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Do undergraduates' motives for studying change as they progress through their degrees?

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Background. Research has suggested that students can approach their studies with different goals, one goal being to understand material (mastery) and another to obtain better grades than others (performance).

Aim. The main aim of this study was to assess whether these goals change as students progress through their degrees.

Sample. 1857 students at a Scottish university.

Methods. Students were asked to complete a questionnaire as they waited to register for their courses. The questionnaire was based on an achievement motivation questionnaire developed by Elliot and McGregor (2001) to assess students' mastery and performance goals; there were also questions on students' expectations about their courses.

Results. Students in years 2, 3 and 4 were substantially less likely to want to master their subjects than students in year 1. They were also more concerned with grades and less likely to expect to enjoy their courses.

Conclusion. The decline in students' motivation to master their subjects raises potentially important questions about whether pressures for grades undermine students' interest in their studies.

One aim of a university education is practical: to impart information or skills that will be of practical value to students in their later lives and, more broadly, to society. Another goal – one with a long and rather noble tradition – is to impart or encourage a love of learning for its own sake, rather than simply as a means to outcomes, such as better jobs. It is relatively easy to assess the imparting of knowledge, through objective tests, but how can we measure love of learning? And do universities actually succeed in increasing students' appreciation of learning and rational thought?

The first question – how can we measure love of learning? – has turned out to be more tractable than might once have appeared. One key step was McClelland, Atkinson, Clark, and Lowell, (1953) development of the concept of achievement motivation.

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Building on earlier work by Murray (1938), McClelland *et al.* proposed that humans have an innate need to achieve, a need which was later described by Atkinson (1964) as 'a capacity to experience pride in accomplishment' (Atkinson, 1964, p. 214). Researchers soon came to the view that this need for achievement is not unitary, but instead encompasses two fundamentally different motives. In some situations, they suggested, we try to do well on a task simply because of the pleasures inherent in mastering it, while in others our goal is to perform well in order to attain some external goal, such as impressing others. In one version of this distinction, Deci (1975) differentiated between intrinsic and extrinsic motivation. Intrinsically motivated behaviours are those performed without any apparent reward; conversely, extrinsically motivated behaviours are those maintained by consequences provided by others. If a child draws a picture in order to be praised by others, for example, this would be an example of extrinsic motivation; if the child draws the picture because he or she finds drawing enjoyable, then the behaviour would be said to be intrinsically motivated.

A similar distinction between intrinsic and extrinsic motives emerged in the work of goal theorists (e.g. Diener & Dweck, 1978; Dweck & Leggett, 1988; Elliott & Dweck, 1988). Whereas achievement-motivation theorists viewed achievement motives as relatively stable aspects of a personality, as a trait or disposition, most goal theorists viewed goals as situation specific: An individual might adopt one goal in one situation and an entirely different goal in another. However, like achievement motivation theorists, goal theorists distinguished between two fundamentally different types of goals. With some tasks, our goal is to master the task for its own sake, whereas in others it is to perform well in order to achieve some goal extrinsic to the task, such as impressing others. This distinction, between mastery goals and performance goals, has since been widely adopted and further developed (e.g. Ames, 1992; Elliot & Church, 1997; Elliot & Harackiewicz, 1994, 1996; Elliot & McGregor, 2001; Maehr & Midgley, 1991, 1996; Nicholls, 1984; Thorkildsen & Nicholls, 1998 see Pintrich, 2003, and Elliot, 2005, for reviews).

In yet another example of convergence on a common set of themes, a similar distinction emerged within the more applied field of educational research. Researchers here commonly analysed students' behaviour in terms of their interest in a subject. The concept of interest is not as global as that of intrinsic motivation – one can be interested in one book but not another, or in one subject but not another – but there is considerable overlap between the concept of intrinsic motivation and what educational psychologists have called individual interest (e.g. Hidi, 2000; Krapp, Hidi, & Renninger, 1992). An individual interest is a stable attitude or orientation to an activity that develops over long periods, and typically involves an ever-deepening knowledge and appreciation of the activity. A student with an individual interest in psychology, for example, would be strongly motivated to learn more about this subject. And again researchers have found it useful to draw a distinction based on whether activities are valued for themselves or only as a means to an end. A student who studied psychology solely in order to get a well-paid job, for example, would not be viewed as having an interest in psychology. (See Eccles & Wigfield, 2002.)

The effects of students' goals

These approaches differ in detail, but all recognize a fundamental division between studying a subject for its own sake – because it is interesting or enjoyable – and studying it as a means to an end. Moreover, a growing body of evidence indicates that which of these approaches a student adopts can affect not only their enjoyment of their subjects but the grades that they obtain.

Before discussing this evidence, we need to introduce a further distinction between types of goals. Elliot (1999) proposed that both mastery and performance goals should be further subdivided on the basis of whether they involve approaching a goal or avoiding it. In the case of studying, an example of a performance-approach goal would be to obtain one of the highest grades in the class; an example of a performance-avoidance goal would be to avoid failing.

