Journal of School and Educational Psychology
2025, Vol. 5, No. 1, 19-30
https://doi.org/10.47602/josep.v5i1.62
https://journalofschoolpsychology.com

RESEARCH ARTICLE

Students' Achievement Goal Orientations Scale: Psychometric Properties and Measurement Invariance Across Genders and Grades

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Abstract

The present study aimed to investigate the psychometric properties of the Greek version of the PALS scale (Patterns of Adaptive Learning Scale) and measurement across genders and grades. The sample of the current research (N=2049) included secondary junior (N1=1342) and senior school (N2=703) students. They responded to self-report questionnaires measuring achievement goal orientations (mastery goals, performance-approach goals, and performance-avoidance goals). Exploratory and confirmatory procedures were applied to the above scales, demonstrating and supporting the underlying dimensionality. Reliability measures using Cronbach's alpha and McDonald's omega were all satisfactory and ranged between 0.575 and 0.824. The research discovered that the three aspects of individual goal orientations—specifically mastery, performance approach, and performance-avoidance—displayed adequate internal consistency within themselves and also measurement invariance was demonstrated across genders and grade levels, ensuring that these important concepts are perceived similarly across different genders and grade categories. The results showed that the Greek version of PALS possesses satisfactory psychometric properties boosting the credibility of the instrument for use in both psychological and educational research.

Keywords: Achievement Goal Orientations, Psychometric Properties, Measurement Invariance, Genders, Grades

Introduction

Motivation has consistently been recognized as a significant determinant of academic behavior, with numerous theories aiming to elucidate how motivation shapes learning outcomes and success. Achievement goals have held a pivotal role in the examination of motivation within achievement contexts. Specifically, the concept of Achievement Goal Orientation (AGT) has garnered considerable attention within the field of educational psychology in recent years due to its capacity to clarify students' attitudes and actions concerning academic learning. The trichotomous model proposed by AGT distinguishes between three types of goals: mastery goals, performance-approach goals, and performance-avoidance goals. This model is widely recognized and accepted, as stated by Elliot and Harackiewicz in 1996. While the 2x2 model, proposed by Elliot and McGregor in 2001, has been suggested, it lacks universal acceptance from academics and is not frequently noticed, particularly among students (Lee & Bong, 2016.

Mastery goals are highly advantageous since they are associated with adaptive academic patterns that facilitate a thorough understanding of the work at hand. Mastery-oriented students typically exhibit high self-efficacy, a strong interest in the academic environment, and employ effective strategies to fully master learning tasks (Barron & Harackiewicz, 2001; Lüftenegger et al., 2017; Scherrer et al., 2020; Senko, 2019; Stavropoulou et al., 2023). In addition, students who choose mastery goals exhibit greater effort and involvement in the learning process (e.g., Senko & Dawson, 2017).

However, performance-approach goals are less advantageous than mastery goals since their learning consequences are variable. Students that embrace performance-approach goals strive to outperform their peers and aim to receive favorable feedback. Performance-approach goals are linked to favorable outcomes when students actively

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participate in tasks that result in significant learning outcomes and frequently high levels of accomplishment (e.g., Al-Emadi, 2001; Church, Elliot, & Gamble, 2001; Pekrun et al., 2009). Conversely, it could also be associated with maladaptive learning patterns, such as adverse emotions (e.g. Bong, 2009), disruptive behavior (e.g., Sideridis & Stamovlasis, 2014), and superficial task management (Midgley et al., 2001). It is important to note that there are studies that also provide evidence of no correlation between this particular objective and adaptive learning results (e.g., Senko & Dawson, 2017).

The third achievement goal is the performance-avoidance goal. When an individual is focused on achieving a certain objective, they exert effort to prevent the manifestation of any deficiencies in their abilities. Additionally, it is associated with diminished performance and reduced interest (e.g., Wimmer et al., 2018). Furthermore, this particular category is not linked to adaptive patterns (e.g., Elliot & Hulleman, 2017). Disruptive attitudes and dishonest behavior are also linked to performance-avoidance goals (Elliot, 2005; Sideridis, 2005). This objective is also associated with adverse feelings, such as anxiety (Kaplan et al., 2002).

