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Help or Hindrance? Higher Education and the Route to Ethnic Equality

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ABSTRACT *Upward social mobility has been evident among British ethnic minority communities since the 1960s, and education appears to have had a key role in this process. Despite this, social scientists have been slow to consider the link between education, ethnicity and social stratification. The role of higher education has been particularly neglected. Although there has been some suggestion of an ethnic bias in the allocation of university places, previous work in this area has been limited by the nature of the data that have been available and by the types of analysis that have been conducted. This article includes detailed consideration of the key stages of the university application procedure, and particular attention is given to the role of candidates' predicted and actual A-level grades. Although young people from ethnic minority backgrounds are admitted into university in large numbers, it is suggested that higher education has an ambivalent role in relation to ethnic equality. Institutional biases mean that ethnic minority candidates are filtered into the new university sector, and it is concluded that biases in education and the labour market combine to create a cumulative pattern of ethnic disadvantage.*

Introduction and Background

Debates about ethnic inequality and disadvantage have historically focused on employment and the labour market. While this clearly reflects the importance of occupation as 'a significant attribute in all the dimensions of stratification, [which] possesses connotations of power and prestige relationships' (Kelsall *et al.*, 1972, p. 18), it has tended to mean that other potentially important areas of inquiry have been neglected. Relatively little attention has, for example, been given to the link between education, ethnicity and social stratification. This is a particularly important gap given the strong ideological and empirical links that exist between occupational status and education in industrial societies.

Ideologically, occupational status is tied to education by the notion of meritocracy. This concept is often used to justify social stratification on the basis that individuals' positions within society are determined by merit (often defined in terms of educational attainment) rather than ascribed social characteristics (such as ethnicity). Empirically, the

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link between education and occupational attainment in 'advanced industrial' countries is relatively close (Cheng & Heath, 1993, p. 152). In such societies, higher education is often viewed as a 'stepping stone to higher level occupations' (Cheng & Heath, 1993, p. 151) and graduates enjoy semi-elite status in the form of high incomes and access to high-status professions (Kelsall *et al.*, 1972; Dolton *et al.*, 1990).

The notion of a meritocracy is evident in the suggestion that some minority groups are consciously using higher education to alter their own class composition. An 'ethnic minority drive for qualifications' has been attributed to a certain 'mentality' associated with economic migrants that includes an over-riding ambition to better oneself and one's family (Modood, 1993, 1998; Modood *et al.*, 1997). Such is the strength of this drive that, while ethnic minority communities account for 8% of 18–24 year olds in Britain, they make up almost twice this proportion of university entrants. This level of representation confounds general social-class patterns as it is achieved from a situation of relative disadvantage. Thus, for example, while two-thirds of white university entrants are from non-manual backgrounds, this compares with slightly more than one-third of Pakistanis and Bangladeshis (Ballard, 1999). This, in part, reflects the extent to which working-class ethnic minority groups achieve better examination results than their white working-class peers (Modood, 1993).

Although education may provide the basis for upward social mobility and has considerable potential as a force for increasing ethnic equality, there is nothing inevitable about this. Thus, for example, Cheng & Heath (1993, p. 152) have suggested that education may simply serve to reinforce broader patterns of social inequality:

> at each stage of their educational and occupational career the members of some ethnic minorities might experience discrimination leading to a cumulative pattern of disadvantage.

The analysis presented in this article is specifically concerned with entry into higher education, as this constitutes a key moment in many people's educational careers and provides the foundations for access to well-paid, high-status occupations. Relatively little attention has been given to issues of racism and ethnicity in higher education. Until recently very little data had been published in this area, and a comprehensive process of ethnic monitoring was only introduced during the late 1980s (Modood, 1993, p. 167). According to Law (1996, p. 179), the 'belated' nature of this focus reflects 'the insularity of universities from local intervention, the myths of academic liberalism, hostility to prescription and arrogance in the face of inequality'.

Before reviewing the research evidence in this area, it is important to be clear about the process by which higher education places are allocated. Applications to university typically involve the following stages.

(i) Candidates make up to six initial applications through the Universities and Colleges Admissions Service (UCAS) [1].
(ii) Institutions decide whether or not to make an 'initial' offer. Typically, at this stage, applicants have not completed their A levels and offers are based on predicted results (as estimated by teachers) and are conditional on candidates gaining certain grades.
(iii) Candidates may select one offer as a 'firm' offer and another as an 'insurance' offer.
(iv) These offers are automatically confirmed if the conditions are fulfilled and, while candidates are committed to accepting them, firm offers over-ride insurance offers. If a candidate does not meet the conditions of an offer, their application may be

rejected. Even in these circumstances, however, an offer may still be confirmed and, even if it is not, the institution may offer a place on a different course.

(v) Candidates who fail to gain a place through the main application procedure may do so subsequently through a process known as clearing.

Existing research has highlighted the informal nature of procedures by which applicants are admitted into higher education. A case study of 10 degree schemes drawn from a range of faculties at the University of Leeds identified a set of widely differing practices and subjective perceptions that had significant implications for ethnic minority applicants (Robinson *et al.*, 1992). This study was based on quantitative and qualitative data, and highlighted the considerable scope that exists for individual officers to exercise discretion and the 'colour-blind' nature of admissions procedures.

Discretion is limited by a range of factors including the balance between supply and demand, departmental rules, and agreed criteria relating to candidates' qualifications and grades. Despite this, a recent reviewer noted that: 'The impression is often of admissions as a rather private process, where staff handle business using whatever methods meet immediate needs' (Law, 1996, p. 184). The Leeds case study found that, even in the same department, admissions tutors had quite different and often contradictory judgements about how to assess factors such as age, social background and re-sits, and were given very little guidance by their departments. It also highlighted the way in which admissions tutors drew on 'soft' data on a range of non-academic issues including applicants' pastimes, 'articulacy' and character (Robinson *et al.*, 1992). In the current context, the role of discretion is particularly important because of the suggestion that where there is scope for subjective assessment in higher education, bias against some or all ethnic minority groups is a likely outcome (see, for example, Esmail & Dewart, 1998).

The Leeds case study also revealed a striking absence of departmental policies relating to ethnicity. Little, if any, consideration had been given to targets, quotas and ethnic monitoring. Furthermore, while attempts had been made to make publicity more attractive to women, no such efforts had been made to attract ethnic minority applicants. While commentators have highlighted the 'colour-blind' nature of the admissions process, they have also noted that such an approach places tremendous faith on a wide range of unmonitored discretionary evaluations by individuals acting with little external guidance (Robinson *et al.*, 1992; Law, 1996).

That such faith may be misplaced is suggested by a growing body of, primarily statistical, evidence. It has already been noted that comprehensive ethnic monitoring of applications and admissions to higher education was introduced during the late 1980s. Although the results of this exercise were quickly used to refute the long-standing claim of ethnic minority under-representation, they also revealed important differences between groups and types of institution (Modood, 1993). Compared with the general population, ethnic minority groups were over-represented within new universities [2]. They were, however, less well represented in old universities where evidence of black Caribbean, Bangladeshi and Pakistani under-representation led Modood (1993) to suggest that there was a definite ethnic hierarchy within this sector. Data from subsequent years confirmed this pattern (Modood, 1998).

