

Supporting Girls in Physics

Introduction

Girls are under-represented in A level physics, making up just 22.2% of entrants in 2018.¹ To explore ways to support these girls, we surveyed girls studying A level physics to understand which, if any, of our proposals would have their backing. The survey was designed and data analysed by Dr Kathryn Boast, STEM Outreach Officer at Hertford College, Oxford.

The survey

The survey assessed the opinions of girls studying A level physics (or equivalent) on potential interventions to support them in their studies. These included:

- an online forum for girls to post questions and suggest answers
- a social network for girls studying physics
- a “step-up” network where girls could post questions and chat to other, more senior women in physics
- a conference for girls in physics, similar to the Conference for Undergraduate Women in Physics, which runs annually.

The survey also asked about their feeling of “belonging”,² and collected some demographic data on the environment in which they are studying physics.

The online survey was shared through social media and mailing lists. It received 259 submissions, of which 255 contained responses (four were blank). The survey was open in October – December 2018. Around 16,000 girls are taking A level physics in the UK, so this data is from approximately 1.5% of that population.

The conclusions

One third of these girls studying physics sometimes feel like they don’t belong, but almost half disagree with this suggestion. There is a correlation between girls’ feeling of belonging and the proportion of their class that is girls – the smaller the proportion, the more likely they are to say they feel like they don’t belong. However, those who sometimes feel like they don’t belong are more likely to say they intend to study physics at university; perhaps these students who are studying despite a feeling of not belonging are the intrinsically most motivated.

There is general support for a forum where girls studying A level physics could post questions and suggest answers among peers nationwide, with only 11% disagreeing with this statement, and more than 60% agreeing. However, there is not substantial support for a “social network”.

A “step-up network” which facilitates interactions between students and more advanced STEM professionals was the most strongly supported proposal. More than 75% agreed or strongly agreed that they would appreciate this, while only 7% said they disagreed or strongly disagreed.

A conference for girls in physics was similarly supported, with 73% in favour of and 8% against the idea.

¹ http://www.iop.org/policy/statistics/uk-a-levels/gender/page_67095.html

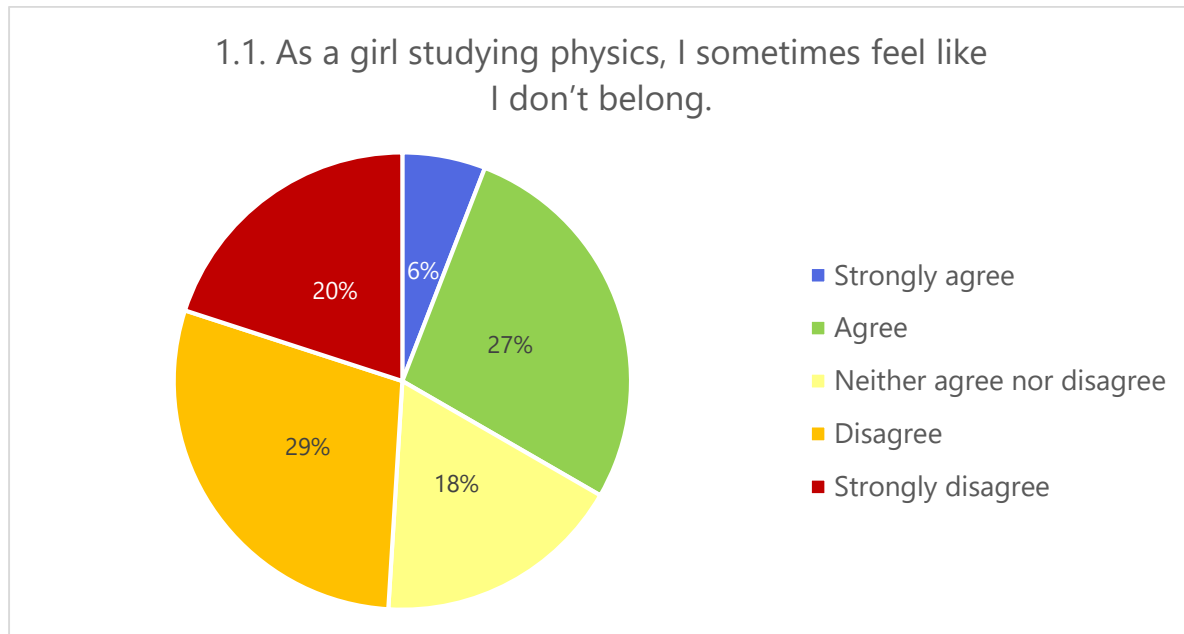
² See https://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=189603 on “belonging” in STEM



