

School effects and the choice of field of study in higher education

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Focus of the paper

- Individual and school factors influencing selection of field of study within higher education
- Application and entry processes
- Degree level programmes only

Higher education in Ireland

- Centralised applications process (CAO)
- Covers university and institute of technology courses
- Degree and sub-degree courses
- Rank courses according to preference
- Numerus clausus; 'points' based on upper secondary exam grades

Data and methodology

- Data on 4,400 students within 108 secondary schools
- Interviews with school principals and guidance counsellors (1994)
- Survey of students towards end of lower secondary education; followed up to Leaving Certificate and CAO applications (1996-7)
- Multi-level modelling techniques

Applications to higher education

- $\frac{3}{4}$ applied for higher education (>60% for degree place)
- Related to gender, social class and prior ability
- School variation; related to orientation to higher education (timing of subject choice, guidance)

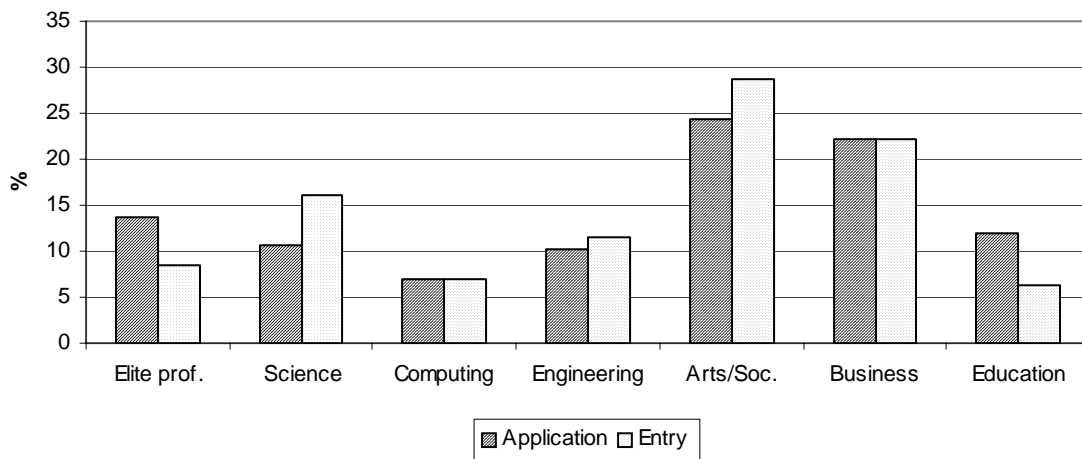
Degree applications and entry

- 2,754 applicants; 981 entrants
- Field of study (1st ranked):
 1. Elite professions (medicine, law, architecture)
 2. Science
 3. Computing
 4. Engineering
 5. Arts/Social Science
 6. Education
 7. Business

