

DRAFT VERSION NOVEMBER 16, 2023
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SDSS-IV from 2014 to 2016: A Detailed Demographic Comparison over Three Years

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E&I Journal Club January 31st 2024

Why demographics of a collaboration?

- Collaborations, especially in observational astronomy have become very large, encompassing many countries and cultures. Good and bad.
- SDSS-IV (2014-2020) had members from 60 institutes and 18 countries.
- In 2010, towards the end of SDSS-III, the Sloan Foundation recommended to evaluate the demographics of SDSS, especially towards gender, first presented in Lundgren et al. 2015.
- Such demographic surveys are also done by national (AAS, RAS, ...) and international (IAU) societies. But also hiring, telescope- and grant allocation demographics, which have lead to changes.
- Perceptions of “fair” gender representation are more commonly identified by men, when the actual male:female ratio is as high as 4:1. Implicit biases affect our perceptions in particular for managerial decision making.

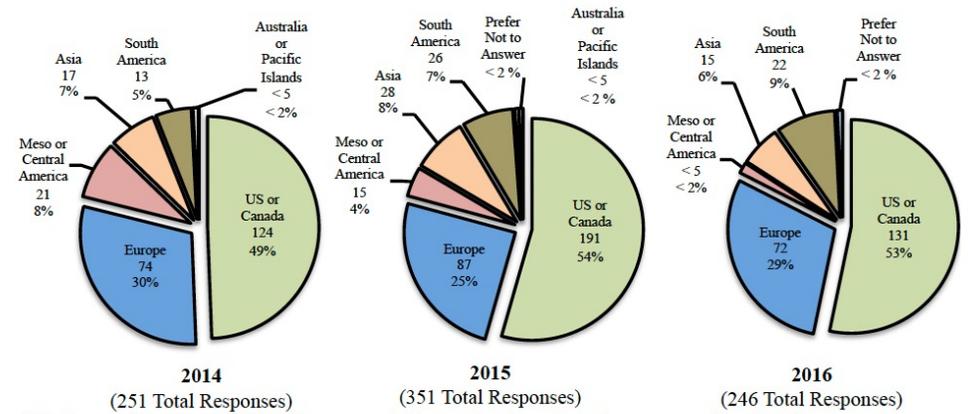
Description of the demographic survey

- Taken in 2015 / 2016, survey (Full survey in Appendix C) asked questions on:
 - Career information
 - Experience with SDSS
 - Demographic information
 - Leadership status in SDSS
- In particular, the demographic survey included new questions on (i) identification within the LBGT community, (ii) disability status, (iii) partnership status, (iv) family status and (v) parental educational achievement.
- The survey did not collect identifying information (e-mail, IP, ...), only submission time. It was completed by 351 and 246 members out of 1485 (wiki subscribers = upper bound), so 24 and 17%, down from the Lundgren et al. 2015 46%.

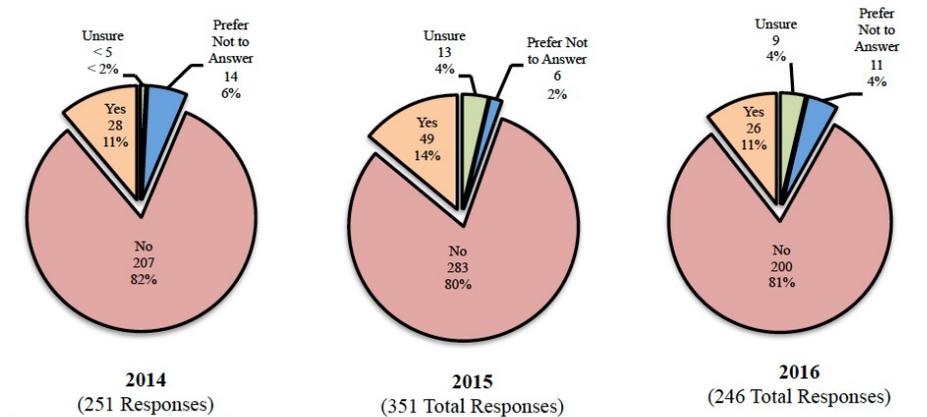
Results – Overall demographics 1

- Member country remained relatively similar, the US representing just over half, Europe just over one quarter of the collaboration. Small change of increase of South America (Las Campanas agreement) and a decrease in Central-Meso America.
- 11-14% of members identify as a (racial or ethnic) minority in the institution they work at. These fractions are consistent with the overall astronomical community in US and UK (slide 6).
- Increase in members of young academic age from 32% -> 41% members being within in or less than 5 years away from their PhD.