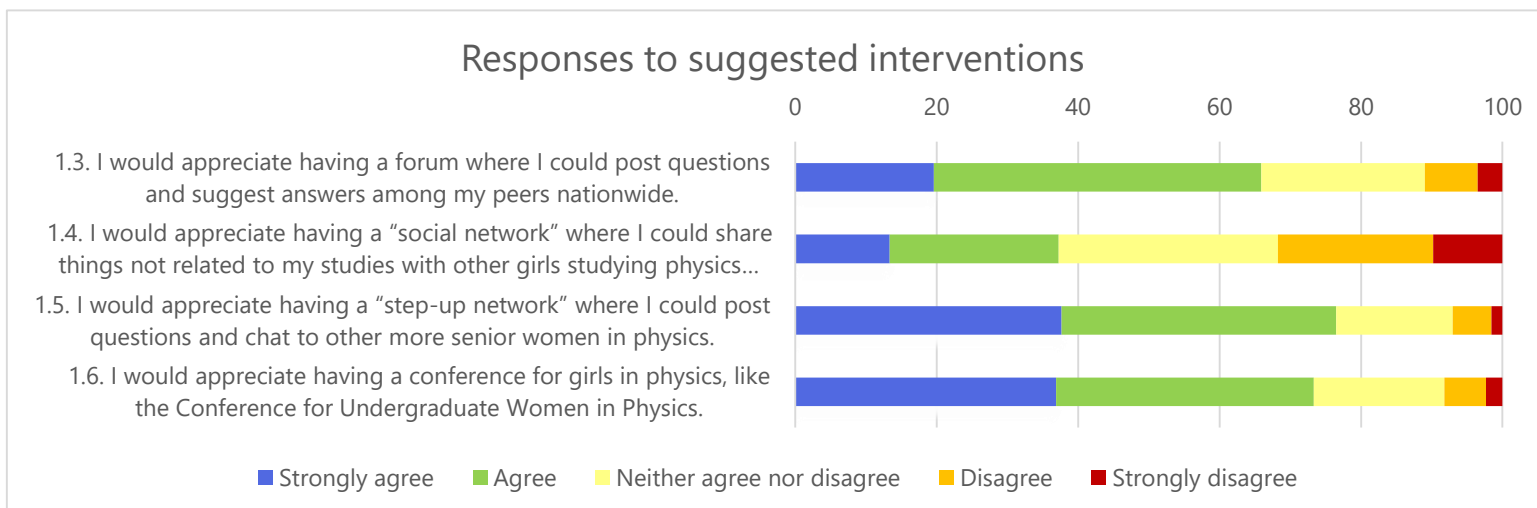
The results

Below are summaries of the results from different sections of the survey.

Feeling of belonging



Responses to interventions



Agreement is shown in blue and green, disagreement in orange and red.