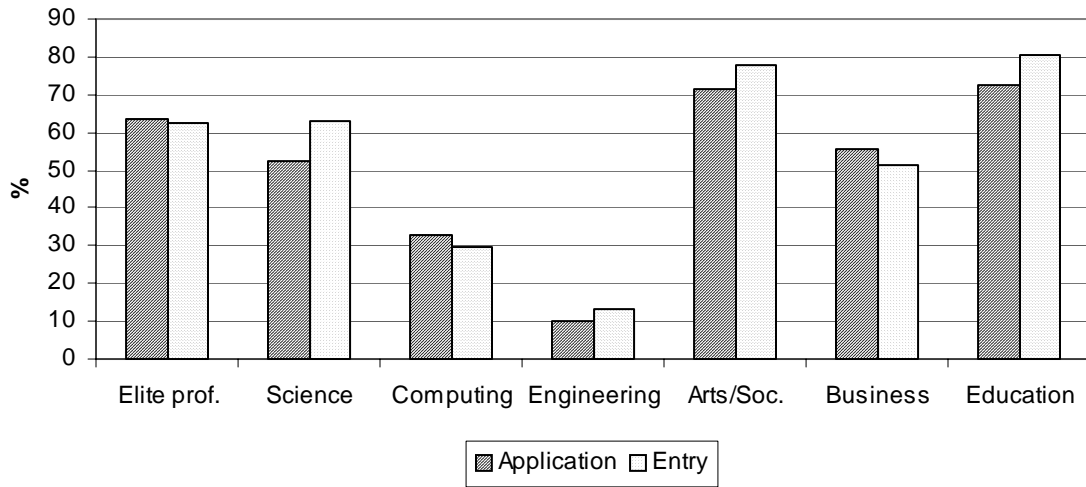
Potential school effects

- Subject provision and take-up at lower and upper secondary levels
- Attitudes to subject areas
- Academic performance – general and in specific subject areas
- Guidance; teacher and peer effects

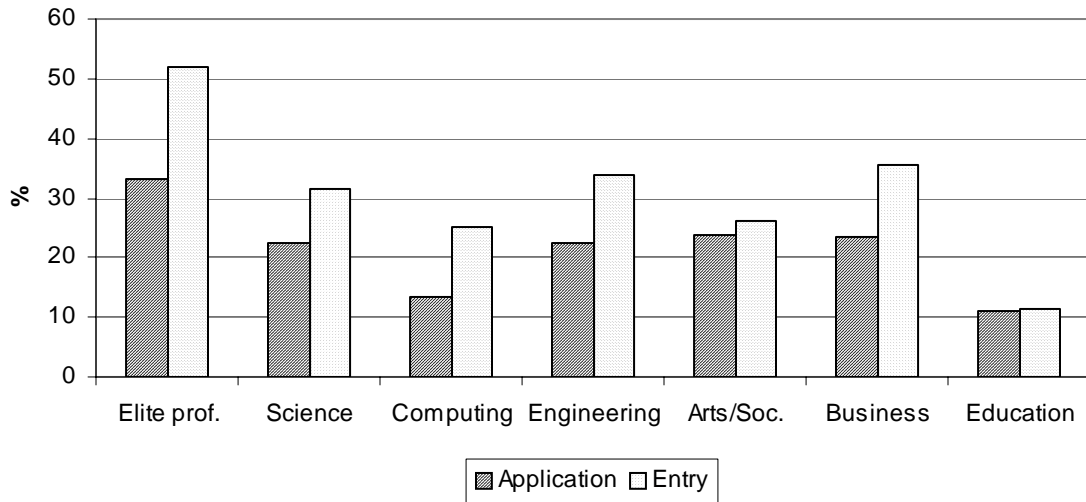
Field of study



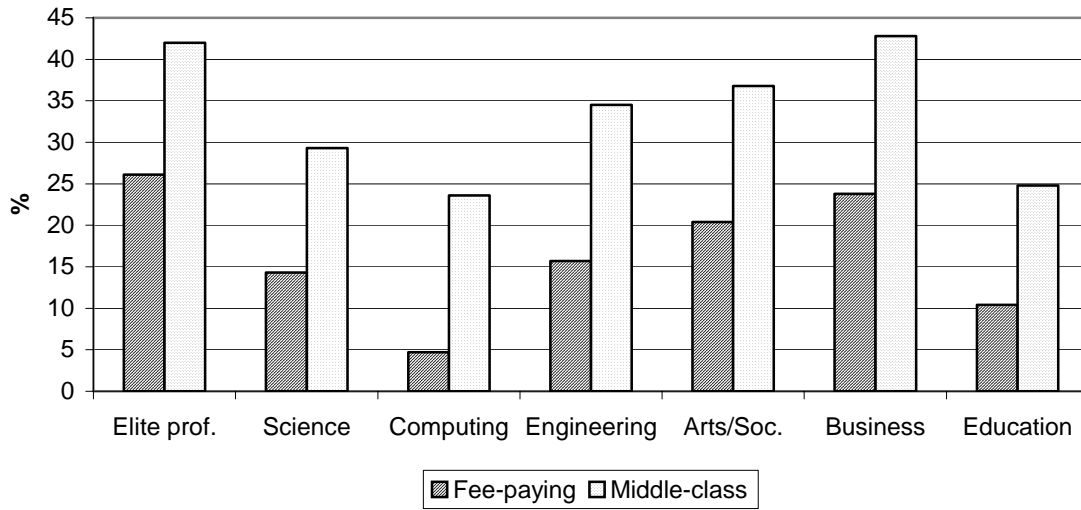
Field of study and gender (% female)



