Measuring confidence in academic study:

A summary report

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ABSTRACT

Introduction. Guided by the work of Bandura on self-efficacy, this study seeks to determine the extent to which differences in students' expectations of higher education could be explained by differing levels of confidence.

Method. An Academic Confidence Scale (ACS) was constructed and used for a survey of level one students, to explore differences in confidence between two very different student groups. One group was further tested for their confidence later in the year and at the same time; they completed a Ladder of Aspiration (LofAsp), to validate the Academic Confidence Scale. With these data, the ACS could be explored further for underlying factors.

Results. Factor analysis of the ACS yielded six factors (Studying, Understanding, Verbalising, Clarifying, Attendance and Grades). The LofAsp provided validation of the ACS. From the LofAsp, a small group that rated themselves lower than the national average was identified. This group was interesting both in terms of ACS scores and academic performance. ACS scores showed a significant reduction over time.

Discussion. A comparison of the ACS scores between the two student groups suggests that confidence could only be responsible to a small extent for differences in students' expectations of higher education. The reduction in ACS scores indicates that ACS is affected by student performance, rather than affects student performance. It also asks questions about students' ability to reason with statistical data as well as their views on their likely performance on their course.

Keywords: Self-efficacy, confidence, university, students

INTRODUCTION

Confident, according to the Oxford English Dictionary (1989) is 'having strong belief, firm trust, or sure expectation; feeling certain, fully assured, 'self-reliant, bold; sure of one-self, one's cause, etc.; having no fear of failure'. Experience tells us that confidence differs between people in the same situation and that people have differing levels of confidence in different situations. Thus someone who is highly confident in a familiar setting, for example, may lose confidence in an unfamiliar and challenging environment. The study reported here originates firstly from the work by Bandura (e.g. 1977, 1993) on concept of self-efficacy, and secondly from a study on students' perceptions of university teaching (Sander et al, 2000). This research details the development of a scale to measure one specific form of confidence, namely academic confidence.

Self-efficacy has been defined (Bandura, 1986, page 391), as "people's judgements of their capabilities to organise and execute courses of action required to attain designated types of performance" and stems from four sources: mastery experience, vicarious experience, ver-bal persuasion and physiological states (Bandura, 1977). Self-efficacy can also be seen as the confidence that people have in their ability to do the things that they try to do (Pajares, 2000). Thus self-efficacy can be seen as a product of a reflexive loop between the individual and their environment: successful experience resulting in higher levels of self-efficacy.

Self-efficacy scales have been applied to educational research, primarily in studies of academic motivation and self-regulation (Pajares, 1997, 2002). Self-efficacy influences the choices people make in specific situations, such as whether to start a task. It influences the effort people put into tasks and their persistence, especially when the "going gets tough". Furthermore, self-efficacy has not only a psychological effect, but also a physiological effect, affecting, for instance, anxiety levels (Pajares, 2002). In summary, self-efficacy research has helped to tease out the contributions that ability and self-confidence in one's ability makes to academic success and in careers beyond education (Crozier, 1997).

Why develop a measure of <u>academic</u> confidence?

There is, therefore, a wealth of empirical evidence showing that self-efficacy affects academic performance, as part of its general effect on behaviour. However this blanket effect may obscure some more specific differences that could be applicable to educational settings,

in particular in higher education, where the autonomy and independence of the student are essential to success (witness the key components of the contemporary interest in the concept of 'graduateness'.) In this context, a new construct distinct from its parent concept, self-efficacy, was suggested, a construct that we termed “academic confidence”.

Originally, academic confidence was hypothesised as explaining some interesting group differences in an earlier study (Sander et al, 2000). This study examined the expectations of two groups of UK university students; one group comprised medical students in a traditional university and the other psychology students in a new university. One aspect of the results was the striking differences in reasons given by students for not liking role-play and student presentations as methods of teaching. Essentially, the medical students were worried that these were not effective methods, whereas the psychology students were worried about their own competence to do them (see also Sander and Stevenson 2002, Stevenson and Sander, 2002). The possibility of academic confidence as an explanation for this difference arose from an examination of the differing entry profiles of the two groups. The medical students had an average A-level point score of 27.8, in contrast to 15.0 for the psychology students, (using the standard pre 2002 UCAS formula for assigning A level points, where A =10, B=8, C=6, D=4, E=2 and AS grades assigned half value points e.g. an A grade AS level =5).