In recent decades, a novel perspective has emerged in the scientific domain, proposing the concept of a multiple-goal perspective. This perspective posits that individuals can simultaneously accept two or more goals. There are four distinct sorts of goals, namely the specialized goal, the additive goal, the interactive goal, and the selected goal (Barron & Harackiewicz, 2001). Research suggests that the combination of mastery goals and performance-approach goals is highly advantageous for students. Mastery goals help students develop a deep understanding and proficiency in the task, while performance-approach goals drive them to achieve high levels of performance. This combination has been supported by studies conducted by Barron and Harackiewicz (2001) as well as Schmidt et al., (2020).

Achievement Goal Orientations Between Genders and Ages

Gender differences in goal orientations have been discovered. Research has shown that girls tend to exhibit greater cooperation, perseverance, and social relationship-building compared to boys (Guan et al., 2006; Meece et al., 2006). Boys also exhibit greater levels of activity compared to girls in areas such as physical education. However, this level of activity tends to decrease as they enter puberty. Furthermore, research has shown that girls tend to have a greater predisposition and excel in artistic activities and languages, whereas boys tend to excel in the field of science (Öztürk & Gürbüz, 2013; Wigfield & Eccles, 2002). The characteristics mentioned above show that girls tend to adopt mastery goals as they insist more, they try more, whereas boys tend to have more performance goals. As multiple types of research indicate, females are more inclined to embrace higher mastery objectives than boys, although the opposite is observed for accomplishment goals (Diseth & Samdal, 2014; Luo et al., 2011; Meece et al., 2003; Schwinger & Wild, 2012). Nevertheless, Linnenbrink-Garcia et al. (2018) did not observe any gender disparities in terms of mastery objectives and performance goals.

Students' motivation is contingent upon their grade level, as evidenced by the research conducted by Diseth and Samdal in 2014. During the elementary schooling years, children typically develop mastery goals, which change as they progress through different grade levels (Urdan & Midgley, 2003; Xiang & Lee, 2002). However, research conducted on younger children reveals the presence of both performance-approach and mastery objectives, but in older students, performance-approach and performance-avoidance goals are observed (Senko & Dawson, 2017). High school students exhibit a greater focus on performance rather than mastery, as evidenced by research conducted by Urdan and Midgley (2003). This can be attributed to the intense pressure placed on students to perform well on final high school exams, which determine their eligibility for higher education within a competitive assessment framework.

Linnenbrink-Garcia et al. (2018) concur that the mastering goals observed in primary school transition into performance goals during secondary school. Urdan and Midgley (2003) found that raising the mastery goal from one grade to another can yield numerous advantages, whereas lowering it has a discernible impact on the student's academic performance, leading to unfavorable outcomes. This phenomenon primarily manifests during the shift from primary to secondary school but becomes much more evident at the move to high school. Freeman and Anderman (2005) present that girls show an increase in mastery goals between the ages of 5 and 7. Bru et al., (2010) conducted a study on Norwegian pupils and concluded that there were no statistically significant alterations

observed between the ages of 5 and 10. Gillet et al., (2012) observe a decline in the intrinsic motivation of children aged 9 to 12 but note an increase in intrinsic motivation for students aged 15 and above.

In this specific instance, the progression from one grade to another once again holds significant significance. Research has found that students' motivation and individual achievement goals have a more significant role for children in lower secondary school grades (middle school) than for students in higher grades of secondary school (high school) (Diseth & Samdal, 2014). Adolescents in the initial phases of their development desire autonomy in their decision-making. Clear alterations are thus recognized in personal accomplishment objectives and throughout kids' adolescence (Bong, 2009; Givens Rolland, 2012; Meece & Miller, 2001). Adolescence is a period characterized by significant changes in the behavior and psychology of students (Urdan & Midgley, 2003). Modifying the educational context can improve these changes. During puberty, students primarily focus on extracurricular activities, which significantly contributes to a decrease in their motivation. Urdan and Midgley (2003) found that when students transition to high school, they tend to prioritize performance goals over mastery goals.

