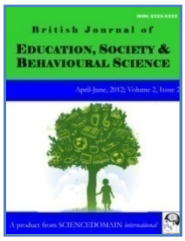

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# An Empirical Validation of Achievement Goals: A 2×2 Framework Study within the Context of Saudi University Learning

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***Authors' contributions***

*This work was carried out in collaboration between both authors.*

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## ABSTRACT

The achievement goal framework has undergone a number of evolutions over the past three decades. The 2×2 model of achievement goals [1,2] in particular, has been researched extensively, with a recent articulation and revision of measurements that emphasize four different goal types. The focus of our study, similarly, involves a validation in structures of achievement goals, taking into consideration the importance of the definition and valence dimensions. We adapted Elliot and Murayama's Achievement Goal Questionnaire- revised (AGQ-R) [7] and administered this adaptation to a cohort of university students (*N*=210). A number of *a* priori models were hypothesized and tested, using confirmatory factor analysis (CFA) procedures, to determine and ascertain a best representation of achievement goals. First and second-order factor testing, especially the use of multiple-indicator correlated trait-correlated method (MI CT-CM) yielded evidence that supports the dimensional structure of achievement goals. The obtained evidence illustrates the different types of achievement goals that Saudi university students adopt in their learning. In particular, contributing to the study of theoretical tenets pertaining to achievement goals in educational contexts, there is some credence from our CFAs to validate and support the 2×2 model.

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*Keywords: Saudi Arabia; achievement goals; the 2×2 model; multidimensional structures; university learning.*

## 1. INTRODUCTION

Educators have, over the past three decades, used the achievement goal framework, with its various iterations to explain students' learning in educational contexts. Specific achievement goal orientations in classroom learning, in particular, may account for students' cognition, motivational patterns and self-beliefs [3,4]. Researchers utilizing advanced statistical techniques have reported, for example, the impact of achievement goals on both cognitive (e.g., processing strategies) and noncognitive (e.g., personal self-efficacy) processes [5,6] of learning. Evidence ascertained has illuminated, in particular, the direct and indirect effects of achievement goals on quality learning and other achievement-related outcomes.

One notable aspect that has been researched extensively is the structures of achievement goals that students may orientate. How many types of achievement goals are there in learning contexts? Is there a dichotomy in students' achievement goal orientations when approaching a particular learning task or subject (e.g., the learning of Calculus I)? The work of Elliot and his colleagues [7,8,9] has highlighted the complexities and contentious positioning of achievement goals in both educational and non-educational contexts. Other researchers, utilizing Likert-scale inventories have similarly concurred with Elliot and colleagues, indicating a distinction in the definition and valence dimensions of competence [4].

From a cultural perspective, the study of achievement goals has important theoretical and practical merits. An examination of the literature indicates that empirical evidence has derived mainly from research studies undertaken in Western contexts, involving Anglo-Saxon students [8,10-12]. The issue of cross-cultural generalizability of findings pertaining to patterns in students' achievement goal orientations, consequently is an important feat for accomplishment [6]. Do Non-Western students in Non-Western contexts exhibit a similar pattern in achievement goal orientations when approaching, say, mathematics learning? Is there a preference for a particular achievement goal type, possibly as a result of personal values, ideologies, and historical backgrounds? The present study then, attempts to explore the multidimensional structures of the achievement goal framework with a cohort of Saudi university students ($N$=210). In particular, within the framework of latent variable approaches [13,14], we propose a number of *a priori* models for statistical testing (e.g., a two-factor model: performance factor versus mastery factor). This examination, in line with previous studies [7,8], is pivotal and may generate relevant findings that could clarify the factor structures of achievement goals.

## 2. CONCEPTUAL FRAMEWORK FOR EMPIRICAL EXAMINATION

We used the 2×2 achievement goal model proposed by Elliot and McGregor [1] as a basis for investigation. As a definition, achievement goals are defined as "competence-relevant aims that individuals strive for in achievement settings'' [11]. The achievement goal theory has undergone an evolution over the past three decades, situating for example within a social-cognitive framework [15,16]. In its original form, simplistic in nature, researchers theorized two major goal types: task-involvement and ego-involvement [17] or mastery (e.g., emphasizes the development of competence) and performance (e.g., demonstrate outward competence) [18]. This mastery-performance representation of achievement goals is rather

limited and does not explain individuals' patterns of cognition, motivation and behaviors. One cannot expect individuals to simply engage in the development of competence, or to demonstrate competence for a subject matter.

The trichotomous model, in contrast, stipulates a bifurcation in the performance categorization, wherein two distinctive components are recognized: approach and avoidance [19,20]. The approach orientation (i.e., performance-approach) focuses on individuals acquiring positive possibilities (e.g., attaining competence and demonstrating superiority) [10], whereas the avoidance orientation (i.e., performance-avoidance) focuses on individuals avoiding negative possibilities (e.g., failure or looking incompetent, normatively). It is important to note that the trichotomous model of achievement goals has merits and research to date reflects this credence [21]. For example, research undertaken in secondary and higher education contexts has produced evidence highlighting the predictive effects of the three achievement goal types on academic learning and achievement-related outcomes [5,6,22,23]. Researchers [24] have developed inventories and have used factor analysis techniques to validate the three major components: mastery (e.g., "I like school work that I'll learn from, even if I make a lot of mistakes"), performance-approach (e.g., "I would feel really good if I were the only one who could answer the teachers' questions in class") and performance-avoidance (e.g., "It's very important to me that I don't look stupid in my classes").

There is a voluminous body of research studies that document the relations between the three types of achievement goals and both adaptive and maladaptive achievement-related behaviors [4,21,23,25]. In many cases, by means of correlational data and using causal modeling procedures, researchers have attested to the potent effects of a mastery goal orientation [e.g., "An important reason why I do my school work is because I like to learn new things": 24]. For example, a number of studies yielded clear and consistent evidence that showed the positive effect of a mastery goal orientation on a myriad of positive behaviors, such as a preference for challenging work [18,26], persistence [26], effort expenditure [5,27,28], reflection [29], the use of deep processing strategies [5,6,30-33] and intrinsic motivation for learning [34,35]. In a similar vein, taking into consideration Bandura's (1986, 1997) social cognitive theory, a mastery goal is also associated with a heightened sense of self-efficacy.

