University of Groningen

Who succeeds at university? Factors predicting academic achievement of first-year Dutch students

Bruinsma, M.; Jansen, E.P.W.A.

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2005
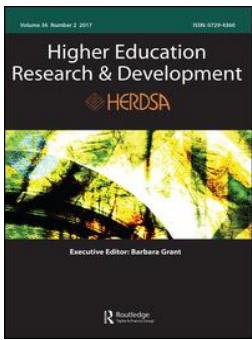
Who Succeeds at University? Factors predicting academic performance in first year Australian university students

Kirsten McKenzie & Robert Schweitzer

Who Succeeds at University? Factors predicting academic performance in first year Australian university students

KIRSTEN MCKENZIE
Queensland University of Technology

ROBERT SCHWEITZER
Queensland University of Technology

ABSTRACT *With the increasing diversity of students attending university, there is a growing interest in the factors predicting academic performance. This study is a prospective investigation of the academic, psychosocial, cognitive, and demographic predictors of academic performance of first year Australian university students. Questionnaires were distributed to 197 first year students 4 to 8 weeks prior to the end of semester exams and overall grade point averages were collected at semester completion. Previous academic performance was identified as the most significant predictor of university performance. Integration into university, self efficacy, and employment responsibilities were also predictive of university grades. Identifying the factors that influence academic performance can improve the targeting of interventions and support services for students at risk of academic problems.*

Introduction

Over the last decade, higher education in Australia has seen a shift from elite to mass education. With the reforms of the late 1980's, equity and access for all have been a primary focus of Australian universities. In a review of higher education, West (1998) stated "central to the vision is ensuring that no Australian is denied access to a high quality of education at any level merely because of his or her social background or financial circumstances" (p. 2). The Organisation for Economic Cooperation and Development (1997) reported that between the years from 1983 to 1995, university enrolments in Australia rose by 70 %.

Accompanying this growth in higher education is an increasing diversity amongst the student population. Students from different social and cultural backgrounds, with different experiences and varying levels of education bring with them different needs and academic potential. The challenge for Australian universities is to recognise this diversity of needs and cater for this changing and heterogeneous population of students. Power, Robertson, and Baker (1987) stated "the stress should not only

be on admitting a wider range of students, but also on giving them the support and help needed to ensure a reasonable chance of success" (p. 3).

The aim of this study was to undertake a prospective investigation of the academic, psychosocial, cognitive, and demographic predictors of academic success in an Australian university context. A broad range of factors were examined in recognition of the diversity of student needs. This study examined the major predictors of academic success identified in previous research, with a view to developing a model which could be used to identify students at risk of academic problems. The sections following will provide a review of previous research on academic, psychosocial, cognitive and demographic predictors of academic performance

Academic Predictors of Academic Performance

Research has shown support for the relationship between previous academic performance and university performance. Power *et al.*, (1987) reported that the correlation between secondary school grades and Grade Point Average (GPA) at university is generally about 0.5. However, they found that the predictive capacity of secondary school grades is different for different individuals and groups. Secondary school grades are not as good predictors for mature age student's performance as they are for school leaver's performance, and female students with the same secondary school grades as male students consistently outperform their male counterparts. Pascoe, McClelland, and McGaw (1997) found the method of entry into university and the ease with which entry could be made into university has also been found to affect the predictive capacity of secondary school grades.

Study skills have also been found to influence academic performance. Pantages and Creedon (1975) and Abbott-Chapman, Hughes, and Wyld (1992) found that students with poor study habits are more likely to withdraw from university or to have academic adjustment problems in the transition from high school to university.

Psychosocial Predictors of Academic Performance

A major contributor to the study of the relationship between psychosocial factors and academic performance is Vincent Tinto. Tinto (1975) developed a student integration model which suggests that a match between the academic ability and motivation of the student with the social and academic qualities of the institution foster academic and social integration into the university system. According to the model, if the student is not integrated into the university, they will develop a low commitment to university. Tinto's model has gained considerable support in the literature. Terenzini and Pascarella (1978) found the most significant predictors of student attrition were academic and social integration variables, with previous academic performance and personality variables accounting for only four percent of the variance in attrition status.