Adolescents frequently experience decreased motivation and altered behavior when the learning environment changes and when they are encouraged to pursue success objectives instead of mastery goals, as noted by Meece et al. (2003). According to Diseth and Samdal (2014), the distinction between classes with mandatory attendance and those without it is equally significant. According to Gottfried, Fleming, and Gottfried (2001), motivation experiences an increase with the transition from middle school to high school. In the first year of high school, students' intrinsic motivation tends to rise when they start to develop a focus on particular academic subjects (Diseth & Samdal, 2014). This may be true because, in high school, students concentrate on areas that they find most interesting and consider important for their future life and career (Gillet et al, 2012). According to Urdan and Midgley (2003), when students perceive a shift from the learning aim to the achievement goal or a decline in the learning goal, it results in a fall in achievement.

Evaluating students' performance in specific subjects is also crucial in the context of education. The shift from middle school to high school is accompanied by an increase in demanding and standardized evaluation methods, resulting in anxiety among students and prompting them to embrace performance-oriented objectives. According to Stamovlasis and Gonida (2018), Greek primary schools have a less rigorous assessment system compared to secondary schools. In secondary schools, especially in the subject of Modern Greek Language, the demands on students increase, and the assessment becomes more rigorous. This trend continues to intensify in high schools.

Aims of the Study and Research Questions

The main objective of the study is to explore the psychometric properties of the PALS Scale (Patterns of Adaptive Learning Surveys) adopted for the Greek student population and the potential differences between groups, given the measurement invariance. Therefore, the following hypotheses were stated:

1. The adopted version of PALS holds satisfactory psychometric properties and factorial validity.
2. The three dimensions of personal goal orientations (mastery, performance-approach, and performance-avoidance), demonstrate satisfactory internal consistency coefficients.
3. There is measurement invariance of the PALS Scale dimensions across genders and grades.

Method

Participants

The current study involved 2045 students, aged between 13 and 17, with almost an equal split of 49.8% girls, enrolled in junior (1342 students) and senior (703 students) secondary education across Greece. More specifically, among the participants, 543 were in 7th grade, 502 were in 8th grade, and 297 were in 9th grade. Additionally, 387 students were enrolled in 10th grade, while 316 were in 11th grade.

Measures

The trichotomous model was developed by employing the Patterns of Adaptive Learning Surveys (PALS; Midgley et al., 1998) to assess mastery-goal orientation (e.g., "I enjoy class work that contributes to my learning, even if I make mistakes"), performance-approach orientation (e.g., "I would feel proud if I were the only one who could answer the teacher's questions in class"), and performance-avoidance orientation (e.g., "It's important to me not to appear foolish in my class"). Mastery and performance-approach goal orientations each comprised six items, while performance-avoidance goal orientations consisted of four items. PALS (Midgley et al., 1998) was also utilized to gauge perceived teacher goal orientations, including perceived mastery goals (e.g., "My teacher believes mistakes are part of the learning process"), perceived performance-approach goals (e.g., "My teacher highlights students who achieve high grades as role models for the class"), and perceived performance-avoidance orientation (e.g., "My teacher emphasizes the importance of avoiding looking incompetent in class"). Each dimension encompassed five items on the scale.

Procedure

The present study utilized an opportunity sample for its research participants. To uphold ethical standards, the researcher contacted school principals to explain the research's objectives. Consent forms were obtained before distributing questionnaires to students. The questionnaires were completed by students in their respective classrooms, while those who chose not to participate engaged in alternative activities during that time.

