

# Measuring Perceived Motivational Climate in Physical Education

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A new instrument of motivational climate in physical education is presented with the goal of measuring perceptions of teachers' emphasis on mastery, performance–approach, performance–avoidance, and social approval goals. The measure was based on the principle of compatibility, according to which climate perceptions and achievement goals should be compatible between each other in terms of target, action domain, life context, and time. The measure was administered to 928 middle school students alongside scales of intrinsic motivation, amotivation, and satisfaction. The statistical analyses included structural equation modeling, investigation of factor correlations, correlation of this measure with intrinsic motivation, satisfaction, and amotivation in physical education and investigation of intraclass correlations. The findings provide evidence of construct validity for the new measure and suggest that mastery and social approval goals can facilitate intrinsic motivation of students.

**Key Words:** validity, compatibility, cross-validation, intervention, questionnaire

It is widely believed that teachers create an environment in their classes that is responsible for students' success and failure. This view did not go unnoticed by many investigators who conducted research on motivational climate in physical education (Ntoumanis & Biddle, 1999a). The term *perceived motivation climate* refers to individual composite views regarding the situationally emphasized goal structures operating in achievement settings (Ames, 1992). Two classes of achievement goals have been described.

When success and failure are defined in comparison to the performance of others, a performance goal orientation is adopted, but when self-referenced criteria of success are used, a mastery goal orientation prevails (Ames, 1992; Dweck &

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Leggett, 1988; Elliot & Harackiewicz, 1996; Nicholls, 1989).<sup>1</sup> Extensive research has established that the effect of a mastery climate on positive motivational outcomes (e.g., satisfaction, positive attitudes toward the lesson, and intrinsic motivation) is large and positive, whereas the effect of performance climate on positive outcomes is small and negative (Ntoumanis & Biddle, 1999a). By contrast, the impact of mastery climate on negative motivational outcomes (e.g., anxiety) is small and negative, whereas the impact of performance climate on negative outcomes is moderate and positive.

Most of the existing research on motivational climate has relied on self-reports (Duda & Whitehead, 1998; Mitchell, 1996; Papaioannou, 1994; Seifriz, Duda, & Chi, 1992). However, these instruments are not in line with recent advances in achievement goals literature that incorporate approach and avoidance goals (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Moreover, concurring with others who suggest that the two achievement goals are unlikely to explain all the variance in achievement situations, a case is made here to capture motivational climate emphasizing social approval goals (Maehr & Nicholls, 1980; Urdan & Maehr, 1995).<sup>2</sup> Further, some weaknesses of the existing measures are presented, and the principle of compatibility (Ajzen & Fishbein, 1977) is delineated and proposed as a requirement for future perceived motivational climate instruments.

To circumvent these limitations, a new measure of perceived motivational climate is presented. It assesses physical education teachers' emphasis on four goals, namely, mastery, performance-approach, performance-avoidance, and social approval. Its development was based on the principle of compatibility. Because the assessment of perceived motivational climate should be clearly distinct from students' goals and motivational outcomes (Duda & Whitehead, 1998; Ferrer-Caja & Weiss, 2002), the motivational climate measure presented here is examined in relation to a measure assessing individual differences in achievement goals.

## **Current Measures of Perceived Motivational Climate and the Principle of Compatibility**

Based on Ames's observation (Ames 1992; Ames & Archer, 1988) that motivational climate is a composite of a number of dimensions—such as the basis and type of evaluation present, the amount of social comparison present, the nature and source of rewards and reinforcement, and the ways in which those in the context are expected to work and regard each other—multiscale questionnaires were developed to tap these climate dimensions (Mitchell, 1996; Newton, Duda, & Yin, 2000; Papaioannou, 1994; 1998).

There are some limitations in these instruments. The confirmatory factor analytic reported by Newton et al. (2000) indicated low goodness-of-fit indices. Moreover, their tool was designed for the sport context, so some of its factors (e.g., intra-team member rivalry) are meaningless for physical education. The instrument of Mitchell (1996) is not tied to a particular achievement goal theory and many of its items start with the word "I," something that is also found in the instruments of Ames and Archer (1988), Papaioannou (1994), and Goudas and Biddle (1994). As Duda and Whitehead (1998) observed, items starting with the word "I" confound students' perceptions of the goal structure operating in their classes with their personal goals (e.g., Goudas & Biddle, 1994; Papaioannou, 1994) and motivational

outcomes (Mitchell, 1996). To circumvent this problem, in subsequent research Papaioannou (1998) used a two-factor instrument assessing perceptions of teachers' emphasis on mastery and performance goals, respectively (Papaioannou, Marsh & Theodorakis, 2004).

Moreover, several subscales of the existing climate measures capture situations that primarily activate cognitions or emotions that are linked with achievement goals but they are not achievement goals per se. Situations such as "important role for each team member," "punishment for mistakes," "unequal recognition" (Newton et al., 2000), "perception of choice" and "teacher support" (Goudas & Biddle, 1994), and "threat" (Mitchell, 1996) have indirect impact on task and ego-oriented goals through the activation of other cognitive-affective mediating units (Mischel & Shoda, 1998), most likely through self-respect, fear, expectations, self-determination, and sense of relatedness.

Taking into consideration that perceived motivational climate measures are most useful in research investigating situational effects on students' goals and corresponding motivational outcomes (Ferrer-Caja & Weiss, 2002), we believe that it is not enough to assess what a student perceives, but it should be also captured whether this perception activates goals that are supposed to affect students' behavior. This presupposition is central to contemporary cybernetic models of motivation (Carver & Scheier, 1998) and classic social-cognitive theories in social psychology and personality (Bandura, 1986; Mischel & Shoda, 1998). These theories suggest that a goal is always activated by an encoding process, which can be either a perception of an external feature of situation or self-generating stimuli (as in thinking, fantasy, and daydreaming). According to Carver and Scheier (1998), the process "stimuli → perception → goal → behavior/emotion/ cognition" is followed for all goals whatever their level of abstraction, for life tasks (Cantor & Fleeson, 1991), for achievement goals (Dweck & Leggett, 1988; Nicholls, 1989), and for temporary goals like current concerns (Klinger, 1975).