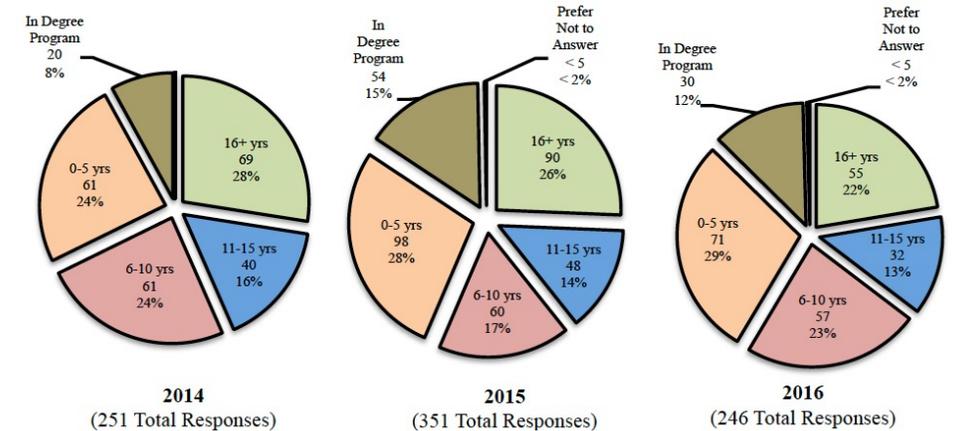
(a) Geographic Location



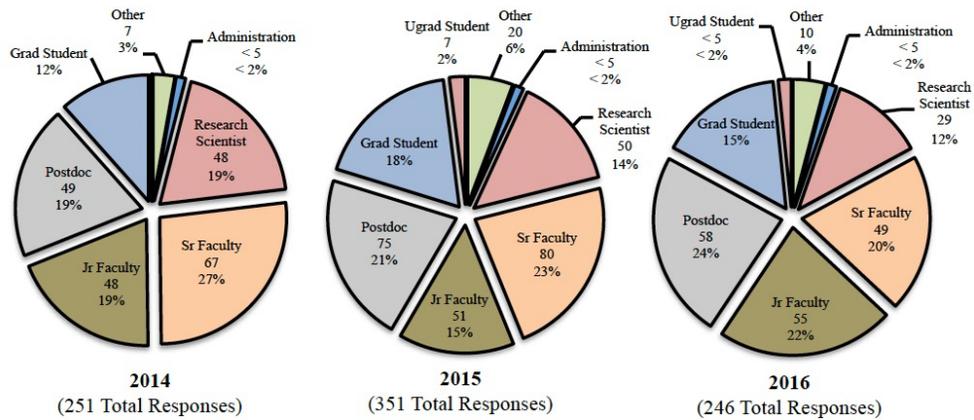
(b) I consider myself to be a racial or ethnic minority at my institution:



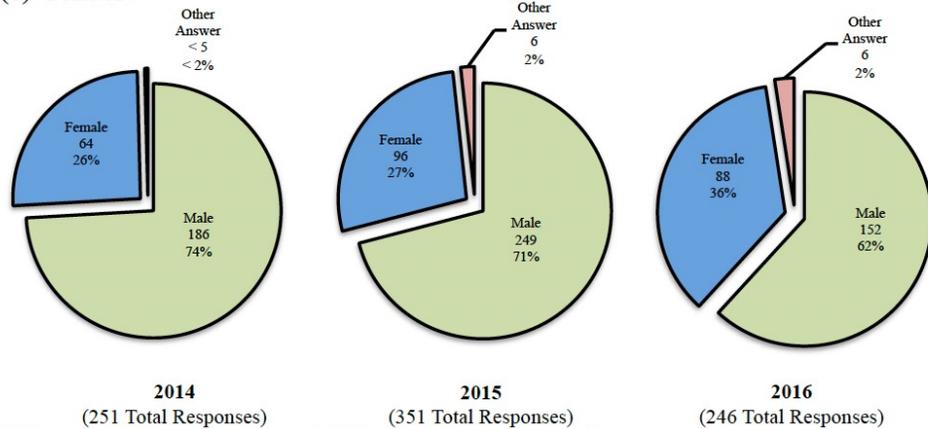
(c) I obtained my degree ____ years ago:



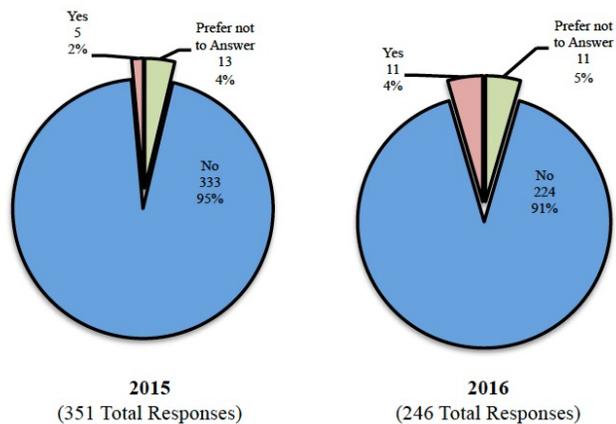
(d) Career Stage:



(e) Gender:



(f) I consider myself a part of the LGBT Community:

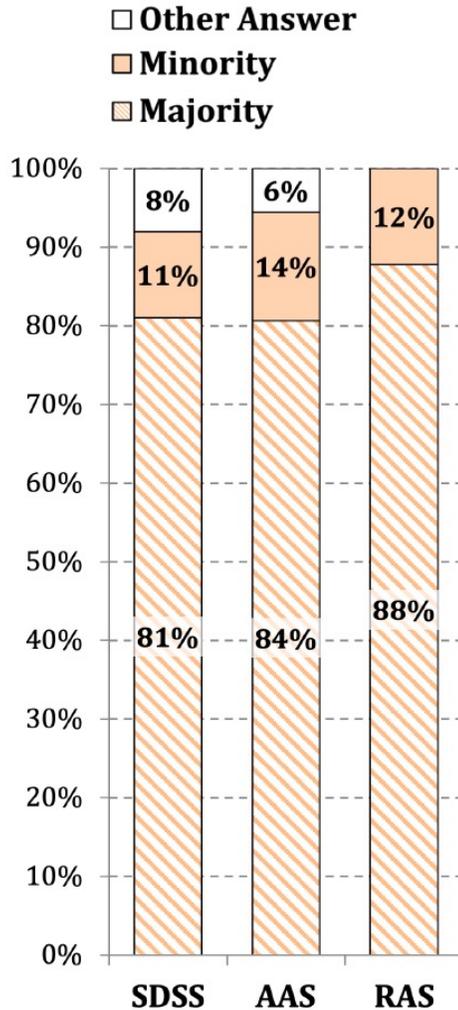


Results – Overall demographics 2

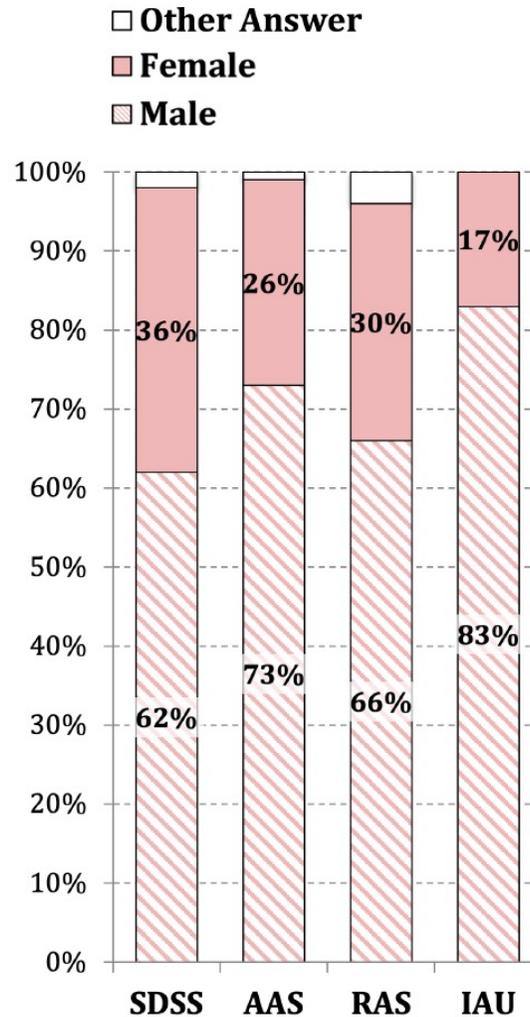
- Slight increase in postdocs and junior faculty with respect to senior faculty and research scientists.
- Significant increase in female percentage in 2016, but largely driven by decrease in male respondents. "Other" is a merged category of "non-binary" and "prefer not to answer" to preserve anonymity.
- 91-95% do not consider themselves part of the LGBT community, which somewhat traces that of US or UK societies.