A study by Harackiewicz, Barron, Tauer, and Elliot (2002) illustrates the importance of which goals students adopt. They assessed psychology students' goals at the beginning of their freshman semester and then measured their interest in the subject over subsequent semesters, as indexed by the number of psychology courses they took and whether they became psychology majors. They found that students with a strong mastery orientation were much more likely to enjoy the first-semester course than students with a performance orientation and they were also more likely to become psychology majors. However, a mastery orientation did not predict grades; the best predictor of grades proved to be a performance-approach orientation.

Other studies have supported the value of performance-approach goals and also highlighted the usefulness of distinguishing performance-approach and performance-avoidance goals. Whereas students with performance-approach orientations get better grades, those with performance-avoidance orientations invest less effort, obtain lower grades and are more likely to give up if they experience failure (e.g. Church, Elliot, & Gable, 2001; Elliot & Harackiewicz, 1996; Grant & Dweck, 2003). On the basis of such findings, Harackiewicz and her colleagues suggested that the optimal approach for students is to pursue a combination of mastery and performance-approach goals, thereby obtaining the best of both worlds – heightened interest in their subjects and also better grades. (See also Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002.)

However, other researchers have been more sceptical about the value of performance-approach goals. One problem has been that performance-approach goals are not always associated with higher grades. Grant and Dweck (2003), for example, studied performance in a difficult chemistry course; in this demanding context, it was students with mastery goals who obtained better grades, not those with performance-approach goals. (See also Church *et al.*, 2001.) Moreover, Midgley, Kaplan, and Middleton (2001) and Brophy (2005) have summarized evidence that a performance-approach orientation can have a variety of harmful effects, including shallower forms of studying (emphasizing rote memorization rather than learning), poorer retention and reduced willingness to cooperate with others. Thus, while a performance orientation can lead to better grades in courses that emphasize memorization and rely on multiple-choice exams for testing, these authors argue an emphasis on performance, even performance approach, is on balance harmful.

In summary, there is substantial agreement that mastery goals lead students to greater enjoyment of their studies, but less agreement on the relationship between students' goals and the grades that they obtain. Whatever the precise relationship between goals and grades, research has established that the goals that students adopt can substantially influence how much they enjoy their courses and how deeply and thoughtfully they study.

What factors promote mastery?

It is clear that students who aim to understand or master their subjects are more likely to enjoy their subjects and think deeply about them. What, then, determines whether

individuals will adopt mastery goals? Much of the relevant research has come from studies of intrinsic motivation, although similar findings have also been obtained in some studies on goals. First consider the conditions that promote intrinsic motivation. Deci and Ryan (1985) have suggested that one important factor is whether performance on a task leads to a feeling of competence. If a task is of the right level of complexity – neither too easy nor too hard – then successful completion will encourage feelings of competence and this in-turn can foster interest. Goal theorists have also emphasized the importance of feelings of competence in encouraging the adoption of mastery goals, and the importance of competence in encouraging interest and the pursuit of mastery has been demonstrated in a wide range of studies (e.g. Deci, 1971; Ryan, Mims, & Koestner, 1983; Senko & Harackiewicz, 2005; Vallerand & Reid, 1984).

A second key factor is autonomy. Deci and Ryan believe that people have a fundamental need to feel in control of their own behaviour; insofar as a task is engaged in freely, this will again encourage feelings of intrinsic motivation (Harackiewicz, 1979). Studies have shown that competence alone is insufficient to promote intrinsic motivation and feelings of competence need to be accompanied by feelings of autonomy (Fisher, 1978; Ryan, 1982.)

Much of the research on intrinsic motivation has focused on what educational theorists call situational interests, relatively temporary interests that are assessed within a period of hours or, at most, days. To develop a more stable, long-term interest in an activity, educational researchers believe that individuals need to also develop a sophisticated knowledge base concerning that activity (e.g. Renninger, 2000). Deepening knowledge allows an individual to begin to recognize relationships between constructs; as they become curious about the gaps in their knowledge, they can begin to develop a sense of mastery from generating their own questions and understanding the subject in greater depth.

Turning to the conditions that undermine intrinsic motivation, Deci and Ryan's theory predicts that any aspect of a task that undermines feelings of competence and autonomy will also reduce intrinsic interest. In one of the first demonstrations of this phenomenon, Lepper, Greene, and Nisbett (1973) found that children promised a reward for drawing pictures actually became less interested in drawing after receiving the reward. According to Deci and Ryan, the use of reward led the children to feel controlled and this reduction in their sense of autonomy undermined their intrinsic interest in drawing. In line with this analysis, other situations which undermine feelings of autonomy – for example, deadlines, threats and competitive pressure – have also been found to reduce intrinsic motivation. (For reviews, see Ryan & Deci, 2000, and Henderlong & Lepper, 2002.)

Do students' goals change as they advance through their degrees?