Although these patterns of ethnic differences are important, they do not necessarily constitute evidence of discrimination. They may, for example, simply reflect differences between candidates that may be regarded as providing a legitimate basis for selection. Thus, for example, having noted that minority candidates tend to gain lower average A-level scores than whites, the Universities Central Council on Admissions (UCCA) went

on to highlight a range of factors that might offer some explanation for 'apparent' ethnic differences in rates of admission (Universities Central Council on Admissions, 1991, 1993).

(a) Applicants from minority groups are more likely to apply for subjects with high entrance requirements, such as medicine and law, and less likely to apply for subjects like teacher training that have low entrance requirements.
(b) By favouring institutions in their home region to a greater extent than white applicants, those from ethnic minority groups limit their choice and may compromise their chances of securing a place [3].
(c) Selectors tend to give less weight to qualifications obtained after more than one sitting. This particularly affects minority applicants, as they are more likely than whites to have re-taken one or more subject.

In those studies that have taken account of such factors, however, ethnic differences have persisted and this has strengthened the suggestion that some groups are discriminated against in the way that university places are allocated. A study of medical schools found that applicants from ethnic minority groups were 1.46 times less likely to be accepted even when qualifications and other factors were taken into account (McManus *et al.*, 1995). High predicted grades were given less weight for ethnic minority candidates than for whites, and particularly low rates of success were evident in relation to candidates with 'non-European surnames', thus pointing towards direct discrimination (see also McManus, 1998):

> Having a European surname predicted acceptance better than ethnic origin itself, implying direct discrimination rather than disadvantage secondary to other possible differences between white and non-white applicants. (McManus *et al.*, 1995, p. 496)

Similarly, Modood & Shiner (1994) showed that, although the factors highlighted by UCCA are important, they do not wholly explain ethnic differences in admissions. This work also confirmed the importance of distinctions between minority groups and between types of institution. Even when a range of academic and socio-demographic differences had been allowed for, black Caribbean and Pakistani applicants were less likely than whites to have gained admission to an old university, although Chinese candidates and those classified as Asian other were more likely to have done so. Black Africans, Black 'Others', Indians, Bangladeshis and those classified as being Other were no more or less likely than whites to have gained admission to an old university. A very different pattern was evident in relation to new universities: black Caribbeans and Indians were more likely than whites to have gained admission to such institutions, although Bangladeshis, Chinese and those classified as Asian 'other' were less likely to have done so. Black Africans, Pakistanis and those classified as 'other' were no more or less likely than whites to have been admitted to a new university.

While there has been growing academic interest in the possible role of racial bias in the allocation of higher education places, a small number of studies have started to consider the experiences of ethnic minority students once they start to study at university. These studies have highlighted ways in which the experiences of ethnic minority students differ from those of whites and are, in some respects, shaped by racism. A recent qualitative study noted that some ethnic minority students reported insensitive comments from staff that made them feel different and unwanted (Acland & Azmi, 1998). Another study found that ethnic minority students felt alienated from aspects of, what they

perceived to be, a 'white' syllabus, and complained of the lack of attention given to issues of racism and the achievements of 'black' people [4] (Allen, 1998). Further criticisms from students have been identified in relation to the under-representation of ethnic minority academic staff (Carter *et al.*, 1999).

The possible role of racial bias in assessment procedures has also emerged as an important cause for concern within higher education. This possibility was considered explicitly by the Barrow Inquiry into Equal Opportunities at the Inns of Court School of Law (Barrow *et al.*, 1994). More recently, written examinations have been found to yield high scores for Asian students and low scores for Caribbean students in a London University (van Dyke, 1998), and research at Manchester University Medical School has suggested that racial bias in face-to-face clinical assessments may help to explain the extremely high failure rate of Asian finalists (Esmail & Dewart, 1998).

Data and Methodology

Previous attempts to identify the possible role of racial bias in the allocation of higher education places have been limited in a number of important ways. They have often focused on a narrow range of courses offered at a small number of institutions, have failed to take account of other factors that may help to explain success and/or have focused on admissions rather than offers. Admissions are less appropriate than offers as the basis for assessing discrimination because they conflate the decisions taken by institutions with those taken by candidates. As such, differences in patterns of admission may reflect the decisions made by candidates rather than institutions: it may be, for example, that applicants from some ethnic minority groups favour new universities over old universities.

Methodologically, our analysis compares favourably with previous work in this area. It was based on a representative sample of applicants drawn from the full range of courses offered by universities in the UK; it took account of a range of factors that have been put forward in attempts to explain ethnic differences in rates of admission; and it focused on offers rather than admissions. As such, we were able to isolate the decisions taken by institutions from those made by candidates. Furthermore, in contrast to previous work in this area, we were also able to consider the role of predicted grades in the allocation of places.

Applications to university for the academic year 1996–97 provided the basis for analysis. We were specifically concerned with the conventional route into higher education and thus focused on applications made by candidates who were 20 years old or younger, who were resident in the UK and for whom A-levels constituted their main qualification. UCAS provided detailed information about the social/demographic characteristics, academic performance (actual and predicted) and applications of 7383 candidates who fulfilled these criteria. In addition, for each course provided at each institution, it provided the following information: (i) the number of initial applications received; (ii) the total A-level points gained by applicants; (iii) the number of admissions, including those resulting from clearing; and (iv) the total A-level points gained by admitted candidates. [5]

Our sample of candidates was randomly selected although it was constructed in such a way as to provide approximately equal numbers of white, Black Caribbean, Black African, Indian, Pakistani, Bangladeshi and Chinese candidates [6] (around 1000 candidates were included from each group). The number of candidates with relatively poor A-level grades was disproportionately large for some minority groups and care was

thus taken to include a sufficient number of similarly qualified whites to permit meaningful comparisons. A system of weighting was developed to correct for the differential sampling fractions that were used and, while statistical significance was assessed on the basis of unweighted data (using the 0.01 cut off), percentages and averages were estimated on the basis of weighted data (Skinner, unpublished, 1994) [7].

Much of our analysis rested on statistical tests that assume cases are independent of one another. This assumption was potentially problematic in relation to initial applications. While candidates may make up to six initial applications, those made by the same candidate may not be considered to be independent of one another. Consequently, for the purposes of analysis, one initial application was selected at random for each candidate. The profile of these selected applications was almost identical to those included in the overall sample.

Discussion and Analysis

While previous research has established that rates of admission into higher education vary between ethnic groups, the analysis described here focused on the extent to which these differences reflect bias in the allocation of places. In particular, it sought to (i) establish the extent to which differences in rates of admission are evident at earlier stages of the applications procedure; (ii) consider how patterns of success vary between old and new universities; (iii) identify key differences between ethnic groups, such as those relating to academic profile and patterns of application, which may help to explain the different rates at which offers are made; and (iv) assess the degree to which such differences account for the rates at which ethnic groups successfully negotiate the various stages of the applications procedure.

