Research Reports

The Predictiveness of Achievement Goals

A 2 × 2 Framework Analysis From a Social Cognitive Perspective

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Abstract

Using the Revised Achievement Goal Questionnaire (AGQ-R) (Elliot & Murayama, 2008), we explored first-year university students' achievement goal orientations on the premise of the 2 × 2 model. Similar to recent studies (Elliot & Murayama, 2008; Elliot & Thrash, 2010), we conceptualized a model that included both antecedent (i.e., enactive learning experience) and consequence (i.e., intrinsic motivation and academic achievement) of achievement goals. Two hundred seventy-seven university students (151 women, 126 men) participated in the study. Structural equation modeling procedures yielded evidence that showed the predictive effects of enactive learning experience and mastery goals on intrinsic motivation. Academic achievement was influenced intrinsic motivation, performance-approach goals, and enactive learning experience. Enactive learning experience also served as an antecedent of the four achievement goal types. On the whole, evidence obtained supports the AGQ-R and contributes, theoretically, to 2 × 2 model.

Keywords: achievement goals, 2 × 2 model, intrinsic motivation, enactive learning experience, social cognitive theory

Introduction

The 2 × 2 model of achievement goals (Elliot & McGregor, 2001; Elliot & Murayama, 2008) has emerged as an important focus of research inquiry in the field of educational psychology. Over the past couple of years, for example, researchers have explored the dimensional structures and predictiveness of the four achievement goal orientations in educational settings (e.g., Alkharusi & Aldhafri, 2010; Elliot & Murayama, 2008; Van Yperen, Elliot, & Anseel, 2009). The mastery-avoidance goal type, in particular, is relatively unknown and has, to date, remained elusive in clarity and explanation. Clarification of the characteristics and operational nature of the four achievement goal types is integral in terms of effective pedagogical practices. On this basis, differing from previous research studies that are based on the trichotomous model (Elliot, McGregor, & Gable, 1999; Fenollar, Román, & Cuestas, 2007; Liem, Lau, & Nie, 2008), we conceptualize a 2 × 2 framework for investigation and statistical testing, using structural equation modeling. Our conceptualization, situating within the contexts of university learning and involved 277 (151 women, 126 men) first-year students, entails the use of the revised Achievement Goal Questionnaire (AGQ-R) (Elliot & Murayama, 2008).

Antecedents and Consequences of Achievement Goals

The conceptualization for the present study, illustrated in Figure 1, is significant, theoretically, for its emphasis on the 2 × 2 model of achievement goals. We situate this model within a social cognitive framework (Bandura, 1986, 1997) and include, in particular, enactive learning experience (e.g., repeated failures in a subject matter) as a potential antecedent. Furthermore, similar to the work of Elliot and Murayama (2008), we consider intrinsic motivation and academic achievement as positive and negative consequences of the four achievement goal types, depending on their characteristics.

The study of achievement goals has undergone an evolution, starting off with the dichotomous model (Dweck, 1986; Dweck & Leggett, 1988; Nicholls, 1984) whereby two main goal types were proposed: *mastery* categorization emphasizing the development of competence versus *performance* categorization, whereby the focus is on a demonstration of competence (Pekrun, Elliot, & Maier, 2009). This mastery-performance distinction was limited, and consequently, a trichotomous model entailing a bifurcation in the performance categorization was included (Elliot & Church, 1997; Elliot & Harackiewicz, 1996): *performance-approach* (i.e., focusing on individuals acquiring positive possibilities) versus *performance-avoidance* (i.e., focusing on individuals avoiding negative possibilities) (Van Yperen et al., 2009). Again, similar to the dichotomous model, the trichotomous model of achievement goals has limitations and does not, according to some researchers, explain the varying patterns in individuals' cognition, motivation, and learning outcome (Elliot & McGregor, 2001; Elliot & Murayama, 2008).

More recently, an extension of the trichotomous model has been conceptualized (Elliot, 1999; Elliot & McGregor, 2001), which entailed a bifurcation in the mastery goal type so that, in total, four distinct goal possibilities may exist: (i) a *mastery-approach* orientation where individuals seek to achieve mastery or improvement, (ii) a *mastery-avoidance* orientation where individuals seek 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. Despite its inception more than a decade ago, the 2 × 2 model remains relatively modest in terms of research progress and development. Some researchers have even raised questions about its validity and/or inclusion within the achievement goal theory (DeShon & Gillespie, 2005). An examination of the empirical literature would also seem to discount its acceptance, given that the majority of research studies have been based on the trichotomous model of achievement goals (e.g., Fenollar et al., 2007; Harackiewicz, Barron, Tauer, & Elliot, 2002; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Liem et al., 2008; Pekrun et al., 2009; Phan, 2009; Senko & Miles, 2008; Wolters, 2004).

Given research into the 2 × 2 model of achievement goals is limited at present, we do not know much about the bifurcation of the mastery goal orientation. A few research studies within the last couple of years, for example, have focused specifically on analyses of the mastery-approach (Hulleman, Durik, Schweigert, & Harackiewicz, 2008; Sins, van Joolingen, Savelsbergh, & van Hout-Wolters, 2008) and/or mastery-avoidance (Van Yperen et al., 2009) goal orientations. In terms of the four achievement goal types tested within one conceptual framework, the work of Elliot and colleagues (Elliot & McGregor, 2001; Elliot & Murayama, 2008; Elliot & Thrash, 2010) has been relatively prominent, detailing some major findings pertaining to their definitions and characteristics. Other researchers, since then, have also underpinned the 2 × 2 model as a focal inquiry for emphasis and advancement (Alkharusi & Aldhafri, 2010; Cury, Elliot, Da Fonseca, & Moller, 2006; Van Yperen, 2006). We concur with this empirical examination, and contend that the 2 × 2 model may yield merits in terms of applications and educational practices.

A Conceptual Model for Investigation

The 2 × 2 model of achievement goals has, to date, received less considerations and research development than the trichotomous model. Even within the last couple of years alone, comparing with the trichotomous model of achievement goals, as we explained, very little is known about the bifurcation of the mastery goal orientations. Furthermore, of the four achievement goal types, there is limited information at present about the mastery-avoidance goals (Elliot & Murayama, 2008; Van Yperen et al., 2009). There are, in this instance, a few major questions that remain elusive and unanswered – for example, to what extent do the four achievement goal types share similar antecedents? Do the consequences of the four achievement goal types differentiate into adaptive and maladaptive outcomes? How effective and explanatory is Elliot and Murayama's (2008) revised Achievement Goal Questionnaire (AGQ-R)?

