Growing Up in Ireland
National Longitudinal Study of Children

Growing Up in Ireland (GUI), Girls, and Physics: Statistical Quest for the Kind of Girl that Chooses Physics at Leaving Certificate

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Trinity College Dublin
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An Roinn Leanaí agus Gnóthaí Óige
Department of Children and Youth Affairs

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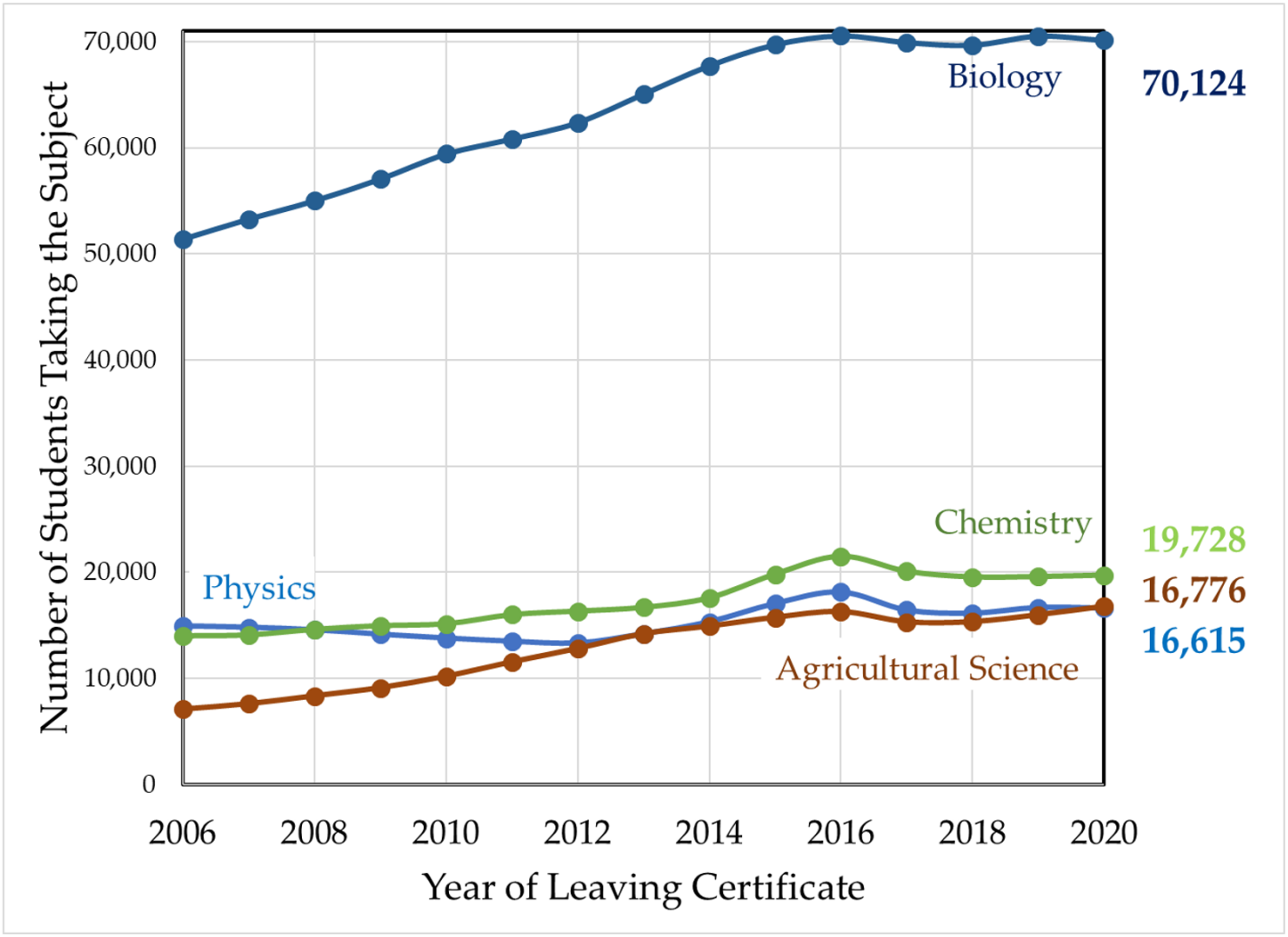
Pupils taking LC science subjects



