The Development of Achievement Goals throughout College:

Modeling Stability and Change

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Abstract

Emerging adulthood, defined for many by the college years, is an active period of personality development; less is known about goal change during these years. We investigated stability and change in the 2×2 model of achievement goals (Elliot & McGregor, 2001) over four years ($N = 527$). We evaluated rank-order stability, mean-level change, and tested *goal coupling* hypotheses – the idea that early changes in goals predict later change in other goals – using multivariate latent difference score models. Achievement goals show moderate rank-order stability over four years. Three of four goals demonstrated small normative declines, excepting performance approach goals. Change in mastery approach goals was associated with levels of the other three goals; these goals jointly acted to slow the decline of mastery goals. Trajectories for the other three goals were largely independent. Results suggest that goals are relatively stable individual differences during the college years.

Keywords: Motivation/Goals, Achievement Goals, Longitudinal Modeling, Latent Difference

Score Analysis

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Some students strive to outperform peers whereas others are more focused on mastering new skills. Still other students strive to strike a balance between pursuing both types of goals. These differences in motivational orientation are captured by the achievement goal construct, and research consistently suggests that achievement goals are associated with academic outcomes (see Senko, Hulleman, & Harackiewicz, 2011 for a recent review). Despite their importance, relatively little research has evaluated stability and change in these attributes over the course of a four-year college career. The current research fills this gap and tests whether changes in achievement goals are correlated.

The 2×2 model of achievement goals (Elliot & McGregor, 2001) is one of the most widely used frameworks for conceptualizing and measuring different achievement goals – a Web of Science search reveals that this seminal paper has already been cited over 620 times as of May 2013. This framework specifies that there are two dimensions underlying achievement goals – valence (approach vs. avoidance) and content (mastery vs. performance) – that when fully crossed produce four distinct achievement goals. Individuals can vary in their endorsement of each of these four goals. *Mastery approach* goals capture striving to learn course material and developing competence, whereas *mastery avoidance* goals capture the motivation to avoid failing to master material. *Performance approach* goals capture the desire to outperform others and demonstrate competence, whereas *performance avoidance* goals capture the motivation to avoid the appearance of incompetence and poor performance relative to peers.

The Development of Achievement Goals during the College Years

The period of the late teens through the 20s (often referred to as emerging adulthood;

Arnett, 2006) overlaps with the college years for many individuals and is an active period of personality development (Roberts, Walton, & Viechtbauer, 2006; Robins, Fraley, Roberts, & Trzesniewski, 2001; Vaidya, Gray, Haig, & Watson, 2002). This is a period in the life span when individuals leave their families of origin and gradually adopt traditional adult roles (e.g., committed romantic partner, full-time worker). It is often characterized as a time of self-focus, identity exploration, and freedom (Arnett, 2006). Against this backdrop, it is possible to consider the development of achievement goals across the college years.

Mean-level differences in levels of achievement goals provide insights into normative developmental patterns. Roberts, O'Donnell, and Robins (2004) noted that college is a time when individuals clarify their values and interests and develop a more realistic sense of the attainability of their goals. At the end of their time in college, individuals tend to identify with a smaller set of key life goals (e.g., relationship and economic goals) than they did at the start of their college experience. This process results in a mean-level decline for many life goals as more students are decreasing rather than increasing their goal commitments (Roberts et al., 2004). Likewise, Salmela-Aro, Aunula, and Nurmi, (2007) found that goals related to education decreased substantially as students concluded their university studies. In a cross-sectional study of British university students, Lieberman and Remedios (2007) found that mastery approach, mastery avoidance, and performance avoidance goals are lower in fourth year students than first year students, whereas performance approach goals are somewhat higher among fourth years compared to first years. Together, these studies therefore generate expectations for mean-level declines in achievement goals over the college years.

Mean-level differences are only one developmental consideration. Another important issue concerns differential or rank-order stability, which reflects how much individuals maintain

their relative standing on achievement goal measures over time. Rank order stability is conceptually and statistically distinct from mean-level change (see Roberts et al., 2006 for a discussion), and it is frequently evaluated by considering test-retest coefficients. If retest correlations are positive and relatively high, this suggests that individuals tend to maintain their ordered standing on a characteristic over time. If correlations are near zero then goal standing is ephemeral such that goal endorsement at one time point does not predict future goal endorsement. A high level of rank-order stability implies that stable factors may be supporting the maintenance of individual differences in goal endorsement over time (Roberts et al., 2004).

A number of perspectives support the prediction the achievement goals should exhibit consistency across time during college. First, previous work suggests that personality and temperamental traits are important contributors to achievement goals (Elliot, 2006; Elliot & McGregor, 2001; Elliot & Thrash, 2002, 2010; Corker, Oswald, & Donnellan, 2012; Sheldon, Cheng, & Hilpert, 2011). Individuals with high levels of Extraversion, positive emotionality, and Conscientiousness tend to adopt performance and mastery approach goals, whereas those with high levels of Neuroticism and negative emotionality tend to adopt performance and mastery avoidance goals. These broader personality traits show relatively high levels of differential stability throughout the college years (Robins et al., 2001; Vaidya et al., 2002), potentially contributing to consistency in goal endorsement.

Second, cognitive perspectives on achievement goals also predict stability by emphasizing the idea that individuals process information in ways that are congruent with their preexisting cognitive representations (Greenwald, 1980). For example, there is evidence that endorsing a goal focuses perception and attention on goal relevant stimuli in a way that ultimately perpetuates endorsement of the goal (Elliot & Harackiewicz, 1996). Individuals who

adopt mastery approach goals may be more attentive to stimuli that provide feedback on that goal (e.g., feelings of engagement and interest in course material), but they may be less attentive to stimuli that are irrelevant to the goal (e.g., performing worse on an assignment relative to peers). This kind of biased information processing would promote consistency in goal endorsement.

A third perspective emphasizes the academic context of college. Previous research indicates that normative grading structures are associated with the endorsement of performance goals (Urdan & Schoenfelder, 2006). Such normative evaluation structures appear to characterize many college courses. This potential uniformity of the college grading environment may generate a fairly consistent situational press for goal stability across all four years of college, perhaps especially for performance goals.

In sum, three lines of evidence (temperamental, cognitive, and environmental) converge to support the prediction that achievement goals will be relatively stable over the college years. In addition, previous research on general goal changes suggests mean-level declines. As it stands, relatively little empirical evidence has tested these ideas using data across four-years of a college career. However, extending knowledge of the development of achievement goals during this period is important for both theoretical and practical reasons. At a theoretical level, understanding stability and change in achievement goals sheds light on how goal dynamics operate in complex systems by following the same students across a developmentally significant phase of the life span when identities are consolidating. At a practical level, educators may wish to understand the normative patterns of development to better understand the motivational orientations of their students. An understanding of normative patterns can also provide insights into whether interventions intended to produce changes in achievement goals to facilitate long-

term success and intrinsic motivation are needed.

