

EXPERIENCED STRESS, PSYCHOLOGICAL SYMPTOMS, SELF-RATED HEALTH AND ACADEMIC ACHIEVEMENT: A LONGITUDINAL STUDY OF SWEDISH UNIVERSITY STUDENTS

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In this study we investigated whether or not problems experienced during years at university affect academic achievement. Students enrolled full-time at a Swedish university were followed up from their year of entry in 1998/1999 through to 2000/2001 ($N = 1,127$) by self-administered questionnaires. Students' sociodemographic characteristics, their experience of stressors, psychological symptoms, and mental and general health ratings were linked to their academic achievement (degree completed). The extent to which various factors or groups of factors affect academic achievement was measured by a series of multiple logistic regression analyses. Older students, females, and those enrolled on comparatively shorter programs (3 years) tended to have higher odds of being awarded a degree. Experienced stress brought on by not coping academically and due to study support demands was a substantial barrier to students' academic achievement.

Keywords: academic performance, stress appraisal, mental health, university students.

Observations made by the staff of counseling centers and other student health care organizations (for reviews, see Robbins, May, & Corrazini, 1985; Sharkin, 1997) indicate that mental health problems of university students are on the increase (Newbury-Birch, Lowry, & Kamali, 2002; Raj, Simpson, Hopman, &

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Singer, 2000; Rosal, Ockene, Ockene, Barrett, & Hebert, 1997). This is a source of concern in the USA and in other countries (Aktekin et al., 2001; Roberts & Golding, 1999; Vaez & Laflamme, 2002). Studies suggest that psychological distress among university students is significantly higher than among the general population (Adlaf, Gliksman, Demers, & Newton-Taylor, 2001; Stewart-Brown et al., 2000), and even among students' working peers (Cotton, Dollard, & Jonge, 2002; Vaez, Kristenson, & Laflamme, 2004).

Explanations for health disorders may be sought by looking at a variety of factors, related not only to the university but also to the family, the peer group, and – for some – personal relationships and the workplace. During their years at university, students cope with a new work environment and the intellectual and relational demands it imposes on them, and create balance and harmony between their various social roles. They may go through changes in living arrangements or start new relationships, while becoming responsible for their own finances for the first time. All of this can generate stress (Disch, Harlow, Campbell, & Dougan, 2000; Lu, 1994; Ross, Niebling, & Heckert, 1999).

Little attention has been paid to individual health status during the years at university, the factors that influence it, and how, in turn, it may impact on academic performance. The size of this population, the increasing university enrolment in many countries and the importance that life at university may have on career development and future health warrant closer consideration (McKenzie & Schweitzer, 2001; Statistics Sweden, 2002).

Among other things, the determinants of student persistence and successful completion of a degree at university make up an important area of research. Previous studies show that academic performance can be affected by a variety of factors, classified as academic, cognitive (e.g., cognitive appraisal), demographic, and psychological (McKenzie & Schweitzer, 2001). Though the latter have received limited attention, a clear positive association with performance has been observed in the case of emotional health (Pritchard & Wilson, 2003; Trockel, Barnes, & Egget, 2000), and – to some extent – a negative one with depression (Stewart, Lam, Betson, Wong, & Wong, 1999). Likewise, negative associations have been found between degree of stress experienced from combined sources and academic performance (Baker, 2002; Garden, 1991; Goldman & Wong, 1997; Hojat, Gonella, Erdman, & Vogel, 2003). Furthermore, the correlation between noncognitive factors and academic performance has been studied virtually only in American student populations and in contexts where student evaluation is largely *relative*, i.e., each student in comparison with others. The relationship has not been investigated in systems based on individual achievement of pre-set goals, i.e., where evaluation is largely *goal-based*. Finally, there are few examples of studies conducted in contexts where university attendance is open

not only to elite students but also to a wider range of people from various classes and backgrounds.