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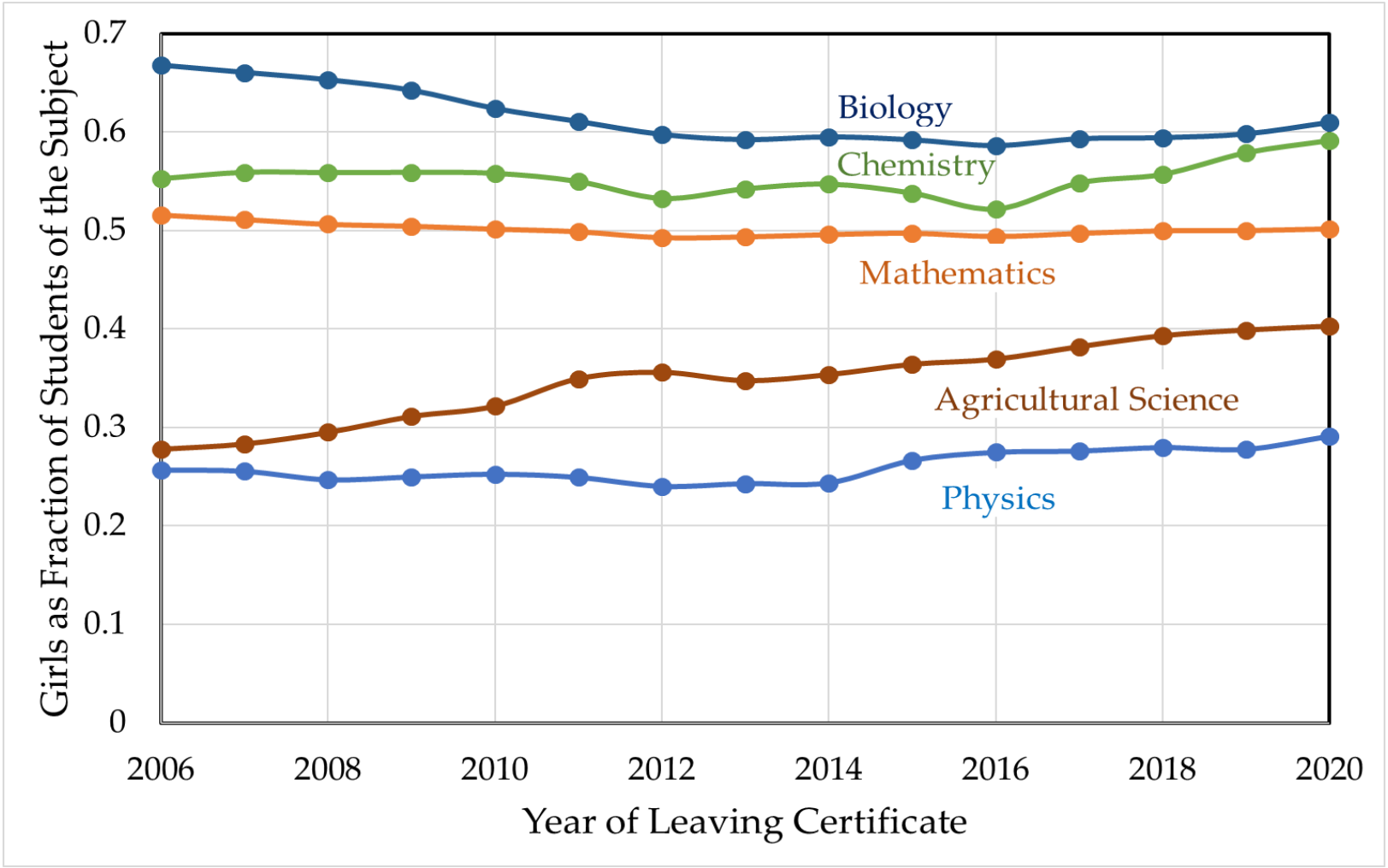
Girls taking LC science subjects