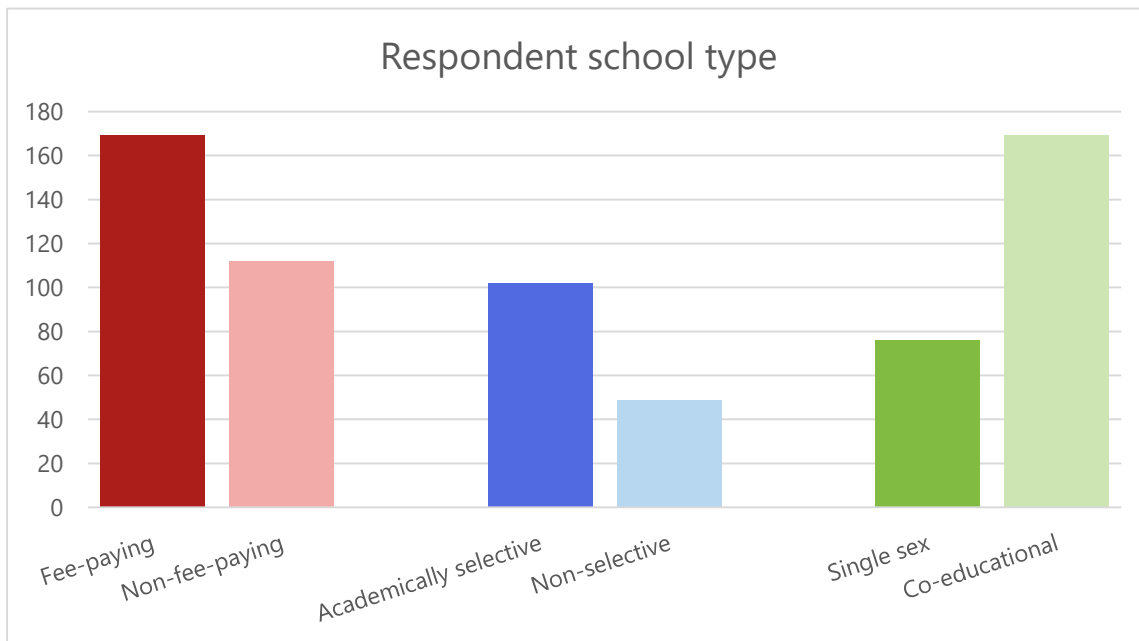
Demographics of respondents

Age

The survey asked for responses only from those in Year 12 (lower sixth) or Year 13 (upper sixth). The ages entered were:

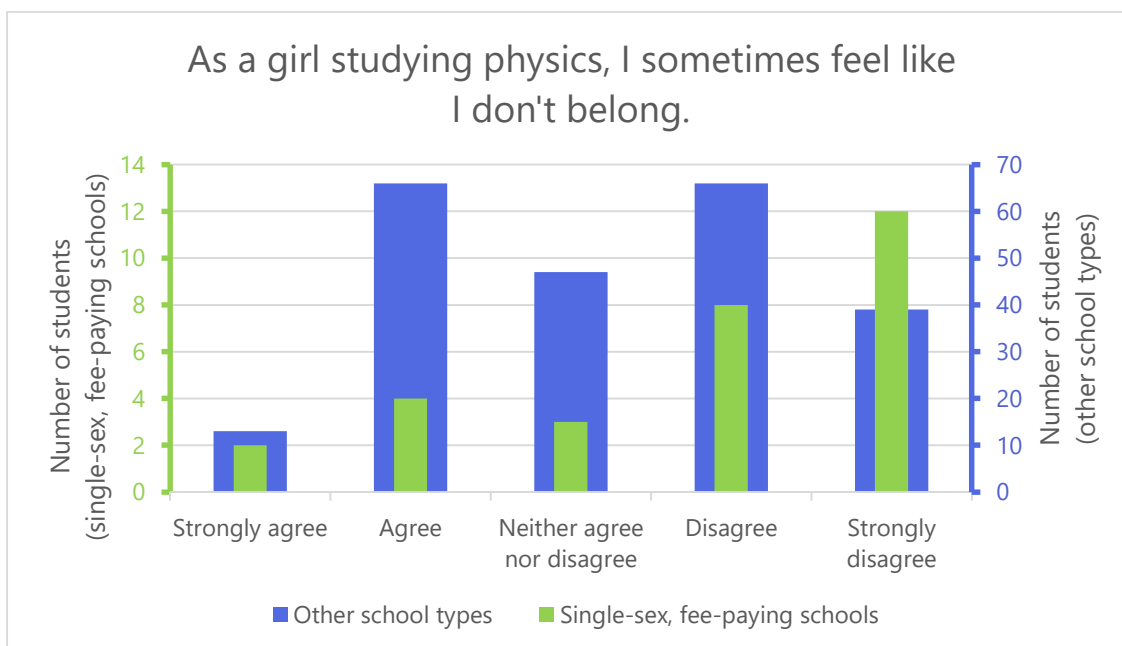
- 56%: Year 12
- 45%: Year 13
- 1%: Other