Data Analysis

The structure and dimensionality of the Patterns of Adaptive Learning Surveys (PALS; Midgley et al., 1998) were examined using Exploratory Factor Analysis (EFA) through Principal Axis Factoring (PAF). This was followed by Confirmatory Factor Analysis (CFA), assessing various fit indices like chi-square ($\chi 2$), comparative fit index (CFI), and root mean square error of approximation (RMSEA) with typical acceptable thresholds: CFI $\geq$0.95, TLI $\geq$0.95, and RMSEA $\leq$ 0.05, as outlined by Geiser in 2013. Additionally, reliability was gauged through measures of internal consistency using Cronbach's alpha and McDonald's omega coefficients. Measurement invariance is a stepwise process encompassing four stages. Initially, the least restrictive model, known as configural invariance, serves as the baseline. Subsequent steps involve assessing increasingly constrained models compared to the previous one. The second step, metric invariance, examines factor loadings across groups to ensure similarity in the construct's meaning and factor variances/covariances. Scalar invariance, the third model, explores if item intercepts are equivalent across groups; any deviation might indicate a bias effect, highlighting differences in how groups perceive the construct. The final stage, strict invariance, tests factor variance equivalence and examines if the residual error is similar across groups. Assessing invariance models involves the $\chi 2$ difference test along with core indexes such as ΔCFI < 0.01 and ΔRMSEA < 0.015 to not reject the null hypothesis (e.g., Chen, 2007; Cheung & Rensvold, 2002).

Results

Exploratory Factor Analysis (EFA)

EFA using PAF with oblique/promax rotation, revealed the underlying dimensionality. Bartlett's test of sphericity ($\chi 2$ = 9821.266, p < 0.0001) and the Kaiser–Meyer–Olkin index (0.946) suggested adequate variance for applying factor analysis. Figure 1 shows the scree plot with parallel analysis, which along with Kaiser's criterion suggested a three-factor structure. The final refined structure includes the items with loading > 0.40 as shown in Table 1 which also presents where the internal consistency measures are also depicted.

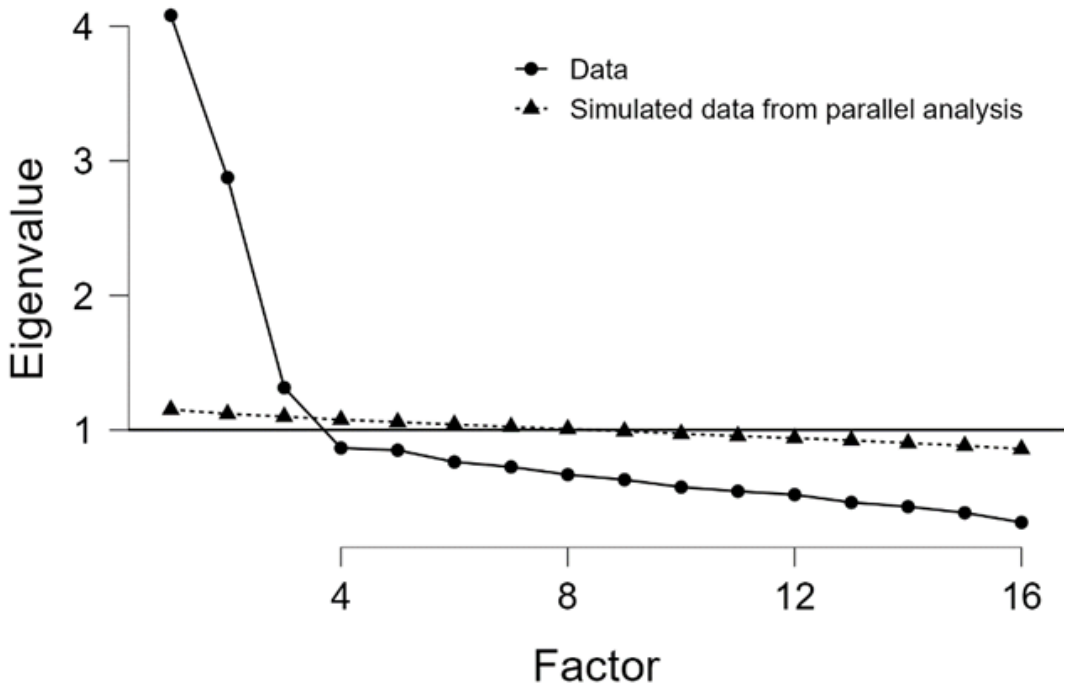

Figure 1. Parallel analysis with scree plot suggesting a three-factor structure

Table 1. Factor loadings of the three-dimensional structure of Students' Achievement Goals

