
 361 clusters. This pattern was repeated in all the other dimensions. Only in the cgflow and
 362 aeflow dimensions were there no statistically significant differences ($p > .05$) between
 363 the "high motivational profile" cluster and the "mastery motivational profile" cluster.

364 As far as gender is concerned, there was a higher percentage of boys than girls in
365 the cluster characterized by high motivation, whilst the girls were more numerous in the
366 mastery motivational profile group. However, the percentage of girls and boys in the
367 low motivational cluster was similar.

368 To sum up, comparatively speaking, the students in the “high motivational
369 profile” had higher values in both global flow and in its nine dimensions, followed by
370 the “mastery motivational profile” students and, finally, the “low motivational profile”
371 students had lower flow values.

372 DISCUSSION

373 This study aimed at clarifying the motivation profile of the physical education by
374 applying the achievement goal theory, and also exploring the relation between extracted
375 motivational profiles and perceived flow experiences.

376 In order to examine the motivation patterns of physical education as the first
377 purpose, three mixed motivational clusters were extracted. Instead of using mean- or
378 median-split to create the four goal-orientation profiles and the four motivational-
379 climate groups (high task / high ego, high task / low ego, low task / high ego and low
380 task /low ego), this study examined the intra-individual differences in motivational
381 types associated with personal and situational factors using cluster analysis. This way of
382 identifying homogenous grouping may be more realistic than artificially imposing a
383 structure on the observed data.

384 The first motivational cluster was called “high motivational profile”. Students in
385 this cluster had relatively high levels of ego and task orientation and perceived
386 relatively moderate ego- and task-involving climate levels. Bearing in mind the
387 significantly negative association found between the perception of an ego-oriented
388 climate and the perception of a task-oriented climate, in line with other research

389 (Jagacinski & Nicholls, 1984; Duda & Nicholls, 1992; Cury *et al.*, 1996; Papaioannou
390 & Theodorakis, 1996; Escartí *et al.*, 1999; Cervelló & Santos-Rosa, 2000;), and
391 considering that the perception of an ego-oriented climate has been associated with
392 cognitive, affective and maladaptive behavioral patterns (Nicholls, 1984, 1989; Ames,
393 1992a, b; Reinboth & Duda, 2004), we could have anticipated that the students in this
394 first cluster would report low levels on the perception of an ego-oriented climate in this
395 first cluster. Unexpectedly, the results show that a relatively moderate level of
396 perception of an ego-oriented climate can be combined with moderate or high levels of
397 a task-oriented climate and task and ego orientation. Recent research has shown that the
398 combination of high task- and ego-involving motivational climates has positive effects
399 on enjoyment (Papaioannou, Marsh, & Theodorakis, 2004), whereas the effects of an
400 ego-involving climate are negative when the task-involving climate is low (Roberts,
401 2001). It is clearly worth paying attention to this subject in future research. It would be
402 interesting to understand which factors make a student feel ego- and task-oriented and
403 perceive an ego-oriented and a task-oriented climate, all at the same time. The research
404 should also determine if this profile is relatively stable in the physical education context
405 or whether it is something transitory, because students will eventually change to a
406 profile more determined by task or ego components.

407 The most undesirable cluster was the second one, called “low motivational
408 profile”. Students in this cluster reported very low levels of task orientation and
409 relatively low levels of ego orientation and task-involving climate. In contrast, these
410 children reported relatively high levels of ego-oriented climate. Clearly, these students
411 are motivationally at risk because both motivational dispositions and the perception of a
412 task-oriented climate have proved to be predictors of future participation in physical
413 activity (Papaioannou & Theodorakis, 1996). Similarly, the perception of an ego-

414 oriented climate has been viewed as a maladaptive pattern for achievement behaviors in
415 sport (Nicholls, 1984, 1989; Ames, 1992a, b; Reinboth & Duda, 2004), unless, as stated
416 above, it is accompanied by moderate levels of perception of a task-oriented climate
417 (Roberts, 2001; Papaioannou *et al.*, 2004).

