# Does the confidence of first year undergraduate students change over time according to achievement goal profile?

David W. Putwain[a]* and Paul Sander[b]

[a]Faculty of Education, Edge Hill University, Ormskirk, UK

[b]Department of Psychology, Cardiff Metropolitan University, Cardiff, UK.

*Correspondung author. Email: putwaind@edgehill.ac.uk

## Abstract

This study examined the changes in students' academic behavioural confidence over the course of their first year of academic study and whether changes differ by their achievement goal profile. Self-report data were collected from 434 participants in three waves: at the beginning of the first semester of their first year of undergraduate study, at the beginning of the second semester and again at beginning of the second year of undergraduate study. At the outset of their studies we identified three clusters of achievement goal profiles which differentiated between students' confidence in attaining grades, independent study and discussing course material. By the beginning of the second year any dips in confidence had disappeared which we construe in a positive light. The clusters of achievement goals shown at the outset of the first year of academic study does not seem to show any differentiated lasting disadvantage or advantage to students' confidence.


*Keywords*: academic behavioural confidence; academic self-efficacy; achievement goals; cluster analysis; undergraduate transition

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## Introduction

The first year of undergraduate study is an important period of transition for students as they adjust to a new academic environment in which standards of competence and pressure to succeed may be markedly different from previous experiences at school or college (Perry, Hall and Ruthig, 2005). For some students it can be a difficult and stressful transition whereas others adjust with relative ease (Denovan and Macaskill, 2012; Perry, Hladkyj, Pekrun and Pelletier, 2001). Educationalists and motivational theorists have been investigating the differences between students in this new setting; why some students seem to adapt to and perform better than others (e.g., Daniels, Perry, Stupinksy, Stewart, Newall and Clifton, 2013; Parker, Summerfeldt, Hogan and Majeski, 2004). In this study we build on previous research examining a variable, Academic Behavioural Confidence, shown to be relevant to a successful transition. Students who are confident in their capacity to successfully perform those behaviours required to learn in a higher education setting enjoy their studies more (Putwain, Larkin and Sander, 2013), use deep rather than shallow learning strategies (Sander, Putwain and de la Fuente, 2013), are less likely to drop out (Robbins, Lauver, Le, Davis, Langley and Carlstrom, 2004) and achieve better marks (Richardson, Abraham and Bond, 2012). Specifically, we examine changes in such beliefs over the course of the first year of study and whether students' achievement goals at the outset of the first year have any bearing on the course of change.

## Academic behavioural confidence

Academic behavioural confidence (ABC) refers to students' beliefs, or expectations, about their capability of performing those behaviours required to successfully learn and achieve at university (Sander and Sanders, 2009; Sander, Stevenson, King and Coates, 2000). Higher education follows a model of pedagogy in which the student assumes a greater responsibility

for their learning than is typically experienced in pre-higher education settings (e.g., Coates, 2005; Gillard, 2010). Successful academic behaviours would include independent study, attending taught sessions, discussing and questioning course material with peers and tutors and the learning strategies required for different types of assessments (Sander and Sanders, 2009). Accordingly, students' beliefs in their capacity to perform those behaviours should be critical to a successful transition to university from school or college.

ABC is similar to the more established and well known construct of academic self-efficacy (ASE: see Bandura, 1997) in that it refers to cognitive judgements concerned with the expectation of competence in future academic related behaviours (Sander and Sanders, 2009). Where ABC and ASE differ is in their level of domain/ context specificity. ASE is typically conceptualised with a *high* degree of domain and context specificity and measured in relation to a specific academic subject or task (Bong and Clarke, 1999; Bong and Skaalvik, 2003). In contrast, ABC is conceptualised at an *intermediate* level of domain/ context specificity (hence referred to as confidence rather than efficacy - see Bandura, 1997) and measured in relation to academic behaviours which would be required for success in a variety of different academic subjects or tasks. This approach is intended to facilitate an understanding of successful transition (and progress) for an undergraduate programme of study rather than the particular elements, courses or modules contained within an undergraduate programme which may differ in their skills and understanding taught and assessed, and require a more highly domain/ context specific approach. Thus, we chose ABC as offering a better fit to the context of the study (an undergraduate degree programme) than ASE.

**Change in ABC over time**

One might hope and expect that students ABC would develop and improve over the course of their undergraduate study as they become more familiar with standards of evaluation and

proficient with independent study. However, Papinczak, Young, Groves and Haynes (2008) showed that the self-efficacy[1] of first year medical students declined over the first seven months of study and Zusho, Pintrich and Coppola, (2003) found that the self-efficacy of undergraduate chemistry students declined from the beginning to the middle of the first semester, but not from the middle to the end of the first semester.

For instance, a student may be confident at the outset of their undergraduate programme of study, but discover that the level of study was more difficult than anticipated. There is a body of literature suggesting that students may be overconfident at the outset of their undergraduate studies, especially when entering an unknown learning environment (e.g., Klassen, 2004; Zusho et al., 2003; Shunk and Pajares, 2009). It is not unreasonable, therefore, to anticipate that students would show an initial decline in ABC during the first semester of undergraduate study. As students receive feedback, both formative and summative, over the course of their first year of study, become familiar with the standards of evaluation and more proficient at independent study, their ABC would not be expected to further decline. *This would hold, as long as standards of evaluation remained relatively similar across the first year of study*.

Accordingly, whether changes in ABC are found depends, in part, at the point in which students are measured in relation to their course progress. We measure students at three time points: at the beginning of their first semester of the first year, at the beginning of their second semester of the first year and at the beginning of the first semester of the second year. As we expect standards of evaluation to remain similar across the first year, we expect ABC scores to dip between the first and second points of measurement, but recover between the second and third points of measurement.