Item	Performance Approach	Mastery Approach	Performance Avoidance	Uniqueness
perfap2	.84			0.44
perfap6	.77			0.46
perfap5	.71			0.46
perfap3	.68			0.49
perfap1	.44			0.73
perfap4	.43			0.60
map5		.78		0.36
map2		.70		0.53
map6		.67		0.54
map4		.66		0.54
map1		.58		0.68
map3		.54		0.72
perfav2			.53	0.77
perfav1			.53	0.69
perfav4			.51	0.70
perfav3			.44	0.80

Note1. The applied rotation method is promax. *Note2.* perfap: performance-approach, map:mastery goal, perfav: performance-avoidance

The three factors correspond to Mastery-approach, performance approach and performance avoidance, with eigenvalues 2.693, 2.665, and 1.159 respectively, while the corresponding portions of variance explained were 16.80%, 16.70%, and 7.20% respectively, while the total variance explained was 40.70% (see Table 2).

Table 2. *Eigenvalues and portions of variance explained the three factors of Students' Achievement Goals*

Variable	Unrotated solution			Rotated solution		
	SumSq. Loadings	Proportion var.	Cumulative	SumSq. Loadings	Proportion var.	Cumulative
Mastery approach	3.54	.22	.22	2.69	.17	.17
Performance approach	2.32	.15	.37	2.67	.17	.34
Performance avoidance	.66	.04	.41	1.16	.07	.41

Confirmatory Factor Analysis (CFA) –The Measurement Model

In a follow-up study, which included a larger sample (N=2024) of participants, CFA was applied to PALS-G, to validate the four latent variable structures underlying the set of observed variables. CFA results for the single-factor model were: $\chi2$=4331.694, df =104, p<0.001, CFI = 0.516, TLI=0.441, RMSEA=0.146, SRMR=0.144, NFI=0.511. The three-factor model fitted satisfactorily to the empirical data possessing the following fit measure indices: $\chi2$=577,312, df =101, p<0.001; CFI =0.996; TLI = 0.960; RMSEA =0.050; 90% CI of RMSEA = [0.046; 0.054]; SRMR=0.049; NFI=0.960; GFI=0.988]. A comparison of the two models using a $\chi2$ test revealed that the three-factor model was substantially improved over the single-factor model ($\Delta\chi2$=3754.382, df=3, p <0.001). Thus, the hypothesis of the unidimensional structure of PALS-G in the present data set was rejected. In addition, by inspecting the standardized residual covariance matrix, which had values smaller than two, the absence of possible model misspecifications was assured (Arbuckle, 2006). The calculations were carried out in R (via JASP).

Table 3. CFA measurement model

Factor	Indicator	Estimate	Std. Error	z-value	*p*	95% Confidence Interval	
						Lower	Upper
Mastery Approach	map1	1.07	.03	35.92	< .001	1.01	1.13
	map2	1.24	.03	40.72	< .001	1.18	1.30
	map3	0.95	.03	32.42	< .001	0.89	1.01
	map4	1.20	.03	40.2	< .001	1.15	1.26
	map5	1.48	.03	44.53	< .001	1.41	1.54
	map6	1.30	.03	42.47	< .001	1.24	1.35
Performance Approach	perfap1	1.09	.03	36.42	< .001	1.03	1.15
	perfap2	1.29	.03	46.17	< .001	1.23	1.34
	perfap3	1.41	.03	48.26	< .001	1.36	1.47
	perfap4	1.26	.03	44.68	< .001	1.20	1.31
	perfap5	1.39	.03	47.81	< .001	1.33	1.45
	perfap6	1.42	.03	48.38	< .001	1.37	1.48
Performance Avoidance	perfav1	1.00	.04	27.76	< .001	.93	1.07
	perfav2	.87	.04	21.99	< .001	.79	.95
	perfav3	.95	.04	25.04	< .001	.88	1.03
	perfav4	1.16	.04	28.96	< .001	1.09	1.240