Antecedents of Achievement Goals — We use Elliot and colleagues' previous work (Elliot & McGregor, 2001; Elliot & Murayama, 2008; Elliot & Thrash, 2010) as a premise for our own conceptual model for investigation. This conceptualization, in particular, entails a process of antecedent, achievement goals, and their consequences. Social cognitive theory (Bandura, 1986, 1997) suggests that enactive learning experiences, authentically and experientially-based are notable in the formation of cognitive appraisal of capability. Personal self-efficacy, defined as a belief in one's capability to executive required courses of action, is formed predominantly from personal performance accomplishments. Repeated successes in a subject matter, based on mastery and/or performance-based criteria assist and strengthen one's efficacy towards learning and resolve to deal with obstacles, setbacks, etc. (Bandura, 1997). A weakened sense of self-efficacy, in contrast, is gauged and formed from one's repeated failures in a subject matter. In the context of achievement goals, similarly, we query the extent to which enactive learning experiences could serve to enhance and predict individuals' achievement goal orientations. Would ongoing successes in mathematics learning, say, orientate university students to adopt mastery-approach and performance-approach goals? Would preference for mastery-avoidance and performance-avoidance goals depend, in contrast, to failures and academic struggles?

The premise pertaining to the potency of enactive learning experience is based on previous research studies, which reported the positive effects of personal performance accomplishments on personal self-efficacy (Britner & Pajares, 2006; Hampton, 1998; Lent, Lopez, & Bieschke, 1991; Liem et al., 2008; Lopez & Lent, 1992; Pajares, Johnson, & Usher, 2007; Phan, 2012b). Some studies have reported students' prior academic grades (Matsui, Matsui, & Ohnishi, 1990; Phan, 2012b), whereas others used Likert-scale (e.g., "I received good grades in high school mathematics class", Lent et al., 1991) to gauge into the effectiveness of enactive learning experience as a source of information. Both methodological approaches have yielded comparable findings, indicating the potency of this informational source on the formation of personal self-efficacy. In the area of achievement goals, in contrast, Elliot and Murayama (2008) found statistical significant effects of two major antecedents: the impact of a need for achievement on both mastery-approach ($\beta = .34$, $p < .01$) and mastery-avoidance ($\beta = .21$, $p < .01$) and performance-approach ($\beta = .22$, $p < .01$) goals, and the impact of a fear of failure on both performance-approach ($\beta = .24$, $p < .01$) and performance-avoidance ($\beta = .31$, $p < .01$) and mastery-avoidance ($\beta = .15$, $p < .01$) goals. Elliot and Thrash's (2010) study, similarly, showed the effects of approach temperament on mastery-approach ($\beta = .28$, $p < .05$) and performance-approach ($\beta = .16$, $p < .05$) goals, and the effects of avoidance temperament on mastery-avoidance ($\beta = .22$, $p < .05$) and performance-avoidance ($\beta = .20$, $p < .05$) goals. It is interesting to note that high school GPA, however, did not regress on the four achievement goals.

Consequences of Achievement Goals — Apart from the study of antecedents, it is also of considerable interest for us to consider the consequences of the four achievement goals. Research into the 2 × 2 model, for example, has yielded some evidence that accentuates the effects of performance-approach (β values ranging .19 to .46) and performance-avoidance goals (β values ranging -.16 to -.48) on exam performance (Elliot & Murayama, 2008; Elliot & Thrash, 2010), and the effects of mastery-approach (β = .28, p < .01) and performance-avoidance goals (β = -.15, p < .05) on intrinsic motivation (Elliot & Murayama, 2008). This evidence, preliminary at present, would seem to support previous theoretical tenets (Elliot & McGregor, 2001; Elliot & Murayama, 2008), whereby there is a clear demarcation in predictive effects on adaptive and maladaptive outcomes. Other studies, more recently, have reported the effects of various goal types, based on the 2 × 2 model, on achievement-related outcomes. Sins et al. (2008), for example, found that a mastery-approach goal orientation influenced deep processing strategies for learning (β = .33, p < .05). Van Yperen et al.'s (2009) study, in contrast, noted the deleterious effect of mastery-avoidance goals on performance improvement in academic learning.

In the context of our research investigation, we regress the four types of achievement goals on intrinsic motivation and academic achievement. This conceptualized approach is similar to those of Elliot and Murayama's (2008) and Elliot and Thrash's (2010) research, which detailed the importance of cause-and-effect of achievement goals. Their findings are inconclusive, at present, and require further clarification and validation. For example, despite the inclusion of both intrinsic motivation and exam performance in the statistical testing, we note that Elliot and Murayama (2008) did not confirm an association between the two constructs. We expect to find an inversed relationship, given the characteristics of intrinsic motivation (Ryan, 1992; Schunk, Pintrich, & Meece, 2008) and performance outcomes that are based, in part, on high stake assessments. We contend, in this case, that performance-based outcomes, such as formal examinations themselves serve as a portal of extrinsic motivation (e.g., obtaining social recognition) and entail more emphases on performance-approach goals.

In Totality: Antecedent, Achievement Goals, and Consequences — In total, the proposed model for investigation and statistical testing in this study is of theoretical significance. Structural validation of the proposed relations depicted in Figure 1 may, in particular, strengthen the AGQ-R (Elliot & Murayama, 2008) in terms of its applicability with students from a different cultural context. Analysis of our conceptualization indicates a central role for achievement goals, mediating between enactive learning experience (antecedent) and intrinsic motivation and academic achievement (adaptive outcomes). Furthermore, in contrast to Elliot and Murayama's (2008) study, we stipulate a direct association between intrinsic motivation and academic achievement. The characteristics of intrinsic motivation would suggest that an inversed relationship, whereby a heightened sense of intrinsic motivation may exert both negative and/or positive effects on academic achievement. Students who prefer and exhibit intrinsic motives for learning may achieve, academically, in their studies, depending in our view on the subject matter hand. By the same token, intrinsic motivation may relative negatively with academic achievement, especially if the latter is based on normative evaluation criteria. This situational positioning of intrinsic motivation may, similarly, mediate between the four achievement goals and academic achievement.

In summation, drawn from existing theoretical tenets and in part previous empirical evidence, the theoretical-conceptual model proposed for examination in the present study details a number of hypotheses, for example:

HP1: Enactive learning experience would exert positive effects on academic achievement, intrinsic motivation, and mastery-approach and performance-based goals, and negative effects on performance-avoidance and mastery-avoidance goals.