Comparison to other astro society's demographics

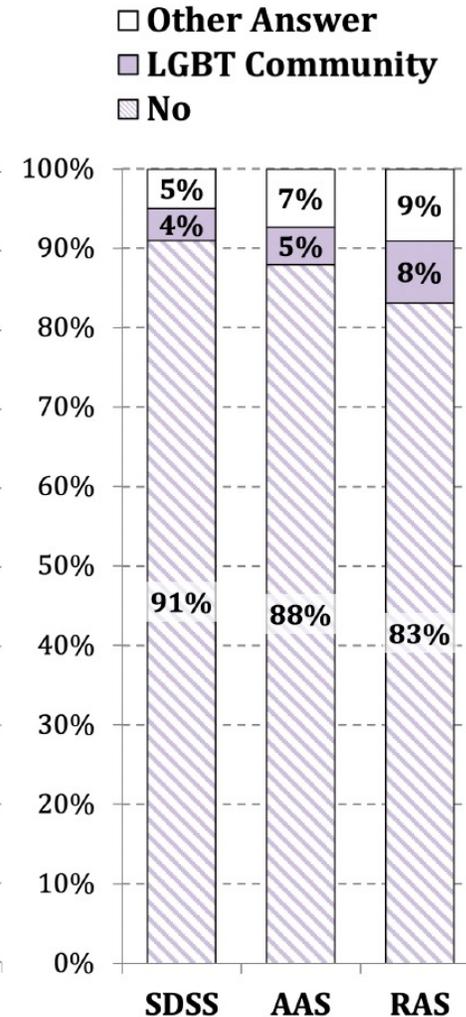
(a) Minority Status



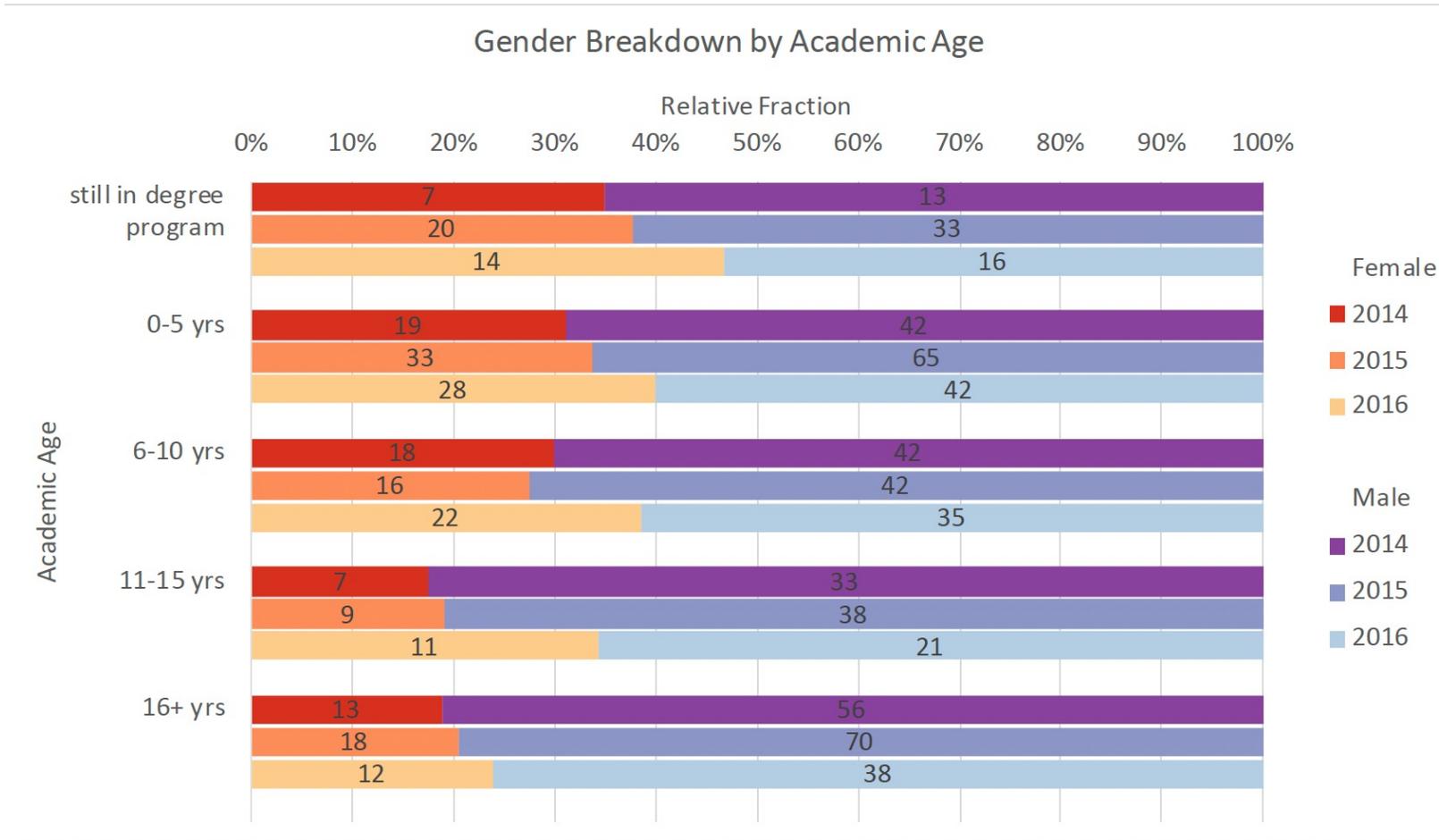
