The use of the NPD and PLASC in examinations research

CAMBRIDGE ASSESSMENT

Rebecca Grayson and Tim Gill (presenters)
Joanne Emery and Carmen Vidal Rodeiro
Assessment Research and Development

PLUG Conference, Bristol University
6th March 2012

University of Cambridge Local Examinations Syndicate

Cambridge Assessment

CAMBRIDGE ASSESSMENT

Assessment Research & Development

- Largest examinations research capacity of its kind in Europe
- Research aims to enhance knowledge and understanding of educational assessment
- 20 researchers
- 4 teams
- Educational Measurement (and Statistics) team

Key examinations data sources

1. Internal Cambridge Assessment data

CA examination results datasets for all candidates

✓ Strength: Highly detailed, candidate level data

✗ Limitation: Only available for CA candidates

2. JCQ Inter-Awarding Body Statistics

General qualification examination results tables for all UK candidates, by gender and school type

✓ Strength: Accessible data for all UK awarding bodies

✗ Limitation: Composite data, at the qualification level

Key examinations data sources: 3. NPD and PLASC

✓ Detailed candidate level examination results data, across all UK awarding bodies

- First use: 16+/18+ databases from 1996
- Yearly data request:
  - Basic KS4 and KS5 NPD extracts
  - Matched to prior attainment and PLASC
  - Plus extra UPN variable
- Manipulation and analysis: Base SAS

NPD and PLASC: Areas of examinations research

1. Routine analysis

2. Reactive analysis

Routine NPD/PLASC analysis

- Candidate uptake and centre provision of GCSE and A-level subjects in England
- Broken down by: gender, attainment, deprivation, centre size, centre type

- Key NPD variables:
  - KS4_SUBLEVNO / KS5_SUBLEVNO = qualification
  - KS4_MAPPING / KS5_MAPPING = subject
  - KS4_ANCN / KS5_ANCN = centre
- Automated SAS programs

Uptake of A-level subjects 2010

Five most popular subjects: uptake overall and by gender

Subject	Uptake (% of Year 13 A-level candidates)		
	All (N = 264,131)	**Male** (N = 142,231)	**Female** (N = 121,900)
Mathematics	24.4	31.5	18.4
Psychology	19.2	11.2	26.1
Biology	19.0	18.0	19.8
General Studies	16.9	17.0	16.8
History	16.3	17.4	15.4

Uptake of A-level subjects 2010

Five most popular subjects: uptake by centre type

Subject	Uptake (% of Year 13 A-level candidates)						
	Academy (N=4473)	Compre. (N=114694)	FE / Tert. College (N=25417)	Grammar (N=21873)	Indepen. (N=34688)	Secondary Modern (N=3974)	Sixth Form College (N=56632)
Mathematics	19.3	22.2	15.8	37.6	37.3	13.3	21.1
Psychology	17.0	20.3	22.7	18.5	8.7	20.7	22.3
Biology	16.2	18.5	12.6	30.9	23.5	11.1	16.3
Gen. Studies	13.6	16.3	3.1	36.7	6.5	6.2	24.9
History	13.8	17.5	11.5	20.3	20.7	14.7	12.4

Provision of A-level subjects 2010

Five most popular subjects: provision by centre type

Subject	Provision (% of A-level centres)						
	Academy (N=115)	Compre. (N=1420)	FE / Tert. College (N=207)	Grammar (N=164)	Indepen. (N=564)	Secondary Modern (N=101)	Sixth Form College (N=135)
Mathematics	79.1	94.4	73.4	99.4	90.4	73.3	97.8
Psychology	68.7	87.0	79.2	80.5	52.3	66.3	94.8
Biology	73.0	92.0	72.9	99.4	87.1	56.4	94.8
Gen. Studies	16.5	37.0	8.7	59.8	15.8	14.9	42.2
History	67.8	90.6	65.7	99.4	83.5	64.4	94.1

Routine NPD/PLASC analysis: CA Statistical Reports

Audiences

Internal and external:

- Examinations practitioners
- Assessment researchers

Purposes:

- Make examinations statistics easily and widely accessible
- Fill a gap in alternative examinations data sources
- Inform research and practice

Reactive NPD/PLASC analysis

Response to current key issues and events:

- **Policy changes**
- **Public consultation**
- **External request**
- **Media / public concern**

Reactive NPD/PLASC analysis

Response to current key issues and events:

- **Policy changes**
- **Public consultation**
- **External request**
- **Media / public concern**

Policy change: 2004 - Modern Foreign Languages no longer compulsory at GCSE

Response: Extended analyses of the uptake of Modern Foreign Languages

• By key centre and candidate characteristics

Mean GCSE	GCSE French uptake (% of Year 11 candidates)	
	2000	2006
Low	40.1	14.9
Medium	56.9	31.8
High	68.5	52.7

Reactive NPD/PLASC analysis

Response to current key issues and events:

Policy changes

Public consultation

External request

Media / public concern

Public consultation: 2011 UCAS higher Education admissions process review

Response: An analysis of how accurately AS-level grades predicted 2010 A level grades

- '09 AS-level results matched to '10 A-level results
- A-level grade equal to, higher than or lower than matched AS-level grade?
- Comparison with BIS analysis of 2009 UCAS predicted grade accuracy:

A-level grade:	Predictor (column %)	
	AS-level grade	Predicted grade
Equal	54.5	51.7
Higher	22.9	6.6
Lower	22.7	41.7

Reactive NPD/PLASC analysis

Response to current key issues and events:

Policy changes

Public consultation

External request

Media / public concern

External request: Cambridge University – what are the numbers and demographics of students attaining the highest A-level results?

Response: A series of Statistical Reports investigating high A-level attainment:

- Attainment of 3 A grades over time
- Attainment of the new A* grade

Centre type	% of 2010 Year 13 A-level candidates attaining at least	
	A*AA	A*A*A*
Comp. / Sec mod	5.7	1.1
Grammar	19.3	5.0
Independent	23.2	6.0

Reactive NPD/PLASC analysis

Response to current key issues and events:

Policy changes

Public consultation

External request

Media / public concern → Media / public concern: Decline in the uptake of Physics qualifications

Response: An analysis of the factors that determine uptake of A-level Physics

What factors determine the uptake of A-level Physics?

Background (1)

Concern about decline in Physics uptake

- "Concern over decline in physics " *(BBC, 11th Aug 2006)*
- "Next generation of scientists could be lost" *(Royal Society, 26th Sept 2006)*
- "Government 'failing' to get teenagers to take science" *(Guardian, 10th March 2006)*
- "Schools letting down UK science" *(CBI, 13th Aug 2006)*
- "Shortage of physics teachers worse than ever" *(IOP, 21st Nov 2005)*
- "Reading closes physics department" *(BBC, 2nd Oct 2006)*

What factors determine the uptake of A-level Physics?

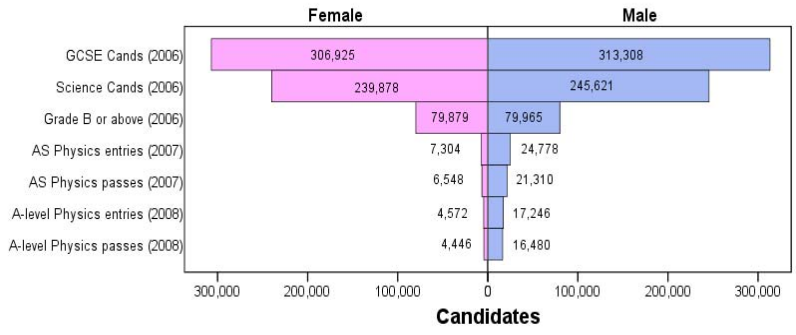
Background(2)

Possible reasons

- Combined Science GCSE
- Lack of specialist teachers (Smithers & Robinson, 2006)
- Difficulty of subject (Vidal Rodeiro, 2007)
- Spiral of decline

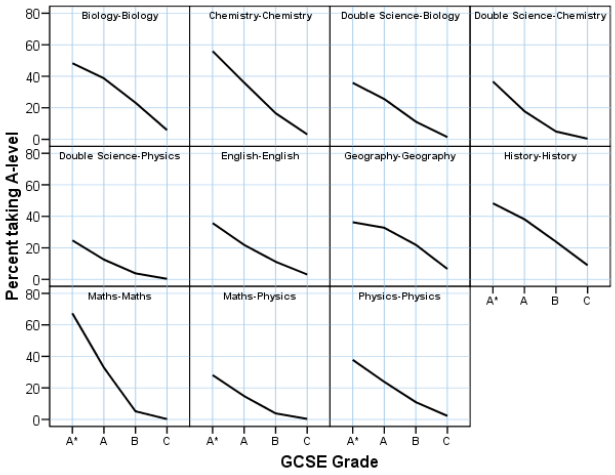
What factors determine the uptake of A-level Physics?