HP2: Mastery-approach and performance-approach goals would exert positive effects on intrinsic motivation and academic achievement, whereas mastery-avoidance and performance-avoidance goals would exert negative effects on these two variables.

HP3: Intrinsic motivation would exert a negative effect on academic achievement.

In total, there are 15 hypothesized structural paths for statistical testing. Evidence obtained from this investigation would contribute, theoretically, to the tenets of achievement goals, especially the 2 × 2 model (Cury et al., 2006; Elliot & McGregor, 2001; Elliot & Murayama, 2008).
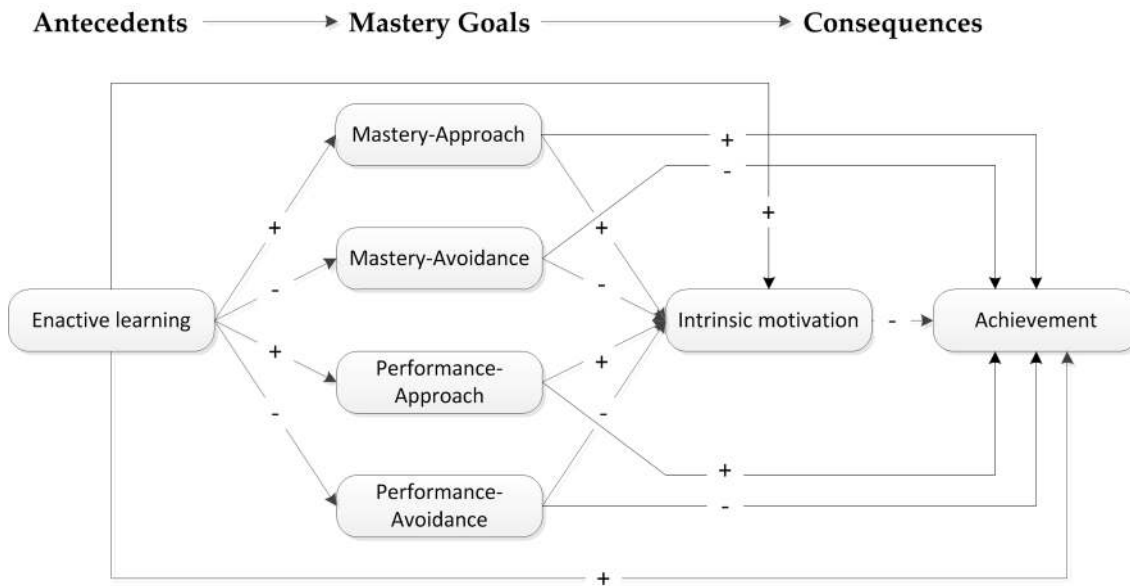

Figure 1. A conceptual model of antecedents and consequences of achievement goals.

Method

Sample and Procedure

Two hundred seventy-seven university students (151 women, 126 men) from Australia enrolling in Education courses participated in this study. The students were enrolled in the academic subject educational psychology and took part in the answering of the questionnaires in the first week of March, 2013. University approval was granted and we followed ethical protocols, such as the assurance of anonymity and confidentiality. Participation in this investigation was voluntary and no remuneration was given. The questionnaires were administered in tutorial classes, lasting approximately 35 minutes, with the assistance of two postgraduate students.

Instrument

The Likert-scale inventories used for this investigation, rated on 7-point rating scales (e.g., 1 (strongly disagree) to 7 (strongly agree)), have been adapted from existing measures. Where appropriate, we asked the students to consider and situate their responses within the context of educational psychology. Similarly, for relevancy and to facilitate better understanding of the items, we modified some wordings to suit the Australian learning and cultural contexts (e.g., the word 'course' is changed to 'unit').

Achievement Goals — To advance our understanding of the 2 × 2 model of achievement goals, we used the AGQ-R (Elliot & Murayama, 2008) inventory which contains 12 items. Each subscale consists of three items, for example: "My aim is to completely master the material presented in this class" (Mastery-approach subscale), "My aim is to avoid learning less than I possibly could" (Mastery-avoidance subscale), "My aim is to perform well relative to other students" (Performance-approach), and "My aim is to avoid doing worse than other students" (Performance-avoidance).

Enactive Learning Experience — Situating within the framework of social cognition (Bandura, 1986, 1997), we adapted our previous scale, validated and published (Phan, 2012a, 2012c), for the contexts of university learning in educational psychology. The six items, measuring students' learning experiences, included, for example: "I always get good marks from my lecturer for this subject, educational psychology" and "I have always done well in assignments for this subject, educational psychology".

Intrinsic Motivation — Intrinsic motivation was measured using an adapted version of Elliot and Church's (1997) eight-item scale, rated on a 7-point rating scale (1 (strongly disagree) to 7 (strongly agree)). Five of the items were worded positively (e.g., "I am enjoying this class very much"), three were worded negatively (e.g., "I don't like this class at all"). For our subsequent analyses, however, the three negative-worded items were reverse scored (i.e., converting to positive valence). Confirmatory factor analyses (CFAs) (Byrne, 1998; Kline, 2011) performed for this inventory yielded an appropriate correlated two-factor solution (e.g., CFI = .973, RMSEA = .080), with factor loadings ranging from .411 to .856 (*Mdn* = .634, *SD* = .223) for the negative valence items, and .811 to .893 (*Mdn* = .849, *SD* = .030) for the positive valence items. The two factors that defined the 'positive' and 'negative' intrinsic motivation items also correlated positively with each other (α = .539, *p* < .001).

Academic Achievement — Academic achievement was measured by collating students' unit mark at the end of the semester. The unit that the students enrolled does not have a formal final exam, but rather entailed continuous assessment tasks (e.g., Reading response task). There is, however, an end-of-semester quiz (20%), which consists of multiple-choice, true/false, and matching questions for answering.

Results

Structural equation modeling (SEM) (Bollen, 1989; Byrne, 1998; Loehlin, 2004), in contrast to other multivariate statistical techniques, is appropriate and may enable us to trace and discern the direct and indirect relations between antecedent, achievement goals, and adaptive outcomes. Consisting of both latent factors and measured indicators, which assume to have true errors (E ≠ 0) SEM is sound as it allows the statistical testing of competing *a priori* models. Modification indices (MIs) may also provide an advisory basis for the testing of *a posteriori* models. Per stipulated protocol, we use aggregated scores to represent measured indicators that define a latent factor. The use of aggregated scores or parcel items, usually averaging two or more items per aggregate-level indicator, according to Marsh and Yeung (1997), is advantageous as this statistical technique: "(i) results in more reliable and valid indicators, (ii) decreases the effects of idiosyncrasies associated with individual items, and (iii) reduces the computer resources required for the analysis" (Marsh & Yeung, 1997, p. 46). In total, for our subsequent analyses, we have six latent factors (i.e., enactive learning experience, the four achievement goal types, and intrinsic motivation) and 19 measured indicators[i] (i.e., three individual or parcel items defining each latent factor; note that we treated academic achievement as a measured indicator).

