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Original

Cooperative learning and approach goals in physical education: The discriminant role of individual accountability☆

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ABSTRACT

The aim of the present study is two-fold: (a) to analyze whether the cooperative learning (CL) factors discriminate the different approach goals of the 3 × 2 achievement goals model and, consequently, (b) to assess the role that can play educational stage. A total of 1292 students participate (660 men and 632 women) belonging to the educational stages of primary (580), secondary (531) and baccalaureate (181), with ages between 10 and 19 years (M = 13.05, SD = 2.45). The CAC and CML 3 × 2-EF questionnaires are administered as data collection instruments. The results of the discriminant analysis have shown that the cooperative learning factors are predictors of the approach goals, highlighting the individual responsibility factor for the task-approach goals (TAG) and self-approach goals (SAG), this being the least discriminant for the other-approach goals (OAG). In addition, the results of the decision tree analysis indicate that in primary education, secondary education and baccalaureate, the students with the highest level in TAG and SAG are those that score the highest in individual responsibility. These findings reflect the importance of individual responsibility so that physical education students show more adaptive patterns such as TAG and SAG.

Aprendizaje cooperativo y metas de aproximación en educación física: el rol dis -criminante de la responsabilidad individual

Palabras clave:
Educación
Cooperación
Metas de logro.

RESUMEN

Los objetivos de este estudio han sido dos: (a) analizar si los factores del aprendizaje cooperativo (AC) discriminan las diferentes metas de aproximación del modelo de metas de logro 3 × 2 y, en consecuencia, (b) valorar el papel que pueda desempeñar la etapa educativa. Participan un total de 1292 estudiantes (660 hombres and 632 mujeres) pertenecientes a las etapas educativas de primaria (580), secundaria (531) y bachillerato (181), con edades comprendidas entre los 10 y los 19 años (M = 13.05, DT = 2.45). Se administran los cuestionarios CAC y CML 3 × 2-EF como instrumentos de recogida de datos. Los resultados del análisis discriminante han mostrado que los factores del aprendizaje cooperativo son predictores de las metas de aproximación, destacándose el factor responsabilidad individual para las metas de aproximación-tarea (MAT) y aproximación-yo (MAY), siendo este mismo el menos discriminante para la meta de aproximación-otros (MAO). Además, los resultados del análisis de árbol de decisiones indican que en educación primaria, educación secundaria y bachillerato, los estudiantes con el nivel más alto en

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MAT y MAY son aquellos que puntúan más elevado en responsabilidad individual. Estos hallazgos reflejan la importancia de la responsabilidad individual para que el alumnado de educación física muestre patrones más adaptativos como lo son MAT y MAY.

Introduction

Cooperative learning (CL) is contingent upon three essential factors (Johnson & Johnson, 1989; Slavin, 1990). The first is that there must be a group task, i.e., a common goal which a group of students must achieve as a group. The second is based on completing the task with each group member members contributing. The third is based on the group's resources from both a social and performance perspective. It is a pedagogical model that bases the development of the teaching/learning process on creating small, generally heterogeneous groups, in which students combine their efforts and resources to learn together (Johnson et al., 1999). This characterisation shows the possible link between the implementation of CL and goals based on the successful completion of tasks. Five conditions are decisive for promoting CL and, therefore, successful group work ((Johnson & Johnson, 1994; Johnson et al., 2013): (1) Positive interdependence, the need that all members have for each other (e.g., the whole group must get through the designated space by stepping inside the circles; if one person does not succeed, neither does the group); (2) Promotive interaction, displaying group behaviour that promotes mutual help, support and encouragement (e.g., team members collaborate and help each other so that no balloons fall touch the ground); (3) Individual accountability, recognising one's importance to the group without being solely reliant on everyone else's work (e.g., exchanging roles of observer and performer after several attempts at developing a motor skill); (4) Group processing, the ability to discuss and evaluate the activities and behaviour (positive or negative) while performing the activity (e.g., the group reflects on the work done during a motor task); and, (5) Social or interpersonal skills, to communicate, manage and provide leadership in performing the task (e.g., team members make assessments and listen to each other after completing a cooperative task involving motor skills).

In addition to promoting academic objectives in different areas and educational levels, CL also contributes to achieving objectives of an emotional, social, and personal nature (Johnson et al., 2000; Kyndt et al., 2013). In a systematic review of the literature from the last five years in the context of physical education (PE), Bores-García et al. (2020) present the positive consequences of implementing CL in PE classes for acquiring social and motor skills (Darnis & Lafont, 2015; O'Leary et al., 2015), social skills (Fernandez-Rio, Cecchini, Méndez-Giménez, Méndez-Alonso, & Prieto, 2017; Sánchez-Hernández et al., 2018; Wallhead & Dyson, 2017), motor/physical skills (Altinkok, 2017), cognitive skills (Dyson et al., 2016; Gorucu, 2016) and affective skills (Casey et al., 2015). This overview of the current situation indicates the need to conduct studies that address the link between CL and goals, given the limited research today using this approach.