This cohort-based study uses survey material on Swedish university students to investigate how health status and some of its known determinants, as experienced during the first and third year at university, influence later individual academic achievement. More specifically, the study considers whether: (a) students' socio-demographic characteristics at the baseline influence the likelihood of obtaining a degree, and (b) experiencing stressors, psychological symptoms, and less than good mental or general health in either the first or third year at university influence academic achievement.

HIGHER EDUCATION IN SWEDEN

It is important to emphasize that, in Sweden, the government holds responsibility for the activities undertaken in the tertiary-education arena (colleges and universities). The emphasis in all higher education is on single-subject courses, each worth a certain number of academic credits. The courses are of varying length, and several different courses can be combined to form a degree program. The extent of any university program is specified in credits, where one credit corresponds to one week's full-time study. An academic year, which in Sweden is usually divided up into an autumn and a spring semester, consists of 40 credits. The most common grades are "Fail," "Pass," and "Pass with distinction."

Sweden has a financial support system for students of higher education designed to ensure that everyone has an opportunity to study at college or university. The system consists of a study grant and study loans which in combination constitute "study support". Specific conditions have to be met for a student to be eligible for this support. For those who already have an income, the amount of support may be reduced. To receive support over a period of years, students must pursue their studies and accumulate a certain number of credits per semester. Everybody in Sweden up to the age of 50 may obtain study support for university studies up to a maximum 240 weeks.

METHOD

PARTICIPANTS

Participants were recruited from a longitudinal data set that comprises information on a population of students enrolled full-time, either on an undergraduate study program (usually 120 Swedish university credits) or on a longer program, at one of the three faculties of Linköping University (LiU) during the academic years 1998-1999 (the first year of university studies) to 2000-2001 (the third year). With its 25,000 students and 3,500 employees, LiU is one of Sweden's largest universities. Its three faculties are the Faculty of Arts

and Science, the Faculty of Health Sciences, and the Institute of Technology. Undergraduate education is based on 87 degree-level programs and 500 separate subject courses.

Data were gathered by a self-administered questionnaire, distributed by post at the end of students' first and third years at the university. In the spring of 1999, all first-year students were asked to complete the questionnaire, which covered aspects such as individual and family background, lifestyles, and health status (more extensively described below). Two years later, in the spring of 2001, all third-year students enrolled at the university (largely the same set of individuals) were asked to complete the same questionnaire. The response rate was 68% in 1999 ($n = 2,180$ full-time students, 45% male) and 66% in 2001 ($n = 1,478$ full-time students, 44% male). In total, 1,250 students (42% male) filled in the questionnaire in both 1999 and 2001.

From among the respondents, the 90 students who stated in 2001 that they had left their study program or had taken a break from their original program were excluded. Further, the 33 students registered on a study program requiring more than 5 academic years (i.e., medical students) were excluded on grounds that they could not have completed their studies at the time individual academic achievement was measured (i.e., November, 2003). Accordingly, the current study is based on the responses of a total of 1,127 students.

Table 1 presents distributions of students according to a number of socio-demographic variables and by duration of study program.

TABLE 1
SOCIODEMOGRAPHIC CHARACTERISTICS OF STUDENTS IN THE COHORT BY DURATION OF STUDY PROGRAM (IN YEARS)

Sociodemographic Characteristics	3 years <i>n</i> = 242	3½ to 4 years <i>n</i> = 421	4½ to 5 years <i>n</i> = 464
Age (in years) at baseline in 1999	%	%	%
18-20	14.5	15.4	17.0
21-24	46.7	55.1	59.7
25+	38.8	29.5	23.3
Gender			
Male	36.0	34.2	52.8
Female	64.0	65.8	47.2
Parental university education			
Yes	41.1	49.4	57.4
No	58.9	50.6	42.6
Academic achievement			
<i>Awarded a degree</i>			
Yes	76.4	55.1	42.9
No	23.6	44.9	57.1

DATA COLLECTION INSTRUMENT AND SELECTED MEASURES OF EXPOSURE

Students' health status was surveyed by means of a self-administered questionnaire. The questionnaire was developed during 1998 on the basis of a number of valid instruments previously employed in national investigations of issues related to student health. A preliminary version of the questionnaire was developed with the assistance of a group of higher-education health professionals, student representatives, and members of the quality assurance committee. After a pretest on 70 students, the final questionnaire comprised 44 items and covered aspects such as individual and family background, place of residence, financial situation, previous education, lifestyle, leisure activities, and health.