One cannot assess whether a perception energizes an achievement goal using items such as "the teacher is more a friend than a figure of authority" (Goudas & Biddle, 1994, p. 244). A student who agrees with this item does not necessarily imply that this teacher facilitates optimum challenge for all students and self-referenced improvement in meaningful tasks, which are preconditions of high task involvement in achievement goals theory. Importantly, this item makes no reference to task-oriented goals of the students. However, the items should also capture whether the structure of this situation is intended to affect students' task orientation too. For example, in the item "our teacher makes sure that I understand how to perform a skill before we move on to another" (Papaioannou, 1998, p. 270), the teacher is perceived to reinforce the task-oriented goal of the student. In the research stage involving the development of perception items, researchers should adopt what we called *the principle of compatibility*, according to which the perception and goal measures should be compatible with each other to the extent that their target, action domain, life context, and time elements are assessed at identical levels of generality or specificity. This approach and terminology was borrowed from Ajzen and Fishbein (1977), who formulated the principle of compatibility in their theory focusing on the attitude-behavior relations.

Duda and Whitehead (1998) seem to be aware of this problem. On one hand, they acknowledged that the measurement of motivational climate would be more

conceptually tidy if researchers restrict the assessment to the elements of task- and ego-involving situations identified by goal perspectives theory. On the other hand, they accepted that the assessment of multiple climate dimensions is more ecologically relevant. If we adopt the principle of compatibility, we can clarify the arguments of Duda and Whitehead (1998) by suggesting that researchers need two types of perceived climate measures. The first should be precise in the measurement of motivational climate perceptions that are most likely to activate achievement goals. An instrument like this is presented here. We also need questionnaires that assess the multifaceted character of motivational climate, including perception of choice, teacher support, punishment for mistakes, threat, and the like, that are captured by the existing instruments (Goudas & Biddle, 1994; Mitchell, 1996; Newton et al., 2000). The latter climate dimensions may indirectly influence achievement goals, but they directly affect several other important determinants of participation in physical activity contexts. Although it seems better to have one instrument combining the two aforementioned types of measures, the assessment of all the facets of motivational climate and their effects on different goals requires a large tool that makes it impractical. The present climate measure focused only on the role of the teacher in the promotion of achievement goals. This approach is compatible with the popular belief that leaders (e.g., coaches or physical education teachers) are particularly responsible for the motivational climate in their sport teams and physical education classes. It is acknowledged, however, that climate is made up by other factors, such as the students and the curriculum.

## **The Approach–Avoidance Distinction**

In line with recent developments in psychology that have unveiled approach and avoidance systems in self-regulation (Higgins, 1997) and emotion (Gray, 1990), Elliot and his colleagues suggested that the motivational outcomes of mastery and performance goals can be better understood if we split them in the approach–avoidance dimension. Accordingly, they first split the performance dimension into performance–approach and performance–avoidance goals (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Given that this differentiation occurred just recently, the existing motivational climate measures are not adapted to assess class climate factors affecting students' avoidance goals. Although the climate measures capture perceptions of threat and worries, it is not clear whether these perceptions are linked with mastery avoidance or performance–avoidance goals or with both of them. According to the principle of compatibility, we should have two subscales: one capturing climate perceptions activating performance–avoidance goals and the other should assess climate perceptions mobilizing mastery avoidance goals. Recently, Elliot and McGregor (2001) added mastery avoidance in this model, but the present study was conducted before the publication of the four-factor model. Moreover, currently the identification of teaching practices that promote mastery avoidance goals is still vague. This prohibits the development of a valid mastery avoidance climate scale and raises serious reservations about whether students can distinguish between teaching practices that activate mastery avoidance goals and teachers' behaviors that activate performance–avoidance goals. Hence, the proposed instrument is based on the trichotomous model focusing on mastery approach, performance–approach, and performance–avoidance goals (Cury, Da Fonseca,

Rufo, & Sarrazin, 2002; Cury, Elliot, Sarrazin, Da Fonseca & Rufo, 2002; Elliot & Church, 1997).

## The Assessment of Social Approval Goals

Recently, a resurgent interest in social goals in sport (Allen, 2003) and physical education settings (Guan, Xiang, McBride & Bruene, 2006) emerged. Consistent with this trend is the present focus on social approval goals. In the original achievement goals model (Maehr & Nicholls, 1980), social approval was considered as a third achievement goal,<sup>2</sup> with different motivational consequences than the other two goals. Although research on this goal vanished for many years, some researchers suggested that this goal has significant motivational outcomes in collectivistic societies (Hayashi, 1996). Moreover, social approval goals probably have positive effects on the achievement of collectivistic minorities living in individualistic societies. For example, Verkuyten, Thijs, and Canatan (2001) found that family-oriented achievement motivation was positively related to mastery goals and academic achievement for Turkish immigrant students living in Netherlands but these relationships were almost zero for Dutch students.

Maehr and Nicholls (1980) described social approval motivation as the behavior directed at maximizing the chances of attributing high effort to oneself and minimizing the chances of attributing low effort to oneself. They based this position on the assumption that effort (unlike ability) is seen as voluntary and something that anyone can display. It can, therefore, indicate conformity to norms or virtuous intent rather than superior talent. Hence, social approval goals indicate virtuous intentions or personal commitment rather than ability.

One can hardly find this presupposition in existing social approval scales. For example, Allen (2003) reported that her four-item social recognition subscale captures a social validation goal incorporating both social approval and social status. However, social status is connected with ability but not high effort, which is exactly opposite the definition of social approval goals provided by Maehr and Nicholls (1980). The adoption of social approval goals is expected to lead to high levels of effort, which in turn should have positive relationship with the adoption of task/mastery goals. Nevertheless, Allen's (2003) social recognition scale was not related to task-involving goals, but it had a moderate positive relationship with ego-involving goals. These findings support our argument that Allen's (2003) social recognition scale was connected with ability and may instead indicate intentions to gain social status, but certainly not social approval. Ewing's (1981) four-item social approval orientation scale had low internal consistency (Whitehead, 1995) and weak factor structure (Weiss & Chaumeton, 1992), and it also does not meet the presupposition of Maehr and Nicholls (1980).