To some extent, we could also argue that a performance-approach goal orientation shares some similar attributes in terms of relationships with other related processes. Empirical research, utilizing correlational techniques shows the positive associations between a performance-approach goal orientation and persistence during task engagement and performance attainment [23], effort expenditure [5,23,29,36] and surface cognitive strategies [5,30,36,37]. These 'shared' attributes differ, however, in terms of students' foci and purposes for learning. If we consider the definitions outlined previously, some of the positive associations reported reflect differing positioning for students in learning contexts. Effort expenditure, for example, may serve and have different connotations: effort that deliberates a desire to know more and improve competence (a mastery goal orientation) or effort that gears towards a need to demonstrate competence and superiority (a performance-approach orientation).

Differing from mastery and performance-approach goal orientations, previous research has also shown the maladaptive practices that associate with a performance-avoidance goal. There is consistent evidence to indicate that performance-avoidance goals relate negatively to intrinsic motivation [20], personal self-efficacy beliefs [5,6] and peer relationship [6].

Students in classroom settings who adopt a performance-avoidance goal tend to, similarly, adopt surface cognitive strategies [6,37,38] and are more disorganized in their study habits [23,31]. From an educational perspective, we would prefer to emphasize and encourage non-performance-avoidance goals in our teaching and instructional practices.

The trichotomous model has been critiqued somewhat, with a number of researchers [2,39] contending a need to differentiate the mastery goal orientation into both approach and avoidance orientations in order to account for the various competence-based strivings [4]. This bifurcation of a mastery goal emphasizes two major components: mastery-approach and mastery-avoidance. Combined with the bifurcation of the performance goal orientation of the trichotomous model [19,20], the 2×2 model defines four major goal types: (i) a mastery-approach orientation where individuals seek to achieve mastery or improvement, (ii) a mastery-avoidance orientation where individuals to avoid failing achievement of a task mastery, (iii) a performance-approach where the main focus is for individuals to accomplish and outperform others, and (iv) a performance-avoidance where one seeks to avoid doing worst than others in given tasks. Since Elliot and McGregor'sconceptualization [1], other researchers have made advances to clarify the nature, structures and compositions of the 2×2 model [see 4's theoretical review]. Elliot and Murayama's [7] work, which has been extended and explored by others [12,40] is significant as it acknowledges some shortcomings that relate to the assessment and measurement of the mastery-performance and approach-avoidance distinctions.

Does a 2×2 model of achievement goals [1,7] have theoretical and practical merits for advancement and implementation? There have been recent theoretical overviews [4,25,41], which give rise to impending questions and issues for consideration and advancement. Is there credence for us to decompose the mastery goal type into two distinctive components: mastery-approach and mastery-avoidance? Does a mastery goal type, in totality, provide enough emphasis to predict and reflect students' learning and performance outcomes? Even in the last couple of years alone, there have been researchers that based their student examinations on the trichotomous model of achievement goals [5,6,11,28,31,36].

## 2.1 Proposed a Priori Models

The empirical literature reviewed previously has provided a basis into the study of the 2×2 model. Existing research has yielded some preliminary evidence that attests to the factor structures and predictive effects of the four achievement goal types. This inquiry, however, is still in its infancy and, more importantly, data collected for analyses have predominantly come from Western students in Western sociocultural and learning contexts (e.g., US) [8,10-12,42]. The present study then, attempts to situate the 2×2 model within the contexts of Saudi Arabia, involving first-year Saudi university students.

Cross-culturally, the question of relevance and applicability of the 2×2 model [1,7] calls for elaboration. Non-Western contexts may entail different philosophical beliefs, expectations, and cultural customs and values that foster certain actions. Collectivism [43,44], for example, instills specific patterns in self-beliefs, cognition and motivation. Some Non-Western societies and their citizens share a set of cultural attributes that illuminate the values of sharing, caring, and working towards aspirations and educational outcomes (e.g., selecting a career choice) for others. The Asian philosophy, similarly, espousing the concept of filial piety [45] reflects an ideology that embraces one's achievement for family values, pride, and dignity (e.g., "My parents will be proud of me if I get into Medicine"). Individuals' motives to

succeed for non-individualistic reasons may, consequently, result in their choosing of performance goal orientations.

The question then, is whether and to what extent the 2×2 model of achievement goals [1,7] actually reflects Non-Western students' patterns in cognition and motivation. Does Elliot and Murayama's [7] Achievement Goal Questionnaire-Revised (AGQ-R), reflective of the four types of achievement goals, demonstrate appropriate construct validity with a cohort of Saudi university students? It is rather simplistic for educators to accept the bifurcation of both mastery and performance goal orientations for granted. There is credence, taking into account the importance of cultural attributes (e.g., appreciating family values), for us to posit that achievement goals could differentiate into two major approaches: mastery versus performance goals. Validation of the AGQ-R and the factor structures of achievement goals, subsequently, may provide fruitful information into the relevance and cross-cultural generalizability of the 2×2 model.

Despite the fact that the 2×2 model of achievement goals [1,7] is still in its infancy, there is some credence to recommend its acceptance. The 2×2 model, in its original conceptualization [1] and the subsequent revision of the Elliot and McGregor's in 2001 Achievement Goal Questionnaire (AGQ) [7], has been studied with different cohorts of students [8,12,42]. Revision was made on the basis that the original AGQ was limited in its articulation (e.g., inclusion of items beyond the mastery-performance distinction) and consequently, items of the four subscales were reworded Table 1. Evidence ascertained from causal modeling techniques showed that the AGQ-R demonstrated good predictive and construct validity [7]. For example, in relation to Elliot and Murayama's [7] analyses, both mastery-approach and performance-avoidance goals exerted positive ($\beta$=.28) and negative ($\beta$=-.15) effects on intrinsic motivation, respectively. Similarly, both performance-approach ($\beta$=.46) and performance-avoidance ($\beta$=-.48) goal orientations influenced students' exam performances in Psychology. Van Yperen et al. [10] study yielded similar results, suggesting that a mastery-avoidance goal orientation, when compared to the other three achievement goal types, is more detrimental in the learning process. Alkharusi and Aldhafri's [40]study involving Omani undergraduates also supported the factor structures of the AGQ-R by gender roles.