In the light of this research, what effect if any should we expect attendance at university to have on students' valuing of learning for its own sake? As might already be apparent, the answer is not straightforward. On the one hand, we could anticipate an enhancement of interest. We've seen that feelings of competence and autonomy can enhance intrinsic motivation and both could be encouraged by attendance at university. University students have far more control of what they study and when they study it than high school students, and they also have greater opportunities to develop and express their own views, all leading to greater feelings of autonomy. Moreover, in-depth exposure to subjects should sharpen skills of critical thinking as well as expanding students'

knowledge base, contributing to a deeper sense of competence. Finally, students are exposed to professors with an intense commitment to scholarship and critical thought, which might also be expected to support the development of intrinsic motivation.

Against this, it is clear that universities can also involve intense, even overwhelming pressures to perform well, and it is clear from laboratory research that such pressures can destroy interest in a task. Students face strong external pressures – to impress their friends and families, to obtain grades that will help them to find good jobs – and these pressures could overshadow any pleasures inherent in mastering their subjects.

The study by Harackiewicz *et al.* (2002), cited earlier, found that students' goals at the beginning of an introductory psychology course influenced their interest in the subject over subsequent years. However, students' goals were measured only once, so this study does not tell us whether students' goals changeover time.

In sum, despite growing evidence that students' goals influence various academic outcomes (e.g. Church *et al.*, 2001; Elliot & Church, 1997; Elliot & Harackiewicz 1994, 1996; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000; Harackiewicz *et al.*, 2002), it is far from clear whether we should expect these goals to change as students advance through their degrees; what is needed is evidence.

To this end, we asked students in each of 4 years of their university degrees to complete a questionnaire on their academic goals. The core of the questionnaire was a 12-item achievement motivation questionnaire developed by Elliot and McGregor (2001). The questions had been shown to tap four underlying constructs: mastery approach (a desire to increase competence on a task), mastery avoidance (a desire to avoid failure), performance approach (a desire to do better than others) and performance avoidance (a desire to avoid doing worse than others). In addition, there were questions on how much the students expected to enjoy their courses and find them interesting.

Most of the fourth-year psychology students in the study had filled in a similar questionnaire when they were in first year. By comparing their responses in years 1 and 4, we were able to track how their goals changed over time. This longitudinal sample provided a check on whether whatever trends we observed by comparing students in different years were also occurring in the same individuals as they advanced through their degrees.

Method

Participants

Students registering for courses at a Scottish university in the autumn semester of 2004 were asked to participate; of these, 1857 students agreed. An honours degree at this University requires 4 years of study; the sample contained 751, 377, 381 and 348 students from years 1, 2, 3 and 4, respectively. The nature of the curriculum and teaching methods obviously depended on the subject studied, but in general the honours degree becomes increasingly specialized as students advance. Teaching in first year was typically through large lecture classes and in some subjects assessment included multiple-choice exams. Study in later years involved much smaller classes or tutorial groups and assessment was usually based on essays, essay exams and, in some subjects, laboratory projects.

The questionnaire

The questionnaire contained 18 items: 3 pieces of demographic data (age, gender and degree course) and 15 questions about motivation. The first 12 questions were derived from the achievement motivation questionnaire devised and validated by Elliot and

McGregor (2001). These questions are shown in Table 1. Participants answered each question by filling in one out of seven circles, ranging from 'Not true of me' to 'Very true of me.' Their answers were later recoded, with 'Not true of me' coded as 1 and 'Very true of me' coded as 7.

Questions 13 and 14 assessed whether students expected their courses that semester to be interesting and enjoyable: 'On the whole, how enjoyable do you expect your courses to be this semester,' and 'On the whole, how interesting do you expect your courses to be this semester.' These questions were again answered by filling in one out of seven circles, with the leftmost circle labelled 'not very much' and the rightmost labelled 'a lot.' Low expectations were later recoded as 1's, high interest as 7's.

Finally, question 15 was designed to measure the relative strength of students' desire to master material as opposed to obtaining good grades. The question read 'For university courses, one possible goal is to understand the material and another is to get a good grade. What is the relative importance of each to you? Specifically, where on the following scale would you locate your feeling, between being primarily concerned with grades at one extreme (the right) and primarily concerned with understanding at the other (the left)'. Responses were again coded on a 7-point scale, where a score of 1 represented a primary concern with understanding and a score of 7 represented a primary concern with grades.

Procedure

Over a period of 4 days, a team of five researchers administered the questionnaire to students registering for their courses. For most students, registration was a two-stage process: they first registered for courses with individual departments, and they then went to a large hall where registration for all students was completed. Most students were approached as they entered the hall for central registration. In addition, to maximize participation, two groups were approached in a setting in which we thought they would be particularly likely to agree to take part. Students in the fourth year of their Psychology degree were approached by a fellow fourth-year student as they waited to register for their psychology courses; students in Nursing were asked to fill in the questionnaire immediately after they had registered, at the beginning of their first lecture. Every student who was approached in these two situations did fill in and return the questionnaire (for Psychology, $N = 85$; for Nursing, $N = 332$).

Results

The data was analysed in two stages. First, although the 12-item achievement motivation instrument had been validated by Elliott and McGregor (2001), we carried out an exploratory analysis to confirm its applicability to our population. We then conducted two-way analyses of variance to see whether students' goals were affected by the subject they were studying or the year they were in.