The Achievement Goal Theory (Nicholls, 1989) is based on the expectations and values that individuals hold for different activities, with the overarching purpose to demonstrate competence or ability. The dichotomous model differentiates between mastery goals (task) and performance goals (ego). Evolution towards the trichotomous model (Elliot & Harackiewicz, 1996) has led to the introduction of two valences: approach and avoidance. Approach focuses on attaining success and positive consequences. Avoidance is based on avoiding failure and negative consequences. Thus, this new model posits three achievement goals: mastery goals, aimed at improving and mastering the task; performance-approach goals, geared to acquiring competence compared to others; and performance-avoidance goals, focused on avoiding incompetence in relation to others.

Over the past decade, Elliot et al. (2011) have considered the mastery goal to be composed of two distinct standards: task and self, evolving into the 3×2 achievement goal model, given the inference of three criteria (standards) that define the construct (task, self and others) and two valences (approach and avoidance). This gives rise to the six possible achievement goals in this model: task-approach goals (TAG), focused on attaining task-based competence (e.g. perform the task correctly); task-avoidance goals, focused on avoiding task-based incompetence (e.g., avoid doing the task poorly); self-approach goals (SAG), focused on attaining self-based competence (e.g., do better than before); self-avoidance goals, focused on avoiding self-based incompetence (e.g., avoid doing worse than before); other-approach goals (OAG), focused on attaining other-based competence (e.g., do better than others); and other-avoidance goals, focused on avoiding other-based incompetence (e.g., avoid doing worse than others). To this end, Méndez-Giménez et al. (2014) determined that the most adaptive pattern in the PE environment is TAG, over SAG and OAG, thus supporting TAG in the educational context. It should also be noted that TAG and SAG have shown to be adaptive, positively predicting both students' self-determined motivation and life satisfaction (Méndez-Giménez et al., 2018). However, there is no previous research in the literature that investigates the link between CL and the 3×2 achievement goal model, specifically in PE. Therefore, the objectives of this study were twofold: (1) to analyse whether CL factors discriminate between different approach goals in the 3×2 achievement goal model and, in consequence, (2) to assess the role of school stage.

Method

Design and participants

This study used an ex post facto transversal research design. A total of 1292 students (51.1% male and 48.9% female) from 12 public schools in the Autonomous Community of Extremadura were selected by purposive sampling or by convenience sampling. The schools are in lower-middle class urban neighbourhoods. Representation by school stage is 580 (44.9%) from primary (5th and 6th grade), 531 (41.1%) from secondary and 181 (14.0%) from baccalaureate. The age range of all subjects was between 10 and 19 years old (M = 13.05, SD = 2.45). The number of participants was determined by the number of students enrolled in primary, secondary and baccalaureate education in Extremadura (122,133 students) in the 2018/2019 academic year, assuming a 3% sampling error and a 96% confidence level.

Instruments

Cooperative Learning Questionnaire (CLQ) by Fernández-Rio et al. (2017). As an instrument that measures the essential factors of CA in class, the questionnaire begins with the sentence Ïn my Physical Education classes. . .; referring specifically to this educational context. It includes a total of 20 items grouped into 5 factors: *interpersonal skills* (e.g. "...we work on dialogue, listening skills and/or debate"); *group processing* (e.g. "...we take decisions by consensus among group members"); *positive interdependence* (e.g. "...help from my groupmates is important to complete the task");

promotive interaction (e.g. "...groupmates relate and interact with one another during tasks"); and *individual accountability* (e.g. "...each member of the group must participate in group tasks"). The reliability indices of the different factors in this study were: *interpersonal skills*, Cronbach's Alpha (α = .83), Composite Reliability (CR = .84), McDonald's Omega (Ω = .78) and Average Variance Extracted (AVE) = .57); *group processing* (α = .85, CR = .81, Ω = .80 and AVE = .52); *positive interdependence* (α = .81, CR = .89, Ω = .84 and AVE = .67); *promotive interaction* (α = .85, CR = .85, Ω = .82 and AVE = .54); *individual accountability* (α = .80, CR = .82, Ω = .80 and AVE = .55). To determine whether the factor model of the original validation study provided a good fit to the data, goodness-of-fit indices were calculated ($\chi 2$ = 1279.245, $\chi 2/df$ = 4.526, GFI = .908, IFI = .904, TLI = .900, CFI = .933, RMSR = .070, RMSEA = .057). As we can see, the adjustment indices of the model show reliability and validity evidence for the generalisation of results.

