

# Revisiting multiple pathways to achievement: Re-examining the roles of achievement goals in predicting grades through task values<sup>☆</sup>

Paul A. O'Keefe<sup>a,d,\*</sup>, Kathryn Everhart Chaffee<sup>b</sup>, E.J. Horberg<sup>a</sup>, Isabelle Plante<sup>b</sup>,  
Judith M. Harackiewicz<sup>c</sup>

<sup>a</sup> Yale-NUS College, Singapore

<sup>b</sup> Université du Québec à Montréal, Canada

<sup>c</sup> University of Wisconsin—Madison, United States of America

<sup>d</sup> National University of Singapore, NUS Business School, Singapore

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## ABSTRACT

Research suggests that undergraduates' learning and performance-approach goals initiate distinct pathways to course achievement through different task values. However, few studies were longitudinal or controlled for initial task values. It therefore remains unclear whether task values mediate the relation between initial achievement goals and final grades beyond initial task values. The present study examined these pathways in two year-long college courses ( $N = 175$ ). When initial task values were not controlled, the hypothesized pathways emerged: Semester 1 learning goals predicted year-end course grades via Semester 2 intrinsic value whereas Semester 1 performance-approach goals predicted course grades via Semester 2 attainment value. When Semester 1 values were controlled, however, achievement goals generally did not predict task values, although Semester 2 intrinsic and attainment value remained independent predictors of grades. These findings help to clarify and reconcile previous research findings and underscore the importance of accounting for construct stability to elucidate motivational processes.

## 1. Introduction

Even when students take the same course—learning the same material and taking the same exams—they may have fundamentally different approaches to learning. How they interpret their academic environments, and the types of value they place on their studies, is important to understanding the motivational processes by which they engage in their courses. Yet, despite the large literatures on students' goals and values in the college classroom (e.g., Church et al., 2001; Durik et al., 2015; Elliot & Church, 1997; Harackiewicz et al., 2002, 1997; Hong et al., 2020; Steinmayr et al., 2019), relatively few studies have examined the interrelation of these constructs (e.g., Conley, 2012; Harackiewicz et al., 2000; Hulleman et al., 2008).

One perspective to emerge from the literature on achievement goals is that of multiple pathways (e.g., Pintrich, 2000), in which both *learning goals* (or mastery goals) and *performance-approach goals*—the goal to learn and develop abilities versus to demonstrate abilities,

respectively—give rise to adaptive outcomes such as higher achievement, but through different mediating mechanisms. In the present research, we investigate the idea that different task values (Eccles & Wigfield, 1995; Wigfield & Eccles, 2000) can explain how learning and performance-approach goals indirectly relate to academic performance (see Hulleman et al., 2008, Study 1). With respect to a learning goal pathway, the goal to learn and develop abilities may predict subsequently higher intrinsic value (i.e., enjoyment and interest) for the course material; intrinsic value, in turn, can predict better year-end course grades (e.g., Bieg et al., 2017; Cho & Kim, 2019; Harackiewicz et al., 2008). With respect to a performance-approach goal pathway, a student's aim is to demonstrate or validate their abilities, and in academic settings, students often look to grades to affirm intellectual ability, which may amplify the importance of attaining high grades. Thus, a performance-approach goal may predict subsequent attainment value for a course (i.e., the personal importance of attaining higher grades). Attainment value, in turn, can predict better course grades (e.g.,

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\* Corresponding author.

E-mail addresses: [paul.okeefe@yale-nus.edu.sg](mailto:paul.okeefe@yale-nus.edu.sg) (P.A. O'Keefe), [kathryn.chaffee@ualberta.ca](mailto:kathryn.chaffee@ualberta.ca) (K.E. Chaffee), [horberg@yale-nus.edu.sg](mailto:horberg@yale-nus.edu.sg) (E.J. Horberg), [plante.isabelle@uqam.ca](mailto:plante.isabelle@uqam.ca) (I. Plante), [jmharack@wisc.edu](mailto:jmharack@wisc.edu) (J.M. Harackiewicz).

Weidinger et al., 2020).

Several studies yielded support for these pathways, with the strongest evidence for the learning goal path through intrinsic value (e.g., Harackiewicz et al., 2000, 2008); the performance-approach goal path through attainment value has been less studied. Still other research has not found support for achievement goals relating to course achievement via task values (e.g., Plante et al., 2013).

Therefore, in the present investigation, we sought to address key limitations of previous research, which could help account for these inconsistent findings. Despite longitudinal theorizing, most studies that examined the joint effects of achievement goals and task values on course achievement have been cross-sectional (see Scherrer et al., 2020). Further, and importantly, relevant longitudinal studies have not controlled for initial task values (e.g., Hulleman et al., 2008), which is critical for claims that achievement goals explain changes in subsequent task values.

We build on past research by examining whether learning and performance-approach goals in Semester 1 independently predict year-end course grades via distinct Semester 2 task values—and whether these pathways remain significant even after controlling for initial (Semester 1) task values. In doing so, our results help answer questions about directionality: Do learning and performance-approach goals predict changes in intrinsic and attainment value, respectively? And if so, do these task values explain indirect links between achievement goals and year-end course grades? Through this investigation, we aim to clarify the motivational pathways to achievement in college.

## 2. Theoretical background

### 2.1. Achievement goal theory

Achievement goal theory proposes that people can adopt different goals in achievement contexts, such as a college classroom. If the achievement context is interpreted as an opportunity to develop new competencies, people tend to adopt a learning goal (Dweck & Leggett, 1988), in which they focus on improving their abilities, especially in comparison to an intrapersonal standard like previous ability or an absolute standard like the highest possible score (O'Keefe, 2013). By contrast, if the context is interpreted as normatively diagnostic of abilities, people tend to adopt performance goals (see Ames, 1992; Dweck & Leggett, 1988). With performance goals, the focus is on demonstrating or validating ability, often in comparison to other people. It should be noted that both learning and performance goals can be further classified along an approach-avoidance dimension, based on whether one wants to approach positive outcomes or avoid negative outcomes (Elliot, 2005; Elliot & Murayama, 2008). For example, one could hold a learning-approach goal to acquire ability or a learning-avoidance goal to avoid losing ability. Similarly, one could hold a performance-approach goal to demonstrate their competence or a performance-avoidance goal to avoid appearing incompetent. We focus solely on the approach dimensions because, as we describe below, they are most relevant to the task values we examine (and herein we refer to these goals as learning and performance-approach goals).

Learning and performance-approach goals are not necessarily mutually exclusive (Harackiewicz et al., 2002), and indeed, students commonly hold both goals, as they often balance the aim to learn with the desire to demonstrate or validate their abilities (Linnenbrink-Garcia et al., 2018). Research has consistently supported this additive multiple-goals perspective (i.e., main effects, sometimes on different outcomes variables; see Barron & Harackiewicz, 2001), wherein both achievement goals uniquely relate to adaptive academic outcomes (multiplicative, or interactive, effects in which achievement goals interact to predict outcomes are relatively uncommon, as noted in Harackiewicz et al., 2002; Pintrich, 2000; Senko & Hulleman, 2013). It is therefore important to examine the independent effects of each goal. For example, learning goals have been reliably linked to intrinsic value or interest outcomes,

whereas performance-approach goals have tended to be unrelated to intrinsic value or interest, but more consistently associated with higher achievement than learning goals (Harackiewicz et al., 2002; Hulleman et al., 2010; Mouratidis et al., 2018).

How do learning and performance goals relate to downstream motivational behaviors and outcomes? Learning goals predict a wide range of beneficial outcomes for motivation (see Dweck & Leggett, 1988; O'Keefe, 2013), including intentions to continue studying a subject after completing a course (e.g., Harackiewicz et al., 2008; Lou & Noels, 2017), as well as the effort and persistence put into learning the material (Elliot et al., 1999). By contrast, because students with performance-approach goals tend to emphasize the demonstration or validation of abilities rather than the process of learning, they also tend to be less engaged (e.g., reduced interest) than those with learning goals (Harackiewicz et al., 1998; Hulleman et al., 2008).