Any comparison of ABC scores over time may mask differences between subgroups. For instance, an examination of mean scores between two points in time may find no

differences because within the overall group of students are two subgroups. The scores of one may increase while the scores of others may decrease (e.g., Nagin, 1999, 2005; Nagin and Odgers, 2010). Our study extends the literature not only by examining changes in ABC scores over time, but also whether such changes depend on the profile of students' achievement goals at the beginning of their first year. We utilise hierarchical cluster analysis, an exploratory data reduction technique, to examine students' goal profiles at the outset of their undergraduate study. This is an approach with empirical and theoretical precedence in the extant literature to examine changes in undergraduates' learning strategies over time (e.g., Entwistle and McCune, 2013).

**Achievement Goals**

Achievement goals are defined as future-orientated, cognitive representations of competence-related aims (Elliot, 2005; Hulleman, Shrager, Bodman and Harackiewicz, 2010). The model of achievement goals adopted in this study proposes two goals, mastery and performance, differentiated against approach-avoidance dimensions of valence (Elliot and McGregor, 2001; Elliot and Murayama, 2008). Competence judged against task- or self-referenced standards is referred to as a mastery goal and competence judged against others (i.e., a normative judgement) is referred to as a performance goal. Four distinct goals result when the approach-avoidance valence is incorporated into the mastery/ performance goal distinction. A mastery-approach goal is focused on developing competence whereas a mastery-avoidance goal is focused on avoiding incomplete competence or incompetence. A performance-approach goal is focused on outperforming others whereas a performance-avoidance goal is focused on avoiding performing worse than others[2]. Mastery-approach goals are typically considered to be the most adaptive and performance-avoidance goals the least adaptive for motivational, emotional and performance processes and outcomes (Huang, 2011, 2012;

Hulleman, Shrager, Bodman and Harackiewicz, 2010; Senko, Hulleman and Harackewicz, 2011).

An alternative to examining achievement goals and their correlates and outcomes in isolation from each other is the multiple goal perspective (Baraon and Harackewicz, 2001; Pintrich, 2000; Shih, 2005; Linnenbrink, 2005; Linnenbrink-Garcia, Tyson and Patall, 2008). According to this view students may adopt multiple goals simultaneously and particular combinations of goals may prove more adaptive than others. Some research has found the high mastery/ low performance goal combination to be the most effective (e.g., Meece and Holt, 1993; Pintrich and Gracia, 1991) whereas others have found the high mastery/ high performance combination to be the most effective (e.g., Bouffard, Boisvert, Vezeau and Larouche, 1995; Liu, Wang, Tan, Ee and Koh, 2009)[3]. Few studies, to date, have examined multiple goals using the 2 x 2 framework. Liu et al. (2009) reported four, and Jang and Liu (2012) reported five, empirically differentiated clusters of achievement goals. Both studies found a profile where students endorsed all four goals. This endorsement of all four goals was the most adaptive profile for perceived competence, effort, value, enjoyment and problem solving in Liu et al. (2009). However, in Jang and Liu (2012) the most adaptive profile for motivation, self-regulated learning and achievement emotions was characterised by students strongly endorsing mastery-approach and performance-approach goals and rejecting mastery-avoidance and performance-avoidance goals.

**ABC and achievement goals**

Achievement goals focus attention on study-related cognitions and behaviours, such as effort, persistence, help-seeking, planning and withdrawal (e.g., Elliot, 1999, 2005; Grant and Dweck, 2003). Students whose goal is to develop competence (i.e., a mastery goal) hold more positive beliefs and engage in more positive learning strategies than students whose goal is to demonstrate their competence relative to others (i.e. a performance goal) (Blackwell,

Trzesniewski and Dweck, 2007; Nussbaum and Dweck, 2008). Specifically, based on research showing how achievement goals may influence future competence and study-related beliefs (e.g., Daniels et al., 2013; Phan, 2011), we anticipate that the trajectory of ABC over the course of the first year of academic study would differ depending on the profile of achievement goals shown at the beginning of the year.

Based on the findings of the multiple goal literature, we anticipate, at the most general level, that trajectories of ABC may differ depending on the profile of achievement goals and that some profiles will be more adaptive than others. More specifically, we anticipate that discrete achievement goals might relate more strongly to certain elements of ABC than others. A mastery-approach goal would focus attention on studying and attendance to improve one's competence and a performance-approach goal on grades as a means to demonstrate one's competence relative to peers and classmates. A performance-avoidance goal would focus on less verbalising so not to appear as incompetent in front of classmates and teaching staff. A mastery-avoidance goal would show a general pattern of low confidence in grades and studying due to the focus on what is not known rather than what is known. The exact trajectories of ABC would therefore depend on the make-up of the achievement goal profiles. The most adaptive profile, in terms of ABC factors, would be characterised by high mastery-approach and performance-approach and low performance-avoidance and mastery-avoidance.

**Aims of the present study**

The aims of the present study are threefold. First, we aim to establish if students show empirically distinct profiles of achievement goals at the outset of their undergraduate study. We offer a speculative prediction regarding achievement goal profiles. On the basis of the multiple goal literature it would seem likely that (a) students can be differentiated in terms of goal profile and (b) there would be expected to be at least one profile characterised by all four

goals being strongly endorsed. Second, we aim to examine changes in ABC across the first year of undergraduate study. We hypothesise that the general pattern of ABC scores will show a dip initially (from the first to second points of measurement) but that these will recover by the end of the first year (from the second to third points of measurement). Third, we examine whether changes in ABC across the first year differ according to the profile of achievement goals. We would expect the hypothesised dip to be ameliorated in the students with the most adaptive profile (characterised by high mastery-approach and performance-approach in combination with low mastery-avoidance and performance-avoidance goals) and perhaps even show an upward trajectory in comparison to other goal profiles.

## Method

### Participants

The participants in this study were drawn from a larger corpus of data examining the first year undergraduate experience. A total of 434 students enrolled in single honours undergraduate programmes in Psychology participated in this project, comprising of 158 males and 276 females. Participants were drawn from two different but similar institutions ($n$ = 220, $n$ = 214) and the average age of students at the outset of the study was 20.2 years of age ($SD$ = 3.2). The sample contained two successive cohorts of students ($n$ = 206, $n$ = 228) following the same first year programme of study at their respective institutions. The sample contained missing data in 1.3% of variables (5.2% of cases) which were imputed using the expectation maximisation algorithm in SPSS. This method is preferred to deleting cases with missing data or replacing missing cases with the mean from a scale or subscale which can reduce statistical power and distort the underlying distribution respectively (Allison, 2001; Little and Rubin, 1987).