**Table 1. Summary of Elliot and Murayama's [7] AGQ-R**

| Achievement goal type | Description of items |
|---|---|
| i. Mastery-approach | My aim is to completely master the material presented in this class (original item 9: I desire to completely master the material presented in this class). |
| ii. Mastery-avoidance | My aim is to avoid learning less than I possibly could (original item 4: I worry that I may not learn all that I possibly could in this class). |
| iii. Performance-approach | My aim is to perform well relative to other students (original item 3: My goal in this class is to get a better grade than most of the other students). |
| iv. Performance-avoidance | My aim is to avoid doing worse than other students (original item 10: I just want to avoid doing poorly in this class). |

*Note: For full version of the ACG-R, Elliot and Murayama [7]*

In summation, the present investigation extends previous studies [7,8,12,40] and attempts to explore two major research objectives: (i) an examination of Saudi university students' achievement goal orientations in educational contexts, using the 2×2 model [1,7] as a premise and (ii) validating the appropriateness of the AGQ-R [7] with Saudi university students. Using Elliot and Murayama's (2008) recent study as a point of comparison, we proposed and tested a number of *a* priori models to determine which representation best reflects Saudi university students' achievement goal orientations.

## 3. METHODS

### 3.1 Participants and Contexts

A total of 210 male (18–22 yrs. *Mn*=19.17), Saudi university students took part in this study. Saudi Arabia, like many countries in the Middle East, has a number of social and cultural attributes that differ from Western countries. One important cultural attribute, for example, is that the functioning of society, in general, is segregated between sexes and genders. The schooling system, from kindergarten to university, reflects this 'segregation', with males and females attending single-sex schooling systems. On this basis, as Westerners ourselves, we were restricted in our sampling procedures. Ideally, of course, in order to explore individual differences, we would have preferred to have a mixed sample, involving both males and females. The restriction of having a single sex sample does not, however, negate the importance of this investigation. What is of considerable interest, for instance, is the situational placement of the achievement goal theory in a Non-Western context.

The schooling system in Saudi Arabia and the pedagogies and instructional policies that are practiced, from our point of view, may create and nurture a different mindset, cognitively transforming Saudi students to depend on authority figures for their academic learning [46,47]. There is limited understanding, at present, about the subjectivity of achievement goal orientations in educational settings. The majority of research studies [8,10-12], as we have noted, have predominantly involved Western contexts. Very few researches, if any, have studied the 2×2 model in Non-Western contexts [40]. For example, in relation to our focus, how does a person's upbringing in Saudi Arabia influence his/her achievement goal orientations? Is it possible for a culture or a society that encourages and accepts passiveness and dependency to limit its citizens from learning and achieving for mastery reasons? We cannot address these questions directly, of course, from a quantitative approach alone, but statistical testing of responses from the AGQ-R [7] may provide some insightful information.

### 3.2 Procedure

The AGQ-R [7] was administered in tutorial classes during late November 2012, when the participants were enrolled in the College of Education in Curricular and Teaching Methods and Education Courses. A research assistant, who was a Saudi himself, administered the AGQ-R to the participants over a period of two weeks. A local university in the Ha'il province, within proximity of 20 km from the city, took part in this study. The university, established in 2005, has approximately 16,000 students enrolled in various degree programs, differentiated of course by genders (i.e., programs for both men and women). The ethos and vision of the university emphasize the importance of technology and innovations in administration, teaching and research development. The university has several campuses and a number of colleges (e.g., College of Medicines, College of Applied Medical Sciences) that offer

courses, such as Education, Dentistry and Medicine. The College of Education, in particular, offers a variety of programs, including for example: Special Education, Curricula and Teaching Methods, Education and Education Technology. Similar to our previous mentioning, staff members and students were all Saudi men, ages ranging from 18–24 yrs. Permission was sought from the lecturers and unit coordinators, and an information sheet outlining the purpose of the study was given to participants one week prior to the commencement of the study. This study is part of a larger project that involves a number of major research objectives and questionnaires. Participants were instructed from the outset to inform the research assistant if they did not wish to take part in any aspect of the project. Ethical protocols, as per our institution's requirements, were followed. For example, the issues of confidentiality and anonymity were explained, and participants were ensured that only the research assistant, statistician, and researchers involved would have access to their answers. Each participant was given an ID (e.g., S1C1001) and was told to remember this number for the duration of the research project.

### 3.3 Measures

We adapted the AGQ-R [7] and used this adaptation for this study. In particular, to suit the Saudi schooling and learning contexts, we modified some wordings – for example, the word 'unit' was substituted for 'course'. The medium of instruction for the university is Arabic, but the students that we chose were relatively well-versed in English. Full descriptions of the 12 items of the AGQ-R may be obtained from Elliot and Murayama (2008). Three items assess each achievement goal orientation include, for example:

1. Mastery-approach: I am striving to understand the content of this unit as thorough as possible.
2. Mastery-avoidance: I am striving to avoid an incomplete understanding of the unit material.
3. Performance-approach: I am striving to do well compared to other students.
4. Performance-avoidance: I am striving to avoid performing worse than others.

For our study, the Cronbach's $\alpha$s are: .94, .95, .92 and .94 for the Mastery-approach, Mastery-avoidance, Performance-approach and Performance-Avoidance goals subscales, respectively. To be consistent with our other inventories that were administered, we used a 7-point rating scale: 1 (strongly disagree) to 7 (strongly agree). Finally, to assist in clarity with a particular focus in mind, we asked the participants to 'situate' their responses within the context of mathematics learning, given that this is a priority academic subject in Saudi Arabia.

## 4. DATA ANALYSIS

We used Elliot and Murayama's [7] hypotheses and statistical testing as a basis for guidance and comparison. In this section of the article, we describe in detail the hypothesized models and statistical procedures that we undertook. In particular, with the exception of a few aspects described in the Elliot and Murayama [7] study that we did not include, our a priori models are summarized in Table 2. We used SPSS AMOS 21 to assist in the analyses.