Both learning goals and performance-approach goals have been found to predict greater achievement on cognitive tasks as well as grades across a variety of contexts, although these effects do not always emerge. For instance, learning goals have been found to predict achievement, including grades, in some studies (e.g., Church et al., 2001; Grant & Dweck, 2003), but this relation has not been consistent (e.g., Dickhäuser et al., 2016; Harackiewicz et al., 2000; Hulleman et al., 2010; Mouratidis et al., 2018). Additionally, numerous studies have reported that performance-approach goals predict increased grades (e.g., Linnenbrink-Garcia et al., 2018), although once again, such results are not always observed (Hulleman et al., 2010; Senko, 2019).

### 2.2. Task values

What processes might explain why learning and performance-approach goals have been shown to predict achievement? Researchers have drawn upon another well-established motivational construct, *task values* (Eccles, 2009; Eccles & Wigfield, 1995, 2002; Wigfield & Eccles, 2020). Eccles (2009) proposed several subjective values that a person may have for a task, two of which are relevant to the current research. First, *intrinsic value* refers to a person's level of interest and enjoyment in a task. For example, a student who finds a particular school assignment fun and fascinating has high intrinsic value for the assignment. Second, *attainment value* refers to the personal importance of doing well on a task. For example, a student who feels that earning high grades is personally important has high attainment value for grades.

A few investigations have shown that examining how achievement goals link to task values can provide a more nuanced portrait of motivation and achievement patterns, a point we turn to next.

### 2.3. Research linking achievement goal theory to task values

The association of achievement goals and task values is likely bidirectional (Scherrer et al., 2020; see Kahraman & Sungur, 2013; Khezir Azar et al., 2010; Lau et al., 2008; Liem et al., 2008 for studies of task values predicting achievement goals). Nevertheless, research on how these constructs unfold in distinct academic pathways tends to conceptualize achievement goals as the predecessor to task values (e.g., Harackiewicz et al., 2000; Hulleman et al., 2008). Achievement goals are broad cognitive frameworks that inform how people respond in achievement contexts, which could include the value students come to perceive in their course work. People with a strong learning goal are intrinsically motivated to learn; as such, they may develop interest and find enjoyment in the material they learn (e.g., Bieg et al., 2017; Cho & Kim, 2019; Elliott & Dweck, 1988; Harackiewicz et al., 2008). Thus, in terms of task values, a learning goal may foster intrinsic value for the task, which itself may ultimately predict achievement. This first link received some empirical support from Hulleman et al. (2008), among others (e.g., Harackiewicz et al., 2008; see also Dickhäuser et al., 2016). They observed that students' initial learning goals, but not performance-approach goals, predicted intrinsic value in their college psychology

course later in the semester. Although they did not find that intrinsic value predicted final grades, some research has. Harackiewicz et al. (2000, 2008) found that beginning stages of interest (“catch”) in a college psychology course predicted final grades. Laboratory research has also shown that relatively high levels of task interest predicts task performance (e.g., O'Keefe & Linnenbrink-Garcia, 2014).

By comparison, in the Hulleman et al. (2008) study (Study 1), performance-approach goals did not predict any of the task values measured, but did predict grades. Possibly, this lack of indirect effect was due to the task values investigated, which did not include attainment value. Given that students with stronger performance-approach goals emphasize the importance of getting high grades to demonstrate or validate their normatively high ability, such goals could lead students to develop stronger attainment value for a course. In turn, attainment value might predict higher grades. For example, undergraduates' attainment value for various academic subjects has been shown to predict their test performance (Cole et al., 2008). Another study showed that attainment value for math helped predict increases in math grades (Weidinger et al., 2020). Thus, the current investigation examines whether a measure of global attainment value mediates the relation between performance-approach goals and grades, a pathway that has not been directly examined in past research.

#### 2.4. Addressing past limitations in testing multiple pathways to course performance

Despite the supporting evidence delineated above, approaches used to test multiple pathways also had limitations, which we seek to address in the present study. One concern is that the research design often could not speak to directionality or temporal precedence of variables. For one, much of the research has been cross-sectional rather than longitudinal (e.g., Hall et al., 2016; Kahraman & Sungur, 2013; Khezir Azar et al., 2010; Lau et al., 2008; Liem et al., 2008; Plante et al., 2013; Scherrer et al., 2020).

Moreover, and critical to our investigation, the few existing longitudinal studies often did not control for the stability of task values; that is, they did not control for initial task values when examining pathways from achievement goals to subsequent task values (e.g., Harackiewicz et al., 2002, 2000; Hulleman et al., 2008). Given the directional nature of the theorizing, this is problematic. Hulleman et al. (2008) recognized this and called for future research to do so: “future research needs to control for initial... task values in order to make stronger claims regarding the causal influence of achievement goals and task values on educational outcomes” (p. 413). Controlling for initial task values would clarify directionality and temporal precedence because it would contribute to establishing whether achievement goals lead to changes in task values. It would also rule out the possibility that an apparent association between initial achievement goals and subsequent task values is due to their pre-existing initial correlation (e.g., Cole & Maxwell, 2003; Selig & Little, 2012). In the present investigation, we assessed task values both initially (at the same time as achievement goals in Semester 1) and as downstream mediators (Semester 2) in the pathway to final course grades. This enabled us to compare models that do and do not control for initial task values in the pathway from initial achievement goals to final grades via mediating task values, thus elucidating how accounting for the stability of task values may re-shape extant evidence and theorizing about multiple pathways.

#### 2.5. Do achievement goals explain the development of different task values?

What patterns might emerge when initial task values are controlled? On one hand—and as we would hypothesize given past research—we may continue to find support for multiple pathways, such that learning goals predict final grades through intrinsic value whereas performance-approach goals predict final grades through attainment value. This

would yield even stronger evidence that achievement goals instigate different motivational pathways than has previously been available.

On the other hand, it is plausible that these pathways will reflect correlations rather than valuation processes that unfold over time. We may not find that achievement goals predict significant changes in a student's intrinsic value or attainment value for their coursework. Thus, achievement goals would no longer indirectly predict course grades via task values.

To examine these competing ideas, we compared analytic models that did and did not control for initial task values when testing the learning and performance-approach goal pathways. We conducted our investigation in two substantively different mandatory courses, each of which spanned a full academic year (i.e., two semesters). This enabled us to assess the robustness and consistency of our findings across academic contexts.

### 3. Study overview and hypotheses

The current investigation tested two distinct motivational pathways by which undergraduates learn and achieve in their courses. As shown in Fig. 1, we tested two hypothesized pathways, informed by prior research (e.g., Hulleman et al., 2008), from achievement goals to final grades at the end of students' first academic year:

**Hypothesis 1. Learning Goal Pathway:** Learning goals assessed in students' first semester should predict higher levels of intrinsic value assessed in the second semester, which, in turn, predict final course grades.

**Hypothesis 2. Performance-Approach Goal Pathway:** Performance-approach goals in the first semester should predict higher levels of attainment value in the second semester, which, in turn, predict final course grades.

Given inconsistent findings in the literature, however, we do not make firm hypotheses about whether achievement goals will directly predict final course grades.

To test our hypothesized pathways and shed light on past findings, we compared the results of two different analytic approaches, which are depicted in Fig. 1. The “values-not-controlled model” does not control for initial task values (Fig. 1, top). The “values-controlled model” does (Fig. 1, bottom) and, therefore, provides the stronger test of directionality.