3 × 2 Achievement Goals Questionnaire in Physical Education (3 × 2 AGQ-PE) by Méndez-Giménez et al. (2014). This is the Spanish version of the questionnaire developed by Elliot et al. (2011) validated for the PE context. For the objectives of this study, only three approach subscales were used (TAG, SAG and OAG). The questionnaire begins with the sentence Ïn my Physical Education classes my goal is...ändand then the 12 items that make up the three subscales are described: *task-approach* (e.g. "...to perform several exercises and activities correctly"); *self-approach* (e.g. "...to perform the exercises better than I usually do"); and *other-approach* (e.g. "...outperform other students in tasks and skills). The reliability indices of the different factors in this study were: *task-approach* (α = .86, CR = .75, Ω = .80 and AVE = .54); *self-approach* (α = .84, CR = .74, Ω = .80 and AVE = .55); *other-approach* (α = .82, CR = .99, Ω = .88 and AVE = .99). To determine whether the factor model of the original validation study provided a good fit to the data, goodness-of-fit indices were calculated ($\chi 2$ = 843.027, $\chi 2/df$ = 3.557, GFI = .988, IFI = .957, TLI = .950, CFI = .957, RMSR = .030, RMSEA = .045). As we can see, the adjustment indices of the model show reliability and validity evidence for the generalisation of results.

In both questionnaires, participants indicated their level of agreement for each item by means of a Likert-type scale from 1 to 5, where 1 is ïtrongly disagreeänd 5 ïtrongly agree".

Procedure

First, the various schools were contacted through their directors to request collaboration in the research. The parents or guardians, PE teachers and students were then informed of the purpose of the research. Through an informed consent document, students were included in the study with participation being voluntary and anonymous. The questionnaires were completed in each group's regular classroom in a calm and individual fashion, avoiding classmates' opinions and therefore data contamination. It should be noted that the study was conducted in accordance with ethical principles for research involving human subjects (Declaration of Helsinki, 2013). The study was approved by the Bioethics and Biosafety Committee of the University of Extremadura (Nº: 0063/2018). Data anonymity and confidentiality has been maintained in accordance with the American Psychological Association guidelines.

Data analysis

Initially, reliability analyses (Cronbach's alpha, Composite Reliability, McDonald's Omega and Average Variance Extracted) and confirmatory instrument analyses were performed to determine whether the factor models found in the original studies provided a good fit with the data in this study. Three statistical analyses were then performed. The first was a descriptive analysis of all the observed variables. The second was discriminant analysis, which allowed us to examine whether significant differences existed between means through an analysis of variance (ANOVA) and to specify which CL factors would best explain the differences. Hence, students could be classified and assigned to each level of each approach goal by the linear combination of the set of independent variables. To perform discriminant analysis, the assumptions of linearity must be met, all the observed variables included in the model must have a normal distribution and equal variance-covariance. The residual scatter plots showed linearity among the estimated variables. The Kolmogorov-Smirnov test was used to analyse normal distribution, $p > .05$, and normality was found for all the observed variables. Additionally, the p-value of > .05 obtained in Box's M test demonstrates the equality of covariance matrices across the groups.

The dependent variables in the discriminant analysis were TAG, SAG and OAG, grouped by percentile into low approach (< 33%), medium approach (between 33% and 66%) and high approach (> 66%). The descriptive scores for the TAG variable and the percentile values for each of the intensity levels were: *M* = 4.29, *SD* = .740, 33rd percentile = 4, 66th percentile = 4.75; for the SAG variable: *M* = 4.24, *SD* = .735, 33rd percentile = 4, 66th percentile = 4.75; and for the OAG variable: *M* = 3.43, *SD* = 1.14, 33rd percentile = 3, 66th percentile = 4.25. The CL factors (interpersonal skills, group processing, positive interdependence, promotive interaction, and individual accountability) were included as independent variables and predictors.

Thirdly, in order to clarify and extend the information regarding classifications and identify the potential role of school stage (primary, secondary and baccalaureate), a classification model based on flow charts was created using the decision tree statistical technique. Statistical analyses were performed using SPSS software version 21.0 for PC and free JASP.

Table 1
Descriptive statistics for TAG, SAG and OAG according to CL components

	Cooperative Learning Components					
	Level	Interpersonal Skills *M(SD)*	Group Processing *M(SD)*	Positive Interdependence *M(SD)*	Promotive Interaction *M(SD)*	Individual Accountability *M(SD)*
TAG	Low	3.14(0.83)	3.28(0.79)	3.67(0.72)	3.74(0.72)	3.97(0.77)
	Medium	3.54(0.84)	3.69(0.80)	4.12(0.64)	4.12(0.65)	4.42(0.55)
	High	3.66(0.91)	3.82(0.88)	4.21(0.65)	4.25(0.65)	4.62(0.53)
SAG	Low	3.13(0.83)	3.26(0.80)	3.69(0.73)	3.74(0.72)	4.00(0.77)
	Medium	3.53(0.80)	3.67(0.75)	4.07(0.63)	4.09(0.62)	4.36(0.60)
	High	3.68(0.90)	3.85(0.85)	4.23(0.63)	4.27(0.64)	4.61(0.48)
OAG	Low	3.18(0.92)	3.39(0.87)	3.88(0.73)	3.92(0.76)	4.29(0.76)
	Medium	3.38(0.81)	3.52(0.80)	3.89(0.72)	3.95(0.70)	4.20(0.71)
	High	3.73(0.87)	3.85(0.84)	4.21(0.62)	4.22(0.62)	4.50(0.53)