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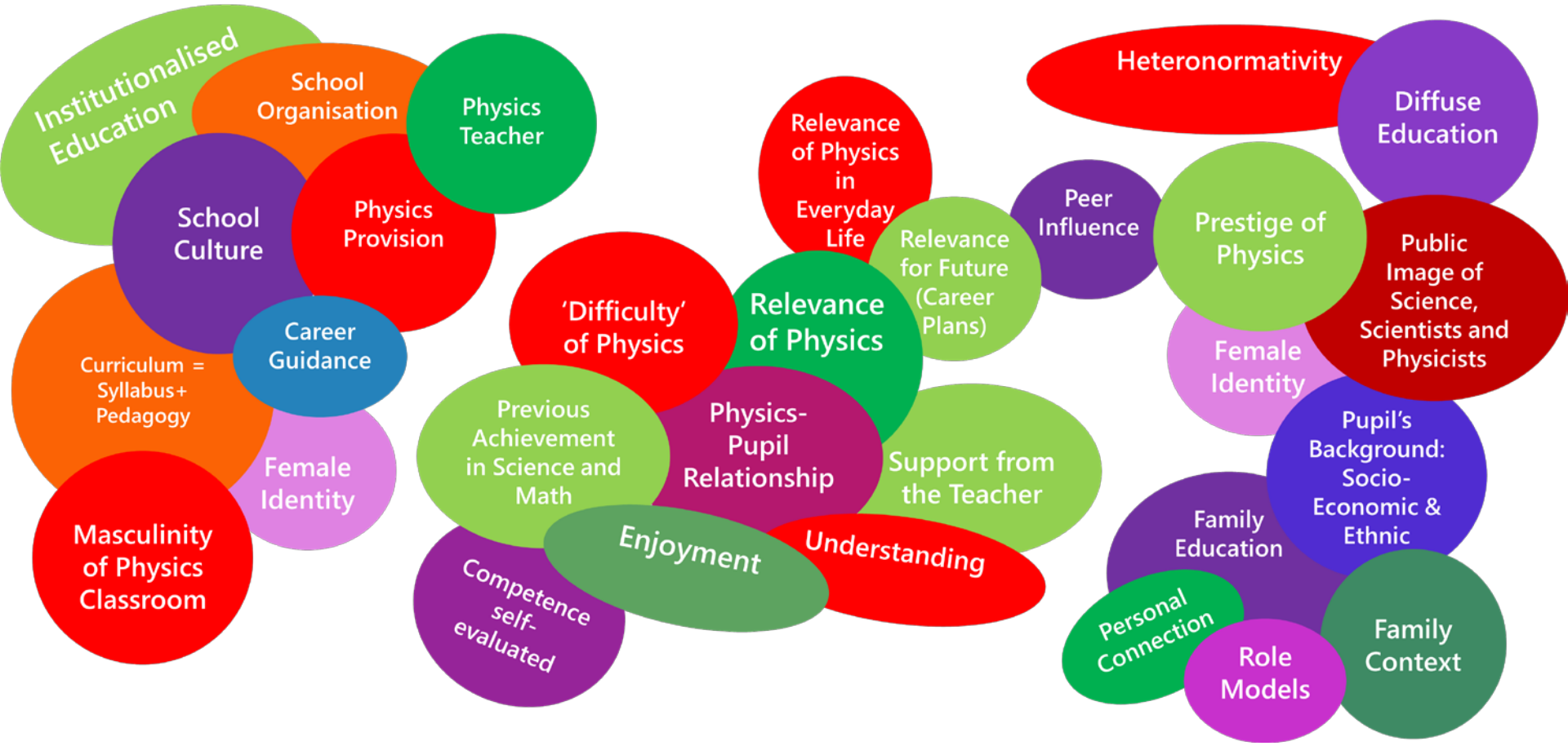
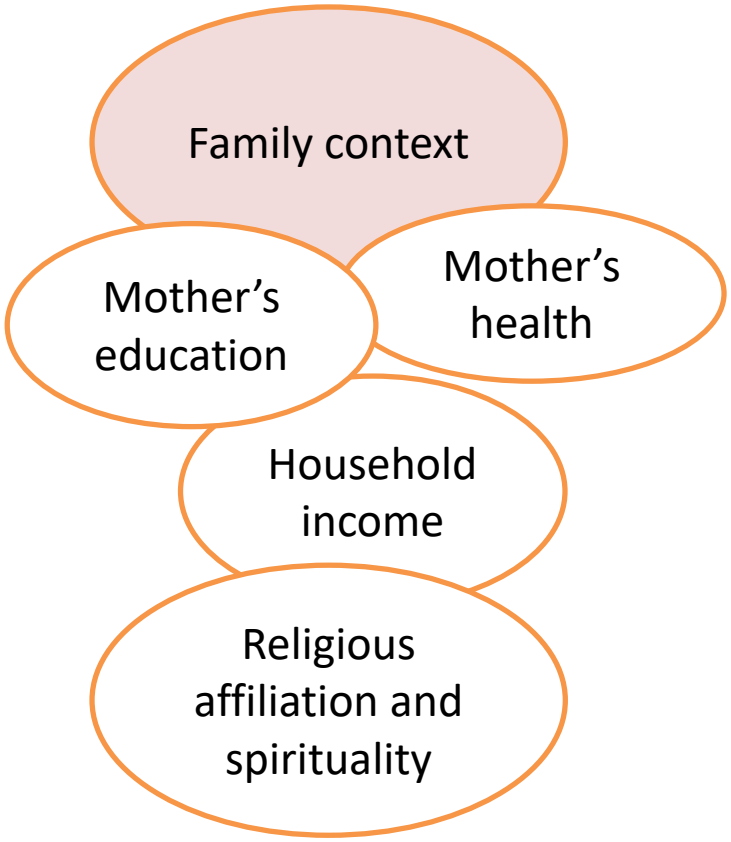
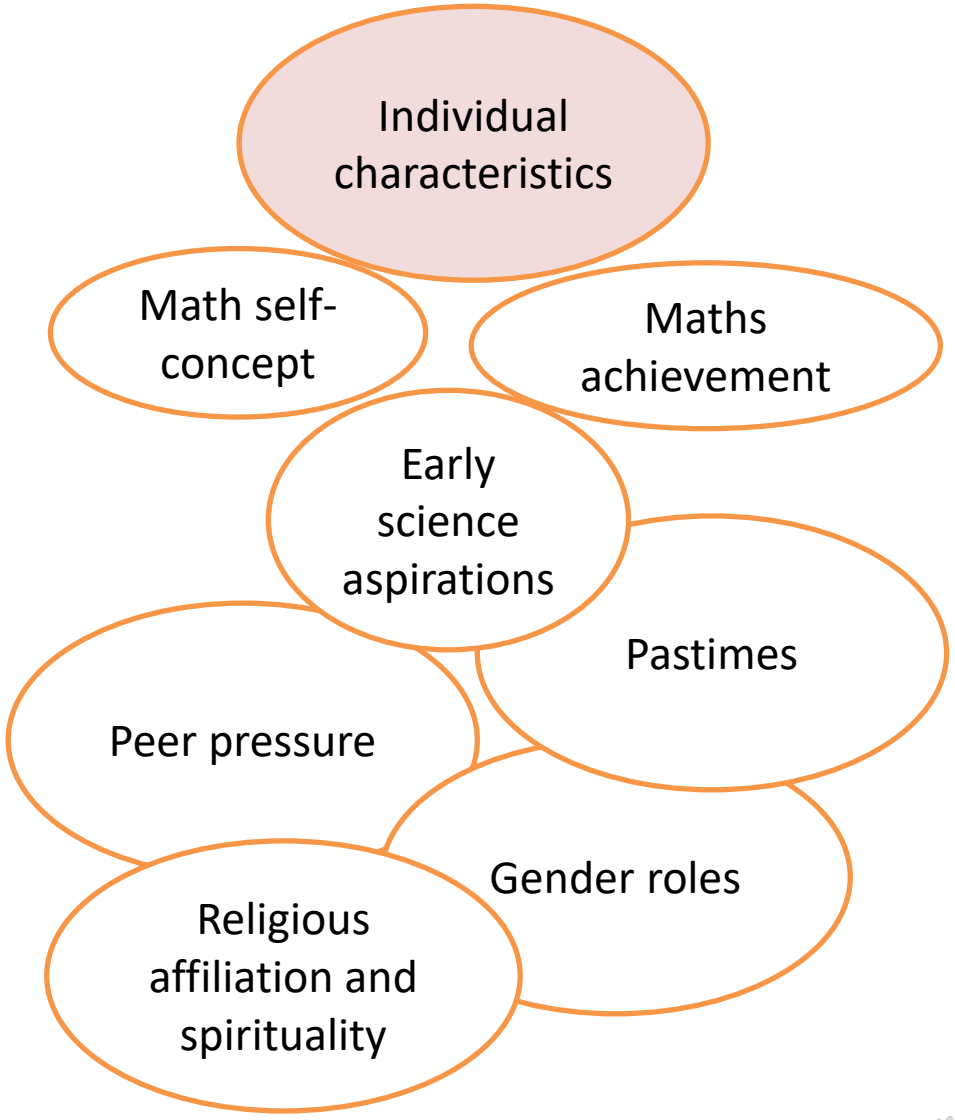
Factors recognised in literature