(b) Gender Identity



(c) Sexual Orientation



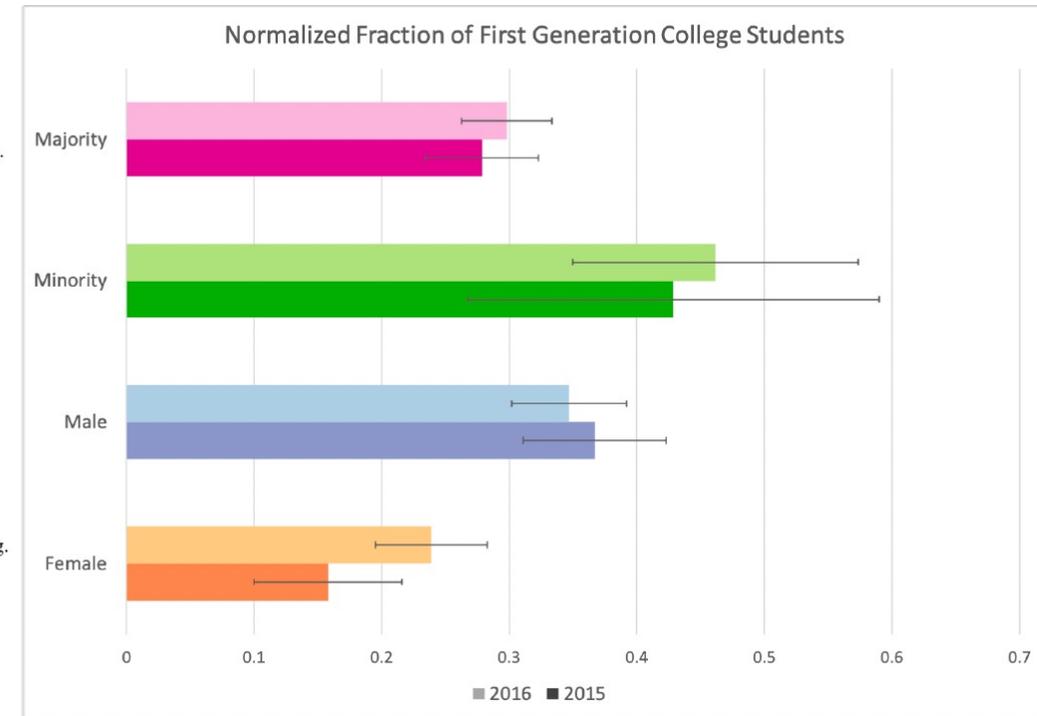
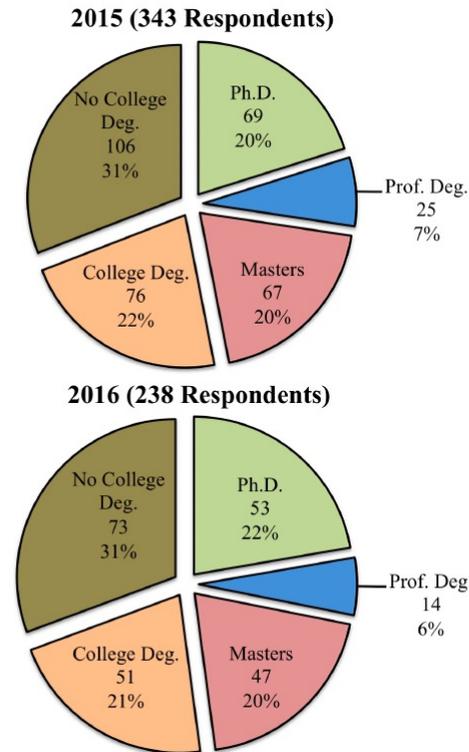
Gender balance breakdown