An Empirical Summary of the Existing Literature of Achievement Goal Development in College Students

Although no study has previously evaluated the development of achievement goals across all four years of college, we are aware of six published papers detailing nine samples that have investigated issues related to stability and change in achievement goals over briefer spans of time (typically one semester) during the college years (Ciani, Sheldon, Hilpert, & Easter, 2011; Fryer & Elliot, 2007; Jagacinski, Kumar, Boe, Lam, & Miller, 2010; Muis & Edwards, 2009; Senko & Harackiewicz, 2005; Shim, Ryan, & Cassady, 2012)^{1, 2}. To obtain a more precise estimate of the stability and change in achievement goals during this interval, we meta-analyzed these published studies ($k = 9$; $N = 1,433$) using the procedures of Hunter and Schmidt (2004). These results will provide a context for considering the development of achievement goals across four years of college.

The meta-analytic summary of mean-level changes in the college student research is displayed in Table 1, expressed in terms of Cohen's d . A considerable amount of variability was observed across studies, but there were a few consistent mean-level trends. Mastery approach goals decreased in the majority of studies (average $d = -.39$, 95% CI = $[-.30, -.48]$). In general, performance approach goals did not change to an appreciable degree (average $d = .00$, 95% CI = $[-.12, .13]$). Performance avoidance goal levels increased on average, but the effect was small (average $d = .14$, 95% CI = $[.002, .29]$). There were just two studies that examined mastery avoidance goals (Ciani et al., 2011; Fryer & Elliot, 2007, Study 3), and neither study found evidence of mean-level change ($ds = -.03$ and $.06$, respectively). On the whole, then, the existing evidence suggests that students' mastery approach goal orientations typically decrease over the

course of a semester, whereas their performance avoidance goal orientations increase to a small extent. The other two achievement goals did not show appreciable mean-level changes in these short-term studies.

Stability coefficients for a one-semester time interval were relatively high for the three goals that were assessed in eight of the studies (see Table 1; Shim et al., 2012, did not present rank-order stabilities³). The average r across mastery approach, performance approach, and performance avoidance goals was .64. By comparison, for example, the average eight-week stability estimates across all of the Big Five personality traits was .73 (based on data in Anusic, Lucas, & Donnellan, 2011) and .65 over an interval of approximately 2.5 years (based on Vaidya et al., 2002). Thus, goals appear to be somewhat less stable than the Big Five dimensions in the short term, consistent with the idea that although goals are rooted in generally stable temperamental characteristics, they are nonetheless open to contextual and developmental influences. Two studies have investigated the stability of mastery avoidance goals in college students, and there are hints that mastery avoidance goals might have lower rank-order stability than the other three goals, but it is difficult to draw a firm conclusion given the lack of data. The stabilities were $r = .33$ (Ciani et al., 2011) and $r = .57$ (Elliot & Fryer, 2007, Study 3). However, the stability of mastery avoidance goals is an issue that needs further study given the paucity of data.

The Present Study

In sum, achievement goals are important constructs that are likely to exhibit both stability and change during the college years. Existing theory and research suggest there should be normative (i.e., mean-level) changes in each goal but that goals should exhibit an appreciable degree of rank-order stability over time (e.g., Fryer & Elliot, 2007). Previous research has

examined goals in the context of specific college classes by studying change across two time points (often over the course of a single semester). The current research extends this work by evaluating stability and change within the broader context of the whole college experience using a sample of college students randomly selected from all incoming students at a large Midwestern university in the fall of 2005 ($n = 527$).

In addition, we use an integrative analytic framework, the *latent difference score* model (McArdle 2001; 2009) to test for connections between the trajectories of difference achievement goals. This model permits rigorous tests for the presence of *coupled* patterns of change, which are correlations between the trajectories of two different goals. If changes in different achievement goals are relatively independent, there is further evidence of the distinctiveness of each goal. If goal changes are associated (or coupled in the language of our statistical model), there is evidence consistent with the possibility that a common source (e.g., negative feedback) accounts for changes in multiple goals. Evidence of goal coupling may also suggest that certain goals exert influences on each other over time. Indeed, proponents of the *goal switching hypothesis* have suggested that individuals with particularly strong levels of performance approach goals are more likely to increase in their levels of performance avoidance goals in response to the negative feedback that often characterizes challenging academic contexts (e.g., Dweck, 1986; Midgley, Kaplan, & Middleton, 2001). Although existing studies of college students suggest that goal switching of this type is relatively rare (Muis & Edwards, 2009; Senko et al., 2011), it remains to be seen whether there will be evidence of this or other kinds of goal couplings over a longer period of time than one semester.

Method

Participants and Procedure

Of 1699 students who were randomly selected from the incoming first-year class in the Fall of 2005, 527 participated in the study (31% response rate). Students selected for participation were invited to complete the study via e-mail, and participants were paid \$10 for each wave of data collection. Participants completed the target measures (which were embedded in a large battery of other measures unrelated to the current research) online up to four times over the course of their college career: once in the fall and spring semesters of 2005-2006 academic year and again in the spring semesters of their second (2006-2007 academic year) and fourth years (2008-2009 academic year). Sixty-six percent of participants were female, and the ethnicity of the sample was approximately 73% White. The entering class in 2005 was 57% female and 79% White; these values were statistically different than our obtained percentages according a chi-square test, indicating that women and ethnic minorities were slightly overrepresented in the sample.

Materials

Participants completed the Achievement Goals Questionnaire (AGQ; Elliot & McGregor, 2001) at each assessment using a 1 (strongly disagree) to 5 (strongly agree) scale. The items were modified to reflect the broader college context rather than any individual class (e.g., the phrase “in this class” was changed to “in my classes”). The AGQ consists of 12 items measuring four different types of achievement goals: performance approach (e.g., “It is important for me to do well compared to others in my classes”), performance avoidance (e.g., “I just want to avoid doing poorly in my classes”), mastery approach (e.g., “I want to learn as much as possible from my classes”), and mastery avoidance (e.g., “Sometimes, I am afraid that I may not understand the content of my classes as thoroughly as I’d like”). This scale has been well-validated (see, e.g., Elliot & Thrash, 2002).