Factors analysed in the GUI data





Investigation of gender gap

Gender gap – differences

Between genders, relating to studied phenomenon

Within the underrepresented gender, between those who perform and those who do not

My study: comparing physics choosing boys and girls

My study: comparing girls who choose physics and girls who don't: this presentation

Method

Dataset: GUI Data_ChildCohortWave3_V1.2.sav;

Software: SPSS and Microsoft Excel;

Correlational techniques: predicting relationships between female uptake of physics and other variables;

Group differences: contrasting females taking physics with males taking physics and females who do not;

Logit model: effect of statistically significant associations and differences in means on the likelihood of a girl choosing physics at LC.

The analysis of the Growing Up in Ireland data

Numbers check: GUI vs National stats

Key Figures from GUI Data	All	Male	Female
Young People in GUI Data	6,216	3,024	3,192
Leaving Cert. English	5,813	2,811	3,002
also taking Physics	1,078	778	300
Leaving Cert. Physics *	**1,079**	**779 (72.2%)**	**300 (27.8%)**
Higher Level	1,002	718	284
Ordinary Level	76	60	16
Junior Cert. Science	5,462	2,844	2,895

* Note: National Statistics for the split of Boys *vs* Girls doing LC Physics is 72.4% *vs* 27.6%

Association between previous maths achievement and choice of physics

	Male Physics Students (as % of boys doing physics) N=775	**Female Physics Students** (as % of girls doing physics) N=300	Female Non-Physics Students (as % of girls not doing physics) N=2667
Junior Cert. Maths Grade A	216 (27.9%)	**118 (39%)**	303 (11.4%)
Junior Cert. Maths Grade B	343 (44.3%)	**122 (40.7%)**	1005 (37.7%)

	Male Physics Students (as % of boys doing physics) N=778	**Female Physics Students** (as % of girls doing physics) N=300	Female Non-Physics Students (as % of girls not doing physics) N=2700
Above Average Mathsiness (relative to peers)	332 (42.7%)	**101 (33.7%)**	296 (11%)
Just Above Average Mathsiness (relative to peers)	194 (24.9%)	**97 (32.3%)**	568 (21%)