Social class (% higher professional)



Applications: School profile



Applications

- School variation
- Gender differences; not accounted for by school factors or comparative advantage
- Social class: not marked but some variation
- Attitudes to subject areas
- Subject take-up at lower secondary – relationship to upper secondary take-up
- Exam performance
- Social class mix of school

Entry

- School variation – related to student profile
- Gender differences
- Social class: little significant effect exc. education
- Attitudes to subject areas
- Subject take-up at lower secondary – relationship to upper secondary take-up
- Exam performance at lower and upper secondary
- Social class mix of school

Conclusions

- Marked gender differences
- Social class – impact on application/entry stronger than on field of study
- Attitudes formed at an early stage
- Succession of choices re subject take-up
- Exam performance (nature of HE system)

Next steps

- More school-level variables
- Interaction between gender and other variables
- Sub-degree as well as degree programmes

Applications: null and adjusted models (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Null model:						
Constant	-0.434*	-0.642*	-1.052*	-0.689*	0.140±	-0.497*
School-level variance	0.283*	0.288*	0.514*	0.816*	0.224*	0.800*
Adjusted model:						
Constant	-1.378*	-0.866*	-0.475	-0.129	-0.364	-0.877*
Female	0.529*	-0.176	-1.187*	-2.695*	0.757*	0.568*
Higher professional	1.007*	0.513±	-0.448	0.319	0.212	-0.260
Lower professional	0.889*	0.573*	0.184	0.601±	0.123	0.444±
Non-manual	0.524	0.389	-0.031	0.185	0.100	0.119
Skilled manual (Base: Semi/unskilled manual)	0.024	0.176	0.225	0.604±	-0.108	-0.107
Verbal/numerical ability	0.031*	0.005	0.013±	0.005	0.003	0.002
School-level variance	0.225*	0.352*	0.557*	0.703*	0.166*	0.700*

Note: * p<.05, ± p<.10. These tables present a series of multilevel binary logistic regression models with the specified fields of study contrasted against Business; this is because estimation problems arose in using a multinomial logit model.

Applications: lower secondary factors (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-2.717*	-0.910	-0.096	-0.973	0.316	-1.060
Female	0.669*	0.224	-0.883*	-2.064*	0.943*	1.427*
Higher professional	0.717*	0.518	-0.451	0.627	0.212	-0.219
Lower professional	0.701*	0.432	0.155	0.780*	0.143	0.641*
Non-manual	0.405	0.318	-0.111	0.263	0.165	0.242
Skilled manual (Base: Semi/unskilled manual)	-0.008	0.121	0.147	0.673±	-0.083	-0.034
Verbal/numerical ability	-0.0004	-0.009	0.027*	0.012	0.007	-0.008
Lower sec. subjects:						
Science	1.062*	1.649*	-0.312	0.694	0.380	0.012
Business	-0.739*	-1.054*	-1.041*	-0.845*	-1.032*	-0.796*
French	0.028	-0.683*	-0.635*	-0.609*	-0.494*	-0.388
Other language	0.086	-0.582*	0.015	-0.292	-0.247	-0.319
History	-0.706	-0.859	-0.752	-1.436	-0.214	-1.259*
Geography	1.225	0.711	1.092	1.382	0.567	1.021*
Practical	0.713*	0.404	0.251	0.606*	0.365	1.292*
Higher stream class	0.267	0.397*	0.553*	0.323	0.255	0.676*
Attitudes:						
Maths orientation	0.106	0.064	0.147	0.283*	-0.326*	-0.187*
Language orientation	-0.019	-0.400*	-0.089	-0.319*	0.195*	0.064
Practical orientation	0.030	0.163	0.223*	0.406*	-0.089	0.243*
Lower secondary exam performance	0.543*	0.164±	-0.210*	-0.137	0.002	0.238*
School-level variance	0.147±	0.323*	0.510*	0.512*	0.148*	0.408*