### Measures

The 17-item *Academic Behavioural Confidence Scale* (Sander and Sanders, 2006, 2009) was used to measure undergraduate students' confidence in four domains: attain grades (grades), engage in independent study (studying), attend lectures and other taught sessions (attendance) and discuss or present course material with peers and teaching staff (verbalising). Grades was measured with six items (e.g., 'How confident are you that you will be able to attain good grades in your work?'), studying with four items (e.g. 'How confident are you that you will be able to study effectively on your own?'), attendance with three items (e.g. 'How confident are you that you will be able to attend most taught sessions') and verbalising with four items, (e.g. 'How confident are you that you will be able to give a presentation to a small group of fellow students?'). The instructions and referents of items in this instrument prompt students to respond in the context of their overall degree programme (Psychology) rather than a specific class or module (e.g., Social Psychology). Students responded on a 5-point scale (1 = not at all confident, 5 = very confident). The reliability and validity of this four-factor model of academic behavioural confidence has been evidenced in previous work (Nicholson, Putwain, Connors, and Hornby-Atkinson, 2013; Sander and Sanders, 2009) and in the current study the internal reliability coefficients were acceptable (Cronbach's α for all four scales at each point of measurement .71 – .82).

The 12-item *Achievement Goals Questionnaire* (Elliot and McGregor, 2001) was used to measure the four achievement goals included in the 2 x 2 framework of achievement goals (3 items per goal). The referent of items in the original version was 'my class'. Items were adapted to refer to 'Psychology' to ensure a comparable match with the ABC. Furthermore, instructions prompted participants to respond in the context of their whole programme rather than a specific class or module. Exemplar items include, 'It is important for me to do well in Psychology compared to others' (performance-approach), 'My goal is to avoid performing poorly' (performance-avoidance), 'It is important for me to understand the content of my

Psychology course as thoroughly as possible' (mastery-approach) and 'I am often concerned that that I may not learn all that there is to learn in my Psychology course' (mastery-avoidance). Students responded on a 5-point scale (1 = strongly disagree, 5 = strongly agree. The reliability and validity of this four-factor model is well-established in the literature (e.g., Curry, Elliot, Da Fonseca and Moller, 2006; Finney, Pieper and Barron, 2004). In the present study the internal reliability coefficients were acceptable (Cronbach's α for all four achievement goals .69 – .83).

**Study design and procedure**

Data were collected in three waves intended to cover key points during the first year of undergraduate study. The first wave of data collection took place during the second and third weeks of the first semester to establish students' goals and confidence at the outset of their course. As students were completing various assignments and examinations across the first semester that may impact upon ABC, the second wave of measurement was scheduled for the second and third weeks of the second semester. Thus, the difference between the first and second waves of measurement represents changes in ABC after one semester of undergraduate study. Similarly, as students were completing assignments and examinations across the second semester of study, the third and final wave of measurement took place during the second and third weeks of the second year of study (in semester one). Thus, the difference between the second and third waves of measurement represents changes in ABC after the second semester of undergraduate study. Questionnaires were collected at the end of a routine teaching session accompanied by an instruction and consent sheet. The consent sheet made clear that course progression and marks were unrelated to study participation. Participants were also offered the retrospective right to withdraw their data, although none took up this offer.

## Results

**Cluster analysis of $T_1$ achievement goals**

In order to examine whether students could be clustered into relatively homogenous groups, based on their achievement goals measured at $T_1$, we performed a hierarchical cluster analysis using Ward's method (see Aldenderfer and Blashfield, 1984). The largest changes in agglomeration coefficients (see Table 1) were found up to the fourth cluster solution so initially two, three and four cluster solutions were considered. Our interpretation of the clusters was informed using the scale metric on which participants responded to achievement goals items. A score of 3 (the scale median) would indicate that a goal was neither endorsed nor rejected. Scores > 3 indicate that the goal was endorsed (moderately from 3-4 and strongly from 4-5). Scores < 3 indicate that the goal was rejected (moderately from 2-3 and strongly from 1-2). One-way, between-participants, Analysis of Variance (ANOVA) was used to examine whether the clusters generated in each of the two, three and four cluster solutions could differentiate between each of the four achievement goals. Descriptive data for the two, three and four cluster solutions and the results of the ANOVAs are reported in Table 2.

[Tables 1 and 2 here]

In the two cluster solution, Cluster (1) described a pattern where students strongly endorsed mastery-approach/ performance-avoidance goals and moderately endorsed performance-approach/ mastery-avoidance goals. In Cluster (2) students strongly endorsed a mastery-approach goal and moderately endorsed performance-approach/ avoidance goals. A mastery-avoidance goal was moderately rejected. Statistically significant differences (*p*s all <.05) between the two clusters were found in all goals.

In the three cluster solution, Cluster (1) described a pattern where a mastery-approach goal was strongly endorsed and the remaining three goals (performance-approach/ avoidance, mastery-avoidance) were moderately endorsed. Cluster (2) remained identical to that

described in the two cluster solution. In Cluster (3) students strongly endorsed performance-approach/ avoidance and mastery-approach goals, and a mastery-avoidance goal moderately. Statistically significant differences between the three clusters were found in all goals (*p*s all <.05) with the exception of Clusters (2) and (3) on a mastery-approach goal ($p > .05$).

In the four cluster solution, Cluster (1) remained unchanged from that of three cluster solution. Cluster (2) described a profile where a mastery-approach goal was strongly endorsed and a performance-approach goal was moderately strongly. Performance/ mastery-avoidance goals were moderately rejected. In Cluster (3) students strongly endorsed performance-approach/ avoidance and mastery-approach goals. A mastery-avoidance goal was moderately rejected. Cluster (4) remained unchanged from that of Cluster (3) in the three-cluster solution. Statistically significant differences were found between all four clusters (*p*s all <.05) on a performance-avoidance goal, for performance-approach/ mastery-approach goals, except between clusters 3 and 4 ($p > .05$), and for a mastery-avoidance goal, except between clusters 2 and 3 ($p > .05$).

