

ELIGIBILITY AND SELF SELECTION:  
DISCONTINUITIES IN TRANSITION TO TERTIARY EDUCATION IN VICTORIA<sup>1</sup>

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*Equality Of Educational Opportunity And The Meritocratic Model*

Conceptions of educational opportunity are diverse and continually evolving; deriving, it seems, from more general conceptions of equality of social chances on the one hand, and differing views of the purposes of primary, secondary and various kinds of tertiary education on the other. For example, Halsey, Heath and Ridge (1981) distinguished three broad conceptions in British thinking on educational opportunity during the present century, whereas Coleman (1968) from an American perspective, advanced a five-fold classification of inequalities.

Drawing these two classifications together, we can distinguish a first meaning of equality as the absence of any legal barriers to hinder young people from entering various forms of education. This is a passive and minimal definition of equality, judged to exist if there are no active inequalities established to deny access to particular groups or individuals by legislation, regulation or administrative fiat. Many historical examples are available. The best example in Britain is perhaps the exclusion from Oxford and Cambridge in the nineteenth century of those who would not subscribe to the Thirty-nine Articles of the Church of England. Other examples are the exclusion of segregation by race from the definition of inequality in the United States prior to the Supreme Court's civil rights decisions of the early 'sixties and, of course, the continuing exclusion of blacks from white South African universities.

A second conception of equality involves the attempt to remove financial barriers from participation in superior forms of compulsory schooling or post-compulsory education. Following this conception, governments in liberal democracies have, at times, demonstrated a concern to eliminate fees from post-secondary and tertiary education, to equalise the financial resources available to schools in diverse geographic regions, socio-economic enclaves or school systems, and to provide means-tested maintenance grants for tertiary students and secondary pupils beyond the statutory school-leaving age.

In Australia, the Tertiary Education Assistance Scheme (TEAS) introduced in the Whitlam Labor Government's "Student Assistance Bill" of 1973, is an excellent example of the conception of educational opportunity as the removal of financial barriers which might prevent participation in study beyond secondary school. In a recent review of the Australian literature on financial assistance to tertiary students, Martin Hayden quotes the (then) Minister for Education as saying of TEAS in his introduction to the Bill:

"It complements this government's decision to abolish fees in tertiary and post-secondary technical institutions and the effects of both these actions will be to ensure that hardship and poverty do not prevent a student from taking advantage of the opportunity for further study"

(Beazley, 1973: p2067)

Hayden commented that:

"it is clear that TEAS was intended to promote equality of educational opportunity whereby participation and progress in tertiary education should become as free as possible of financial barriers"

(Hayden, 1980; p7)

A third conception of equality of opportunity takes us somewhat along the path towards equality of outcomes. This is a conception which suggests that in all intermediate stages in the transition towards superior or higher forms of education, all salient social groups should be equitably represented. (That is, in numbers proportionate to their representation in the population at large). It is not, therefore, equality of outcomes in the form of examination results or certificates which is usually sought, but equality of outcomes as defined by *access* to all forms of post-compulsory education and to higher quality streams of compulsory schooling. The conception thus draws on the distinction between *practical* and *legal* equality of social chances generally, put forcefully by the historian R.H.Tawney in the early 1930's (Tawney, 1964). It takes the viewpoint that the true

test of practical equality of opportunity is equality of representation, and rejects as socially unjust and politically naive the position which asserts that "it would be absurd to define equality in education between the sexes, social classes and races as equal *representation*", as certain groups may simply not want the alternative of (for example) going to higher education (Husen, 1976; P410).

Halsey *et al* (1980) describe this third conception thus:

"the third definition of equality of opportunity...is one which compares the relative chances of access to schools and qualifications which were *substantively* as distinct from *formally* open to children of different social classes. In effect, taking the word 'equality' to have its normal meaning in common speech, the definition now shifts from equality of opportunity to equality of outcome." (Halsey, Heath and Ridge 1980 P.202)

Coleman (1968) described a similar conception of equality of opportunity as equality of outcome, but distinguished between "inequality...defined in terms of the consequences of the school for individuals with *equal* backgrounds and abilities" and "inequality...defined in terms of the consequences of the school for individuals of *unequal* backgrounds and abilities" (our emphasis). These are strongly contrasting views of inequality. The first-mentioned focusses on inequalities caused by the differential effects of schools or school systems irrespective of prior differences between children on entry. The second-mentioned focusses on the presumed potential of education to reduce already existing inequalities.

"In this (second-mentioned) definition, equality of educational opportunity is equality of results given different individual inputs."