Applications: upper secondary factors (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-2.158*	-0.029	0.319	-0.580	0.249	-1.247
Female	0.611*	-0.328	-1.059*	-1.996*	0.838*	1.508*
Higher professional	0.648±	0.674	-0.433	1.291*	0.309	-0.194
Lower professional	0.583	0.696	0.106	1.284*	0.281	0.737*
Non-manual	0.229	0.542	-0.035	0.723	0.210	0.276
Skilled manual (Base: Semi/unsk. manual)	-0.114	0.279	-0.171	0.977*	0.066	0.009
Verbal/numerical ability	-0.0004	-0.010	0.030*	0.015	0.010	-0.010
Lower sec. subjects:						
Science	0.651	1.133*	-0.658	0.533	0.149	-0.098
Business	0.047	-0.014	-0.406	0.072	-0.304	0.445
French	0.416	-0.277	-0.432	0.039	-0.430	-0.089
Other language	0.095	-0.598*	0.454	0.047	-0.331	-0.006
History	-1.298	-1.058	-1.108	-0.564	-0.713	-1.215±
Geography	2.013*	1.400*	1.692	1.181	0.952*	1.499*
Practical	0.362	0.574	-0.147	-0.146	0.457	1.164*
Higher stream class	0.140	0.182	0.364	-0.136	0.368*	0.530*
Attitudes:						
Maths orientation	0.087	0.029	0.021	0.211	-0.268*	-0.247*
Language orientation	0.041	-0.384*	-0.036	-0.294*	0.204*	0.085
Practical orientation	-0.069	0.077	0.070	0.122	-0.057	0.085
Lower secondary exam performance	0.500*	0.189±	-0.202±	-0.163	-0.047	0.270*
Upper sec. subjects:						
Science	0.686*	1.283*	0.444	-0.063	0.251	0.629*
Business	-1.966*	-2.531*	-1.739*	-2.106*	-1.742*	-2.008*
Practical	0.854*	-0.766*	0.842*	1.733*	-0.138	0.757*
French	-0.416	-0.801*	0.222	-0.817*	0.239	-0.538
Other language	0.016	-0.383	0.135	0.009	0.441±	-0.421
History	0.329	-0.578*	-0.696*	-0.897*	0.609*	0.012
Geography	-0.042	-0.420±	0.415±	-0.269	0.355*	-0.011
Social class mix of school	0.125	0.644*	1.036*	0.735*	0.093	0.760*
School-level variance	0.117	0.136	0.272	0.410*	0.017	0.307*

Applications: the effect of comparative advantage (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-1.499*	-0.974*	-0.544	-0.248	-0.479*	-0.980*
Female	0.473*	-0.190	-1.226*	-2.683*	0.733*	0.572*
Higher professional	1.188*	0.574±	-0.411	0.394	0.289	-0.226
Lower professional	1.072*	0.638*	0.248	0.646*	0.197	0.462±
Non-manual	0.609*	0.466	0.047	0.224	0.148	0.138
Skilled manual (Base: Semi/unskilled manual)	0.103	0.249	0.270	0.649*	-0.055	-0.077
Comparative advantage (numerical)	0.177	-0.211±	-0.288*	0.027	-0.545*	0.012
School-level variance	0.237*	0.321*	0.551*	0.676*	0.176*	0.679*