418 The third motivational profile that emerged from the cluster analyses represented
419 those students with relatively high levels of task orientation and perceived task-
420 involving climate and relatively low levels in the measures involving ego (ego
421 orientation and ego-involving climate). This cluster is clearly in line with previous
422 studies which point the associations between the dispositional achievement goals and
423 the perception of motivational climates within educational contexts (Ames & Ames,
424 1984; Ames & Archer, 1988; Ames, 1992a, b). Nevertheless, considering the three
425 profiles that have emerged from the cluster analysis in general, our results are in line
426 with prior studies that have concluded that labeling people into extreme groups of high
427 or low motivation is too simple (Hodge & Petlichkoff, 2000; Wang & Biddle, 2001;
428 Ntoumanis, 2002; Wang, Chatzisarantis, Spray, & Biddle, 2002).

429 A second aim of this study was to explore the relation between the emerged
430 motivational profiles and the perceived flow experiences. Post hoc comparisons using
431 the Scheffé test highlighted statistically significant differences between the clusters. The
432 mean value in global flow for the high motivational profile group was 6.58 ($SD = 1.57$)
433 on a scale of 10, 5.09 ($SD = 1.43$) for the low motivational profile, and 6.15 ($SD = 1.43$)
434 for the mastery group. This pattern of difference between the clusters was repeated for
435 the flow dimensions. Nevertheless, the significant difference on perceived flow
436 experiences among the three emerged clusters is of particular interest in terms of the
437 relative influence of personal and situational motivational factors.

438 Out of the entire sample, the students grouped in the low motivational profile
439 group had the lowest scores in perceived flow experiences. Given that this cluster was
440 characterized by a relatively high ego-involving climate and relatively low task and ego
441 orientation and task-involving climate, it would appear that the perception of an ego-
442 involving climate may not be as relevant to flow experiences as the other variables. In
443 fact, the ego-involving motivational climate did not show a significant correlation with
444 the global flow value, and the statistically significant associations with four of the flow
445 dimensions (aaflow, ctflow, ttflow y aeflow) were very weak. Nevertheless, we should
446 also consider that the value of perceived flow experiences differs significantly between
447 the high motivational group and the mastery profile. Given that, relatively speaking,
448 every one of these profile groups was characterized by a moderate to high-task
449 component (task orientation and task-involving climate), it appears that the variation in
450 the ego component (ego orientation and ego-involving climate) might be a contributing
451 factor to explain the differences in flow ratings between these two profile groups.

452 At first sight, this result seems to contradict the motivational implications of
453 personal and situational factors derived from the achievement goal theory. Researchers
454 in this perspective have defined an emphasis on task orientation and a task-involving
455 climate as a means to maximize adaptive achievement behaviors in sport and physical
456 education settings (e.g. Ames & Archer, 1988; Ames, 1992a, b; Duda & Nicholls, 1992)
457 and, in this way, they have implied that high levels of ego orientation and an ego-
458 involving climate are typically maladaptive. However, a number of studies indicate that
459 the latter are not necessarily bad or maladaptive when paired with a high task
460 orientation or a perceived ego-involving climate (Fox, Goudas, Biddle, Duda, &
461 Armstrong, 1994; Roberts, 2001; Papaioannou *et al.*, 2004). In line with these papers,
462 the difference found in perceived flow between the mastery and the high motivational

463 profile group may be explained by the fact that a moderate to high task orientation and
464 task-involving climate may need to have, respectively, some level of balance
465 complemented by a moderate to high ego orientation and ego-involving climate to
466 foster an adaptive goal profile with respect to perceived flow experiences.

467 In this study, we found that the global mean in the task subscales (task orientation
468 and task-involving climate) had moderate to high values (7.78 and 6.11 on a scale of
469 10), whilst the means in the ego subscales (ego orientation and ego-involving climate)
470 had moderate to low values (5.20 and 3.26). Similar results have been found in other
471 research (Fox *et al.*, 1994; Hodge & Petlichkoff, 2000; Cervelló, Jiménez, Del Villar,
472 Ramos, & Santos-Rosa, 2004; Moreno, Cervelló & González-Cutre, 2007).
473 Consequently, perhaps the issue to facilitate perceived flow experiences does not lie so
474 much in increasing the task orientation and task-involving climate, but rather in
475 achieving a balance complementing the latter with average to high values of ego
476 orientation and ego-involving climate. Our cluster analysis results, at least for this
477 sample, seem to support this idea with regard to perceived flow experiences. Therefore,
478 the group of students that showed the highest levels of perceived flow was the one that
479 combined relatively high levels of ego and task orientation and relatively moderate
480 levels of ego and task-involving climate. Future research should clarify the extent to
481 which mastery and performance components should complement each other so that
482 adaptive motivational behavior can emerge in physical education.