**Table 2. Different A priori models tested**

| Descriptions | $\chi^2$ | df | NNFI | CFI | RMSEA | AIC | BIC |
|---|---|---|---|---|---|---|---|
| **Model 2A** Two factors: Mastery and Performance | 585.03 | 54 | .82 | .85 | .22 | 633.03 | 712.19 |
| **Model 2A-C** Model 2A with correlation | 246.59 | 53 | .93 | .95 | .14 | 296.59 | 379.05 |
| **Model 2B** Two factors: Approach and Avoidance | 844.88 | 54 | .73 | .78 | .27 | 892.88 | 972.04 |
| **Model 2B-C** Model 2B with correlation | 392.24 | 53 | .88 | .90 | .18 | 442.24 | 524.70 |
| **Model 3A** Three factors: Mastery, Performance-approach and Performance-avoidance | 817.32 | 54 | .74 | .78 | .27 | 865.32 | 944.48 |
| **Model 3A-C** Model 3A with correlation between Performance-approach and Performance-avoidance | 557.41 | 53 | .82 | .86 | .22 | 607.41 | 689.87 |
| **Model 3B** Three factors: Mastery-approach, Mastery-avoidance, and Performance | 962.77 | 54 | .69 | .74 | .29 | 1010.77 | 1089.93 |
| **Model 3B-C** Model 3B with correlation between Mastery-approach and Mastery-avoidance | 564.24 | 53 | .82 | .86 | .22 | 614.24 | 696.70 |
| **Model 3C** Three factors: Mastery-approach, Performance-approach, and Avoidance (both Mastery and Performance) | 1029.38 | 54 | .66 | .72 | .30 | 1077.38 | 1156.54 |
| **Model 3C-C** Model 3C with correlation between Mastery-approach and Performance-Approach | 801.88 | 53 | .74 | .79 | .27 | 851.88 | 934.34 |
| **Model 3D-C** Model 3D with correlation between Mastery-avoidance and Performance-avoidance | 723.60 | 53 | .76 | .81 | .25 | 773.60 | 856.06 |

***Table 2 Continued……..***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Model 4A** Four factors: Mastery-Approach, Mastery-Avoidance, Performance-Approach and Performance-Avoidance, with no correlation specified | 1204.84 | 57 | .62 | .67 | .32 | 1246.84 | 1316.11 |
| **Model 4B** Four factors: Mastery-Approach, Mastery-Avoidance, Performance-Approach and Performance-Avoidance, with correlations specified between Mastery-Approach and Mastery-Avoidance, and between Performance-Approach and Performance-Avoidance | 608.11 | 56 | .83 | .84 | .22 | 652.11 | 724.67 |
| **Model 4C** Four factors: Mastery-Approach, Mastery-Avoidance, Performance-Approach and Performance-Avoidance, with correlations specified between Mastery-Approach and Performance-Approach, and between Mastery-Avoidance and Performance-Avoidance | 738.30 | 56 | .77 | .81 | .25 | 782.30 | 854.87 |
| **Model 5** MI CT-CM model of achievement goals, correlated between the Approach and Avoidance components | 253.53 | 54 | .93 | .94 | .14 | 301.53 | 380.69 |
| **Model 5A** MI CT-CM model of achievement goals, correlated between the Mastery and Performance components, and between the Approach and Avoidance components | 229.55 | 53 | .94 | .95 | .13 | 279.55 | 362.00 |

***Table 2 Continued……***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Model 6A<br>A Mastery-Performance two-level model, with a Mastery factor (consisting of Mastery-Approach and Mastery-Avoidance) and a Performance factor (consisting of Performance-Approach and Performance-Avoidance) | 286.31 | 55 | .92 | .93 | .15 | 332.31 | 408.18 |
| Model 6B<br>An Approach-Avoidance two-level model, with an Approach factor (consisting of Mastery-Approach and Performance-Approach) and an Avoidance factor (consisting of Mastery-Avoidance and Performance-Avoidance) | 410.31 | 55 | .88 | .90 | .18 | 460.31 | 536.17 |

*Note: CFI = comparative fit index, NNFI = non-normed fit index, AIC = Akaike information criterion, BIC = Bayesian information criterion. MI CT-CM = multiple-indicator correlated trait-correlated method*

Following previous protocols [14,48,49], we used covariance matrices and maximum likelihood solutions. Correlational matrix analysis, for example, has been known to entail potential problems, such as producing incorrect goodness-of-fit index values and standard errors [13,50]. Maximum likelihood procedure, similarly, has been noted to perform reasonably well when data are normally distributed [51]. For the goodness-of-fit index values, indicative of appropriate model fits, we used the Comparative Fit Index (CFI) (CFI value $\geq$.90), the Non-normed Fit Index (NNFI)(NNFI value $\geq$.90) and the Root Mean Square Error of Approximation (RMSEA)(RMSEA value $\leq$.080). Finally, the Akaike information criterion (AIC) and Bayesian information criterion (BIC) were used to assist in the comparison of multiple models (the lower the values, the better the fit).

## 4.1 A Comparison of a Priori Models

Preliminary data screening indicated there was no missing data, and that there was multivariate normality (e.g., kurtosis values ranging from -.22 to .92 (*SD* =.29), and skewness values ranging from -1.32 to -.61 (*SD* =.14); no extreme outliers). Our first set of analyses, involving a four-factor model, Models 4A, 4B and 4C, show poor model fits, as indicated by the various goodness-of-fit index values (e.g., CFI and NNFI values $\leq$.90). Of the three models tested, Model 4B with a correlation stipulated between the mastery-approach and mastery-avoidance latent factors, and between the performance-approach and performance-avoidance latent factors was the best fit for a four-factor model (e.g., CFI=.84, NNFI=.83). Alternatives to this model were also made, in particular, a statistical testing of the trichotomous model of achievement goals.