Patterns of Success

There were marked ethnic differences in the rate at which applications yielded initial offers and the rate at which firm offers were confirmed (see Table I). With the exception of Chinese candidates, ethnic minority applicants had lower rates of success than whites at both stages of the applications procedure and this was particularly striking in relation to Black Africans and Pakistanis. Thus, for example, only 57% of the applications made by Black Africans yielded an initial offer and 38% of the firm offers held by these candidates were confirmed.

The variations that were evident in relation to initial offers and firm offers culminated in different rates of entry, with most ethnic minority groups being admitted at a lower rate than whites. Nevertheless, ethnic differences in this regard were less marked than might have been expected given the size of the variations that existed at earlier stages of the applications procedure and this clearly reflected the role of clearing. Ethnic minority candidates were between 1.5 and 2.5 times as likely as whites to have gained admission through this route. Twelve percent of white applicants gained a place through clearing, and this compared with 31% of Pakistanis, 28% of Black Africans, 27% of Indians, 25% of Bangladeshis, 19% of Chinese and 18% of Black Caribbeans.

Not only were ethnic differences in admission rates relatively small, but those that did exist could largely be explained by academic factors such as A-level scores, number of A-levels taken and whether re-takes had been required. Once these variables had been taken into account [8], the admission rates of Black Africans, Black Caribbeans, Indians and Bangladeshis were not significantly different from those of whites. Furthermore,

TABLE I. Offers and admissions by ethnicity (percentages and number of cases included in the analysis)

	Rate at which applications yielded initial offers[a]	Rate at which firm offers were confirmed[b]	Rate at which applicants were admitted into higher education
White	70%	65%	80%
	(1056)	(908)	(1056)
Black Caribbean	62%	46%	69%
	(1065)	(898)	(1066)
Black African	57%	38%	70%
	(901)	(741)	(901)
Indian	63%	46%	76%
	(983)	(827)	(984)
Pakistani	58%	41%	71%
	(984)	(765)	(986)
Bangladeshi	63%	43%	73%
	(1135)	(932)	(1136)
Chinese	69%	57%	84%
	(1174)	(1036)	(1174)
Overall	69%	63%	80%
	(7298)	(6107)	(7303)

$p < 0.01$.

[a]Figures given here include conditional and unconditional offers.

[b]At the confirmation stage of the applications procedure, 7% of candidates who had a firm offer were offered a place on a different course from that for which they had applied. The rate at which such offers were made did not vary significantly according to candidates' ethnicity. For the purposes of the analysis presented in this paper, these offers were not classified as confirmed offers.

while Pakistanis continued be admitted at a lower rate than whites, this evidence of ethnic disadvantage was counter balanced by the position of Chinese candidates who enjoyed relatively high rates of admission [9].

Destinations

Candidates' destinations within higher education varied according to their ethnicity so that, with the exception of the Chinese, minority groups were over-represented in new universities. While 35% of Chinese and 45% of white entrants were admitted to new universities, this compared with 68% of Black Caribbeans, 58% of Black Africans and Pakistanis, 54% of Indians and 49% of Bangladeshis. To some extent, this simply reflected different patterns of application. Black Caribbean candidates, for example, showed the highest rate of application to new universities (59% of their applications went to such institutions) and it followed from this that they were largely concentrated in this sector. Chinese candidates, in contrast, had the lowest rate of application to new universities (35% of their applications went to this type of university) and thus they were largely concentrated in old universities. In seeking to explain ethnic differences in destination, however, the importance of patterns application should not be overstated as variations between the remaining groups were small (between 44 and 47% of their applications went to new universities).

Although the concentration of minorities in new universities was, in part, due to their patterns of application, it also reflected the responses of the different types of institution.

TABLE II. Initial offers, confirmed offers by ethnicity and type of institution (percentages and number of cases included in the analysis)

	Rate at which applications yielded initial offers			Rate at which firm offers were confirmed		
	Old universities	New universities	*p* for difference	Old universities	New universities	*p* for difference
White	70% (565)	69% (491)	>0.01	67% (552)	63% (386)	<0.01
Black Caribbean	54% (434)	68% (631)	<0.01	42% (373)	47% (525)	<0.01
Black African	44% (504)	72% (397)	<0.01	39% (399)	41% (342)	>0.01
Indian	50% (546)	79% (437)	<0.01	48% (474)	43% (353)	<0.01
Pakistani	46% (522)	72% (462)	<0.01	40% (426)	42% (339)	<0.01
Bangladeshi	50% (638)	76% (497)	<0.01	44% (546)	41% (386)	>0.01[a]
Chinese	65% (767)	77% (407)	<0.01	62% (741)	45% (295)	<0.01
Overall	68% (3976)	70% (3322)		65% (3481)	61% (2626)	

$p < 0.01$.
[a]This difference was close to being statistically significant ($p = 0.04$).

Within old and new universities there were significant ethnic differences in success rates at both stages of the applications procedure. There was, furthermore, clear evidence that old and new universities responded differently to applications from ethnic minority candidates (see Table II). This was most evident in relation to initial applications. For white candidates, the rate at which such applications yielded an offer did not vary significantly according to the type of institution to which they applied. For ethnic minority candidates, however, applications to new universities were more likely to yield an initial offer than were those to old universities. Such differences were less evident in relation to the rate at which firm offers were confirmed, although for Black Caribbeans, and to a lesser degree, Pakistanis, the confirmation rate from new universities was higher than that from old universities.

The patterns of entry that resulted from the main applications procedure were reinforced by clearing. More than three-fifths (62%) of the admissions that resulted from clearing were made to new universities. Thus, ethnic minority candidates' greater dependence on this route into higher education (see earlier) had the effect of further filtering them into the new university sector.

Explanations and Key Ethnic Differences

In seeking to explain ethnic differences in rates of entry into higher education, commentators have identified a number of potentially important academic factors. Thus, for example, UCCA noted that ethnic minority candidates tend to gain lower average A-level scores than whites and are more likely to have taken re-sits (see earlier). While academic differences were evident between ethnic groups, it was not simply the case that whites had better academic profiles than their minority counterparts. Chinese candidates

TABLE III. Average (median) A-level score by ethnicity

	Predicted	Actual
White	20	18
	(1033)	(1056)
Back Caribbean	16	10
	(1034)	(1066)
Black African	17	12
	(880)	(901)
Indian	18	14
	(964)	(984)
Pakistani	17	12
	(967)	(986)
Bangladeshi	18	12
	(1113)	(1136)
Chinese	21	18
	(1156)	(1174)
Overall	20	17
	(7147)	(7303)

$p < 0.01$.

had very similar profiles to whites. The proportion of candidates in each of these groups that had re-taken their A-levels was, for example, identical: at 8%, it was also notably lower than the proportion in any other group (18% of Pakistanis, 15% of Black Caribbeans and Bangladeshis, 13% of Indians and 12% of Black Africans) [10].