Academic confidence is conceptualised as being how students differ in the extent to which they have a ‘strong belief, firm trust, or sure expectation’ of what university has to offer. As part of its parent concept, self-efficacy, academic confidence may stem from the same four sources: mastery experience, vicarious experience, verbal persuasion and physiological states. It is likely to be subject to change as experience impinges upon expectation. The question becomes to what extent may it predict the nature of that experience? McLean (2001), in a study of medical students found that learning style was clearly associated with academic performance. How might academic confidence interact with learning styles? Could it have a role to play in predicting academic performance?

Academic confidence, therefore, is proposed as a mediating variable between the individual’s inherent abilities, their learning styles and the opportunities afforded by the academic environment of higher education.

In order to explore this further it was necessary to develop an instrument to measure this specific construct. As the notion of academic confidence has its theoretical foundations

in Bandura's work on self-efficacy, the guidelines for measuring self-efficacy are taken to be equally applicable in measuring academic confidence.

METHOD

Level 1 students were surveyed at two points in the academic year. In induction week (time 1), psychology students and medical students, at two different universities, completed an Academic Confidence Scale (ACS, see appendix 1) that had already been tested for acceptable internal reliability. At the end of the Easter term (time 2), the same group of psychology students were invited to complete the ACS for a second time, along with a validation task, the Ladder of Aspiration (LofAsp, see appendix 2), based on the work of Cantrill (1965) and Sanders (1987).

Results

At time 1, 102 psychology students and 182 medical students completed the ACS. The average A level points for the medical students were 32.04 (sd=3.88) in comparison with the psychology students, whose average A level points were 17.41 (sd=3.78). At time 2, at the end of the Easter term, 88, psychology students responded to the ACS and LofAsp, 81 of whom had completed the ACS in the first phase.

From the first phase of the study, the responses from both sets of students to the ACS were factor analysed which yielded factors of: Studying, Understanding, Verbalising, Clarifying, Attendance and Grades (Table 1). As shown, in table 1, the statements that comprised the ACS did not, generally load onto just one factor, suggesting that it would not be acceptable to look at differences between the two groups of students for each of these factors. However, there was a significant difference between the medical students and the psychology students for mean ACS score ($t=1.784$, $df=262$, $p<0.05$, one tailed). A one-tailed test was felt to be acceptable, as the Sander et al (2000) study had predicted that there would be greater academic confidence in the medical students. To further explore the differences in academic confidence between the medical students and the psychology students, differences for each of the 24 statements in the ACS were examined using t-tests. This showed that the medical students had significantly higher scores for statements 2, 5, 6, 18, 21, 22 (table 2). In contrast, the psychology students had significantly higher scores for statements 10 and 17 (table 3), which explains the small difference between the two student groups for overall ACS score.

Table 1: Statement loadings on each of the six factors

	Factors					
	Studying	**Under-standing**	**Attendance**	**Grades**	**Verbalizing**	**Clarifying**
1. Study effectively on your own in independent / private study	.548	.308				
2. Produce your best work under examination conditions				.751		
3. Respond to questions asked by a lecturer in front of a full lecture theatre					.780	
4. Manage your work load to meet coursework deadlines	.542	.301				
5. Give a presentation to a small group of fellow students					.706	
6. Attend most taught sessions			.833			.337
7. Attain good grades in your work				.546		
8. Engage in profitable academic debate with your peers					.681	.837
9. Ask lecturers questions about the material they are teaching, in a one-to-one setting						.487
10. Ask lecturers questions about the material they are teaching, during a lecture					.565	
11. Understand the material outlined and discussed with you by lecturers.		.610		.350		
12. Follow the themes and debates in lectures.		.736				
13. Prepare thoroughly for tutorials.	.351	.677				
14. Read the recommended background material.	.314	.664				
15. Produce coursework at the required standard.	.373	.406		.431		
16. Write in an appropriate academic style.		.464		.457		.617
17. Ask for help if you don't understand.						
18. Be on time for lectures.			.705			
19. Make the most of the opportunity of studying for a degree at university	.400		.420	.301		
20. Pass assessments at the first attempt.	.382			.757		
21. Plan appropriate revision schedules.	.769					
22. Remain adequately motivated throughout.	.743					
23. Produce your best work in coursework assignments	.614					
24. Attend tutorials			.800			