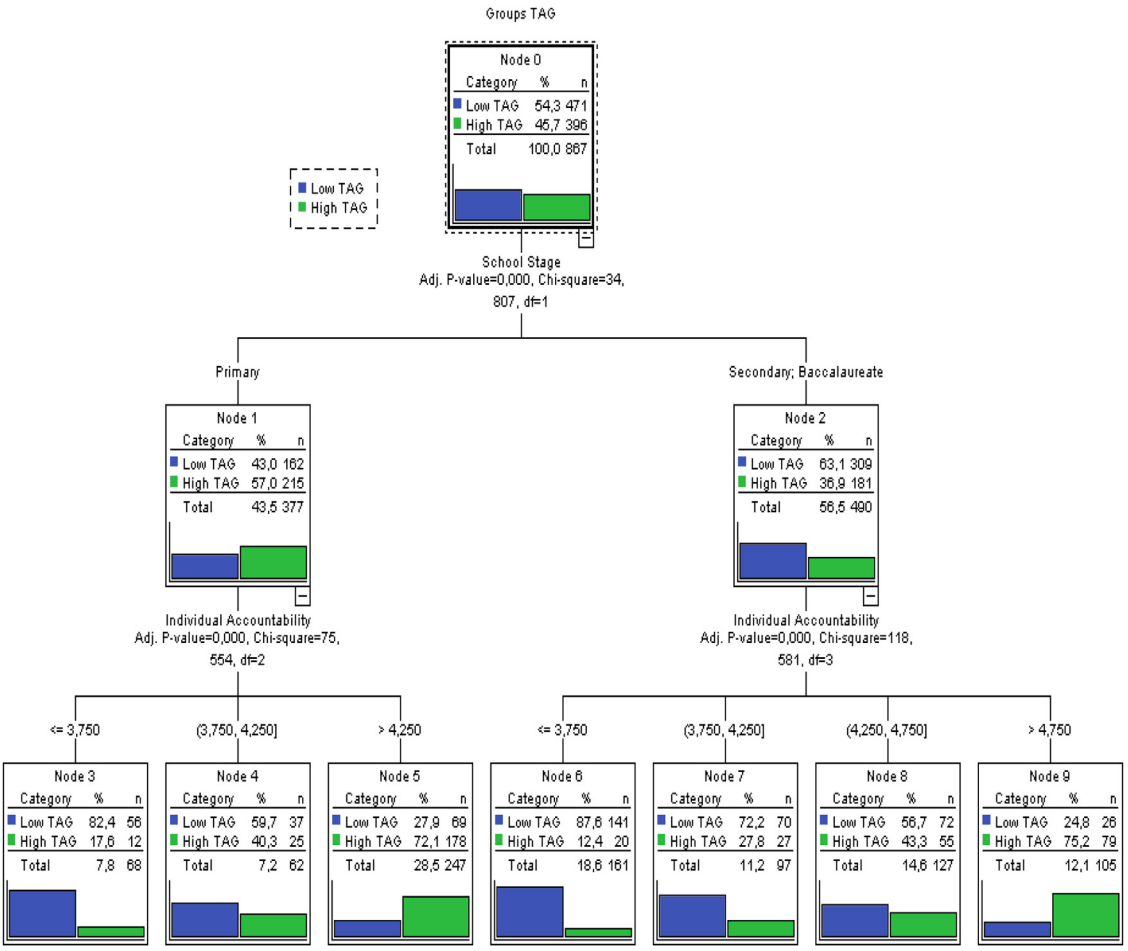

Figure 1. Classification tree for TAG.