For the trichotomous models, we tested four alternatives:

I. Model 3A where the mastery-approach and mastery-avoidance items loaded together on a first latent factor, and the performance-approach and performance-avoidance items on their respective latent factors,
II. Model 3B where the mastery-approach and mastery-avoidance items loaded on their respective latent factors, and the performance-approach and performance-avoidance items loaded together on a third latent factor,
III. Model 3C where the mastery-approach and performance-approach items loaded on their respective latent factors, and the mastery-avoidance and performance-avoidance items loaded together on a third latent factor and
IV. Model 3D where the mastery-avoidance and performance-avoidance items loaded on their respective latent factors, and the mastery-approach and performance-approach items loaded together on a third latent factor.

Again, similar to Models 4A, 4B and 4C, the results obtained indicated poor model fits (CFI and NNFI values $\leq$.90). It is interesting to note the extensions of Models 3A-C, 3B-C and 3C-C, where we specified permutations in associations between the three latent factors – for example, Model 3A-C with a correlation stipulated between a performance-approach and performance-avoidance. The goodness-of-fit index values showed poor model fits to the data (e.g., CFI and NNFI values $\leq$.90).

Apart from the trichotomous and four-factor models, we also tested two alternatives of a two-factor model:

i. Model 2A where the mastery-approach and mastery-avoidance items loaded together on one latent factor ('Mastery'), and the performance-approach and performance-avoidance items loaded together on another factor ('Performance') and
ii. Model 2B where the mastery-approach and performance-approach items loaded together on one latent factor ('Approach'), and the mastery-avoidance and performance-avoidance items loaded together on another factor ('Avoidance').

Again, similar to the results reported previously, the goodness-of-fit index values reflected poor model fit for the two models, Model 2A and Model 2B. Similar to our previous stipulation with Models 3A, 3B and 3C, we also tested a correlated model, in this case, Model 2A-C (correlation between the mastery and performance latent factors) and Model 2B-C (correlation between the approach and avoidance latent factors). The goodness-of-fit index values indicated an improvement in model fit, especially for the two latent-factor model with a correlation specified between mastery and performance (e.g., NNFI=.93, CFI=.95).

## 4.2 The Dimensional Structure of Achievement Goals

From the results outlined in the preceding sections, it is obvious that none of the hypothesized models and/or alternatives were robust in model fit. Elliot and Murayama (2008) argued in their analyses that CFA, alone, does not provide a basis to explore the dimensional structure of achievement goals. In particular, with reference to the 2$\times$2 structure, Elliot and Murayama (2008) argue that the valence of competence (positive for approach or negative for avoidance) should cross with the definition of competence (mastery or performance), resulting in four distinct factors. Consequently, as a result of this limitation, we

used the multiple-indicator correlated trait-correlated method (MI CT-CM) [52,53] to test the two-dimensional structure of achievement goals.

Fig. 1 presents the final MI CT-CM model of a two-dimensional structure of achievement goals. In this model, both the valence and definition dimensions of competence are expected to have additive effects on an achievement goal factor [7]. The valence dimension consists of an approach factor and an avoidance factor, only one of which is applicable to any given goal factor. The definition dimension, similarly, consists of a mastery factor and a performance factor, only one of which is applicable to any given goal factor. It is hypothesized, for example, that both the approach factor and the mastery factor would explain the mastery-approach factor. Finally, it is posited that factors within each dimension can correlate with each other, but those that are across dimensions are uncorrelated (e.g., the approach factor and the performance factor). This postulation suggests then, that the valence and definition dimensions each contribute independently to the achievement goal factors, which allows the achievement goal factor to decompose into valence, definition, and unique residual components.

To identify the MI CT-CM model (Model 5A) and similar to Elliot and Murayama's (2008) statistical approach, we constrained paths from the same second factors to be equal, and fixed the variance of the latent Approach factor to be 0. The results indicated a moderate model fit, as indicated by the following goodness-of-fit index values: $\chi^2(53, N=290) = 229.55$, $p<.001$, CFI=.95, NNFI=.94 and all paths are significant at .001. The factor loadings from the measured indicators to their respective first-order factors, statistically significant at .001, ranged from .92 to .95 for mastery-approach, .92 to .95 for mastery-avoidance, .71 to .95 for performance-approach, and .93 to .96 for performance-avoidance. The factor loadings between the first and second-order latent factors ranged from .74 to .76 for the latent approach factor, .62 to .64 for the latent avoidance factor, .67 to .79 for the latent mastery factor, and .65 to .77 for the latent performance factor.

Apart from this MI CT-CM model, we also analyzed two alternative models, Model 6A and Model 6B. Both alternative models are presented in Fig. 2, where they are may be considered as a form of two-level model. That is, the four achievement goal factors themselves constitute a two-factor structure: (i) a mastery-performance two-level model, in which a mastery factor (consisting of mastery-approach and mastery-avoidance factors) and a performance factor (consisting of performance-approach and performance-avoidance factors) are formed as second-order factors, and (ii) an approach-avoidance two-level model, in which an approach factor (consisting of mastery-approach and performance-approach factors) and an avoidance factor (consisting of mastery-avoidance and performance-avoidance factors) are formed as second-order factors. An inspection of Fig. 1 and Fig. 2 indicates one major difference, whereby the two-level models derive factors out of only one dimension of the $2\times2$ model. To ensure a proper execution of the data in our analyses, we constrained paths from the second factors to be equal (e.g., 1). This constraint would enable a more stable solution, with proper standardized factor loadings. The goodness-of-fit index values reflect, to some extent, moderate model fits, especially for Model 6A (e.g., CFI=.93, NNFI=.92).