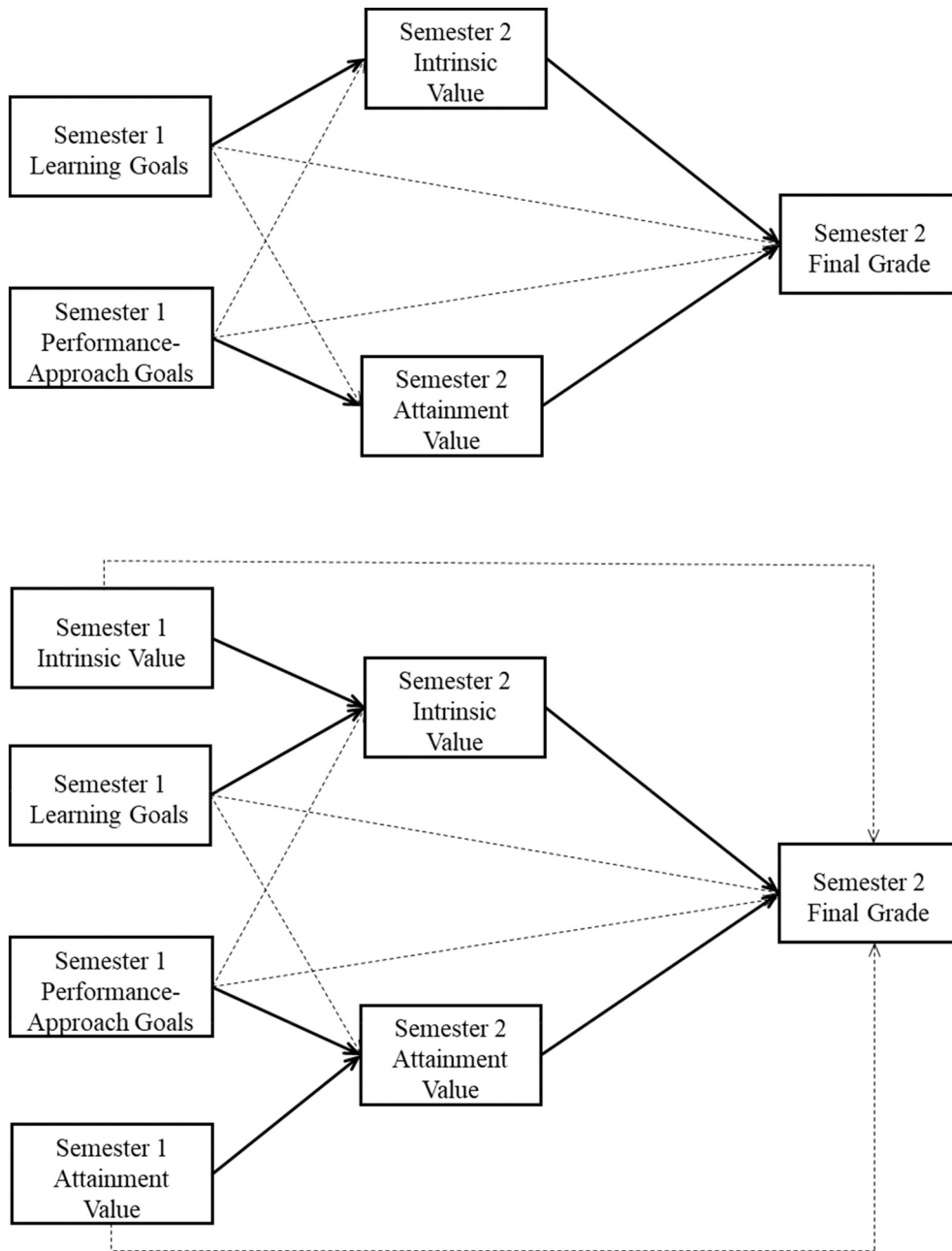
Additionally, to gain greater clarity about our hypothesized pathways, we also tested two alternative models: one in which achievement goals mediate the link from task values to grades, and another testing the multiplicative effect of learning and performance-approach achievement goals.

### 4. Method

The research reported was conducted in accordance with American Psychological Association's ethical standards for the treatment of human subjects. This study was approved by the IRB at the corresponding author's institution.

#### 4.1. Participants

All incoming first-year undergraduates (210 total) at a liberal arts college in Singapore were invited to participate, of whom 175 (54.3 % women; age:  $M = 19.15$  years,  $SD = 1.36$ ) enrolled in the study. This represented the majority of the cohort (83.3 %). Consistent with the internationally diverse student demographics of the college, citizenship data showed that the sample was 55.0 % Singaporean, 22.2 % from other East or Southeast Asian countries, 7.6 % from North America, 4.7 % from India or Pakistan, 4.1 % from Europe, 3.5 % from Australia or New Zealand, 1.8 % from Africa, and 1.2 % from South America.



**Fig. 1.** Hypothesized Values-Not-Controlled Model (top) and Values-Controlled Model (bottom)

Note. Solid black lines represent paths hypothesized to be significant. These depict the hypothesized learning goal pathway and performance-approach goal pathway (both models) and the autocorrelations of task values (values-controlled model only). Dashed lines represent non-hypothesized links.

The sample was recruited as part of a larger project designed to address multiple hypotheses. The other purpose of the project—unrelated to the current study—was to pilot an online orientation activity and to test its effect on course experiences and achievement (specifically, students were randomly assigned either to an activity that discussed how academic interests can be developed and are not fixed, or that discussed optimal study skills useful to college students). Furthermore, the course examined for those hypotheses was different than the two courses examined here. Students were later invited to complete four follow-up questionnaires throughout their first year, and their final grades for Semester 2 were collected from official records. No data from this project or sample has been published.

The focus of the present research was the assessments of achievement goals and task values in two year-long courses. Of the 175 students who

completed the pre-matriculation activity, 174 (99.4 %) completed one or both follow-up questionnaires given in Semester 1, 168 (96.0 %) completed one or both follow-up questionnaires given in Semester 2, and 169 (96.6 %) had grade data (six students withdrew from the college).

#### 4.2. Setting

The study was conducted before the COVID-19 pandemic at a relatively small, selective, internationally diverse, 4-year liberal arts college in Singapore, an English-speaking country. The curriculum was designed

to expose students to diverse academic areas. As part of the curriculum, all first-year students were enrolled in two year-long mandatory courses<sup>1</sup>: a Literature/Humanities course examining literary masterpieces and a Philosophy/Political Science course introducing students to themes and figures in philosophy and political thought.<sup>2</sup>

Although all students took these two courses, they were assigned to different, small seminar groups (average  $n = 18.78$  for Literature/Humanities and  $n = 15.36$  for Philosophy/Political Science; their classmates and seminar instructors changed from first to second semester in each course). Focusing on these two courses, unlike students' single-semester courses (cf. Hulleman et al., 2008), enabled us to examine the roles of achievement goals and task values across an entire academic year, and how they ultimately related to final course grades at the end of the year (all courses in the first semester were ungraded and students received a pass/no pass mark on their transcript).

#### 4.3. Procedure

During student orientation, the week before the beginning of the academic year, incoming students were recruited to participate in an online baseline questionnaire followed by a pre-matriculation activity designed to assist their transition to college as well as to help the college learn more about its new students. In the baseline questionnaire, which included only a few questions, we assessed students' gender, to be used as a covariate in the model due to its significant association with students' final grades (see Tables 1 and 2). Then, although irrelevant to the hypotheses of the present research, students were randomly assigned to one of two orientation exercises, one about how new interests can be developed, the other about optimizing study skills.<sup>3</sup> Because of this, orientation-exercise condition was also included as a covariate in our analyses (see Tables 1 and 2).

The first two follow-up questionnaires were administered in class at the midpoint and near the end of Semester 1 (2 weeks before finals began), respectively. The remaining two follow-up questionnaires were completed during students' Philosophy/Political Science course and similarly took place at the midpoint and near the end of Semester 2 (again, 2 weeks before finals began), respectively. The four follow-up questionnaires were nearly identical in content and structure; in each one, students completed identical measures of achievement goals and task values for both year-long courses. The one exception was that attainment value (see Measures) was assessed as a global measure (i.e., across courses) in each questionnaire, rather than in relation to each course.