The addition of the fourth cluster did not empirically discriminate between differences in performance-approach, mastery-approach and mastery-avoidance goals beyond that presented in the three cluster solution. Accordingly, no further solutions were explored and we chose the three cluster solution as representing the best balance between parsimony and a theoretically meaningful explanation. The three cluster solution is presented in Figure 1. The original scale metric (1-5) was replaced with a metric centred round zero to highlight differences between clusters in the endorsement and rejection of goals. Scores above 0 indicate where a goal was endorsed and scores below zero indicate where a goal was rejected.

[Figure 1 here]

A mastery-approach goal was endorsed most strongly in all three clusters, but in varying combinations with other goals. Cluster (2) represented a combination of mastery-

approach and performance-approach goals. We anticipate that this would be the most adaptive profile as mastery-avoidance and performance-avoidance goals did not figure strongly in the profile. In Cluster (3) all four goals were endorsed, predominantly consisting of mastery-approach with performance-approach/avoidance goals. We anticipate that this would be the next most adaptive profile, due to the greater endorsement of mastery-avoidance and performance-avoidance goals than shown in the Cluster (2) profile. The Cluster (1) profile consisted of mastery-approach with performance-avoidance and mastery-avoidance goals. We anticipate that this would be the least adaptive profile as performance-approach and mastery-approach goals were not as strongly endorsed as in Clusters (1) and (2).

**Differences over time in academic behavioural confidence and between profiles of achievement goals**

Having established that students may be clustered according to their profile of achievement goals we examined: (i) whether students' academic behavioural confidence changed over time and (ii), whether changes of time differed according to the cluster profile of achievement goals. Data were analysed in a 3 x 3 mixed analysis of variance (ANOVA) with one within-participants factor (the time point of measurement) and one between-participants factor (the cluster profile of the student). ANOVAs were performed separately for each of the four components of academic behavioural confidence as a separate dependent variable. Descriptive statistics are reported in Table 3.

[Table 3 here]

***Confidence in attaining grades.***

A statistically significant effect was reported for time, $F(2,862) = 12.24$, $p < .001$, $\eta_p^2 = .03$, whereby confidence increased from $T_1$ to $T_3$. A statistically significant effect was also reported for cluster profile, $F(2,431) = 15.11$, $p < .001$, $\eta_p^2 = .07$, whereby confidence was highest in students showing a Cluster (2) profile. A time x cluster profile was also reported,

$F(4,862) = 3.55$, $p < .001$, $\eta_p^2 = .02$, graphed in Figure 2. At $T_1$ and $T_2$ students with a Cluster (2) profile of achievement goals showed higher significantly confidence in attaining grades than students with a Cluster (1) or (3) profile ($p < .001$, Bonferroni corrected), but there were no significant differences between students with a Cluster (2) and (3) profile ($p > .05$, Bonferroni corrected). At $T_3$ the confidence of students with Cluster (1) and (3) profiles to attain grades had improved so that they were no longer significantly lower than students with a cluster (2) profile ($p > .05$, Bonferroni corrected).

[Figure 2 here]

***Confidence in studying.***

A statistically significant effect was reported for time, $F(2,862) = 7.05$, $p = .001$, $\eta_p^2 = .02$, whereby confidence dipped from $T_1$ to $T_2$ but by $T_3$ had not only recovered, but increased from $T_1$ confidence. A statistically significant effect was also reported for cluster profile, $F(2,431) = 4.55$, $p = .01$, $\eta_p^2 = .02$, whereby confidence was highest in students showing a Cluster (2) profile. An interaction between time and cluster profile was also reported, $F(4,862) = 3.22$, $p = .01$, $\eta_p^2 = .02$, graphed in Figure 3. At $T_1$ students with a Cluster (2) profile of achievement goals had significantly higher confidence in studying than students with a Cluster (1) or (3) profile ($p = .01$, Bonferroni corrected), whereas students with a Cluster (2) and (3) profile did not significantly differ ($p > .05$, Bonferroni corrected). At $T_2$ the confidence of students with Cluster (2) and (1) profiles had dipped whereas those with a Cluster (3) profile had improved (*p*s all >.05, Bonferroni corrected). At $T_3$ the confidence of all students improved from that of $T_2$ and differences between cluster profiles remained non-significant (*p*s all >.05, Bonferroni corrected)

[Figure 3 here]

***Confidence in verbalising.***

There were no statistically significant effects over time, $F(2,862) = 2.31$, $p > .05$, $\eta_p^2 < .01$, however a statistically significant effect was reported for cluster profile, $F(2,431) = 18.18$, $p < .001$, $\eta_p^2 = .08$, whereby confidence was highest in students showing a Cluster (2) profile. A time x cluster profile was also reported, $F(4,862) = 5.77$, $p < .001$, $\eta_p^2 = .03$, graphed in Figure 4. At $T_1$ students with a Cluster (2) profile of achievement goals had higher significantly confidence in attaining grades than students with a Cluster (1) or (3) profile ($p < .001$, Bonferroni corrected). Students with a Cluster (2) and (3) profile did not significantly differ ($p > .05$, Bonferroni corrected). The confidence of all students had dipped at $T_2$, but the differences between cluster profiles remained identical to those found at $T_1$. At $T_3$ the confidence of students with Cluster (2) profile continued to dip, remained static for those with a Cluster (1) profile and improved for those with a Cluster (3) profile such that there were no longer any significant differences between cluster profiles (*p*s all >.05, Bonferroni corrected).

[Figure 4 here]

***Confidence in attendance.***

A statistically significant effect was reported for time, $F(2,862) = 22.48$, $p < .001$, $\eta_p^2 = .05$, whereby confidence dipped from $T_1$ to $T_2$ but by $T_3$ had not only recovered, but increased from $T_1$ confidence. There were no statistically significant differences between cluster profiles, $F(2,431) = 1.76$, $p > .05$, $\eta_p^2 < .01$, or for the interaction between time and cluster profile, $F(4,862) = 2.01$, $p > .05$, $\eta_p^2 < .01$.