Results

We will first consider whether there was evidence for mean-level change in the achievement goals over four years of college, we will then consider evidence for rank-order stability, and finally, we will consider different shapes of change as well as the possibility of goal coupling using latent different score modeling.

Initial Comments and Plan of Analysis

All analyses were conducted in a structural equation modeling framework using Mplus (version 4.1, Muthén & Muthén, 2006) using the maximum likelihood (ML) estimation procedure. As with all longitudinal studies, attrition was a concern; 28% of participants missed none of the four assessments, 30% missed only one assessment, 20% missed two assessments, and 22% missed three assessments. To deal with the missing data, we used a full information maximum likelihood (FIML) approach. FIML gives unbiased parameter estimates when data are missing completely at random or missing at random and is viewed as the “state of the art” even if data are not missing at random (Schafer & Graham, 2002). (Missing at random, in a statistical sense, means that missingness is systematic and is predictable from one or more variables in the model.) For all analyses, we considered absolute model fit using standard fit statistics; a model had acceptable fit if CFI was at least .95, RMSEA was .06 or less, and SRMR was no greater than .08 (Hu & Bentler, 1999). Descriptive statistics (mean, standard deviation, alpha reliability coefficients) for each scale at each time point are in Table 2.

Measurement Invariance

We first conducted an analysis of measurement invariance to ensure that goals were being measured in the same way over time to make certain that conclusions about quantitative changes in the goals are meaningful. Accordingly, we evaluated measurement invariance within

the framework of confirmatory factor analysis (Brown, 2006; Schmitt & Kuljanin, 2008) using a series of nested model comparisons. For nested model comparisons, we evaluated relative fit using ΔCFI along with $\Delta\chi^2$ because $\Delta\chi^2$ is dependent on sample size, whereas ΔCFI is not (Brannick, 1995; Cheung & Rensvold, 2002). Relative fit was considered acceptable if ΔCFI was $\leq .01$ (Cheung & Rensvold, 2002; Murayama, Elliot, & Yamagata, 2011). We first specified a configural invariance model (Model 1) with sixteen factors (one for each of the four achievement goals at each of the four time points: semesters one, two, four, and eight). Each goal was indicated by the three items that address the goal in the achievement goals questionnaire, and for identification, the loading for the first item of each scale was fixed to one. We also allowed correlations between the residuals for the same items across different waves (a typical specification in longitudinal models; McArdle, 2009).

This initial model tests whether the achievement goal scales have the same general factor structure over time (e.g., a single factor for each of the four goals in the 2×2 framework) and serves as a baseline for comparisons with more restrictive models. Three models were then specified in which the loadings of the items were fixed to be equal over time (Model 2; weak metric invariance), the intercepts of the items were fixed to be equal over time (Model 3; strong metric invariance), and the error variances and covariances were fixed to be equal over time (Model 4; strict metric invariance). These models test whether the different items are equally good indicators of the latent construct at each measurement occasion (Model 2), whether the scale of measurement is being used in the same way over time (Model 3), and finally whether the reliability of the items is the same over time (Model 4). Strict invariance (i.e., Model 4) is rarely found in practice and was not required for the planned analyses.

The configural invariance model had an adequate fit to the data, $\chi^2(888) = 1276.48, p <$

.001, CFI = .958, RMSEA = .029, SRMR = .053. Adding the constraints associated with Models 2 and 3 did not significantly worsen model fit according to the Δ CFI index (Δ CFI = .005, $\Delta\chi^2(24) = 61.91$ for Model 2 compared to Model 1, and Δ CFI = .010, $\Delta\chi^2(24) = 115.60$ for Model 3 compared to Model 2). However adding the constraints in Model 4 seemed to worsen model fit to an unacceptable level (Δ CFI = .011, $\Delta\chi^2(96) = 204.13$ compared to Model 3). All of the models had adequate fit according to the RMSEA and SRMR statistics (all RMSEAs $\leq$.034; all SRMRs $\leq$.063).

Taken together these analyses suggest that there is evidence for strong factorial invariance in the measurement of achievement goals, meaning that the same constructs are assessed in the same way over time albeit with differing levels of reliability. Because of the complexity of models, all subsequent analyses were conducted using observed variables (i.e., scale averages) for each of the achievement goals, as opposed to modeling goals as latent variables indicated by their items (DiStefano, Zhu, & Mindrila, 2009; Wackwitz & Horn, 1971).

Mean-Level Change

We next considered change in the achievement goals over the four-year period – separately for each goal – using a linear latent growth curve model. Linear change would imply that change is occurring at a constant rate throughout the study. Therefore, slope factor loadings were set to 0, .1429, .4286, and 1 to reflect the proportion of change that should have occurred by a given assessment under a linear model (i.e., 0/7 at Semester 1, 1/7 at Semester 2, 3/7 at Semester 4, 7/7 at Semester 8). The mean slope therefore reflects the total amount of linear mean-level change across the four-year interval. We also fixed the time specific residuals to be equal across all four time points.

Results indicated that mean-levels of performance approach goals did not change ($b =$

0.002, $t = 0.029$, $p > .05$), but mean-levels of the other three goals decreased over time.

Performance avoidance goals decreased the most ($b = -.573$, $t = -9.005$, $p < .001$), followed by mastery avoidance goals ($b = -.291$, $t = -4.832$, $p < .001$), and mastery approach goals ($b = -.216$, $t = -4.252$, $p < .001$). Similar results are displayed in Table 2 in terms of Cohen's d effect sizes from the first to the last assessment (based on raw M s and SD s). The latent means for the four goals were 3.491 (performance approach), 3.735 (performance avoidance), 3.940 (mastery approach), and 3.671 (mastery avoidance).⁴

We also tested whether there was statistically significant variability in the slope factors (i.e., we tested whether the random effect was significant) to evaluate whether there was evidence of individual differences in rates of linear change. These differences were evident for performance approach goals (variance of the slope = .285, $t = 3.575$, $p < .001$), performance avoidance goals (.330, $t = 3.076$, $p < .01$), mastery avoidance goals (.202, $t = 2.040$, $p < .05$), and mastery approach goals (.147, $t = 2.251$, $p < .05$).

Thus, three out of four achievement goals showed moderate normative decline during four years of college, consistent with previous research suggesting that many life goals, including educational goals, decline over the college years (Roberts et al., 2004; Salmela-Aro et al., 2007). Performance approach goals were the only goal that did not decline at the mean-level, suggesting that goals about performing well compared to other students remain at a high level throughout college. Furthermore, there were indications of individual differences in change for the four achievement goals.