However, the prediction that social integration is associated with academic achievement is arguable. Research has shown that social integration into the univer-

sity is not necessarily beneficial for achieving high grades. McInnis, James, and McNaught (1995) found a higher percentage of students achieving average marks worked in social groups to study, while students achieving the highest and lowest marks were less social in their academic work.

Research has also shown that satisfaction with university, financial situation, career orientation, and social support affect academic performance. Rickinson and Rutherford (1995) found dissatisfaction with the course of study was the reason most commonly endorsed for leaving university. Lecompte, Kaufman, and Rousseeuw (1983) found financial difficulties was also a common reason for leaving university. In terms of career orientation, Himelstein (1992) reported that students with a clear career orientation achieved higher GPA's and were less likely to withdraw from university than students lacking a clear career orientation. Social support has also been found to influence academic performance. Gerdes and Mallinckrodt (1994) found that the presence of a person who provides strong support and support from family or spouse are important predictors of student retention and academic success.

Psychological health variables have gained a limited amount of attention in the academic performance literature. Lecompte *et al.*, (1983) found that student's reporting high anxiety at the start of the academic year had significantly poorer grades at the end of the academic year than their less anxious peers.

Cognitive Appraisal as a Predictor of Academic Performance

Cognitive appraisal research tends to fall into one of two categories in academic performance literature: studies of self efficacy and studies of attributional style. Self-efficacy has been found to be predictive of university grades. A belief that one will perform successfully in a given course predicts actual successful performance in that course. Lecompte *et al.*, (1983) found that an expectation of academic success (self-efficacy) has a highly significant positive relationship with actual academic success and with low withdrawal rates. A study by Peterson and Barrett (1987) examined attributional style and academic performance in a university population. They found a significant negative relationship between pessimistic attributional style and first year GPA.

Demographic Predictors of Academic Performance

Studies have reported inconsistent results when measuring the relationship between age and academic achievement. Some studies show a significant negative relationship between age and academic achievement (Clark & Ramsay, 1990) while other studies have found that mature students, having a clearer career orientation and lower integration needs, are more likely to achieve higher academic results (McInnis *et al.*, 1995). Employment responsibilities have been found to influence student retention. Pantages and Creedon (1975) found full-time students who worked more than 15 hours per week were more likely to withdraw than full-time students who worked less than 15 hours per week.

Rationale for Study

Little prospective research has been undertaken on the predictors of academic performance which integrates both academic and non-academic predictors. The majority of studies have employed a cross-sectional or retrospective methodology. Research tends to focus on the relationship between academic performance and one of the three broad areas of: academic performance, psychosocial factors, or cognitive appraisal. The few studies that have examined more than one of these areas have been directed at the study of student attrition rather than academic performance (Gerdes & Mallinckrodt, 1994; Pascarella *et al.*, 1981; Spady, 1971; Terenzini & Pascarella, 1978; Tinto, 1975). The majority of these studies have been based on Tinto's Student Integration Model, which has been criticised and contradicted by several researchers (McInnis *et al.*, 1995; McKeown, Macdonell, & Bowman, 1993). The influence of demographic variables is often excluded, or not examined adequately in many studies. There has been no systematic research which examines both academic and non-academic predictors of academic performance and the relationship between these predictors. Moreover, there has been little published research of either academic or non-academic predictors, let alone an integration of these predictors, performed within an Australian tertiary context.

This prospective study will examine the relationship between academic, psychosocial, cognitive, and demographic variables, and the academic performance of first year Australian university students. The variables are based on factors identified in previous research as being important predictors of academic performance. Academic performance is based on the first semester GPA of students. The aim of the study is to identify the variables within each of the four factors that affect academic performance, with a view to develop a model which could be used to identify students at risk of academic problems. Based on previous research, several hypotheses are proposed.

1. Higher grades in secondary school and well developed study skills will be associated with higher university grades
2. Integration, commitment, satisfaction with university, social support, lack of financial difficulty, and a clear career orientation will be related to higher university grades.
3. Psychological health will be related to higher university grades.
4. High self efficacy and optimism will be related to higher university grades.
5. Full-time students with limited employment responsibilities will have higher GPA's than full-time students with more demanding employment responsibilities.