## Discussion

This study examined whether changes in students' ABC across their first year of academic study differed according to their profile of achievement goals held at the outset of the first semester of the first year. A hierarchical cluster analysis was performed in which we examined two, three and four cluster solutions. We chose a three cluster solution as offering

the best balance between parsimony (the smallest number of factors) and empirically differentiating between achievement goals in a theoretically meaningful manner. In the Cluster (1) profile mastery-approach and performance-approach/ avoidance goals were endorsed. In the Cluster (2) profile performance-approach and mastery-approach goals were endorsed and a mastery-avoidance goal was rejected. In the Cluster (3) profile all four goals were endorsed. Students' confidence in studying and attendance dipped from the beginning of the first semester to the beginning of the second semester but had not only recovered, but improved, by the beginning of the second year. No differences in verbalising were shown over time and confidence in grades showed an increase from the beginning of the first year to the beginning of the second year. In general, students with a Cluster (2) profile showed higher confidence in grades, studying and verbalising, however these differed across time. Although students with a Cluster (2) profile showed higher confidence in grades, studying and verbalising at the beginning of the first year, students with a Cluster (1) and (3) profile had caught up by the beginning of the second year and the verbalising of students with a Cluster (2) profile had declined to a similar level of that of Cluster (1) and (3) profile students.

Our general prediction that students could be differentiated on the basis of achievement goal profile was supported. In particular Cluster (3) matched our expectation that at least one profile of achievement goals would be characterised by endorsement of all four goals. These findings are consistent with Liu et al. (2009) and Jang and Liu (2012). The most adaptive profile in our study, at least for the outset of undergraduate studies, was Cluster (2); characterised by endorsement of performance-approach and mastery-approach goals and rejection of a mastery-avoidance goal. This was also the most adaptive profile in Jang and Liu's (2012) study. However, unlike these two previous studies that, using secondary school students, identified four and five clusters of empirically differentiated

achievement goal clusters, our study only showed three clusters. Notwithstanding the caveat that our study used older students at a different stage of education and that the identification of clusters is an interpretive exercise there would seem, at present, little consensus on the number of achievement goal profiles emerging from the 2x2 framework.

It is notable that a mastery-approach goal was the most strongly endorsed goal in all three clusters and that we did not find an amotivated (or unmotivated) cluster profile where all four goals were rejected. This may reveal something reassuring about the character and aspiration of students at the outset of higher education; that their most dominant goal is to develop their subject competence even if other goals (i.e. performance-approach and performance-avoidance) may also come into play. In a general sense our findings are consistent with earlier research using dichotomous and trichotomous achievement goal frameworks showing that mastery and performance may combine in different ways (Bouffard et al., 1995; Meece and Holt, 1993; Pintrich and Gracia, 1991).

We hypothesised that ABC scores would dip from the beginning of the first semester to the beginning of the second semester and then recover by the beginning of the next academic year. This pattern was supported for studying and attendance, albeit a small one (by Cohen's, 1988, criteria) but not for grades, which showed no dip, and verbalising which did not differ over the course of the first year. The findings for studying and attendance are consistent with self-efficacy research showing an initial dip during the first year (e.g., Papinczak et al., 2008; Zusho et al., 2003), although we cannot, on the basis of our data, comment of whether our findings are the result of initial overconfidence in studying and attendance. It may be the case that the grades and verbalising components of ABC involve a lesser degree of student control than the studying and attendance components (Sander, 2009, Sander and Sanders, 2009). A student may choose to study or attend whereas the grades one receives depends partly on the marker and one's experience of discussing course materials

depends on the person one is talking to. The dip and return of confidence in studying and attendance may reflect a closer alignment with self-regulative processes determined by control than grades and verbalising.

Our final hypothesis concerned whether the pattern of change in ABC would differ based on goal profile. Our expectation that the trajectory of ABC scores may depend on achievement goal profile was supported in grades, studying and verbalising. In all three cases, students with a Cluster (2) profile showed higher confidence in grades, studying and verbalising at the beginning of the year and would therefore be considered the most adaptive profile for this point in time. This finding is consistent with the literature suggesting that a mastery-approach goal and, to a lesser extent, a performance-approach goal are associated more strongly with adaptive performance processes than mastery/ performance-avoidance goals (Huang, 2011, 2012; Hulleman et al. 2010; Senko, Hulleman and Harackewicz, 2011). However, by the beginning of second year, any confidence advantage offered by a Cluster (2) profile had disappeared. The confidence of students with Cluster (1) and (3) profiles pertaining to grades and studying improved over time to match that of students with a Cluster (2) profile which remained static. The confidence of students with a Cluster (2) profile pertaining to verbalising declined over time to match that of with Cluster (1) and (3) profiles. Thus, our prediction that different trajectories of ABC would be found depending on goal cluster was supported, but not quite in the way in which we had anticipated.

It is reassuring that students with the less adaptive profiles, Cluster (1) and Cluster (3), at the outset of undergraduate study did not show a lasting disadvantage in confidence and studying. There may be numerous reasons for this. The challenges of the transition to university study have been well documented in the literature (e.g., Perry et al., 2001, 2005; Denovan and Macaskill, 2012). It may be that students with profiles including avoidance-focused goals (both performance and mastery), seen most clearly in Clusters (1) and (3) make

more hesitant transitions to university study. Such students may be asking questions of their own competencies (for instance, ‘Am I capable of university level study?’ or ‘Am I as good as my peers’) that may be shown in the initial lower confidence in grades and studying. As students adjust to the level and pedagogical style of university education it is possible that their goal profiles might change to become less avoidance-focused (for both performance and mastery). We did not measure such changes here and so our explanation remains provisional.