Factor analysis for the twelve achievement-motivation questions

The 12 items were submitted to principal components analysis with varimax rotation using SPSS. Factor analysis examines data to try to identify clusters of related variables. Each such cluster, or factor, consists of variables that correlate more highly among themselves than they do with variables outside the cluster; the extent of this clustering

is measured by an index called an eigenvalue. The principal components analysis revealed four components with eigenvalues exceeding unity. The eigenvalues and proportions of variance these components accounted for were as follows: Component 1 (Performance Approach), $\lambda = 3.5$, 29.0%; Component 2 (Mastery Avoidance), $\lambda = 2.4$, 20.2%; Component 3 (Mastery Approach), $\lambda = 1.49$, 12.4%; and Component 4 (Performance Avoidance), $\lambda = 1.1$, 8.9%. The factor loadings also appear in Table 1.

Table 1. Loadings for the four-factor solution for the 12-item achievement motivation questionnaire

	Factor			
Statement	Performance-approach	Mastery-avoidance	Mastery-approach	Performance-avoidance
It is important to me to be better than other students	**.90**			
It is important for me to do well compared to others in my courses	**.88**			
My goal in this course is to get a better grade than most of the other students	**.91**			
I am often concerned that I may not learn all there is to learn in this class		**.79**		
Sometimes I'm afraid that I may not understand the content of this course as thoroughly as I'd like		**.81**		
I worry that I may not learn all that I possibly could in my classes		**.83**	.21	
I want to learn as much as possible from all my courses			**.83**	
I desire to completely master the material presented in my courses			.77	
It is important for me to understand the content of my courses as thoroughly as possible			**.84**	
My goal in this course is to avoid performing poorly				**.79**
My fear of performing poorly is often what motivates me	.33	.36		**.44**
I just want to avoid doing poorly in my courses				**.83**

Note. Primary loadings are in bold; secondary loadings are shown only if they were greater than .20.

The 12-item four-component solution fitted the data very well apart from the statement 'My fear of performing poorly is often what motivates me.' This item did not load onto any single component strongly and it loaded equally on two components; the question was removed from subsequent analysis. The ratings of the three items for the Mastery-Approach, Mastery-Avoidance and Performance-Approach constructs, and the ratings for the two items for the Performance-Avoidance construct, were averaged to produce four scores for each participant. This gave us seven measures of motivation: Mastery Approach, Mastery Avoidance, Performance Approach, Performance Avoidance, Expected Interest, Expected Enjoyment and Mastery vs. Performance.

The effects of academic subject and year of study on student motivation

Two questions were of particular interest to us: Did students' motivations changed as they advanced through their degrees? And did any pattern of changes differ in students studying different subjects? To address the latter question, we divided participants into three categories: those studying arts subjects (e.g. English, history, languages), science subjects (e.g. biology, environmental science, mathematics, single-honors psychology) and subjects that did not seem to fall neatly into either category (e.g. psychology and business law, nursing). We then ran separate two-way analyses of variances, using the variables of year and subject studied, for each out of our seven measures of motivation. The main results are shown in Table 2; Table 2A provides the mean ratings for the three subject areas, and Table 2B provides the ratings for the 4 years of study.

Table 2. Mean motivation ratings in study 2 as a function of subject studied and year of study

	A) Subject studied mean rating			
Motive	Sciences	Arts	Others	Effect size
Mastery approach**	5.54_a	5.39_b	5.31_b	.00
Mastery avoidance*	4.61_a	4.46_b	4.45_b	.00
Performance approach***	3.24_a	3.42_b	3.64_c	.00
Performance avoidance**	5.40_a	5.16_b	5.15_b	.00
Expected interest	5.60_a	5.58_a	5.46_a	.00
Expected enjoyment**	5.36_a	5.31_a	5.10_b	.00
Mastery vs. performance	4.07_a	4.07_a	4.22_a	.00
N	858	524	475	

	B) Year of study mean rating				
Motive	year 1	year 2	year 3	year 4	Effect size
Mastery approach***	5.79_a	5.40_b	5.26_{bc}	5.19_c	.05
Mastery avoidance*	4.59_a	4.60_a	4.50_{ab}	4.33_b	.00
Performance approach*	3.27_a	3.39_{ab}	3.52_b	3.57_b	.00
Performance avoidance**	5.40_a	5.27_a	5.24_a	5.03_b	.00
Expected interest***	5.96_a	5.53_b	5.37_b	5.34_b	.04
Expected enjoyment***	5.71_a	5.18_b	5.11_b	5.02_b	.04
Mastery vs. performance*	4.01_a	4.07_a	4.12_a	4.27_b	.00
N	751	377	381	348	

Note. Means in the same row that do not share any subscript differ significantly at $p < .05$.
*$p < .05$; **$p < .01$; ***$p < .001$.

We also calculated the effect sizes for each analysis. Olejnik and Algina (2000) suggest this is particularly important when sample sizes are large, (as ours were) because small differences can still pass significance tests. Olejnik and Algina recommend using partial eta-squared ($\acute{\eta}^2$) to measure the size of the treatment effect; Cohen (1988) suggests that eta-squared values of .01, .06, and .14 be interpreted as small, medium and large effects, respectively.

