

The Effect of Achievement Goals Profiles on Learning Approaches and Academic Achievement: A Multiple-Goals Perspective

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Abstract

The present study aimed at investigating whether high school students can be grouped into different achievement goals profiles, whether these profiles differ in learning approaches and academic achievement, and whether learning approaches is a mediator of the relationship between achievement goals profiles and academic achievement. The sample of the study included 350 high school students (189 males and 161 females) in Oman. Students responded to the Arabic version of the Learning Process Questionnaire-Revised-2 Factors (LPQ-R-2F-A) and the Achievement Goal Questionnaire-Revised (AGQ-R-A). A hierarchical cluster analysis showed four different achievement goals profiles: High mastery-approach goal, high performance-approach goal, all low multiple goals, and high performance-avoidance goal. Students with mastery-approach goal profile showed the highest usage of the deep approach to learning whereas students with performance-avoidance goal profile were the lowest. Students with performance-avoidance goal profile showed the highest usage of surface approach to learning, whereas students with mastery-approach goal profile were the lowest. Students with high performance-avoidance goal profile had the lowest academic achievement. Learning approaches fully mediated the effect of achievement goals profiles on academic achievement.

Keywords: Achievement goals profiles; Learning approaches, Academic achievement; Multiple-goals perspective; Hierarchical cluster analysis

Introduction

One well-established psychological model that can help understand how individuals feel, think, and behave in different achievement contexts is the achievement goal model [1,2]. An achievement goal is a combination of affect, beliefs, and attributions that stimulates reasons of behaviors [1]. Within an academic achievement setting, achievement goals refer to the reasons students participate in achievement-related behaviors and the significance they assign to such behaviors [1-3]. According to the achievement goal theory, students' approach, involvement, and performance in academic achievement situations can be understood by considering the reasons for engaging in those situations [1,2].

The dichotomous achievement goals framework that theorizes goals as mastery versus performance goals has been the leading framework in the educational psychology literature for several decades [1,2,4]. A mastery goal (also known as learning or task goal orientation) is an attempt to gain competence while a performance goal (also known as ego-involved goal orientation) is an attempt to demonstrate competence relative to others. Mastery goals highlight that one's perception of ability is self-referenced and that a person with a mastery goal orientation sets personal criteria of evaluation. This person seeks self-improvement, learning, understanding, and task mastery, and he/she is willing to exert effort. Performance goals involve that perceived ability is other-referenced and that a person with a performance goal orientation adopts criteria of evaluation set by significant others. This person is striving to demonstrate superiority to feel competent [1,2,5]. Elliot and his colleagues [6,7] argued against the basic idea of the dichotomous achievement goals framework because several studies showed mixed findings regarding the relationship between performance goals and several psychological and educational outcomes [1,8].

Elliot and his colleagues [5,6,9,10], therefore, proposed a trichotomous achievement goals framework in which the mastery goal

construct remained identical to that in the dichotomous framework, but the performance goal construct was divided into a performance-approach goal and a performance-avoidance goal. A performance-approach goal emphasizes achievement of competence compared to others (i.e., normative competence), whereas a performance-avoidance goal focuses on avoidance of incompetence compared to others.

The 2 × 2 Achievement goals framework

Elliot and his colleagues [6,9,11] suggested the 2 × 2 achievement goal model. Their model highlights competence to be the basis of the achievement goals endorsed by individuals. Competence can be classified according to its definition or valence. As for definition, competence is highlighted in relation to the standards utilized to assess competence. These standards include the task itself, one's previous performance (mastery), or significant others' performance (performance). The competence valence distinguishes between approach goals and avoidance goals. When crossing up the mastery and performance goals with approach and avoidance goals, the result is four achievements goal orientations that students can pursue in an academic context: (1) mastery-approach goal which focuses on intrapersonal competence, such as, for example, a person exerts effort to do better than past personal achievement, (2) mastery-avoidance goal which focuses on intrapersonal incompetence, such as, for example, when a person exerts effort to avoid doing worse compared to past personal

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achievements; (3) performance-approach goal, which focuses on interpersonal competence, such as, for example, when a person exerts effort to do better than peers or classmates, and (4) performance-avoidance goal, which focuses on interpersonal incompetence, such as, for example, when a person exerts effort to avoid doing worse than peers or classmates [9,11,12]. Figure 1 shows the 2 × 2 achievement goals framework.

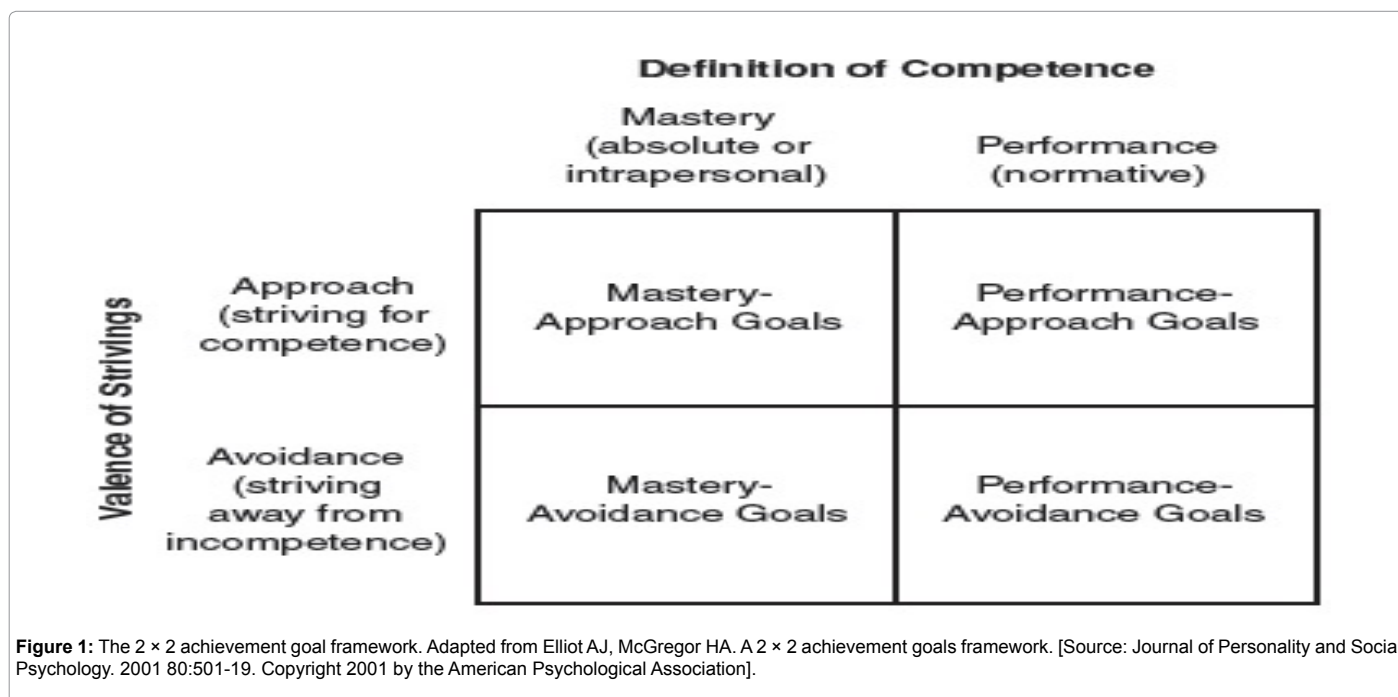
Within an academic achievement context, a student endorsing a mastery-approach goal is characterized by a desire to understand and thoroughly master the learning material. A student endorsing a performance-approach goal is more likely to combine the performance-approach with an aspiration for normative success. The student wants to master the material compared to other students; therefore, success is achieved by beating other students and showing greater competency rather than mastering the material absolutely. A student endorsing a mastery-avoidance goal is more likely to show a perfectionistic disposition and use rigorous mastery standards to avoid mistakes. The student focuses on avoiding any sign of incompetence rather than learning or mastering the learning material. A student endorsing a performance-avoidance goal tries to avoid negative judgments or being incompetent relative to peers [6,13-15].

Several studies have supported the validity and utility of the 2 × 2 achievement goal framework [16]. These studies showed that the four achievement goals can be expressed in four separate constructs and that these goals predicted several learning-related outcomes [11,17,18]. Other studies have followed the same research path and confirmed the four-factor structure of the 2 × 2 achievement goal framework and they continued to further examine the utility of this framework [19-24]. More importantly, research showed that mastery avoidance goals are common in achievement contexts [24,25] and can have harmful impact on performance [26], thus offering support for the significance of mastery-avoidance goal to be considered as part of the 2 × 2 achievement goal framework.