For the current study, three sets of variables were used to predict academic achievement. These were labeled *demographic variables*, *experienced stress*, and *psychological symptoms and self-rated health (SRH)*.

Demographic variables The demographic variables considered were age, gender, parental university education, and duration of study program. The subjects were allocated to three categories with respect to age at baseline (in 1999): 18-20 years, 21-24 years, and 25 years and older. Parental university education was dichotomized into two categories according to whether or not each student had a parent with an academic background. Duration of study program was divided into three categories: (a) 3 years (short study program), (b) 3½ to 4 years (intermediate study program), and (c) 4½ to 5 years (long study program).

Experienced stress A total of 14 potential sources of stress, covering aspects of student life, were listed, and, for each of them, students were asked to determine the extent to which they had been under stress during the preceding academic year on a 4-point range: 0 (*not at all stressed*), 1 (*slightly stressed*), 2 (*rather stressed*), and 3 (*highly stressed*). The aspects covered (see Table 2 below) are related to life at and outside of university. The responses to each of the 14 stressor questions were dichotomized into two categories according to whether they were experienced as a stress factor or not. The category "no" included the responses *not at all* and *slightly*, and the category "yes" covered the remaining two alternatives.

Psychological symptoms and self-rated health (SRH) Symptoms related to students' psychological health were identified on the basis of declared symptoms (difficulty in concentrating, anxiety, depression, and tiredness) when answering the question: "During the academic year, did you experience any of the following psychological problems?" Response alternatives were *not at all*, *a little*, *quite a lot*, and *a lot*. For the current study, the responses to each symptom were dichotomized into two categories according to whether they were experienced or not. The category "no" included the responses *not at all* and *a little*, and the category "yes" covered the remaining two alternatives.

Student health status was studied with self-rated mental and general health by using two single item questions: "How do you rate your general state of health?" and "How do you rate your state of mental health?", with response alternatives *very good*, *good*, *neither good nor poor*, *poor*, and *very poor*. For both general and mental health, two status categories were created, namely "good health" (including *very good* and *good*) and "less than good" (incorporating the three other categories).

Measure of Academic Achievement Whereas assessments of stress, symptoms, and health were measured at the end of the first and third year of university, academic achievement was measured toward the end of third year of university (November, 2003). Students' academic achievement was measured on the basis of whether they had been awarded their degree (about 54.7% of students on average; see also Table 1) by the end of 2003. The total numbers of degrees awarded were taken from the University Registry (as of the end of November, 2003).

DATA ANALYSIS

The extent to which various factors or groups of factors affect academic achievement (gaining a degree) was measured by a series of multiple logistic regression analyses. These analyses encompassed the following groups of variables: (a) sociodemographics, comprising age, gender, parental academic background, and duration of study program (at baseline 1999), (b) experienced stress, and (c) psychological symptoms and self-rated mental and general health. In all cases, crude and adjusted odds ratios (ORs) with 95% confidence intervals were computed. Students who were female, aged 18-20 years, had a parent with academic background, were in the short study program (3 years), were not exposed to stressful events and psychological symptoms, and rated their health as *good* were used as reference groups.

RESULTS

Table 2 shows the ORs for being awarded a degree according to the blocks of variables in the first year of university. The oldest age group (25+ years) had a significantly higher OR than did the lower one as regards being awarded a degree ($OR_{\text{crude}} = 1.53$; 95% CI 1.03 - 2.27). These age differences disappear after adjusting for other variables. Male students, those from the intermediate or long study program, and those who experienced stress due to "not coping academically" and "study related demands," and who experienced "concentration difficulty" in 1999 had significantly lower ORs of obtaining a degree two years later. Those who were stressed due to "poor finances" and "perceived inadequacy for the family" had significantly higher crude ORs compared with

those who did not experience stress. The effects of these variables disappear in the adjusted model.