We used SPSS 20 and SPSS AMOS 20 software packages in the structural equation analyses. Correlational matrix has been known to cause some major problems, such as producing incorrect goodness-of-fit and standard error values (Byrne, 1998; Jöreskog & Sörbom, 2001). Consequently, we chose to use covariance matrices with maximum likelihood (ML) estimation procedures. Various goodness-of-fit index values are available to assist in the determination of a model fit, but in this case, we used the following: Comparative Fit Index (CFI) (CFI ≥ .90), the Non-normed Fit Index (NNFI) (NNFI ≥ .90), and the Root Mean Square Error of Approximation (RMSEA) (RMSEA ≤ .080).

Structural Validity

Descriptive statistics and Cronbach's alpha values are presented in Table 1, whereas Table 2 presents the correlations among the variables. SEM analyses, according to researchers (Byrne, 1998; Loehlin, 2004), depend on the distribution of scores, characterized in part by kurtosis and skewness values approximately to the vicinity of zero. Some researchers have provided a recommendation, suggesting that scores of kurtosis and skewness are considered as being within the range of normality if they range from 0 to ± 2.00 (Byrne, 1998; Curran, West, & Finch, 1996). Our initial screening yielded multivariate normality (e.g., kurtosis and skewness values ~ +/- 2.00) of the data, permitting us consequently to use maximum likelihood procedures. In our subsequent structural equation analyses, we tested a number of *a priori* models, which are also shown in Table 3 for viewing. A comparison in the goodness-of-fit index values and the $\Delta\chi^2$ tests are used to assist in the ascertainment of the best model fit.

Table 1

Descriptive Statistics (Mean Scores and Standard Deviations) and Cronbach's

Instruments	Means			Cronbach
	Men (*N* = 151)	Women (*N* = 143)	Total (*N* = 294)	
Enactive learning experience	2.820 (1.109)	2.797 (1.144)	2.808 (1.126)	.831
Mastery-Approach	5.370 (1.482)	5.464 (1.453)	5.421 (1.465)	.947
Mastery-Avoidance	5.312 (1.746)	5.382 (1.722)	5.350 (1.730)	.955
Performance-Approach	4.765 (1.247)	4.894 (1.283)	4.835 (1.266)	.915
Performance-Avoidance	5.582 (1.417)	5.625 (1.369)	5.605 (1.389)	.948
Intrinsic motivation	5.849 (0.913)	5.777 (0.961)	5.810 (0.939)	.899

Note. Standard deviations are presented in brackets.

Table 2

The Correlations among Variables in the Model (N = 277)

Variables	1	2	3	4	5	6	7
1. Enactive learning experience	—						
2. Mastery-Avoidance	.10*	—					
3. Mastery-Approach	.12*	.83**	—				
4. Performance-Avoidance	.11*	.78**	.79**	—			
5. Performance-Approach	.06*	.75**	.76**	.78**	—		
6. Intrinsic Motivation	.21**	-.05*	.10**	.06	.05	—	
7. Achievement	.70**	.03	.02	.03	.08*	-.09*	—

Note. All the variables above are latent variables, with the exception of academic achievement.
*p < .05. **p < .01.

Table 3

Goodness-of-fit Index Values for a Priori Models Tested

Description	χ^2	df	Comparison	$\Delta\chi^2$	NNFI	CFI	RMSEA
Model M$_1$	1786.057	142			.723	.770	.205
Basic model with structural paths freed from:							
• Enactive learning experience to achievement goals							
• Enactive learning experience to intrinsic motivation							
• Enactive learning experience to academic achievement							
• Achievement goals to intrinsic motivation							
• Intrinsic motivation to academic achievement							
Model M$_2$	838.789	137	M$_1$ - M$_2$	947.268***	.877	.902	.136
Model M$_1$ with specified errors added							
Model M$_{3A}$	831.850	135	M$_2$ - M$_{3A}$	6.939*	.877	.903	.137
Model M$_2$ with the deletion of structural paths from performance-avoidance and mastery-avoidance goals to intrinsic motivation							
Model M$_{3B}$	827.611	135	M$_2$ - M$_{3B}$	11.178**	.877	.903	.136
Model M$_2$ with the deletion of structural paths from performance-approach and performance-avoidance goals to intrinsic motivation							
Model M$_4$	826.133	133	M$_2$ - M$_4$	12.656*	.878	.903	.136
Model M$_2$ with the inclusion of structural paths from achievement goals to academic achievement							

*$p < .05$. **$p < .01$. ***$p < .001$.

The methodological approach that we undertook in this process of analyses is rather structured, in this case, involving a progression in different *a priori* models. We used procedures that have been noted and used previously by researchers (Bandalos, Yates, & Thorndike-Christ, 1995; Byrne, 1998) – notably, as mentioned in the preceding sections, the modification of *a priori* models, where appropriate, was based on the provided MI values (Byrne, 1998). Apart from validating the hypotheses made, we anticipated that this statistical testing (i.e., comparing different *a priori* and *a posteriori* models) would enable us to refine existing theoretical tenets (e.g., achievement goals).

In our initial model for testing, Model M$_1$, we specified the freeing of 11 structural paths from: (i) enactive learning experience to the four types of achievement goals, intrinsic motivation, and academic achievement, (ii) the four types of achievement goals to intrinsic motivation, and (iii) intrinsic motivation to academic achievement. The goodness-of-fit index values are less than optimal, and modification indices suggest the freeing of four paths between the variances of the four achievement goal types, and an error path between two items of the performance-approach scale (i.e., items "My aim is to perform well relative to other students" and "My goal is to perform better than the other students"). Correlated variances between the four achievement goals are possible and expected, as previous research studies have yielded similar patterns in findings (Elliot & McGregor, 2001; Elliot & Murayama, 2008). On this basis, for Model M$_2$, we freed a path between the two mentioned items of the performance-approach achievement goal subscale, and the four variance paths of the four corresponding achievement goals – that is, mastery-approach and mastery-avoidance and performance-approach and performance-avoidance goals (i.e., the *valence* dimension), and mastery-approach and performance-approach and mastery-avoidance and performance-avoidance goals (i.e., the *definition* dimension). The goodness-of-fit values for this model, Model M$_2$, reflect

an improvement in model fit (e.g., CFI = .902, NNFI = .877) and the chi-square difference test is indicative of this ($\Delta\chi^2$ = 947.268, *p* < .001).