483 As far as the composition of the cluster is concerned, fortunately a higher number
484 of students was found in the 'high motivational' group (40.28%). Furthermore, another
485 32.15% of the sample was found in the mastery profile group. As in other studies, the
486 results indicate that the group with fewer participants was the one that showed the
487 lowest motivation (Wang & Biddle, 2001; Ntoumanis, 2002; Moreno, Cervelló &

488 González-Cutre, 2007). However, for the sample in this study, approximately 27% of
489 the students reported relatively low or very low levels of ego and task orientation and
490 task-involving climate. This percentage should be worrying for the physical education
491 context and the teachers and this group should be a focus of attention for the curriculum
492 in classes. In this regard, Spray (2000) has suggested that in a compulsory education
493 context, situational influences can have a stronger impact than goal orientations on
494 motivation to learn. In this way, the results of the research support the idea of students
495 having goals on entering their physical education classes (see Chen, 2001). Therefore,
496 the design of learning tasks would play a critical role in the manipulation of students'
497 motivational perceptions and in their interest in learning. If that is the case, physical
498 education teachers should participate in their classes using teaching strategies that
499 improve positive emotions and feelings.

500 Prior studies on motivational profiles have found that girls are usually in the low
501 motivation groups and in mastery-oriented clusters, whilst the boys are usually
502 overrepresented in the high motivation groups (Wang & Biddle, 2001; McNeill &
503 Wang, 2005; Moreno, Cervelló & González-Cutre, 2007). The findings of this study are
504 partially consistent with that research. A greater number of boys were represented in the
505 cluster characterized by high motivation. Moreover, girls were overrepresented in the
506 mastery motivational profile group. Nevertheless, the representation percentage of girls
507 in the low motivational cluster was not much higher than the boys'.

508 As far as motivational differences are concerned, research usually indicates that
509 boys tend to perceive an ego-involving climate and be more ego-oriented than girls
510 (Duda, 1989; White & Duda, 1994; Spray & Biddle, 1997; White, Kavassanu & Guest,
511 1998; Duda & Whitehead, 1998; Ntoumanis & Biddle, 1999; Carr & Weigand, 2001).
512 On the other hand, several studies have demonstrated how gender determines children's

513 perception within physical education classes and how it affects task engagement.
514 Specifically, research that has examined the treatment of children of different genders
515 has demonstrated that girls receive less positive feedback and do not have the same
516 chances to participate as boys (Martinek, 1989; Lirgg, 1993). As studies have shown,
517 teachers usually encourage boys more strongly than they do girls, and children probably
518 perceive this unequal treatment (Martinek, 1989; Papaioannou, 1995; Cervelló *et al.*,
519 2004). Results of this study suggest that it could foster certain levels of ego orientation
520 and ego-involving climate and thus facilitate a complementary balance with task
521 orientation and task-involving climate levels, as occurs in the high motivational profile
522 group. In this respect, besides promoting flow experiences with task-involving
523 environments, physical education teachers could create some aspects of an ego-
524 involving motivational environment in order to effectively combine task and ego
525 components. In general, future research should determine the extent and the manner in
526 which both components could be combined to create adaptive achievement behaviors in
527 physical education contexts. The complex nature of interaction between achievement
528 goals, perceived motivational climate and students' psychological state may depend on
529 physical activity settings. Therefore, research should also be carried out with different
530 physical activity settings and with different students of different ages. In this latter case,
531 understanding the developmental pattern of motivational behavior in education would
532 help us to know whether the high and mastery motivational profiles are more evident in
533 early childhood and controlling low motivational profiles more widespread in late
534 childhood and adolescence.

535 Certain limitations should also be acknowledged in this research. Firstly, the
536 measurement of the variables was self-reported data and the use of these measurements
537 may create error. In line with this first limitation, we must highlight that our work is a

538 correlational study and, therefore, the interpretation of the results is speculative and it is
539 based a priori on theoretical assumptions that should be tested experimentally.
540 Furthermore, it should be recognized that the relationships between motivation and flow
541 experiences are probably affected by social and not only instructional goals. In this
542 vein, recent studies have pointed out (Urduan & Maehr, 1995; Stuntz & Weiss, 2003;
543 Guan, Xiang, McBride, & Bruene, 2006) that only using task and ego goal orientations
544 to explain achievement behaviors may be incomplete and, therefore, social goals should
545 also be considered in future studies to define success in achievement situations and
546 understand students' engagement (Wentzel, 1992, 1999).