"Such a definition taken in the extreme would imply that educational equality is reached only when the results of schooling (achievements and attitudes) are the same for racial and religious minorities as for the dominant group." (Coleman, 1968:pp16-17)

Thus, there is some confusion in the literature as to the extent to which our third conception of equality of opportunity as equality of outcome implies affirmative action to ameliorate group and even individual differences in examination results or test scores. We believe that it is useful here to keep the distinction between access to successive stages of education on the one hand, and grades and certificates on the other, as sharp as possible. If post-compulsory education is viewed as a continuing process, grades and certificates are only one mechanism by which access to further and higher stages can be sanctioned. Equality of opportunity in this third sense does not therefore necessarily imply equality of examination results, although it may imply the need for procedures and attitudes which reduce the high correlation between examination results and educational transitions.

The issue of grading and certification in hierarchical systems of education is, as present, closely tied to conceptions of educational opportunity. During the twentieth century, the popular view of the main purpose of education has shifted from one of transmission of selected aspects of the dominant culture to one of the provision of skilled manpower to fuel continued economic growth. As this shift has occurred, the view that every effort should be made to locate and train all young people who show the requisite levels of intelligence and enthusiasm has consolidated. Standardised test scores or public examination results provide the mechanics of this search for latent talent and, when linked with financial support for the children of the 'needy', have formed a widespread means of implementing the second conception of equality of opportunity described above. Writing in 'The Age Monthly Review' recently, Professor Colin Howard provided a concise statement of this view:

"Judged by the results, education at the tertiary level, with one very important exception, should certainly not be free. The exception is that university education (only?) should be within the reach of gifted students who do not happen to come from well off families; but it should be available on a scholarship basis and not on a free-for-all basis.

*Public money should be concentrated on providing scholarships for students whose educational performance at the secondary level has demonstrated their capacity to benefit from university education.*" (Howard, 1981: P.4 Our Emphasis)

Although it is proposed less frequently, the view that higher education should be restricted to those who show high academic achievement and sufficient diligence can be readily linked to our third conception of equality of opportunity. Thus, it is sometimes optimistically proposed that rigorous selection on the criteria of achievement and diligence would ensure that group inequalities in access to successive stages of higher education would be minimised. For such optimism to be sustained, however, measures of achievement and diligence

would have to be uncorrelated with social background and other differences between students, a most unlikely possibility.

The 'social theory' which underpins various versions of this model of selection and maintenance of students in public education was pejoratively dubbed 'meritocratic' by Michael Young (1958). We would prefer to use a more neutral adjective, but as 'meritocratic' has gained such widespread useage, we will stay with it. Certainly the literal and pejorative meaning seems to have slipped a little, and Michael Young's neologism now seems to be used to mean simply 'based on merit'.

The meritocratic model has so influenced research and practice in education in Australia in the last few decades that it has now attained almost the combined force of a scientific meta-theory and social imperative. It, has for example, spawned more research than on practically any other aspect of higher education; in particular, research designed to evaluate the 'pool of talent' available for tertiary education and the prediction of college and university performance to avoid 'wastage'. Also, the model has fostered a short-lived scheme to award scholarships to middle secondary students as encouragements to persist with the final two years of schooling, and the related development of test batteries to aid in the award of the scholarships and to predict scholastic aptitude at year 12. And, particularly since the introduction of faculty quotas in the late 1950's and the later development of centralised admissions services, the meritocratic model has dominated formal processes of selection and allocation in tertiary education.

Our aim in this paper is to use the meritocratic model as a heuristic device to explore the equality of opportunity of various social groups in transition to tertiary education in Victoria. Following our third conception of equality of educational opportunity as substantive equality of access to higher education, we regard transition as a series of discontinuities in the student's educational history. We question whether, at each discontinuity, transition to the next stage is determined by meritocratic effects alone, or whether social inequalities exist, either over and above the meritocratic effects, or are mediated by them. A complete analysis of inequalities in transition to higher education would, ideally, commence with a cohort of year 12 students. Indicators of discontinuities in transition for this group would therefore include completion of year 12, application to a college or university, receipt of an offer, acceptance of the offer and delayed entry.

In a recent study of college and university applicants in Victoria we used administrative and survey data to develop causal models of the decisions of successful applicants to enrol either full- or part-time rather than to defer or decline (Elsworth, Day, Hurworth and Andrews, 1981). We showed that group inequalities in the decision whether or not to enrol after an offer was received favoured males, metropolitan students, and those from higher socio-economic status (SES) and non-English speaking immigrant families. Individual differences in enrolment decisions favoured those with higher academic achievements and those who perceived greater vocational benefits and fewer costs involved in continuing to tertiary study.

In this paper we extend our analysis from the focus on *self selection* to include the preceding discontinuity in transition of *eligibility* to enrol. Also, we concentrate on the relative and absolute size of meritocratic effects compared with between-group inequalities, on these two major discontinuities in transition. Here we use only our administrative data source, and our analysis is thereby restricted to the students' sex, home location and type of secondary school attended as possible sources of inequality.