To differentiate the mastery from the social approval items, one should examine the consequences of success in the social relations. Triandis, Kilty, Shanmugam, Tanaka, and Vassiliou (1972) suggested that consequences of success vary between cultures. Because the present study was conducted in Greece, pertinent to this research is the finding of Triandis et al. (1972) that the top consequence of success for Greeks was *love*. These authors suggested that in Greece success leads to greater acceptance by the in-group and the concept of love is strongly connected with approval from members of the in-group. Therefore, for the Greek physical

education context, the social approval items should describe the adoption of task-related behaviors and people's wish to be loved by others.

## The Present Study

This study was undertaken to provide evidence regarding the construct validity of an instrument measuring motivational climate. Based on the rule of compatibility, two distinct scales were developed. The first one was designed to measure students' goal orientation, whereas the second one was designed to measure their perceptions of physical education teachers' emphasis on goals. In developing these scales, an effort has been made to incorporate recent advances in the field of goal orientation (e.g., the split of performance goals into performance–approach and performance–avoidance goals) and overcome previous instruments' shortcomings (poor conceptualization of social approval goals).

Establishing the construct validity of an instrument is an on going process. According to Marsh (1998), a within-network and between-network approach is needed to evaluate the validity of a measure. Within-network or internal construct validation approaches (Fox, 1998) include factor analysis and examination of the factor correlation pattern. Between-network or external construct validation approaches investigate patterns of relationships between subscales and external criteria. Thus in this study we examined the internal structure of the instruments; their internal consistency; whether they are distinct from each other; whether the predicted relationships exist among factors; and whether a logical, theoretical consistent pattern of relations exists between our measure and intrinsic motivation, amotivation, and satisfaction in physical education. We expected mastery scales to correspond positively with intrinsic motivation and satisfaction but performance scales to have positive relationship with less self-determined forms of motivation, such as amotivation (Elliot & Church, 1997). Moreover, the proportion of variance attributable to class influences (Kenny & Lavoie, 1985) was examined. Finally, because the present study was conducted in Greece, the findings in conjunction with those from other countries (e.g., Guan et. al., 2006) allow one to extract inferences about the cross-cultural generalization of findings and teaching implications based on achievement goal theory.

## Method

### Participants

The initial sample of the study consisted of 928 secondary school students. Their schools were randomly selected from among all available schools in the eastern part of a large metropolitan city of Northern Greece. These schools were located in neighborhoods with residents who had either middle class or low-class socioeconomic background. Listwise deletion of cases with missing data restricted the sample to 770. Three hundred and seventy nine of them were males ( $M = 13.86$  years old,  $SD = .73$ ), 388 were females ( $M = 13.80$  years old,  $SD = .76$ ), and 3 did not report their gender. All students provided written consent concerning their participation in the study.

## Instrumentation

Two self-reported questionnaires were developed to assess students' (1) perceptions of physical education teachers' emphasis on goals and (2) achievement goals. One of the authors selected a pool of items from existing motivational climate and goal orientation measures and adapted them to fit the context of physical education, the goals (four goals and four corresponding perceptions), the action domain (achievement) and the time (the stem "in this physical education class" was used). Several of the selected motivational climate items had been originally developed in Greek (e.g., Papaioannou, 1994, 1998) and most of the items had been used in previous Greek studies involving large numbers of students (Papaioannou, 1994; Papaioannou et al., 2004). The results of these investigations supported the validity of these items in Greek physical education (e.g., Marsh, Papaioannou, Martin, & Theodorakis, 2006). For the new items from the English literature that were added to the pool, we followed (a) the double-translation protocol, and then (b) investigation of content validity based on the opinions of two physical education teachers who judged the meaningfulness of the new items for young adolescents participating in physical education classes. The selection of perception items was based on the principle that the item should connote a teacher who activates a particular achievement goal. Next, three researchers familiar with the tenets of goal perspective theory who were also physical education teachers judged the appropriateness of each item and reduced the number of items to 32 (8 for each subscale).

These items were administered to 96 students and their responses were analyzed via exploratory factor and scale reliability analyses. Items with high loadings on the four expected factors were considered appropriate and the remaining items were excluded from subsequent analyses and were replaced. The new version was given to a second sample of students ( $n = 105$ ) and the data were also analyzed via exploratory factor and reliability analyses.<sup>3</sup> The final versions are presented below. Participants in the pilot studies were excluded from the following two main studies.

***Students' Perceptions of Their Physical Education (PE) Teachers' Emphasis on Goals.*** Following the stem "My physical education teacher", students responded to the 24 items shown in the Appendix of this article, assessing the teacher's emphasis on mastery, teacher's emphasis on performance–approach, teacher's emphasis on performance–avoidance and teacher's emphasis on social approval. Respondents were asked to indicate how much they agree with each of the 24 statements. Responses were given on a 5-point Likert scale with anchors of 5 = *strongly agree* and 1 = *strongly disagree*.

***Achievement Goals.*** Overall, this measure comprised 24 items assessing four dispositional goals, mastery, performance–approach, performance–avoidance and social approval (Appendix). Following the stem "In the physical education lesson", respondents were asked to indicate how much they agree with each of the 24 statements. Responses were given on a 5-point Likert scale with anchors of 5 = *strongly agree*, and 1 = *strongly disagree*.

***Satisfaction.*** The five-item scale of Duda and Nicholls (1992) assessing satisfaction in sport was adapted to physical education class. Item examples of this scale are "I usually enjoy the physical education class" and "In the physical education

class, I usually find time flies.” The scale had been adapted to Greek in previous studies supporting its validity and reliability (e.g., Papaioannou, Milosis, Kosmidou, & Tsigilis, 2002; Papaioannou, 2006).

***Intrinsic Motivation and Amotivation.*** The Sport Motivation Scale (SMS; Pelletier et al. 1995) is a measure of intrinsic–extrinsic motivation and amotivation in sport. We adapted the 12 intrinsic motivation items and the 4 amotivation items of SMS for physical education. Responses were given on a 7-point Likert scale with anchors of 1 = *does not correspond at all*, and 7 = *corresponds exactly*. Double-translation was used to adapt these items in Greek.

## Procedure

Prior to the main study, permission from the principal of each school was requested and granted. Self-reported questionnaires were administered during PE classes in a quiet place. Students were informed that their participation in the study was voluntary and no extra credits would be given. An author was always present to answer any questions posed by the students.