One notable aspect of SEM analyses, of course, entails the importance of refinement in model fit in order to facilitate in theory building (Byrne, 2010; Kline, 2011). Some researchers in psychology and social sciences research are more inclined towards the progressive addition of structural paths, based on goodness-of-fit index and/or MI values. Recommendations, similarly, have also been offered in terms of deletion of paths and the use of $\Delta\chi^2$ statistics to validate this *a posteriori* positioning in order to improve model fits (Bandalos et al., 1995; Byrne, 1998; Helmke & van Aken, 1995). We acknowledge this statistical approach (i.e., the addition and/or deletion of paths) is 'exploratory', in part, but it does assist researchers in their quest to refine theoretical tenets.

Consequently, on this basis, we extended Model M_2 and tested three *a posteriori* models, whereby a refinement was made in terms of both deletion and addition of structural paths. Existing research, at present, has reported inconclusive findings in relation to the associations between achievement goals and intrinsic motivation and academic achievement. For example, the recent work of Elliot and Murayama (2008) has recorded only the statistical significant effects of mastery-approach and performance-avoidance goals on intrinsic motivation. A similar pattern is also attested for the achievement goals-achievement relationships, whereby some predictive effects (e.g., performance-approach goal → academic achievement) are more pronounced than others. We progressed from Model M_2 with the following specifications: (i) the deletion of structural paths from performance-avoidance and mastery-avoidance goals to intrinsic motivation (Model M_{3A}), (ii) the deletion of structural paths from performance-approach and performance-avoidance goals to intrinsic motivation (Model M_{3B}), and (iii) the inclusion of structural paths from the four achievement goals to academic achievement (Model M_4).

The testing of Model M_{3A} and Model M_{3B} is based on the theoretical premise that the definition and/or the valence dimensions could have non-significant effects on intrinsic motivation. The goodness-of-fit index values for the three models are relatively modest (e.g., CFI = .903 and NNFI = .878 for Model M_4), and chi-square difference tests indicate the appropriateness of Model M_4 over Model M_{3A} and Model M_{3B} ($\Delta\chi^2$ ($M_2 - M_4$) = 12.656, *p* < .05). On this basis, we decide to retain Model M_4 as the final solution for discussion. Illustratively, the final solution for Model M_4 is shown in Figure 2.
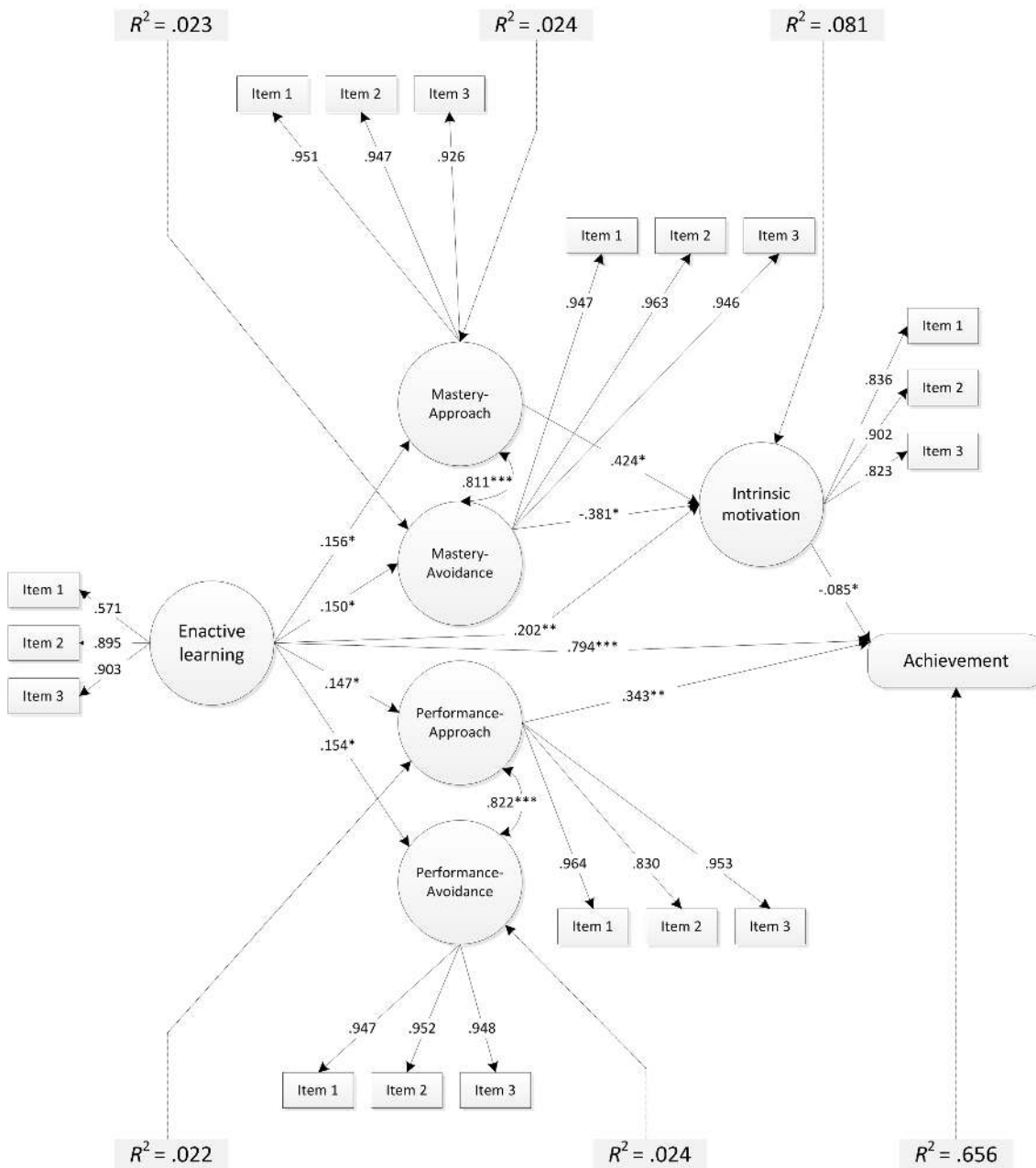
Figure 2. A final solution for antecedents and consequences of achievement goals. *p < .05. **p < .01. ***p < .001.