#### *Data Sources and Methods of Analysis*

Our investigations are based on cross-sectional data on an accessible population of students in transition, defined to closely approximate the total group of young people (24 years old and younger) who were Victorian residents and who applied in 1979, for a place in a Victorian tertiary institution to commence study for the first time in 1980. Further, the population we consider here is limited to 19,554 applicants who were applying to commence tertiary study on the basis of a completed Higher School Certificate (HSC) or (for a very small number) a school-based year 12 assessment.

In this paper, our analyses are limited to the non-confidential parts of the information supplied by the applicants to the Victorian Universities Admissions Committee, which, in 1979-1980, processed applications for all Victorian tertiary institutions with the exception of three small teacher education colleges affiliated with the Institute of Catholic Education, the three Victorian agricultural and horticultural colleges and the Victorian College of the Arts. The data set includes:

- (i) the applicant's sex;
- (ii) the location of the applicant's home (coded for our analyses here as metropolitan and rural);

- (iii) the type of school attended when the application for a college or university place was made (coded as state high school, Catholic independent school, non-Catholic independent and other);
- (iv) a simple aggregate of the standardised marks of the students for the four best subjects at the last attempt at HSC and a list of the subjects studied (recoded to give a simple contrast between science and non-science courses);
- (v) the type of institution which made the final offer to the student (coded as university, metropolitan college of advanced education, metropolitan teachers' college, regional college of advanced education);
- (vi) the preference level of the final offer made to the student (coded from 1 to 8, with a category for a negotiated offer); and
- (vii) the outcome of the offer (originally a five-category variable; no offer, offer accepted full-time, accepted part-time, declined, or deferred which was recoded to two dichotomous variables namely, offer vs no offer and continued with tertiary study in 1980 vs did not continue).

The analyses are supplemented by reference to data from a questionnaire survey of an achieved sample of 1297 (from a 74% response rate) of those students who were offered a tertiary place. The sample was stratified to ensure adequate representation of those who enrolled both full-time and part-time and who deferred and declined.

We focus our attention on specifying the relationships between the independent and dependent variables in a simple causal model of transition to tertiary education in Victoria. The base population for the model is the previously defined group of secondary school students who applied for a college or university place to commence study in 1980, and the dependent variable is whether or not they actually commenced study in 1980. This dependent variable is therefore a composite of two discontinuities; whether or not the student received an offer of a place and, subsequently, whether or not the successful applicants took up the offer. Among the independent variables, we first consider a number of ascribed (predetermined) influences; characteristics of the individual students or their environment which are (at least largely) due to the circumstances of their birth and which may therefore be linked with differential educational opportunities and expectations. In our present model, these influences are the student's sex, the rural or urban location of their family home and the kind of secondary school they attended. Next, we consider two possible meritocratic effects on transition, effects which can reasonably be regarded as being achieved by the students as a result of their intelligence and abilities, aspirations or effort, and which, in turn, directly influence their eligibility to proceed to higher education, and may also influence their subsequent decisions on the offer of a place. We also recognise that these 'achievements' may be partly due to the sorting and distributing effects of the social and educational systems acting on group differences between the students, irrespective of the basic 'meritocratic' influences of 'ability plus effort'. Our group of achieved factors comprises the kind of course the students took in their final year of secondary school and the aggregate results of their final examinations. And finally, we introduce the first discontinuity in transition to tertiary study of our selected population. This is the indicator of whether or not the student received an offer of a tertiary place.

We test this model of transition by examining the gross, total, direct and indirect effects of the independent variables on the dependent variable, and the variable which indexes receipt of a college or university offer, using various path analysis techniques including the method outlined by Alwin and Hauser (1975) for decomposing total effects in recursive causal models into direct and indirect parts and the method for combining the effects of individual independent variables within a block of related variables (the 'sheaf' co-efficient) developed by Heise (1972).

#### *Who Continue On Directly To College Or University in Victoria?*

Of the 19,554 previously defined applicants for tertiary places in Victoria in 1979-80, 14,042 (71.8%) received an offer of a tertiary place. Of these 'successful' applicants, 9,625 (49.2% of the base population) commenced tertiary study in the following year. Thus, 22.6% either declined their offer or arranged to defer their enrolment for a year or more.