Rank-Order Stability

We first consider stability coefficients between the first two occasions, which occurred in the beginning of the fall and spring semesters in the first year of college to compare to previous

findings that considered stability within a single semester. Correlations between the scales from Semester 1 to Semester 2 are displayed in Table 2 (these correlations are estimates based on FIML treatment of missing data). A full correlation matrix is displayed in the Appendix. On the whole, stability coefficients from the first to the second semester of college were comparable with the meta-analytic results. From semester one to semester two, performance approach goals had the highest level of stability ($r = .65$), and this estimate was within the confidence interval of the meta-analytic results. Mastery approach goals were also fairly stable ($r = .58$), but this estimate fell below the lower bound of the confidence interval for the meta-analytic estimate. Similarly, performance avoidance goals were fairly stable ($r = .54$), but this estimate also fell below the lower bound of the meta-analytic confidence interval. Mastery avoidance goals appear to be less stable than the other three goal types; the semester one to semester two stability estimate was only $r = .37$. On the whole, these results suggest that different achievement goals about college broadly tend to show similar to slightly lower levels of short-term stability to achievement goals pertaining to individual courses. Finally, considering stability over the four year measurement interval, performance and mastery approach goals were the most stable ($r_s = .47$ and $.49$), whereas performance and mastery avoidance goals were less stable ($r_s = .37$ and $.32$).

Establishing Shapes of Change

Beyond evaluating simply whether goals are changing, an important question concerns how goals are changing. Univariate latent difference score models (McArdle, 2001; 2009) can answer the question of whether change is occurring at a constant rate (i.e., linearly) or if the shape of change is more complex. The basic latent difference score model is illustrated in Figure 1 for a single achievement goal and is described here. First, each of the dependent variables (Y_1

to Y_8) represents the average scale score of each goal at each occasion of measurement. The variables ΔY_2 to ΔY_8 represent the change in goals from one time point to the next. To establish equal intervals of measurement, phantom latent variables were specified for the semesters in which data were not collected (3, 5, 6, and 7). This approach allows us to make the assumption that the amount of change that is occurring between semester 4 and semester 8 (i.e., the third and fourth waves of data collection) is four times the amount that is occurring between semester 1 and semester 2 (i.e., the first and second waves of data collection). The residual associated with each observed indicator was fixed to be equal over time.

Similar to a linear growth model, the latent variable G_0 represents the average initial level of the goal for an individual, and the variance associated with this parameter tests if this initial level varies across individuals. G_1 represents the amount of linear change in goals between each time point across individuals, and this factor is identified by fixing the loadings of ΔY_2 to ΔY_8 on G_1 to 1. The variance associated with slope (G_1) tests whether individuals vary in their amount of linear change. The level (G_0) and slope (G_1) variables were allowed to covary (ρ_{01}). Finally, the parameter β represents proportional (i.e., auto-regressive) change. This portion of the model is dynamic (i.e., recursive), and it allows for the fact that an individual's current change in goal level depends on his or her goal level at the previous time point. A negative β would indicate that change is slowing over time, whereas a positive β would indicate that change is accelerating over time. If β is fixed to zero, only linear change is allowed, and the model is equivalent to the linear growth models presented above. If the slope (G_1) is fixed to zero, only proportional change is allowed. If both the slope and β are fixed to zero, a no-change model is specified.

A series of latent difference score models were conducted to establish the description of change for each of the achievement goals separately. First, for each goal, a no-change baseline

model was specified such that G_1 (mean and variance), β , and the covariance between G_0 and G_1 were fixed to zero. The fit of this model was then compared to a proportional-change only model (i.e., mean and variance of $G_1 = 0$, and $\rho_{01} = 0$), a linear-change only model (i.e., $\beta = 0$), and a model with dual-change (i.e., β was freely estimated, and G_1 was freely estimated). A proportional-change only model asserts that change results only from one's prior level of a goal (i.e., change is only autoregressive). A dual-change model allows both proportional and linear change – that is, change results from one's prior goal levels as well as normative development. By testing these models in a nested fashion, we can assess which one is the most parsimonious model that fits the data adequately. To the extent that a model with more free parameters does not fit the data significantly better than a model with those parameters fixed to zero, the more parsimonious model is considered to have a better fit.

The fit statistics for these nested models are displayed in Table 3. The results show that for both of the avoidance goals, each nested model fit significantly better than the previous models, indicating that the most complex (dual-change) model – which allows both linear and proportional change – fits the data best for these goals. In contrast, a linear-change only model was sufficient for both of the approach goals. For performance approach goals the average amount of change was close to zero, but the linear change only model fit better than the no-change model because there was significant variability in the slope that was being forced to zero in the no-change model. For mastery approach goals, there was evidence for linear decline in goal endorsement over time, but the final model did not fit the data as well as it did for the other goals (as shown below, this likely is because early levels of the other goals are associated with later change in mastery approach goals).

The results imply that levels of both types of avoidance goals decline more rapidly early

in college than later. Performance approach goals remained unchanged on average (but there was variability in the slope parameter), and mastery approach goals de-escalated linearly (but there was room for improvement in the model).

Tests of Goal-Switching Hypotheses

Having considered mean-level changes and what shape of change had the best fit to the data, we tested for goal couplings using multivariate latent difference score models to evaluate evidence for goal coupling (McArdle, 2001; 2009). The major purpose of these models is to test for coupled changes in goals – that is, instances in which earlier levels of some goals are associated with change in other goals. These models take the basic univariate model depicted in Figure 1 and extend it to the multivariate case, testing differing patterns of associations between the different achievement goals. We tested coupled changes to determine whether there was evidence for a particular pattern of change (i.e., early decline in performance approach goals that is associated with later growth in performance avoidance goals, as well as the possibility of other patterns of linked change).

We specified a series of nested multivariate latent difference score models to test this hypothesis of goal influence over time. To conduct the test, a no-coupling baseline model was specified in which all four achievement goals were modeled using the basic change shapes identified in the analysis above (i.e., dual change for the avoidance goals and linear change only for the approach goals). The level and slope factors for each goal were allowed to freely correlate with the levels and slopes of the other goals, and goals measured at the same wave were allowed to correlate with one another (these correlations were also fixed to be equal over time).

This no-coupling model was then compared to four different models in which different patterns of model couplings were specified (see Table 4). Again, model couplings are paths from

one goal at each time point to the latent difference score of another goal at later ($t+1$) time points. The presence of such couplings indicates that levels of a goal at earlier time points are predicting change in another goal at later time points. Couplings were tested simultaneously for each goal. For example, for the first coupling model listed in Table 4 (couplings to performance approach), couplings from mastery approach, mastery avoidance, and performance avoidance to performance approach were all tested at the same time. A significant chi-square difference test comparing the baseline model to each coupled model indicates significant coupling effects for that goal. The couplings from one goal to another goal (e.g., from mastery avoidance to mastery approach) were fixed to be equal over time, a necessary choice due to the use of phantom variables to create equal intervals of measurement.