As can be seen in Table 2, there were many significant effects, but in most cases the effect sizes, as measured by partial eta-squared, were very small. Therefore, we will

focus here only on results where the effect sizes were greater than.01, the minimum level recommended by Cohen (1988) as being necessary for consideration. We will refer to effect sizes that met this criterion as substantive.

The only variable to have substantive effects on student ratings was year of study, which had substantive effects on three measures of motivation: Expected Interest, Expected Enjoyment and Mastery Approach. These effects are plotted in Figures 1, 2 and 3.

As can be seen in Figure 1, the average rating of Expected Interest fell from approximately 6.0 in year 1 to 5.5 in year 2 and essentially remained at this lower level in subsequent years. Similar levels were observed in all three areas of study and there was no interaction between subject and year of study. The difference between years was significant, $F(3, 1845) = 25.04$, $p < .001$, and the effect size was $\acute{\eta}^2 = .04$. *Post hoc* comparisons using the Method of Tukey confirmed that year 1 differed significantly from each of the subsequent years ($p < .001$); no other comparisons were significant.

Figure 2 plots the change in ratings of Expected Enjoyment for different years and students in different subjects. The pattern is similar to that in Figure 1: ratings of Expected Enjoyment fell from approximately 5.7 in year 1 to 5.2 in year 2 and then remained at this lower level; similar results were obtained for students in all three subject areas. The effect of years was significant, $F(3, 1845) = 25.97$, $p < .001$, and substantive, $\acute{\eta}^2 = .04$. *Post hoc* tests indicated that ratings of Enjoyment in year 1 were significantly higher than in each of the subsequent years ($p < .001$); no other comparisons were significant.

Figure 3 shows the effect of year of study on Mastery Approach. Again, ratings fell from year 1 (approximately 5.8) to year 2 (approximately 5.4) and then remained near this level in subsequent years. Analysis of variance revealed a significant difference between years, $F(3, 1845) = 29.12$, $p < .001$, with an effect size of $\acute{\eta}^2 = .05$. *Post hoc* tests confirmed that ratings in year 1 were significantly higher than in each of the

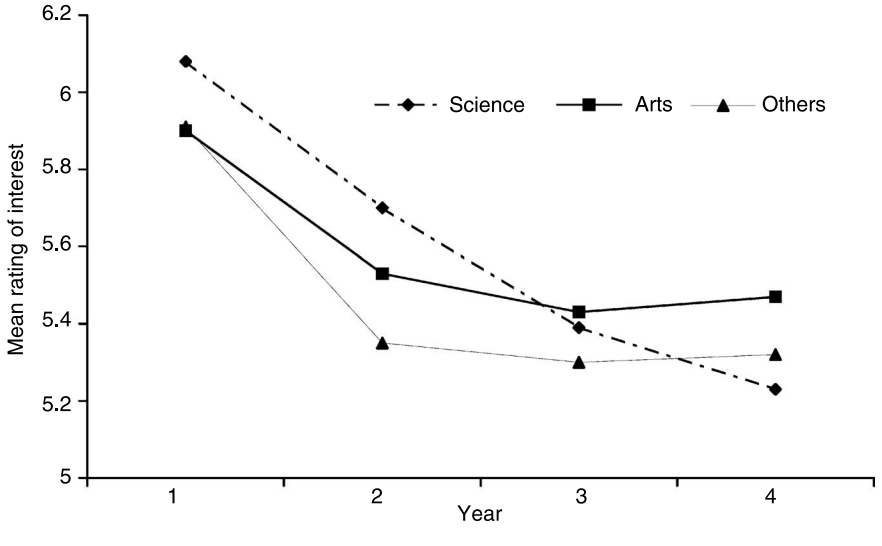

Figure 1. Mean ratings of expected course interest, for students in different years and subjects.

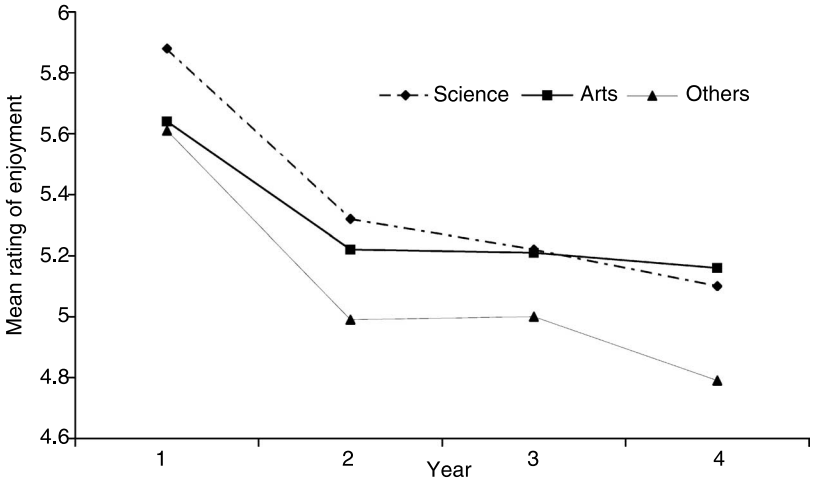

Figure 2. Mean ratings of expected course enjoyment, for students in different years and subjects.