**TABLE 1**  
**THE GROSS EFFECTS OF THE PREDETERMINED VARIABLES ON ELEGIBILITY AND SELF-SELECTION FOR TERTIARY STUDY<sup>a</sup>**

Predetermined Variable	Outcome of the Application			
	No Offer %	Offer 'Turned Down' %	Offer 'Taken Up' %	All %
(a) <u>Sex</u>				
Male	27.4	19.3	53.2	45.9
Female	28.8	25.3	45.8	54.1
All	28.2	22.6	49.2	100.0
(b) <u>Home Location</u>				
Rural	25.7	29.8	44.5	27.2
Metropolitan	29.1	19.8	51.0	72.8
All	28.2	22.6	49.2	100.0
(c) <u>School Type</u>				
State High	32.0	22.1	45.9	51.7
Catholic Independent	27.3	25.8	46.9	24.8
Non-Catholic Independent	17.9	21.1	61.0	20.6
Other	42.7	16.8	40.5	2.9
All	28.2	22.7	49.1	100.0

NOTE a THE TABLE SHOWS PERCENTAGES BY ROWS, AND ROW AND COLUMN MARGINALS.  
 MINOR DISCREPANCIES ARE DUE TO SMALL AMOUNTS OF MISSING DATA AND ROUNDING ERRORS.

Table 1 shows the gross effects (in cross-tabular form) of the three predetermined variables on the aspects of eligibility and self-selection as they affect the transition of these applicants to tertiary study in the year following their application. From part (a) of the table, we can see that 27.4% of the male applicants did not receive an offer of a tertiary place, whereas 19.3% received an offer but either declined or deferred it and 53.2% received an offer and enrolled to commence study in 1980. The equivalent percentages for females were 28.8%, 25.3% and 45.8% respectively. Thus females were slightly less likely than males to receive an offer from a college or university and were considerably more likely to turn down an offer if they received one. These two complementary biases result in the number of females who failed to make the transition to tertiary study being 7.4 percentage points greater than the number of males.

Part (b) of Table 1 suggests that there were contrary tendencies in the effect of home location on transition to tertiary study. Metropolitan students were somewhat more likely than rural students to miss out on an offer of a place, but rural students were considerably more likely to turn down an offer if they received one. Thus the number of rural students who did not proceed directly to tertiary study was 6.5 percentage points greater than the number of metropolitan students who did not make the transition.

Part (c) of Table 1 shows the apparent effect of school type on transition. The small number of applicants from 'other' schools who applied for a college or university place on the basis of a completed HSC or school assessed 12th year were the most likely to not receive an offer. They were followed by applicants from state high schools, and applicants from Catholic independent schools. Students from non-Catholic independent schools were the most likely to receive a tertiary offer. In contrast, applicants from Catholic independent schools were the most likely to turn down a tertiary offer if they received one. They were followed by students from state high schools and those from non-Catholic independent schools.

Students from 'other' schools were the least likely to turn down an offer. In combination, the two discontinuities resulted in students from 'other' schools being the least likely to proceed immediately to tertiary study by 5.4 percentage points from students from state high schools, who were 1 percentage point less likely to proceed than students from Catholic independent schools. Students from non-Catholic independent schools were the most likely to make a direct transition to tertiary study by 14.1 percentage points from those from Catholic schools.

**TABLE 2**  
**THE GROSS EFFECT OF THE ACHIEVEMENT VARIABLES ON ELIGIBILITY AND**  
**SELF-SELECTION FOR TERTIARY STUDY<sup>a</sup>**

Variable	Outcome of the Application			
	No Offer %	Offer 'Turned Down' %	Offer 'Taken Up' %	ALL %
<b>(a) HSC Course Type</b>				
Non-Science	33.6	24.3	42.0	64.0
Science	18.3	19.9	61.9	36.0
All	28.1	22.7	49.2	100.0
<b>(b) HSC Score</b>				
Less than 199	95.2	1.8	3.0	18.2
Less than 239	32.1	27.4	40.5	30.1
200 THRU 239	2.7	32.5	64.8	30.9
240 THRU 279	0.9	22.4	76.7	15.3
280 THRU 319	0.6	13.5	86.0	5.5
ALL	28.0	22.8	49.2	100.0

NOTE: a THE TABLE SHOWS PERCENTAGES BY ROWS, AND ROW AND COLUMN MARGINALS.  
 MINOR DISCREPANCIES ARE DUE TO SMALL AMOUNTS OF MISSING DATA AND ROUNDING ERRORS.

Table 2 shows the gross effects of the achievement variables on the students' transition to tertiary study. Again the data are presented in cross-tabular form. From part (a) it is apparent that those who took a non-science course in year 12 were more likely than science students to miss out on a tertiary offer (33.6% of the non-science students failed to receive an offer compared with 18.3% of the science students)<sup>2</sup>. Similarly, non-scientists were also more likely to turn down an offer if they had received one (24.3% of the non-science students compared with 19.9% of the science students). Overall, non-science students were less likely to proceed immediately to tertiary study by a difference of 19.9 percentage points.

The first column of part (b) shows an anticipated strong and linear relationship between the applicant's HSC aggregate score and receipt of a college or university offer. It is worth noting that a small number of students with HSC scores less than an aggregate 'pass' (200) received offers of places and that a small number with relatively high scores did not receive an offer. The first group are most likely to be those students who were given special consideration in some form by various institutions, although it is possible that, as our aggregate score was formed from the applicant's last attempt at HSC, a small number of students had 'passed' HSC with a better aggregate at a previous attempt. The group with high HSC aggregates who missed out on an offer are almost certainly those who applied for only one or two highly competitive courses.