Multiple goals perspective: Goal profiles

The multiple goals perspective theorizes that a mastery-approach goal and a performance-approach goal are not reciprocally exclusive. It proposes that students can endorse multiple goals simultaneously although goals with a shared dimension (i.e., a mastery-approach and a mastery-avoidance goal also a mastery-approach goal and a performance-approach goal) tend to occur together [13]. Students can also adopt different level of a mastery goal or a performance goal with varying impacts on learning and motivation, and they can adjust their achievement goals to the achievement situation [27,28]. Furthermore, the multiple goals perspective theorizes that a mastery-approach goal and a performance-approach goal can be adaptive; highlighting that whether goals are beneficial depends on the achievement or the learning context [13]. The idea of multiple goals is particularly interesting when used within the 2 × 2 achievement goals framework due to two reasons. Firstly, several researchers were hesitant concerning the utility of considering the mastery-avoidance goal as part of the 2 × 2 achievement goals framework [29]. Secondly, some researchers argued that a limited number of studies have used the 2 × 2 framework compared to the Elliot's trichotomous model [9,30].

The 2 × 2 achievement goals framework have encouraged much research that seek to understand how the endorsement of these achievement goals can guide behavior in achievement settings, and how those behaviors can predict different achievement outcomes [13]. Although such studies are imperative in investigating the utility and validity of the 2 × 2 achievement goal framework, they often use a variable-centered as contrasting to a person-centered analysis technique. In a variable-centered analysis technique (e.g. correlation and regression), process and outcome variables are usually linked to each goal orientation distinctly [31,32]. The main problem of these techniques is that they do not sufficiently consider variations in how different achievement goals are integrated and incorporated within an individual in an achievement context [33,34]. However, the person-



centered analysis technique is principally appropriate for researchers who adopt the multiple goals perspective. A person-centered analysis (e.g. cluster analysis) detects the set of achievement goals of each individual and then group together individuals with similar achievement goals (achievement goals profile) [31,32].

For example, Wang and his colleagues [24], using a sample of 348 students in Singapore, clustered four achievement goals within the framework of the 2×2 achievement goal model. They reported four goal patterns: moderate achievement goals cluster, low achievement goals cluster, high achievement goals cluster, and mastery achievement goals cluster. The high achievement goals cluster was related to the most adaptive characteristics and outcomes including highest perceived competence and relatedness, and lowest amotivation. Students in this cluster also showed the most effort and enjoyment of physical education activities. The low achievement goals cluster was related to the least adaptive characteristics and outcomes including lowest autonomy, relatedness, and perceived competence, and highest amotivation. Students in this cluster also showed the least effort and enjoyment of physical education activities. This study indicated that the endorsement of avoidance goals may not be damaging if accompanied by the pursuing of approach goals.

Achievements goals, learning approaches and academic achievement

Learning approaches are defined as the ways in which students approach academic tasks, thereby influencing learning outcomes [35]. An approach to learning includes both the motivation for performing the task and the strategies for doing it. Learning approaches include two main categories: deep and surface approach to learning [35]. The deep approach is related to intrinsic motivation and reflective learning. This approach highlights a developmental process with changes in students' perceptions, epistemological beliefs, and learning habits [36,37]. A deep approach focuses on elaboration, critical thinking, and organization, and it comprises challenging the accuracy of information and incorporation of recent information with previous knowledge and experiences which helps long-term retention of these information (e.g. an outline of key concepts). This approach shows engagement in tasks, focuses on meaning, basic ideas, principles and themes, and uses evidence and utilizes knowledge across contexts [36,38].

The surface approach, on the opposite, is based upon extrinsic motivation and shallow learning. This approach involves less cognitive engagement and points to rehearsal including rote memorization and information repetitive rehearsal, which supports integrating new information and knowledge into short-term memory (e.g. reading the learning material several times) [39-42]. The surface approach is treating the learning materials as unrelated or distinct bits of knowledge, memorizing information and procedures, focusing on the syllabus minimum requirements, feeling little value of the course or tasks, studying without reflection or thinking about purpose or strategy, and feeling unnecessary stress and anxiety about learning [43]. The surface approach is known as the surface apathetic approach because it suffers syllabus dependency, fear of failure, and lack of understanding.

For example, Toh [44], using a sample of 341 high school students in Australia reported that a cluster analysis identified five clusters of students with significantly different achievement goals profiles within the 2×2 achievement goals framework: mastery group, performance group, all goals moderate group, all goals high group, and all goals low group. Four predictor groups were included in a path model, except the

performance group, which was used as a reference control group due to its relatively low scores on exams, deep strategy, and effort. It was found that mastery group, all goals moderate group, and all goals high group positively predicted deep strategy. Mastery group negatively predicted surface approach to learning. All goals moderate group predicted negatively the weakest grade achieved by students during their last examination or recent assignments.

Bruce and Stevens [45] identified two achievement goals clusters within the 2×2 achievement goals framework using hierarchical cluster analysis with a sample of 844 high school students in Malaysia: all high achievement goals cluster and all low achievement goals cluster. Students in the all high achievement goals cluster showed high science and language achievement. This cluster also reported the most effort and enjoyment of academic activities. In contrast, students in the all low achievement goals cluster showed low science and language achievement. This cluster also reported the least effort and enjoyment of academic activities.

Jang and Liu [46] used cluster analysis to identify distinct subgroups of participants with similar goal profiles within the 2×2 achievement goals framework. The sample of the study included 480 Secondary 2 students (aged between 13 and 14 years) from two coeducational government schools in Singapore. The analysis revealed the presence of five clusters of students with significantly different achievement goals profiles: high multiple goals cluster, high mastery approach and low mastery avoidance cluster, all low multiple goals cluster, high mastery avoidance cluster, and low performance goals cluster. The findings of the study revealed that students from the high multiple goals cluster generally indicated significantly higher levels of the various learning strategies (rehearsal, elaboration, organization, critical thinking, and self-regulation). Students from the high mastery approach and low mastery avoidance cluster had the best mathematics results. Students from the all low multiple goals cluster generally endorsed significantly lower levels of the learning strategies and had poor mathematics achievement.

Problem and rational of the study

Teachers face difficulty when teaching disinterested and apathetic students who are not willing to use their potentials in academic settings. They often inquiry why certain students persist in academics, persevere when faced with difficulties and challenges, and have the will to exert and put more effort while others struggle and withdraw easily. Recognizing this academic challenge, researchers have focused a great deal of attention examining the motivational factors associated with these academic differences among students. One important framework that has been frequently employed for this purpose is the achievement goal theory.

One side of the problem of the present study is that most of the research on the achievement goal theory has applied a variable-centered analysis (e.g. correlation or regression analysis) wherein each achievement goal is related individually and independently to process and outcome variables. A drawback of the analytical approach is that it focuses on inter-individual differences between the isolated goals in terms of specific learning processes and achievement outcomes. It does not reasonably consider variations in how different achievement goals are simultaneously integrated and incorporated within an individual in an achievement context, thereby affecting these learning processes and achievement outcomes [24]. Simply put, a variable-centered analysis assumes that an achievement goal can function equally across individuals, and it does not take into account whether the function of

an achievement goal differs according to other achievement goals that may be simultaneously endorsed in an achievement context [45].

For example, a simple Pearson correlation coefficient between a mastery-approach goal and a performance-approach goal emphasizes merely a sample-level relationship and does not inform about the simultaneous occurrence of these goals within individuals [46]. A variable-centered technique can, therefore, mask heterogeneity in the function and levels of endorsed achievement goals and falsify the experience of specific achievement goals [13]. In addition, it is of little ecological validity to examine either mean levels or relations among achievement goals either independently or when controlling for the effect of other achievement goals because achievement goals can co-occur within individual and the relationships among achievement goals may differ according to the level of the set of achievement goals endorsed by the individual [24].

However, the recent developments of the achievement goal theory have resulted in a multiple goals perspective of achievement goals orientations which theorizes that an individual is ideally motivated by adopting more than one achievement goal simultaneously. It often uses a person-centered analysis technique (i.e., cluster analysis) wherein individuals with similar achievement goals are grouped together to form unique achievement goals profiles. These profiles are then related to important learning processes and achievement outcomes. Thus, the multiple goals perspective focuses on intra-individual differences among these profiles. Although the research utilizing the multiple goals perspective is important to understand the functional relevance of the achievement goals in achievement contexts [12,47], very few studies have used this analytical approach [24,46]. There is, therefore, a debate regarding which combination of achievement goals (i.e., goal profiles) leads to the most adaptive outcomes, and how the effects of multiple goals are best revealed in terms of learning processes and achievement outcomes.