## Data Analysis

Construct validity of students’ goals and their corresponding perceptions were examined using structural equation modeling procedures. This procedure entails specifying the hypothesized relationships among variables in the postulated model and assessing whether those relations adequately account for the observed data. All analyses were conducted using the SPSS statistical program AMOS 3.62 (Arbuckle, 1997).

***Model Specification.*** At the first stage of the analysis, the distinctiveness between perceptions and their matching goals was examined. Two models were postulated and tested. The first model comprised eight latent factors, four perceptions, and four corresponding goals. Each latent variable was associated only with the six items assessing one particular goal or perception. This model was contrasted with an alternative four-factor model, where the goals and corresponding perception items loaded on the same factor. This alternative four-factor model postulated that the six mastery goals items and the six items assessing perceptions of teachers’ emphasis on mastery goals were associated with the first latent variable, the six performance–approach goals items and the six items assessing perceptions of teachers’ emphasis on performance–approach goals were associated with the second latent variable, and so on. Preliminary analyses showed that the latent variables should be associated with each other.

The next stage of analysis focused on establishing the distinctiveness of social approval factor from the remaining three factors. For both goals and perceptions measures, a number of alternative three-factor models were developed in which the mastery, performance–approach, and performance–avoidance factors were independent from each other and the social approval items did not constitute a separate factor but were free to load on one or all of these factors. It was expected that these alternative three-factor models without a distinct social approval factor would be inferior to the four-factor models.

**Assessment of Fit.** The overall fit of the data to the postulated models was evaluated using the chi-square statistic. Nonsignificant values suggest a good fit, because they indicate minor discrepancy between the observed and the estimated covariance matrix. Supplement to the conventional  $\chi^2$ , absolute and incremental indices were used to assess the adequacy of the postulated models (Hoyle & Panter, 1995). Recently, Fan, Thompson, and Wang (1999) revealed that the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Tucker & Lewis, 1973) and the root mean square error of approximation (RMSEA; Bentler, 1995) were less sensitive to sample size and estimation method, whereas CFI and TLI were less sensitive to model misspecification.

Based on the above considerations, it was decided to present the chi-square statistic, the chi-square statistic divided by the degrees of freedom, an absolute fit index, the root mean square error of approximation, and two incremental fit indexes: the comparative fit index and the Tucker-Lewis index. According to Hu and Bentler (1999) cut-off values close to .06 for RMSEA, and close to .95 for CFI and TLI are needed before we can declare a relatively good fit between the observed data and the hypothesized model. Moreover, in case of contrasting nonnested competing models, Browne and Cudeck's (1989) expected cross-validation index (ECVI) along with a 90% confidence interval was employed. The model with the smaller ECVI value indicates a better and more parsimonious model fit.

**Class Influences.** Because valid class climate scales should discriminate classes of different climate (Fraser, 1986; Papaioannou et al., 2004), for every climate score the intraclass correlation was computed (Kenny & Lavoie, 1985). This is the sum of the variance components for class divided by the sum of the variance components for class and students.

**Criterion Validity.** The between-network construct validation approach included correlations of the goals and perceptions with intrinsic motivation, amotivation, and satisfaction in physical education. Moreover, these three external variables were hierarchically regressed on the four perceptions at the first step and on the four goals at the second step. The purpose of this analysis was twofold: first to examine the contribution of each perception or goal in the explanation of the dependent variable when all goals or perceptions are entered into the equation and, second, to investigate whether goals and matching perceptions have unique contributions in the explanation of the dependent variable. The order of the entry of the independent variables into the regression equation is in line with theories of motivation (Carver & Scheier, 1998) and personality (Bandura, 1986; Mischel & Shoda, 1998), suggesting that perception activation triggers goal activation and this leads to important cognitive, emotional, or behavioral outcomes.

## Results

Preliminary data screening showed that most of the observed variables were not normally distributed, suggesting that the assumption of multivariate normality was not tenable. According to Bollen and Stine (1992), bootstrapping techniques may represent an ideal means to tackle problems in situations where the assumptions of adequate sample size, and/or data of a continuous scale and with multivariate normal

distribution are not met. Moreover, bootstrapping techniques work satisfactorily for any estimation criterion. In the present analysis, the maximum likelihood method of estimation was used and bootstrapping was employed in all analyses.

### Investigation of the Rule of Compatibility: Distinctiveness Between Perceptions and Their Matching Goals

Here we examined the factor structure of the new measure and whether the perception factors are distinct from the corresponding goals factors. To begin with, the four-factor model, in which the goals and matching perceptions loaded to the same factor should be rejected as indicated by all fit indices,  $\chi^2 = 4,776$ ,  $df = 1,028$ ,  $\chi^2/df = 4.65$ ,  $CFI = .735$ ,  $TLI = .721$ ,  $RMSEA = .069$ ,  $ECVI = 6.47$  (6.19–6.75). In contrast, the eight-factor model, comprising four goals and four corresponding perceptions, offered acceptable fit to the present data,  $\chi^2 = 1,796$ ,  $df = 1,006$ ,  $\chi^2/df = 1.78$ ,  $CFI = .944$ ,  $TLI = .940$ ,  $RMSEA = .032$ ,  $ECVI = 2.65$  (2.50–2.81). Thus, the eight-factor model was selected as the most tenable. It should be noted that the item 15 of the perceptions questionnaire was excluded because preliminary analyses revealed many standardized residual values above 2 (Arbuckle, 1997).