Association between other previous achievements and choice of physics: science

	Male Physics Students (as % of boys doing physics) N=761	**Female Physics Students** (as % of girls doing physics) N=294	Female Non-Physics Students (as % of girls not doing physics) N= 2465
Junior Cert. Science Grade A	197 (25.9%)	**129 (43.9%)**	296 (12%)
Junior Cert. Science Grade B	364 (47.8%)	**120 (42.8%)**	967 (39.2%)

Association between other previous achievements and choice of physics: English

	Male Physics Students (as % of boys doing physics) N=775	**Female Physics Students** (as % of girls doing physics) N=300	Female Non-Physics Students (as % of girls not doing physics) N=2658
Junior Cert. English Grade A	119 (15.4%)	**97 (32.3%)**	409 (15.4%)
Junior Cert. English Grade B	264 (34.1%)	**123 (41%)**	1000 (37.6%)

Comparing girls doing physics to other LC girls
Religiosity and spirituality

		Female Physics Students (as % of female physics students)	Female Non-Physics Students* (as % of female non-physics students)	Pearson's Chi-sq.
Parental Affiliation to Church	Yes:	249 (88.6%)	2539 (83.8%)	5.815 (1), P=.016 Phi= -.05
	No:	48 (11.4%)	327 (16.2%)	
Young Person Affiliation to Church	Yes:	215 (71.67%)	2293 (84.96%)	34.833 (1) P<.001 Phi= -.11
	No:	85 (28.33%)	406 (15.04%)	
Young Person's Spirituality:				20.99 (4) P<.001 Phi= -.08
	Extremely	**8 (2.7%)**	64 (2.4%)	
	V much	**26 (8.7%)**	301 (11.1%)	
	Quite	**55 (18.3%)**	484 (17.9%)	
	A little	**90 (30%)**	1080 (40%)	
	Not at all	**121 (40.3%)**	773 (28.6%)	

*but will sit /have sat LC English

Comparing girls doing physics to other LC girls
Pastimes (things a girl does to relax)

		Female Physics Students (as % of female physics students)	Female Non-Physics Students* (as % of female non-physics students)	Pearson's Chi-sq.
Reading for pleasure	Yes:	**231 (77%)**	1556 (58%)	42.238 (1) P<.001 Phi= .12
	No:	**69 (23%)**	1146 (42%)	
Frequency of reading for pleasure among those who do:				17.175 (4) P=.002 Phi= .1
Several times/week		**41%**	20%	
Weekly		**23%**	20%	
Fortnightly		**10%**	11%	
"Making music"	Yes:	**184 (61.3%)**	1407 (52.1%)	9.296 (1) P=.002 Phi= .06
	No:	**116 (38.7)**	1295 (47.9%)	
Individual sport	Yes:	**120 (40%)**	896 (33.2%)	5.641 (1) P=.018 Phi= .04
	No:	**180 (60%)**	1806 (66.8%)	
Beauty *Frequency: Non-PH girls much more frequent*	Yes:	**116 (38.7%)**	Yes: 1211 (44.8%)	4.143 (1) P=.042 Phi= -.04
	No:	**184 (61.3%)**	No: 1491 (55.2%)	
Clubs and Pubs *Frequency – practically no differences among those who do*	Yes:	**164 (54.7%)**	1968 (72.8%)	43.305 (1) P<.001 Phi= -.12
	No:	**136 (45.3%)**	734 (27.2%)	