- Leaky pipeline, i.e. decrease of women with seniority from 35% to 20%.
- But trend is worse in overall US, i.e. 45% down to 21%.
- They repeatedly refer to Roy et al. 2020, which addressed issues on why women leave the natural sciences more granularly.

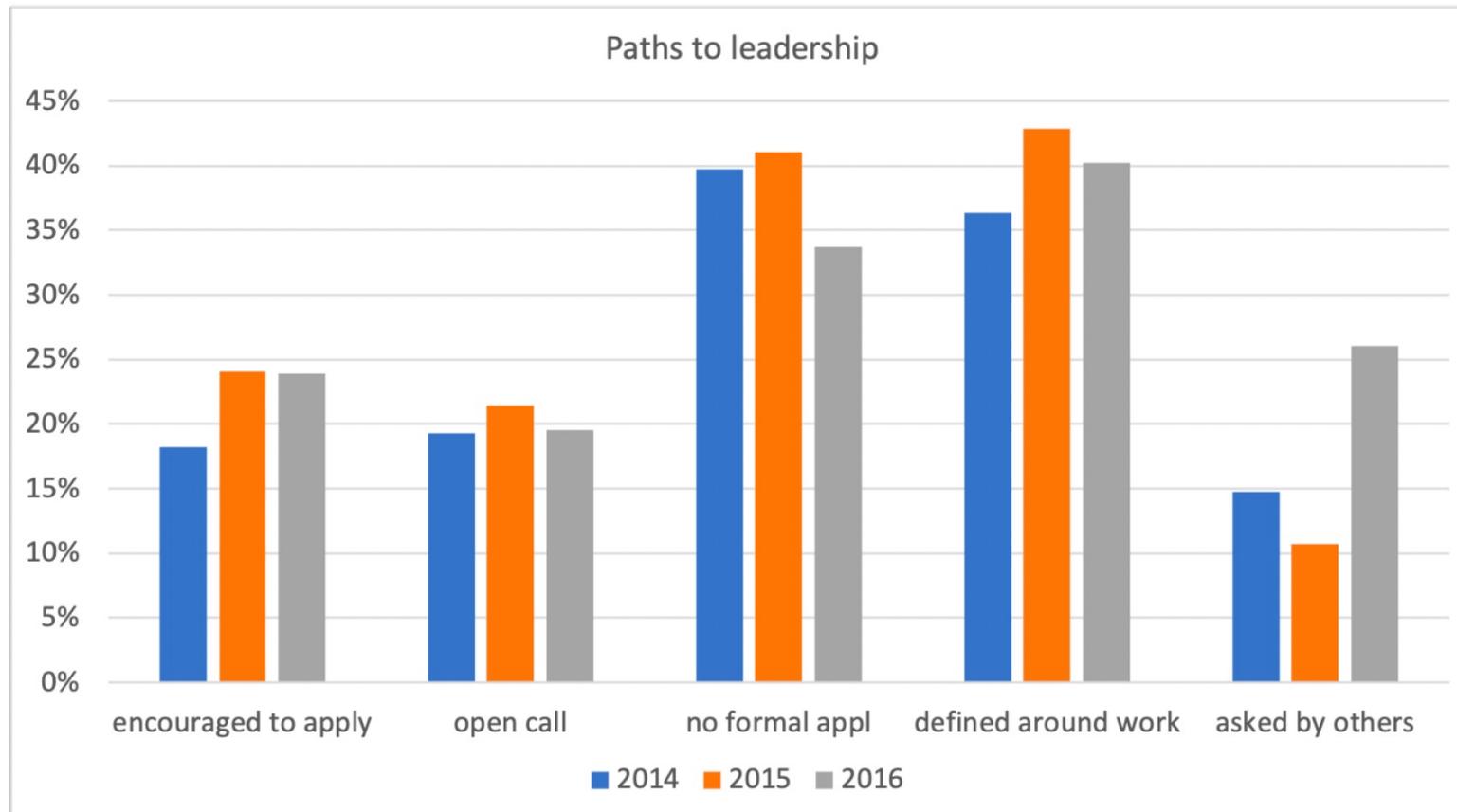
Educational/Socioeconomic breakdown

- Focussed on educational background, as economic background would've been difficult given the broad cultural range of members (e.g. terms like “working class”).
- Around 70% of survey members have a parent with a degree from a higher educational institution, much larger than the general population than any SDSS country (~40%).