TABLE 2
CRUDE AND ADJUSTED ODDS RATIOS (ORs) WITH 95% (CIs) FOR THE EFFECT OF FACTORS IN 1999 ON ACADEMIC ACHIEVEMENT IN 2003

Models incorporating the following sets of variables	Crude OR [95% CI]	Adjusted ^a OR [95% CI]
I) Sociodemographic at baseline (in 1999)		
Age		
18-20 years	1	1
21-24 years	1.14 (0.80-1.63)	1.21 (0.82-1.77)
25+ years	1.53 (1.03-2.27)	1.50 (0.96-2.35)
Gender		
Female	1	1
Male	0.47 (0.36-0.61)	0.45 (0.34-0.60)
Having parent with academic background		
Yes	1	1
No	0.98 (0.76-1.26)	0.99 (0.75-1.30)
Duration of study program		
3 years	1	1
3½ to 4 years	0.37 (0.26-0.54)	0.37 (0.25-0.55)
4½ to 5 years	0.26 (0.18-0.38)	0.23 (0.15-0.33)
II) Experienced stress in 1999^b		
Not coping academically	0.77 (0.58-1.02)	0.72 (0.53-0.99)
Study support demands	0.60 (0.44-0.82)	0.62 (0.44-0.87)
Problems with teachers	0.95 (0.44-0.82)	1.00 (0.54-1.86)
Problems with fellow students	1.34 (0.82-2.20)	1.36 (0.80-2.31)
Extracurricular activities	1.00 (0.74-1.34)	0.90 (0.65-1.24)
Poor finances	1.33 (1.01-1.75)	0.96 (0.70-1.31)
Poor housing	0.79 (0.49-1.28)	0.81 (0.48-1.38)
Perceived inadequacy for the family	1.61 (1.12-2.29)	1.15 (0.77-1.73)
Having family problems	1.37 (0.86-2.17)	1.50 (0.90-2.50)
Not having a relationship	0.75 (0.49-1.15)	0.89 (0.56-1.40)
Relationship problems	0.89 (0.62-1.30)	1.04 (0.69-1.56)
Friendship issues	0.75 (0.43-1.30)	0.84 (0.46-1.52)
Doubts about future	0.79 (0.58-1.08)	0.82 (0.58-1.15)
Loneliness	1.11 (0.68-1.79)	0.96 (0.55-1.67)
III) Psychological symptoms and health in 1999		
Tiredness	1.22 (0.92-1.61)	1.13 (0.82-1.55)
Anxiety	1.05 (0.74-1.50)	1.25 (0.82-1.90)
Concentration difficulty	0.61 (0.43-0.86)	0.67 (0.45-0.99)
Depression	1.08 (0.72-1.64)	0.94 (0.58-1.53)
Less than good mental health	0.89 (0.56-1.39)	0.81 (0.48-1.36)
Less than good general health	0.69 (0.44-1.08)	0.65 (0.39-1.06)

^a Adjusted for all variables included in the table.

^b Those who did not experience stress and psychological symptoms and those who rated their health as good were used as reference groups.

TABLE 3
CRUDE AND ADJUSTED ODDS RATIOS (ORs) WITH 95% (CIs) FOR THE EFFECT OF FACTORS IN
2001 ON ACADEMIC ACHIEVEMENT IN 2003