For clarity, we have omitted associations between variances and errors and non-statistical significant paths. Factor loadings from the measured indicators to their respective latent factors are significant at *p* < .001, and ranged from .571 to .903 (*Mdn* = .790, *SD* = .189) for enactive learning experience, .823 to .902 (*Mdn* = .873, *SD* = .044) for intrinsic motivation, .926 to .951 (*Mdn* = .941, *SD* = .013) for mastery-approach goal, .946 to .963 (*Mdn* = .952, *SD* = .010) for mastery-avoidance goal, .830 to .964 (*Mdn* = .916, *SD* = .074) for performance-approach goal, and .947 to .952 (*Mdn* = .949, *SD* = .003) for performance-avoidance goal.

Direct, Indirect, and Total Effects

A decomposition of effects, shown in Table 4, indicates 12 total statistical significant effects. In terms of direct effects, the four hypothesized paths from enactive learning experience to achievement goals were confirmed: .156 (mastery-approach), .150 (mastery-avoidance), .147 (performance-approach), and .154 (performance-avoidance). Enactive learning experience, as an antecedent, also influenced intrinsic motivation (β = .202, *p* < .01) and academic achievement (β = .794, *p* < .001). For the four achievement goal types, performance-approach goal influenced academic achievement (β = .343, *p* < .01) whereas mastery-approach (β = .424, *p* < .05) and mastery-avoidance (β = -.381, *p* < .05) influenced intrinsic motivation. Intrinsic motivation also exerted a small, but negative effect on academic achievement (β = -.085, *p* < .05). For indirect effects, in contrast, enactive learning experience influenced intrinsic motivation (β = .011, *p* < .05) and academic achievement (β = -.033, *p* < .05) via mastery-approach and mastery-avoidance goals. Similar to enactive learning experience, both mastery-approach (β = -.036, *p* < .05) and mastery-avoidance (β = .033, *p* < .05) influenced academic achievement via intrinsic motivation. Finally, the total effects for both mastery-approach (β = -.171, *p* < .05) and mastery-avoidance (β = -.043, *p* < .05) on academic achievement were statistically significant.

Table 4

Decomposition of Effects: Direct, Indirect, and Total

Predictor	Outcome	Direct	Indirect	Total
Enactive learning experience	Mastery-Approach	.156*	.000	.156*
Enactive learning experience	Mastery-Avoidance	.150*	.000	.150*
Enactive learning experience	Performance-Approach	.147*	.000	.147*
Enactive learning experience	Performance-Avoidance	.154*	.000	.154*
Mastery-approach	Intrinsic motivation	.424*	.000	.424*
Mastery-avoidance		-.381*	.000	-.381*
Performance-approach		.224	.000	.224
Performance-avoidance		-.202	.000	-.202
Enactive learning experience		.202**	.011*	.213**
Intrinsic motivation	Academic achievement	-.085*	.000	-.085*
Mastery-approach		-.135	-.036*	-.171*
Mastery-avoidance		-.076	.033*	-.043*
Performance-approach		.343**	-.019	.324**
Performance-avoidance		-.211	.017	-.194
Enactive learning experience		.794***	-.033*	.764***

*p < .05. ***p* < .01. ****p* < .001.

Discussion of Results

The present study involved an examination of students' achievement goal orientations, based on the 2 × 2 model (Elliot, 1999; Elliot & McGregor, 2001), and situated within the subject educational psychology. Drawing from the recent studies (Alkharusi & Aldhafri, 2010; Elliot & Murayama, 2008; Elliot & Thrash, 2010), in particular, our investigation explored the interrelated process of antecedent and consequences of achievement goals. What has been reported in the literature of late is rather inconclusive and requires continuing research development. For example, in relation to the 2 × 2 model of achievement goals, one notable emphasis for exploration is the study and validation of the AGQ-R (Elliot & Murayama, 2008). What is important, in this analysis, is the illumination in predictive effects of the AGQ-R. Similarly, in the context of the AGQ-R, we know very little about the nature and

characteristics of the mastery-avoidance goal type (Elliot & Murayama, 2008; Van Yperen et al., 2009). Consequently, on this basis, we articulated three major hypotheses for examination that reflected some inconclusive relationships – for example, does a mastery-avoidance goal orientation relate to intrinsic motivation, negatively? Does intrinsic motivation relate to academic achievement?

There are implications for applied teaching practices, especially when we consider the potent effects of different achievement goal types, (e.g., based on the trichotomous model) (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Finally, there is credence to study the 2 × 2 model given there have been questions raised recently about the appropriateness and justification of the four goal types (DeShon & Gillespie, 2005). The findings we obtained, in general, support the hypotheses outlined previously. In this section of the article, we discuss the importance of our evidence and how this may assist in research advancement and educational practices.

The Importance of Enactive Learning Experience

Students' responses of the AGQ-R (Elliot & Murayama, 2008) emphasize the distinctive dimensional structures of the four subscales. The four latent factors, reflecting the four corresponding achievement goals are well defined, as reflected by the factor loadings. Enactive learning experience, proposed as an antecedent, is reported to exert positive effects on the four achievement goals. Enactive learning experience, based on social cognitive theory (Bandura, 1986, 1997), reflects repeated and ongoing successes and failures (e.g., "I always get good marks from my lecturers for this subject, educational psychology") that may subject to both mastery and performance-based criteria. Theoretical tenets (Bandura, 1997) and previous research studies (Britner & Pajares, 2006; Hampton, 1998; Lent et al., 1991; Liem et al., 2008; Lopez & Lent, 1992; Pajares et al., 2007; Phan, 2012b) have noted the potency of enactive learning experiences in the formation of personal self-efficacy. Ongoing successes in a subject matter (e.g., mathematics), in this analysis, may strengthen one's resolve to approach other similar learning tasks with a sense of confidence. Upon reflection of their successes, for example, some students may also partake in other cognitive learning strategies to assist in comprehension and understanding of unit contents.