”Hidden curriculum” advantage.
- Notable are parents holding doctoral degree (20% vs. 1-3%)
- Female members are more likely to have parents with higher education degrees, while racial minorities are less likely.



SDSS-IV leadership demographics

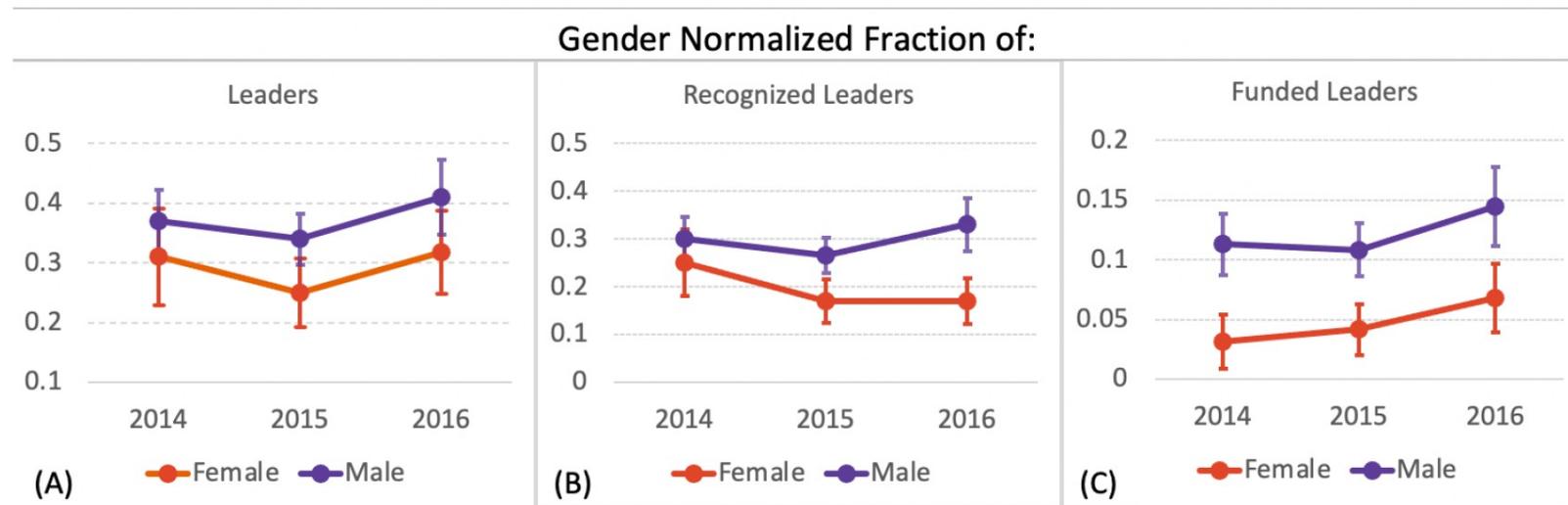
Definition: “... tasks or responsibilities include making decisions that affect other people and the survey, organizing regular project discussions or meetings, professional mentoring, or influencing/directing others in their tasks”