Overall, the results regarding goal influence suggest that mastery approach goal change was influenced by earlier levels of the other three goals and that the combined influence of these goals had the effect of slowing the decline of mastery approach goals over time. There was little evidence for linked changes for the other three goals (performance approach, performance avoidance, and mastery avoidance), implying that the trajectories of these goals were relatively independent. However, the result that early changes in performance approach, performance avoidance, and mastery avoidance goals were associated with later change in mastery approach goals indicates that the trajectory for this goal was dependent on changes in these other goals. This finding may suggest that changes in mastery approach goals might be driven by a common process that also affects the other goals, a possibility which we explore in the discussion.

The model parameters for the final model (couplings to mastery approach) are displayed in Table 5. Examination of the values of the individual coupling parameters revealed negative effects of levels of mastery and performance avoidance goals and slightly smaller positive effects

of performance approach goals on changes in mastery approach goals. This result implies that decreases in mastery and performance avoidance goals were associated with slowed decline in mastery approach goals. That is, the normative declines in both types of avoidance goals helped to temper the decline of mastery approach goals. Further the high levels of performance approach goals that remained constant over time were associated with slight positive change in mastery approach goals. Given these parameters, the trajectory of all four goals for the typical individual is plotted in Figure 2. Overall, it can be seen that the coupling parameters had the effect of slowing the decline of mastery approach goals as time progressed.

Discussion

The purpose of the current research was to evaluate the development of the achievement goals in Elliot and McGregor's (2001) 2×2 model across four years of college. We examined evidence for mean-level change, rank-order stability, and goal coupling, each of which is considered in turn, followed by a discussion of implications for educators and limitations of the research.

Mean-Level Change

In terms of mean-level trends, performance avoidance, mastery avoidance, and mastery approach goals showed mean-level declines over the course of college. Performance approach goals did not follow this pattern, as they remained constant across four years of college. These trends were evident when evaluating the shapes of change analyses and when considering simple *d*-metric effect sizes from the first time point to the last (Table 2). It is useful to note that tests of measurement invariance suggested that these changes were not an artifact of changing measurement properties. In general, achievement goals, like life goals, tend to show normative decline during the college years (see, e.g., Roberts et al., 2004; Salmela-Aro et al., 2007).

An interpretation of these mean-level trends reveals a mixed picture. The lack of a decline in performance approach goals might be considered a positive outcome given that higher levels of performance approach goals are often predictive of academic success (Corker & Donnellan, 2012; Senko et al., 2011). On the other hand, mastery approach goals, which are widely considered to be important for outcomes such as engagement and learning, declined over the course of college, and such a decline could be viewed as a negative outcome. A possible explanation for the finding that performance approach goals seem to remain steady throughout college is that many post-college rewards (e.g., getting a good job) may be viewed as tied to outperforming others, and it may be that this high perceived instrumentality contributes to maintenance of performance approach goals in terms of mean-levels over time. Were this true, it suggests that emphasizing the instrumentality of mastery approach goals may provide an avenue for encouraging the maintenance of these goals over time. For instance, educators could emphasize the importance of gaining high-level understanding of the course material for the purpose of later use in a given career path. However, such an emphasis on the instrumentality of learning may be inconsistent with the intrinsic motivational basis of mastery approach goals. That is, if students endorse mastery approach goals because they value learning as an end in itself, emphasizing the instrumentality of learning may misfit that orientation, ultimately leading to decreases in goal striving (Higgins, 2000).

However, the declining mean-levels of both types of avoidance achievement goals is likely viewed as positive trend, given the association of these goals with negative academic outcomes. These results seem to indicate that students are less concerned about seeming incompetent or failing to develop their competence as they progress through college. An explanation for the decline in these goals might be that these declines could stem from increases

in self-efficacy that develop as students become more comfortable with the expectations of the college environment. Such logic would be consistent with previous research that has found a link between avoidance goals and low self-efficacy (e.g., Elliot & McGregor, 1997).

Finally, it is potentially interesting that the majority of the declines for all three of the goals with mean-level changes seemed to occur in the first two years of college, during which time students are typically completing their general education requirements and selecting a major. In the later years, when students had presumably already settled on a major, the changes were less pronounced. This information could be used to inform the timing of any efforts to bolster mastery-approach goals in college students.

Rank-Order Stability

In terms of differential stability, the results provided evidence for the stability of individual differences in goal endorsement over time. For example, the correlations from the first assessment to the last assessment covering a four-year span ranged from .32 to .57 for each of the four goals in latent variable models accounting for measurement error. This stability implies that the rank-ordering of students on these goals over the course of college is for the most part consistent. These coefficients, however, were generally smaller than the stability coefficients typically observed for Big Five personality attributes in studies that track the consistency of traits over the course of 4-years of college. Consider that the average disattenuated correlation reported by Robins et al. (2001) was .78 for the Big Five domains over four years of college (Max. = .92; Min. = .63). Such a difference between achievement goals and the Big Five makes sense if one views achievement goals as more contextualized than broad trait dispositions, in line with hierarchical models of motivation (e.g., Elliot, 2006). These results therefore suggest that there is probably more rank-order change in these attributes than in broad personality dimensions.

Nonetheless, there is evidence that individual differences in achievement goals persist over time.

One notable finding was that the stability coefficients for mastery avoidance goals seemed lower than the other goals. Although this finding should be replicated in future research, it seems to imply that endorsement of this goal is more variable than the other three goals. We have little theoretical guidance as to why these goals should be so much less stable than the other three types of goals; clearly, more work is needed in this area.

Goal Coupling and the Goal Switching Hypothesis

Regarding goal coupling, there was little evidence for the specific hypothesis of a switch from performance approach to performance avoidance goals. This result is consistent with the short-term studies reviewed by Senko et al. (2011) that also found little evidence of switching (e.g., Fryer & Elliot, 2007; Jagacinski et al., 2010; Summers, 2006). Thus, it seems reasonable to conclude that this kind of switch is a relatively rare occurrence, even over relatively long spans of time. In terms of theory, such results argue against perspectives that assert that performance approach goals engender vulnerability towards future avoidance goals. Instead, the results seem to support a multiple goals perspective (Senko et al., 2011). A multiple goals perspective asserts that mastery and performance approach goals each have unique benefits, and students who highly endorse both of these types of goals stand to reap all of these benefits; this perspective stands in contrast to earlier theorizing that posited the existence of hidden costs to performance approach goal endorsement. An important caveat, however, is that the current research did not examine goals contextualized within specific experiences of success and failure in a single course. The strongest version of the goal switching hypothesis suggests that it is the experience of failure that is posited to trigger a goal switch (see, e.g., Senko & Harackiewicz, 2005).