It is less reassuring, and also somewhat disheartening, that confidence in verbalising reduced over time for Cluster (2), rather than improving in Clusters (1) and (3). This may have been a case of initial overconfidence in the Cluster (2) profile that adjusted to a more accurate judgement over time. However, as we note above, we have no way of verifying this explanation. Verbalising may also involve a greater social element, relating to the anxieties around public speaking (for instance when in a lecture, seminar or class environment), than the confidence in grades, studying and attendance. Confidence in verbalising may rely more on attentional control processes (Jones, Fazio and Vasey, 2013) whereas confidence in studying and grades may align more closely with the types of regulation more typically found in model of self regulated learning, such as task-setting, self-control and self-evaluation (e.g. Zimmerman and Kitsantas, 2005). Accordingly, confidence in studying and grades could follow a different trajectory to that of verbalising.

It should be noted that although there were differences in grades, studying and verbalising over time by cluster profile, the effect sizes were relatively small by Cohen’s (1988) criteria. We speculate that this may be, in part, to the positive influence of a mastery-approach goal. This was endorsed most strongly in each profile and would focus students’ attention on those cognitions and behaviours required to develop one’s competence. Even if combined with less adaptive goals, in Cluster (1) and Cluster (3), it still remains the dominant influence. The influence of a mastery-approach may also be one reason why no differences

over time were shown for attendance by cluster profile. For such differences to occur it may be necessary to have a cluster profile where avoidance-orientated goals (both performance-avoidance and mastery-avoidance) were dominant over a mastery-approach goals. Previous studies have shown that not attending classes and tutorials (a form of academic self-handicapping) may be one way that avoidance goals may influence study behaviour (e.g., Midgley and Urdan, 2001; Urdan, 2004).

**Limitations**

First, we would like to acknowledge that cluster analysis is an exploratory technique. Although we justified our choice of a three cluster solution this should not be viewed as the single and/ or solely correct solution. We accept that there may be other scholars who would chose and justify other cluster solutions for perfectly acceptable alternate empirical and theoretical reasons. Second, although it was not the aim of our study to examine changes in cluster profiles of achievement goals over time, one could argue that had we done so it would have afforded our study additional explanatory power. We would have been able to establish, for example, if students in Clusters (1) and (3), for instance, became less orientated towards performance goals. Third, both the starting point and trajectory of ABC may depend, in part, on the match between students aspired and achieved grades in their pre-university courses (these are typically, but not exclusively A Level). A particular grade for one student might be an overwhelming success and the same grade for another student a grave disappointment. Capturing this dynamic at the outset of a students' first year would help to establish if a degree of under or overconfidence was present as well as facilitating cluster profiles of students on additional criteria to achievement goals.

**Implications for practice**

We can draw out two implications for practitioners and teachers of higher education. First, student's dominant goal is to develop their understanding (a mastery-approach goal). In itself

this is nothing remarkable. After all, students have chosen to study a particular degree programme and are in a learning environment that promotes mastery values. What is interesting, for the practitioner, is that this goal may be combined with other, less adaptive, goals. Thus it would useful to recognise that students may also be driven by fears about not being 'good enough' for university (a mastery-avoidance goal) or as good as their peers (a performance-avoidance goal). There are various suggestions made in the literature (e.g., Church, Elliot and Gable, 2001) about how lecturers and instructors, who may have limited time and face-to-face contact with students, can introduce relatively simple strategies to avoid exacerbating less adaptive goals (the extent to which evaluation and the stringency of evaluation practices is emphasised). Second, although it was reassuring in our study that dips in confidence did not last, this may still be disconcerting for the student themselves mid-semester. A mastery-goal may be one of several factors that drives students to persist with their studies and make efforts to overcome challenges rather than give up or adopt self-defensive behaviours. Practitioners may wish to incorporate reflective exercises into study-skills programmes, that are typical of many first year undergraduate programmes, to help students identify their own strengths and weaknesses in relation to goals and confidence. Such self-monitoring processes has been shown to help students develop themselves as self-regulated learners (see Zimmerman, 2002).

**Summary and conclusion**

Students' confidence in grades, studying and attendance shows a small increase over the first year of undergraduate study, having shown an initial dip in studying and attendance. Students' confidence in grades, studying and verbalising could be differentiated by their achievement goal cluster at the beginning of the first year, but these were not lasting and did not differentiate confidence at the beginning of the second year. Thus achievement goal

profiles held by students at the outset of their academic study did not, in our sample of participating students, offer any lasting advantage or disadvantage in terms of confidence.

**Endnotes**

[1]Although the construct in this study was referred to as self-efficacy, the scale included both domain-specific and domain-intermediate items (the latter are more similar to ABC).

[2]A revised version delineates between the task- and self-focused components of mastery goals in a 3 x 2 framework (Elliot, Muryama and Pekrun, 2011).

[3]Integration of these findings is difficult as earlier research has used dichotomous (mastery and performance goals only) and trichotomous frameworks (mastery, performance-approach and performance-avoidance goals).

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**Table 1**

*The agglomeration schedule for the last ten clusters.*

| Number of clusters | Agglomeration coefficient (rounded) | Change in coefficient to next level (%) |
|---|---|---|
| 10 | 366 | 5.2 |
| 9 | 386 | 5.4 |
| 8 | 408 | 6.0 |
| 7 | 434 | 7.4 |
| 6 | 469 | 9.6 |
| 5 | 519 | 9.8 |
| 4 | 570 | 15.2 |
| 3 | 672 | 18.1 |
| 2 | 820 | 21.2 |
| 1 | 1041 | — |