Method

Participants

A sample of 197 first year university students from the Faculties of Science ($n = 149$) and Information Technology ($n = 48$) in a large urban commuter-based university

consented to participate in the study. The sample included 103 males and 94 females with a mean age of 21.24 years.

Materials

A questionnaire was developed to measure academic variables, psychosocial variables, cognitive appraisal, and some demographic variables. Self reported study skills were assessed using the Academic Problems sub-scale from the College Adjustment Scales Inventory. This scale measures the extent of difficulties students experience in regard to academic performance. The sub-scale has a reported internal consistency of 0.87 (Anton & Reed, 1991).

Questions measuring commitment to university, student-institution integration, satisfaction with university, career orientation, financial difficulties, and social support were rated along a 4 point Likert scale from "did not apply to me" (0) to "applied to me very much or most of the time" (3). Most questions were adapted from Himelstein's (1992) questionnaire used to identify students at risk of withdrawal and/or failure. While the psychometric properties of the questionnaire were not reported, Himelstein (1992) found student's indicating the statements applied to them very much, had higher rates of course completion and higher GPA's than students who indicated low applicability.

Psychological health was assessed using the short version (21 items) of the Depression, Anxiety and Stress Scale (DASS) (Lovibond & Lovibond, 1995). Internal consistency of the sub-scales of the DASS is high (Cronbach's $\alpha = 0.96$, 0.89, and 0.93 for depression, anxiety, and stress respectively) (Brown *et al.*, 1997). Self-efficacy was assessed by measuring participants responses to the statement "Based on my academic ability, I expect my grades will be above average" (Himelstein, 1992). The response was also scored along a 4 point Likert scale from "did not apply to me" (0) to "applied to me very much or most of the time" (3).

Attributional style was measured using the Attributional Style Questionnaire (ASQ) developed by Peterson, Semmel, von Baeyer, Abramson, Metalsky and Seligman (1982). Peterson *et al.* (1982) found the ASQ to have acceptable levels of reliability for CoPos and CoNeg ($\alpha = 0.75$ and 0.72 respectively). Peterson and Seligman (1984) reported the ASQ has high consistency of scores across tests, and high criterion related validity, and that attributional style has high temporal stability. The age, gender, workload, university entry score, and first semester GPA's of participants were obtained by accessing the Student Information System (SIS), which is a computerised record of student information at the University.

Procedure

The purpose of the study was explained to students in lecture time four to eight weeks prior to the end of semester examinations. The voluntary nature of the study was explained and students who chose to complete the questionnaire provided informed consent to participate in the study. Students then proceeded to complete the questionnaire, which took approximately twenty-five minutes. Questionnaires

were collected immediately after completion. The return rate was over 65% for the Science students but there was a poor response rate for the Information Technology (IT) students.

Results

Descriptive Analysis

The mean GPA for the Science and IT sample were compared to the overall mean for the whole population of first year Science and IT students at the university in order to assess how representative the sample was of the whole population. While there was no significant difference between the Science sample and the whole population of Science students, there was a significant difference indicated between the IT sample and the whole population of IT students with the sample achieving a significantly higher mean GPA than the whole population of IT students.

The means of all the variables used in the analysis are reported in Table 1.

Academic Predictors of Academic Performance

A standard regression was performed between GPA as the dependent variable and university entry score as the independent variable. University entry score was significantly related to GPA. University entry score accounted for 39% of the variance in GPA. Table 2 summarises the results of the regression analyses in this study.

A standard regression was performed between GPA and self reported study skills. Self reported study skills was not a significant predictor of GPA.