In the second column of part (b) we see an apparently curvilinear relationship between the HSC aggregate and the percentage of students who 'turned down' their tertiary offers. Those applicants who 'failed' HSC were very unlikely to turn down an offer if they received one, whereas those who scored in the mid-range of the aggregate (240 through 279) were the most likely to turn down an offer. There were thus many students who, having 'passed' HSC either declined or deferred their offer of a place, including some with high HSC scores. Within the 'pass' range, however, there is a negative relationship between score and the likelihood of turning down an offer, with the exception of the 200 through 239 category. It appears that the meritocratic effects on transition

TABLE 3  
THE EFFECTS OF SEX, HOME LOCATION AND SCHOOL TYPE ON HSC COURSE TYPE, HSC AGGREGATE SCORE, NON-RECEIPT OF AN OFFER  
OF A TERTIARY PLACE AND NON-COMPLETION OF TERTIARY STUDY

INDEPENDENT VARIABLES	DEPENDENT VARIABLES							
	HSC COURSE		DID NOT RECEIVE TERTIARY OFFER		DID NOT COMMENCE TERTIARY STUDY		H	
	A	B	C	D	E	F	G	H
Sex (Female = 1, Male = 0)	R = 0.23 <sup>a</sup> N = 19,089 <sup>b</sup>	R = 0.29 N = 19,055	R = 0.14 N = 19,139	R = 0.69 N = 19,055	R = 0.15 N = 19,139	R = 0.52 N = 19,055	R = 0.63 N = 19,139	R = 0.64 N = 19,055
Home Location (Metropolitan = 1, Rural = 0)	-0.216(-0.22) <sup>a</sup>	2.61(0.03)	0.010(0.01)	-0.007(-0.01)	0.065(0.07)	0.038(0.04)	0.059(0.06)	0.042(0.04)
School Type (vs State High School)								
Catholic Independent	-0.014(-0.01)	8.49(0.08)	-0.049(-0.05)	0.003(0.00)	-0.005(-0.00)	0.035(0.03)	0.028(0.02)	0.033(0.03)
Non-Catholic Independent	0.048(0.04)	24.99(0.21)	-0.145(-0.13)	0.021(0.02)	-0.140(-0.11)	-0.005(-0.00)	-0.041(-0.03)	-0.017(-0.01)
Other	-0.024(-0.01)	-12.50(-0.04)	0.099(0.04)	0.016(0.01)	0.068(0.02)	0.000(0.00)	0.000(0.00)	-0.009(-0.00)
Did Not Receive Tertiary Offer (No Offer = 1, Offer = 0)							0.683(0.61)	0.566(0.51)
HSC Course Type (Science = 1, Non-Science = 0)		19.66(0.20)						
HSC Score								
All Predetermined Variables			(0.14) <sup>d</sup>	(0.05)	(0.15)	(0.07)	(0.11)	(0.09)
All Achievement Variables				(0.69)		(0.51)		(0.17)

Notes: a. We present the multiple correlation co-efficient (R) rather than R<sup>2</sup> for comparison of the relative predictive value of the models, as with dichotomous dependent variables, the maximum value of R is not necessarily 1 and the usual 'proportion of variance accounted for' interpretation of R<sup>2</sup> is not possible.

b. All equations are calculated by 'pairwise' deletion of missing data. The number of subjects shown is the minimum pairwise N.

c. Effects are shown in the form of metric co-efficients, with standardised co-efficients in brackets.

d. These are Heise's (1972) 'sheaf' co-efficients, in effect, multiple partial correlation co-efficients.

seen so clearly on eligibility are being reinforced by self-selection.

In combination, therefore, eligibility and self-selection result in the strong linear relationship between HSC aggregate and transition seen in the third column of part (b). Whereas 97% of those students with scores of 199 or less could not (or did not) commence study in the subsequent year, 86% of those scoring 320 or above did. From these gross data there appears to be very little loss of 'superior' talent in transition to tertiary study in Victoria, but there is considerable loss of those who have not scored as well, but have none-the-less been certified as eligible by the grading and selection system. Of the group who scored between 200 and 319 on the HSC aggregate, 6,201 or 32.3% of our defined pool of applicants did not commence tertiary study in the following year. Of these, 4,160 (or 67.1%) were eligible in the sense that they received an offer of a place. The largest group who did not make the transition in this cross-tabulation were those who scored between 240 and 279 and turned down the offer of a place.