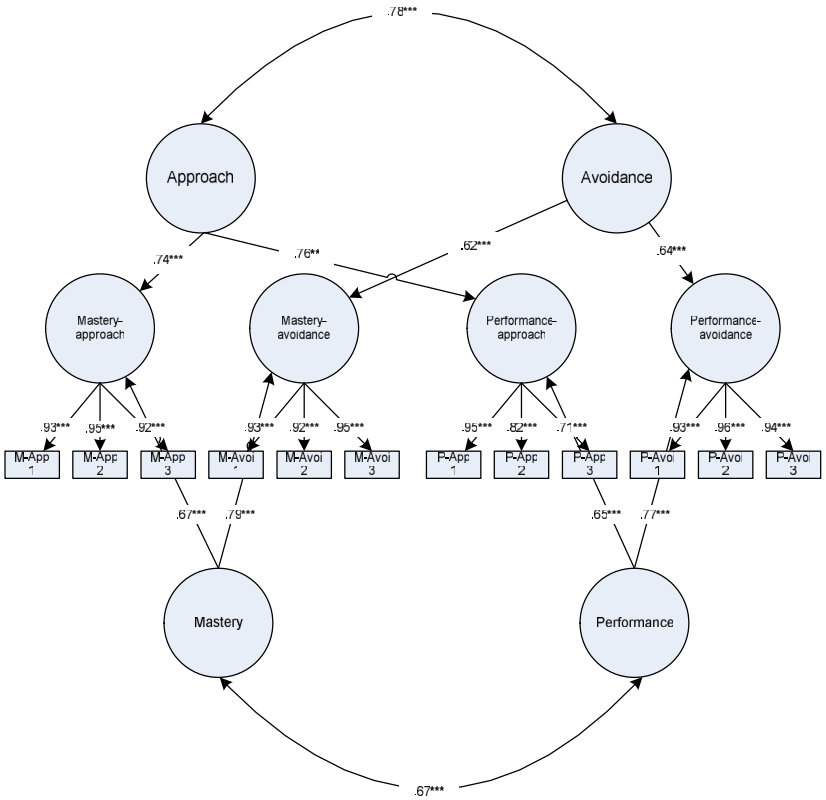


**Fig. 1. MI CT-CM model of achievement goals**

*Note: *** p < .001, estimates are standardized. Error variables are not presented for clarity*

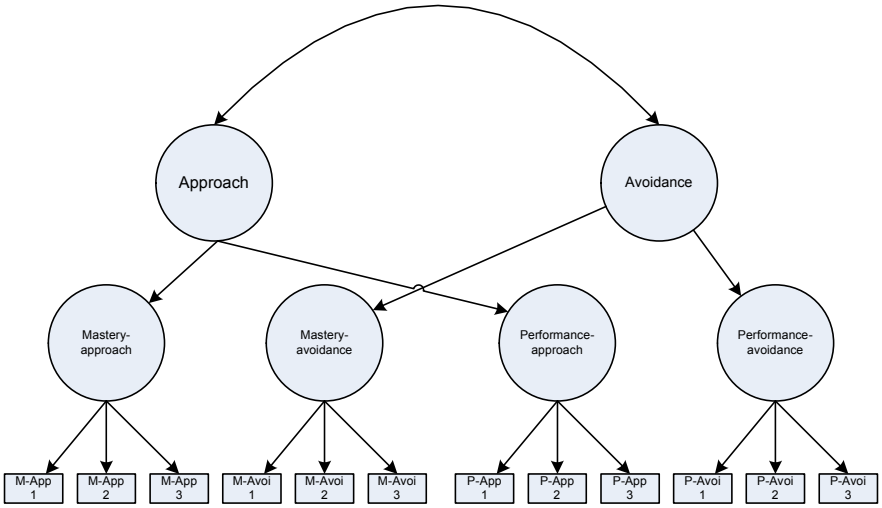


**Fig. 2. An Example of a two-level model of achievement goals**

*Note: error variables are not presented for clarity*

## 5. DISCUSSION OF FINDINGS

The present study, involving Saudi university students, has produced some notable evidence into the factor structures of achievement goals in educational contexts. The modest model fits of various factor iterations, as we detailed previously, have provided empirical grounding for the continuation and advancement of research into the 2 × 2 model of achievement goals [1,7]. Achievement goal theories have undergone an evolution over the past three decades, with a number of different iterations proposed and tested [3,25,54]. An examination of the literature has indicated that the majority of research studies, based on the dichotomous, trichotomous and 2×2 models, have predominantly used data drawn from Western settings. The extent to which the 2×2 model, as detailed by Elliot and colleagues [1,7], would reflect the achievement goals that Non-Western students in a Non-Western context aspire and adopt is contentious. There has been very few research that has explored the 2×2 model with Non-Western students, situated in Non-Western learning and sociocultural contexts [40]. Evidence ascertained from CFAs in the present study has contributed to the theoretical tenets regarding the definition and valence dimensions of achievement goals. Cross-culturally, the conceptualization that we developed has generated substantial yields for continuing research development and educational practices for consideration.

### 5.1 Structural Validity

Using Elliot and Murayama's (2008) study as a basis for examination, we hypothesized and tested a number of *a* priori models that reflected a progression in evolution of achievement goals. An inspection of the goodness-of-fit index values for the six different permutations indicates a number of interesting findings for consideration and further advancement. The benchmark for appropriate model fits (e.g., CFI value ≥.90) would suggest that there are three possible *a priori* models for acceptance: Model 2A-C, Model 5A, and Model 6A. The results for the various hypothesized trichotomous models are similar to those of Elliot and Murayama's [7] and reflect poor model fits. A correlated two-factor model, $\Delta\chi^2$ = 338.44, $p$< .001, in contrast, is an improvement in model fit (e.g., CFI=.95, NNFI=.93), and emphasizes a positive association between the two latent factors. This collective response from our Saudi students is rather interesting, contending that orientations for academic learning and achievements fall into two distinct, but yet related categories: (i) students opting to engage in learning of a subject material in order to demonstrate competence and surpass others, and (ii) students opting to engage in quality learning for mastery and personal competence. This empirical deduction, arising from the goodness-of-fit index values of our analyses accentuates, in part, previous theoretical contentions pertaining to a dichotomous understanding of achievement goals [17,18,55].