TABLE 1. Descriptives for data in the study

Variable	Mean	SD
University entry score	5.91	2.69
Study skills	1.59	0.76
Integration	1.62	0.64
Commitment	2.23	0.54
Satisfaction	2.1	0.54
Career orientation	1.83	0.94
Social support	2.70	0.71
Depression	2.86	1.49
Anxiety	2.38	1.32
Stress	3.40	1.39
Self efficacy	1.87	0.92
CPCN	2.82	2.56
CoNeg	12.36	1.87
CoPos	15.18	1.83

TABLE 2. Summary of regression analyses

Variable	B	SE B	β
Uni entry score	− 0.26	0.03	− 0.62****
Study skills	0.15	0.11	0.10
Integration	− 0.32	0.13	− 0.18**
Commitment	0.20	0.16	0.09
Satisfaction	0.29	0.16	0.14*
Career orientation	− 0.01	0.09	− 0.01
Depression	0.04	0.06	0.05
Anxiety	0.02	0.07	0.03
Stress	0.09	0.06	0.11
Self efficacy	0.34	0.09	0.28***
CPCN	− 0.05	0.03	− 0.12
CoNeg	0.08	0.05	0.13*
CoPos	− 0.02	0.05	− 0.03

**** $p < 0.0001$. *** $p < 0.001$. ** $p < 0.05$. * $p < 0.10$.

Psychosocial Predictors of Academic Performance

Student institution integration was significantly related to GPA accounting for 3% of the variance in GPA. Inspection of the beta values shows a negative relationship between student institution integration and GPA. Commitment, satisfaction, and career orientation were not significant predictors of GPA.

A one-way ANOVA was performed between GPA as the dependent variable and level of financial difficulty as the independent variable. There was no significant difference between GPA for levels of financial difficulty, $F (3,171) = 2.46$, $p > 0.05$.

The hypothesis concerning social support cannot be analysed due to the extreme skewness of the distribution. The majority of students reported high levels of social support for their university studies.

Depression, anxiety and stress were not significant predictors of GPA.

Cognitive Appraisal as a Predictor of Academic Performance

Self-efficacy was significantly related to GPA accounting for 8% of the variance in GPA. A standard regression was performed between GPA and attribution style (CoNeg dimension). Negative attribution style was a significant positive predictor of GPA at the 0.10 level accounting for 2% of the variance in GPA.

Demographic Predictors of Academic Performance

A one-way ANOVA was performed between age and GPA, student workload and GPA, and gender and GPA. There was no significant difference found across age groups, $F (1,173) = 0.23$, $p = 0.63$, between the GPA's of part time and full time students, $F (1,173) = 0.11$, $p = 0.74$, or between males and females GPA, $F (1,173) = 0.17$, $p = 0.68$.

TABLE 3. Psychosocial, cognitive and demographic predictors of GPA removing OP

Variable	B	SE B	β	R^2
Step 1				
OP	− 0.26	0.03	− 0.62****	
Total R^2				0.39****
Step 2				
Integration	− 0.55	0.14	− 0.29***	
Self efficacy	0.38	0.10	0.30***	
Employment	− 0.24	0.15	− 0.11	
R^2 change				0.12****
Total R^2				0.51****

**** $p < 0.0001$. *** $p < 0.001$. ** $p < 0.05$. * $p < 0.10$

A one-way ANOVA was performed between GPA and employment responsibilities. A significant difference in GPA was found for students with different employment responsibilities, $(F2, 172) = 10.73$, $p < 0.0001$. A post hoc analysis (Tukeys HSD) revealed part time employed students have significantly poorer GPA's than full time employed or unemployed students, with no significant difference between the GPA's of full time employed students and unemployed students. As small numbers in some cells prevented a factorial ANOVA from being performed, a chi square analysis was performed between employment and student workload. It appeared that full time employees were often part time students, part time employees were often full time students, and students with no employment responsibilities appeared to be full time students $(p < 0.0001)$. Considered together, full time employees with a part time student workload and full time students with no employment commitments appear to have significantly higher GPA's than full time students who work part time.

Academic, Psychosocial, Cognitive, and Demographic Predictors of Academic Performance

To inspect the data further, an hierarchical regression was performed between GPA as the dependent variable and university entry score entered in the first block, with student institution integration, self efficacy, and employment responsibilities entered in the second block (See Table 3).

Integration and self-efficacy were found to contribute significantly to the prediction of GPA over and above that accounted for by university entry score alone. The addition of measures of integration and self-efficacy improves the prediction of GPA to 51 %, a 12% improvement on the prediction of GPA based on OP alone.

Discussion

The main purpose of this study was to undertake a prospective investigation of the relationship between academic, psychosocial, cognitive, and demographic factors and academic achievement in university.