### Within-Network Construct Validation Approach: Evidence of Convergent–Discriminant Validity

The associations among the eight latent factors representing students' goals and their corresponding perceptions derived from the eight-factor model are presented in Table 1. The positive associations between goals and perceptions sharing similar meaning (e.g., between mastery goal and perception of teacher's emphasis on mastery) were of moderate value, indicating that these constructs converge but are also distinct from each other. As was expected, the two performance goals and the two performance perceptions were positively related between each other. Interestingly,

**Table 1** Interfactor Correlations Among Student's Goals and Perceptions of Teacher's Emphasis on Goals and Alpha Reliabilities in Parentheses

|                                             | 1                  | 2                  | 3                  | 4                 | 5                 | 6     | 7     | 8     |
|---------------------------------------------|--------------------|--------------------|--------------------|-------------------|-------------------|-------|-------|-------|
| <b>Personal goals</b>                       |                    |                    |                    |                   |                   |       |       |       |
| 1. Mastery                                  | (.82)              |                    |                    |                   |                   |       |       |       |
| 2. Performance approach                     | -.07 <sup>ns</sup> | (.87)              |                    |                   |                   |       |       |       |
| 3. Performance avoidance                    | -.23*              | .33*               | (.86)              |                   |                   |       |       |       |
| 4. Social approval                          | .49*               | .39*               | .20*               | (.88)             |                   |       |       |       |
| <b>Perceptions of teacher's emphasis on</b> |                    |                    |                    |                   |                   |       |       |       |
| 5. Mastery                                  | .44*               | -.03 <sup>ns</sup> | -.08 <sup>ns</sup> | .32*              | (.80)             |       |       |       |
| 6. Performance approach                     | -.02 <sup>ns</sup> | .47*               | .32*               | .23*              | .05 <sup>ns</sup> | (.73) |       |       |
| 7. Performance avoidance                    | -.20*              | .17*               | .58*               | .05 <sup>ns</sup> | -.22*             | .58*  | (.80) |       |
| 8. Social approval                          | .23*               | .16*               | .15*               | .62*              | .55*              | .44*  | .20*  | (.86) |

Note. ns = nonsignificant.

\* $p < .05$ .

the magnitude of the relationship between the two performance goals ( $r = .33$ ) was lower ( $p < .001$ ) than the magnitude of the association between the two performance perceptions ( $r = .58$ ). This finding indicates that students see the two performance-oriented perceptions as more interlinked than their own performance goals.

Divergent validity is supported by the lack of association between goals and perceptions scales tapping conceptually unrelated constructs. Hence, mastery goals and perceptions were uncorrelated with performance–approach goals and perceptions and were negatively related to performance–avoidance goals and perceptions. As was expected, the social approval scales were positively linked with mastery scales as well as with performance scales. Finally, all scales had acceptable internal consistency.

### **Distinctiveness Between Social Approval and the Three Achievement Goals Factors**

Four three-factor models were created in which the mastery, performance–approach, and performance–avoidance factors were distinct, but the social approval items did not constitute a separate factor. Instead, the social approval items were connected with the mastery factor (Model 3f\_1), or with the performance–approach factor (Model 3f\_2), or with the performance–avoidance factor (Model 3f\_3), or with all factors (Model 3f\_4). These models were applied for both goals and perceptions questionnaires. All these models were contrasted with the four-factor models in which the social approval factor was distinct from the other three factors. The ECVI 90% index is used to compare alternative models, suggesting that the best model has the lowest value. The results shown in Table 2 provide evidence that the four-factor models were superior to alternative three-factor models, suggesting that the social approval factor is clearly distinct from the remaining three achievement goal factors.

### **Class Influences**

We computed the class means for the four climate scores and conducted four regression analyses. In each analysis, one of the climate scores was the dependent variable and its corresponding class mean was the independent variable. It emerged that class differences explained a significant amount of the variance of perceptions of teachers' emphasis on (1) mastery goals (18%,  $p < .001$ ), (2) performance–approach goals (17%,  $p < .001$ ), (3) performance–avoidance goals (19%,  $p < .001$ ), and (4) social approval goals (16%,  $p < .001$ ). These findings imply that the four climate subscales capture a significant proportion of variance attributable to class differences.

### **Between-Network Construct Validation Approach: Correlation with External Criteria**

Internal consistency for the five items designed to measure satisfaction was .79. In addition, alpha coefficient for the intrinsic motivation scale was .83 and was .71 for the amotivation scale. In Table 3, the Pearson's correlation coefficients among students' goals, their corresponding perceptions, and satisfaction from the physical education and motivation are presented. Given the relative large sample size ( $n =$

**Table 2 Goodness-of-Fit Indices for Four-Factor Models and for Three-Factor Models That Do Not Include the Social Approval Factor as a Distinct Factor for the Total Sample (N = 770)**

| Model              | $\chi^2$ | df  | $\chi^2/df$ | $\Delta\chi^2$ | $\Delta df$ | CFI  | TLI  | RMSEA | ECVI 90%           |
|--------------------|----------|-----|-------------|----------------|-------------|------|------|-------|--------------------|
| <b>Goals</b>       |          |     |             |                |             |      |      |       |                    |
| Model 4f           | 540      | 246 | 2.19        |                |             | .962 | .957 | .040  | .85 (.77 – .94)    |
| Model 3f_1         | 1,479    | 249 | 5.94        | 939*           | 3           | .840 | .823 | .081  | 2.07 (1.92 – 2.24) |
| Model 3f_2         | 2,095    | 249 | 8.41        | 1,555*         | 3           | .760 | .734 | .099  | 2.88 (2.70 – 3.41) |
| Model 3f_3         | 2,337    | 249 | 9.39        | 1,797*         | 3           | .729 | .699 | .105  | 3.20 (3.00 – 3.41) |
| Model 3f_4         | 1,010    | 237 | 4.26        | 470*           | 9           | .899 | .883 | .065  | 1.49 (1.37 – 1.63) |
| <b>Perceptions</b> |          |     |             |                |             |      |      |       |                    |
| Model 4f           | 612      | 224 | 2.73        |                |             | .930 | .921 | .048  | .94 (.85 – 1.04)   |
| Model 3f_1         | 1,309    | 227 | 5.77        | 697*           | 3           | .805 | .783 | .079  | 1.84 (1.70 – 2.00) |
| Model 3f_2         | 1,185    | 227 | 5.22        | 573*           | 3           | .828 | .808 | .074  | 1.68 (1.55 – 1.83) |
| Model 3f_3         | 1,900    | 227 | 8.37        | 1,288*         | 3           | .699 | .665 | .098  | 2.62 (2.44 – 2.81) |
| Model 3f_4         | 796      | 215 | 3.70        | 184*           | 9           | .896 | .877 | .060  | 1.21 (1.10 – 1.32) |

*Note.* Model 4f contains four factors: mastery, performance–approach, performance–avoidance and social approval. Models 3f are three-factor models, where mastery, performance–approach and performance–avoidance items comprise distinct factors. In Model 3f\_1, mastery and social approval items load on the same factor. In Model 3f\_2, performance–approach and social approval items load on the same factor. In Model 3f\_3, performance–avoidance and social approval items load on the same factor. In Model 3f\_4, social approval items are free to load to all three factors.