Assessing each achievement goal and task value at two time points per semester enabled us to calculate a composite that was more reliable than if only assessed once, and it was more likely to reflect students' ratings across the semester rather than during, for example, a particular timepoint or lesson. More specifically, because a single assessment may be disproportionately influenced by a particular lesson or other factors unique to the week in which it occurred, averaging assessments from two distinct time points (i.e., mid- and late-semester) reflects a more

<sup>1</sup> The other three required single-semester courses were a social science course (Semester 1), a scientific reasoning course (Semester 1), and a quantitative reasoning course (Semester 2).

<sup>2</sup> For example, in the Literature/Humanities course, students read myths (e.g., Homer's *Odyssey*), a novel by Lu Xun, and plays by Shakespeare, and explored ideas like cross-cultural differences, national identities, modern urban life, social movements, and the realities and fantasies of colonialism. In the Philosophy/Political Science course, for example, students read pieces by Plato, Hobbes, Descartes, and Nietzsche, and explored ideas about the nature of the self, reality, and knowledge, as well as more contemporary ideas about science and technology, free trade and notions of the state.

<sup>3</sup> In these ~30-minute online exercises, students read materials about their randomly-assigned topic (i.e., developing new interests or optimal study skills) and wrote short responses about those same topics.

stable and generalized measurement than when measured only once. Further, for the same reason, we did not intend to examine differences from mid- to late-semester as evidence of change because differences between timepoints could be attributable to extraneous factors specific to the given week rather than capturing a true and stable shift (see Measures for mean differences from mid- to late-semester). Finally, collapsing assessments within the same semester also resulted in models that were suitable to our sample size. For example, a more complicated cross-lagged analysis would be underpowered and violate sample-size-per-parameter requirements (Kline, 2011).

Each questionnaire took approximately 10 min (medians ranged from 8.13 to 11.42 min) and students completed them on personal computers. Absent students received the questionnaire link by email on the evening of the same day with instructions to complete the questionnaire at home. Students also completed other measures that were unrelated to the present hypotheses, and therefore are not discussed in the Measures section below.

#### 4.4. Measures

##### 4.4.1. Achievement goals (semesters 1 and 2)

Using an adapted version of Grant and Dweck's (2003) assessment, students rated their level of endorsement of learning and performance-approach goals separately for each course. This adaptation was made in consultation with one of the authors of the 2003 assessment to ensure that our items captured each of their two facets of learning goals (i.e., learning and mastery-challenge facets) and each of their four performance-approach goal facets (i.e., ability, normative ability, outcome, normative outcome).

These items had a common question stem (i.e., "In thinking about your [course title] course, to what extent is your goal(s) to..."), and a description of an achievement goal followed. There were two learning goal items: "learn new information and skills" and "challenge yourself," which reflect the learning and mastery-challenge facets of learning goals. Items were rated on 7-point scales (1 = *Strongly disagree*, 7 = *Strongly agree*). As indicated earlier, all measures were assessed at two timepoints during each semester (mid- and late-semester). Thus, these two learning goal items were assessed twice per semester for a total of four items in each semester. Using the averaged mid- and late-semester learning goal ratings, we calculated a mean Semester 1 Learning Goals score for each course (Literature/Humanities,  $\alpha = 0.74$ ; Philosophy/Political Science,  $\alpha = 0.78$ ). Similarly, we calculated a mean Semester 2 Learning Goals score for each course (Literature/Humanities,  $\alpha = 0.80$ ; Philosophy/Political Science,  $\alpha = 0.74$ ).

Another four items assessed performance-approach goals ("validate your intelligence [i.e., feel smart]," "perform better than other students," "get a good grade," and "confirm that I am more intelligent than other students").<sup>4</sup> These reflect the ability, normative ability, outcome, and normative outcome facets of performance-approach goals, respectively (Grant & Dweck, 2003). As with learning goals, these four performance-approach goal items were assessed at both timepoints in each semester (with one exception: "confirm that I am more intelligent than other students" was not in the mid-Semester 1 questionnaire. It was added in the remaining three follow-up questionnaires to capture normative ability, following Grant & Dweck, 2003). Thus, there were a total of seven performance-approach goal items in Semester 1 (three in the mid-semester and four in the late-semester questionnaire) and eight performance-approach goal items in Semester 2 (four in the mid-semester and four in late-semester questionnaire). We calculated a mean Semester 1 Performance-Approach Goals score (Literature/

<sup>4</sup> Although the "get a good grade" item refers to the outcome of a good grade rather than a good grade relative to other students, our results do not change when the item is omitted from the scale. For completeness, we therefore report results with the item retained.

**Table 1**  
Descriptive statistics and correlation matrix for literature/humanities course.

Variables	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Condition (1=interest development -1=study skills)			–	–	–	–	–	–	–	–	–	–	–
2. Gender (1=man 0=woman)			-.03	–	–	–	–	–	–	–	–	–	–
3. Semester 1 Learning Goals	6.03	0.77	.16*	-.04	–	.02	.43**	.17*	.50**	-.01	.26*	.17*	.04
4. Semester 1 Performance- Approach Goals	4.32	1.16	.19*	.03	.06	–	.18*	.35**	-.05	.70**	.05	.36**	.02
5. Semester 1 Intrinsic Value	4.81	0.84	.14	-.10	.43**	.19*	–	.15	.31**	.15	.55**	.20*	.10
6. Semester 1 Attainment Value	4.80	0.88	.07	-.03	.18*	.36**	.16*	–	.15	.30**	.03	.63**	.08
7. Semester 2 Learning Goals	5.84	0.93	.02	-.14	.48**	-.05	.31**	.15	–	.15	.52**	.17*	.03
8. Semester 2 Performance- Approach Goals	4.13	1.24	.07	-.01	0.00	.69**	.16*	.30**	.15	–	.14	.41**	.06
9. Semester 2 Intrinsic Value	4.80	0.94	-.01	-.15	.25**	.04	.55**	.03	.52**	.14	–	.10	.18**
10. Semester 2 Attainment Value	4.92	0.91	.06	.03	.17*	.37**	.20	.63**	.16*	.41**	.10	–	.19**
11. Semester 2 Final Grade	7.81	1.32	.07	.19*	.04	.03	.07	.08	.02	.06	.15	.19*	–

Note. Correlation matrix displays zero-order coefficients below the diagonal (in grey) and partial correlation coefficients controlling for gender and condition above the diagonal. \* $p < 0.05$ , \*\* $p < 0.01$ .

Humanities,  $\alpha = 0.86$ ; Philosophy/Political Science,  $\alpha = 0.85$ ) and a mean Semester 2 Performance-Approach Goals score (Literature/Humanities,  $\alpha = 0.89$ ; Philosophy/Political Science,  $\alpha = 0.90$ ).<sup>5</sup>

4.4.2. Task values (semesters 1 and 2)

Based on Eccles and Wigfield's (2002) definition of intrinsic value as the enjoyment and interest one has in an activity or subject, two items assessed the extent to which students held intrinsic value for each course: "The material in [course title] is interesting to me" and "I enjoy the work I'm doing in [course title]." Intrinsic value items were rated on a 6-point scale (1 = Strongly disagree, 6 = Strongly agree). As with achievement goals, we averaged students' mid- and late-semester intrinsic value ratings and took their mean for each course to create a

Semester 1 Intrinsic Value score (a total of four items; Literature/Humanities,  $\alpha = 0.85$ ; Philosophy/Political Science,  $\alpha = 0.87$ ) and a Semester 2 Intrinsic Value score (a total of four items; Literature/Humanities,  $\alpha = 0.86$ ; Philosophy/Political Science,  $\alpha = 0.90$ ).