Academic Predictors of Academic Performance

As predicted, university entry scores were a significant predictor of student's GPA's at the end of the first semester of their course of study. Students with high university entry scores were likely to continue this high academic achievement in university. However, university entry scores need to be interpreted with caution, as they explain less than half of the variance in GPA.

The hypothesis that study skills were related to GPA was not supported. Self-reported study skills were not significantly different for different levels of academic achievement. An explanation for this is that students may report a level of study skill deemed acceptable for university. Students with poorer study skills may be unwilling to report such difficulties and students with well-developed study skills may report a lower, more conservative level of study skill.

Psychosocial Predictors of Academic Performance

As predicted, student institution integration was a significant predictor of academic performance, but interestingly, the relationship was a negative correlation. That is, students who indicated high levels of integration into university tended to have poorer GPA's than students indicating low levels of integration. The finding that integration has an adverse affect on academic achievement is contrary to Tinto's (1975) model of integration that suggests integration is crucial for positive outcomes at university. There are several explanations for these research findings. Firstly, the distinction between attrition and academic achievement must be noted. Tinto's model was originally developed to explain student attrition, and while researchers have found support for this model in relation to academic achievement, it is possible that differences arise from the distinction between the two concepts. High academic achievement is not necessarily related to retention and poor academic performance does not always result in attrition. Thus, it is possible that while student institution integration has a negative correlation with academic achievement, integration may still be positively correlated with student retention. Also, with changes in technology and university policies, the characteristic well-integrated student identified in previous research may have changed. With the advent of the Internet and e-mail, the social nature of universities may be changing, and studying in isolation may have become adaptive for a sub-group of high achieving students.

The hypothesis that commitment to university would be a significant predictor of academic achievement was not supported. The majority of students indicated a moderate to high level of commitment to university and it is possible that the slight negative skewness of the sample affected the significance of commitment as a predictor of GPA.

The hypothesis that career orientation would be predictive of GPA was not supported in this sample of first year students. Students with different levels of clarity of career goals did not differ significantly in their attained GPA. The majority of students indicated moderate to high levels of clarity in their career orientation. One of the possible explanations for this result is that career orientation fluctuates and affects GPA differently at different times in the student's university career.

Psychological health was not a significant predictor of academic achievement. However, as psychological health was measured in the middle of semester, it is possible that depression, anxiety and stress levels were already affected by university factors (exams and assignments). The non-significant results obtained in measures of psychological health may be due to the time of semester that results were obtained. Another argument is that, rather than having a direct relationship with GPA, psychological health may influence other predictors of academic performance, such as student institution integration, satisfaction with university and self efficacy.

Cognitive Appraisal as a Predictor of Academic Performance

The hypothesis that self-efficacy would be positively related to academic performance was supported. Students reporting high self-efficacy of achieving above average grades had significantly higher GPA's than students reporting low self efficacy of achievement. This finding is in line with previous research in the field (Lent, Brown & Larkin, 1984, 1987).

The hypothesis that an optimistic attributional style would be related to higher academic achievement was not supported. Interestingly, the opposite relationship was found, that is, a pessimistic attributional style was predictive of higher GPA's at the 0.10 probability level.

Demographic Predictors of Academic Performance

The hypothesis concerning the influence of employment responsibilities and student workload was partially supported. Full-time students with no employment responsibilities appeared to have higher GPA's than full-time students with part-time employment responsibilities. In addition, it was found that part-time students with full-time employment responsibilities had significantly higher GPA's than full-time students with part-time employment responsibilities. The poorest GPA's were identified amongst students with full-time study commitments and part-time employment.

The difference in GPA between full-time students with no employment and with part-time employment can possibly be explained by time restraints. While full-time students with no employment can devote their time to study for university, part-time employment limits the amount of time available to devote to study. The difference in GPA's between full-time students with part-time employment and part-time students with full-time employment is somewhat more complex and obscure. It is possible that part-time students with full-time employment are highly motivated to study and have clear career goals. They may also have well developed time management skills as a product of their full-time employment responsibilities, which might benefit them in their university studies. Full-time students with part-time employment may not have developed these time management skills and career goals, and lacking these skills and goals may adversely affect their academic performance.