Table 2: Statements for which the medical students score significant more confident than psychology students

ACS Statement	Mean [SD] ACS score		Tests of difference
	Psychology	Medical	
2	3.02 [1.099]	3.50 [0.917]	t=3.958, df=281, p<0.001
5	3.29 [1.068]	3.95 [0.887]	t=5.551, df=282, p<0.001
6	4.56 [0.555]	4.78 [0.438]	t=3.769, df=281, p<0.001
18	4.27 [0.799]	4.51 [0.726]	t=2.550, df=281, p<0.025
21	3.37 [1.052]	3.68 [0.952]	t=2.480, df=282, p<0.025
22	3.68 [0.747]	3.98 [0.897]	t=2.929, df=281, p<0.005

Table 3: Statements for which the psychology students score significant more confident than medical students

ACS Statement	Mean [SD] ACS score		Tests of difference
	Psychology	Medical	
10	3.12 [1.131]	2.69 [1.053]	t=3.178, df=280, p<0.0025
17	4.26 [0.716]	4.04 [0.837]	t=2.217, df=281, p<0.05

The LofAsp scores provided three groups of students when students' predicted performance in level 3 was compared to the hypothesised and given national average of 57%. These groups were "Better than the National Average" (N=69), "Equal to the National Average" (N=10) and "Worse than the National Average" (N=9). With these three LofAsp groups, it was possible to look at the differences in their ACS scores at time 2 (end of Easter term). Analysis of variance across the three groups, for ACS scores was significant, $F(2, 85) = 5.404$, $p<0.01$). Post hoc tests (Tukey's) showed that the small group of nine students who perceived themselves as likely to score lower than the national average in the final year of their degree (Worse than the National Average group) had significantly lower ACS scores than the other two groups. These were the only significant differences. The ACS scores at induction (time 1) for these three LofAsp groups did not differ significantly.

This non-significant difference in ACS scores for the three LofAsp groups at time 1 is important as it easily allows differential changes in ASC scores over time to be explored. This could be done for th threee LofAsp groups, as well as combined ACS scores. Across all students, 83% showed a decrease in ACS score. Initially, the overall mean ACS score was 3.79, which dropped to 3.5 at time 2. This drop is significant ($t=7.238$, $df=80$, $p<0.001$). For the "Worse than the National Average" group there was a significant drop ($t=4.099$, $df=8$, $p<0.05$)

as well as for the "Greater than the National Average" group ($t=6.161$, $df=62$, $p<0.001$). There was no significant change for the "Equal to the National Average group".

The "Worse than the National Average" group was interesting in other ways, too. Four had left the course by the end of level 1; all but one had resit assessments from semester 1; four had "mitigating circumstances" presented to the semester 1 exam board and; one had to be counselled on the request of the exam board. These nine students scored around 7% less in their overall semester 1 assessments, but they were not significantly lower in A level points, nor was there a significant difference in age in this group of students, compared to the other two groups.

Seventy-eight percent of students who completed the ACS at time 2 thought that they would perform better than the National Average, of whom, 3 thought that they would get a mark in excess of 87%!

Interestingly, correlations between the average grade for semester 1 and each of the 24 ACS statements from both time 1 and time 2, for the psychology students, yielded just three statements, 2, 20 and 21 that were significant (table 4), all from the ACS scores at time 2. Correlations between pre-university performance (GCSE scores and A level points) and ACS scores at time 1 and time 2 and average semester grade were computed. There was no significant correlation between ACS scores and pre-university performance measures. However, A level points did correlate with average semester 1 grades ($r=0.344$, $n=68$, $p<0.005$).