In the context of this investigation, the statistical significant effects of enactive learning experience emphasize how this informational source could assist in students' achievement goal orientations. This evidence differs relatively to the findings that Elliot and Thrash (2010) obtained, which showed a null impact for students' high school GPA scores. Our findings, however, share a similar pattern to those of Elliot and Murayama's (2008), whereby the authors found the significant effects of a need for achievement ($\rightarrow$ mastery-approach, mastery-avoidance, and performance-approach) and fear of failure ($\rightarrow$ mastery-avoidance, performance-approach, and performance-avoidance) on achievement goals. A closer inspection of a need for achievement (e.g., "I enjoy difficult work": Jackson, 1974) and fear of failure (e.g., "When I am failing, I worry about what others think about me": Conroy, 2001) would seem to suggest the sharing of similar attributes that emphasize and encourage enactive learning experiences. Characteristics defining one's fear of failure and/or need to achieve in a subject matter would, in this sense, mobilize both cognitive and motivational processes – a student, for example, may feel compelled to resort to necessary means in educational settings to learn and excel, academically. Our theoretical contention indicates that enactive learning experience may, perhaps, coincide with these two constructs, dynamically, to influence students' achievement goal orientations. In a similar vein, however, an alternative positioning may also exist, whereby a need for achievement and fear of failure influence students' learning experiences and performance accomplishments.

From an educational perspective, structural validation of the positive impact of enactive learning experience has some major implications for educators and researchers to consider. We know from the empirical literature that

the social milieus (e.g., classrooms, schools) often impart specific messages that emphasize the saliency of certain goal types (e.g., a preference for mastery and deep learning) (Ames, 1992; Anderman & Midgley, 1997; Urdan, 2004; Urdan, Kneisel, & Mason, 1999). Schools may, for instance, design and structure instructional policies and pedagogical practices that devalue the importance of normative evaluation practices, competitions, and achievements (e.g., reducing individualized tests and quizzes). Our findings, similarly, suggest the possibility of using enactive learning experiences as a premise to emphasize and/or encourage certain goal orientations. A preference for students to orientate towards mastery-approach goals would stipulate a requirement in learning tasks and activities that draw in mastery criteria. A performance-approach goal orientation, in contrast, would require an emphasis on cultivation of normative evaluation standards.

In essence, from daily classroom settings, there is credence to foster and encourage the saliency of positive learning experiences and personal accomplishments as these also influence students' intrinsic motivation for learning. This finding, enactive learning experience → intrinsic motivation, is not unexpected, given that enactive learning experiences serve as a focal point for continuing cognitive and motivational processes. Repeated successes in an academic subject (e.g., first-year educational psychology), for example, may instill an appreciation, positive task values (e.g., perceived usefulness), and intellectual curiosity for learning. Bandura's (1986, 1997) social cognitive theory and previous findings (e.g., Britner & Pajares, 2006; Lent et al., 1991; Liem et al., 2008; Pajares et al., 2007; Phan, 2012b) would also suggest a heightened sense of personal self-efficacy beliefs, resulting from positive learning experiences and academic achievements. This self-belief for learning, coupled with the notion of personal interest and intellectual curiosity, is likely to orientate students towards intrinsic motives.

The Potency of Achievement Goals and Intrinsic Motivation

The findings we obtained, in part, reflect the recent studies in achievement goals, using the 2 × 2 model as a basis for conceptualization. We found from SEM that both mastery-approach and mastery-avoidance goals exerted positive and negative effects on intrinsic motivation, respectively. Elliot and Murayama (2008), in contrast, reported the positive effect of mastery-approach and negative effect of performance-avoidance goals on intrinsic motivation. Considering this line of evidence, collectively, there is clearly a demarcation in the valence dimension of achievement goals in terms of consequences. It would seem to suggest, in this analysis that the *approach* aspects (e.g., mastery-approach) relate positively to intrinsic motivation, whereas the *avoidance* aspects (e.g., mastery-avoidance) relate negatively to intrinsic motivation. What is interesting, however, as a point of comparison, is that there is a null association between performance-approach goals and intrinsic motivation. This lack in statistical significance, again, may not be of surprise, given the dichotomous characteristics of the two constructs.

In terms of consistency, comparing the four achievement goal types, we note that only performance-approach goals influenced academic achievement. This finding is consistent with those of Elliot and Murayama's (2008) and Elliot and Thrash's (2010), whereby the authors also found positive associations between the two constructs. In contrast, however, we reported a lack in association between performance-avoidance goals and academic achievement, whereas Elliot and colleagues' (Elliot & Murayama, 2008; Elliot & Thrash, 2010) findings indicated negative effects of performance-avoidance goals (e.g., β = -.48: Elliot & Murayama, 2008).

A notable consistency, too, is the lack in associations between the mastery goal types and academic achievement. This non-statistical significance, again, is not unexpected given the nature and characteristics of mastery goals. Academic achievement and exam performances, as inferred from previous studies (Elliot & Murayama, 2008; Elliot & Thrash, 2010), entail or may entail more emphases pertaining to social comparison and performance-

based criteria. Academic excellence, as reflected by exam performances, say, may not necessarily detail interesting contents and aspects for mastery learning. Messages informing students the importance and value of academic achievements, based normative evaluations, consequently motivate a preference for performance-approach goals. Our finding and those of Elliot and Murayama's (2008) and Elliot and Thrash's (2010), in general, emphasize and discern the definition dimension of achievement goals. The performance type goals, drawn from the AGQ-R (Elliot & Murayama, 2008), are more likely to predict achievements that are non-mastery based.

Differing from the Elliot and Murayama (2008) study, we noted a negative association between intrinsic motivation and academic achievement. The tenets and characteristics of intrinsic motivation are as such that we would negative predictive effects, given that achievements are also defined by performance-based and social comparison criteria (e.g., periodic quizzes in a semester). Quality learning based on mastery criteria, in contrast, is more likely to relate positively with intrinsic motivation, and negatively with extrinsic motivation. The negative impact of intrinsic motivation on academic achievement from our investigation differs from Elliot and Murayama's (2008) conceptualization, which detailed a non-association between the two constructs. From an educational perspective, recognizing the potency of intrinsic motivation has implications for educators and students, alike. Structuring contents and subject activities that instill interest, authenticity, and curiosity could serve to motivate students, intrinsically, with a view to study and learn for non-achievement purposes.