Another side of the problem of the present study is that most of the research that have utilized the variable-centered approach have examined the effect of achievement goals on either learning approaches as a process variable or academic achievement as an outcome variable; that they rarely incorporate both variables in one research path [44,48]. In the present study, we argue that it is important to investigate both learning approaches along with academic achievement in the same research path because research have shown that learning approaches can predict academic achievement [49-53]. Specifically, a deep approach to learning correlated positively with academic achievement, whereas a surface approach to learning correlated negatively with examination results [44]. One advantage of merging learning approaches and academic achievement in one research path is that it makes it possible to examine the role of learning approaches as a mediator variable of the effect of achievement goals on academic achievement [54,55]. As indicated by Chan, Wong, and Lo [56] much research is required to investigate not only the direct impact of learning approaches on academic achievement, but also the mediational role of learning approaches in the relationship between achievement goals and academic achievement.

Furthermore, concerning the application and utility of the achievement goal theory, to date, the vast majority of empirical investigations of the achievement goal theory and particularly the multiple goals perspective has been conducted almost exclusively within subjects from Western and Asian contexts [44-46] that represent individualistic cultures with slight attention been given to samples belong to Arabic countries particularly the Arabic Gulf area. In fact,

one should be alert to probable differences in achievement goal conceptualization, endorsement, and effect from culture to culture. There are some initial clues that cultural factors influence both goal orientation adoption and goal orientation relationship to academic achievement [34,48]. Therefore, the research path of the multiple goals perspective becomes more interesting when examined using samples from Arabic Gulf countries such as Oman because different cultures are presumed to encourage different motivational approaches [48].

To summarize, the present study utilizes a multiple goals perspective to investigate how different achievement goals are integrated and incorporated simultaneously within an individual in an achievement context and thereby affect important learning processes and achievement outcomes. Specifically, the problem tackled in the present study is to whether high school students in Oman can be grouped into different achievement goals profiles and whether these profiles differ in learning approaches and academic achievement. The present study also examines learning approaches as a possible mediator of the relationship between achievement goals profiles and academic achievement as suggested by Chan and his colleagues [56].

Questions of the study

The present study seeks to answer the following research questions:

1. Do students show subgroups (i.e., clusters) with different achievement goals profiles?
2. Do students with different achievement goals profiles differ significantly in learning approaches and academic achievement?
3. Do student's learning approaches mediate the relationship between achievement goals profiles and academic achievement?

Aims of the study

The following aims guide the present study:

1. Examine different achievement goals profiles shown by high school students in Oman.
2. Investigate whether students with different achievement goals profiles differ significantly in learning approaches and academic achievement, thereby identifying the best achievement goal profiles that lead to the most adaptive process (i.e., learning approaches) and outcomes variables (i.e., academic achievement)
3. Examine learning approaches as a potential mediator of the relationship between achievement goals profiles and academic achievement.

Significance of the study

The significance of the present study is summarized as following:

1. The application of the 2 × 2 achievement goal model to a sample of students in Oman provides evidence for the cross-cultural external validity of this model within a non-Western context.
2. The examination of achievement goals profiles can provide further evidence to research and theory on the multiple goals perspective as a promising approach to examine how achievement goals can be integrated within individuals simultaneously, and thereby affecting important learning process and achievement outcomes.
3. Learning approaches and academic achievement represent process and outcome variables that are great significance to students' academic career.

Methods

Participants

Participants of the present study included 350 students (189 males and 161 females) enrolled in eight public schools distributed over three governorates in Sultanate of Oman: Muscat (2 schools), Al-Batinah North (3 schools), and Dhofar (3 schools). All students were at Year 10 (i.e., first year in high school). All schools were from metropolitan areas and had single-gender population. The age mean and the standard deviation were 15.47 and 0.64 for boys and 15.12 and 0.34 for girls. The percentage of missing data was 2%. Only students with complete data were retained for the present study. The analysis of demographic data showed that 98% of participants belong to the middle socioeconomic class. The data collected from this sample will be used to examine the psychometric properties (validity and reliability) of the measurements and to run the main statistical analyses to test the hypotheses of the present study and because it was not possible to secure another sample due to time constraints.

Measurements

The Achievement Goal Questionnaire-Revised (AGQ-R)

Elliot and Murayama [13] developed the Achievement Goal Questionnaire-Revised (AGQ-R) as a new version of the Achievement Goal Questionnaire (AGQ) that Elliot and McGregor [11] originally developed. The AGQ-R consisted of 12 items distributed equally over four achievement goal factors: (a) mastery-approach goal (e.g. My aim is to completely master the material presented in a class), (b) mastery-avoidance goal (e.g. My aim is to avoid learning less than I possibly could), (c) performance-approach goal (e.g. My aim is to perform well relative to other students), and (d) performance-avoidance goal (e.g. My aim is to avoid doing worse than other students). Students responded to each item of the AGQ-R on a 5-point Likert type scale that ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). A total score can be computed for each goal type by summing up the ratings for all items of this goal and it can range from 1 to 15. High score represents high level of the specified goal.

Alkharusi and Aldgafri [57] adapted and validated the AGQ-R using a sample of 242 undergraduates in Oman. They reported that the AGQ-R Arabic version (AGQ-R-A) has Cronbach's alpha that ranged from 0.71 to 0.77. Although the AGQ-R-A was originally developed using data collected from undergraduate samples [13], some studies have successfully used the questionnaire with high school students [58,59]. For example, Abd-El-Fattah and Al-Nabhani [58] used the AGQ-R-A with a sample of 195 Year 11 students in Oman.

Reliability of the AGQ-R-A

The reliability estimates of the AGQ-R as tested by two methods are reported in Table 1:

(1) Test-retest reliability

The AGQ-R-A was re-administered to a subsample of students ($n=135$) after 4 weeks. Table 1 shows values of the test-retest reliability coefficient (stability coefficient) for the subscales of the AGQ-R-A which ranged from 0.78 to 0.83. These values support the stability of students' performance scores on the AGQ-R-A subscales.

(2) Internal-consistency reliability

The internal-consistency reliability of the AGQ-R-A was estimated using the full sample of ($N=350$). Table 1 shows values of the internal

consistency reliability coefficients (Cronbach's Alpha) for the subscales of the AGQ-R-A which ranged from 0.80 to 0.85. These values support the internal consistency reliability of the AGQ-R-A subscales.

The Learning Process Questionnaire-Revised-2 Factors (LPQ-R-2F)

Kember, Biggs, and Leung [60] developed the Learning Process Questionnaire-Revised-2 Factors (LPQ-R-2F) as a new version of the Learning Approaches Questionnaire that Biggs [35,61,62] originally developed. The LPQ-R-2F consisted of 22 items distributed equally over two factors: deep approach (11 items, e.g. When I read a textbook, I try to understand what the author means) and surface approach (11 items, e.g. I learn material by rote, going over and over them until I know them by heart even if I do not understand them) and four corresponding subscales: deep motive (7 items), deep strategy (4 items), surface motive (4 items) and surface strategy (7 items). Students responded to each item of the LPQ-R-2F on a 5-point Likert type scale that ranged from 1 (Never or only rarely true of me) to 5 (Always or almost true of me). A total score can be computed for each approach by summing up the ratings for all items of this approach and it can range from 11 to 55. High score indicates high level of the specific approach type.

Translation of the LPQ-R-2F

Applying a blind back translation strategy [63] to the LPQ-R-2F, two bilingual professors of educational psychology translated the LPQ-R-2F from English into Arabic using the back-translation method. Two others bilingual professors of educational psychology, working without referencing to the English version of the LPQ-R-2F, independently translated the Arabic version back to English. Finally, two certified translators independently compared the original English version of the LPQ-R-2F to the new English version that was translated back from Arabic and rated the match between the two versions on a scale of 0 or 1. A score of zero represented no match, whereas a score of 1 represented perfect match. The average percentage of match was 98% which could be considered highly acceptable [63].

Furthermore, inter-rater agreement was calculated using SPSS 22.0 program Crosstabs function. This produces a Kappa statistic for level of agreement. Cohen [64] argued that Kappa values can range between -1 and +1. $Kappa > 0$ refer to greater than chance agreement, $Kappa < 0$ refers to less than chance agreement, and $Kappa = 0$ refers to chance agreement. Landis and Koch [65] categorized $Kappa < 0.41$ as weak, $0.41 < Kappa < 0.60$ as moderate, and $Kappa > 0.60$ as large level of agreement. The inter-rater agreement Kappa value for the LPQ-R-2F Arabic version (LPQ-R-2F-A) was 0.83 which indicated high levels of interrater agreement.