Models incorporating the following sets of variables	Crude OR [95% CI]	Adjusted ^a OR [95% CI]
I) Sociodemographic at baseline (in 1999)		
Age		
18-20 years	1	1
21-24 years	1.14 (0.80-1.63)	1.31 (0.89-1.94)
25+ years	1.53 (1.03-2.27)	1.77 (1.13-2.78)
Gender		
Female	1	1
Male	0.47 (0.36-0.61)	0.43 (0.32-0.59)
Having parent with academic background		
Yes	1	1
No	0.98 (0.76-1.26)	1.04 (0.78-1.37)
Duration of study program		
3 years	1	1
3½ to 4 years	0.37 (0.26-0.54)	0.36 (0.24-0.54)
4½ to 5 years	0.26 (0.18-0.38)	0.23 (0.16-0.35)
II) Experienced stress 2001^b		
Not coping academically	0.68 (0.68-0.92)	0.67 (0.48-0.92)
Study support demands	0.37 (0.26-0.52)	0.41 (0.28-0.61)
Problems with teachers	1.30 (0.74-2.30)	1.17 (0.64-2.16)
Problems with fellow students	1.08 (0.66-1.78)	1.28 (0.75-2.19)
Extracurricular activities	0.89 (0.66-1.19)	0.89 (0.65-1.22)
Poor finances	1.09 (0.82-1.45)	0.86 (0.63-1.18)
Poor housing	0.57 (0.33-1.00)	0.75 (0.41-1.38)
Perceived inadequacy for the family	1.43 (1.02-2.01)	1.00 (0.68-1.48)
Having family problems	1.71 (1.09-2.68)	1.69 (1.04-2.74)
Not having a relationship	0.76 (0.49-1.19)	0.82 (0.50-1.33)
Relationship problems	0.75 (0.50-1.13)	0.96 (0.62-1.48)
Friendship issues	1.36 (0.74-2.48)	1.29 (0.68-2.45)
Doubts about future	1.27 (0.95-1.69)	1.23 (0.89-1.71)
Loneliness	0.82 (0.51-1.32)	0.90 (0.52-1.54)
III) Psychological symptoms and health in 2001		
Tiredness	1.33 (0.99-1.79)	1.07 (0.76-1.52)
Anxiety	1.13 (0.80-1.59)	1.20 (0.80-1.81)
Concentration difficulty	0.43 (0.32-0.60)	0.47 (0.32-0.68)
Depression	0.85 (0.58-1.23)	0.89 (0.57-1.39)
Less than good mental health	0.72 (0.47-1.12)	0.73 (0.44-1.23)
Less than good general health	1.12 (0.72-1.74)	1.10 (0.66-1.85)

^a Adjusted for all variables included in the table.

^b Those who did not experience stress and psychological symptoms and those who rated their health as good were used as reference groups.

Few of the stressors measured in the third year are strongly associated with being awarded a degree. Whereas “not coping academically” (OR = 0.68; 95% CI 0.68-0.92), and “study support demands” (OR = 0.37; 95% CI 0.26-0.52) are associated with reduced ORs, “perceived inadequacy for the family” and “having family problems” have a protective effect. “Having family problems” increased the odds of obtaining a degree (OR = 1.71). Further, from among the psychological symptoms and SRH measures in the third year, “concentration difficulty” acts as a significant barrier.

DISCUSSION

MAIN FINDINGS

The outcome chosen in the current study for measuring academic achievement differs from those that usually have been employed. The bulk of the studies conducted so far have focused on either student attrition or students’ relative performance. But the system in which our study is conducted is goal-oriented; in that context, obtaining a degree was regarded as the important outcome. Such consideration was also motivated by the fact that the study base consisted of students who already had been enrolled full-time for three consecutive university years and the data at hand gave us an opportunity to measure what enables persistent students to achieve or not achieve a desired outcome.

In general terms, the study shows that few of the factors investigated impact on the probability of obtaining a degree, but that those from the first year at university that are significantly linked to degree success remain linked in the third year. Experienced stress due to “not coping academically” and “study support demands” are substantial barriers, in particular when coupled with concentration difficulties. By contrast, perceived inadequacy for the family and experienced stress due to having family problems emerge as incentives.

Also, students’ age and gender as well as program duration have significant impacts on their academic performance. Male students, younger ones and those enrolled in long-lasting study programs complete their studies in smaller proportions than do female students, older ones and those attending comparatively shorter programs. Having a parent with a university education has virtually no impact. These latter findings are echoed in earlier research dealing with academic performance. To start with, the finding that gender and age play a role in university students’ performance is not unique to our study. The fact that female performance tends to surpass that of male students has been documented before (see, for example, Baker, 2003; Strahan, 2003), as has the tendency for older students to perform better than younger ones (Baker). The lack of impact of parental academic education (Shields, 2002), however, was less expected

– although the composition of the study group and the outcome chosen may have had selection effects.