In a section separate from the course ratings, attainment value was assessed with a global (rather than course-specific) item: "It's important to me to get good grades in my courses, even if I'm not that interested in them." We designed this item to measure the attainment value students ascribed to high academic performance, independent of how much they were or were not interested in their courses (i.e., aside from their intrinsic value), to reinforce the distinction between the task values. We used a global rather than course-specific item because grades are important to first-year undergraduates regardless of the classes they take. Grades in general are one of the most central domains on which their self-worth is based (Crocker et al., 2003). Moreover, as our first-year students did not choose their courses, their value for grades is likely to be generalized (rather than tied to specific courses), as an indication that they are competent or intelligent enough. The item was rated on a 6-point scale (1 = Strongly disagree, 6 = Strongly agree). As before, we collapsed mid- and late-semester ratings (a total of two items) into a single Semester 2 attainment value score,  $r(163) = 0.56$ ,  $p <$

<sup>5</sup> There was no significant difference between the mid- and late-Semester 1 questionnaire on endorsement of a learning goal in either course. For both courses, endorsement of a performance-approach goal was significantly higher in the mid-Semester 1 questionnaire ( $M_{\text{Literature/Humanities}} = 4.46$ ;  $M_{\text{Philosophy/Political Science}} = 4.46$ ) than in the late-Semester 1 questionnaire ( $M_{\text{Literature/Humanities}} = 4.17$ ;  $M_{\text{Philosophy/Political Science}} = 4.05$ ,  $ps < 0.01$ ). No achievement goal differences between mid- and late-Semester 2 emerged in either course.

**Table 2**  
Descriptive statistics and correlation matrix for philosophy/politics course.

Variables	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Condition (1=interest development -1=study skills)			–	–	–	–	–	–	–	–	–	–	–
2. Gender (1=man, 0=woman)			-.03	–	–	–	–	–	–	–	–	–	–
3. Semester 1 Learning Goals	6.19	.74	.07	.04	–	.13	.51**	.21*	.54**	.03	.26*	.14	.11
4. Semester 1 Performance- Approach Goals	4.23	1.13	.07	.04	.12	–	.18*	.31**	.05	.71**	.10	.29**	.23*
5. Semester 1 Intrinsic Value	4.75	.98	.03	.09	.52**	.17*	–	.10	.39**	.14	.51**	.13	.13
6. Semester 1 Attainment Value	4.80	.88	.07	-.03	.22*	.31*	.10	–	.23*	.24*	.14	.63**	.05
7. Semester 2 Learning Goals	5.95	.81	-.02	.02	.54**	.05	.39**	.23*	–	.17*	.50**	.16*	.05
8. Semester 2 Performance- Approach Goals	4.05	1.24	.02	.09	.03	.71**	.15	.24*	.17*	–	.15	.33**	.24*
9. Semester 2 Intrinsic Value	4.71	.91	.08	.09	.27**	.10	.52**	.14	.49**	.16*	–	.16	.20*
10. Semester 2 Attainment Value	4.92	.91	.06	.03	.15	.29**	.14	.63**	.16*	.33**	.16*	–	.23*
11. Semester 2 Final Grade	8.00	1.30	.10	.26**	.11	.22*	.15	.03	.05	.26*	.23*	.23*	–

Note. Correlation matrix displays zero-order coefficients below the diagonal (in grey) and partial correlation coefficients controlling for gender and condition above the diagonal. \* $p < 0.05$ , \*\* $p < 0.01$ .

0.001;  $\alpha = 0.71$ .<sup>6</sup>

#### 4.4.3. Final grades (end of semester 2)

We obtained students' official final letter grades from Registry after the end of the academic year. Grades were for Semester 2 only, as Semester 1 was ungraded. They were on an 11-point letter grading system, from F to A+ (the college does not issue grades of C- or D-, although using a 13-point scale that includes those grades does not change any of our results), which were recoded into an interval numeric scale (1 = F, 11 = A+). The distribution of grades ranged from F to A in both the Literature/Humanities ( $M = 7.81, SD = 1.32$ ) and Philosophy/Political Science ( $M = 8.00, SD = 1.30$ ) courses.

<sup>6</sup> No differences in task values from mid- to late-Semester 1 emerged in either course. In Semester 2, there was no significant difference in attainment value between the mid- and late-semester questionnaires. For the Philosophy/Political Science course only, intrinsic value was significantly lower in the mid-Semester 2 questionnaire ( $M = 4.61$ ) than in the late-Semester 2 questionnaire ( $M = 4.76$ ),  $p = 0.015$ .

## 5. Results

### 5.1. Preliminary analyses

Descriptive statistics, zero-order correlation coefficients among all variables, and partial correlation coefficients among variables while controlling for orientation exercise condition and gender are provided in Table 1 (for the Literature/Humanities course) and Table 2 (for the Philosophy/Political Science course).

#### 5.1.1. Effects of covariates (condition and gender) on key variables

Condition and gender showed significant associations with several central variables (see Tables 1 and 2). Therefore, we included condition and gender as covariates in all paths of both models in order account for their variance when examining associations between key variables and

to rule them out as alternative explanations for our findings.<sup>7</sup>

## 5.2. Main analyses

### 5.2.1. Analytic approach

Following Hulleman et al. (2008), we used regression-based path analysis to test our proposed pathways. We tested two independent indirect paths from achievement goals to achievement outcomes: (a) learning goals predicting final course grade through intrinsic value, and (b) performance-approach goals predicting final course grade through attainment value. These correspond to Hypothesis 1 and Hypothesis 2, respectively. We tested these paths in each course, first, with the values-not-controlled models (see Fig. 1, top), and second, with the values-controlled models (see Fig. 1, bottom).

Testing separate models for each course enabled us to evaluate the relevance and robustness of the model across two distinct academic courses while maintaining at least five participants per parameter, as recommended by Bentler and Chou (1987).<sup>8</sup>

Hypothesized paths were tested in *Mplus* (version 8), using full-information maximum likelihood to handle missing data (Graham, 2009). Although our focus was on the paths to test our central hypotheses, we also report goodness-of-fit indices of the full model for each course using Chi-square (in which non-significance indicates good fit) and other indicators of model fit. These included the Comparative Fit Index (CFI), in which a well-fitted model is determined by values close to or over 0.95 (Hu & Bentler, 1999), the Root Mean Square Error of Approximation (RMSEA), in which values lower than 0.08 indicate good fit (Browne & Cudeck, 1993), and the standardized root mean square residual (SRMR), for which values of 0.08 or below are considered evidence of good fit (Kline, 2011).

### 5.2.2. Results of the values-not-controlled models in literature/humanities and philosophy/political science

We first present results of the values-not-controlled model for both courses (see Fig. 2). For clarity of presentation, the complete statistics for each path in the model (including non-significant paths and covariates) are provided in Supplemental Table 1 for Literature/Humanities and Supplemental Table 2 for Philosophy/Political Science.

Fit indices for the values-not-controlled models suggested excellent model fit in the Literature/Humanities course ( $\chi^2(1) = 0.43, p = 0.513$ , CFI = 1.00, RMSEA = 0.00, SRMR = 0.01, and  $R^2_{\text{grades}} = 0.10$ ) and good fit in the Philosophy/Political Science course ( $\chi^2(1) = 2.16, p = 0.142$ , CFI = 0.98, RMSEA = 0.083, SRMR = 0.02, and  $R^2_{\text{grades}} = 0.16$ ).

We turn next to examining the hypothesized pathways from achievement goals to final grades via task values. See Supplemental

<sup>7</sup> Specifically, learning and performance-approach goals in the Literatures/Humanities course were higher in the interest-development condition than in the study-skills condition. Furthermore, men earned higher grades than women in both courses. See Supplemental File for Results of the values-controlled and values-not-controlled models without gender and condition covariates. Results are similar to those presented in the main text.

<sup>8</sup> Although participants were nested within different classroom instructors, a multilevel approach was contraindicated because our sample included between nine and 11 instructors, which is too few to support multilevel analyses (Kreft, 1996; Maas & Hox, 2004, 2005; Moineddin et al., 2007), but too many to include as dummy-coded covariates given our sample size. More importantly, the average intraclass correlation for the variables included in each model was particularly low (ICCs between 0.02 and 0.03), indicating that only 2–3 % of the variance in each model was attributable to the classroom. Based on the average cluster sizes, this indicated an average design effect of 1.36 in the Literature/Humanities class and 1.29 in the Philosophy/Political Science class. When the design effect is  $< 2$ , estimates from single-level analyses not accounting for clustering are generally unbiased enough that multilevel methods need not be used (e.g., Lai & Kwok, 2015). Therefore, we tested hypotheses using path models.