Results

Table 1 presents the descriptive statistics. An ANOVA was used to analyse the differences between the means of the three levels of each approach goal as a function of CL factor score. The following results were obtained. First, with regard to *TAG* levels for the *interpersonal skills* factor (Wilks $\lambda = .937$, $F = 44.748$, $p < .001$); *group processing* (Wilks $\lambda = .928$, $F = 51.746$, $p < .001$); *positive interdependence* (Wilks $\lambda = .885$, $F = 86.160$, $p < .001$); *promotive interaction* (Wilks $\lambda = .904$, $F = 70.903$, $p < .001$); *individual accountability* (Wilks $\lambda = .844$, $F = 123.188$, $p < .001$). Second, for SAG, the *interpersonal skills* factor (Wilks $\lambda = .922$, $F = 56.134$, $p < .001$); *group processing* (Wilks $\lambda = .902$, $F = 72.410$, $p < .001$); *positive interdependence* (Wilks $\lambda = .883$, $F = 87.897$, $p < .001$); *promotive interaction* (Wilks $\lambda = .890$, $F = 82.545$, $p < .001$); *individual accountability* (Wilks $\lambda = .848$, $F = 119.363$, $p < .001$). Lastly, for *OAG* the *interpersonal skills* factor (Wilks $\lambda = .940$, $F = 42.640$, $p < .001$); *group processing* (Wilks $\lambda = .952$, $F = 33.227$, $p < .001$); *positive interdependence* (Wilks $\lambda = .955$, $F = 31.114$, $p < .001$); *promotive interaction* (Wilks $\lambda = .964$, $F = 24.552$, $p < .001$); *individual accountability* (*Wilks* $\lambda = .967$, $F = 22.811$, $p < .001$).

After verifying the existence of significant differences, discriminant analysis allows us to observe which CL factors are predictive according to the dependent variables. Thus, Table 2 shows the CL factor structure matrix of TAG, SAG and OAG. Similarly, through discriminant analysis the participants were classified and assigned to each of the approach goal levels according to the result of the linear combination of the set of independent variables.

Table 2
Structure matrix. Variables ordered by the size of the correlation with the discriminant function

		Functions	
	CL Components	Function 1	Function 2
TAG	Individual Accountability	.900[a]	−.397
	Positive Interdependence	.749[a]	.649
	Promotive Interaction	.684[a]	.068
	Group Processing	.584[a]	.161
	Interpersonal Skills	.542[a]	.214
SAG	Individual Accountability	.857[a]	−.465
	Positive Interdependence	.735[a]	.403
	Promotive Interaction	.713[a]	.168
	Group Processing	.667[a]	.392
	Interpersonal Skills	.586[a]	.594
OAG	Interpersonal Skills	.895[a]	−.354
	Group Processing	.797[a]	−.180
	Positive Interdependence	.760[a]	.356
	Promotive Interaction	.683[a]	.192
	Individual Accountability	.585[a]	.739

[a] Higher absolute correlation between each variable and the discriminant function.

Function 1 presents a higher discriminatory power in all three cases, explaining a much higher percentage of variance than the other functions, and shows a higher canonical correlation and distance between discriminated groups (Wilks' Lambda closer to 0). Additionally, the $\chi 2$ analysis presents the highest level of significance. Function 1 for TAG (% of variance = 98.4, canonical correlation = .431, Wilks $\lambda = .811$, $\chi 2 = 277.949$, $df = 10$, $p < .001$); Function 2 for TAG (% of variance = 1.6, canonical correlation = .062,