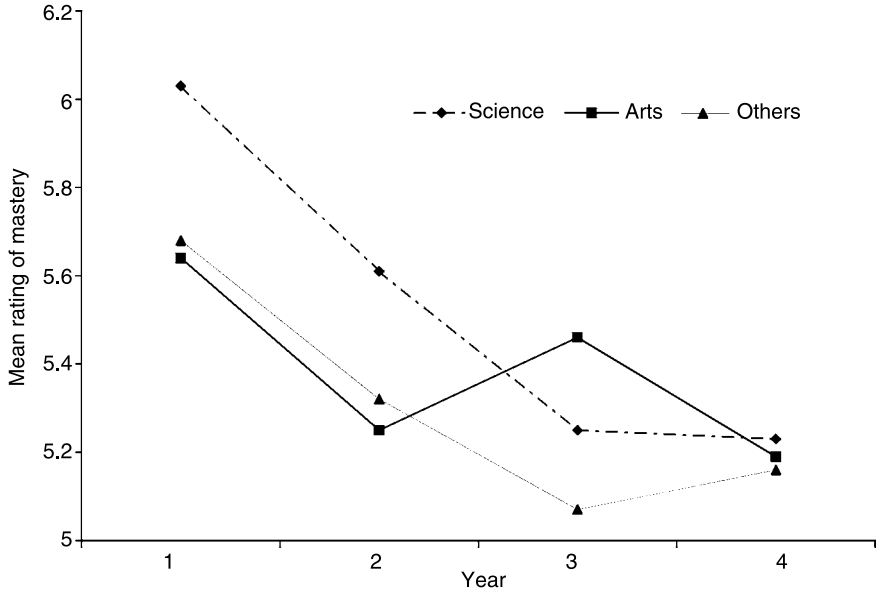

Figure 3. Mean ratings of the importance of mastering course material, for students in different years and subjects.

subsequent years ($p < .001$); in addition, ratings in year 2 were significantly higher than in year 4 ($p < .05$).

As shown in Table 2A, subject studied had significant effects on several measures of motivation, but all of these effects were small. In particular, none met the minimum criterion for effect size of .01 nor did any of the interactions between subject and year.

In order to obtain a sample with a very high participation rate, students in Nursing were asked to fill in the questionnaire at the beginning of their first lecture, immediately

Table 3. Motivation scores of nursing students as a function of year of study

	Mean rating			Standard deviation			
Motive	year 1	year 2	year 3	year 1	year 2	year 3	Effect size
Mastery approach***	6.44_a	5.73_b	5.36_c	.63	.88	1.16	.22
Mastery avoidance	4.98_a	5.10_a	4.88_a	1.47	1.21	1.33	.00
Performance approach	2.94_a	2.56_a	2.91_a	1.80	1.57	1.47	.00
Performance avoidance**	6.18_a	5.88_{ab}	5.61_b	1.25	1.27	1.43	.03
Expected interest***	6.51_a	5.89_b	5.51_c	.82	1.35	1.25	.13
Expected enjoyment***	6.31_a	5.58_b	5.35_b	1.01	1.44	1.35	.11
Mastery vs. performance	3.90_a	3.81_a	3.93_a	1.26	1.20	1.58	.00
N	145	95	83				

Note. Means in the same row that do not share any subscript differ significantly at $p < .05$.
*$p < .05$. **$p < .01$. ***$p < .001$.

after they had registered, and the results for years 1, 2 and 3 are shown in Table 3. (There were only eight students in fourth year, so we did not include data from that year.) Year of study had substantive effects on four measures of motivation: Expected Interest, $F(2, 321) = 23.16$, $p < .001$, $\acute{\eta}^2 = .13$, Expected Enjoyment, $F(2, 321) = 19.02$, $p < .001$, $\acute{\eta}^2 = .11$, Mastery Approach, $F(2, 321) = 44.81$, $p < .001$, $\acute{\eta}^2 = .22$ and Performance Avoidance, $F(2, 321) = 5.29$, $p < .001$, $\acute{\eta}^2 = .03$. *Post hoc* comparisons using the Least Significant Differences test (LSD) revealed that ratings for Expected Interest and Mastery Approach were significantly higher for year 1 than for year 2, which in-turn were significantly higher than year 3, $p < .001$. Ratings for Expected Enjoyment were significantly higher in year 1 than in years 2 and 3, $p < .001$; for Performance Avoidance, ratings in year 1 were significantly higher than in year 3, $p < .01$.