Table 1 for complete results of the Literature/Humanities course and Supplemental Table 2 for complete results of the Philosophy/Political Science course.

First, we examined the learning goal pathway in both courses (Hypothesis 1). As shown in Fig. 2, and consistent with past research (e.g., Hulleman et al., 2008), greater endorsement of Semester 1 learning goals (but not Semester 1 performance-approach goals), predicted significantly higher Semester 2 intrinsic value in both courses. In turn, Semester 2 intrinsic value significantly predicted higher final course grades in both courses. There was no direct association between Semester 1 learning goals and Semester 2 final course grade in either course. However, in support of the hypothesized learning goal pathway, an analysis using 5000 bias-corrected bootstrap samples showed that the indirect effect of Semester 1 learning goals on final course grade via Semester 2 intrinsic value was significant in the Literature/Humanities course ( $\beta = 0.05$ , 95 % CI [0.006, 0.126]) and in the Philosophy/Political Science course ( $\beta = 0.04$ , 95 % CI [0.005, 0.099]).

Next, we examined the performance-approach goal pathway (Hypothesis 2). As shown in Fig. 2, higher Semester 1 performance-approach goals (but not learning goals) predicted increased Semester 2 attainment value in both courses. In turn, greater attainment value predicted higher final course grades in both courses. As with learning goals, there was no direct association between performance-approach goals and final course grade in Literature/Humanities; however, the indirect effect of Semester 1 performance-approach goals on final course grades, via Semester 2 attainment value, was significant,  $\beta = 0.07$ , 95 % CI [0.018, 0.118]. In Philosophy/Political Science, there was a direct association between performance-approach goals and final course grades, which is consistent with some prior research (e.g., Harackiewicz et al., 2000; Huang, 2012; Hulleman et al., 2008, 2010; Van Yperen et al., 2014). Furthermore, and supporting the hypothesized performance-approach goal pathway, this direct effect was partially mediated by attainment value: the indirect effect of Semester 1 performance-approach goals on final course grades through Semester 2 attainment value was significant,  $\beta = 0.04$ , 95 % CI [0.004, 0.097].

In summary, the values-not-controlled model yielded multiple pathways to achievement in both courses. Supporting Hypothesis 1, learning goals uniquely and positively predicted grades via increased intrinsic value for the course. Supporting Hypothesis 2, performance-approach goals uniquely and positively predicted grades via increased global attainment value. In Philosophy/Political Science only, performance-approach goals also directly predicted higher grades.

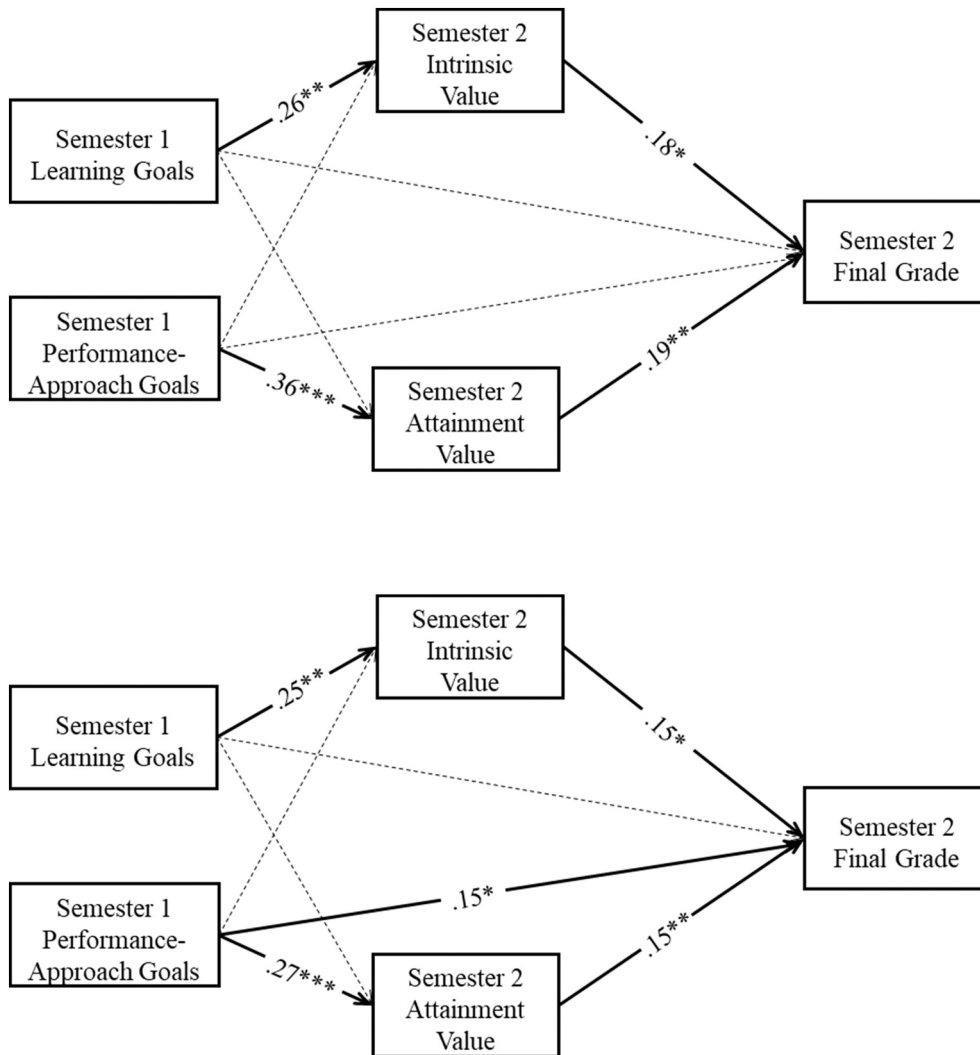
### 5.2.3. Results of the values-controlled models in literature/humanities and philosophy/political science

We next present results of the values-controlled models for both courses (see Fig. 3). Statistics associated with each link in the model are fully presented in Supplemental Table 1 for Literature/Humanities and Supplemental Table 2 for Philosophy/Political Science.

Fit indices for the values-not-controlled model suggested excellent model fit in the Literature/Humanities course ( $\chi^2(1) = 0.378, p = 0.538$ , CFI = 1.00, RMSEA = 0.00, SRMR = 0.01, and  $R^2_{\text{grades}} = 0.10$ ) and in the Philosophy/Political Science course ( $\chi^2(1) = 0.540, p = 0.463$ , CFI = 1.00, RMSEA = 0.00, SRMR = 0.01, and  $R^2_{\text{grades}} = 0.20$ ). As expected, the autocorrelations of Semester 1 and Semester 2 task values were significant in both courses.

We turn next to examining the hypothesized pathways from achievement goals to final grades via task values (see Supplemental Table 1 and Supplemental 2 for complete results). First, we examined the learning goal pathway (Hypothesis 1). As shown in Fig. 3, Semester 1 learning goals did not predict Semester 2 intrinsic value (above and beyond Semester 1 intrinsic value) in either course. As such, there was no significant indirect effect of learning goals on course grade via intrinsic value, and thus, no support for Hypothesis 1, in contradiction to the findings of the values-not-controlled model. However, higher Semester 2 intrinsic value significantly predicted a higher final course





**Fig. 2.** Values-not-controlled models for the literature/humanities course (top) and philosophy/political science course (bottom)  
 Note. Standardized coefficients are shown. Dashed lines represent non-significant links. Covariates of gender and condition were omitted for clarity. The indirect effects for both achievement-goal pathways were significant. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