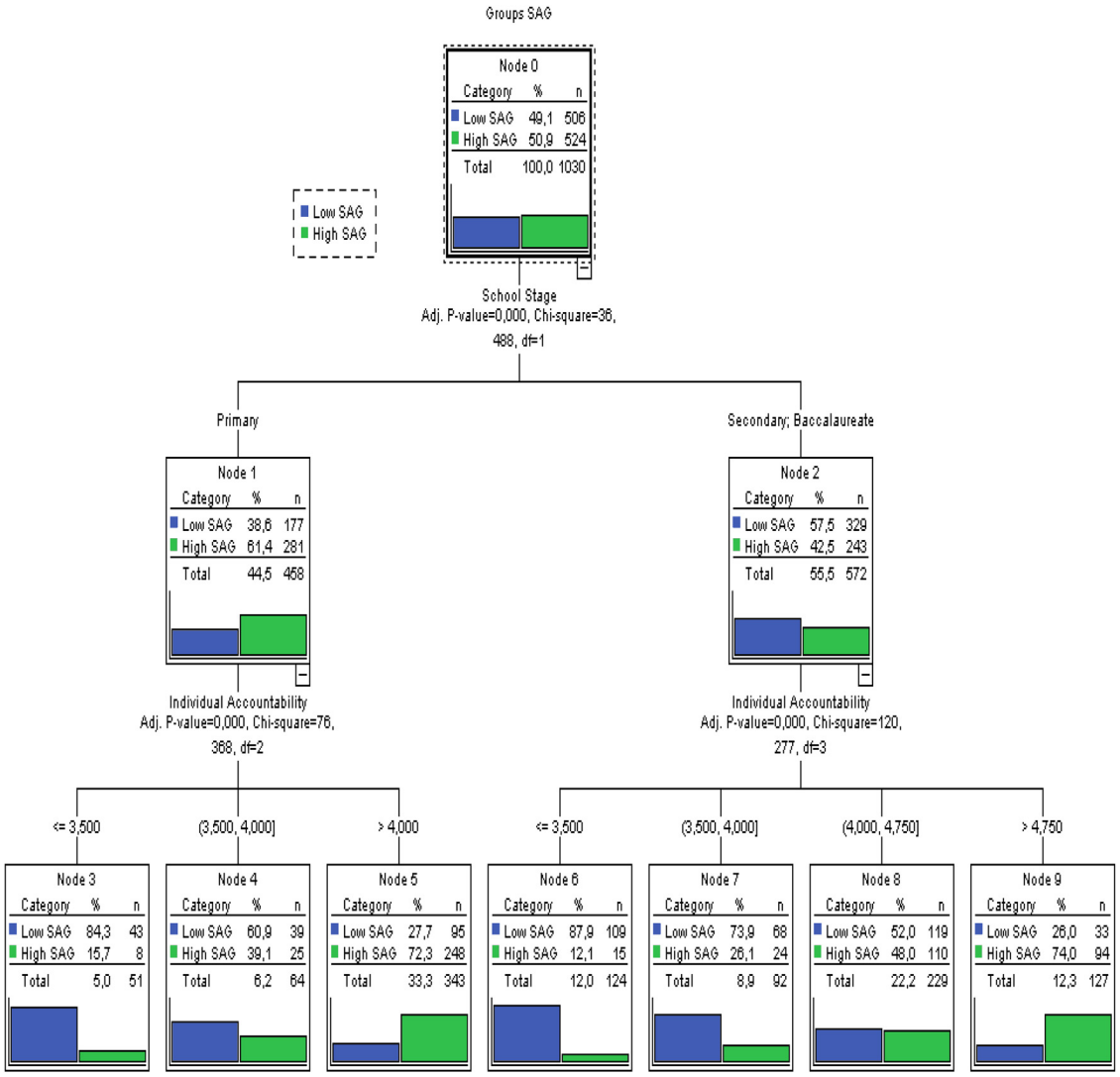

Figure 2. Classification tree for SAG.

Wilks λ = .996, $\chi 2$ = 5.039, *df* = 4, *p* < .283). With regard to SAG values, Function 1 (% of variance = 99.4, canonical correlation = .443, Wilks λ = .802, $\chi 2$ = 292.035, *df* = 10, *p* < .001); Function 2 for SAG (% of variance = 0.6, canonical correlation = .038, Wilks λ = .999, $\chi 2$ = 1.952, *df* = 4, *p* < .745). Lastly, the values for OAG: Function 1 (% of variance = 84.8, canonical correlation = .269, Wilks λ = .915, $\chi 2$ = 118.135, *df* = 10, *p* < .001); Function 2 (% of variance = 15.2, canonical correlation = .118, Wilks λ = .986, $\chi 2$ = 18.470, *df* = 3, *p* < .001). Therefore, based on Function 1, the factor with the highest predictive capability for TAG and SAG is individual accountability (.900 y .857, respectively), whereas for OAG it is interpersonal skills (.895). The relationship of each factor with the different roles is interpreted by the means and the sign of the functions in the centroids of the groups: for *TAG*, low = -.624, medium = .200 and high = .507; for SAG, low = -.601, medium = .118 and high = .513; and for OAG, low = -266, medium = -.122 and high = .405. For all the approach goals, the high level has the greatest correlation with all of the factors.

The canonical discriminant function obtained (Table 3) allows for the correct classification for TAG: 61.1% low, 26.9 % medium and 68.4% high; for SAG: 60.9% low, 20.5% medium and 68.3% high; and for OAG: 41.8% low, 33.3% medium and 63.2% high; average gains in prediction for the high and low levels, above 33.3%, would be by chance.

Table 3
Results of the classification using the discriminant function

		Predicted group		
a* TAG		Low Level	Medium Level	High Level
Count	Low Level	288	63	120
	Medium Level	119	125	221
	High Level	68	57	271
%	Low Level	61.1	13.4	25.5
	Medium Level	25.6	26.9	47.5
	High Level	17.2	14.4	68.4
b* SAG				
Count	Low Level	308	70	128
	Medium Level	92	62	148
	High Level	99	67	358
%	Low Level	60.9	13.8	25.3
	Medium Level	30.5	20.5	49.0
	High Level	18.9	12.8	68.3
c* OAG				
Count	Low Level	163	89	138
	Medium Level	148	176	203
	High Level	90	63	262
%	Low Level	41.8	22.8	35.4
	Medium Level	28.1	33.4	38.5
	High Level	21.7	15.2	63.1

a. Classified correctly 51.4 % of the cases originally grouped together.
b. Classified correctly 54.7 % of the cases originally grouped together.
c. Classified correctly 45.1 % of the cases originally grouped together.