#### *Causal Models of Transition to Tertiary Study*

While the preceding cross-tabular presentations of our data have provided an overview of the effects of group inequalities and meritocratic influences on transition to tertiary study in Victoria, they do not allow us to confront our research question directly. First, it is quite probable that there are non-causal relationships among the predetermined variables, through which we may have under- or over-estimated the strength of their effects. Secondly, the predetermined variables may have causal influences on the achievement variables. For example, we could reasonably expect that fewer girls than boys would have studied a science course at HSC; and published data from the examining body (Victorian Institute of Secondary Education, 1980) suggest that science students have higher aggregate HSC scores than non-science students. We might, therefore, have over-estimated the unique effects of the achievement variables on transition; some of the effects of HSC course type and score being properly attributable to sex differences between the applicants. Thirdly, in order to estimate the relative effects of group inequalities and meritocratic influences on transition, we require a summary statistic for the three predetermined variables and the two achievement variables which will correct for the inter-correlations within the two categories. We overcome these difficulties by constructing a set of causal models of transition, and subsequently by disaggregating the total effects in these models into their direct and indirect parts for eligibility and self-selection separately.

Table 3 shows the metric and (in brackets) standardised co-efficients for eight simple path models in which the predetermined variables are related to the achievement variables (column A and B) and these two sets, in turn, are related to the transition outcomes (columns C through H).<sup>3</sup> We will augment the data in Table 3 with a breakdown, into their direct and indirect parts, of the total effects of the predetermined and achievement variables on transition overall, clustered into two further groups; those which are mediated by eligibility to enrol and those mediated by self-selection.<sup>4</sup> Our strategy for describing the relationships shown by these analyses is to focus on columns E and F of Table 3 which show the group and individual inequalities in transition overall. Subsequently, we will describe the separate effects of the inequalities on eligibility (columns C and D) and self-selection (columns G and H).

As indexed by total effects, the most salient group inequality in transition to tertiary study over the two discontinuities is associated with the type of secondary school the student attended (column E). Students from non-Catholic independent schools were, other things equal, approximately 14 percentage points more likely than those from state high schools to commence tertiary study in the year following their application. There were almost no differences between state high school and Catholic school students, whereas those from 'other' schools were almost 7 percentage points less likely than state high school students to commence study in 1980. There were also small, but clear, inequalities associated with the sex of the student and their home location. Other things equal, 6.5 percentage points fewer female students commenced study in 1980 than males, as did 5.4 percentage points fewer rural than metropolitan students.

The 'sheaf' co-efficient for the group of predetermined variables is 0.15 which, following Thomas (1980) must be regarded as a "modest" effect only, but the absolute percentage-point differences between the groups is quite striking.

When we introduce the two achievement variables into the model (column F), the multiple correlation co-efficient increases markedly, indicating a substantial independent effect of the achievement variables. In terms of *total* effects, however, the meritocratic influences on transition overall are only a little over three times as strong as the group inequalities, whereas in terms of *direct* effects they are about 7 times as strong. (Compare the following pairs of 'sheaf' co-efficients; 0.15 to 0.51 and 0.07 to 0.51). This is



because much of the effect of school type is mediated through school achievements. (Note, particularly, the drop in the co-efficient for non-Catholic independent school from -0.140 to -0.005.) Our additional detailed analyses of mediated effects show that, with one modest reservation, virtually all of the advantage experienced by students who attended non-Catholic independent schools is due to their higher HSC scores. Further, something less than half of the effect of the applicants' sex on transition appears to be due to their lower HSC achievements (from columns C and D, the co-efficient drops from 0.065 to 0.038). More detailed analyses show that the mediated effects of sex are, however, quite complex. About 60% of the effect is due to the fact that girls were less likely to have taken a science course at HSC, and that science students (partly because of *their* lower HSC scores) were less likely to commence study in the following year. But this effect is counterbalanced somewhat (about 20%) by the fact that, net of the type of course studied, girls received higher HSC scores which were related to a greater likelihood of continuing with tertiary study.

The data in column D also illustrate the very substantial effect of HSC score (and a modest effect of HSC course type) on transition overall, which we might expect from a predominantly meritocratic selection system. The metric co-efficient of -0.0051 indicates, other things equal, that the percentage of students who commenced tertiary study in the year following their application decreased by 5.1 points for every 10 marks decrease in the aggregate of their four best subjects at HSC. Further, non-science students were about 9 percentage points less likely to continue directly with study (net of their HSC scores) than science students. The total effect of taking a science course is a little over twice as large as this direct effect, the increase being due to the higher HSC aggregate scores of science students.

The data in columns C, D, G and H provide information which enables us to estimate the relative influences of group inequalities and meritocratic effects on eligibility (columns C and D) and self-selection (columns G and H) independently. Examining first the 'sheaf' co-efficients in the last two rows of columns C and D it is apparent that the ratio of the total effects (0.14 to 0.69 = 1:5 approximately) is a little greater than that for transition overall, but that the total effect of the predetermined variables is of a similar order. The direct effect of the predetermined variables, as a group, is negligible, however. Thus, as we might expect, group inequalities are a little less important as influences on eligibility than on transition overall and much of their effect on eligibility is mediated through subsequent achievements.

