Sex differences in degree performance at the University of Oxford

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ABSTRACT

For many years, men have outperformed women in the final degree examinations at the Universities of Oxford and Cambridge. This not only contradicts the trends at most other British universities but is particularly baffling since British females perform on par or better than their male peers in secondary school examinations. The present article draws on a longitudinal study of Oxford University applicants ($n = 1929$) to investigate competing explanations for this 'gender gap' in final examinations. The findings, based on detailed information of a subset of participants who were successful in gaining entrance to the University, found that their gender, their performance in first year exams and their expectation of obtaining a top grade (first class) degree were the strongest predictors of actual performance. Logistic regression models estimating the probability of obtaining a first showed that these two factors (first year exam marks and expectation of a first), both of which were higher in men, accounted for the gender gap. We argue that expectation of a first is an example of specific academic self-concept and that the higher level in men reflects different responses of the sexes to the particular academic environment of Oxford. The study also found that higher levels of selfesteem were associated with lower examination performance in both men and women.

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1. Introduction

In the present article, we investigate degree performance for men and women at the University of Oxford. Female students and women generally have higher educational attainment than boys and men in secondary schools and higher education (e.g. Goldthorpe, 2000; gov.uk, 2011; HESA, 2011/12). But when breaking such aggregate statistics down by institution, there is a surprising persistent discrepancy in degree performance results for the two most ancient and most elite British Universities Oxford and Cambridge. Here, women obtain a lower proportion of the highest (first class) degrees than do men. This matters from an institutional and public policy perspective regarding labour market entry, but is also of interest to psychological research as we think about potential explanations for this pattern.

The higher proportion of men than women at Oxford and Cambridge universities receiving first class degrees in their final university examinations has been present for many years (e.g. Leman & Mann, 2003; McCrum, 1994, 1997; Spurling, 1990). This is the case even when it is taken into account that more men take degrees such as Physics which award a higher proportion of firsts than some arts subjects in which there is a higher proportion of women (Ogg, Zimdars, & Heath, 2009; Surtees, Wainwright, & Pharoah, 2002). This contrasts with the position at most UK universities (Woodfield & Earl-Novell, 2006), including

some other of the more prestigious universities (Russell Group) and in particular with the work of Farsides and Woodfield (2007) at Sussex University. There are a number of ways in which Oxford and Cambridge differ from other universities which might contribute to the apparent underperformance of women. Firstly, a major part of teaching and learning, particularly in the humanities and social sciences, involves very small tutorial groups. Tutorial groups here are usually only two or sometimes three students with a tutor. The teaching method can be intentionally adversarial and it is conceivable that this style impacts differently on men and women. A further difference is that the majority of the marks contributing to final degree grades are based on timed written examinations that usually last for 3 h. Poorer exam grades of boys than girls at school are at least partly attributable to their lower average performance and wider distribution of marks in coursework (Elwood, 2005). This male disadvantage would not apply at Oxford since, in contrast to other UK universities, there is a relatively small (if any) contribution from independent coursework to the final degree marks. It has often been proposed that timed tests are exceptionally stressful for women (see Voyer, 2011). This might inadvertently disadvantage women because of their well-researched greater tendency to be more anxious than men. However, we have shown in previous work on the present cohort (Mellanby & Zimdars, 2011) that the higher level of trait anxiety typical of women actually appears to advantage them in academic success at Oxford. This finding is in line with research from Cambridge University using Eysenck's neuroticism score which found that this trait was predictive of academic success for women (Surtees et al., 2002).

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A previous study at Oxford (Mellanby, Martin, & O'Doherty, 2000) of undergraduates in their final year, carried out nine years before most of the research participants represented in this paper took their finals, had investigated a range of factors that might be likely to affect performance of university students in examinations. Many of the factors investigated were chosen because they had been shown in the comprehensive book by Maccoby and Jacklin (1974) frequently to show differences between the sexes. These factors included self-esteem, responses to stresses of examinations and of personal relationships, happiness, risk-taking, working patterns, anxiety and depression, and expectation of examination success. Additionally, we measured verbal and non-verbal reasoning (Alice Heim 6 test, Heim, Watts, & Simmonds, 1983). It was postulated that only factors that both differed between the sexes and predicted examination results could be considered as possibly causative with respect to the gender difference in exam results. There was only one measure that met this criterion: the expectation of receiving the highest possible degree class, a first class degree. Here, more men expected it and they were more likely to achieve it.