However, our goal coupling analyses did reveal that changes in mastery approach goals at

later time points were associated with earlier levels of the other goals. Jointly the other three achievement goals helped to slow the decline of mastery approach goals. This finding suggests that changes in mastery approach goals might be driven by a common process that also affects the other goals. For instance, if students develop self-efficacy as they progress through college, this efficacy could lead them to lessen their endorsement of the avoidance goals, subsequently developing higher levels of interest and intrinsic motivation and heightening endorsement of mastery approach goals. Future research could examine this possibility by examining changes in self-efficacy along with changes in achievement goals to determine if (a) there are mean-level changes in self-efficacy over college and (b) changes in efficacy are associated with changes in achievement goals.

Importantly, there was no evidence of goal coupling for any of the other goals. Thus, the developmental trajectories of achievement goals can be viewed as relatively independent of each other, with the exception that changes in mastery approach goals seem to be linked to earlier levels of the other goals. Such a result further supports much previous research (e.g., Elliot & McGregor, 2001; Elliot & Thrash, 2002) as it suggests that, for the most part, different factors (e.g., traits, developmental trends, contextual effects) are associated with different goals. If a single cause were responsible for all changes, then there should have been more evidence for goal couplings. Thus, future research should continue to investigate the multiple sources underlying this change.

Implications for Educators

Previous research on classroom structures has indicated that educators can contribute to the types of achievement goals that their students adopt based on how they structure their classrooms (Anderman & Patrick, 2012). Ames' (1992) TARGET model identifies important

classroom features that comprise a classroom's goal structure. According to this model, how teachers structure Tasks, Authority, Rewards, Groups, Evaluation, and Time contributes to a mastery versus performance classroom goal structure. When students perceive that they are completing tasks that engage them, have high autonomy, are rewarded for intra-personal gains in performance, are not grouped and evaluated using social comparative means, and the pacing of instructing is appropriate, they tend to report higher levels of mastery than performance personal goals.

It is worth considering that our finding that mastery approach goals tend to decline over the course of college may be due in part to a lack of mastery classroom goal structure in large university classes. Students may enter college with a high level of curiosity and a natural engagement with the material. However, this excitement may quickly wane upon encountering the realities of a large university classroom. Because class sizes are large, instructors at such institutions tend to rely on lectures to the exclusion of more engaging pedagogical tactics. Students have little autonomy, and inter-personal comparisons are often implicitly or explicitly encouraged (e.g., consider entry-level "weed out" classes, such as Introduction to Biology, that are designed to classify students as able to continue in the major or weed them out early on). In spite of the fact that upper level classes may have a higher level of mastery goal classroom structure than these entry level courses, our data do not suggest that mastery approach goals rebound to their early levels later in college.

If it is in fact true that performance classroom goal structures contribute to declines in personal mastery goals, we should find that in a college environment that strives to support mastery classroom goal structure from day one (e.g., high quality, small liberal arts colleges), students do not experience the same developmental drop in mastery goals as they did in the

current large university setting. Regardless, students in large university classes may benefit from efforts to increase classroom mastery goal structuring. Professors, for example, can emphasize that the purpose of grading is to give students feedback on their learning (with the aim of reducing inter-personal comparisons), or they can give students choices concerning the focus of course material (potentially increasing sense of autonomy and interest; see Patall, Cooper, & Wynn, 2010). Clearly, however, additional research is needed on the specific tactics that are most effective at fostering this type of classroom goal structure and how such changes translate into personal achievement goals, especially in the college setting.

Limitations

There are several important limitations of the current research that must be noted. Although the sample that was used for the present analyses was drawn at random from the incoming class of a large Midwestern university, the results may not generalize to other students who declined to participate in this study or to other colleges and universities. The patterns of goal stability and change for students in large, relatively impersonal university settings may differ from students in smaller, more intimate settings in which accountability is higher (e.g., classes in liberal arts colleges). Second, we had missing data. Although modeling with FIML estimation is a recommended technique for handling missing data, it is not a perfect solution to the issues (Baraldi & Enders, 2010). In the absence of data that are missing at random, the standard errors may be underestimated resulting in increased levels of Type I errors. However, our choice to include even single-time responders reduces the likelihood that the analyses are biased in this way.

Last, the current study assessed goals at the broader level of courses generally rather than in the context of a specific course. As a result, there was at least one discrepancy between the

current results and our meta-analysis of the development of achievement goals over the course of single courses that should be considered. We found that both mastery approach goals and performance avoidance goals decreased over the four years of college whereas these trends were not found in research tracking goals in a specific class over the course of a semester as seen in Table 1. As noted previously, developmental change over the course of college may not be consistent with within-semester changes associated with a given course. It could be the case that in the broader scheme of things, performance avoidance goal endorsement tends to decrease, in spite of within-semester trends for specific classes.

A related possibility is that goal endorsement at the level of a student's college experience might be different from goal endorsement at the level of an individual class. Although we are not fully sympathetic to this view, critics could argue that we are actually charting the development of goal *orientations* over four years of college and not achievement goals themselves. Current definitions of the goal construct as a cognitive representation of a desired end state are in line with our assessment of goals (Elliot & Fryer, 2008).

An interesting consideration, however, is whether we would expect goals measured at the level of specific courses to be more or less stable than goals measured at this broad level. On the one hand, the hierarchical model might predict that broader goals should be more stable than more specific sub-goals. On the other hand, individual classroom situations are likely more stable than the broad context of college courses in general, and this stability might contribute to higher stability in goals for specific classes as compared to goals for courses in general. Indeed, both processes could be at play, leading to similar levels of stability for broader versus more specific goals. Regardless, future research should continue examine the influence of level of goal abstraction on goal endorsement in more detail. Detailed work is needed to understand precisely

how achievement goals are structured within individuals to evaluate how course-specific goals are related to the broad constructs we assessed.