The gender gap



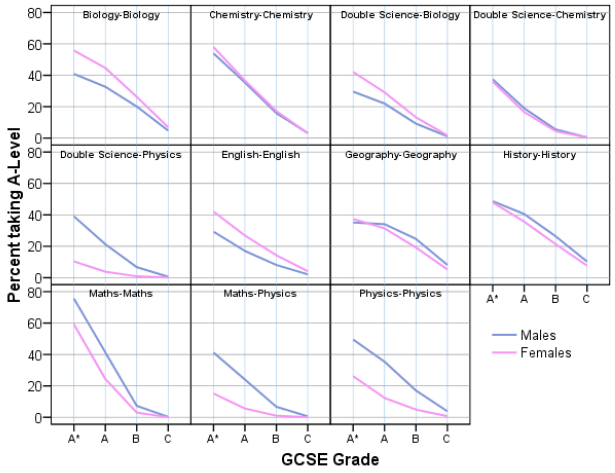
What factors determine the uptake of A-level Physics?

Progression to A-level



What factors determine the uptake of A-level Physics?

Progression to A-level



What factors determine the uptake of A-level Physics?

Multi-level model

Data: National Pupil Database 2008 KS5 extract
NCN database

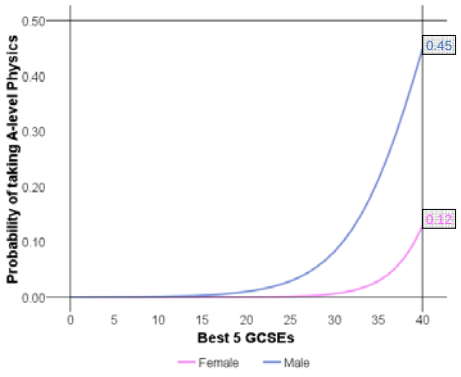
Outcome measure: Taking A-level Physics or not

Independent variables:
- Gender
- Prior attainment
- School type
- Mixed/single sex schools
- Type of science at GCSE
- GCSE Science/Maths grade

What factors determine the uptake of A-level Physics?

Results

Model I – gender & prior attainment

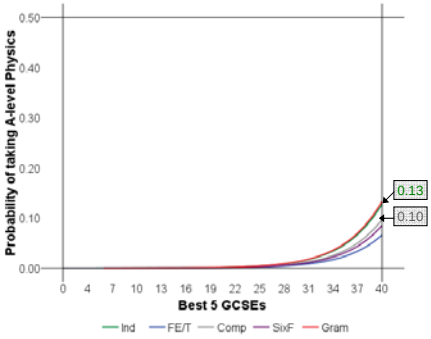


What factors determine the uptake of A-level Physics?

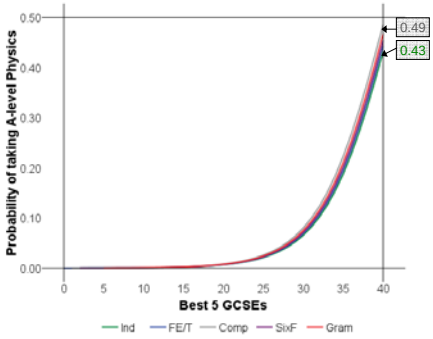
Results

Model II – Model I + school type

Females



Males

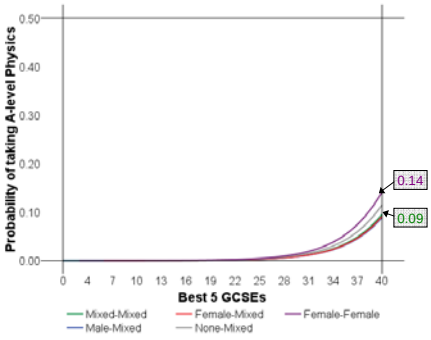


What factors determine the uptake of A-level Physics?