We do know, from existing empirical evidence that theoretical tenets pertaining to achievement goal orientations have evolved to encompass more complex models other than the dichotomous model of achievement goals [17,18,55]. Responses to an adapted version of the AGQ-R [7], resulting in an appropriate two-factor model of achievement goals require further consideration and research development. The importance of sociocultural attributes, such as formal values and customary practices of a particular cultural group may shape and influence individuals' perceptions, anticipatory thoughts about learning, planning and achievement orientations. The Saudi contexts are rather unique, emphasizing segregation between sexes and suggest the notion of achievements for pride, family honor etc. We noted from our observations that there was a sense of automation and purpose, whereby Saudi students exhibited structured behavioral patterns, for example: many of the students

indicated a preference for instructions in order to self-regulate their goals and behaviors. How these related characteristics combine, in totality, translate to account for a demarcation between two major types of goals requires further examination. In particular, when we compare our findings to those of Elliot and Murayama's [7], there is clearly an inconclusive positioning, with the authors finding the hypothesized four-factor structure to be a better fit than the two and three-factor alternatives.

The evidence we obtained is significant, providing support for a two-dimensional structure that emphasizes the importance of a 2 (definition) $\times$2 (valence) achievement goal model. This two-dimensional model (Model 5A) was also found to fit the data better than the two alternatives, Model 6A and Model 6B. Differing from Elliot and Murayama's [7] analysis, which specified a null association between the mastery and performance latent factors, we noted a positive association between the two definitions of competence components. In part, drawn from results of Model 2A-C, we specified *a priori* a positive association between the mastery and performance latent factors. From a theoretical point of view, as confirmed from Elliot and Murayama's [7] and our CT-CM analyses, there is credence to contend that each of the four goals is reflected by a combination of two underlying competence dimensions. From Fig. 1, for example, the mastery-avoidance goal type shares both valence (e.g., avoidance) and definition (e.g., mastery) dimensions. In a similar vein, there is also a sharing of a dimension for some goals (e.g., mastery-approach versus mastery-avoidance), whereas others do not share a dimension and are unrelated (e.g., mastery-approach versus performance-avoidance).

Again, of considerable interest when comparing our findings to those of Elliot and Murayama's (2008), is the observed strength in relations between the dimensions of competence. Elliot and Murayama (2008), for instance, stipulated a null association for the definition dimension of competence. We, on the other hand, noted positive associations for both the valence ($r$ =.78) and definition ($r$ =.67) dimensions of competence. A comparison between Model 5A (MI CT-CM with correlations between the approach and avoidance, and between the mastery and performance latent factors) and Model 5 (MI CT-CM with correlation between the approach and avoidance latent factors) indicates a statistically significant chi-square difference ($\Delta\chi^2$ = 23.98, p<.001), confirming the appropriateness of an association between the mastery and performance latent factors. This observation in positive associations is interesting, theoretically, and may suggest a number of implications for consideration. For example, one question that comes to our mind is whether a demarcation can clearly be stated between the mastery and performance goals for some learning activities and tasks, especially when we take into consideration some subject areas and domains of functioning (e.g., Calculus versus Ancient History)? The contextualization of a subject matter, in this instance, may influence students' motives and values for learning, ranging from a desire to achieve and demonstrate competence for social recognition to that of intellectual curiosity and mastery over time. In terms of future anticipations and career planning, similarly, some students may continuously transform their thinking and planning to shift from a deep and mastery emphasis to a performance-based attribute, or vice versa.

It is also possible that cultural attributes and related influences could explain and account for the observed association between mastery and performance goals. Ideologies, beliefs, and values impart by a particular society or culture may create and instill some uncertainties or unclear demarcation between learning motives and/or aims. An individual may feel and experience a sense of perplexity in terms of his/her own desire and objective – for example, what do I really want to do given my family wishes that I follow dad's footstep and become a

librarian? Relating back to our previous contention, perhaps one area of inquiry that we could expand upon is the use of longitudinal data to study achievement goals.

It is interesting to note that, similar to Elliot and Murayama's (2008) study, the results we obtained also indicate a moderate model fit for Model 6A (e.g., CFI =.93, NNFI =.92). Of the two alternatives of a two-level model of achievement goals, Elliot and Murayama's (2008) findings are similar to ours, and indicate an appropriate fit of a mastery-performance two-level model (e.g., CFI = .95, NNFI = .95). The approach-avoidance two-level model, in contrast, did not fair well when compared to the MI CT-CM or mastery-performance two-level model. When we compare the goodness-of-fit index values, of course, the MI CT-CM model is more appropriate in justifying the dimensionality of achievement goals. We cannot discount and ignore, in totality, the two-level alternatives, especially when we consider the fact that our data, and those of Elliot and Murayama [7] are not in the multitrait-multimethod (MTMM) format. We urge researchers to use the AGQ-R [7] in other learning and sociocultural contexts to see if similar patterns in findings may be obtained. Does the AGQ-R definitively address the different goal types and discern their differences? In particular, with reference to the dimensional structure of achievement goals, are there better items or inventories that could measure the definition and valence dimensions of competence? We consider this query as part of the ongoing development of theories and measures of achievement goals. Elliot's (1999) previous theoretical tenets, for example, connote the notion that a mastery-based goal may differentiate into two respective possibilities: task-based versus intrapersonal standard used to infer competence evaluation. Van Yperen's (2006) research, in contrast, uses a novel, simple, and precise measure to explore this issue of task-based and intrapersonal foci of mastery goals.

## 5.2 Directions for Continuing Research

From an empirical point of view, the findings we have yielded support previous research studies [7,40,56] that emphasize the potency of the 2×2 model of achievement goals. We attempted to explore the 2×2 model within a Saudi context. A quantitative methodological approach alone does not permit us to make conclusive inferences about the nature and influences of Non-Western sociocultural settings. We can, however, say that our findings have relevance for further advances into the explanatory processes of achievement goals. For example, some of the questions, which we mentioned briefly, include: (i) does the AGQ-R [7] transcend to other Non-Western contexts to produce similar patterns in findings (e.g., a two-level model of achievement goals with a correlation between, say, mastery and performance goal latent factors)?, (ii) how does the 3×2 model of achievement goals manifest in patterns for different educational levels and learning contexts?, and (iii) what possible reasons are there to explain for the comparable findings in goodness-of-fit index values for the MI CT-CM and two-level models? The present findings, we agree, do not provide an adequate validation in factor structures of the theoretical tenets pertaining to the 2×2 model. The moderate goodness-of-fit index values indicated previously suggest a need for researchers to extend our focus and previous findings [7,12] to other sociocultural contexts and cohorts. Such an inquiry would clarify the positioning and nature of the 2×2 model, and whether the various factor iterations tested to date could be improved.