In Totality: Antecedents and Consequences of Achievement Goals

A key finding from the present study, as depicted in Figure 2, is the ascertainment in trajectories from enactive learning experience to academic achievement, via the two mastery goal types and intrinsic motivation. This tracing in cognitive and motivational processes of learning is important, theoretically, and has received considerable traction from researchers, recently (Elliot & Murayama, 2008; Fenollar et al., 2007; Harackiewicz et al., 2008; Liem et al., 2008; Simons, Dewitte, & Lens, 2004). Overall, for example, the trajectory that details enactive learning experience → mastery-approach goals → intrinsic motivation → academic achievement illuminates the central roles of achievement goals and intrinsic motivation. What is interesting perhaps, arising from this structural validation is the fact that students' learning operates in a system of change. Longitudinal examination with multiple occasions in data collection may provide fruitful information into the temporally displaced effects of the variables under investigation. The conceptual model that we proposed and tested could, for example, be replicated to encompass a longitudinal design. This methodological approach, used more recently in motivational research (e.g., Bong, 2001; Durik, Lovejoy, & Johnson, 2009; Harackiewicz et al., 2008; Phan, 2012b), could provide insights into the temporally displaced and lasting effects of achievement goals. How lasting is the predictive effect of mastery-approach goals?

In totality, from Figure 2, the present study has validated the 'consequent-and-antecedent' of achievement goals. This depiction in relationships is consistent with previous studies (e.g., Elliot & Murayama, 2008; Elliot & Thrash, 2010; Fenollar et al., 2007; Harackiewicz et al., 2008; Liem et al., 2008), which highlight the central roles of achievement goals. More importantly, from a global perspective, our integrated model enabled an understanding of antecedents and how various achievement goal types, in combination, predicted the enhancement of academic achievement. This integration, detailing the situational placement of the 2 × 2 model of achievement goals provides a premise for researchers to include other variables for examination. Apart from intrinsic motivation and academic achievement, say, it would be of considerable interest for researchers to identify other adaptive outcomes (e.g., effort expenditure) of the four achievement goal types.

Conclusion

In general, the use of the AGQ-R (Elliot & Murayama, 2008) in the present study has yielded some empirical evidence, detailing the characteristics of the 2 × 2 model of achievement goals. Significantly, our investigation has provided grounding, in part, for the continuation in cross-cultural study of the AGQ-R and Elliot and colleagues' (e.g., Elliot & Murayama, 2008; Elliot & Thrash, 2010) articulation of the antecedent-achievement goals-consequence theoretical model. There have been very few studies, to date, that have explored the four types of achievement goals within one theoretical-conceptual model of academic learning. One notable aspect entailed in this investigation, in particular, involved our attempts at refinement in theory building, with the use of statistical testing of *a priori* and *a posteriori* models.

It is important to recognize that there are some major limitations in this study, which require further research development. We acknowledge, in the first instance, that the goodness-of-fit index values for the final solution were relatively average and less than optimal, from expected methodological standards (e.g., CFI value > .95, RMSEA < .080). The complexities of the models tested (e.g., Model M_4) could have, in this case, accounted for the 'average' solutions observed. MI values, indicative of potential improvement, were available for us to consider. Having said this, though, we opted not to refine Model M_2 with the inclusion of other paths, as there was very few, if any, theoretical justification. On this basis, our final model for acceptance and discussion may not necessarily define or reflect the intricacy in relationships between the variables. We encourage researchers to consider replicating the final solution that we discussed with other cultural samples of different educational levels. Questions could also be asked about the AGQ-R (Elliot & Murayama, 2008) and whether this measure, at present, is definitive and methodologically sound. A refinement in measurement is a possibility, especially given that we also found some correlated errors between the items. The cross-cultural validation of our conceptual model with other samples, including enactive learning experience as an antecedent is another possibility for consideration.

Expanding our conceptual model, especially given the findings that we have obtained, researchers could also include other variables for statistical testing. For example, the non-statistical significant effects of mastery goals on academic achievement may compel the inclusion of quality learning outcomes that reflect mastery and non-competitive criteria. Does a mastery-approach goal orientation explain and enhance understanding of authentic and daily-relevant learning tasks? At a more global aspect of educational practices, researchers could focus on academic engagement and disengagement towards schooling. Academic engagement, as a theoretical orientation, has currency given its potent effects on non-academic, achievement-related outcomes (e.g., anti-social behaviors) (Fredricks, Blumenfeld, & Paris, 2004; Salamonson, Andrew, & Everett, 2009; Willms, 2003). Similar to our previous questioning, for example, does a mastery-approach goal orientation relate positively with academic engagement? Is academic disengagement a manifestation of performance-avoidance goals?

Finally, from a methodological point of view, our research investigation was limited for its cross-sectional nature. One major caveat that we made in this article is our usage of the term 'effect' to describe the relations between the variables. This terminology, from the perspective of SEM (Marsh & Yeung, 1997; Rogosa, 1979), is rather erroneous and may, in fact, misconstrue the patterns in relationships between the variables under investigation. As a point of justification, our mentioning of the 'effect' terminology is drawn from SEM procedures that enable us to identify and decompose direct, indirect, and total effects (Byrne, 1998; Chou & Bentler, 1995; Loehlin, 2004). Having said this, however, we contend that it would be more appropriate and methodologically sound for researchers to consider using multi-wave panel designs (e.g., Marsh & Yeung, 1997; Martin, Colmar, Davey, & Marsh, 2010;

Phan, 2011). Longitudinal examination, analyzed within the framework of SEM, is more advantageous as this methodological approach would allow us to explore the issues of causality and causal predominance (Marsh & Yeung, 1997, 1998). One avenue of inquiry, for example, may entail the possible impact of intrinsic motivation on mastery-approach goals. Intrinsic motives for learning may initiate and stimulate students to orientation towards mastery-approach goals. In a similar vein, the inclusion of extrinsic motivation may also account and predict performance-approach goals.

Notes

i) Per recommendation from previous researchers (Lent, Brown, & Gore, 1997; Lent, Lopez, Brown, & Gore, 1996), we formed aggregated scores by utilizing the following steps (see Lent et al., 1997, pp. 309-310): (i) single-factor solutions were fit to each scale (e.g., mastery-approach goal) by using exploratory factor analyses (EFAs), (ii) Item-factor loadings from EFAs were then used to form composite items, (iii) for each latent factor, depending on the number of items per scale (e.g., four items for each of the achievement goals subscales), items with the highest and lowest loadings were averaged to form the first indicator, items with the next highest and lowest loadings were averaged to form the second indicator, etc.

Given we wanted to minimize to three measured indicators: (i) the three negative valence items, reverse scored of the intrinsic motivation scale were aggregated to form the first indicator, whereas the other five items, using the above procedures (Lent et al., 1996, 1997), were aggregated to form the other two measured items (i.e., two + three), (ii) the six items of the enactive learning experience subscale, using the above procedures, were averaged to form three measured indicators, and (iii) the three items for each achievement goal were left unaggregated.

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