Coda

In sum, the current study is notable for the longitudinal design across four years of college as well as its use of latent variable models to examine patterns of change in achievement goals over time. Achievement goals with the exception of mastery-avoidance goals seem to have appreciable levels of rank-order stability across the college years. This indicates that achievement goals are relatively stable individual differences during the college years. However, these goals are not as stable as personality traits. This finding is anticipated by contemporary research and theorizing that posits that achievement goals exist on a different level of the hierarchical model of achievement motivation (Elliot, 2006; Elliot & Thrash, 2010). Mean-levels of three of the goals decline over time whereas performance-approach goals remain consistent. Achievement goal trajectories are relatively independent, with the exception that performance avoidance, mastery avoidance, and performance approach act jointly to slow the decline of mastery approach goals over time. All told, the current study adds important insights into describing the developmental course of achievement goals during the college years.

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Footnotes

¹ Phan (2010) and Hernandez, Schultz, Estrada, Woodcock, & Chance (2013) collected data on achievement goals in college students over time, but they did so using the PALS measure. They are therefore excluded from the meta-analysis. For the most part, their results are consistent with the meta-analysis. Phan (2010) measured PAp and MAp goals in 352 students over one academic year. For mean-level change Cohen's $d = .11$ for PAp and $.05$ for MAp; for rank-order stability $r = .24$ for PAp and $.46$ for MAp. Hernandez et al. (2013) measured PAp, PAv, and MAp over five semesters in 1,046 African-American and Latino college students. Mean-level changes across the study were small ($ds = .00, .07, -.09$ for PAp, PAv, and MAp), and stabilities were substantial ($rs = .50, .46, .56$ for PAp, PAv, and MAp).

² Though not the focus of the current research, some research on goal stability and change has been conducted using samples of children and adolescents (for reviews see, e.g., Anderman, Austin, & Johnson, 2002; Eccles, Wigfield, & Schiefele, 1998; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). On the whole, this research points to general declines in academic motivation (in terms of average levels) during the transition from elementary to middle school, as well as from middle to high school.

³ The Shim et al. (2012) is distinct from the remaining studies in the meta-analysis in a few ways. They assessed goals over one academic year, did not report stability coefficients, and measured mastery approach goals using the Grant and Dweck (2003) measure. Performance approach and avoidance goals were assessed with the AGQ.

⁴ These univariate, linear latent growth curve models are statistically identical to the univariate latent difference score models with linear change only (see p. 15-16, this manuscript). Therefore, the fit statistics for these models can be found in Table 3, under linear change only.

Table 1

Stability and Change over One Semester in Achievement Goals in College Students

Study	Scale	Rank-Order Stability (<i>r</i>)	Mean-Level Change (<i>d</i>)
Senko & Harackiewicz (2005) Study 1 (<i>n</i> = 166)	PAP	.60	-.28
	PAV	.53	.52
	MAP	.66	-.29
Fryer & Elliot (2007) Study 1 (<i>n</i> = 188)	PAP	.82	-.11
	PAV	.76	.28
	MAP	.67	-.61
Fryer & Elliot (2007) Study 2 (<i>n</i> = 211)	PAP	.81	.09
	PAV	.77	.31
	MAP	.77	-.48
Fryer & Elliot (2007) Study 3 (<i>n</i> = 224)	PAP	.74	-.02
	PAV	.72	.18
	MAP	.72	-.48
Muis & Edwards (2009) Study 1 (<i>n</i> = 33)	PAP	.78	.11
	PAV	.72	.08
	MAP	.54	-.05
Muis & Edwards (2009) Study 2 (<i>n</i> = 30)	PAP	.75	-.31
	PAV	.45	-.33
	MAP	.42	-.02
Jagacinski et al. (2010) (<i>n</i> = 162)	PAP	.51	.42
	PAV	.51	.11
	MAP	.64	-.28
Ciani et al. (2011) (<i>n</i> = 108)	PAP	.68	-.16
	PAV	.61	-.07
	MAP	.57	-.42
Shim et al. (2012) (<i>n</i> = 311)	PAP	-	.03
	PAV	-	-.13
	MAP	-	-.31
[<i>k</i> = 8 or 9; <i>N</i> = 1,122 or 1,433]	PAP	<i>M</i> = .68 [.62, .74]	<i>M</i> = .00 [-.12, .13]
	PAV	<i>M</i> = .61 [.57, .66]	<i>M</i> = .14 [.002, .29]
	MAP	<i>M</i> = .63 [.61, .65]	<i>M</i> = -.39 [-.30, -.48]

Note. PAP = performance approach, PAV = performance avoidance, MAP = mastery approach. Average *rs* and *ds* are meta-analytic estimates; 95% confidence intervals are in brackets.

Table 2

Stability and Change in Achievement Goals over 4 Years in College Students

Scale	S1 <i>M</i> (<i>SD</i>), S2 <i>M</i> (<i>SD</i>), S4 <i>M</i> (<i>SD</i>), S8 <i>M</i> (<i>SD</i>)	S1 - S8 Alpha	S1 to S2 Stability (<i>r</i>)	S1 to S8 Stability (<i>r</i>)	S1 to S2 Change (<i>d</i>)	S1 to S8 Change (<i>d</i>)
PAp	3.47 (.85), 3.48 (.88), 3.59 (.84), 3.47 (.90)	.84, .84, .83, .87	.71 (.65)	.48 (.47)	0.01	0.00
PAv	3.77 (.92), 3.61 (.96), 3.40 (.81), 3.20 (1.01)	.78, .82, .81, .83	.59 (.54)	.42 (.37)	-0.17	-0.59
MAp	4.00 (.71), 3.83 (.72), 3.86 (.75), 3.79 (.83)	.83, .79, .82, .86	.66 (.58)	.57 (.49)	-0.24	-0.27
MAv	3.72 (.80), 3.59 (.82), 3.47 (.84), 3.41 (.96)	.78, .82, .83, .86	.36 (.37)	.32 (.32)	-0.16	-0.35

Note. Stability coefficients are disattenuated to account for measurement error (unadjusted coefficients are displayed in parentheses). PAp = performance approach, PAv = performance avoidance, MAp = mastery approach, MAv = mastery avoidance, S = semester. Mean-level changes are reported in terms of raw *Ms* and *SDs*.