Confirmatory factor analysis of the LPQ-R-2F-A

For purposes of establishing the construct validity of the LPQ-R-2F-A, the AMOS 20 program [66] was used to run a confirmatory factor analysis for the proposed correlated two-factor model of the LPQ-R-2F-A; a deep approach to learning factor (11 items) and a surface approach to learning factor (11 items). Confirmatory factor analysis is used to validate and confirm the structure of a measurement tool [67]. Figure 2 shows a hypothesized correlated two-factor model of the LPQ-R-2F-A.

Within this model, the items function as observed variables for their designated factors (subscales) which in turn function as latent variables. The data showed both univariate (skewness and kurtosis values were between -1 and +1) and multivariate normality (Mardia's

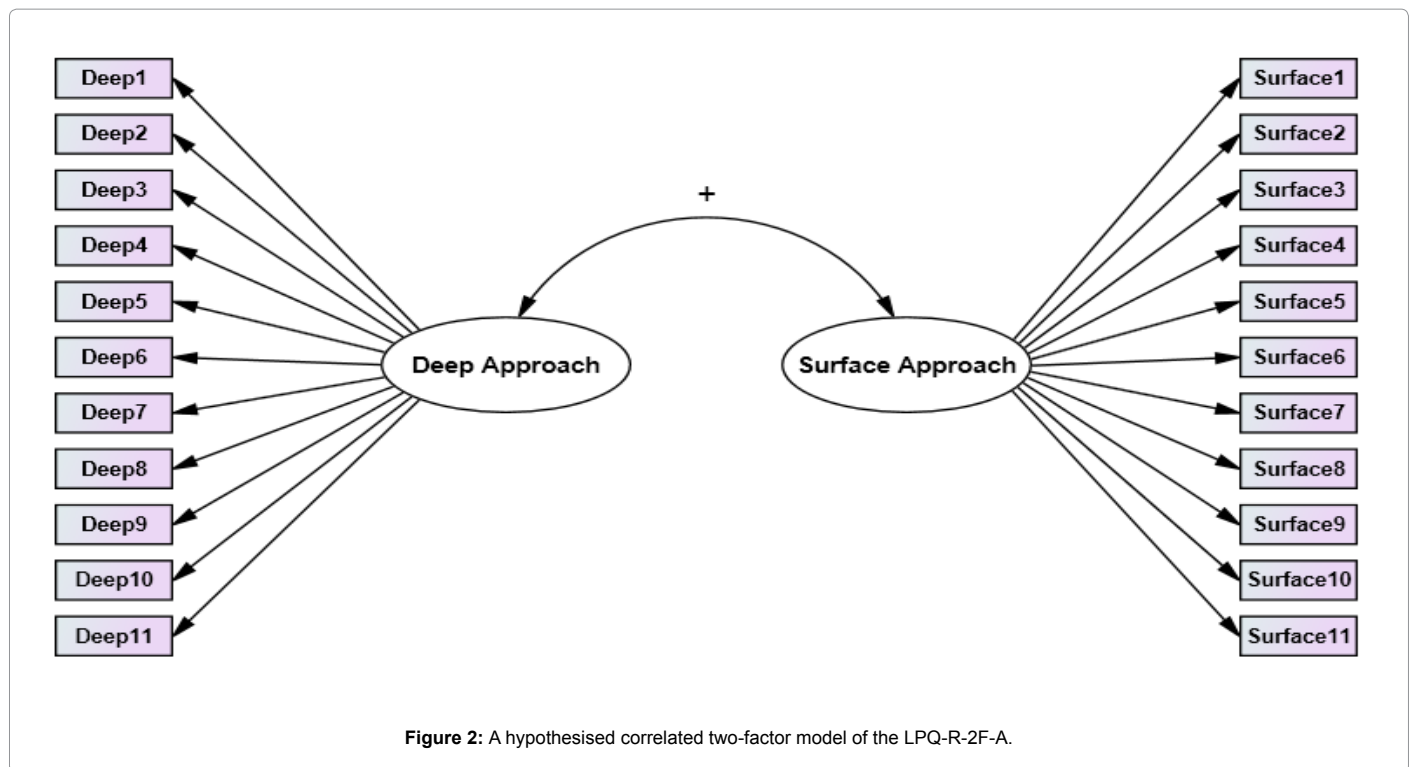


Figure 2: A hypothesised correlated two-factor model of the LPQ-R-2F-A.

coefficient=43.16 and the Normalized estimate=21.33) [68]. The variance covariance matrix was analyzed using full information maximum likelihood method [69]. The fit indices used to evaluate the model fit to the data included: (1) Absolute fit indexes (Chi-square (χ^2)/df<2.0; Standardized Root Mean-Square Residual (SRMR)<0.08, and Root-Mean-Square Error of Approximation (RMSEA)<0.06), and (2) Relative fit indexes (Comparative Fit Index (CFI)>0.95 and Nonnormed Fit Index (NNFI)>0.90) [67,68].

The fit indices from the CFA analysis showed that the proposed correlated two-factor model had an acceptable fit to the data ($\chi^2=258.33$, df=228, $\chi^2/df=1.13$, RMSEA=0.03, SRMR=0.05, CFI=0.98, NNFI=0.98). The two factors correlated significantly ($r=0.35$, $p<0.01$). Table 2 shows the standardized regression weights and associated critical ratio (CR) for the items of deep-approach and the surface-approach subscales. The standardized regression weights for the deep-approach subscale ranged from 0.58 to 0.72 with associated critical ratio ranging from 3.77 to 9.22. The standardized regression weights for the surface-approach subscale ranged from 0.51 to 0.77 with associated critical ratio ranging from 4.52 to 10.33. The critical ratio (CR) is the test statistic used to investigate the statistical significance of the factor loadings. The CR values need to be $> \pm 1.96$ for factor loading to be acceptable (i.e., statistically different from zero) [69,70]. According to these guidelines, all the factor loadings of the LPQ-R-2F-A model were statistically significant because the CR values were > 1.96 .

Reliability of the LPQ-R-2F-A

The reliability estimates of the LPQ-R-2F-A as tested by two methods are reported in Table 3:

(1) Test-retest reliability

The LPQ-R-2F-A was re-administered to a subsample of students ($n=135$) after 4 weeks. Table 3 shows that the values of the test-retest

reliability coefficients (stability coefficient) were 0.85 for the deep-approach subscale and 0.88 for the surface-approach subscale. These values support the stability of students' performance scores on the LPQ-R-2F-A subscales.

(2) Internal-consistency reliability

The internal-consistency reliability of the LPQ-R-2F-A was estimated using the full sample of ($N=350$). Table 3 shows that the values of the internal consistency reliability coefficients (Cronbach's Alpha) were 0.92 for the deep-approach subscale and 0.90 for the surface-approach subscale. These values support the internal consistency reliability of the LPQ-R-2F-A subscales.

(3) Academic achievement

Participant students' academic achievement scores were obtained from their school records for the overall academic year 2016/2017. These scores were the courses aggregated total score (i.e., the sum of on courses assignments and examinations scores) and were expressed as percentages. High scores indicate a high level of academic achievement.

Procedure

The researcher obtained an oral approval to conduct the research at the selected schools from school authorities. Students were recruited to participate in the present study during their normal classes at their schools. Specific classes in each school participated in the present study depending on students' classroom schedules. Students were notified that participation was voluntary and that their responses would be kept confidential. All students signed a consent form that they were willing to participate in the study. The AGQ-R-A and the LPQ-R-2F-A were administered to participant students as one bundle by trained experimenters according to standardized instructions during the second week of the first semester of the 2016/2017 school year. Students

Variables	Number of items	Test-retest coefficient ⁽¹⁾	Internal-consistency coefficient ⁽²⁾
Mastery approach	3	0.80	0.80
Mastery avoidance	3	0.83	0.85
Performance approach	3	0.78	0.81
Performance avoidance	3	0.82	0.85

Note: ⁽¹⁾ n=135; ⁽²⁾ N=350

Table 1: Test-retest and Cronbach's alpha reliability coefficients for the AGQ-R-A sub-scales.

Factor/subscale	Item	Item loading	Critical ratio ⁽¹⁾
Deep strategy	Deep 1	0.66	4.35
	Deep 2	0.70	6.20
	Deep 3	0.64	3.89
	Deep 4	0.60	4.85
	Deep 5	0.72	7.36
	Deep 6	0.64	9.22
	Deep 7	0.58	8.44
	Deep 8	0.65	6.66
	Deep 9	0.62	3.77
	Deep 10	0.68	4.52
	Deep 11	0.70	6.35
Surface strategy	Surface 1	0.63	7.66
	Surface 2	0.68	8.55
	Surface 3	0.71	10.33
	Surface 4	0.77	6.58
	Surface 5	0.62	4.85
	Surface 6	0.51	7.30
	Surface 7	0.56	4.90
	Surface 8	0.60	4.52
	Surface 9	0.61	8.10
	Surface 9	0.69	5.60
	Surface 10	0.63	7.12
Surface 11	0.60	5.77	

Table 2: Item loadings and critical ratio for the two factors of the LPQ-R-2F-A.