Academic, Psychosocial, Cognitive and Demographic Predictors of Academic Performance

Student institution integration and self-efficacy were significant predictors of GPA in a Science and IT sample after accounting for the differences in OP scores between students. This model improved the prediction of GPA from OP score by 12%.

Recommendations

We have several recommendations based on this study. From a methodological perspective, adequate recording of university entry scores/high school grades of all students is important. Implementing stringent record keeping procedures at the university level would enable researchers to fully examine the relationship between age, previous academic performance and university achievement.

Attributional style research is a relatively new field and several research possibilities have been highlighted in this study. The attributional style of students across fields of study could be examined to identify the characteristic attributional styles of groups of students. The behaviour invoked by optimistic and pessimistic students in response to negative events may be investigated to gain a better understanding of the complex relationship between attributional style and academic performance. The relationship between self-efficacy, attributional style, and academic performance could be examined to identify the influence of a student's self efficacy on their attributions for events, and the corresponding influence on their academic achievement. Such studies may also be extended across cultures to examine the potential "culture-bound" nature of attributional style.

We suggest several important implications for student support interventions and curriculum change. In general, higher university entry scores and high self efficacy are related to higher academic achievement at university. In terms of university entry scores, universities need to make realistic appraisals of the academic demands of particular courses and set the entry score for school leavers at a level based on academic challenge rather than on course demand. As high university entry scores are moderately correlated with high GPA's, entry to courses with a high level of difficulty should be set at a realistic level to avoid undue problems for both students with lower university entry scores and for the university. Alternatively, specialised enhancement programs need to be introduced and evaluated to provide students with additional skills.

Also, interventions could be aimed at promoting academic achievement as an important part of integration into the university. University orientation weeks, with their often heavy emphasis on social activities, having fun, and alcohol consumption, may in fact be promoting this disinclination toward academic achievement. It may be necessary to rethink the activities promoted in orientation week and put an increased emphasis on study skills and academic achievement as integral parts of university life. Promotion of study groups (as opposed to social groups) and high academic achievement as socially acceptable and encouraged may help to change this negative view of academic achievement that appears to be promoted in orientation week.

The study however is limited in its scope to Science and Information Technology students. Students' attitudes and expectations are strongly influenced by their chosen field of study (Smart, 1997). Furthermore, the poor response rate from the IT sample resulted in a negatively skewed sample of IT students. Future research needs to expand the fields of study under examination and also aim for a larger sample size to ensure samples are representative of the whole population.

This study has addressed the issue of student achievement by examining prospectively the relationship between academic, psychosocial, cognitive, and demographic variables and the academic performance of first year Australian university students at an urban commuter-based university. While previous academic performance was the most significant predictor of academic achievement in university, several other factors were identified that influence university grades. Measuring a broad range of academic, psychosocial, cognitive, and demographic variables led to the development of a model that improved the prediction of academic achievement from a prediction based on previous academic performance alone.

Identification of factors that influence academic performance is important at this point in the history of Australian higher education. With the expanding of Australian universities over the last decade to provide equal access for all, comes an increasing diversity of student's characteristics and needs. To fully embrace this equity initiative, universities must cater for this diverse student population and implement strategies and interventions based on sound research, to give all students a fair chance for academic success.

Address for correspondence: Kirsten McKenzie, School of Psychology and Counselling, Queensland University of Technology, Beams Road, Carseldine Campus, QLD, 4034, Australia. E-mail: k.mckenzie@qut.edu.au

References

ABBOTT-CHAPMAN, J., HUGHES, P., & WYLD, C. (1992). *Monitoring student progress: A framework for improving student performance and reducing attrition in higher education*. Hobart: National Clearinghouse for Youth Studies.

ANTON, W. D., & REED, J. R. (1991). *College Adjustment Scales: Professional Manual*. Florida, Psychological Assessment Resources.

BROWN, T. A., CHORPITA, B. F., KOROTITSCH, W., & BARLOW, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behavioural Research and Therapy, 35*, 79–89.

CLARK, E. E., & RAMSAY, W. (1990). Problems of retention in tertiary education. *Education Research and Perspectives, 17*, 47–57.