Note. perfap: performance-approach, map:mastery goal, perfav: performance-avoidance

A R=.56)

Reliability Analysis

Reliability measures of the four GTIB's factors were computed using Cronbach's Alpha (α) and McDonald's omega (ω): Master Approach (α=0.817/ ω=0.816), Performance Approach (α=0.822/ ω=0.824), and Performance-Avoidance (α=0.575/ ω=0.575). Performance avoidance presents low reliability, a finding which is consistent to prior research (e.g. Stavropoulou et al., 2023, 2024). The overall internal reliability of the PALS-G is α=0.789/ ω=0.776. These reliability indices suggest that the present measurements with the PALS-G sub-scales have a satisfactory degree of internal consistency (Table 4). Table 4 shows the correlation matrix of the four dimensions, along with the means and the standard deviations of each factor. Master Approach correlated with Performance Approach (r=0.173, p<0.001) and the latter with Performance Avoidance (r=0.336, p<0.001).

Table 4. Factor correlation matrix, means, standard deviations, and internal consistency measures, Cronbach's Alpha and McDonald's Omega

Variable	Master Approach	Performance Approach	Performance Avoidance
Master Approach	1		
Performance Approach	.17***	1	
Performance Avoidance	.01	.34***	1
Mean	4.36	4.00	3.45
Std. Deviation	1.34	1.44	1.32
Alpha, *α*	0.87	0.82	0.58
Omega, *ω*	0.82	0.82	0.58

*Note: * p < .05, ** p < .01, *** p < .001*

Measurement Invariance for Gender

Having ensured validity issues with CFA, measurement invariance was carried out for the two genders, according to the description presented in a proceeded section. The measurement invariance is a general concern in psychometrics and it has always been a potential research question. The present study tested this hypothesis, which has not been addressed, so far, for the population under study, and it comprises an additional innovative element of this endeavor. Table 5 summarizes measurement invariance for gender. The chi-square difference ($\Delta\chi^2$) test, when comparing each of the invariance models: configural, metric, scalar, and strict invariance model with its predecessor, showed that p-values are statistically significant, which might imply a small bias, however, seeing the differences in CFI, TLI, RMSEA and SRMR, which are negligible, it be concluded that overall the measurement invariance holds for gender.

Table 5. Students' Achievement Goals: Measurement Invariance for Gender

Invariance model	χ^2	*df*	CFI	TLT	RMSEA	SRMR	$\Delta\chi^2$	*Df*	*p*-value
	0	0							
Configural	607.51	202	.97	.97	.05	0.05	607.51	202	
Metric	627.29	215	.97	.97	.05	0.05	19.78	13	0.1
scalar	700.73	228	.97	.97	.05	0.05	73.44	13	0.001
Strict	740.30	244	.97	.97	.05	0.05	39.57	16	0.001

Measurement Invariance for Grade

Measurement invariance was carried out for the six grade-groups, ranging between grade A-gymnasium to grade B-lyceum. In Greece schools are discriminated into primary and secondary education each discriminated into 6 grades. In secondary school, the first three grades are called gymnasium or lower secondary education and the last three are called lyceum or high school education. Table 6 summarizes measurement invariance for grades. The chi-square difference ($\Delta\chi^2$) tests showed also statistically significant p-values, however, the differences in CFI, TLI, RMSEA and SRMR, are small and negligible, thus the overall measurement invariance can be assumed for grades.