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TABLE 1

MEANS, STANDARD DEVIATIONS, ALPHA COEFFICIENT AND CORRELATIONS FOR ALL VARIABLES

Measure	M	SD	α	r													
				1	2	3	4	5	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
1. Ego involving motivational climate	3.26	1.45	.77		-.28**	.20**	-.17**	-.00	.03	.10**	-.03	-.00	-.08**	-.05	.04	.06*	-.11**
2. Task involving motivational climate	6.11	1.51	.73			.04	.32**	.36**	.31**	.23**	.36**	.29**	.30**	.32**	.19**	.18**	.38**
3. Ego orientation	5.20	2.97	.92				.38**	.30**	.31**	.28**	.24**	.28**	.19**	.25**	.19**	.174**	.19**
4. Task orientation	7.78	2.06	.89					.40**	.35**	.27**	.41**	.34**	.38**	.37**	.18**	.14**	.35**
5. Dispositional Flow	6.03	1.61	.94						.85**	.72**	.85**	.86**	.81**	.86**	.71**	.53**	.79**
5.1. csflow	5.93	1.97	.76							.63**	.70**	.74**	.63**	.70**	.54**	.38**	.68**
5.2. aaflow	5.30	2.05	.76								.55**	.60**	.47**	.55**	.42**	.37**	.47**
5.3. cgflow	6.52	1.97	.74									.74**	.74**	.75**	.53**	.32**	.66**
5.4. ufflow	6.46	2.12	.80										.69**	.77**	.55**	.32**	.63**
5.5. ctflow	6.48	2.03	.78											.76**	.53**	.29**	.60**
5.6. scflow	6.29	2.05	.80												.57**	.34**	.63**
5.7. lsflow	6.02	2.22	.76													.32**	.46**
5.8. ttflow	5.28	2.03	.65														.37**
5.9. aeflow	6.44	2.15	.78														

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

TABLE 2
FINAL CONGLOMERATE CENTERS AND N FOR THE THREE-
SOLUTION OF THE K-MEANS CLUSTER ANALYSIS

	Clusters		
	1	2	3
Ego-involving climate	.19	.56	-.72
Task-involving climate	.09	-.83	.59
Ego orientation	.94	-.48	-.77
Task orientation	.53	-1.07	.25
Cluster Characteristics			
Cluster <i>n</i>	396	271	316
Males <i>n</i> (%)	242 (61.1)	131 (48.3)	125 (39.6)
Females <i>n</i> (%)	154 (38.9)	140 (51.7)	191 (60.4)

TABLE 3
ANOVA TO EXAMINE THE SIGNIFICANCE OF THE VARIABLES IN THE CLUSTER
FORMATION FOR THE THREE-CLUSTER SOLUTION OF THE K-MEANS CLUSTER
ANALYSIS

	Cluster		Error		<i>F</i>
	S. Mean	<i>SD</i>	S. Mean	<i>SD</i>	
Ego-involving climate	133.035	2	.731	980	182.10*
Task-involving climate	151.542	2	.693	980	218.74*
Ego orientation	305.218	2	.379	980	805.00*
Task orientation	222.941	2	.547	980	407.52*