GERDES, H., & MALLINCKRODT, B. (1994). Emotional, social, and academic adjustment of college students: A longitudinal study of retention. *Journal of Counselling and Development, 72*, 281–288.

HIMELSTEIN, H. C. (1992). Early identification of high-risk students: Using non-cognitive indicators. *Journal of College Student Development, 33*, 89–90.

LECOMPTE, D., KAUFMAN, L., & ROUSSEEUW, P. (1983). Search for the relationship between interrupted university attendance of first year students and some psychosocial factors. *Acta Psychiatrica Belgica, 83*, 609–617.

LECOMPTE, D., KAUFMAN, L., ROUSSEEUW, P., & TASSIN, A. (1983). Search for the relationship between academic performance and some psychosocial factors: The use of a structured interview. *Acta Psychiatrica Belgica, 83*, 598–608.

LENT, R. W., BROWN, S. D., & LARKIN, K. C. (1984). Relation of self-efficacy expectations to academic achievement and persistence. *Journal of Counselling Psychology, 31*, 356–362.

LENT, R. W., BROWN, S. D., & LARKIN, K. C. (1987). Comparison of three theoretically derived variables in predicting career and academic behaviour: Self efficacy, interest congruence, and consequence thinking. *Journal of Counselling Psychology, 34*, 293–298.

LOVIBOND, S. L., & LOVIBOND, P. F. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*, 335–343.

MCINNES, C., JAMES, R., & MCNAUGHT, C. (1995). Diversity in the initial experiences of Australian undergraduates. *Committee for the Advancement of University Teaching* (On-line). Available: www.online.anu.edu.au/caut/com … e/FYEfront.html.

MCKEOWN, B., MACDONELL, A., & BOWMAN, C. (1993). The point of view of the student in attrition research. *The Canadian Journal of Higher Education, 23*, 65–85.

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT. (1997). Thematic review of the first years of tertiary education in Australia. *Department of Employment, Education, Training, and Youth Affairs* (On-line). Available: www.deetya.gov.au/divisions/hed/operations/theme.htm.

PANTAGES, T. J., & CREEDON, C. F. (1975). Studies of college attrition: 1950–1975. *Review of Educational Research, 48*, 49–101.

PASCARELLA, E. T., DUBY, P. B., MILLER, V. A., & RASHER, S. P. (1981). Preenrollment variables and academic performance as predictors of freshman year persistence, early withdrawal, and stopout behaviour in an urban, nonresidential university. *Research in Higher Education, 15*, 329–347.

PASCOE, R., MCCLELLAND, A., & MCGAW, B. (1997). *Perspectives on selection methods for entry into higher education in Australia.* Canberra: Australian Government Publishing Service.

PETERSON, C., & BARRETT, L. (1987). Explanatory style and academic performance among university freshman. *Journal of Personality and Social Psychology, 53*, 603–607.

PETERSON, C., & SELIGMAN, M. E. P. (1984). Causal explanation as a risk factor for depression: Theory and evidence. *Psychological Review, 91*, 347–374.

PETERSON, C., SEMMEL, A., VON BAEYER, C., ABRAMSON, L. Y., METALSKY, G. I., & SELIGMAN, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research, 6*, 287–299.

POWER, C., ROBERTSON, F., & BAKER, M. (1987). *Success in higher education.* Canberra: Australian Government Publishing Service.

RICKINSON, B., & RUTHERFORD, D. (1995). Increasing undergraduate student retention rates. *British Journal of Guidance and Counselling, 23*, 161–171.

SMART, J. C. (1997). Academic subenvironments and differential patterns of self-perceived growth during college: A test of Holland's theory. *Journal of College Student Development, 38*, 68–78.

SPADY, W. G. (1971). Dropouts from higher education: Toward an empirical model. *Interchange, 2*, 38–62.

TERENZINI, P. T., & PASCARELLA, E. T. (1978). The relation of students' precollege characteristics and freshman experience to voluntary attrition. *Research in Higher Education, 9*, 347–366.

TINTO, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*, 89–125.

WEST, R. (1998). Learning for life: Higher education review—Final report. Department of Employment, Education, Training, and Youth Affairs (On-line). Available: www.deetya.gov.au/divisions/hed/hereview/execsum1.htm.