Entry to higher education: null and adjusted models (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Null model:						
Constant	-0.931*	-0.237*	-1.072*	-0.523*	0.355*	-1.132*
School-level variance	0.269*	0.239	0.720*	1.035*	0.416*	0.588±
Adjusted model:						
Constant	-2.956*	-0.743	-0.277	0.072	-0.267	-3.014*
Female	0.844*	0.576*	-0.988*	-2.214*	1.197*	1.247*
Higher professional	1.067	-0.044	-0.587	0.270	-0.278	-0.230
Lower professional	0.459	-0.100	-0.029	0.700	0.009	1.527±
Non-manual	0.449	-0.011	-0.697	-0.136	-0.105	0.895
Skilled manual (Base: Semi/unskilled manual)	-0.104	0.440	-0.162	0.002	0.495	0.463
Verbal/numerical ability	0.081*	0.023*	0.008	0.008	-0.009	0.021
School-level variance	0.0	0.152	0.467	0.937*	0.166	0.331

Entry: lower secondary factors (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-3.773*	0.011	0.171	-0.599	1.338±	-5.326
Female	0.685	0.871*	-0.855*	-1.866*	1.668*	2.274*
Higher professional	0.936	0.030	-0.979	0.389	-0.313	0.221
Lower professional	0.485	-0.170	-0.386	0.875	0.086	2.120*
Non-manual	0.788	-0.039	-1.264*	-0.092	0.019	1.230
Skilled manual (Base: Semi/unskilled manual)	-0.051	0.499	-0.596	-0.138	0.500	0.521
Verbal/numerical ability	0.030*	0.013	0.022	0.009	0.022*	0.023
Lower sec. subjects:						
Business	-0.790	-0.759*	-0.156	-0.926*	-1.089*	-0.268
French	-0.224	-0.751*	-0.759	-0.665	-0.586	-0.754
Other language	0.016	-0.397	0.252	-0.393	-0.082	-0.578
Practical	0.551	0.920	0.015	1.398*	0.332	3.082*
Higher stream class	-0.294	0.508±	0.040	0.498	0.153	0.856*
Attitudes:						
Maths orientation	-0.001	0.300*	0.414*	0.657*	-0.327*	-0.426*
Language orientation	0.285	-0.363*	0.004	-0.312	0.403*	0.052
Practical orientation	-0.404	0.054	0.099	0.256	-0.355*	0.613*
Lower secondary exam performance	2.175*	0.069	-0.639*	0.051	-0.601*	0.997*
School-level variance	0.381	0.154	0.613	0.667±	0.104	0.0

Entry: upper secondary factors (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-1.998	1.670	0.182	1.242	0.630	-4.552*
Female	0.678	0.522	-0.790	-2.016*	1.639*	2.555*
Higher professional	0.618	-0.286	-1.554*	0.889	-0.576	-0.474
Lower professional	0.102	-0.605	-1.013	1.608	-0.036	1.843±
Non-manual	0.596	-0.492	-1.581*	0.305	-0.123	0.713
Skilled manual	0.096	-0.268	-1.065	1.150	0.232	-0.914
(Base: Semi/unsk. manual)						
Verbal/numerical ability	0.026	0.015	0.031	0.027	0.023±	0.030
Lower sec. subjects:						
Business	-0.463	0.536	0.700	0.027	-0.018	1.190
French	-0.035	0.086	-1.144	-0.217	-1.032*	-0.513
Other language	-0.719	-0.598	0.571	-0.260	-0.135	-0.186
Practical	0.798	1.081	-0.098	0.937	1.067	3.262*
Higher stream class	-0.306	0.489	0.303	0.364	0.262	1.004*
Attitudes:						
Maths orientation	0.093	0.455*	0.408±	0.787*	-0.338*	-0.579*
Language orientation	0.422	-0.244	0.195	0.162	0.451*	0.139
Practical orientation	-0.621*	-0.001	-0.082	-0.006	-0.287*	0.503±
Lower secondary exam performance	2.129*	-0.030	-1.033*	0.092	-0.674*	1.070*
Upper sec. subjects:						
Science	-0.128	1.531*	1.169*	0.002	0.658*	0.714
Business	-2.166*	-2.876*	-1.674*	-3.151*	-2.142*	-2.202*
Practical	0.917	-0.082	1.285*	0.996	-0.334	0.874
French	-0.270	-2.320*	0.177	-1.894*	0.921*	-1.461
Other language	0.847	-1.120	-0.050	-0.979	0.496	-1.030
History	-0.194	-0.983*	-0.445	-1.645*	1.136*	0.722
Geography	-0.439	-0.683±	0.458	-1.092*	0.422	0.260
School-level variance	0.0	0.0	0.457	0.569	0.011	0.0