\* $p < .001$ .

770), power analysis was performed. Results showed that correlation coefficients above .138 yield adequate statistical power (above .90) at the .001 significance level (Cohen, 1988).

The findings are supportive of the construct validity of the new measures. Mastery goals and perceptions were positively associated with intrinsic motivation and satisfaction and were negatively related to amotivation. The lack of substantial positive associations between performance goals/perceptions and intrinsic motivation and satisfaction supports the divergent validity of the measures. In line with arguments suggesting that performance goals and perceptions are connected with low levels of self-determination, both performance goals and perceptions were positively related to amotivation. In line with expectations, social approval goals and perceptions were positively related to satisfaction and intrinsic motivation, but they were unrelated to amotivation.

Next, three hierarchical regression analyses were computed using the three external criteria as the dependent variables, the four perceptions as the independent variables in Step 1, and the four goals as the independent variables in Step 2 (Table 3).

The results of the first regression analysis revealed that in Step 1 mastery, social approval, and performance–avoidance perceptions had unique contributions in the explanation of the total variance of intrinsic motivation. Whereas the signs for mastery and social approval were positive, the sign of performance–avoidance perceptions was negative. The entry of achievement goals in the next step increased significantly the explanation of the total variance. At the second step mastery goals, social approval goals and mastery perceptions had unique positive contributions in the explanation of the variance of intrinsic motivation.

The findings of the second analysis suggest that at Step 1, mastery, performance–approach, and performance–avoidance perceptions contributed significantly to the prediction of amotivation. Although the contribution of the performance–approach and performance–avoidance perceptions in the explanation of amotivation was positive, it emerged that the higher the mastery perceptions the lower the amotivation. The entry of achievement goals in Step 2 increased significantly the explained variance. At this second step, performance–approach goals and performance–avoidance goals and perceptions had unique positive contributions in the explanation of the total variance of amotivation. On the other hand, mastery goals also made a unique contribution in the explanation of the total variance of amotivation, but the sign for this variable was negative.

Finally, at the first step of the third regression analysis, mastery and social approval perceptions had a positive contribution in the explanation of the total variance of satisfaction in physical education. In contrast, performance–avoidance perceptions also had a unique contribution in the explanation of the variance of satisfaction, but the sign for this variable was negative. When achievement goals were entered in the second step, the explanation of the total variance of satisfaction was significantly increased. Mastery perceptions, mastery goals, and social approval goals had a unique positive contribution in the explanation of satisfaction in physical education, which in total accounted for 26% of the variance.

**Table 3 Standardized Beta Weights ( $\beta$ ) and Pearson Correlations ( $r$ ) Following Hierarchical Regression Analyses**

| Independent variable               | Dependent variable |         |             |         |              |         |
|------------------------------------|--------------------|---------|-------------|---------|--------------|---------|
|                                    | Intrinsic          |         | Amotivation |         | Satisfaction |         |
|                                    | $r$                | $\beta$ | $r$         | $\beta$ | $r$          | $\beta$ |
| Step 1: Perceptions                |                    |         |             |         |              |         |
| Mastery – Perception               | .37***             | .29***  | -.14***     | -.10*   | .36***       | .30***  |
| Performance approach – Perception  | .08*               | .08     | .29***      | .16***  | -.04         | -.01    |
| Performance avoidance – Perception | -.08*              | -.10*   | .34***      | .24***  | -.15***      | -.10*   |
| Social approval – Perception       | .28***             | .14**   | .07         | .02     | .20***       | .09*    |
| Step 2: Goals are added            |                    |         |             |         |              |         |
| Mastery – Perception               | .37***             | .14***  | -.14***     | -.02    | .36***       | .30***  |
| Performance approach – Perception  | .08*               | .04     | .29***      | .08     | -.04         | -.03    |
| Performance avoidance – Perception | -.08*              | -.07    | .34***      | .10*    | -.15***      | -.06    |
| Social approval – Perception       | .28***             | .02     | .07         | .05     | .20***       | .01     |
| Mastery – Goal                     | .56***             | .42***  | -.33***     | -.24*** | .45***       | .33***  |
| Performance approach – Goal        | .13***             | .07     | .27***      | .16***  | .02          | .03     |
| Performance avoidance – Goal       | -.03               | .02     | .41***      | .25***  | -.08*        | .00     |
| Social approval – Goal             | .44***             | .19***  | -.02        | -.06    | .30***       | .10*    |
| $\Delta R^2$ at Step 1             |                    |         |             |         |              |         |
|                                    |                    | .16***  |             | .14***  |              | .14***  |
| $\Delta R^2$ at Step 2             |                    |         |             |         |              |         |
|                                    |                    | .23***  |             | .15***  |              | .12***  |

Note.  $r$  = Pearson correlation coefficients,  $\beta$  = standardized beta weight.  
 \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

## Discussion

In this report we presented a construct validation approach for a new motivational climate measure in physical education. This instrument makes a substantive contribution in the existing literature of perceived motivational climate. First, in line with contemporary approaches in the achievement goals literature (Elliot & Church, 1997), it distinguishes the measurement of performance climate to performance–approach and performance–avoidance. Second, it captures perceptions of teachers’ emphasis on social approval. Third, this measure is based on the principle of compatibility, according to which climate perceptions and goals should be compatible in terms of target, action domain, life context, and time. Below we describe the methodological and substantive contribution of the study.

### Methodological Issues

To date there is no climate instrument tapping teachers’ emphasis on four goals, namely, mastery, performance–approach, performance–avoidance, and social approval. Results from confirmatory factor analysis supported the four-factor structure of the achievement goals measure and the four-factor structure of the perceptions of teacher’s emphasis on achievement goals instrument. These findings provide initial support of the model for the student population over 12 years of age.