Table 4: Statements for which there was a significant correlation, for the psychology students, between time 2 ACS score and average semester 1 grades

ACS Statement	**Correlation**
2	$r=0.243$, $n=88$, $p<0.025$
20	$r=0.307$, $n=88$, $p<0.005$
21	$r=0.230$, $n=88$, $p<0.05$

DISCUSSION

The differences in ACS scores for the LofAsp groups is taken as good evidence of the validity of the ACS. In contrast to research on self-efficacy and academic performance, it would seem that the ACS scores from the students used in these studies were affected by academic performance, rather than predicting academic performance. This is evidenced by the significant correlations between the average grade for semester 1 and statements 2, 20 and 21 from the ACS, each of which directly relates to examination performance. There was no correlation between any of the ACS statements at time 1 and semester 1 performance, which would seem to rule out the use of the ACS as a diagnostic tool at the start of a course, or as a measure for admission's purposes.

One of the key features of self-efficacy theory is that self-efficacy is specific to particular situations (Pajares, 1996). There can be no meaningful measure of global self-efficacy. That the ACS scores from time 1 do not correlate with later performance indicators, whether average semester grades or LofAsp predictions, suggests that the academic environment in university is, for the student, quite different than the school or college environment that they have just left. The drop in ACS during the first year of study also points to the university environment as a new environment in which the student has to develop a level of confidence. The fact that there was a significant correlation between A level points and semester 1 grades (for the psychology students – the only group for which the level 1 grades was available), but not between A level points and ACS scores at time 1 or time 2, or between ACS scores at either time and average semester 1 grades, suggests that students, in rating their academic confidence, are judging something broader than academic performance as measured by marks awarded for assessed work.

The decrement in ACS score between time 1 and time 2, though, leads to the interesting Gung-Ho! hypothesis. This hypothesis predicts that students enter university, or at least the university that these psychology students came to, with unrealistic expectations that get lowered through adverse experiences on the course. When the differential affect of LofAsp group and ACS score changes over time is considered, it may well be that the Gung Ho! Hypothesis only relates to the "Better than the National Average" group and not the "Worse that the National Average" group. That there was no significant drop for the "Same as the National Average" group, is quite reassuring as estimating likely level 3 performance as equal to

the National Average is probably the safest thing to do in the LofAsp test situation. There is no reason to believe that Gung-Ho! would be more applicable to psychology students than medical students, but there was no ACS data from time 2 for the medical students to explore this further. The Gung-Ho! hypothesis is particularly interesting and could be explored in a longitudinal study that monitored changes in ACS scores over the duration of a degree course.

The ACS would appear to be sufficiently sensitive to be used to monitor the impact of teaching / learning innovations on a course, or to identify students in a large cohort, who could benefit from advise, guidance or encouragement, with the aim of boosting their academic confidence. It could also be useful for the teaching team to be aware of students who would seem to be highly, and perhaps overly, confident in their academic studies.

The prediction that the differences between medical and psychology student groups on perceptions of university teaching could be attributable to different confidence levels (Sander et al, 2000) is only weakly supported. The medical students were more confident for overall ACS scores, although, given that the average A level points for the medical students is getting on for twice that of the psychology students, it is surprising that there was not a greater difference. In all, there were no significant differences between these two student groups for 16 statements in the ACS. The six statements that the medical students scored significantly more confident on, suggest, perhaps, a general attribute of diligence (see Bernard and Schuttenberg, 1985; Covington, Spratt and Omelich, 1980) in these students. The two statements for which the psychology students scored higher, suggests a greater confidence in asking for help in these students who have the substantially lower entry qualifications. If so, the place of these two statements in the ACS should be considered.

The small difference between the medical and psychology groups could also be because the ACS statements were worded in a way that did not measure confidence in performance at an absolute level, which the LofAsp did. Rather, the ACS could have been measuring confidence more in relation to students' aspirations. Also, the ACS covers a much broader spectrum of issues relating to academic performance. Had the medical students completed the Lofsp, a substantial difference in predicted level 3 performance might have been observed.

Another issue relating to the validation of the ACS by the LofAsp concerns the generation of the ACS statements. These were generated by teachers with many years of teaching experience, which arguably, presents a view of academic confidence as seen by an out group of teachers, than by the in-group of students themselves. It might be profitable to try and understand academic confidence from the students' perspective as it is possible that academic confidence, as seen by students, might well be different. Scenarios could be compiled, depicting a confident student, or a student lacking in confidence. Students could then be asked to identify aspects of the behaviour of students in the scenarios, which could reveal students' thinking about academic confidence. The out-group, teacher's perspective and the in-group, student's perspective could be compared and its impact on the structure and content of ACS considered.