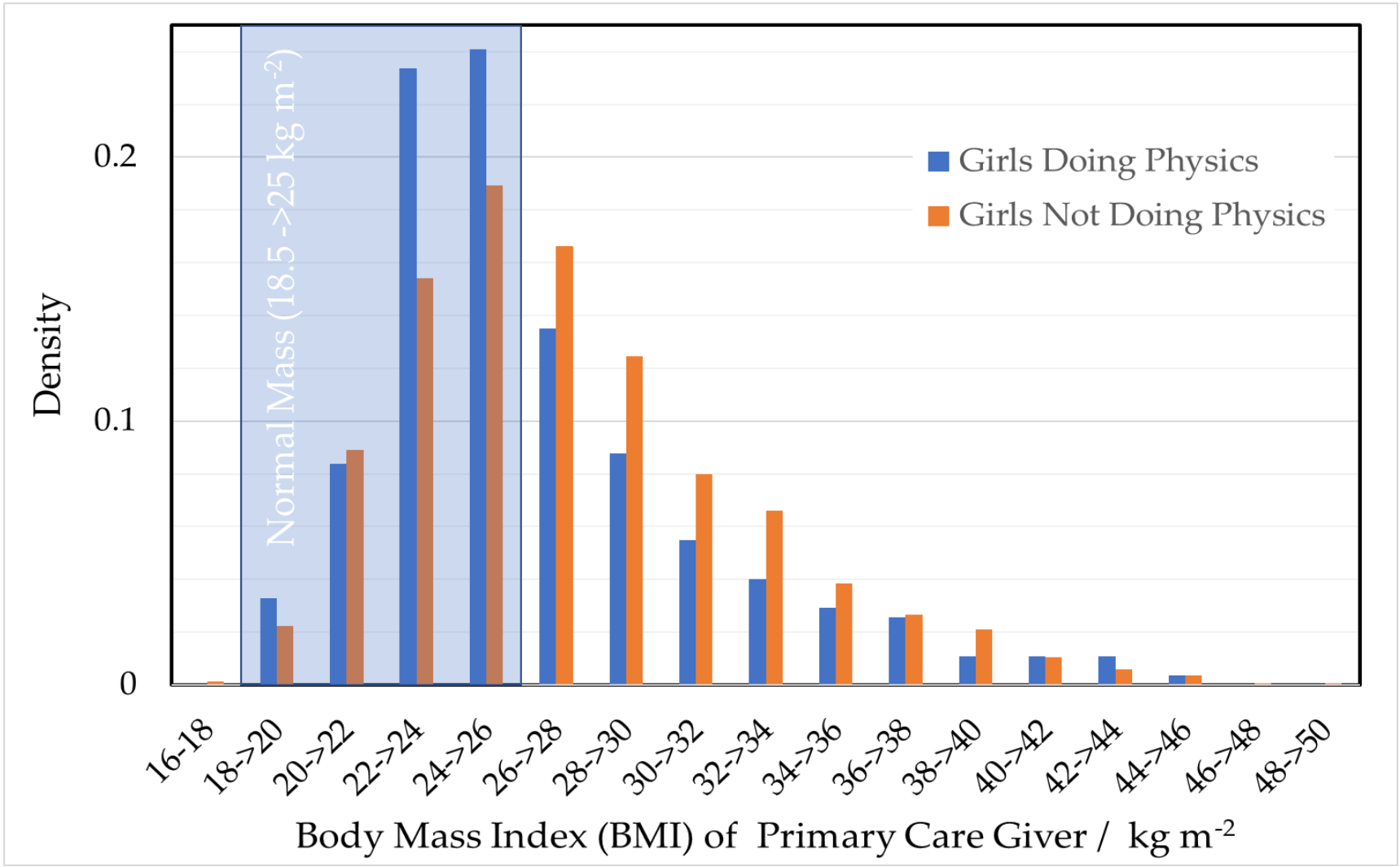
*but will sit /have sat LC English

Comparing girls doing physics to other LC girls
Indicators of Resistance to peer pressure