A broadly similar pattern was evident in relation to predicted and actual A-level scores. While Chinese candidates matched their white counterparts, other minority groups tended to do less well (see Table III). In part, the relatively low scores of most minority groups reflected a tendency to study fewer subjects. Only 10% of white and 11% of Chinese candidates had taken less than three A-levels (or their equivalent), and this compared with 22% of Black Caribbeans, 19% of Black Africans, 19% of Bangladeshis, 15% of Indians and 13% of Pakistanis. Nevertheless, the number of subjects studied did not fully explain ethnic differences in A-level scores. The average [11] predicted score per subject varied from 7.2 for Chinese candidates and 6.7 for whites to 6.0 for Black Caribbeans, Black Africans and Pakistanis, and to 6.3 for Indians and Bangladeshis. For actual grades, it varied from 6.0 for Chinese and white candidates to 4.0 for Black Caribbeans, Black Africans and Pakistanis, to 4.4 for Bangladeshis, and to 4.7 for Indians.

Reliance on predicted rather than actual grades during the early stages of the applications procedure did not constitute a source of particular disadvantage to ethnic minority candidates. Although the accuracy of teachers' predictions varied significantly according to applicants' ethnicity, there was no evidence that the performance of minority candidates was systematically under-estimated. Teachers' predictions tended to be optimistic for all groups and, confirming previous findings (Delap, 1994), this was particularly apparent in relation to minorities. On average, white candidates' predicted scores were two points greater than their actual scores, and this compared with a gap of five points for Black Caribbeans and Black Africans, four points for Indians, Pakistanis and Bangladeshis, and three points for Chinese. Although such ethnic differences have

important implications for applications to university, Delap (1994) has shown that they cease to be significant once candidates' age, sex, type of school or college and actual grade are taken into account.

Although ethnic minority candidates tended not to have very competitive academic profiles, there was no suggestion that they reinforced this position by applying for particularly competitive courses. Medicine and dentistry, and subjects allied to medicine, were popular choices for Black African and Asian candidates. With the exception of the Chinese, however, there was no evidence that ethnic minority candidates systematically applied to the most academically competitive courses. Nor was there any suggestion that they applied to the most popular courses [12]. Nevertheless, ethnic minority candidates' academic performance did tend to mean that they were in a position of reduced competitiveness. White and Chinese candidates gained actual scores that were, on average, 0.6 points greater than the average for applicants for the particular course to which they had applied. This compared with scores of −1.9 for Indians, −2.8 for Pakistanis, −3.0 for Black Caribbeans, −3.3 for Bangladeshis and −4.2 for Black Africans [13].

Although ethnic minority candidates did not appear to apply for particularly competitive courses, UCCA's suggestion that they may reduce their chances of success by favouring local institutions was potentially important [14]. Certainly, it was the case that ethnic minority candidates applied to local institutions at a greater rate than whites. While one-quarter of white candidates' applications went to institutions within their region of residence, this compared with approximately one-third of those made by Chinese and Indian applicants, with more than two-fifths of those made by Black Caribbeans, Pakistanis, and Black Africans, and with more than one-half of those made by Bangladeshis. Differences of geography were also evident in patterns of residence and application, and were particularly striking in relation to London. Reflecting the general population (Owen, 1994), ethnic minority candidates had much higher levels of residence in Greater London than did whites. They were, similarly, much more likely to have applied to London-based institutions: while 11% of applications from white candidates went to such institutions, the figures for minority groups varied from 32% for Chinese candidates to 52% for Bangladeshis.

Although not discussed by UCCA, socio-demographic factors may help to explain the ethnic differences that have been observed in relation to entry into higher education. Certainly, minority candidates have distinctive profiles. They tend to be older than whites and to come from less privileged social class backgrounds, although there was considerable diversity between groups in this regard. Reflecting the general population from which they were drawn (Modood *et al.* 1997), Pakistani and Bangladeshi candidates had the least privileged social class profiles as indicated by their parents' occupation. While Black African, and to a lesser extent Chinese, applicants were relatively privileged, Black Caribbeans and Indians occupied an intermediate position. Differences in social class background were reflected in the type of school or college that candidates' attended in order to study A-levels. Minority candidates tended to be over-represented in sixth-form colleges and further education colleges. With the exception of Chinese applicants, white applicants were the most likely to have attended a selective school (i.e. an independent or grammar school). Finally, it is also worth noting that the proportion of female applicants was particularly high among Black Caribbeans: 65% of applicants within this group were women, and this compared with approximately one-half of all other groups (the exact figures varied from 46% for Bangladeshis to 53% for whites).

Identifying Patterns of Ethnic Disadvantage: multivariate analysis

To examine whether ethnic minority candidates were disadvantaged in applications to university, a series of multivariate analyses were conducted. Using logistic regression techniques, separate models were developed in relation to initial offers and the confirmation of firm offers. The former included A-level scores based on predicted grades, and the latter included scores based on actual grades. The variables included in the multivariate analysis are summarised in Table IV.

Each model was developed in three distinct stages [15]. Stage one focused on applicants' academic performance and the competitiveness of the course for which an application had been made [16]. Stage two incorporated variables relating to the characteristics of the institution and course for which an application had been made. Stage three added variables relating to applicants' socio-demographic characteristics to the model. Variables relating to applicants' ethnicity were included in the model at all three stages, regardless of their statistical significance, as they constituted the key focus of the analysis. Otherwise, at each stage, the most parsimonious model was developed. Specific analyses were conducted to assess the adequacy and robustness of the final models [17].

Academic factors were clearly important in distinguishing between successful and unsuccessful applications. At both stages of the applications procedure, the probability of success increased dramatically with better relative A-level scores: thus, for example, for an average application [18], the probability of eliciting an initial offer varied from approximately 0.29 to 0.88 depending on candidates' relative (predicted) A-level scores. The contrast was even more striking in relation to the confirmation of firm offers as the probability of success varied from approximately 0.02 to 0.94 according to candidates' actual scores. At both stages of the applications procedure, the effect of A-level scores (predicted and actual) varied between old and new universities. New universities tended to respond more positively than old universities to applications where candidates' scores fell in the middle categories (i.e. those associated with average or moderately high or low relative scores).

Although the importance of A-level scores was beyond question, the role of other academic factors was less clear. In terms of initial offers, for example, there was no suggestion that institutions gave less weight to grades obtained after more than one sitting. Such evidence was, however, clearly apparent in relation to the confirmation of firm offers: on average, re-taking ones' examinations reduced the probability of confirmation from 0.48 to 0.38. Similarly, while the number of subjects candidates' studied did not have an effect on initial offers, it was significant at the confirmation stage. Priority was given to scores achieved on the basis of fewer subjects: on average, studying less than three A-levels increased the probability of success at this stage from 0.45 to 0.56 [19].

In addition to academic indicators, a range of institutional and course factors were significant predictors of success.