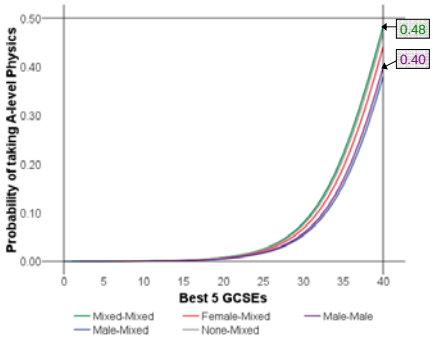
Results

Model III – Model I + school gender

Females



Males

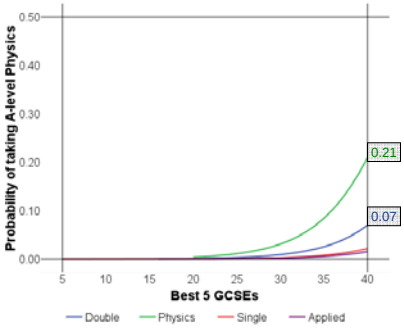


What factors determine the uptake of A-level Physics?

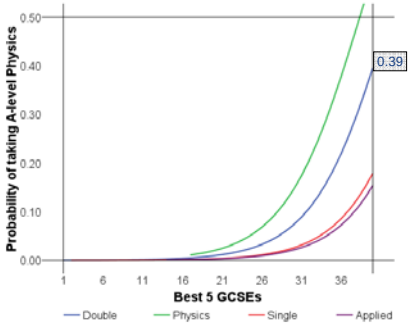
Results

Model IV – Model I + GCSE science

Females



Males

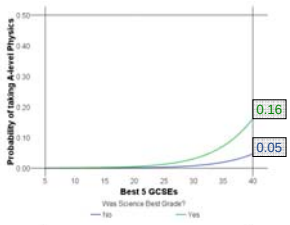


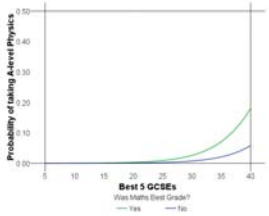
What factors determine the uptake of A-level Physics?

Results

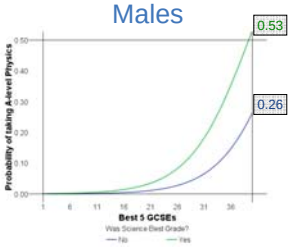
Model V – Model I + GCSE science/maths grade

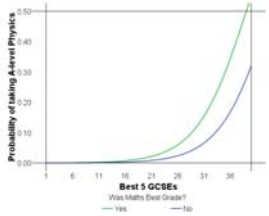
Females





Males





What factors determine the uptake of A-level Physics?

Conclusions

CAMBRIDGE ASSESSMENT

Predictors of uptake

- Male
- Physics GCSE
- Best result in Science/Maths GCSE
- Grammar/Independent school (females only)

Solutions?

- Increase uptake/provision of Physics GCSE
- Increase uptake amongst girls
- More specialist physics teachers

References

CAMBRIDGE ASSESSMENT

- Cambridge Assessment Statistical Reports: http://www.cambridgeassessment.org.uk/ca/Our_Services/Research/Statistical_Reports
- JCQ Inter-Awarding Body Statistics: http://www.jcq.org.uk/national_results/index.cfm
- UCAS 2011 Admissions Process Review Consultation: http://www.ucas.com/reviews/admissionsprocessreview/
- Gill, T. & Bell, J.F. (2011): What Factors Determine the Uptake of A-level Physics?, International Journal of Science Education: http://www.tandfonline.com/doi/abs/10.1080/09500693.2011.577843

Tim: gill.tim@cambridgeassessment.org.uk

Rebecca: grayson.r@cambridgeassessment.org.uk

CAMBRIDGE ASSESSMENT

Any questions?

Disclaimer: not all of the work referred to in the presentation was undertaken by us so we might not be able to answer detailed or technical questions about specific projects