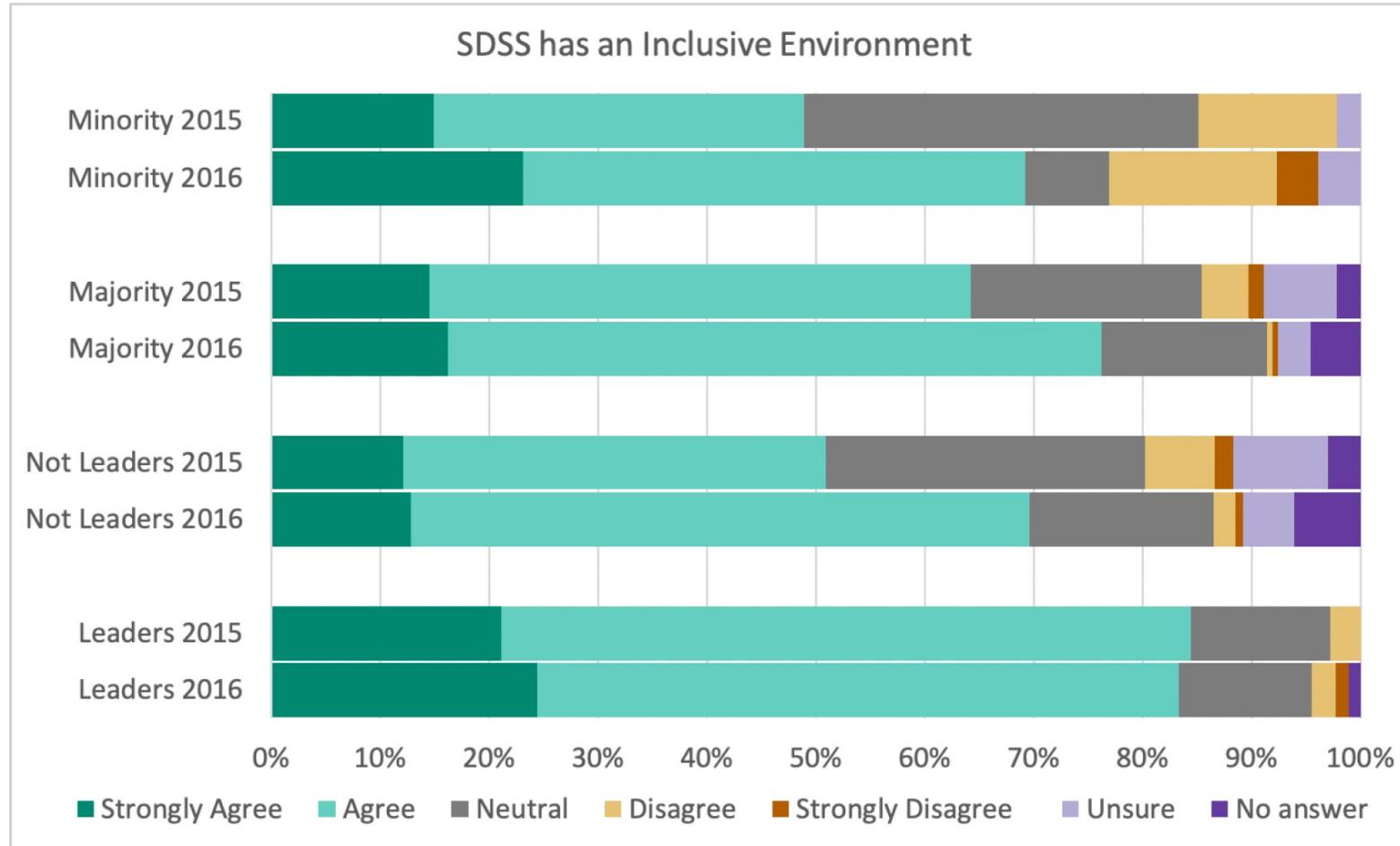
- ✓ Contractual
- ✓ Open calls
- ✓ Task based

Gender balance and recognition of leadership

- Fewer fraction of female leaders with the number of recognized female leaders even decreasing with time (statistically significant). But may be due to large increase of female junior scientists.
- A severe lack of female leaders as a function of “top” position (e.g. “leader of APOGEE” -> leader of “package”), but this does slightly increase with time.
- Thus these two points largely drive the conclusions that female leaders feel largely unseen and unrecognized.



SDSS as an inclusive environment



Leaders think that SDSS has an inclusive environment more strongly (80%) than non-leaders (~60%). No particular difference within majority / minority divide.

Recommendations

- **Leaky pipeline:** [...] *When identifying excellence in science and/or scientists we all should be aware of the impact of “opportunity bias” and should seek excellent potential rather than the biased metrics of success. [...]*
- **Lack of FGCS:** [...] *FGCS, who may need additional support navigating the “hidden curriculum” of academic careers at all stages [...]*
- **Gender imbalance within leadership:** [...] *Attention needs to be paid to the kind of work junior women in a collaboration are asked to do, to consider if those contributions may be considered less valuable as leadership skills than others [...]*
- **Perception of inclusion:** [...] *more work can be done to foster an inclusive environment for minority racial or ethnic group members. It is also crucial to survey everyone in a collaboration, not just leadership, on the success of inclusive practices. [...]*