- *Course popularity*. At both stages of the applications procedure, a reduction in the ratio of applications to places was associated with an increased probability of success.
- *Type of institution and status of the course*. The outcome of an application varied according to whether it went to an old or new university, although as already noted this effect was tied up with academic factors. At both stages of the applications procedure, candidates whose academic performance could be described as middling had a greater chance of success if they applied to new rather than old universities. The probability

TABLE IV. Variables included in the multivariate analyses

Competitiveness	The ratio of applicants to places was entered as continuous, interval, data. All of the other variables took the form of categorical data and were entered into the model as a series of dummy variables
Relative academic performance	The effect of falling into each of the lower categories was compared with that of falling into the highest (i.e. that which represented the best relative scores)
Did predicted grades include a range?	Scores based on predictions that included a range of grades were compared with those that did not include a range. This was only included in the analysis of initial offers
Sittings	The effect of having taken up to one A-level and one AS-level early, or of having taken a minimum of two A-levels in 1995 and 1996, was compared with having taken all of ones examinations in one sitting (i.e. 1996)
Number of A-levels taken	The effect of having taken four A-levels (or their equivalents) including General Studies, four subjects excluding General studies or two A-levels or less was compared with the effect of having taken three A-levels
Status of institution applied to	The effect of having applied to a new university was compared with that of having applied to an old university
Academic performance × status of institution applied to	A series of dummy variables was created to measure the interaction effects between the type of institution to which an application had been made and applicants' academic performance. These variables showed whether the effect of academic performance on applicants' chances of success varied according to the type of institution to which they had applied
Status of course applied for	The effect of having applied for an HND was compared with that of having applied for a degree course
Geographical location of the institution	The effect of applying to an institution in each region was compared with that of having applied to an institution in the North. Applications to Northern Ireland were excluded from the analysis
Local application?	The effect of having applied locally was compared with that of having applied outside of the region of residence
Ethnicity	The effect of being in each minority category was compared with the effect of being white
Ethnicity × status of institution applied to	A series of variables were entered in order to assess the interaction effects between applicants' ethnicity and the type of institution to which an application had been made
Sex	The effect of being female was compared with the effect of being male
Age	The effect of being 19 or 20 was compared with the effect of being 18 or younger
Type of school or college attended	The effect of having attended an independent school, a grammar school, a sixth form or a college or some other kind of educational establishment was compared with having attended a comprehensive school
Social class background	The effect of coming from a professional or managerial, a skilled manual or an unskilled or semi-skilled family background was compared with the effect of coming from a sales and clerical family background. A separate category was also included for applicants whose families' occupational class background was unknown
Area of residence	The effect of living in each area was compared with that of living in Yorkshire and Humberside. Candidates resident in Scotland were excluded from the analysis

of success also varied according to the status of the course for which an application was made. An application had less of a chance of securing an initial offer if it was for an HND rather than a degree, although the probability of confirmation did not vary according to the status of the course.

- *Location of the institution and proximity*. Regional effects were evident in relation to both initial and confirmed offers, although none were consistent across the different stages of the applications procedure. While securing an initial offer from London-based institutions appeared to be relatively difficult, gaining an offer from universities in Wales and Scotland was relatively easy. The only significant regional effect at the confirmation stage was associated with institutions in the South East of England, from which the probability of confirmation was relatively high.

The issue of proximity is particularly important given the Universities Central Council on Admissions' (1993) suggestion that candidates who apply locally may limit their choices and thereby compromise their chances of success. In making initial offers, institutions appeared to slightly favour applications from local residents: for an average application, the probability of eliciting an initial offer increased from 0.71 to 0.75 if it was made by a local resident. No such differences were evident in the rate at which firm offers were confirmed.

In general, there was little suggestion that candidates' chances of success were effected by their socio-demographic characteristics [20]. Against this general background, however, there was clear evidence of ethnic disadvantage, although it was fairly specific. In relation to initial offers, the effects associated with ethnic minority status varied according to the type of institution to which applications were made (see Table V). While ethnic minority candidates were penalised by old universities, no such bias was evident among new universities. Indeed, compared with whites, some minority groups (namely, Indians, Bangladeshis and Chinese) were favoured by new universities, which thus offered something of a counter-balance to the biases that were evident within old universities (see Table VII). [21]

The patterns of disadvantage that were evident in relation to initial offers did not vary greatly between minority groups. Nevertheless, the bias within old universities against Chinese applicants and, to a lesser extent, Black Caribbean candidates did appear to be less severe than that which faced other minority applicants [22]. It may be that bias against Black Caribbean candidates was mitigated by a tendency for their names to be less obviously non-European than those associated with other minorities. In relation to new universities, Indian applicants were better placed than their Black Caribbean, Black African and Pakistani counterparts, and Chinese candidates appeared to be better placed than their Black Caribbean equivalents. Furthermore, there was fairly strong evidence that, within this sector, Bangladeshi applicants were in a better position than Black Caribbeans and that Chinese candidates were in a better position than Pakistanis [23]. None of the other contrasts between minority groups were significant.

Initial offers are typically made on the basis of predicted A-level grades and, thus, the analysis already described provides the most realistic appraisal of this stage of the applications procedure. As already noted, however, A-level predictions were particularly optimistic for ethnic minority candidates, and thus the model presented in Table VI was replicated with actual rather than predicted grades. The results were similar to those described earlier: the effect of ethnicity varied according to the type of institution to which applications were made and, within old universities, there continued to be evidence of a bias against ethnic minority applicants [24]. This clearly strengthened

TABLE V. Initial offers by predicted grades, a multivariate analysis (regression co-efficients and standard errors)

Relative predicted A-level score (category 1)[a]				*Local application? (outside region of residence)*	
Category 2†				Within region of residence*	0.21 (0.07)
Category 3*	−0.49	(0.13)			
Category 4*	−0.77	(0.13)		*Sex (Male)*	
Category 5*	−1.62	(0.14)		Female*	−0.19 (0.06)
Category 6*	−1.73	(0.14)			
Category 7*	−1.80	(0.14)		*Area of residence (Yorkshire and Humberside)*	
Category 8*	−2.18	(0.15)		Northern Ireland*	−0.95 (0.15)
Category 9*	−2.16	(0.12)		East Midlands*	−0.95 (0.15)
Category 10*	−2.84	(0.12)		North†	
				North West†	
Status of Institution (old university)				West Midlands†	
New university†	−0.24	(0.17)[b]		East Anglia†	
				Greater London†	
Relative predicted A-level score × status of institution				South East†	
(category 1 × new university)				South West†	
Category 2 × new university†				Wales†	
Category 3 × new university†					
Category 4 × new university†				*Ethnicity (white)*	
Category 5 × new university*	0.78	(0.20)		Black Caribbean*	−0.48 (0.15)
Category 6 × new university*	0.72	(0.20)		Black African*	−0.81 (0.15)
Category 7 × new university*	0.69	(0.19)		Indian*	−0.78 (0.14)
Category 8 × new university*	0.66	(0.19)		Pakistani*	−0.80 (0.15)
Category 9 × new university†				Bangladeshi*	−0.79 (0.14)
Category 10 × new university†				Chinese†	−0.32 (0.14)[c]
*Competitiveness**	−0.14	(0.01)		*Ethnicity × status of institution type (white × new university)*	
				Black Caribbean × new university*	0.62 (0.22)

Status of course (degree)			Black African × new university*	1.00	(0.23)
HND*	−0.60	(0.19)	Indian × new university*	1.57	(0.23)
			Pakistani × new university*	1.01	(0.22)
Geographical location of institution (North)			Bangladeshi × new university*	1.31	(0.22)
Greater London*	−0.24	(0.07)	Chinese × new university*	0.96	(0.23)
Wales*	0.53	(0.20)			
Scotland*	0.91	(0.23)	*Constant*	3.70	(0.15)
Yorkshire and Humberside†					
North West†			*Non-significant variables*		
West Midlands†			Candidates' age, type of school or college attended, social class, number		
East Midlands†			of sittings in which A-levels (or equivalents) were taken, number of		
East Anglia†			A-levels (or equivalents) taken, whether predicted A-level scores included		
South East†			a range of grades for a single subject		
South West†					

*$p < 0.01$, †not significant ($p > 0.01$).