Table 6. Students' Achievement Goals: Measurement Invariance for Grade

Invariance model	χ^2	*df*	CFI	TLT	RMSEA	SRMR	$\Delta\chi^2$	Δdf	*p*-value
	0	0							
Configural	817.01	505	.98	.97	.04	.06	817.01	505	
Metric	923.48	557	.97	.97	.04	.06	106.46	52	0.001
scalar	996.70	609	.97	.97	.04	.06	73.22	52	0.028
Strict	1159.31	673	.97	.97	.04	.07	162.62	64	0.001

Testing the Differences Among Individual Characteristics

Given that the measurement invariance holds among gender and grade groups the potential underlying differences were tested. Two-way analysis of variance (2w-ANOVA) was applied with the grade and gender as independent variables predicting students' personal goals. For mastery goals, the main effects of gender ($F = 15.81$, $p < 0.001$) and grade ($F = 40.47$, $p < 0.001$) are statistically significant, while the interaction gender*grade is not. Figure 2 shows students' personal achievement goals as a function of grade and gender. Regarding mastery goals, girls, in general, appear to foster higher mastery goals across grades. Also, in the gymnasium, a decline is observed from grades A to C, while it increases in the lyceum. For performance-approach goals, the main effects of gender ($F = 8.10$, $p < 0.01$) and grade ($F = 19.34$, $p < 0.001$) are statistically significant, while the interaction gender*grade is not. For this goal, a consistent decline for both genders is observed from grades A-Gymnasium to B-Lyceum. For performance-avoidance goals, the main effects of grade ($F = 11.88$, $p < 0.001$) and the interaction term gender*grade ($F = 3.03$, $p < 0.05$), are statistically significant. A consistent decline for both genders is also observed from grades A-Gymnasium to B-Lyceum.

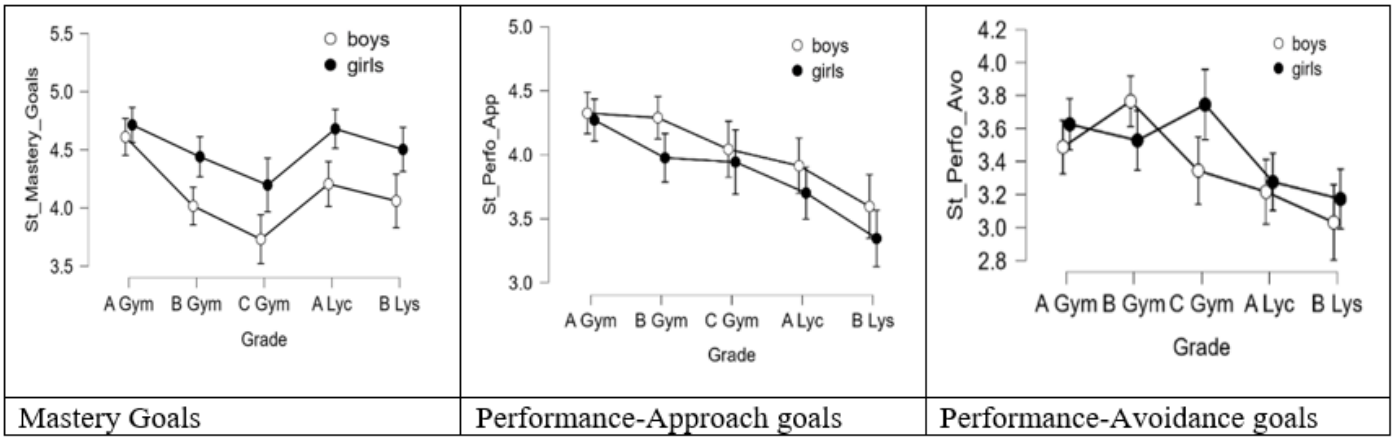

Figure 2. Students' Personal Achievement Goals as a function of grade and gender

Discussion

The revised version of the Patterns of Adaptive Learning Surveys (PALS) shows satisfactory characteristics in terms of its psychometrics and validity in terms of factors as presented in other research (Arslan, 2021; Yıldırım & Şanlı,

2023). The research discovered that the three aspects of individual goal orientations—specifically mastery, performance approach, and performance avoidance—displayed adequate internal consistency within themselves (Hypotheses 1, 2). Furthermore, the study demonstrated measurement invariance across genders and grade levels, ensuring that these important concepts are perceived similarly across different genders and grade categories (Hypothesis 3). The findings suggest that the scale being studied has a strong theoretical foundation and can be effectively utilized to measure personal goal orientations within educational environments by educators or by educational psychologists.