One notable aspect missing from our study, which is a limitation in part, is the structural validity of the adapted version of the AGQ-R [7]. Previous research [e.g., 7,10,12] has, for example, studied the impact of different goal types on academic performance and other related outcomes. We encourage researchers to consider other achievement-related

outcomes, other than just academic performance, alone. As a point of reference, for example, one aspect is the possible impact of achievement goals on intrinsic motivation [7, 12], academic buoyancy [57,58], and school engagement and disengagement [59-61]. We suspect that the negative valenced nature of a performance-avoidance goal [e.g., "My aim is to avoid doing worse than other students": 7] would result in school disengagement, and a lack in academic buoyancy for learning. Our theoretical positioning, from a more global perspective [62], is that there is more to academia than just academic achievement *per se*. As educators and policy makers, we need to take into account and focus on wider education-related implications for practices etc. The achievement goal framework, in this analysis, may allow us to explain and predict other future anticipations and life-impact decision-making for individuals. This line of reasoning, specifically, emphasizes the potential featuring of the 2×2 model in individuals' lives, especially their personal well-being, democratic and civic values etc. For example, does a mastery-approach goal orientation lead to proactive engagement in civics education?

Methodologically, the use of multi-level testing [63,64] is more advantageous in terms of comparative analyses between different cohorts. One major avenue of inquiry, which may be advanced, involves a validation in dimensional structures of achievement goals in different sociocultural settings (e.g., country versus school). This statistical testing would assist in the clarification of the two-level model of achievement goals. Does an academic subject matter taught in one class compared to another subject account for a disparity in model representations of achievement goals (e.g., a two-level model)? We also support the use of non-quantitative methodological approaches to study the nature and underlying processes of achievement goals. This non-quantitative methodological approach (e.g., in situ observation) may compliment quantitative evidence, especially in situations where we include extraneous factors and influences (e.g., personal ethos).

Finally, the sample chosen for this investigation was purposive; in particular, we chose a cohort of Saudi students who answered the AGQ-R [7] in English and not Arabic. Could the AGQ-R, administered and answered in Arabic, elicit differing patterns in understanding and interpretation? In a similar vein, the answering of the AGQ-R in Japanese, Samoan, etc., would also draw parallels in theoretical and empirical implications. Does the AGQ-R yield similar patterns in factor structures and predictiveness when answered in Japanese? This comparison in terms of instructional mediums, we believe, would make a theoretical contribution in terms of cultural comparison and cross-cultural generalizability of the 2×2 model.

## 6. CROSS-CULTURAL IMPLICATIONS, FINAL THOUGHTS AND CONCLUSION

In summation, from a cross-cultural point of view, the present investigation has provided some notable insights, which enable researchers to advance the study of achievement goals in different sociocultural settings. Notably, the focus of our research inquiry involved the testing of a theoretical-conceptual model that depicted four major types of achievement goals, derived from Western scholars' theorizations and conceptualizations [1,3,7,25,54]. The obtained evidence illustrates, importantly, the different types of achievement goals that Saudi university students adopt in their learning. Educationally, of course, the findings from this inquiry (i.e., the 2×2 model of achievement goals) have implications in terms of understanding and applied practices. One major objective in higher education, for example, entails the encouragement and fostering of mastery and quality learning [65]. The focus, in this analysis, emphasizes the importance of interest, intellectual curiosity and appreciation

for learning. Knowing the specific pattern in achievement goals of students would, in this case, assist educators in their pedagogical approaches and instructional policies. For example, the use of authentic assessment tasks could foster a milieu that accentuates the saliency of mastery goals (e.g., mastery-approach goal).

Cross-culturally, of course, the obtained findings also have educational implications for Saudi university students. This inquiry suggests, as we discussed previously, the need for Saudi educators to consider their customary practices, pedagogical approaches and instructional policies in educational settings. We notice that structured, traditional methods of assessments, for example, are still being implemented to gauge into students' understanding and learning processes. Instructor-centered pedagogies (i.e., non-active) exist and operate in many lessons and, from our point of view, these may instill and encourage a reliance on facts, authority figures etc.

Examination of the 2×2 model [1,7] has relevance for students in differing sociocultural contexts. From a research perspective, inquiries may involve a cross-cultural comparison of Western and Non-Western students in a particular cultural context (e.g., Western expatriate students versus native Singaporean students, both located in Singapore). In a similar vein, we could compare achievement goals of students of a particular ethnic group, located in two separate cultural sites (e.g., Australian expatriate students located in Singapore versus Australian students located in Australia) to discern disparities in cognitive and motivational processes (e.g., achievement goals). This comparison is quite unique, as empirical findings would provide potential insights into the cultural ethos and social philosophies that espouse a society, in general. Does a community in Saudi, Singapore, or elsewhere instill and perpetuate a specific mindset in terms of aspirations, motivation, and/or decision making? Methodologically, from a quantitative approach, we commend the use of factorial invariance techniques [13] to study the issues of equivalency and non-equivalency across educational levels (e.g., first-year versus third-year), time (e.g., Time 1, Time 2 and Time 3) and cultures (e.g., Singaporean undergraduates versus Saudi undergraduates).

We emphasize, however, that inquiries into the cross-cultural comparisons of students from different sites would require additional, non-quantitative methodological approaches [66-68]. The study of cultural values and related attributes, such as personal ethos and ideologies on individuals' motives for academic learning and achievements are complex, and may include relatively long-term, in situ documentations etc. The distinction in mastery versus performance goals is more than just situational or contextual in nature and may depend on wider, global sociocultural influences that extend beyond the classroom setting. This theorization, suggesting the 'subsuming' of achievement goals within a system of society and related cultural attributes (e.g., the importance of collectivism) requires prolonged qualitative examinations. Likert-scale inventories and surveys, alone, cannot capture the complexities that encompass students' achievement goal orientations.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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