Further, the sources of stress (measured here as being stressed due to “not coping academically”) having a role to play is in line with several earlier studies (see, for example, Halamandaris & Power, 1999; Larose, Robertson, Roy, & Legault, 1998; Struthers, Perry, & Menec, 2000). In our case, the factor tends to act as an obstacle to obtaining a degree.

For their part, relational problems are also documented in earlier studies as achievement barriers or incentives. Specifically, academic relational problems lie at the center of preoccupations in Tinto’s interactionalist model (1975, 1993), but other types of such problems also have been considered (Leppel, 2001; Lievens, Coetsier, Fruyt, & Maesneer, 2002; Magolda, 1992; Mannan, 2001; Rocha-Singh, 1994; Sandler, 2000; Trockel et al., 2000).

In general terms, studies on stress appraisal and academic performance also indicate that better stress appraisal and coping strategies contribute to satisfactory academic performance (Duff, Boyle, Dunleavy, & Ferguson, 2004; Hojat et al., 2003; Nonis, Hudson, Logan, & Ford, 1998; Rodríguez-Fornells & Maydeu-Olivares, 2000; Struthers et al., 2000).

Finally, the fact that psychological health was found to be weakly related to performance cannot be left unmentioned. This area of research, though embryonic (McKenzie & Schweitzer, 2001), needs to be developed further. In this respect, it may be worth investigating in-depth the interrelationships between health, stress, and academic performance, while not excluding the possibility that some relationships may be the opposite of what might be expected (Nonis et al., 1998).

STRENGTHS AND LIMITATIONS OF THE STUDY

The study is based on a large number of full-time students from a variety of university disciplines and programs, and, as such, presents one of the few cohorts of university students offering opportunities for comparisons between various career orientations. Also, the absolute number of subjects is relatively high, and the response rate for each year of data collection was relatively good. An additional asset is that the relationships of interest are studied in a system based on individual achievement of preset goals, i.e., in Sweden, where evaluation is mainly *goal-based* rather than *relative* to other students.

One set of limitations involves the content of the data collection instrument itself. Self-reporting as a means of data collection can be problematic. The accuracy of data is dependent on a subject’s self-reporting and cannot be corroborated by objective assessment. Conceived as a screening and follow up device, the questionnaire covers a variety of health disorders, but it does not

investigate any single one of them in depth. The data at hand are also based on what respondents have knowledge of and remember about various health disorders, not on their medical records. Recall bias can be particularly important when the reference period used is as lengthy as one year. As a consequence, it is possible that the current studies give a somewhat brighter picture of the health situation of students than is actually the case.

An additional limitation has to do with the characteristics of the students considered. They can be regarded as resilient since, by virtue of selection, they all remained full-time students after three years at university (thus excluding dropouts). In other words, the data at hand reveal nothing about how the factors studied affect the academic achievement of other categories of students. This also applies to students who did not respond to the questionnaires, but who were still enrolled full-time at the end of the third year at university. Such excluded students may be in relatively less good physical or mental shape than the respondents – or, perhaps more importantly, they may react differently to various stressors or experience more psychological symptoms. In addition, the time period of measurement favors students on short programs, since they may have had more time to complete their degree, i.e., from the end of the third academic year in May, 2001, through the end of November, 2003.

IMPLICATIONS

Better knowledge of the determinants of university students' academic achievement, alongside how these change during the years at university, can help define various means by which achievements are made early and then maintained, and also perhaps how student attrition might be counteracted. This, in turn, may improve the targeting of interventions and support services for students at risk of academic problems. In this regard, academic coping and relational problems deserve special attention. Satisfactory academic achievement contributes to good career prospects. This applies to everyone making the critical transition between being a student and becoming established in working life.

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