* $p < .001$

FIGURE 1
CLUSTER PROFILES FOR THE THREE-CLUSTER SOLUTION OF THE K-MEANS
CLUSTER ANALYSIS

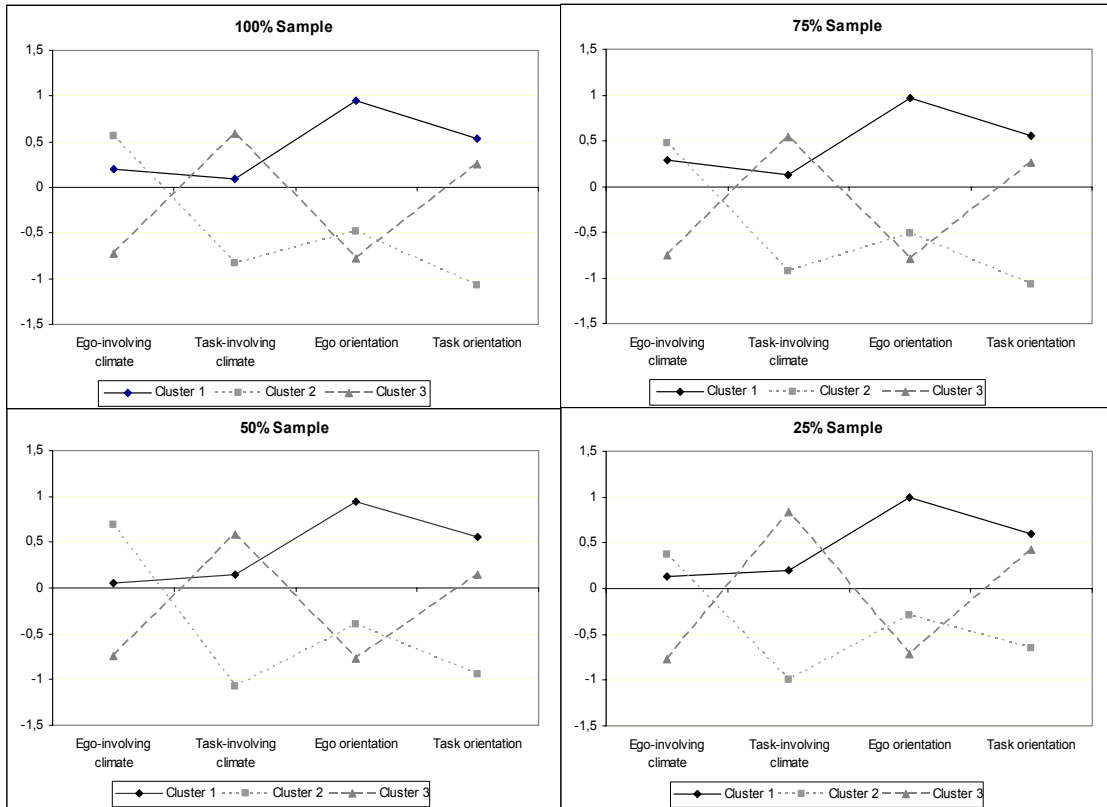


TABLE 4
DESCRIPTIVES AND ANOVA OF GLOBAL DISPOSITIONAL FLOW AND FLOW
DIMENSIONS BY CLUSTER

		N	M	SD	$F_{2,980}$
Dispositional Flow	Cluster 1	396	6.58	1.57	82.24*
	Cluster 2	271	5.09	1.43	
	Cluster 3	316	6.15	1.43	
Csflow	Cluster 1	396	6.60	1.87	67.24*
	Cluster 2	271	4.90	1.83	
	Cluster 3	316	5.97	1.83	
Aaflow	Cluster 1	396	5.87	2.08	33.65*
	Cluster 2	271	4.60	1.79	
	Cluster 3	316	5.18	2.01	
Cgflow	Cluster 1	396	7.08	1.81	74.40*
	Cluster 2	271	5.37	1.84	
	Cluster 3	316	6.79	1.84	
Ufflow	Cluster 1	396	6.73	1.95	58.67*
	Cluster 2	271	5.02	2.03	
	Cluster 3	316	6.10	2.04	
Ctflow	Cluster 1	396	6.92	1.97	52.36*
	Cluster 2	271	5.46	1.98	
	Cluster 3	316	6.80	1.83	
Scflow	Cluster 1	396	6.90	1.96	67.73*
	Cluster 2	271	5.17	1.91	
	Cluster 3	316	6.48	1.88	
Lsflow	Cluster 1	396	6.50	2.17	21.95*
	Cluster 2	271	5.37	1.99	
	Cluster 3	316	5.96	2.30	
Ttflow	Cluster 1	396	5.71	2.05	20.63*
	Cluster 2	271	4.71	1.79	
	Cluster 3	316	5.21	2.06	
Aeflow	Cluster 1	396	6.92	2.01	72.840*
	Cluster 2	271	5.18	1.95	
	Cluster 3	316	6.89	2.04	

* $p < .001$