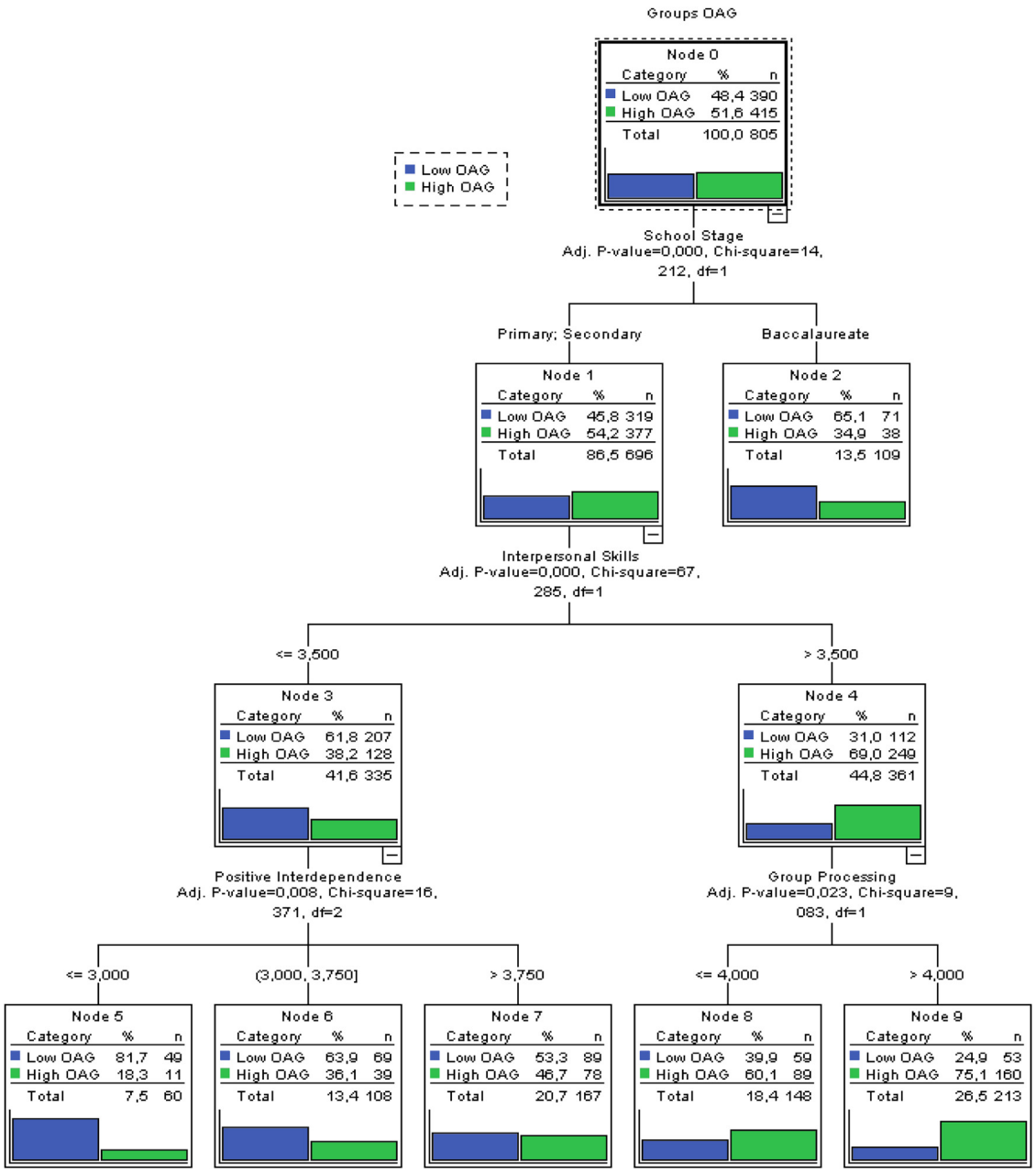

Figure 3. Classification tree for OAG.

For the purpose of clarifying and extending the information regarding classifications and to understand the role of school stage (primary, secondary and baccalaureate), a decision tree analysis was applied to each dependent variable (TAG, TAG and OAG), comparing low approach to high approach. The factors used as predictors proved useful for classifying the low- and high-level approach groups, but with low efficacy for the medium approach group. Average predicted gains less than 33.33% would be expected by chance in the three levels of approach goals (low, medium, and high).

Figure 1 shows that the lowest probability of a high TAG level (17.6%) corresponds to primary school students with lower *individual accountability* (Node 3), while the highest probability of a high TAG level (75.2%) is found among secondary and baccalaureate students with a high level of *individual accountability* (Node 9). Conversely, the highest probability of a low TAG level (87.6%) occurs among the secondary and baccalaureate students with low *individual accountability* (Node 6), while the lower probability of a low TAG level (24.8%) is seen in the secondary and baccalaureate students with the highest TAG level (Node 9).

Figure 2, prepared for SAG, shows results similar to TAG but with different percentages. That is, the lowest probability of a high SAG level (15.7%) corresponds to Node 3, while the highest probability of a high SAG level (74.0%) is found in Node 9. Similarly, the highest probability of a low TAG level (87.2%) occurs in Node 6, while the lowest probability of a low SAG level (26.0%) corresponds to Node 9.