Variables	Number of items	Test-retest coefficient ⁽¹⁾	Internal-consistency coefficient ⁽²⁾
Deep approach	11	0.85	0.92
Surface approach	11	0.88	0.90

Note: ⁽¹⁾ n=135; ⁽²⁾ N=350

Table 3: Test-retest and Cronbach's alpha reliability coefficients for the LPQ-R-2F-A subscales.

completed the two questionnaires in 20 to 25 minutes. Demographic data collected including participant students' names, identification number, gender, age, and residency (i.e., governorate).

Results

Descriptive statistics and correlation analyses

Table 4 shows means, standard deviations, and Pearson's correlations among all variables of the present study. Essentially, students had relatively high mastery-approach (mean=3.75 on the five-point scale) and performance-approach goals (means=3.71 on the five-point scale). In terms of learning approaches, students tended to agree that they use both deep (mean=3.49 on the five-point scale) and surface (mean=3.30 on the five-point scale) approaches to learning. In general, the correlations among the achievement goals orientations were high and positive ($.50 < r < .64$, $p < 0.001$). The highest correlation was between the two approach goals and

the lowest correlation was between the two avoidance goals.

The four achievement goals correlated differently with academic achievement and learning approaches. Amongst the four achievement goals, performance-approach goal had the highest positive correlations with academic achievement, deep approach to learning, and surface approach to learning. Mastery-approach goal correlated positively with deep approach to learning and negatively with surface approach to learning, but not with academic achievement. Mastery-avoidance goal did not correlate with any of the outcome variables. Performance-avoidance goal correlated negatively with deep approach to learning and academic achievement, and positively with surface-approach to learning. A one-way MANOVA were conducted to examine gender differences in achievement goals orientations. In this analysis, students' gender was set as the independent variable and achievement goals orientations were set as the dependent variables. The analysis showed nonsignificant difference in achievement goals orientations due to

Subscales	M	SD	1	2	3	4	5	6	7
Mastery-approach	3.75	0.45**	--	--	--	--	--	--	--
Mastery-avoidance	2.95	0.62**	0.60**	--	--	--	--	--	--
Performance- approach	3.71	0.38**	0.64**	0.57**	--	--	--	--	--
Performance-avoidance	3.20	0.52**	0.55**	0.50**	0.53**	--	--	--	--
Deep approach	3.49	0.44**	0.46**	0.08	0.48**	-0.39**	--	--	--
Surface approach	3.30	0.39**	-0.41**	0.11	0.45**	0.37*	0.39**	--	--
Academic achievement	74.33	2.33	0.04	0.07	0.50**	-0.33*	0.47**	-0.44**	--

Note: N=350. ** p<0.001, *p < 0.01. α represents Cronbach's alpha

Table 4: Descriptive statistics and Pearson's correlations among variables of the study.

Variables	Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	High mastery-approach goal (n=104, 30%)		High Performance-Approach goal (n=88, 25%)		All low multiple goals (n=70, 20%)		High performance-avoidance goal (n=88, 25%)	
	M	Z	M	Z	M	Z	M	Z
Mastery approach	4.25	1.66	1.75	0.41	2.10	-0.85	2.22	0.25
Mastery avoidance	2.07	0.39	2.44	0.27	1.95	-0.52	2.27	0.55
Performance approach	2.97	0.23	4.10	1.16	2.25	-0.62	3.05	0.08
Performance avoidance	2.55	0.08	2.04	0.18	2.14	-0.52	4.36	1.11

Note: Four achievement goals clusters extracted by hierarchical cluster analysis

Table 5: Cluster means, standard deviations, and Z scores of hierarchical cluster analysis.

gender, Pillai's Trace=0.07, F (4, 345)=0.87, p>0.05, η²=0.01.

Question 1: Do students show subgroups (i.e., clusters) with different achievement goals profiles?

To answer this question, the four achievement goals orientations were analyzed using hierarchical cluster analysis in order to identify distinctive achievement goals profiles. Cluster analysis is a statistical technique that identifies similar (i.e., homogenous) groups or clusters of individuals based upon the common characteristics they hold. The procedure allows the researcher to examine intraindividual differences in specific characteristic or trait rather than looking at interindividual differences. In this statistical technique, an observation starts its group or cluster. Next, new groups or clusters are formed by connecting the greatest analogous observations until either all data are clustered to form a single cluster or group, or the researcher decides that the greatest parsimonious model has been reached according to the dendrogram and agglomeration schedule [71,72].

Ward's method of analysis was used to keep the within-cluster differences to minimum and to overcome the problem of long chaining of the observations identified in other methods. Standardization of the four achievement goals orientations did not occur because they were all measured on the same scale [72,73]. Based upon the agglomeration schedule, the analysis showed that the merging of a solution of four clusters into a solution of three clusters resulted in a greater change in the coefficients (14%) compared to prior merging (below 8% change), suggesting that divergent clusters were merged. Therefore, a decision was taken that a solution of four clusters was more appropriate for the present dataset. The decision was clearly supported by the dendrogram. An explanation of clusters is led by the researcher and is based upon theory and empirical work [73].

The four achievement goals clusters. The four clusters identified through cluster analysis include cluster 1 (High mastery-approach goal) which constituted 30% (n=104) of the sample. Males constituted 70% of the number of participants in this cluster. Students in this cluster had a mastery-approach goal mean score of 4.25 on a 5-point scale

while their mean scores on the other three achievement goals ranged from 2.07 to 2.97. This means that students in this cluster had high endorsements of the mastery-approach goal and low endorsement of all other achievement goals. Cluster 2 (High performance-approach goal) constituted 25% (n=88) of the sample. Males constituted 73% of the number of participants in this cluster. Students in this cluster had a performance-approach goal mean score of 4.10 on a 5-point scale while their mean scores on the other three achievement goals were below average. This means that students in this cluster had high endorsements of the performance-approach goal and low endorsement of all other achievement goals. Cluster 3 (All low multiple goals) constituted 20% (n=70) of the sample. Females constituted 50% of the number of participants in this cluster. Students in this cluster had mean scores on all achievement goals below average on a 5-point scale. This means that students in this cluster had low endorsements on all achievement goals. Cluster 4 (High performance-avoidance goals) constituted 25% (n=88) of the sample. Females constituted 67% of the number of participants in this cluster. Students in this cluster had a performance-avoidance goal mean score of 4.36 on a 5-point scale while their mean scores on the other three achievement goals ranged from 2.22 to 3.05. This means that students in this cluster had high endorsements of performance-avoidance goal and low endorsement of all other achievement goals. Figure 3 displays the four achievement goals clusters revealed via hierarchical cluster analysis and Table 5 shows the cluster size, means, standard deviations, and z scores of hierarchical cluster analysis.

Question 2: Do students with different achievement goals profiles differ significantly in learning approaches and academic achievement?

To answer this question, a multivariate analysis of variance (MANOVA) was conducted. The purpose of MANOVA was to examine whether students' learning approaches (deep versus surface) and academic achievement differed as a function of their achievement goals profiles. In this analysis students' achievement goals profiles were set as an independent variable whereas student's learning approaches (deep versus surface) and academic achievement were set as dependent