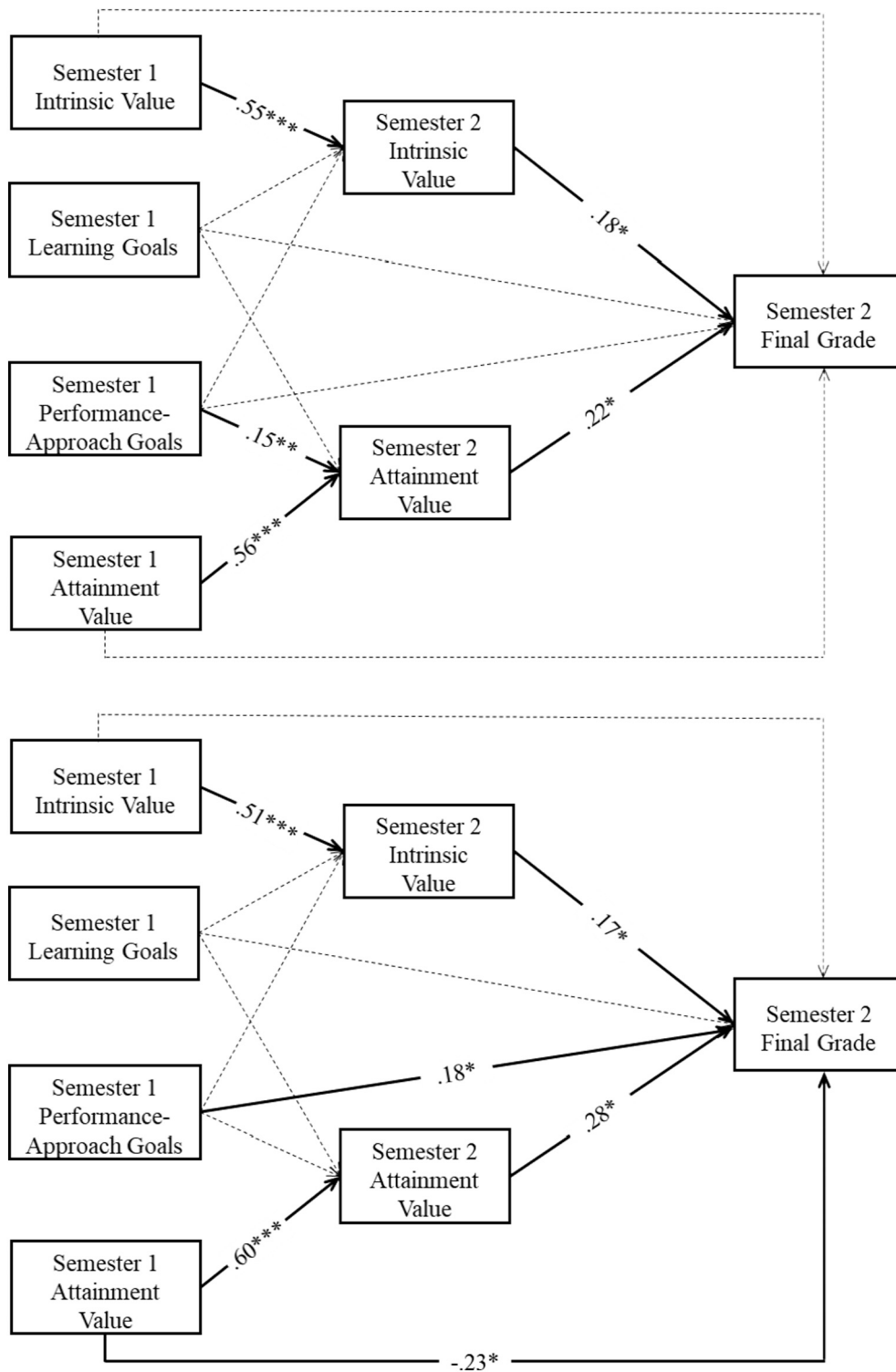
grade in both Literature/Humanities and Philosophy/Political Science. Next, we examined the performance-approach goal pathway (Hypothesis 2). Semester 1 performance-approach goals predicted Semester 2 attainment value in Literature/Humanities but not in the Philosophy/Political Science course. Higher Semester 2 attainment value predicted higher final course grade in both Literature/Humanities and Political Science. As such, we found a significant indirect effect of Semester 1 performance-approach goals on final grade via Semester 2 attainment value in the Literature/Humanities course ( $\beta = 0.03$ , 95 % CI [0.004, 0.094]) but not in the Philosophy/Political Science course. Thus, for the values-controlled model, we found support for Hypothesis 2 only in the Literature/Humanities course. Again, there was a direct effect of Semester 1 performance-approach goals on final course grade in the Philosophy/Political Science course only.<sup>9</sup> In summary, we did not find consistent support for multiple

<sup>9</sup> Semester 1 attainment value showed an unexpected negative association with final course grade in Philosophy/Political Science (see Fig. 3). This may have been the result of a suppressor effect (Lutz, 1983); after accounting for the variance in final grade associated with Semester 2 attainment value, which showed a positive association, any remaining variance associated with Semester 1 attainment value was in the negative direction.

pathways once we controlled for initial task values. The results of the values-controlled model did not support the learning goal pathway (Hypothesis 1) and only supported the performance-approach goal pathway (Hypothesis 2) in one of the two courses. This contradicts the results of the values-not-controlled model, which found support for both hypothesized pathways in both courses. However, there was one set of findings that was consistent across both courses and all models: Semester 2 intrinsic and attainment value independently predicted higher final course grade.

5.2.4. Testing alternative models

Finally, we considered two alternative models in explaining final grades. We summarize the conclusions here; analyses and statistics are reported in the Supplemental File. First, we tested reverse-order pathways in which Semester 1 task values predicted final grades via Semester 2 achievement goals. Similar to the central models, we conducted a “goals-not-controlled” model that did not control for initial achievement goals, and a “goals-controlled” model that did. Both models showed acceptable fit. However, although intrinsic value and attainment value predicted subsequent achievement goals in the goals-not-controlled model, these paths became non-significant in the goals-controlled model. Moreover, Semester 2 learning and performance-approach goals did not predict final grades in the goals-controlled models (see



**Fig. 3.** Values-controlled model for the literature/humanities course (top) and philosophy/political science course (bottom). Note. Standardized coefficients are shown. Dashed lines represent non-significant links. Covariates of gender and condition were omitted for clarity. The indirect effect for the performance-approach goal pathway in Literature/Humanities was significant.  $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ .

Supplemental File). Thus, there were no significant indirect pathways from task values to grades via achievement goals.

Second, we tested a multiplicative (i.e., interactive) multiple goals model (e.g. Harackiewicz et al., 2002), in which holding relatively high levels of both achievement goals would result in the highest grades. However, we found no significant interaction of learning and performance-approach goals in either course, and thus did not find

support for the multiplicative model.

### 6. Discussion

Past research on the interrelation of undergraduates' goals and values has posited multiple motivational pathways through which students achieve in their courses. In the present study, we address key

limitations in this literature that were found to influence the evidence in support of those pathways. In doing so, the results invite us to reconsider the processes by which achievement goals and task values may predict final course grades, and they shed light on steps for future research.

### 6.1. The roles of achievement goals and task values in predicting achievement in year-long courses

Extending prior work on achievement goals and task values, we examined whether learning and performance-approach goals predict achievement indirectly through different mechanisms, namely, intrinsic value and attainment value. Employing a longitudinal design, we found that evidence in support of these pathways depended on whether the analyses accounted for stability in task values over time. To that end, in the model that did not control for initial task values, the hypothesized multiple pathways emerged: Students' goal to learn new information and to challenge themselves (i.e., learning goals) earlier in their first year (Semester 1) predicted greater enjoyment and interest in their course material later in the year (Semester 2). It was through this intrinsic value that learning goals indirectly predicted higher grades at the end of the year. By contrast, students' goal to demonstrate or validate their abilities (i.e., performance-approach goals) earlier in the year predicted a stronger belief that high grades are important to earn (regardless of interest) later in the year. It was through this attainment value that performance-approach goals predicted students' year-end grades. These patterns were consistent across two different courses in students' first-year curriculum, and they dovetail with past research revealing multiple pathways in college, which also did not control for initial task values (Hulleman et al., 2008).