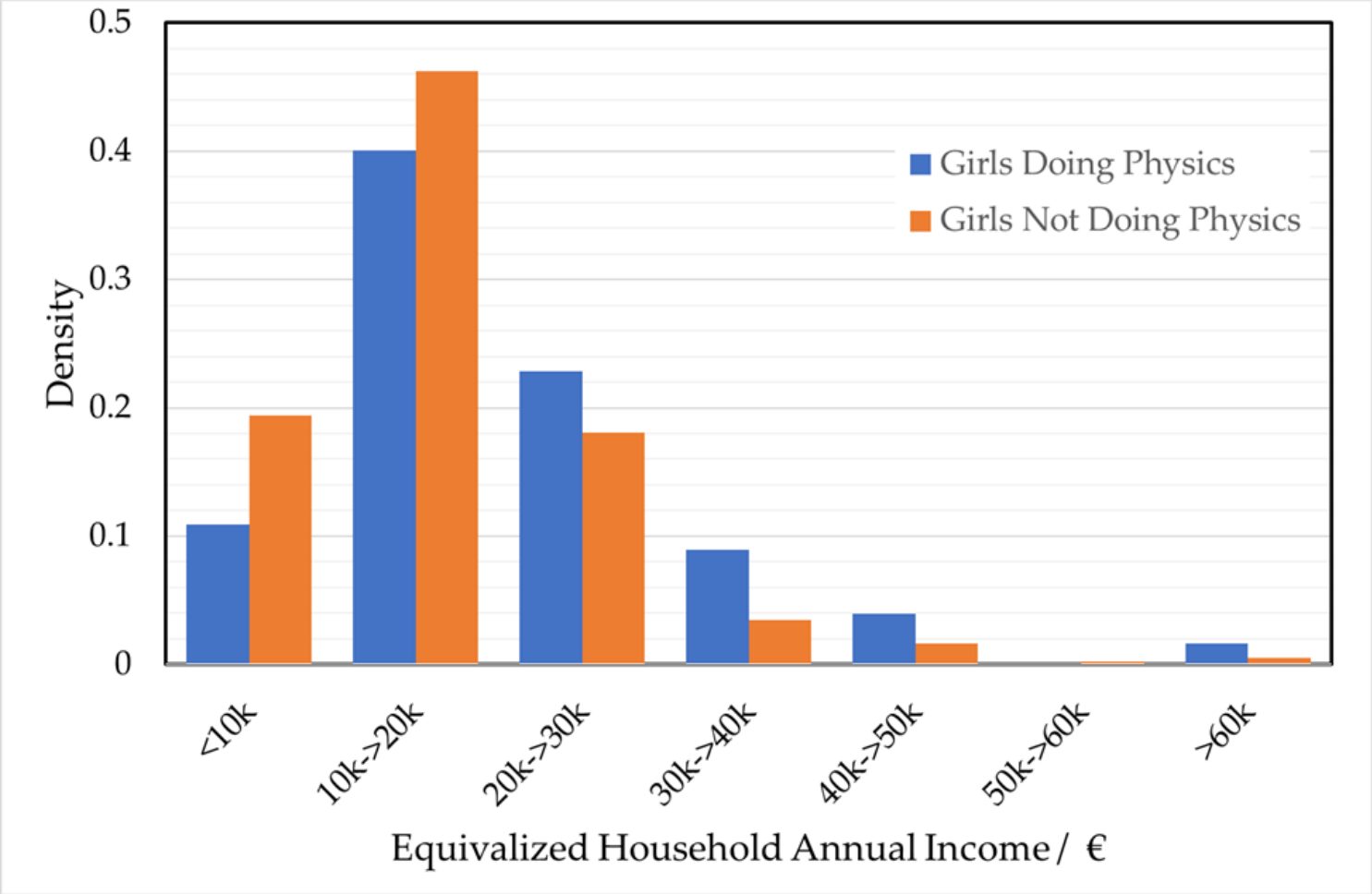
		Female Physics Students (as % of female physics students)	Female Non-Physics Students* (as % of female non-physics students)	Pearson's Chi-sq.
Ever smoked a cigarette	Yes:	100 (33.6%)	1277 (47.5%)	20.96 (1) p=.00 Phi=-.084
	No:	198 (66.4%)	1412 (52.5%)	
Ever drank alcohol	Yes:	241 (80.9%)	2441 (90.7%)	28.44 (1) p=.00 Phi=-.098
	No:	57 (19.1%)	249 (9.3%)	
Currently dating	Yes:	76 (25.5%)	866 (32.2%)	5.54 (1) p<.02 Phi= -.043
	No:	222 (74.5%)	1825 (67.8%)	

*but will sit /have sat LC English

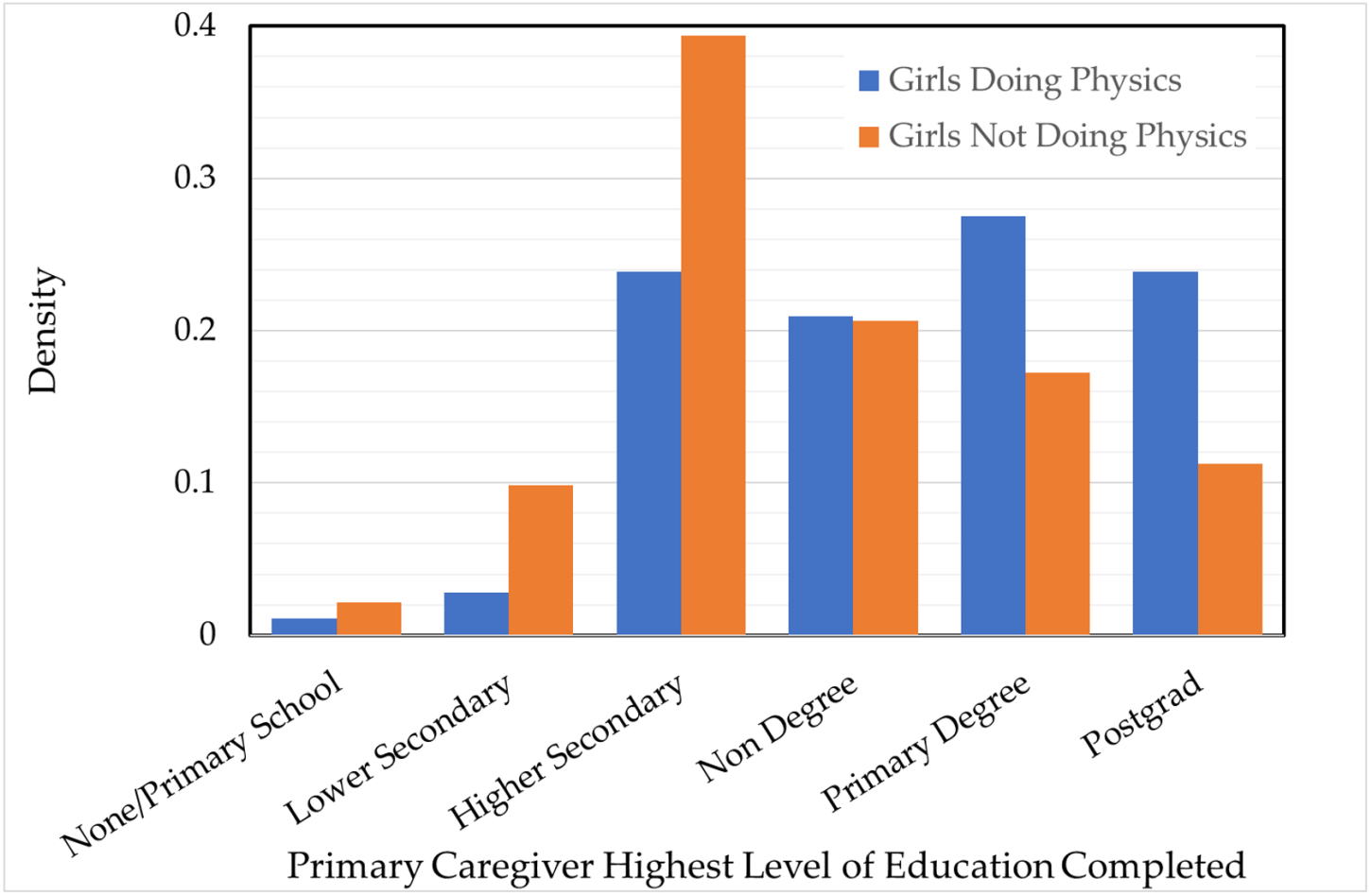
Family background: Primary caregiver's BMI