Additionally, variations in the average values of the three dimensions within PALS were identified among genders and across different grade levels using analysis of variances. To summarize the current findings, it's notable that girls tend to embrace more mastery-oriented goals compared to boys, whereas boys typically show higher tendencies toward performance-avoidance goals, aligning with earlier research (Diseth & Samdal, 2014; Luo et al., 2011). Notably, there were no significant differences in performance-approach goals observed between genders. Differences were also noted among different grade levels. Mastery goals displayed variability across grades, with an increase from gymnasium to lyceum for both genders. Additionally, performance-avoidance goals exhibited no increase in the gymnasium and a decrease in lyceum for both genders, whereas performance-approach goals consistently decreased across grades.

Implications and Limitations

The present research possesses also limitations associated with utilizing an opportunity sampling method and relying on cross-sectional data. Nonetheless, the results are consistent with and endorse prior studies on PALS application (Leondari & Gonida, 2008), offering more robust conclusions through the incorporation of substantial sample size and considering measurement invariance.

The current survey, focused on methodology, serves to connect theoretical ideas with practical use by introducing an accredited tool ensuring accurate measurement. Exploring distinctions among individual traits offers educators and policymakers valuable insights to create specific interventions that encourage favorable goal orientations and academic achievement for every student by emphasizing mastery goals which present a protective role (Stamovlasis & Gonida, 2018; Stavropoulou et al., 2023). Additionally, researchers must investigate the persistence of these disparities and their impact on academic performance and students' overall comfort in educational settings, considering other variables such as emotions. This approach can also be applied to under-researched populations, such as university students, to expand our understanding in the field.

matrix.

Conclusion

The revised Patterns of Adaptive Learning Surveys (PALS) demonstrate robust psychometric properties and validity, evidenced by satisfactory internal consistency and measurement invariance across genders and grade levels, thus advancing achievement goal theory (Kaplan & Urdan, 2020; Leondari & Gonida, 2008). Mastery, performance approach, and performance-avoidance goal orientations were found to be distinct yet stable constructs within educational environments. Notably, gender and grade-level differences were observed, with girls exhibiting higher mastery-oriented goals and boys displaying greater tendencies towards performance-avoidance goals. These findings underscore the importance of considering individual differences in goal orientations when designing educational interventions. Overall, the study highlights the significance of aligning theoretical concepts with practical methodologies to promote positive outcomes in educational settings.

Compliance with Ethical Standards

Ethical Standards

The research project was approved by the Ethics Committee of the Institute of Educational Policy of Greece (Research Section). Entrance permission to the schools was provided by the Greek Ministry of Education. This research was approved by the Ethics Committee of the Institute of Educational Policy of Greece (1817/06-03-

2018/ΙΕΠ). For this project the approval statement from the ethics committee was not mandatory in our university, However, we confirm that all procedures performed in this study followed the guidelines Declaration of Helsinki. Written informed consent was obtained from all participants who voluntarily agreed to participate in the study after the research procedure and objectives of the study were explained in simple, clear language. Participants were reassured that the data collected would be confidential and would be used for research purposes only. It was clearly explained that participation in this study was voluntary, and the participant had the right to withdraw at any time without any deprivation. Any measure for personal data protection was also taken according to DPO instructions.

Informed consent

Parents completed informed consent forms for their children's participation in the study.

Conflict of interest

Stavropoulou Georgia received a PhD Fellowship grant from the State Scholarships Foundation. Stamovlasis Dimitrios, PhD supervisor, declares that there is no conflict of interest.

Funding

The research work was supported by the State Scholarships Foundation.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Acknowledgements

This research is co-financed by Greece and the European Union (European Social Fund- ESF) through the Operational Programme «Human Resources Development, Education and Lifelong Learning» in the context of the project "Strengthening Human Resources Research Potential via Doctorate Research" (MIS-5000432), implemented by the State Scholarships Foundation (IKY).

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Received: November 11, 2023
Accepted: April 22, 2024
Published Online: February 28, 2025

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