However, in the models that controlled for initial task values, we did not find consistent support for the hypothesized pathways. The learning goal pathway did not emerge in either course. Once students' pre-existing level of intrinsic value was accounted for, learning goals in the first semester no longer predicted intrinsic value in the second semester. The performance-approach goal pathway did emerge in one of two courses (Literature/Humanities) even after accounting for students' initial attainment value. Taken together, however, longitudinal evidence for the pathways was not robust.

Our results suggest that the reasons students developed intrinsic value or attainment value in the first place may have had little to do with students' initial achievement goals. Potentially, the value students derived from engaging in the coursework may have been directly shaped by other factors instead. For example, task values may depend on characteristics of the coursework itself (e.g., whether it was engaging and interesting), past achievement, expectations of success, or otherwise (Eccles & Wigfield, 1995; Wigfield & Eccles, 2020).

Regardless of their origins, second-semester intrinsic and attainment value accounted for unique variance in final grades, highlighting the possibility that these task values represent different value-based routes to achievement. That we found separable effects of intrinsic and attainment value is notable in part because past research has not consistently sought to distinguish between different types of task value. Although Eccles and colleagues theorized distinct task values (e.g., Eccles & Wigfield, 1995; Eccles & Wigfield, 2002), previous studies on the interrelation of achievement goals and values often assessed task values as a singular construct, usually by collapsing across intrinsic, attainment, and/or utility value (e.g., Hall et al., 2016; Kahraman & Sungur, 2013; Khezir Azar et al., 2010; Lau et al., 2008; Liem et al., 2008; Plante et al., 2013). Further research on the role of task values in achievement is needed, particularly longitudinal models that can control for baseline levels of achievement (as ours could not). Nevertheless, intrinsic and attainment value as distinct routes to achievement would be in keeping with the spirit of multiple pathways—the idea that students can achieve positive educational outcomes through different mechanisms—which had inspired our investigation.

### 6.2. Implications for multiple pathways and future research

Our results suggest that perspectives on multiple pathways deserve reconsideration, in light of the apparent lack of association between earlier achievement goals and subsequent task values. However, it is important to recognize that the present research does not directly contradict or refute research by Hulleman et al. (2008) and others. For one, the pathways we examined were not identical to theirs—they did not assess attainment value—nor did we examine identical educational contexts (we examined mandatory first-year college courses whereas they studied an elective psychology course in college). It is unknown how the results of past research would have changed, if at all, by controlling for initial task values.

At the same time, in revealing the variation in results from our values-not-controlled models to our values-controlled models, our results encourage future multiple pathways work to pursue issues of change and stability. Although we did not find robust longitudinal evidence of our hypothesized learning goal pathway or performance-approach goal pathway, it is conceivable that the pathways might emerge or be observable under other conditions. For example, one or two semesters of a college course may be too short of a time frame for learning and performance-approach goals to result in the internalization of distinct task values. However, perhaps achievement goals help shape task values as part of a longer-term developmental process. Similarly, while achievement goals may not significantly shape task values for one's mandatory coursework—which students may be engaging in only because it is required, not due to internal motivations—perhaps achievement goals play a role in the development of task values for courses within one's chosen major. Future research could identify the conditions under which multiple pathways emerge.

Along with other studies, our findings indicate that educators might be advised to emphasize teaching practices that promote intrinsic and attainment value. Past research has shown that utility-value interventions, in which students consider the personal relevance and usefulness of their course material, can promote interest and achievement for those who lack it (e.g., Hecht et al., 2019; Hulleman & Harackiewicz, 2009). Likewise, interventions that teach students that interests are developable, not fixed, can increase interest (or intrinsic value) and achievement in academic domains outside of their pre-existing interest areas (O'Keefe et al., 2017, 2021). However, there may also be unique benefits to promoting intrinsic or attainment value, even beyond course achievement outcomes shown in the present research. Intrinsic value has specifically been shown to relate to day-to-day academic engagement, such as taking part in class discussions or spending more free time engaging in a relevant activity (e.g., Durik et al., 2006). Attainment value, on the other hand, may be linked to long-term academic pursuits; for example, it may predict students' enrollment in challenging courses (e.g., Safavian & Conley, 2016).

To that end, as shown in prior research (e.g., O'Keefe et al., 2013), educators can structure classroom environments to promote intrinsic value, and potentially attainment value as well. The TARGET classroom, for example, highlights six dimensions by which to encourage an orientation toward enjoyment in learning (e.g., Ames, 1992; Lüftenecker et al., 2014). These include Tasks (e.g., administration of varied and diverse learning activities), Authority (providing students with autonomy in how they learn), Recognition (rewarding students for progress rather than ability), Grouping (using non-competitive group work), Evaluation (evaluating students according to personalized goals and criteria), and Time (permitting flexibility in time to complete tasks). In contexts similar to those studied in the current work, attention to these dimensions could potentially set students on an intrinsic value-based route to academic achievement. Other work suggests that students' attainment value depends on perceptions that one's teacher has designed a curriculum that is relevant and meaningful (McKellar et al., 2019). This suggests that teachers' efforts to draw connections between the material and students' lives is likely to encourage the development of

attainment value.

### 6.3. Limitations, theoretical contributions, and future directions

Beyond accounting for stability in task values, the present study had several methodological strengths. First, by testing our model in year-long courses, we examined our proposed pathways over a longer time period than most studies, which tended to focus on a single semester (e.g., Harackiewicz et al., 2008; Hulleman et al., 2008). Given our aim to highlight change in task values, extending the span of time between initial and subsequent task values likely provided a better design. Furthermore, because the targeted courses were mandatory and completed simultaneously by the full cohort, our sample included many types of students with diverse academic trajectories, rather than only students who chose to study a specific subject (e.g., psychology majors) and who would likely already be relatively high in motivation. Given this, and because our study was conducted at a liberal arts college in Singapore, we also help address a broader concern regarding generalizability beyond typical American psychology student samples (see Arnett, 2008).

However, our design also introduced some limitations. First, the attainment value measure used in both models assessed students' general value for earning high grades across courses, regardless of their interest in the material. Although it is potentially limiting that we did not measure course-specific attainment value, research shows that earning good grades in general is centrally important to undergraduates; for instance, first-year students tend to base their self-worth on their grades across all of their courses (e.g., Crocker et al., 2003; Crocker & Park, 2011). Regardless, the pathway from attainment value to grades was robust and consistent across both substantively different courses. Second, we were unable to control for prior achievement because students' first-semester courses were ungraded. Thus, we are unable to draw stronger conclusions about the role of task values in increasing achievement, although they represent an intriguing direction for future research.

Despite limitations, our study makes important contributions to the literature. Interventions that solely target achievement goals may not be sufficient to bolster students' grades. Although more research is needed to confirm the role of task values in achievement, focusing on internalization processes that lead to the adoption of distinct task values might be key to promoting achievement. Importantly, adaptive outcomes can be achieved without necessarily implementing costly, time- or labor-intensive practices like changes to curriculum or the classroom environment, such as in the TARGET classroom described earlier. Even relatively brief reflective writing exercises can be effective (see O'Keefe et al., 2021; Walton & Wilson, 2018). For example, they may guide students to reflect on the meaning of course material for their personal lives periodically during the semester to leverage utility value (Hulleman & Harackiewicz, 2021) or to leverage a combination of utility, intrinsic, and attainment value (Acee & Weinstein, 2010; Perez et al., 2022). Such strategies may provide an optimal setting for the adoption of distinct and complementary task values.

## 7. Conclusion

Our findings speak to the motivational processes that influence achievement in college courses. The present work suggests that more research is needed to understand if, or under what conditions, learning and performance-approach goals give rise to distinct task values during college. Moreover, intrinsic and attainment value might offer unique routes to achievement, and if so, it may be advisable for educators and institutions to diversify educational strategies to develop the value students place on their courses. Doing so may be a fruitful avenue to ensure that a larger proportion of college students are successful in their first year of college.

## Appendix A. Supplemental File

Supplemental File for this article can be found online at <https://doi.org/10.1016/j.lindif.2022.102186>.

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