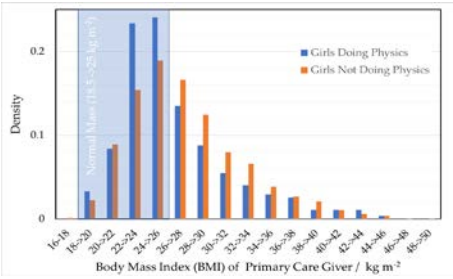
Family background: Household income (eqv.)



Family background: Primary caregiver's level of education

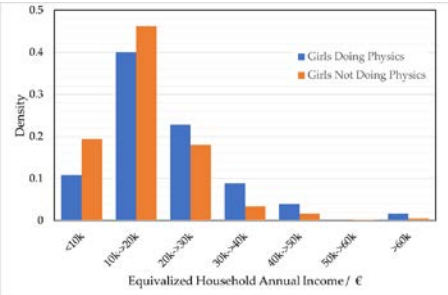


Family background: Primary caregiver's BMI



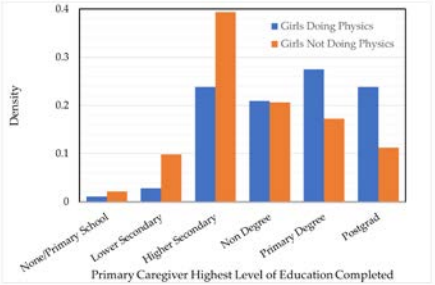
Multivariate analyses show that BMI of the primary caregiver does not have an independent effect on the likelihood of choosing physics.

Family background: Household income (eqv.)



Weighted data: household income of girls doing physics is statistically significantly higher (18,248.71 ±10,299.24) than the household income of the non-physics girls (14,408.71 ±8,329.68), $t(2059)= 15.53$, $P<.001$

Family background: Primary caregiver's level of education



Weighted data: primary caregiver's level of education for girls doing physics is statistically significantly higher (4.21 ±1.31) than the respective level of education of the non-physics girls (3.34 ±1.2), $t(2361)= 29.08$, $P<.001$

Logit model

Method: logistic regression modelling the log-odds of females choosing Physics as a LC subject;

Predictor variables:

- primary caregiver's educational level,
- household income,
- grades in Junior Cert maths, science, English,
- self-perceived ability in maths,
- selected pastimes,
- smoking cigarettes and consuming alcohol.

Logit model

	B	S.E.	Sig.	Exp(B)
Going clubs, pubs, etc.	-0.598	0.165	**P<.001**	**0.55**
JC - Grade in Mathematics	0.277	0.104	**P=.008**	**1.319**
JC - Grade in Science	0.455	0.112	**P <.001**	**1.575**
Mathsiness	0.491	0.085	**P <.001**	**1.634**
Spiritual person	-0.251	0.078	**P=.001**	**0.778**
Household Income Deciles	0.009	0.031	**P=.783**	1.009
Primary Caregiver Higher Education	0.904	0.172	**P <.001**	**2.469**
Constant	1.222	0.415	**P=.003**	3.394

Summary

Very exceptional group of girls;

- Both in terms of stronger academic preparation and performance and
- their socio-economic background;

Doing physics while being a girl – a life-style?

- studiousness and high academic achievement
- certain cultural choices (reading, avoidance of clubbing)

Outliers in many categories: highly educated mother + low religiosity

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