An important contribution of this study was the investigation of the structural validity of a motivational climate measure based on the principle of compatibility. The development of items for the current instrument was based on the principle that climate and corresponding goal items were compatible in terms of target, action domain, life context, and time. It was necessary to establish, however, that climate items were still distinct from compatible goal items. Results from model comparison suggested that climate subscales were distinct from the corresponding goals subscales. Moreover, factor correlations implied that although climate subscales converged with compatible goal subscales (e.g., mastery-oriented climate with mastery goals) these relationships were of moderate magnitude. These factor correlation results support the assumption that the developed instrument is based on the principle of compatibility and at the same time provide additional support for the distinctiveness between climate and corresponding goals subscales.

The creation of scales assessing social approval goals and perceptions of teachers’ emphasis on social approval is a new development in the existing literature of physical activity. If one wants to examine the importance of social approval goals in achievement domains, then social approval items should refer to achievement behaviors. These behaviors should be task involving because they are the most likely to exhibit high effort, virtuous intent, and personal commitment (Maehr & Nicholls, 1980). Unlike task/mastery scales though, social approval items should also describe the consequences of achievement as for the social relations. To investigate whether the social approval scales are distinct from mastery and performance scales, we developed models in which social approval factors were distinct from mastery and performance factors, and models in which social approval items did not compose a distinct factor but were free to load to mastery, performance–approach, and performance–avoidance factors. The results provided clear support for the superiority of models, suggesting that social approval factors are distinct from the other factors.

Performance–approach and performance–avoidance scales were positively related with each other, which is in line with the trichotomous model of achievement goals (Elliot, 1997). Moreover, because social approval and mastery scales describe task-involving conditions, the two scales were positively related with each other. These findings support the internal convergent validity of the measure. In contrast, mastery scales were unrelated to performance–approach scales and negatively related to performance–avoidance scales. These findings support the internal divergent validity of the developed instrument.

Unlike mastery scales, social approval scales had a positive relationship with performance scales. This supports the internal convergent validity of these scales, because a common feature in both social approval and performance goals is the elaboration of one's achievement based on criteria that are determined by others. When performance goals are pursued, one's achievement is judged in comparison with the achievement of others. When social approval goals are adopted, one's achievement is judged based on whether the others approve the behavior of the individual. It should be noted here that these positive relationships between social approval and performance scales emerged although none of the social approval items described normative behaviors, but all performance items were normative in nature. To sum up, these different correlation patterns between mastery, performance, and social approval scales are explicable and support the discriminant validity of the measures.

Mastery climate and goals corresponded positively to intrinsic motivation and satisfaction in physical education but were negatively related to amotivation. On the contrary, performance–approach and performance–avoidance climates and goals corresponded positively to amotivation but were either unrelated or low negatively related to intrinsic motivation and satisfaction. These findings are in line with existing research (e.g., Ntoumanis & Biddle, 1999a, 1999b). Finally, social approval was positively related with intrinsic motivation and satisfaction in physical education, which is a hardly surprising finding for relatively collectivistic countries such as Greece. All in all these correlations provide evidence of external construct validity for the current measure.

## **Substantive Issues and Implications for Teachers**

The findings of the present study are in line with the existing literature suggesting that mastery goals and a mastery-oriented climate are likely to facilitate intrinsic motivation and satisfaction but performance-oriented climates and performance goals have no positive impact on intrinsic motivation in physical education (Ntoumanis & Biddle, 1999a; 1999b). Indeed, this study showed that both a mastery disposition and a perception of teacher's emphasis on mastery had a unique positive contribution in the explanation of intrinsic motivation and satisfaction in physical education. Moreover, both performance goals and perceptions of performance-oriented climate had a unique contribution in the explanation of amotivation in physical education. In other words, it is both the goals of students that are determined by their personal history and the class climate that is created by the teacher that influence the intrinsic motivation, the amotivation, and the satisfaction of students in physical education. These findings imply that apart from teachers, other important social factors, such as parents, friends, and the media,

play a significant role in the motivation of students in physical education. Hence, interventions to facilitate mastery goals should be conducted in schools as well as in family and peer contexts.

According to some researchers, the worst mode of achievement goals for students' motivation is performance-avoidance goals (Elliot & Church, 1997). The present study showed that this observation may have little relevance for teaching. The strong positive association between perceptions of performance-approach- and performance-avoidance-oriented climates implies that students cannot easily disassociate these two perceptions. Hence, the endorsement of performance-approach goals in school is likely to promote performance-avoidance goals too. Indeed, in short-term interventions in physical education, we found that the promotion of performance-approach goals increased the adoption of performance-avoidance goals (Papaioannou, et al. 2002). Moreover, in a recent longitudinal study we found that performance-approach goals had causal effects on performance-avoidance goals in subsequent years (Papaioannou, Ampatzoglou, Kalogiannis, & Sagovits, 2006). Hence, class climates promoting performance-approach goals may enhance performance-avoidance goals. Undoubtedly, further research is needed in this area.

Today there are numerous implications for the creation of a mastery-oriented climate (e.g., Treasure & Roberts, 1995; Papaioannou & Goudas, 1999). These implications stem largely from theory but they have not been extensively examined in physical education. We do not have enough information from interventions aiming to facilitate mastery goals in physical education settings. Some recent attempts seem promising, although in most cases the effects were weak and did not last for long (Christodoulidis, Papaioannou, & Digelidis, 2001; Digelidis, Papaioannou, Christodoulidis, & Laparidis, 2003; Kokkonen, Jaakkola, & Papaioannou, 2001; Solmon, 1996; Treasure, 1993). Moreover, observations and teacher and student interviews are needed in order to unveil the practices adopted by teachers who try to establish a mastery-oriented environment (Xiang, McBride, & Solmon, 2003). These research approaches could provide rich and valid information if they are accompanied by methods assessing what kind of goals were activated by teachers. We hope that the present instrument could possibly facilitate this process. It can be also useful to teachers who want to know whether they promote mastery goals in their classes.