Column C shows that the strongest effects are, again, for school type. Non-Catholic independent school students were 14.5 percentage points less likely than were state high school students to miss out on an offer of a tertiary place and those from Catholic independent schools were about 5 percentage points less likely to miss out. Students from other schools were about 10 percentage points more likely to miss out on an offer. The other noticeable group difference is between rural and metropolitan students; metropolitan students were about 4 percentage points more likely to miss out on an offer than were rural students. These results confirm those from the cross-tabulations described above. The data in column D, however, show that, while the effect of home location is almost completely direct, the school type effects are mostly mediated by the achievement variables. Further analysis shows that virtually all of the effects of school type are associated with differences in HSC scores. Non-Catholic and Catholic independent school students had higher aggregate HSC scores than those from state high schools, and those from 'other' schools had lower scores (see column B) and these scores directly affected their receipt of an offer. It is worthy of note that non-Catholic independent school students were a little *more* likely to miss out on an offer than state high school students after their HSC scores were controlled. Probably, they were more likely to apply for more highly competitive courses.

Finally, the effect of the achievement variables on eligibility can be quickly dealt with. The very substantial effect of HSC score can be noted along with a very modest direct effect of HSC course type. The total effect of course type is about 5 times larger, however, the remainder being mediated by the higher scores of science students.

Shifting our attention to the effects on transition net of eligibility, that is, by inference, the direct effects on self-selection, the sheaf co-efficients show that the ratio of group inequalities to achievement effects is now less than 1:2 (comparing the co-efficients of 0.11 and 0.17). Also, very little of the group inequalities appear to be mediated by achievement. The strongest group inequalities in self-selection are between rural and metropolitan students. We estimate that, other things equal, there was a percentage-point difference of 8.0 in self-selection which favours metropolitan students. The apparent reversal in inequalities for rural students suggested by the cross-tabulations is thus confirmed; they were more likely to receive offers of tertiary places, but also more likely to decline or defer their offers. In sum, the balance is towards a clear disadvantage for rural students.

There is also a modest sex difference in self-selection, favouring males, of about 4 percentage points. Eligibility and self-selection thus compound for females leading to a clear disadvantage in transition. Finally, the school type effects show that students from Catholic schools were the *most* likely to turn down an offer of a tertiary place and that those from 'other' schools and non-Catholic independent schools were the *least* likely. These effects are minor, however, compared with the effects on eligibility. These group inequalities in self-selection do not appear to be strongly mediated in this analysis by the students' HSC achievements. Analyses of our survey data show, however, an effect of lower HSC scores for both females and rural students. A combination of perceived financial costs and fewer career benefits are also important barriers for rural students, and fewer perceived career benefits is an important barrier for females. (Elsworth, Day, Hurworth and Andrews, 1981)

Finally, we should note that the net effects of HSC achievements are somewhat stronger than the group inequalities, even on self-selection. Students who took a science course at HSC were less likely to turn down their tertiary offers than others (by 7 percentage points, other things equal) as were those with higher aggregate scores. Other analyses show that approximately 50% of the effect of HSC score is mediated by the preference level of the offer made to the student and, independently, by the kind of institution making the offer. The effect of taking a science course on self-selection, however, remains a direct one.

#### Conclusion

If a little tongue in cheek, we set out in this paper to compare certain group inequalities in access to tertiary education in Victoria against a meritocratic model of transition. Our findings can be readily summarised:

(i) While meritocratic effects predominate in determining eligibility to enter a college or university, there are modest group inequalities associated, particularly, with the type of school attended. These effects are mediated largely by the lower HSC achievements of those from 'other' schools and state high schools compared, particularly, to non-Catholic school students.

(ii) There are also modest group inequalities in self-selection for rural students and females, associated with their perceptions of the financial costs and career benefits of courses of higher education, and with their lower HSC achievements.

(iii) The meritocratic procedures certifying eligibility to continue to a higher education are quite strongly reinforced by self-selection; partly, it seems, through the restriction of enrolments in many preferred courses, partly through perceptions of institutional status and academic expectations.

The group inequalities that we have described in this paper are *relatively* small compared with the effects of individual achievements. However, in absolute terms they appear to be quite substantial, and if the additive model is an adequate representation of the data, they cumulate. The difference in the likelihood of a country girl from a state high school going on immediately to tertiary study, compared with a city boy from a non-Catholic independent school is of the order of 25 percentage points. Certainly, in our conception of educational equality, this is a situation that calls for positive (if not affirmative) action.