Cox and Snell $R^2 = 0.26$, Nagelkerke $R^2 = 0.35$.

The accuracy of the model did not vary according to candidates' ethnicity (residuals did not vary significantly between groups) and, overall, it correctly classified 76% of cases included in the analysis (cases were classified according to whether they were above or below the 0.5 cut-off). Offers were successfully predicted at a higher rate than rejections (86% compared with 58%) and a Kappa statistic of 0.46 indicated a moderate level of agreement between predicted and actual outcomes (Altman, 1991). Virtually identical results were evident in relation to the cases on which the robustness of the model was assessed.

[a]For variables with a categorical structure, the reference category is presented in parentheses.

[b]In general, non-significant variables were excluded from the model. The type of institution applied to, however, was part of a significant interaction effect and was therefore left in the model.

[c]This effect was very close to attaining statistical significance ($p = 0.02$).

TABLE VI. Confirmed offers by actual grades, a multivariate analysis (regression co-efficients and standard errors)

Relative actual A-level score (category 1)		*Competitiveness**	− 0.08 (0.01)
Category 2†			
Category 3*	− 1.31 (0.18)	*Geographical location of institution (North)*	
Category 4*	− 2.39 (0.19)	South East*	0.36 (0.13)
Category 5*	− 3.05 (0.19)	Yorkshire and Humberside†	
Category 6*	− 3.78 (0.22)	North West†	
Category 7*	− 4.37 (0.23)	West Midlands†	
Category 8*	− 4.98 (0.21)	East Midlands†	
Category 9*	− 6.21 (0.30)	East Anglia†	
Category 10*	− 6.96 (0.44)	Greater London†	
		South West†	
Status of Institution (old university)		Wales†	
New university†	0.49 (0.25)	Scotland†	
Relative predicted A-level score × status of institution		*Ethnicity (white)*	
(new university × category 1)		African Caribbean*	− 0.57 (0.22)
Category 2 × new university†		African†	− 0.51 (0.22)
Category 3 × new university†		Indian*	− 0.72 (0.20)
Category 4 × new university*	0.97 (0.26)	Pakistani*	− 0.77 (0.21)
Category 5 × new university*	0.81 (0.24)	Bangladeshi*	− 0.84 (0.20)
Category 6 × new university*	0.83 (0.25)	Chinese†	− 0.18 (0.19)
Category 7 × new university*	0.70 (0.27)		
Category 8 × new university†		*Ethnicity × status of institution type (white × new*	
Category 9 × new university†		*university)*	
Category 10 × new university†		Black Caribbean × new university†	0.72 (0.30)
		Black African × new university†	0.44 (0.32)

Status of course (degree)		Indian × new university*	0.80 (0.31)
HND*	− 2.18 (0.20)	Pakistani × new university†	0.58 (0.32)
		Bangladeshi × new university†	0.69 (0.30)
Sittings (took all A-levels in one sitting)		Chinese × new university†	− 0.16 (0.30)
Retook A-levels*	− 0.41 (0.13)		
Took an A-&/or an AS-level early†		*Constant*	3.94 (0.23)
Number of A-levels taken (three)		*Non-significant variables*	
Two*	− 0.45 (0.14)	Whether application was made within region of residence, social class background, type of school or college attended, area of residence, age and sex	
Four (including General Studies)†			
Four excluding General Studies)†			

*$p < 0.01$, †not significant ($p > 0.01$).
Cox and Snell $R^2 = 043$, Nagelkerke $R^2 = 0.57$.
Regardless of their statistical significance, all of the ethnicity variables were included in the model because they were of primary interest. For the main effects, the non-significant categories and their associated p values were: Black African, 0.02; and Chinese, 0.33. For the interaction effects, they were: Black Caribbean, 0.02; Black African, 0.17; Pakistani, 0.07; Bangladeshi, 0.02; and Chinese, 0.60. Statistical significance is often assessed in terms of whether the associated p value is above or below 0.05, although in this case the 0.01 cut-off was used. Altman (1991, p. 168) has noted that 'it is ridiculous to interpret the results of a study differently according to whether the p value was, say 0.055 or 0.45. These p values should lead to very similar conclusions, not diametrically opposed ones'. Consequently, the ethnic effects included in the model that had a p value of 0.02 can safely be generalised to the population.
The accuracy of the model did not vary according to candidates' ethnicity (residuals did not vary significantly between groups) and, overall, it correctly classified 81% of cases included in the analysis (cases were classified according to whether they were above or below the 0.5 cut-off). The rates at which confirmation and rejection were accurately predicted was almost identical (80% compared with 82%) and a Kappa statistic 0.63 indicated a good level of agreement between predicted and actual outcomes (Altman, 1991). Virtually identical results were evident in relation to the cases on which the robustness of the model was assessed.

TABLE VII. Probability of eliciting an initial offer by ethnicity (estimated on the basis of an average application, results of multivariate analysis)

	Type of institution applied to	
	Old university	New university
White	0.75	0.73
Black Caribbean	0.65*	0.75
Black African	0.57*	0.76
Indian	0.58*	0.85*
Pakistani	0.57*	0.77
Bangladeshi	0.57*	0.82*
Chinese	0.68†[a]	0.83*

*$p < 0.01$, †ns = not significant ($p > 0.01$).
For each type of institution, significance tests compare the probability of success for each minority group with that of whites.
[a]$p = 0.018$.

the case that can be made for the suggestion that ethnic minority candidates are disadvantaged in the allocation of places by old universities.

Evidence of ethnic disadvantage was not limited to initial offers, but extended to the rate at which firm offers were confirmed. This may seem surprising given that the decision of whether to confirm an offer is made largely on the basis of whether a candidate has fulfilled the criteria specified in the initial offer. Even here, however, there is an element of discretion. Decisions have to be made about candidates who have failed, perhaps by a small margin, to achieve the grades specified in an initial offer. Some of the ethnic biases that were evident among old universities in relation to initial offers were also apparent in the rate at which firm offers were confirmed. For an average candidate with a firm offer from an old university, the probability of confirmation was 0.55 if they were white, 0.35 if they were Bangladeshi, 0.37 if they were Indian or Pakistani, 0.41 if they were Black Caribbean, 0.43 if they were Black African, and 0.51 if they were Chinese [25]. Once again, there was evidence that the biases of old universities were partially off-set by new universities, although this pattern was less clear than that which was evident in relation to initial offers [26]. Among new universities, ethnicity did not appear to have a significant effect on the rate at which firm offers were confirmed [27].

In terms of the biases that were evident in the rate at which firm offers were confirmed, there were very few differences between minority groups. Within the old university sector, however, Chinese candidates were significantly better placed than their Indian, Pakistani and Bangladeshi counterparts. No other significant differences between minority groups were evident in the rate at which old or new universities confirmed their initial offers.