Table 3
Fit Statistics for Univariate Latent Difference Score Models

	χ^2	<i>df</i>	CFI	RMSEA	AIC	$\Delta \chi^2/df$
Performance Approach						
No Change	31.73	11	.953	.060	3141.73	-
Prop. Change Only	31.70	10	.950	.064	3143.70	.03/1
Linear Change Only	13.91	8	.987	.037	3129.91	17.82/3*
Dual Change	13.85	7	.984	.042	3131.85	.06/1
Performance Avoidance						
No Change	125.42	11	.664	.141	3620.72	-
Prop. Change Only	35.14	10	.926	.069	3532.43	90.28/1*
Linear Change Only	17.64	8	.972	.048	3518.94	107.78/3*
Dual Change	5.08	7	1.00	.000	3508.38	12.56/1*
Mastery Approach						
No Change	62.93	11	.838	.095	2850.34	-
Prop. Change Only	45.61	10	.889	.082	2835.02	17.32/1*
Linear Change Only	33.00	8	.922	.077	2826.42	29.93/3*
Dual Change	29.95	7	.928	.079	2825.37	3.05/1
Mastery Avoidance						
No Change	55.61	11	.761	.088	3327.23	-
Prop. Change Only	31.73	10	.884	.064	3305.36	23.88/1*
Linear Change Only	15.51	8	.960	.042	3293.13	40.10/3*
Dual Change	6.19	7	1.00	.000	3285.81	9.32/1*

Note. Bolded model represents best fitting growth curve shape. Prop = proportional. * $p < .05$.

Table 4

Fit Statistics for Multivariate Latent Difference Score Models

	χ^2	<i>df</i>	CFI	RMSEA	AIC	$\Delta \chi^2$
1. No Couplings	147.30	96	.970	.032	12352.57	-
2a. Couplings on PAp	139.66	93	.973	.031	12350.93	7.64
2b. Couplings on PAv	143.12	93	.971	.032	12354.39	4.18
2c. Couplings on MAp	135.92	93	.975	.030	12347.20	11.38*
2d. Couplings on MAV	143.52	93	.971	.032	12354.80	3.78

Note. PAp = performance approach, PAv = performance avoidance, MAp = mastery approach, MAV = mastery avoidance. * Chi-square difference test was statistically significant.

Table 5

Model Parameters for Final Multivariate Latent Difference Score Model

Parameter	PAP	PAv	MAp	MAv
Average Level (μ_{g0})	3.492 (.036)	3.778 (.041)	3.974 (.031)	3.723 (.035)
Average Slope (μ_{g1})	0.001 (.008)	0.701 (.237)	0.540 (.665)	1.553 (.479)
Variance of Level (σ^2_{g0})	0.478 (.042)	0.489 (.052)	0.255 (.029)	0.235 (.043)
Variance of Slope (σ^2_{g1})	0.006 (.002)	0.040 (.019)	0.019 (.016)	0.082 (.042)
Variance of Error (σ^2_e)	0.273 (.016)	0.403 (.024)	0.259 (.015)	0.404 (.025)
Autoregressive Change (β)	- -	-0.230 (.068)	- -	-0.450 (.135)
Couplings on MAP	0.089 (.174)	-0.112 (.080)	- -	-0.140 (.136)

Note. Parameters are unstandardized model estimates. Values in parentheses are standard errors. PAP = performance approach, PAv = performance avoidance, MAP = mastery approach, MAv = mastery avoidance.

Figure 1. Specification of univariate latent difference score model.

Figure 2. Growth trajectories for the typical individual's achievement goals over the course of college. Trajectories allow for linear change in performance approach goals (PAp), dual change in performance avoidance (PAv) and mastery avoidance (MAv) goals, and linear change plus couplings for mastery approach (MAp) goals.

Appendix

Descriptive Statistics and Intercorrelations of Study Variables

	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. S1 PAp	500	3.47	0.85	(.84)	.65	.57	.47	.12	.10	.15	.21	.16	.09	-.01	.07	.18	.03	-.04	.00
2. S2 PAp	383	3.48	0.88	.71	(.84)	.65	.57	.06	.09	.12	.14	.18	.17	.10	.11	.13	.07	-.03	-.05
3. S4 PAp	294	3.59	0.84	.63	.72	(.83)	.54	.02	.13	.12	.15	.18	.07	.22	.12	.16	.08	.05	.04
4. S8 PAp	220	3.47	0.90	.48	.60	.56	(.87)	.13	.17	.09	.15	.14	.09	.04	.24	.15	.06	.00	.01
5. S1 PAv	491	3.77	0.92	.05	.01	-.06	.12	(.78)	.54	.47	.37	-.04	-.07	.00	-.01	.16	.13	.19	.08
6. S2 PAv	383	3.61	0.96	.08	.06	.07	.15	.59	(.82)	.56	.47	-.05	-.07	-.03	.03	.09	.08	.12	.03
7. S4 PAv	294	3.40	1.02	.12	.10	.05	.05	.53	.60	(.81)	.57	-.05	-.11	-.05	-.10	.11	.11	.20	.06
8. S8 PAv	220	3.20	1.01	.22	.16	.12	.12	.42	.51	.62	(.83)	-.02	.04	-.05	-.17	.00	-.02	.08	.00
9. S1 MAp	500	4.00	0.71	.19	.20	.20	.18	-.02	-.05	.02	.03	(.83)	.58	.49	.49	.49	.24	.20	.32
10. S2 MAp	383	3.83	0.72	.10	.19	.08	.11	-.04	-.04	-.01	.05	.66	(.79)	.45	.47	.37	.47	.26	.31
11. S4 MAp	294	3.86	0.75	-.01	.12	.28	.07	-.04	-.10	-.02	-.13	.53	.48	(.82)	.51	.30	.17	.47	.29
12. S8 MAp	220	3.79	0.83	.06	.08	.12	.29	.00	.06	-.05	-.19	.57	.51	.54	(.86)	.33	.25	.35	.54
13. S1 MAV	500	3.72	0.80	.18	.13	.19	.14	.13	.10	.15	.07	.54	.27	.33	.32	(.78)	.37	.31	.32
14. S2 MAV	383	3.59	0.82	.05	.06	.11	.05	.09	.08	.10	.03	.40	.55	.28	.34	.36	(.82)	.45	.44
15. S4 MAV	294	3.47	0.84	-.03	-.01	.08	-.05	.10	.07	.22	.04	.33	.18	.54	.30	.33	.49	(.83)	.42
16. S8 MAV	220	3.41	0.96	-.03	-.08	.07	-.03	-.03	-.05	.06	-.01	.34	.25	.40	.60	.32	.43	.44	(.86)

Note. Bolded coefficients represent differential stabilities. Alpha reliabilities are displayed on the diagonal. Correlations below the diagonal are between latent variables under the assumption of strong metric invariance; correlations above the diagonal are between observed variables (scale averages). Both matrices account for missing data using FIML estimation. S = Semester. PAp = Performance Approach. PAv = Performance Avoidance. MAp = Mastery Approach. MAV = Mastery Avoidance.