There are, as always, many caveats that might be applied to the conclusions we have drawn. Most importantly, perhaps, the causal models we have evaluated in this paper lack any measures of family socio-economic status and the 'rurality' of the home and school; variables which are undoubtedly important to consider in models of educational transitions. Also, on theoretical grounds, we can certainly be taken to task for including HSC course type (in this context, curriculum allocation) as an achieved rather than a predetermined variable. Had we done the latter and used a more detailed classification of HSC courses, our estimates of total group inequalities would certainly have been larger.

#### Notes

1. The original data gathering and preparation of the first report of this study was funded by the Commonwealth Tertiary Education Commission under its Evaluative Studies Program.
2. A "science course" is defined as a course of four or more subjects containing three or more of Chemistry, Physics, Applied Mathematics, Pure Mathematics, General Mathematics, Agricultural Science, Biology, Earth Science, Environmental Science, Geography or Physical Science.
3. It will be helpful to briefly state here the way in which these co-efficients may be interpreted. As all the dichotomous variables in the equations are coded 0 and 1, the marginal proportions of these variables can be interpreted as probabilities of occurrence in one or other category of the dichotomy, and the *metric* regression co-efficients can be interpreted as probabilities conditional on the distributions of other variables in the model. Thus, for example, the *metric*

co-efficients in column A of Table 3 is 0.216. This relates the applicant's sex (coded 1 for female, 0 for male) to the type of HSC course taken (coded 1 for science, 0 for non-science). It shows that, other variables in the model being equal, the probability of a female taking science courses at HSC was 0.216 points less than that for a male. An alternative, and most useful interpretation, is that if other things represented by the remaining variables in the equation had been equal, 21.6 percentage points fewer female than male applicants would have studied a science course at HSC. On the other hand, the *standardised* co-efficients, as they are adjusted in effect for the variance of the continuous variable and the marginal distributions of the dichotomous variables, enable a direct comparison to be made between the size of the effects within any one set of equations. Thus for example, the standardised co-efficients for HSC course type and HSC score in column H are 0.07 and 0.14 respectively. We can conclude that, net of the predetermined variables and *net of eligibility*, the independent effect of HSC score on self-selection is twice that of the independent effect of HSC course type. The co-efficients in the rows of Table 3 labelled 'predetermined variables' and 'achievement variables' are the 'sheaf' co-efficient described by Heise (1972). These co-efficients index the combined effect of the appropriate set of variables. They are standardised co-efficients and therefore their size can be compared within the one set of equations, but their sign is unimportant

4. Total effects are gross effects (bivariate associations) which are discounted for the relationships between the independent variable under consideration and all other variables which are prior to, or co-incident with it in a causal model. Total effects are thus discounted for all non-causal (or spurious) elements of association and can be interpreted as the amount of change that could be brought about in the dependent variable given unit change in the independent variable. Total effects can be partitioned into direct and indirect effects. In this way we can attempt an explanation of *how* an independent variable affects an outcome. Indirect effects are those that pass through (are mediated by) variables which follow the one of interest in the causal model. Direct effects represent the residual relationship between the independent and dependent variables when the overlapping relationships with *all* other variables are accounted for.

#### References

- Alwin, D.F. and Hauser, R.M. The Decomposition of Effects in Path Analysis. *American Sociological Review*, 39, p210, 1975
- Beazley, K. Speech to the "Student Assistance Bill, 1973". Australia, Parliament, *Parliamentary Debates (House of Representatives)* 86, 2067, 1973.
- Coleman, J.S. The Concept of Equality of Educational Opportunity. *Harvard Educational Review*, 38, 8-22, 1968
- Elsworth, G. R., Day, N. A., Hurworth, R. and Andrews, J. *From School To Tertiary Study: Transition To College and University in Victoria*, Hawthorn: Australian Council for Educational Research, 1981
- Halsey, A. H., Heath, A. F. and Ridge, J. M. *Origins And Destinations*, Oxford: Clarendon Press, 1980.
- Hayden, M. Financial Assistance to Tertiary Education Students: A review of recent literature and research. University of Melbourne, Centre for the Study of Higher Education, March, 1980.
- Heise, D. R. Employing Nominal Values, Induced Variables and Block Variables in Path Analysis *Sociological Methods and Research*, 1, p147, 1972.
- Howard, C. In Defence of Elites. *The Age Monthly Review*, Melbourne: The Age, No. 2, 1981
- Husen, T. Problems of Securing Equal Access to Higher Education: The Dilemma Between Equality and Excellence. *Higher Education*, 5, 407-422, 1976.
- Thomas, G. E. Race and Sex Differences and Similarities in the Process-of College Entry. *Higher Education*, 9, 179-202, 1980.
- Victorian Institute of Secondary Education. Report of Examiners: HSC Examination 1979. Victorian Institute of Secondary Education, 1980
- Young, M. *The Rise of the Meritocracy*, London: Thames and Hudson, 1958.