**Table 2**

*Descriptive statistics and MANOVAs for the two, three and four cluster solutions.*

| Solution | | Performance Approach | | Performance Avoidance | | Mastery Approach | | Mastery Avoidance | |
|---|---|---|---|---|---|---|---|---|---|
| | ***n*** | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** |
| *Two Cluster Solution:* | | | | | | | | | |
| Cluster (1) | 291 | 3.42 | .77 | 4.81 | .64 | 4.44 | .54 | 3.95 | .62 |
| Cluster (2) | 143 | 3.86 | .74 | 3.21 | 1.01 | 4.65 | .43 | 2.76 | .77 |
| *F*(df) | | 31.29 (1,432) | | 101.97 (1,432) | | 16.73 (1,432) | | 303.12 (1,432) | |
| $\eta_p^2$ | | .08 | | .19 | | .04 | | .41 | |
| *Three Cluster Solution:* | | | | | | | | | |
| Cluster (1) | 200 | $3.07^a$ | .58 | $3.79^a$ | .60 | $4.30^a$ | .57 | $3.76^a$ | .59 |
| Cluster (2) | 143 | $3.86^b$ | .74 | $3.21^b$ | 1.01 | $4.65^b$ | .43 | $2.76^b$ | .77 |
| Cluster (3) | 91 | $4.21^c$ | .53 | $4.48^c$ | .46 | $4.74^b$ | .32 | $3.49^c$ | .44 |
| *F*(df) | | 126.06 (2,431) | | 85.25 (2,431) | | 34.98 (2,431) | | 204.21 (2,431) | |
| $\eta_p^2$ | | .37 | | .28 | | .14 | | .49 | |
| *Four Cluster Solution:* | | | | | | | | | |
| Cluster (1) | 200 | $3.07^a$ | .58 | $3.79^a$ | .60 | $4.30^a$ | .57 | $3.76^a$ | .59 |
| Cluster (2) | 79 | $3.73^b$ | .84 | $2.47^b$ | .63 | $4.51^b$ | .50 | $2.82^b$ | .83 |
| Cluster (3) | 64 | $4.03^c$ | .56 | $4.11^c$ | .55 | $4.83^c$ | .24 | $2.68^b$ | .70 |
| Cluster (4) | 91 | $4.21^c$ | .53 | $4.48^d$ | .46 | $4.74^c$ | .32 | $3.49^c$ | .44 |
| *F*(df) | | 88.04 (3,430) | | 194.82 (3,430) | | 29.42 (3,430) | | 136.91 (3,430) | |
| $\eta_p^2$ | | .38 | | .58 | | .17 | | .49 | |

*Note*: *F* tests were all statistically significant ($p < .001$); means in the same column with different subscripts represent statistically different differences on post-hoc tests with Bonferroni correction ($p < .05$).

**Table 3**

*Descriptive statistics for academic behavioural confidence over time for the three cluster solution*

| | $T_1$ | | $T_2$ | | $T_3$ | |
|---|---|---|---|---|---|---|
| | ***M*** | ***SD*** | ***M*** | ***SD*** | ***M*** | ***SD*** |
| *Grades* | | | | | | |
| Cluster (1) | 3.39 | .57 | 3.48 | .49 | 3.59 | .55 |
| Cluster (2) | 3.72 | .56 | 3.71 | .46 | 3.71 | .45 |
| Cluster (3) | 3.39 | .76 | 3.45 | .59 | 3.66 | .49 |
| *Studying* | | | | | | |
| Cluster (1) | 3.53 | .59 | 3.45 | .57 | 3.61 | .56 |
| Cluster (2) | 3.73 | .67 | 3.60 | .63 | 3.67 | .59 |
| Cluster (3) | 3.41 | .72 | 3.51 | .55 | 3.63 | .49 |
| *Verbalising* | | | | | | |
| Cluster (1) | 2.76 | .76 | 2.75 | .74 | 2.71 | .70 |
| Cluster (2) | 3.20 | .75 | 3.14 | .72 | 2.89 | .71 |
| Cluster (3) | 2.68 | .75 | 2.62 | .67 | 2.79 | .71 |
| *Attendance* | | | | | | |
| Cluster (1) | 4.32 | .62 | 4.20 | .64 | 4.32 | .48 |
| Cluster (2) | 4.50 | .51 | 4.35 | .61 | 4.35 | .52 |
| Cluster (3) | 4.42 | .57 | 4.34 | .66 | 4.34 | .51 |

**Figure 1**

*Scores on the four achievement goals (centred round zero) in the three cluster solution.*