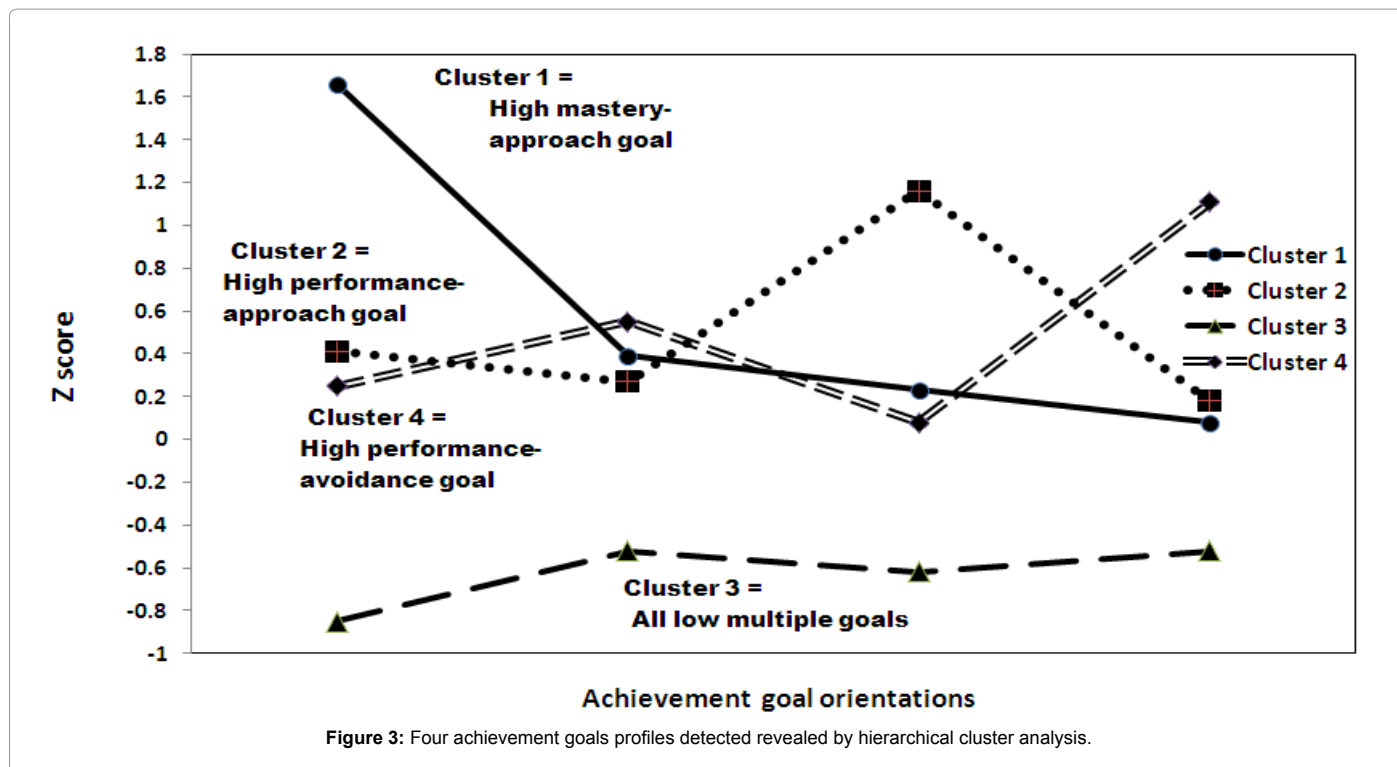


Figure 3: Four achievement goals profiles detected revealed by hierarchical cluster analysis.

variables. Table 4 shows, a significant moderate of correlations among the dependent variables ($0.39 < r < .47$, $p < 0.01$), suggesting the appropriateness of MANOVA [74]. Results showed that students' learning approaches and academic achievement differed significantly according to their achievement goals profiles, Pillai's Trace=0.93, $F(9, 1038)=7.14$, $p < 0.001$, $\eta^2=0.32$, which meant that 32% of the variance in the canonical dependent variable was explained by the students' achievement goals profiles. The value of partial Eta Square (η^2) represented a large effect size according to Cohen's guidelines; small medium large: 0.01, 0.06, 0.14 respectively [75].

To examine the effect of the independent variable on each of the dependent variables separately, a one-way analysis of variance (ANOVA) was conducted for each dependent variable. Given that three ANOVAs in total were conducted and for purposes of preventing the inflation of Type I error, Bonferroni adjustments was made via α/n where α is the significance level set at 0.05 and n is the number of comparisons among four goal profiles (6 comparisons). In the present study, each ANOVA was tested at the 0.008 level of significance ($0.05/6=0.008$) [74]. Table 6 shows the means and the standard deviations of the dependent variables for each of the four achievement goals profiles.

In the first ANOVA, achievement goals profiles were set as the independent variable and a deep approach to learning was set as the dependent variable. The analysis showed significant differences, $F(3, 346)=8.25$, $p < 0.001$, partial $\eta^2=0.14$, among the four achievement goals profiles in the terms of the usage of the deep approach to learning. A partial Eta Square ($\eta^2=0.14$) indicated that 14% of the variance in the deep approach to learning was accounted for by the four achievement goals profiles. Post-hoc analyses using Scheffe's method were performed. The analysis showed that all mean comparisons within the post hoc analysis were statistically significant ($p < 0.001$). Specifically, students with mastery-approach goal profile ($M=4.80$, $SD=0.41$) showed the highest usage of the deep approach to learning compared to all other

profiles followed by students with performance-approach goal profile ($M=3.92$, $SD=0.58$), and students with the all low multiple goals profile ($M=3.25$, $SD=0.75$), and finally students with performance-avoidance goal profile ($M=2.11$, $SD=0.21$).

In the second ANOVA, achievement goals profiles were set as the independent variable and a surface approach to learning was set as the dependent variable. The analysis showed significant differences, $F(3, 346)=10.15$, $p < 0.001$, partial $\eta^2=0.19$, among the four achievement goals profiles in terms of the usage of the surface approach to learning. A partial Eta Square ($\eta^2=0.19$) indicated that 19% of the variance in the surface approach to learning was accounted for by the four achievement goals profiles. Post-hoc analyses using the Scheffe's method were performed. The analysis showed that all mean comparisons within the post hoc analysis were statistically significant ($p < 0.001$). Specifically, students with performance-avoidance goal profile ($M=4.66$, $SD=0.66$) showed the highest usage of surface approach to learning, followed by students with the performance-approach goal profile ($M=3.92$, $SD=0.42$), students with all low multiple goals profile ($M=2.50$, $SD=0.84$), and finally students with mastery-approach goal profile ($M=2.02$, $SD=0.22$). Figure 4 shows means of the deep approach and surface approach for different achievement goals profiles.

In the third ANOVA, achievement goals profiles were set as the independent variable and academic achievement was set as the dependent variable. The analysis showed significant differences, $F(3, 346)=15.36$, $p < 0.001$, partial $\eta^2=0.24$, among the four achievement goals profiles in terms of academic achievement. A partial Eta Square ($\eta^2=0.24$) indicated that 24% of the variance in academic achievement was accounted for by the four achievement goals profiles. Post-hoc analyses using Scheffe's method were performed. The results revealed non-significant differences ($p > 0.05$) among three achievement goals profiles; high mastery-approach goal ($M=80.45$, $SD=1.97$), high performance-approach goal ($M=80.27$, $SD=1.84$), and all low multiple

goals ($M=80.10$, $SD=1.78$) in terms of academic achievement. However, these three achievement goals profiles differed significantly ($p<0.001$) from the high performance-avoidance profile in terms of academic achievement. Specifically, the high performance-avoidance profile ($M=75.55$, $SD=1.10$) scored the lowest among the four goal profiles in terms of academic achievement. Figure 5 shows means of academic achievement for different achievement goals profiles.

Question 3: Do students' learning approaches mediate the relationship between achievement goals profiles and academic achievement?

To answer this question, a one-way multivariate analysis of covariance (ANCOVA) was used to test whether students' learning approaches (deep versus surface) can mediate the effect of their achievement goals profiles on academic achievement. ANCOVA is an appropriate statistical procedure to test a mediational hypothesis and several researchers have used it for this purpose [76-79]. In the present analysis, achievement goals profiles acted as an independent variable;

academic achievement as a dependent variable, and learning approaches as covariates. When reporting ANCOVA for mediational purposes, it is important to indicate the effect of the independent variable on the dependent variable when controlling for the effect of the covariate [78]. Thus, the question answered by ANCOVA is: Do students with different achievement goals profiles differ significantly in academic achievement when controlling for the effect of learning approaches?

If the effect of the independent variable (achievement goals profiles) on the dependent variable (academic achievement) became nonsignificant after controlling for the effect of the covariate (learning approaches), then one can conclude that the effect of the independent variable on the dependent variable is mediated by the covariate [77,78]. In the present study, ANCOVA showed that the effect of achievement goals profiles on academic achievement became nonsignificant, $F(15, 349)=1.4$, $p>0.05$, partial $\eta^2=0.003$ when controlling for the effect of learning approaches. Partial η^2 was reduced from 0.24 (third ANOVA in Question 2) to 0.003 in the current ANCOVA. Thus, learning approaches fully mediated the effect of achievement goals profiles on

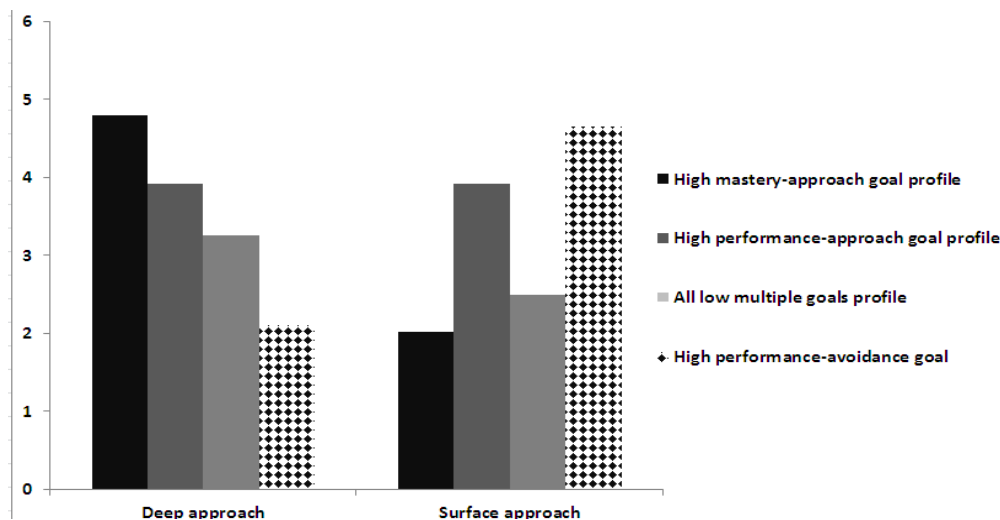


Figure 4: Means of deep approach and surface approach by achievement goals profiles.