Entry: upper secondary factors and Leaving Certificate (upper secondary) performance (base category: Business)

	<i>Elite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-1.250	2.093	0.851	1.315	0.993	-5.773*
Female	0.538	0.161	-1.505*	-2.987*	1.558*	2.009*
Higher professional	-0.194	0.097	-1.381±	1.706	-0.464	0.031
Lower professional	-0.711	-0.470	-0.951	1.926	0.041	2.487*
Non-manual	-0.173	-0.413	-1.625*	0.434	-0.117	0.926
Skilled manual (Base: Semi/unsk. manual)	-0.521	-0.312	-1.458	1.262	0.233	-0.383
Verbal/numerical ability	0.023	0.022	0.038	0.028	0.027*	0.021
Lower sec. subjects:						
Business	-0.751	0.224	0.024	-0.376	-0.182	1.655
French	-0.766	0.339	-0.649	-0.230	-1.007*	-1.739
Other language	-1.172±	-0.326	1.186±	0.245	-0.080	-0.349
Practical	-0.359	0.817	-0.486	0.532	1.132±	2.785*
Higher stream class	-0.398	0.179	-0.373	-0.276	0.161	0.884
Attitudes:						
Maths orientation	0.018	0.427*	0.341	0.842*	-0.339*	-0.773*
Language orientation	0.326	-0.254	0.123	0.191	0.458*	0.132
Practical orientation	-0.752*	-0.005	-0.068	0.035	-0.305*	0.729*
Lower secondary grades	-0.174	-0.031	-1.179*	-0.619	-0.483±	-1.205±
Upper sec. subjects:						
Science	-0.117	1.467*	1.398*	0.310	0.626*	0.380
Business	-2.135*	-2.889*	-1.601*	-3.510*	-2.092*	-2.988*
Practical	0.539	-0.105	1.458*	0.906	-0.376	0.841
French	-0.365	-2.306*	0.160	-1.532±	0.935±	-0.848
Other language	0.327	-1.015	0.075	-0.807	0.534	-1.186
History	-0.005	-1.098*	-0.562	-1.856*	1.076*	0.510
Geography	-0.471	-0.683±	0.638	-1.038±	0.461	0.212
Leaving Cert grades	0.950*	-0.033	-0.024	0.204	-0.115	1.054*
Social class mix of school	0.002	0.865*	1.906*	1.885*	0.235	1.160*
School-level variance	0.0	0.0	0.133	0.045	0.025	0.0

Entry: the effect of comparative advantage (base category: Business)

	<i>Élite professions</i>	<i>Science</i>	<i>Computing</i>	<i>Engineering</i>	<i>Arts</i>	<i>Education</i>
Constant	-2.379*	-0.607	-0.433	-0.443	-0.515	-2.941*
Female	0.573±	0.514*	-0.923*	-2.096*	1.230*	1.282*
Higher professional	1.546±	-0.011	-0.511	0.645	-0.191	-0.188
Lower professional	1.048	-0.009	0.031	0.974	0.058	1.582±
Non-manual	0.859	0.114	-0.608	0.115	-0.051	1.039
Skilled manual (Base: Semi/unskilled manual)	0.475	0.610	-0.059	0.184	0.661	0.707
Comparative advantage (numerical)	-0.396±	-0.451*	-0.081	0.257	-0.685*	-0.384
School-level variance	0.212	0.141	0.530	0.953*	0.237	0.424