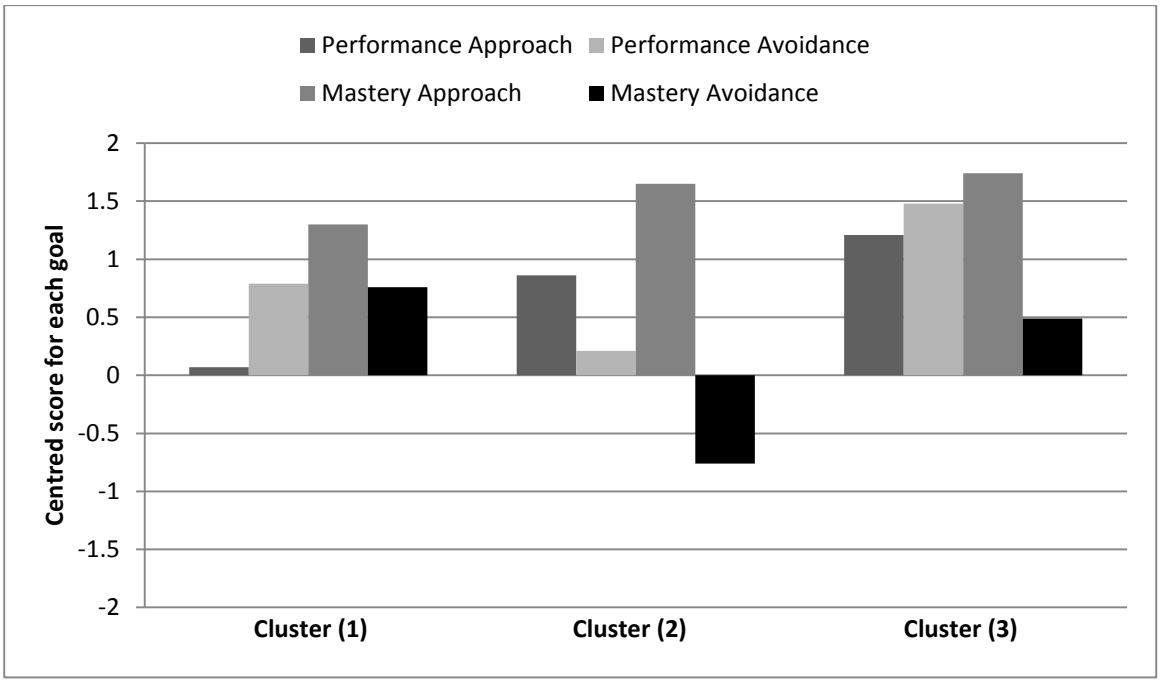

**Figure 2**

*The time x cluster profile for confidence in attaining grades.*

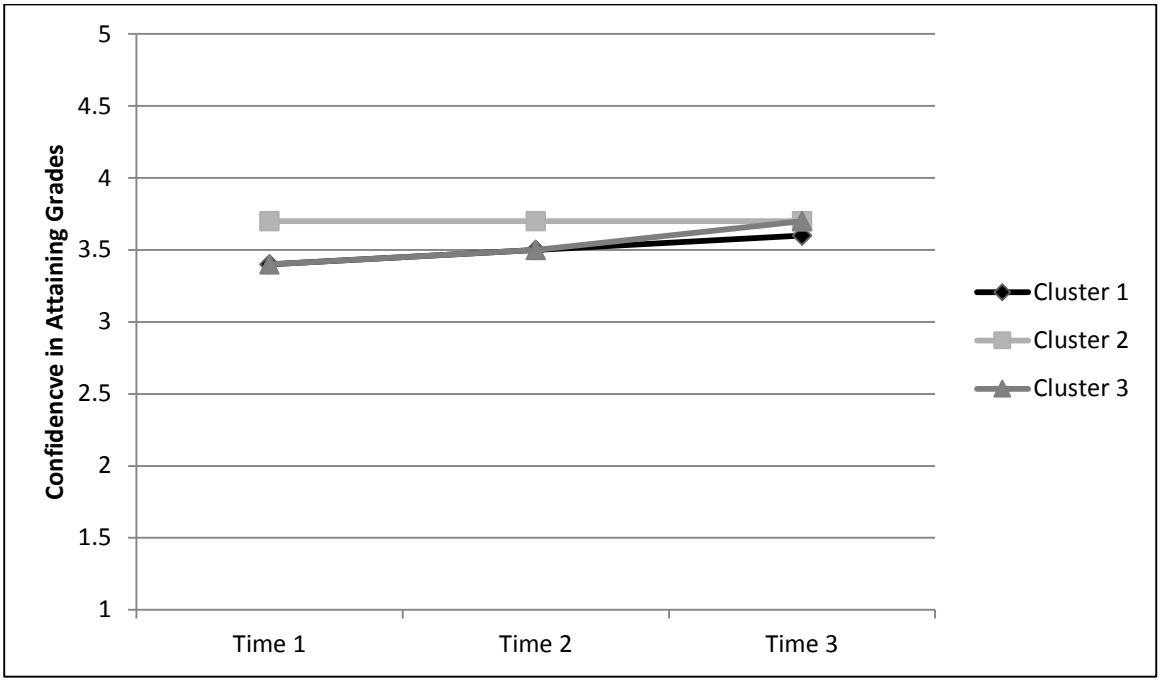

**Figure 3**

*The time x cluster profile for confidence in studying.*

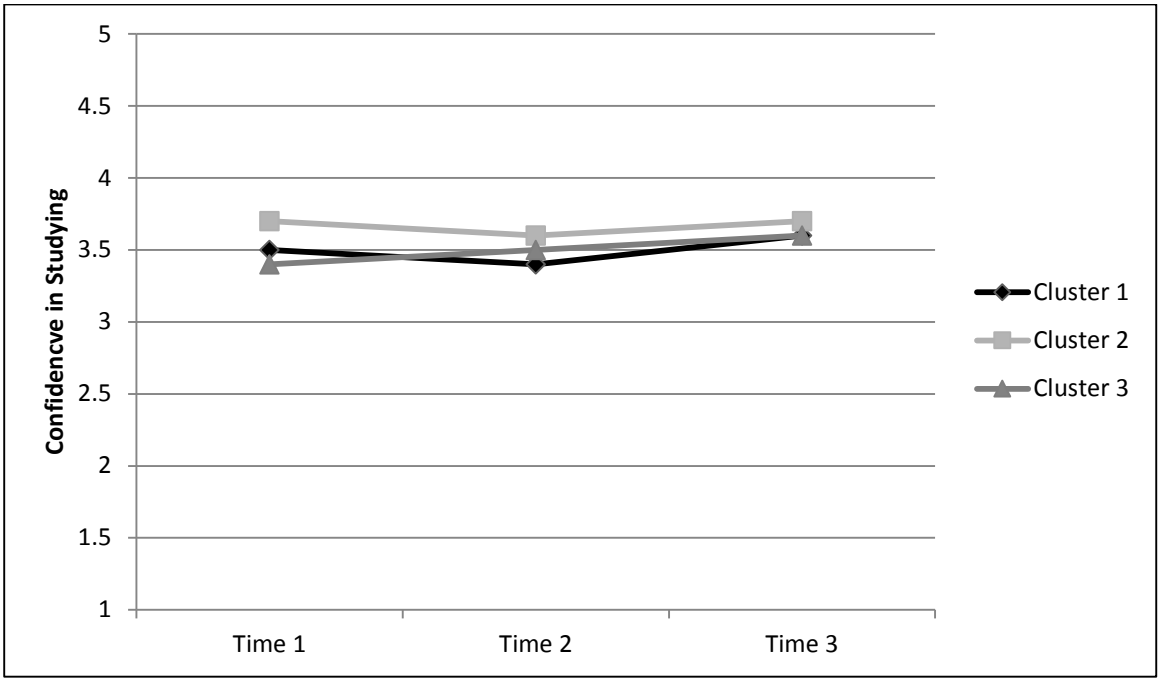

**Figure 4**

*The time x cluster profile for confidence in verbalising.*