School type



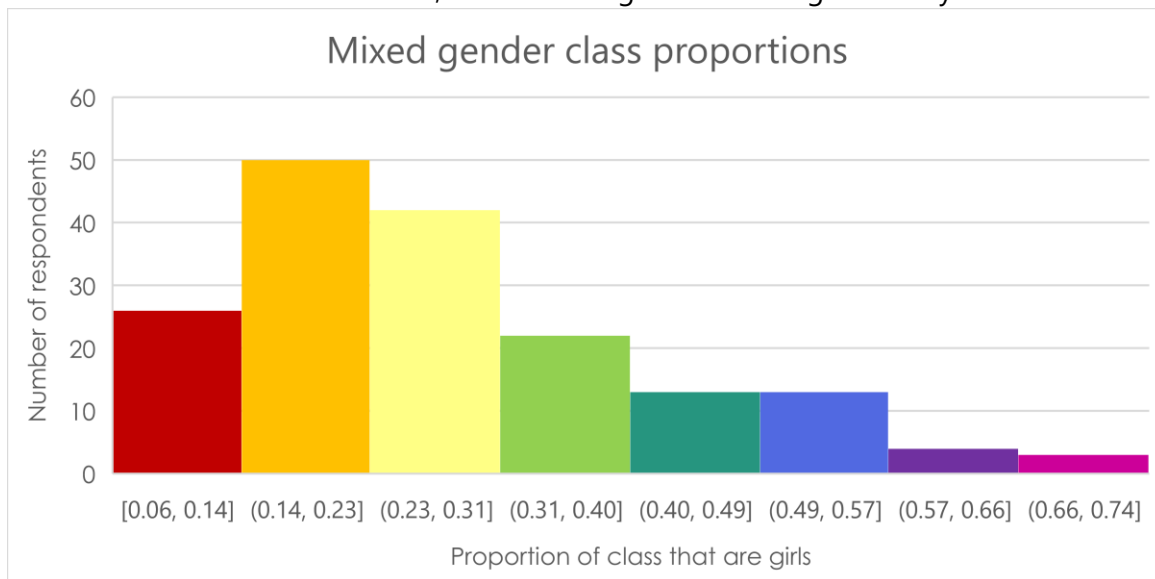
Respondents could select as many of these options as they wanted.

We can break down some of the other data by school type, though the numbers per school type are quite small.



Gender of physics classes

Of 249 respondents, 30.5% said their classes were all girls; the remaining 69.5% are taught in mixed classes. Of those in mixed classes, there is a range of ratios of girls to boys:



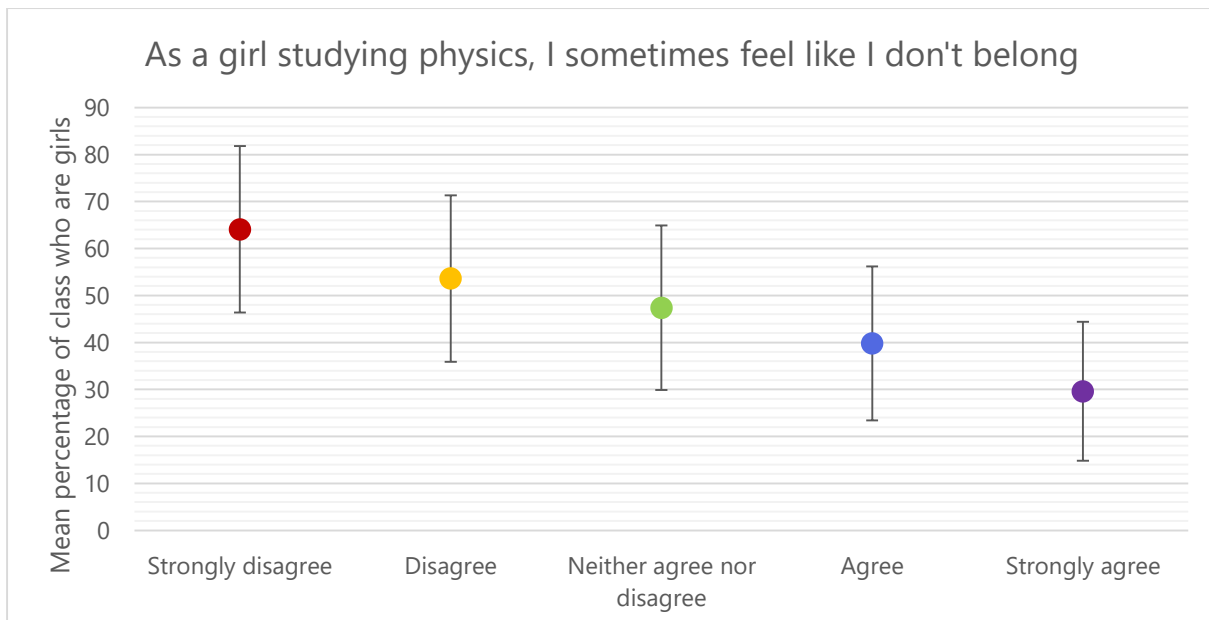
Physics at university

The question 'Are you thinking of studying physics at university?' had 249 responses:

- Yes: 30%
- No: 41%
- Not sure: 25%

Belonging vs. mixed classes

There is a correlation between a feeling of belonging and the proportion of their physics class who are girls. This data considers only those in mixed classes.