Teaching practices are expected to vary across cultures. The consequences of goal adoption are also likely to vary across cultures (Xiang, Lee, & Solmon, 1997). In this study in Greece, social approval goals were connected with intrinsic motivation. Importantly, both mastery and social approval goals had unique contribution in the explanation of intrinsic motivation and satisfaction in physical education. These findings maybe suggest that social approval goals are determinants of students' motivation in a collectivistic, or a relatively collectivistic culture, such as that of Greece (Georgas, 1989; Hofstede, 1980). These results have also implications for the motivation of collectivistic minorities studying in individualistic societies (Verkuyten et al., 2001). Teachers adopting an individualistic culture should be aware of the needs of minority collectivists to become approved by others. The present findings maybe imply that if teachers deemphasize social approval goals in their classes, they will probably decrease the intrinsic motivation of students adopting a collectivistic culture.

## Utility of the Current Measure in Future Research

Future research focusing on the effects of teaching on students' goals and corresponding cognitive, affective, and behavioral outcomes should adopt the present scales or climate measures that meet the requirements of the principle of compatibility. If we want to find out whether teaching affects students' goals, we should pose this question directly to the students. Otherwise, researchers are in danger of losing some important information, that is, whether students perceived that the structure of the situation really aimed at affecting their goals and corresponding motivational outcomes. Researchers conducting interventions aiming to affect motivational climate and students' achievement goals in physical education could adopt this instrument in order to examine the effectiveness of their manipulation. Moreover, this measure can facilitate the investigation of the cause-effect relationships among motivational climate, negative affect, avoidance tendencies, and decreased motivation particularly in secondary physical education (Marsh et al., 2006). In addition, investigators in different countries could adapt this instrument to their culture in order to investigate the cross-cultural generalizability of implications stemming from motivational climate research. We hope that this measure will be of significant assistance to researchers and teachers interested in the motivational climate and students' achievement in physical education.

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## Notes

1. It is acknowledged that despite the many similarities, Elliot (1997), Nicholls (1989), and Dweck and Leggett (1988) provide different definitions of achievement goals, different explanations about the development of achievement goals, and make different predictions about the outcomes of

these goals. Although a description of these differences is beyond the purpose of this study, it should be mentioned that the present scales of mastery and performance were based on the theoretical approach of Elliot (1997).

2. Although many social goals exist, it seems likely that only social approval goals have direct impact on achievement behaviors. Indeed, according to Maehr and Nicholls (1980), social approval goals can be considered achievement goals too.
3. The results of the pilot studies are available from the authors upon request.
4. The items presented here are a direct translation from the Greek version (although double-translation was followed), and the present findings are based on the Greek version. Readers who want to use this instrument in English or other languages can follow a similar validation process.

## Appendix

### Achievement Goals Questionnaire

*In the Physical Education Lesson . . .*

1. I feel wonderful when I'm the only one who can do an exercise
2. I'm completely satisfied when I outperform others
3. It is important for me to learn a game or skill and so the others to love me
4. It is my attitude to avoid skills and games for which I may be giped at, for my abilities
5. My goal is to continuously develop my skills
6. I feel absolutely successful when I'm the only one who can make it in skills and games
7. I'm often worried about being told that I don't have any abilities
8. I'm glad when I develop my abilities and the others love me
9. I intend to try even more in order to learn new skills and games
10. I'll continue avoiding skills and games in which I may look incapable
11. I like learning new skills and games and gaining others' love
12. It is important for me to learn new things all the time
13. I'm concerned whether I look incapable and this often worries me
14. When I learn a skill, this makes me try even more
15. My attitude is always trying to get ahead others in skills and games
16. I often worry that if I try to perform a routine I might look incapable
17. I want to achieve high performances and other people love me
18. I will always try to outperform my classmates
19. I like doing an exercise perfectly and being beloved
20. I like learning new things no matter how difficult they are
21. I want to avoid drills and games in which I may look incapable
22. I feel absolutely successful when I do something right and others love me

23. I'm pleased when others can't make it as good as I do
24. I like to put effort in difficult exercises because this is a way to develop my abilities

Mastery Items: 5, 9, 12, 14, 20, 24.

Performance–Approach Items: 1, 2, 6, 15, 18, 23.

Performance–Avoidance Items: 4, 7, 10, 13, 16, 21.

Social Approval Items: 3, 8, 11, 17, 19, 22.

Note that the word *love* is appropriate for the Greek language and culture. In English, the verb *love* could be translated as *like* and the noun *love* could be translated as *approval*.

## Perceptions of Teacher's Emphasis on Goals Questionnaire

*My physical education teacher . . .*

1. He [or she]\* often makes me worried if they say that I'm not capable in Physical Education
2. His principle for me is to learn skills and games for which my schoolmates will love me
3. He encourages students to play better than the others
4. He makes me afraid of the evaluation in Physical Education and protect myself from it
5. He is happy when, for what I learn in Physical Education the other people love me
6. He is absolutely satisfied only with students that everyone recognizes as more capable in P.E.
7. He often makes me worry about how others watch my athletic abilities
8. He is very satisfied when I try to learn a skill and so make other people love me
9. He insists that we must fight to prove that we are more capable in skills and games than others
10. He makes me avoid questions in the lesson which could possibly be the reason to be laughed at by other people
11. He believes it's important to do well a skill or game and so the other people to love me
12. He's very happy when I learn new skills and games
13. He often makes me worry if they call me incapable in drills or games
14. He pays particular attention to whether my skills are improving
15. He only praises students that look like more capable than others in Physical Education
16. He likes me to learn new skills and games and to earn others' love
17. He is absolutely satisfied when he sees that I improve all my physical abilities

18. His principle is that students should prove that they are more capable than others in all skills and games
19. He feels great when I learn a new skill and my classmates love me
20. He helps me in learning how to improve my abilities in games and exercises
21. He wants us to appear more capable than others in all exercises
22. He makes me to avoid exercises or games in which my abilities could be negatively commented
23. He insists that errors in skills and games help me to find my weaknesses and improve my abilities.
24. He makes sure that I understand how to perform a new skill before the class moves on to learning other skills

Mastery Items: 12, 14, 17, 20, 23, 24.

Performance–Approach Items: 3, 6, 9, 15, 18, 21.

Performance–Avoidance Items: 1, 4, 7, 10, 13, 22.

Social Approval Items: 2, 5, 8, 11, 16, 19.

\*Please choose *he* or *she* depending on teacher's gender. *Note.* Item 15 was excluded from the confirmatory factor analysis.

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