The present study built on these findings. The expectation of a first class degree can be considered as a surrogate for specific academic self-concept (see Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995). Most Oxford University degree courses comprise a single subject area such as Chemistry, Physics, Law, Mathematics, English Language and Literature. Therefore the expectation of a first is a personal evaluation of the likelihood of success in a specific academic domain. The reciprocal model of Marsh and Yeung (1997), derived from a longitudinal study, demonstrated the inter-relationship between academic achievement and academic self-concept.

Examinations at Oxford University are mostly taken at the end of students' first year and then at the end of their degree course. The highly selective admission process for the university means that males and females are closely matched on their grades obtained at school.[1] If the men obtain higher grades in first year exams this could not therefore be related to a difference in previous attainment but would be likely to reflect sex difference in response to the Oxford courses or Oxford environment. Success in first year exams would be expected to raise the males' academic self concept and specifically, this would raise their expectation of getting a first class degree. Hence the factors could work together to contribute to males actually obtaining a higher proportion of first class degrees in the final exams. It is relevant here that a sex difference limited to the usual university age group (18–22 years) was identified by Maccoby and Jacklin (1974; p359) as the women's 'lack confidence in their ability to do well in a new task'.

We introduced a measure of deep approach to learning into the present study. A deep approach to learning involves seeking meaning and relating new information to knowledge already acquired and this approach is considered to be particularly appropriate for university learning (Biggs, 1978, 1985, 1993; Biggs, Kember, & Leung, 2001; Marton & Säljö, 1976). Deep approach contrasts with a surface approach which may involve rote learning and puts emphasis on detail rather than looking for connections between concepts. A surface approach is expected to be less conducive to success in university level work and indeed deep learning has been associated with obtaining higher marks in university final exams (McManus, Richards, Winder, & Sproston, 1998; Prosser & Trigwell, 1999; but see Phan, 2009). We hypothesised that if females at Oxford University were less likely than males to use a deep learning approach then this might contribute to reduced achievement in university examinations. Furthermore, Phan (2009) has shown complex interrelationships between deep learning and factors such as mastery and performance goals which do impact on academic attainment. It is to be hoped

that a university education, particularly one involving as much tutor/student interaction as occurs in the tutorial system at Oxford, would encourage a deep learning approach.

In the present article, we use original empirical data which we collected for a research project called the Oxford Admissions Study. The project was set up in 2000 with the following aims: to investigate the social equity of the admission process, to trial a new type of admission test, and to look at possible causes of the fact that a lower proportion of women than men obtained the highest class of degree. In the present article, we are only concerned with the last one of these three aims; findings relating to admission processes are published elsewhere (Ogg et al., 2009; Zimdars, Sullivan, & Heath, 2009). The research material for the Oxford Admissions Study consisted of a questionnaire and an intelligence test taken before admission. Those who gained a place for study at Oxford were also followed up near the end of their degree course, when they filled in a further questionnaire. Their final degree class and marks were collected. In addition, the marks in first year exams of a sub-group of the Oxford students were obtained. The research design facilitated a longitudinal approach to investigating which responses changed over the duration of students' degree courses, whether any changes differed between the sexes and whether any measures either at start or finish were predictive of academic success in the final exams.

Our modelling strategy was first to compare scores of men and women on all these measures. Then, in view of the predictive value of the expectation of obtaining a first class degree, we look at how this interacted with other factors in predicting a first, and whether such interactions differed between the sexes. In view of the contradictory views in the media and the scientific literature on the effects of high self-esteem on academic performance we also looked at the interaction of this factor, which the previous study showed was higher in men, with other factors related to achievement. We fitted logistic regression models with gaining a first as the response variable; the explanatory variables in these models included the continuous measures such as prior attainment and deep approach to learning and their interactions with gender.

2. Methods

2.1. Participants

A total of 1929 applicants to the University volunteered to take part in the study (for detailed information see Zimdars, 2007). Of these, 709 were offered and took up a place at Oxford (347 males and 362 females) and the present study concerns this latter group. Of these, 394 agreed to fill in the follow-up questionnaire in their 3rd year. In the tables there are some small variations in the numbers of participants owing to the fact that sometimes a question was not answered; we preferred not to impute values. To be able to implement model selection strategies, we used a subset, $n = 302$, with complete information to predict degree class including the average of the first year exam marks. This first year average mark is called Prelimav. The reduced sample size resulted because some of the participants did not take an exam until their second year and because some chairmen of examiners did not release the exam marks.

2.2. Procedure

The tests were administered under examination conditions in the college to which the candidates had applied. The confidentiality of the information collected was emphasised at all times and the exercises were not marked until all the decisions about applications had been finalised. Only the intelligence test part of the testing was timed. The rest of the exercise took less than 1 h and the students were permitted to leave once they had finished.

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[1] This observation is interesting in its own right as girls actually achieve more highly than boys in their GCSE results.