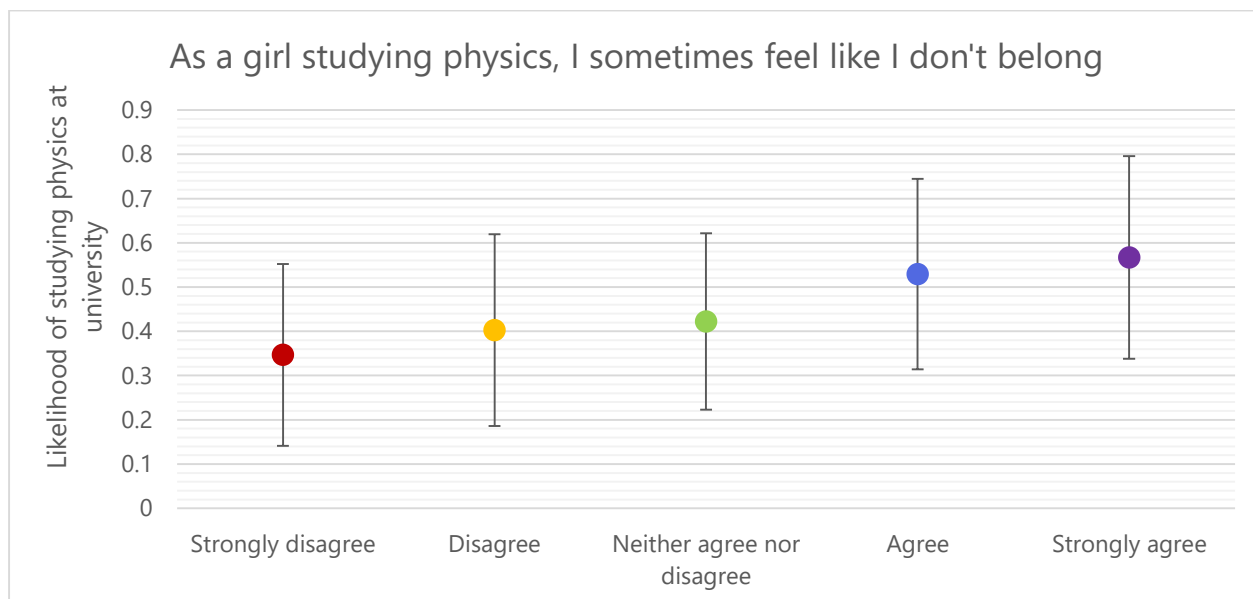


The error bars in this plot show the standard deviation of the proportion of girls in the class.



Belonging vs. continuing to study physics

There is an anti-correlation between a feeling of not belonging and an intention to study physics at university, where a "Yes" to the above question scored 1, a "No" scored 0 and a "Not sure" scored 0.5.



The questions

1. Please say whether you agree or disagree with the following statements: *{Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree}*
 - i. As a girl studying physics, I sometimes feel like I don't belong
 - ii. I would appreciate having a peer group of other girls studying physics
 - iii. I would appreciate having a forum where I could post questions and suggest answers among my peers nationwide.
 - iv. I would appreciate having a "social network" where I could share things not related to my studies with other girls studying physics (e.g. space for posting photos and updates).
 - v. I would appreciate having a "step-up network" where I could post questions and chat to other more senior women in physics.
 - vi. I would appreciate having a conference for girls in physics, like the Conference for Undergraduate Women in Physics.
2. We are open to any suggestions! Do you have any further thoughts on what might help you, what you think definitely wouldn't work, or what you might want instead? Or any other comments? We'd love to hear what you think!
3. What kind of school or college are you at? Tick all that apply. *{Single sex, Co-educational (mixed), Academically selective, Non-selective, Fee-paying, Non-fee-paying, Other}*
4. School year *{Y12 (lower sixth), Y13 (upper sixth), Other}*
5. Roughly how many people are studying physics in your year group?
6. Roughly how many people are in your physics class?
7. Roughly how many people in your physics class are girls?
8. Are you thinking of studying physics at university? *{Yes, No, Not sure}*