Within the applications procedure there was evidence of a slight bias against women, and further analyses were conducted to examine whether this pattern of disadvantage varied between ethnic groups. For an average application, the probability of eliciting an initial offer was 0.74 if it was made by a man and 0.70 if it was made by a woman. There was little evidence that female members of the various minority groups faced a greater or lesser degree of ethnic disadvantage than the men [28]. The only significant difference related to Chinese applicants, among whom women appeared to be better placed than

men. Turning to the rate at which firm offers were confirmed, there was no evidence of bias against female candidates nor was there any suggestion that patterns of ethnic disadvantage varied between men and women.

Although the analysis was specifically designed to consider non-white ethnic minority groups, the patterns of disadvantage that it uncovered extended to include Northern Irish candidates [29]. Applicants from Northern Ireland had significantly lower rates of admission than did those who lived in England and Wales: while 62% of the former were admitted, this compared with 81% of the latter [30]. A number of factors may have contributed to Irish candidates' relatively low admission rate. It may in part, for example, have reflected their particular patterns of application as they showed a strong orientation to Irish and Scottish institutions. On average, Irish candidates made three applications within Northern Ireland, one to Scotland, and two to England and Wales. It may also have reflected the degree to which Irish candidates enrolled at institutions not covered by UCAS (such as those based in Southern Ireland, for example) [31]. Furthermore, and in contrast to the situation of non-white minority groups, Irish candidates appeared to make little use of clearing: 9% of Irish candidates gained a place through this route compared with 14% of English and Welsh candidates [32].

Although important, these factors did not wholly explain Northern Irish candidates' low rate of admission. There was clear evidence that Irish applicants were disadvantaged if they applied to universities in England, Scotland and Wales [33]. Different admission rates could not be explained by academic factors, nor by the other variables included in the analysis. Bias against Irish candidates was evident in relation to initial offers (see Table VI) and this did not vary between old and new universities [34]. While there was no evidence of a bias against Irish candidates in the rate at which firm offers were confirmed, the analysis included too few cases for any firm conclusions to be drawn about this [35].

Conclusion

This article has focused on applications to higher education and on the possibility that ethnic minority applicants are disadvantaged in the way that places are allocated. While the reconstruction of admissions decisions is difficult, particularly given the lack of explicit criteria and guidelines that characterise this process (Law, 1996), our analysis suggests that higher education has an ambivalent role in relation to ethnic equality.

It is likely that education is central to any explanation of the upward social mobility that has been evident within British ethnic minority communities since the 1960s (Iganski & Payne, 1996), and that higher education has had an important role in this regard. Large numbers of, mainly young, people from ethnic minority backgrounds are accepted into university and there is little evidence of ethnic disadvantage in overall rates of admission. The ambivalent role of higher education becomes evident, however, once we look beyond overall admission rates, as they hide striking ethnic differences in destination. With the exception of Chinese applicants, ethnic minority candidates are concentrated in new universities. While this is due partly to their patterns of application, it also reflects an apparently greater commitment among new universities to widening the social and ethnic basis of participation in higher education (Major, 1999; Thompson, 1999).

New universities respond more positively than old universities to (non-white) ethnic minority applicants [36] and, within this sector, Chinese, Bangladeshi and Indian candidates appear to be favoured over whites. When applying to old universities, however, there is strong evidence that minority candidates face an ethnic penalty.

Institutions within this sector are most likely to select white and, to a lesser extent, Chinese candidates from among a group of similarly qualified applicants. Although ethnic minority applicants may be admitted to old universities in reasonable numbers, they generally have to perform better than do their white peers in order to secure a place.

Our analysis included a range of factors that the admissions service has put forward in an attempt to explain ethnic differences. We have shown that even when these factors are taken into account ethnic differences persist. Furthermore, while we have falsified the hypothesis that (non-white) ethnic minority status is associated with a reduced chance of success when applying to new universities, we have failed to do so in relation to old universities. Our analysis raises crucial questions about the extent to which the differences identified in relation to old universities may be attributed to discrimination. While the analytical techniques we have used are very useful in establishing differences between groups, they do not identify the casual mechanisms that underpin such differences. Nevertheless, previous work in this area—some of which rests on a very different methodological approach to that used here—indicates that explanations of our results that focus on discrimination are highly plausible. There is little regulation in the process by which applicants are admitted into higher education and admissions officers are allowed considerable discretion. It should be recognised, however, that discrimination may take complex and subtle forms. Earlier studies have pointed to both direct and indirect discrimination, and it may be that inequality is, in part, the result of unconscious assumptions about ethnic minorities that are shared across an institution (Macpherson of cluny, 1999; Fenton *et al.*, 2000).

Any suggestion of ethnic disadvantage in the allocation of higher education places should be a considerable cause for concern. The biases that are evident within the old university sector contradict its self-image of excellence, the principle of selection on merit, and the causes of access and inclusivity that are being urged by the government. That they also have far-reaching social implications is evident in the suggestion that discrimination in education and the labour market combine to create a cumulative pattern of ethnic disadvantage. While it is well established that there is an ethnic penalty in the labour market (Heath & McMahon, 1997; Modood *et al.*, 1997), the concentration of ethnic minority students in new universities reinforces their disadvantaged position. The country's 'top 2000' companies recruit overwhelmingly from among old university graduates [37] and a similar preference is evident within the legal profession, especially among the high-status, high-paying, City firms (Shiner, 1997, 1999). These patterns of recruitment indirectly disadvantage ethnic minority candidates as they tend to be concentrated in new universities. If, as is often supposed, education is to provide the basis for greater equality, old universities must examine seriously the evidence of ethnic bias, and consider how it is effected and how it may be eliminated.

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NOTES

[1] After 1992, the separate admissions services that operated for universities and polytechnics (UCCA and PCAS) were replaced by a single service known as UCAS.

[2] Historically, British higher education has been divided between universities and polytechnics, although this distinction was dissolved in 1992. Throughout this paper, the term 'old university' has been used to describe institutions that had university status prior to 1992, and the term 'new university' has been used to describe those that were polytechnics. These terms have been used even when the period prior to 1992 is being discussed.

[3] Robinson *et al.* (1992) found, however, that some admissions tutors were inclined to favour local candidates.

[4] This should be set in the broader context of a survey at the University of East London, which found that most ethnic minority students—as well as most white students—did not agree that 'race, culture, nationality and religion should be reflected in the curriculum content' (Jiwani & Regan, 1998).

[5] This data was not limited to the sample of 7383 but was provided on the basis of all candidates who applied through UCAS for the academic year 1996–7 and met the criteria for inclusion in the analysis.

[6] The ethnic categories used by UCAS were based on those from the 1991 Census. For the purposes of sampling and analysis, the categories Black Caribbean and Black Other were combined as it has been shown that the category of Black Other is used mostly by people of Caribbean family origin who are not white and consider themselves to be British (Ballard & Kalra, 1994). Analysis focused on 'home' applicants, as those with overseas status were not included in the sample.

[7] A small number of cases were excluded from the analysis because candidates withdrew their application. Further exclusions were required for methodological reasons. First, while the Scottish education system is based on highers rather than A-levels, only nine candidates in the data set were resident in Scotland and this was considered insufficient to sustain the analysis. Second, having applied to an institution in Northern Ireland was strongly correlated with living in this region and thus it was difficult to disentangle the effect of applying to Northern Ireland from that of living there. Applications made by candidates living in Scotland and those made to Irish institutions were excluded from the analysis.