Lastly, Figure 3 shows different results for OAG, with the lowest probability of a high OAG level (18.3%) seen in the primary and secondary students with the lowest scores in *interpersonal skills* and *positive interdependence* (Node 5), while the highest probability of a high OAG level (75.1%) is among the primary and secondary students with high scores in *interpersonal skills* and *group processing* (Node 9). As for the low OAG level, the highest probability (81.7%)

occurs in Node 5, whereas the lesser probability of a low *OAG* level (24.9%) is found among the primary and secondary students with higher scores in *interpersonal skills* and *group processing* (Node 9).

Discussion

The purpose of this research was twofold: (a) to analyse whether CL factors discriminate between different approach goals in the 3×2 achievement goal model and, in consequence, (b) to assess the role of school stage. Regarding the first objective, the results show that the CL factors discriminate significantly at the high level of each approach goal, highlighting individual accountability as the most important factor predicting TAG and SAG, and conversely, as the worst predictor of OAG. Therefore, these findings suggest that students who engage in the teaching/learning process under the methodological guidelines of CL and perceive a classroom climate based on individual accountability could orient their goals to attaining competence based on task or interpersonal standard (the self).

As for the fact that individual accountability distinguishes TAG and SAG as the main factor and OAG as the last factor, there are no direct precedents in the literature. However, several studies in the context of PE have found that the of mastery-approach goal correlates positively with intrinsic motivation (Conroy et al., 2006; Méndez-Giménez et al., 2012; Ruiz-Juan & Baena-Extremera, 2015), while performance-approach is associated with extrinsic motivation (Smith et al., 2002). In turn, different studies have shown the relationship between TAG and SAG with respect to self-determined motivation, while in OAG this association is negative (Diseth, 2015; Méndez-Giménez et al., 2017; Méndez-Giménez et al., 2018). Moreover, previous studies indicate a direct relationship between responsibility and intrinsic motivation (Belando et al., 2015; Menéndez & Fernández-Rio, 2017; Moreno-Murcia et al., 2012) and between responsibility and self-determined motivation (Merino-Barrero et al., 2019). The results obtained in this study are consistent with earlier studies, highlighting responsibility as a fundamental factor in motivating students to focus their goals on attaining task- and self-based competence, with TAG being the goal to be pursued in the context of PE (Méndez-Giménez et al., 2014). However, the similarity of the results found in TAG and SAG in the present study, together with studies such Méndez-Giménez et al. (2018a), shows that both goals are adaptive in a similar manner, which could suggest encouraging both in PE. Therefore, the findings are relevant, since responsibility demonstrated by students, or lack thereof, seems to be essential in orientating students in PE classes towards more adaptive goals such as TAG or SAG rather than less adaptive ones such as OAG. A recent study by Fernandez-Rio and Casey (2020) has shown that implementing the sport education model (based on cooperation) significantly increases individual accountability.

As for the second objective, the results show that in both primary and secondary education the highest TAG and SAG values occur when students have a high score in individual accountability. Additionally, the OAG factor does not exhibit the same behaviour as the other approach goals since the individual accountability factor does not directly predict OAG. It has been observed that in both primary and secondary education, the pattern by which students orient their intentions to TAG and SAG lies in the perception of individual responsibility. Scientific literature has shown in previous studies the importance of responsibility in PE at different educational levels (Carbonero et al., 2015; Fernández-Rio et al., 2019; Manzano & Valero-Valenzuela, 2019; Merino-Barrero et al., 2019). These findings suggest that by implementing a CL-based methodology which fosters individual accountability, the conditions necessary in PE classes to create a climate which prompts students' motivational orientation towards more adaptive approach goals can be achieved (Méndez-Giménez et al., 2014; Méndez-Giménez et al. 2018b). Similarly, it has recently been observed that students show an increase in responsibility when CL is highly structured (Cecchini et al., 2020).

This research presents certain limitations. The study is cross-sectional, the sample was restricted to a single region in Spain, and cooperation was evaluated based on a single instrument. It should also be noted that the strength of this study is that it is the first to examine the connection between CL and the 3×2 achievement goal model for PE. Moreover, five basic structural elements were used to measure CL.

The findings provide a new contribution to the theoretical framework of CL, underscoring the role of individual accountability as a relevant structural element. The main practical implication for PE teachers lies in the importance of designing cooperative environments in which patterns of individual accountability are well defined within the group task. Particular attention should be paid to the role of the individual within the group. Working regularly in small groups and having students take on the role of teacher are examples of activities which help students to feel more integrated in the educational project (Fernandez-Rio & Casey, 2020), thus encouraging individual accountability. There is a need for further research to address the role of CL in the development of adaptive patterns in PE.

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