Finally, we compared the ratings of students in fourth-year Psychology with those of the same students when in first year Psychology. Since we did not request students to fill in their registration numbers in the current study, we could not identify the authors of individual questionnaires and thus we could not compare the responses of an individual in year 4 to the responses of the same individual when in year 1. However, by consulting Psychology Department records we were able to determine the registration numbers for the entire set of students who registered on the day of our study. In addition, when these students were in first year and filled in a similar questionnaire, each student entered their registration number on the questionnaire. By combining this information, we were able to identify the questionnaires filled in by our fourth-year students when this same set of students was in first year (in other words, we could not compare individuals, but we were able to compare the responses of the year 4 group as a whole to the responses of the same group when in year 1). Out of the 85 fourth-year students who registered for single-honours psychology in Study 2, we found that 63 (74%) had filled in our questionnaires when in first year. The mean ratings for the two samples are shown in Table 4.

We compared ratings for the two samples using *t* tests. Students in fourth year had significantly lower scores for Mastery, Expected Interest and Expected Enjoyment than when they were in first year (in all cases, $p < .001$), and significantly higher scores on Performance Approach and a significantly greater orientation towards grades on the single question that pitted grades against mastery. The results for the five tests were as

Table 4. Motivation scores of psychology students in years 1 and 4

	Mean rating		
Motive	Year 1	year 4	Effect size
Mastery Approach***	6.35	5.22	.22
Performance Approach*	3.11	3.60	.02
Performance Avoidance	4.71	4.97	.00
Expected Interest***	6.24	5.42	.12
Expected Enjoyment***	5.94	5.19	.08
Mastery vs. Performance*	3.81	4.40	.05
N	63	85	

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

follows: for Mastery, $t(145) = 1.14$; for Expected Interest, $t(126) = 4.41$; for Expected Enjoyment, $t(146) = 3.46$; for Mastery vs. Performance, $t(145) = 2.84$, $p < .01$; for Performance Approach, $t(141) = 182$, $p < .05$. The effect sizes for the five measures were .22, .12, .08, .05, and .02, respectively.

Discussion

The results revealed significant, sometimes substantial, differences in students' motivation in different years of study. One difference was in their motivation to master their subjects. We asked students to rate their agreement with statements, such as 'I want to learn as much as possible from all my courses' and 'It is important for me to understand the content of my courses as thoroughly as possible'; their desire to understand or master their subjects declined significantly after first year and remained at this lower level in subsequent years. This decline was accompanied by a significant decrease in their expectations that they would be interested in their courses or would enjoy them. Moreover, this effect was not peculiar to students studying one subject: we found almost identical patterns in all disciplines. Something about exposure to university seemed to be undermining students' interest in understanding their subjects.

It is important not to confuse a decline in interest or intrinsic motivation with a complete loss: students in years 2, 3 and 4 continued to score highly on various measures of intrinsic motivation. Nevertheless, the striking finding was that students' desire to understand their subjects did not increase over time, but actually fell. Moreover, the magnitude of this decline was not trivial. One widely accepted measure of effect size is eta-squared, and in Cohen's (1988) influential scheme, effects size of .01 should be considered small, effects of .06 moderate and effects of .14 large; most effect sizes in the social sciences, he reported, were between .01 and .09. Within this framework, most of the effects observed in our studies were in the small-to-medium range, with effect sizes of .04, 04 and .05 for Interest, Enjoyment and Mastery Approach, respectively.

Moreover, it could be argued that these figures actually underestimate the true sizes of these effects, as only about half the students who registered filled in our questionnaire. Crucially, the participation rate dropped substantially after first year: 55% of registering students agreed to participate in year 1, 36% in year 2, 38% in year 3 and 40% in year 4. It seems plausible that students who agreed to stop and fill in our questionnaire were in some sense more 'responsible' or self-motivated than those who

didn't. If so, then students who didn't participate in years 2–4 would have been less interested in their studies than those who did, which would mean that our results underestimate the degree to which student interest declined after first year.

This argument is, of course, speculative, but we were able to obtain two samples in which the possibility of sample bias did not arise, because every student who was approached agreed to participate. In Nursing, the pattern of results was the same as for the larger study, but the effect sizes proved to be much larger: the effects for Interest, Enjoyment and Mastery Approach (.13, .11, and .22, respectively) all approached or exceeded Cohen's criterion for large effects. An almost identical pattern was observed in Psychology: ratings of interest, enjoyment and mastery were all significantly lower in fourth year than in first year and the effect sizes were very similar to those for students in nursing (.12, .08, and .22, respectively). Thus, the effects for interest, enjoyment and mastery were all at least small-to-moderate, and where we could obtain unbiased samples they approached or exceeded the criterion for large. The effect sizes for Performance were smaller, ranging from .00 to .03, as were the changes on the question that pitted Mastery against Performance, where the effect sizes ranged from .00 to .05.

In summary, we have observed consistent, moderate-to-large declines in the extent to which students expect to enjoy their courses as they progress through their degrees, together with a shift away from a desire to master their subjects towards a desire to obtain good grades. One possibility is that this decrease reflected poor teaching at the university studied, rather than some more general effect of exposure to higher education. However, external assessment of the University's teaching does not support this interpretation. During the period from 1994–1998, all British universities were subject to intensive site visits as part of a government-initiated process called Teaching Quality Assessment; out of the 20 departments rated, 18 were in the top two categories, Excellent or Highly Satisfactory. Based on this and other information, in 2003 the Times Higher Educational Supplement rated the quality of teaching at the University as the 14th best in Britain (O'Leary, 2003). In a similar survey in 2005, the Times rated the University's teaching as the 11th best out of 100 universities surveyed (McCall, 2005); this rating was slightly higher than Oxford's! The quality of teaching at this University, in other words, appears to be not simply average but far above average. Therefore, it seems unlikely that the changes in motivation we observed will prove to be peculiar to just this one institution.