[8] These factors were taken into account on the basis of multivariate logistic regression. This analysis was conducted in the manner described later in relation to the confirmation of firm offers, although an absolute measure of A-level scores was used rather than a relative one. Scores were entered into the model as a series of dummy variables based on the decile values of the original variable. The final model indicated that, in addition to academic factors, candidates' age, area of residence and type of school/college attended had a significant independent effect on their chances of being admitted into higher education. Being older slightly increased the probability of gaining admission, while attending a sixth-form college or an independent school slightly reduced it. Living in Ireland also affected the probability of admission and this is discussed later.

[9] The effects associated with these ethnic categories very narrowly failed to meet the criteria used to assess statistical significance. For the effect of being Chinese $p = 0.011$, and for that of being Pakistani $p = 0.029$. In such circumstances, Altman (1991) has provided a clear rational for generalising such effects to the population (for more details, see Table VI later).

[10] Candidates were considered to have re-taken if they had taken the equivalent of two or more A-levels in 1995 and had done so again in 1996.

[11] Unless specified otherwise, the median has been used as the preferred measure of central tendency throughout this article because data frequently departed from the normal distribution.

[12] While the academic competitiveness of courses was assessed on the basis of applicants' A-level scores, their popularity was considered on the basis of the ratio of applicants to places (the number of candidates admitted on to a course was used as a proxy measure for the number of places).

[13] A broadly similar pattern was evident in relation to predicted grades.

[14] The data set indicated applicants' area of residence and, for each application, the location of the institution to which they applied. The regional classification that was used distinguished between the following areas: Yorkshire and Humberside, North, North West, West Midlands, East Midlands, East Anglia, Greater London, South East, South West, Wales, Scotland and Northern Ireland.

[15] In developing multivariate statistical models, stepwise procedures are often used to exclude non-significant variables or to include significant ones. We rejected this approach on the basis that it is overly

mechanistic and atheoretical. The three-stage process developed for this project reflected the theoretical concerns of the research.

[16] A relative A-level score was used whereby an applicant's score (predicted or actual) was compared with the mean actual score for all candidates who applied to the same course at the same institution (data were not available for the predicted grades of all applicants). Applicants' rates of success did not increase uniformly with their relative A-level score and thus this variable was re-classified into 10 categories of equal size: category 1 included applications where candidates' relative A-level scores (actual or predicted) were among the highest 10%, and category 10 includes those where candidates' relative A-level score was among the lowest 10% (see also Modood & Shiner, 1994).

[17] The adequacy of the final models was assessed according to the extent to which they correctly predicted the outcome of the applications on which they were based. The 'robustness' of the models was assessed in relation to cases that were not included in the original analyses. The analysis of initial offers included one applicant per candidate, and the robustness of the final model was assessed on the basis of approximately 60,000 cases that were randomly selected from among those that were not included in the initial analysis. Once again, no more than one application was selected per candidate. The robustness of the model relating to the confirmation of firm offers was assessed on the basis of slightly more than 1500 cases (approximately one-quarter of the total that were available) that were randomly excluded from the original analysis.

[18] The probabilities presented throughout this paper were generated using the models presented in Tables V and VI, and were based on the characteristics of a statistically average application. The mean value of each significant variable was used to estimate the probability of success. For the analysis relating to firm offers, only those applications that resulted in a firm offer were used to estimate the mean values. The estimated probability of success at the initial offers stage was 0.73 and, according to unweighed data, this compared with an actual rate of success of 0.64. For confirmed offers the estimated average probability of success was 0.65, and this compared with an actual rate of 56%. Thus, while our models were reasonably accurate, they tended to over-estimate the probability of success at both stages of selection.

[19] It should be noted that relative A-level scores were held constant in this analysis. Thus, an apparent preference for candidates who had taken fewer A-levels may actually indicate a preference for higher grades.

[20] This supports the work of McManus *et al.* (1995), which indicated that, once other factors had been taken into account, there was no bias according to candidates' social class.

[21] To assess the significance of ethnic differences in relation to new universities, the analyses shown in Table V and VI were replicated with old universities set to the reference category.

[22] Differences between Chinese candidates on the one hand and Black Africans, Indians, Pakistanis and Bangladeshis on the other were all statistically significant. While those between Black Caribbeans on the one hand and Black Africans, Indians, Pakistanis and Bangladeshis on the other did not meet the formal criteria for significance, they were very close to doing so ($p = 0.03$, 0.04, 0.04 and 0.03, respectively). For the comparison of Chinese and Black Caribbeans, $p = 0.27$.

[23] $p = 0.02$ and $p = 0.03$, respectively.

[24] In relation to application to old universities, the differences between whites on the one hand and Black Africans, Indians, Pakistanis and Bangladeshis on the other met the criteria for statistical significance. That between whites and Black Caribbeans failed to do so by a very narrow margin ($p = 0.02$). For the difference between whites and Chinese, $p = 0.08$.

[25] While the effects of being Black Caribbean, Indian, Pakistani or Bangladeshi rather than white all met the criteria of statistical significance, the effect of being Black African narrowly failed to do so ($p = 0.02$). For the effect of being Chinese rather than white, $p = 0.33$.

[26] The effect of being Indian varied significantly according to the type of institution applied to. A similar pattern was evident in relation to the effects of being Black Caribbean, Bangladeshi and, to a lesser extent, Pakistani, although they narrowly failed to meet the formal criteria of statistical significance ($p = 0.02$, 0.02 and 0.07, respectively). For Chinese candidates, $p = 0.60$ for the effect of applying to a new rather than an old university.

[27] The p values associated with the effect of being from an ethnic minority group varied from 0.15 to 0.77.

[28] This was assessed through the use of interaction effects.

[29] Of the candidates included in the sample 94 lived in Northern Ireland.

[30] It should be noted that, throughout this paper, admission rates include admissions made to institutions in Northern Ireland.

[31] We are grateful to Liz Viggars for pointing this out to us.

[32] The figures given in this paragraph are based on all of the candidates included in the sample who lived in Northern Ireland, regardless of whether or not they applied to institutions outside of the province.

[33] For reasons already outlined, analyses of initial offers and the confirmation of firm offers excluded applications to institutions in Northern Ireland. Similarly, with the exception of that presented in the previous paragraph, analysis of admissions excluded applicants who had not applied outside of the province. Only 18 of the 94 Irish candidates in the sample were excluded on this basis. None of those who were resident in England or Wales were excluded on this basis. These figures are based on unweighted data.

[34] This was assessed via an interaction effect.

[35] Only 21 Northern Irish candidates were included in the multivariate analysis of the rate at which firm offers were confirmed.

[36] Evidence of bias against Northern Irish candidates did not vary between old and new universities (see earlier).

[37] This research was conducted by the private tutors group Mander, Portmann, and Woodward. While the research has not been published, the findings were reported in the press (see, for example, *METRO*, 17 August 1999, p. 12). Companies were assessed on the basis of their market value.

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