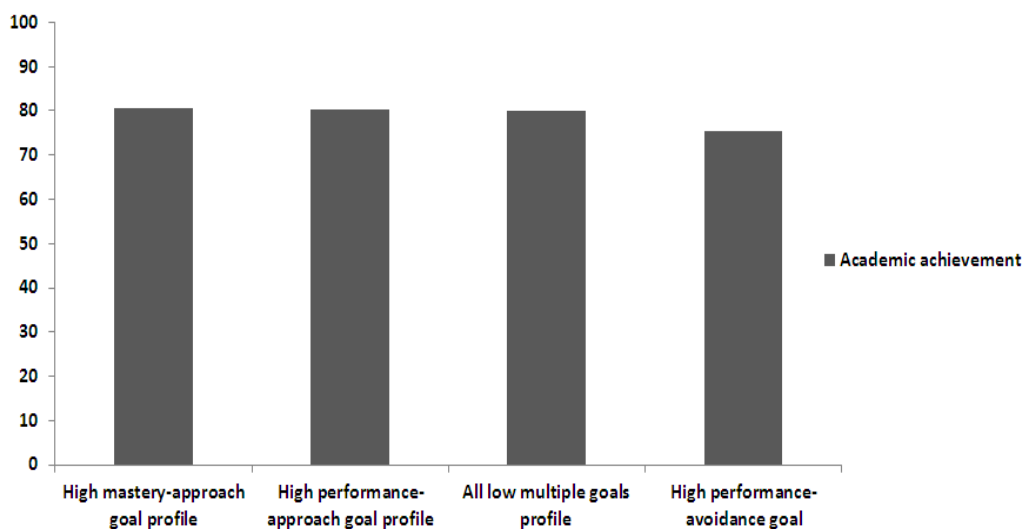


Figure 5: Means of academic achievement by achievement goals profiles.

Dependent variables	Independent variables	M	SD	F (3, 346)	Partial Eta Square η^2
Goal profiles					
Deep approach ⁽¹⁾	High mastery-approach goal	4.80	0.41	8.25	0.14
	High performance-approach goal	3.92	0.58		
	All low multiple goals	3.25	0.75		
	High performance-avoidance goal	2.11	0.21		
Surface approach ⁽²⁾	High mastery-approach goal	2.02	0.22	10.15	0.19
	High performance-approach goal	3.92	0.42		
	All low multiple goals	2.50	0.84		
	High performance-avoidance goal	4.66	0.66		
Academic achievement ⁽³⁾	High mastery-approach goal	80.45	1.97	15.36	0.24
	High performance-approach goal	80.27	1.84		
	All low multiple goals	80.10	1.78		
	High performance-avoidance goal	75.55	1.10		

Note: ⁽¹⁾⁽²⁾ Mean scores are computed out of 5 by dividing a student's total score on each subscale by the number of the items of the subscale. ⁽³⁾Academic achievement is averaged across courses and across the first and the second semesters of the academic year 2016/2017.

Table 6: Means, standard deviations, *F* values and partial Eta Square (η^2) for the effect of four achievement goals profiles on learning approaches and academic achievement.

academic achievement.

Discussion

The aim of the present study was to investigate whether high school students can be grouped into different achievement goals profiles, whether these profiles differ in learning approaches and academic achievement, and whether learning approaches is a mediator of the relationship between achievement goals profiles and academic achievement.

With reference to the first research question, the four achievement goals orientations within the 2 × 2 achievement goals framework were subjected to a hierarchical cluster analysis to investigate how students integrate and incorporate different achievement goals orientations to form distinctive achievement goals profiles. The analysis revealed four different achievement goals profiles; high mastery-approach goal, high performance-approach goal, all low multiple goals, and high performance-avoidance goal. This finding is consistent with the findings reported by several other studies within educational contexts [44-46,48]. It also agrees the finding by Wang and his colleagues [24] within the psychological education context.

One possible interpretation for the formation of these distinctive achievement goal profiles is culture. Culture plays a critical role in the development of the individual in multiple ways- cognitively, affectively, and motivationally. Elliott and Bempechat [80] proposed that different cultures are able to promote different values and beliefs concerning traits and characteristics that are important, worth pursuing, and socially desirable. Individuals who gain these cultural values and beliefs also acquire behaviors which in turn might affect their motivation, goal orientations, and academic achievement. Abd-El-Fattah and Patrick [81] proposed that individuals may pursue different achievement goals because they are guided by specific achievement motivations within their cultural contexts. They demonstrated that at collectivistic societies, high school students who endorsed higher levels of individually oriented achievement motivation (IOAM) pursued a mastery-approach goal. Students who endorsed higher levels of socially oriented achievement motivation (SOAM) pursued a performance-approach goal. Furthermore, Elliot, Chirkov, Kim, and Sheldon [82] documented that individuals from collectivistic societies are more inclined to endorse avoidance goals and that the endorsement of these goals may not result in negative consequences or undesirable outcomes

as it is the case in individualistic societies. They explained that the avoidance goals within the collectivistic society match and is consistent with the cultural values and norms of the collectivistic society which emphasizes avoiding negative characteristics and undesirable outcomes that may result in group discordance [83].

Another possible interpretation for the formation of these achievement goals profiles is the learning context of high school in Oman. According to Urdan, Midgley, and Anderman [84] students' mastery and performance-approach goals are linked to their perception of whether the learning context is mastery goal structured (e.g. teachers emphasize learning and task mastery) or performance goal structured (e.g. teachers emphasize achievement compared to others). Wentzel [85] argued that academic contexts could have a plenty of interactive interrelated cultural, social, and contextual variables that might contribute strongly towards students' forming of achievement goals profiles. Students' goal profile and associated characteristics and outcomes might differ in another situation.

One noteworthy aspect of the formation of these distinctive achievement goal profiles is that warrants further investigation is that males typically formed two advantageous achievement goals profiles; the high mastery-approach goal profile and the high performance-approach goal profile. However, females typically formed the least advantageous achievement goal profile; the high performance-avoidance goal profile. This finding agrees with the finding reported by Liu and his colleagues [48] within an academic context that males mainly formed the two most profitable profiles; the highly motivated profile and the moderately high motivation profile. Furthermore, this finding is consistent with the finding reported by several previous studies within the context of physical activity and sport [24,86]. For example, Wang and Biddle [86] reported that males mostly formed the ideal motivational profile, but females mostly formed the "at-risk profiles". Wang and his colleagues demonstrated that males typically formed the high achievement goal profile; however, females typically formed the low achievement goal profile. Taken together, these findings suggest that female students might have greater tendency compared to male students to pursue less adaptive achievement goals profiles. More empirical research is needed because findings such as these highlight possible problematic and challenging motivational profiles within female students. This research is expected to examine the extent of the problem and investigate whether this finding is linked to specific cultural and contextual variables.

With reference to the second research question, the analysis showed that students with a high mastery-approach goal profile were the highest in using a deep-approach to learning, but they were the lowest in using the surface-approach to learning. This finding comes at no surprise given the positive characteristics associated with the pursuing of a mastery-approach goal. A mastery-approach goal is defined in terms of task interest, task mastery, learning and gain of understanding and insight, and acceptance of challenge and competition. It also encompasses developing new skills and improving and developing competence [5,6,8]. All these healthy characteristics match the use of the deep-approach to learning that is characterized by intrinsic motivation and meaningful learning, support of elaboration, organization, critical thinking, and meaningful engagement in tasks as well as an application of knowledge across contexts [36]. On the contrary, the healthy characteristics of the mastery-approach goal does not match the usage of a surface-approach to learning that promotes rote memorization, shallow learning, extrinsic motivation, and information repetitive rehearsal [40,42]. This finding agrees with the finding reported by Toh [44] that mastery group positively predicted deep-approach to learning and negatively predicted surface approach to learning.