Further research is aimed at understanding the relationship between the ACS factors and academic confidence. To pursue this, the wording of statements would have to be refined to develop a psychometric tool that had statements loading onto just one factor of the six factors of the ACS. It would be interesting to see how the different LofAsp groups and students from different academic subjects, like medicine and psychology, perform on any resultant subscales.

Finally, the responses to the LofAsp gave insight into the way in which students, who had at least one semester's training in research methods and statistics, use statistical data. In this study, students were asked to estimate their likely performance against an average percentage score, described as the National Average. Experience would suggest that 78% of the participants on the psychology course used in this study would not really get a final grade higher than a national average. There is, though, a large research literature from diverse areas of psychology, which shows that people are not good at using statistical data, even when they have been trained to think statistically. For example, in the area of health psychology, unrealistic optimism has been offered as an explanation for various types of behaviour, including poor health (Sissons and Carter 1996). Linked to this may well be people's desire not to see themselves as average.

CONCLUSION:

There is good statistical evidence for the validity of the ACS and good statistical evidence to believe that there are six factors, although intuitively and statistically, some of the factors seem to more directly linked to academic confidence than others. Further work could consider the place of statements 10 and 17 in the ACS and the refinement of the ACS to produce sub-scales.

Overall, there is good reason to believe that the ACS could be used to identify students who are coping less well with a course. It is could also be that the ACS is sufficiently valid and sensitive to be used to explore the impact of different or innovative teaching and learning methods, like assessed and non-assessed student presentations.

Whilst there is a significant difference in ACS scores between the medical students and psychology students for Studying, Attendance and Clarifying, it is felt that the qualitative differences between these two groups require further investigation and explanation.

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Appendix 1

How confident are you that you will be able to:

1. Study effectively on your own in independent / private study	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
2. Produce your best work under examination conditions	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
3. Respond to questions asked by a lecturer in front of a full lecture theatre	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
4. Manage your work load to meet coursework deadlines	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
5. Give a presentation to a small group of fellow students	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
6. Attend most taught sessions	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
7. Attain good grades in your work	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
8. Engage in profitable academic debate with your peers	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
9. Ask lecturers questions about the material they are teaching, in a one-to-one setting	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
10. Ask lecturers questions about the material they are teaching, during a lecture	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
11. Understand the material outlined and discussed with you by lecturers.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
12. Follow the themes and debates in lectures.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
13. Prepare thoroughly for tutorials.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
14. Read the recommended background material.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
15. Produce coursework at the required standard.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
16. Write in an appropriate academic style.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
17. Ask for help if you don't understand.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
18. Be on time for lectures.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
19. Make the most of the opportunity of studying for a degree at university	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
20. Pass assessments at the first attempt.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
21. Plan appropriate revision schedules.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
22. Remain adequately motivated throughout.	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
23. Produce your best work in coursework assignments	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**
24. Attend tutorials	**Very confident**	**0**	**0**	**0**	**Not at all confident** **0**

Appendix 2

Now we are asking you to look ahead to think about what will be likely outcomes for you and your group for the next three years of the course. That is, at the end of level 1 this summer, at the end of level 2 in 2003, and at the point of graduation in 2004. To help you make this decision we have highlighted an average mark for psychology across all UK Universities.

So using the table below, <u>for each year</u> please indicate:

1. **What you think will be the average mark for your year group by writing *'YG'***
2. **What you think will be your own average mark by writing '*ME'***

Grade	Mark [%]	Summer 2002 End of Level 1	Summer 2003 End of Level 2	Summer 2004 Graduation	
A+	95-100				
	90-94				
A	85-89				
	80-84				
A-	75-79				
	70-75				
B+	69				
	68				
	67				
B	66				
	65				
	64				
B-	63				
	62				
	61				
	60				
C+	59				
	58				
	57				Mean for psychology
C	56				
	55				
	54				
C-	53				
	52				
	51				
	50				
D+	49				
	48				
	47				
D	46				
	45				
	44				
D-	43				
	42				
	41				
	40				
F_6	39				
	38				
	37				
F_5	36				
	35				
	34				
F_4	33				
	32				
	31				
	30				
F_3	25-29				
	20-24				
F_2	16-20				
	11-15				
F_1	5-10				
	0-4				

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