Without prejudging the generality of our findings, one question they raise is that why at least some students seem to become less concerned with understanding their subjects as they progress through their degrees. Our data do not allow us to pinpoint the cause of this shift, but research in laboratory settings has made it clear that pressure to do well can substantially undermine people's enjoyment of tasks (e.g. Harackiewicz, Abrahams, & Wageman, 1987; Harackiewicz, 1979; Koestner, Zuckerman, & Koestner, 1987; Koestner, Zuckerman, & Olsson, 1990; Ryan, 1982). It seems at least possible that the same processes could be at work in the real-life setting of higher education, where pressures to obtain good grades could be undermining student interest.

Another possibility is that students enter university with unrealistically high expectations about how enjoyable their studies will be. According to this analysis, the problem is not so much that pressures undermined interest as that initial interest levels were based on an idealized view of what university would entail; once students encountered the reality, they adjusted their expectations. In this interpretation, students need not have felt any pressure over grades; exposure to university could simply have led them to modify unrealistic expectations.

One problem for the latter explanation concerns the time course of the changes. If the problem was simply that students' expectation were overly rosy when they started university, we might expect that any adjustment would occur relatively rapidly. In line with this prediction, most of the changes we observed did occur within the first year, but not all. Ratings of Mastery Approach, Mastery Avoidance, Performance Avoidance and Mastery vs. Performance were all significantly different in fourth year than in second year. Thus, although the largest changes we observed did occur within the first year, changes continued in subsequent years and it is not clear whether an expectation analysis on its own could account for shifts that continued over a 4-year period.

In addition, while high expectations could readily explain the decrease in how much students expected to enjoy their courses, it is less clear whether expectations could explain the decrease in students' desire to learn. When we asked students whether they wanted to learn or understand as much as possible, we found that their commitment to learning decreased substantially as they advanced through their degrees. It is possible that this was again solely the result of unrealistic expectations – students found their courses weren't as interesting as they expected, and therefore became less motivated to learn the material – but we don't find this completely persuasive. Even if there was some degree of disillusionment initially, the literature on interest suggests that as students became more knowledgeable about a subject, their interest tends to increase (e.g. Renninger, 2000). In a university context, it might not be surprising if students' motivation to master material fell a bit initially, but we would have hoped and expected that interest and the desire for understanding should increase again as students became immersed in their subjects. Whatever the precise contributions of grade, pressure and unrealistic expectations, we find it somewhat worrying that students' desire to learn not only did not increase during 4 years at university, but actually fell.

One final point is that most laboratory research on intrinsic motivation has been conducted over short periods – hours or days. In Lepper and Greene's study, for example, the effect of reward was assessed 2 weeks after the manipulation. We thus know very little about how intrinsic motivation changes over longer periods. Several reviews of this literature have noted this problem. Murphy and Alexander (2000), for example, commented that 'we do not seem to have a comprehensive picture of students' motivations as they manifest across their educational careers' (p. 45). Similarly, Schunk (2000) concluded a special issue of Contemporary Educational Research devoted to this issue by writing 'Finally, I recommend a stronger focus on long-term motivation (employing) systematic, longitudinal investigations . . . Long-term motivation is a complex issue and not an easy one to investigate empirically . . . yet it offers insights into motivation from a different window and the results would have useful implications for teaching and learning' (p. 118–119).

To date, there has been very little such longitudinal research. In one such study, Remedios, Ritchie, and Lieberman (2005) studied primary-school pupils' motivation before and after sitting an exam that determined whether they would be admitted to the high school of their choice. Remedios *et al.* found that pupils' interest in their school subjects fell sharply after receiving their results, even though most had passed the exam. A control group, which for policy reasons did not take the exam, showed no decline. However, the study covered only a 6-month period, and it is possible that students would have regained their motivation once they actually began high school.

The present study adds one more element to the emerging mosaic. As in the high school students studied by Remedios *et al.* our findings raise the possibility that pressures to do well might also be undermining interest in university students. Certainly

at an anecdotal level, we have had many conversations with fourth-year students in which they said that they had lost interest in their studies and couldn't wait to escape from the pressure, perhaps by taking a year off before looking for a job or considering postgraduate study. One of the central goals of a university education is to encourage intellectual curiosity and a love of learning, but the pressures built in to university education could actually be undermining this love rather than nurturing it.

Given the potential importance of this conclusion, we think there is an urgent need for further longitudinal research in this area. Our results document a marked decline in students' desire to understand their subjects after first year, but they do not pinpoint the cause of this decline. We need more longitudinal research to determine whether pressure for grades really does undermine a love of learning for its own sake and, if so, to begin to explore what could be done to counteract this effect.

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