The analysis also demonstrated that students with a high performance-approach goal profile used both surface- and deep approaches to learning equally well. This means that those students utilized both learning approaches simultaneously to study their courses at high school. A performance-approach goal focuses on demonstrating competence or ability relative to others [6-9]. As such, it is possible that students would adopt either the deep or the surface approach to learning and in some instance, even both approaches, as long as this enable them to achieve a good result and outperform and beat other students. This finding agrees with the recent multiple goals perspective that performance goals are beneficial and can be associated with positive psychological processes [8]. Meanwhile, this finding agrees also with the traditional dichotomous achievement goal view that performance goals are negative and harmful goals that should be discouraged in the classroom [1,87]. This finding contradicts the finding reported by Toh [44] that a performance-goal cluster was set as a reference group in the path analysis because students in this cluster obtained low scores on exams, deep strategy, and effort.

Furthermore, the analysis revealed that students with all low multiple goals profile achieved well above average on the deep-approach to learning (mean=3.25) and just on average on the surface-approach to learning (mean=2.50). This finding demonstrates that the adoption of a combination of approach and avoidance achievement goals could be linked to positive learning process and achievement outcomes. One possible interpretation for this finding lies within the collectivistic culture of the Omani society. According to Elliot and his colleagues [82], the adoption of avoidance goals is shown not to be related to unfavorable outcomes within collectivistic societies as it is the case in individualistic societies because in collectivistic cultures avoidance goals agrees with the cultural promoting of avoiding negative outcomes. In addition, research has shown that pursuing approach goals apparently buffers any unfavorable outcomes of avoidance goals [24]. Apparently, an individual can be positively inspired when endorsing an avoidance goal, providing that it is accompanied by an approach goal [9,87]. On the contrary of this finding, Jang and Liu [46] reported that students in all low multiple goals cluster generally endorsed significantly lower levels of the learning strategies.

The analysis further demonstrated that students with high performance-avoidance goal profile were the highest in pursuing the

surface approach to learning and the lowest in pursuing the deep-approach to learning. This finding stands in line with the general premise in the psychology literature that performance-avoidance goals are associated with negative processes and outcomes [5,9] because students who endorse these harmful goals emphasize shallow learning that promotes surface processing, rote memorization, and shallow repetition [6,10]. It is therefore possible that students with a performance-avoidance goal profile are trying to avoid appear as the worst in the classroom or the least able among their peers or be judged as incompetent or unskilled. They might use the surface approach to learning as a means to show off their ability to others and to pretend that they comprehend the learning material. Thus, those students use a surface-approach to learning to mask their incompetence [6].

As for the effect of achievement goals profiles on academic achievement, the analysis demonstrated nonsignificant differences in academic achievement among students in the high mastery-approach, high performance-approach, and all low multiple goals profiles. In line with this finding, Jang and Liu [46] reported that students in the high mastery approach and low mastery avoidance cluster had the best mathematics results. However, they found that students in the all low multiple goals cluster generally had poor mathematics achievement. One possible way to understand these non-significant differences lies within the characteristics of the learning context at high schools in Oman. This learning context may not be prepared or structured to detect relationships between achievement goals orientations and academic achievement. That is, this learning context may function in a way that conceal or mask any differences in students' academic achievement that are due to differences in their achievement goals orientations. Specifically, the sample of the present study consisted primarily of first year high school students with no stated specialties and who may have been settled within a traditional, cooperative, and relaxing learning context.

Such learning context is more likely to be noncompetitive, unchallenging, and undemanding. However, the differences in academic achievement have been well detected and uncovered when the learning context is difficult, competitive, challenging, exciting, complex, and demanding [54,87]. For example, Grant and Dweck [54] reported that mastery goals were found to support high academic achievement when the learning context was characterized by challenge and competition, performance goals that were based on comparing students' performance with each other (i.e., normative competence) was not related to academic achievement, and performance goals based on validating one's ability led to high academic achievement when challenge and competition were not existent but it led to lower achievement when challenge and competition were existent.

One important aspect of the learning context at high school in Oman is the courses grading system. Most of high schools in Oman seem to utilize a combination of criterion- and norm-referenced grading system and as such it is expected that students' academic achievement is guided by both mastery-approach and performance-approach goal orientations with no chance for any specific goal orientation to outperform the other in terms of boosting academic achievement. Several researchers argued that normative comparison is the base of a performance goal orientation [10,88], while criterion-reference comparison is the base of a mastery goal orientation [89]. Furthermore, the analysis showed that students in the high performance-avoidance goal profile scored the lowest among the four achievement goals profiles in terms of academic achievement. This finding comes at no surprise given that researchers have a fairly common agreement concerning the disadvantages of

performance-avoidance goals for academic achievement [12,47]. There is accumulative research evidence that relates performance-avoidance goals positively to anxiety, hopelessness, shame [90], low ability-related self-esteem, and pre-task threat appraisals and negatively to self-determination, perceptions of control, and feeling calm during evaluations [11,91]. Students with performance-avoidance goals were also found to have thoughts unrelated to learning or thoughts about dodging and avoiding learning, which was found to have a damaging effect on academic achievement [92].

With reference to the third research question, the analysis identified learning approaches as a mediator of the relationship between achievement goals profiles and academic achievement. Specifically, the analysis showed that when learning approaches were covaried out of the effect of achievement goals profiles on academic achievement, this effect became statistically nonsignificant. This means that learning approaches fully mediated the relationship between achievement goals profiles and academic achievement. Within hindsight, this appears to be a readily understood relationship; pursuing certain achievement goals profiles could affect individuals' academic achievement differently only through stimulating specific learning approaches. Put it another way, endorsement of different achievement goals profiles might not influence students' academic achievement unless through promoting of specific learning approaches. This finding is consistent with the previous research findings that learning approaches can mediate between achievement goals orientations and academic achievement [44,54-56].

Conclusion and Recommendations

To summarize, the present study offers further empirical evidence for the role of achievement goals profiles within an academic context. It adopted a multiple goals perspective which revealed that high school students in Oman could integrate and incorporate different achievement goals orientations to form distinctive goal profiles, and that these profiles could have distinctive effects on their learning approaches and academic achievement. These findings therefore encourage researchers to start considering the multiple goals perspective particularly those who are interested in investigating how different achievement goals profiles are linked to various psychological processes and educational outcomes.

Implications for teaching and learning practices at school

The findings of the present study highlight several important implications for teaching and learning practices at school:

(1) Classroom teacher should help students understand different learning approaches because it is the first step to become an effective learner. Although the classroom teacher should generally encourage and emphasize the utilizations of a deep-approach to learning, he/she should instruct students that each subject is unique and may require a somewhat different learning approach.

(2) Classroom teacher should assist students develop a mastery-approach goal by encouraging student to set realistic but challenging goals, get involved in learning and on-task behavior, promote personal sense of responsibility for their own learning, and instill a belief that effort leads to success. The main idea is to highlight the significance of striving towards learning, improvement and growth. It should be noted however, that mastery goal may not be the only goal that fosters academic achievement and that other goal combinations (clusters) should also be taken into account.

(3) Although the findings of the present study have shown that a performance-approach goal is helpful and beneficial for students' academic achievement and using of adaptive learning approaches, classroom teacher should be careful not to emphasize social comparisons among students when judging students' capabilities and performance. The preoccupation with how one is perceived by others is predictive of unhealthy processes and outcomes. Alternatively, classroom teachers should base students' grading on exerting of effort, improvement and the achievement of imperative pre-defined standards (grading on bell-shaped normal distribution) instead of normative comparisons (i.e., grading on a curve).

(4) Classroom teacher's teaching and assessment practices should help develop a classroom structure that promotes mastery and performance approach goals because both goals were proved to be adaptive (i.e., the multi-goal perspective). This is particularly important at the high school level where adolescents are expected to face a change in their patterns of motivation and achievement, and where teachers may be more disposed to create a performance-oriented classroom structure.

(5) Classroom teacher should discourage students concerning endorsing maladaptive goals (i.e., performance-avoidance goals) by deemphasizing these goals in their teaching and assessment practices, uncovering the disadvantages of pursuing these goals, and reducing students' fear of failure through employing alternative forms of assessment such as portfolio, journal writing, and self-reflections rather than relying on one type of assessment.

(6) Classroom teacher should encourage students to pursue a combination of both mastery-approach and performance-approach goals because a combination of these goals has been shown to be beneficial. One way a teacher can do that is to encourage students to endorse a mastery-approach goal during the semester and then encouraging them to adopt a performance-approach goal when preparing for their exams.

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