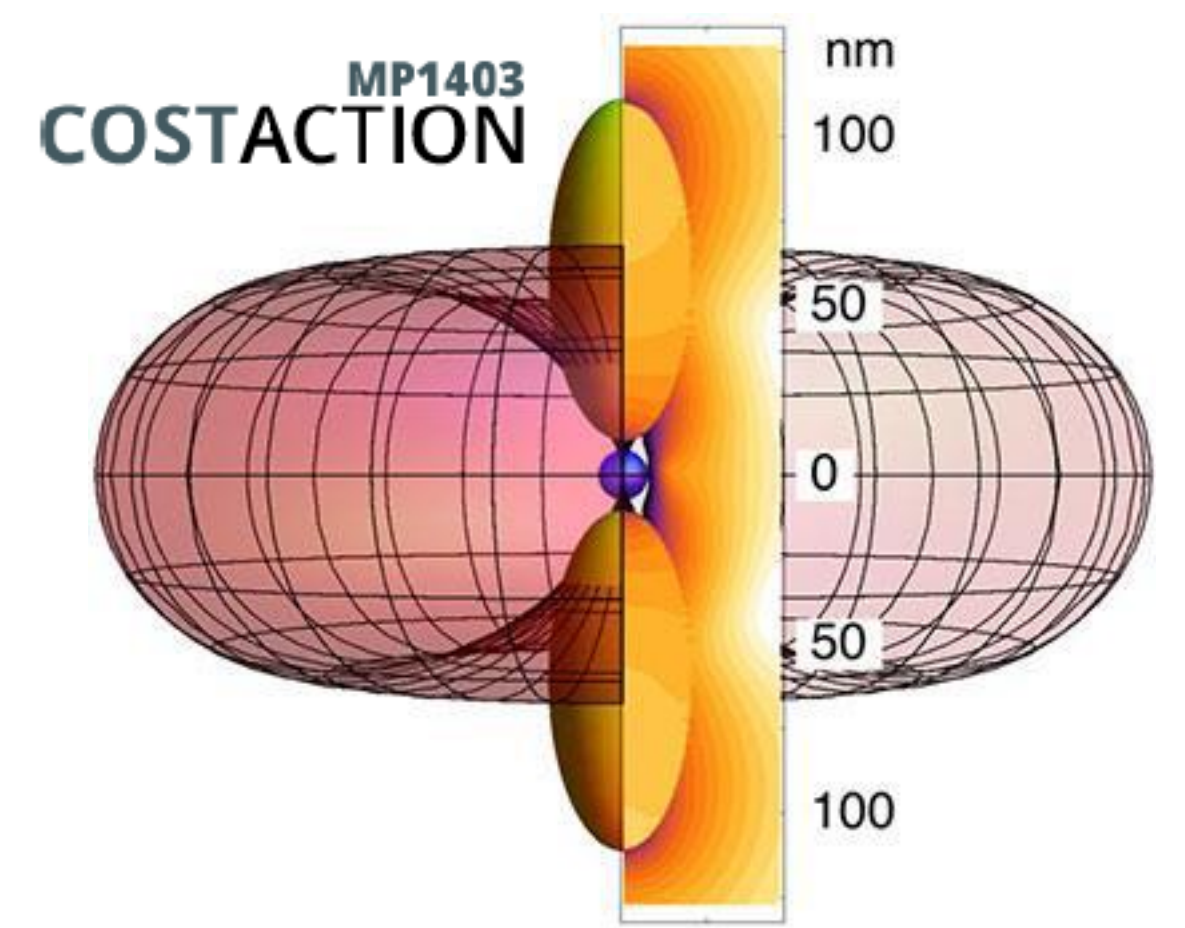


Attitudes to Gender Equality Issues amongst Nanoscale Quantum Optics Scientists



A survey performed by Dr. Ruth Oulton, University of Bristol, on behalf of European COST Action MP1403 Nanoscale Quantum Optics

Introduction

The COST Nano Quantum Optics Action is a group of scientists from academia and industry with a traditionally unbalanced gender make-up. Only 16% of the COST members are women. The COST NQO Action is committed to improving this balance and ensuring equality of opportunity for both the present members and to improve the future gender balance in the field.

Many independent studies exist that document the discrimination faced by women and other minorities in science and engineering disciplines. At the same time, there are several strategies in use in universities, companies and other places of work and study, to combat bias and discrimination. But which ones are proven to be effective? Is the scientific community aware of the best practice? To this effect we commissioned a survey of our members attitudes towards gender equality interventions and compare them to independent studies and best practice.

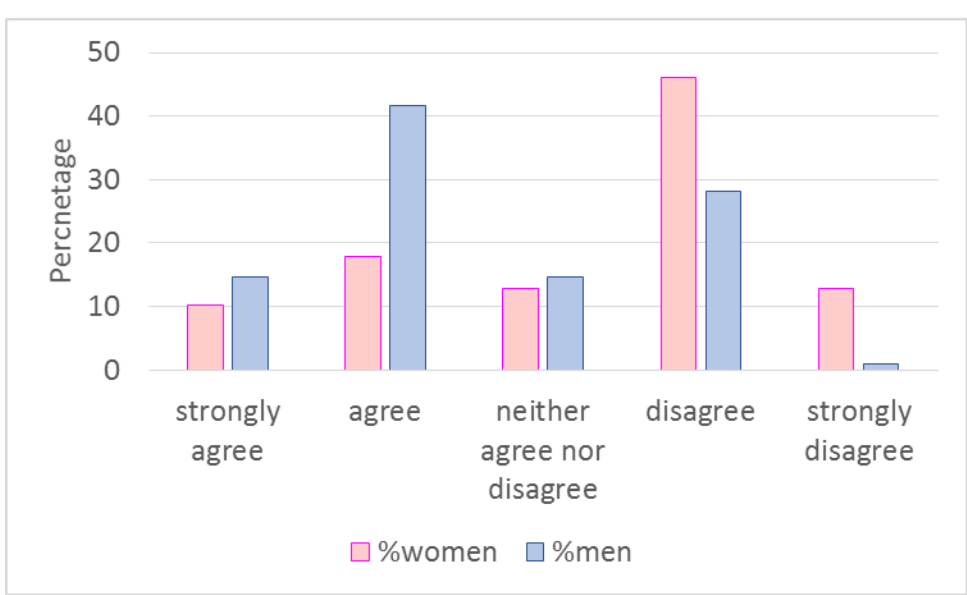
Our Survey

In this survey 10 questions were posed to the entire COST NQO membership of 400 people. For questions 1-8 a statement was given and responses from "strongly agree" to "strongly disagree" were available. Aside from Q10 which asked about gender of respondent, for brevity we did not solicit information about seniority or nationality/country of residence. Question 9 had four options to choose from. Note that Q10 gave four possible responses to the question about gender. As well as "female" and "male", "other" and "prefer not to say" were given as possible answers.

25% of the members answered the survey of 10 questions related to gender equality topics. Of these, 26% of respondents were women, and were 69% men. This means that men were over represented as a whole, but women were 1.6 times as likely to answer the survey.

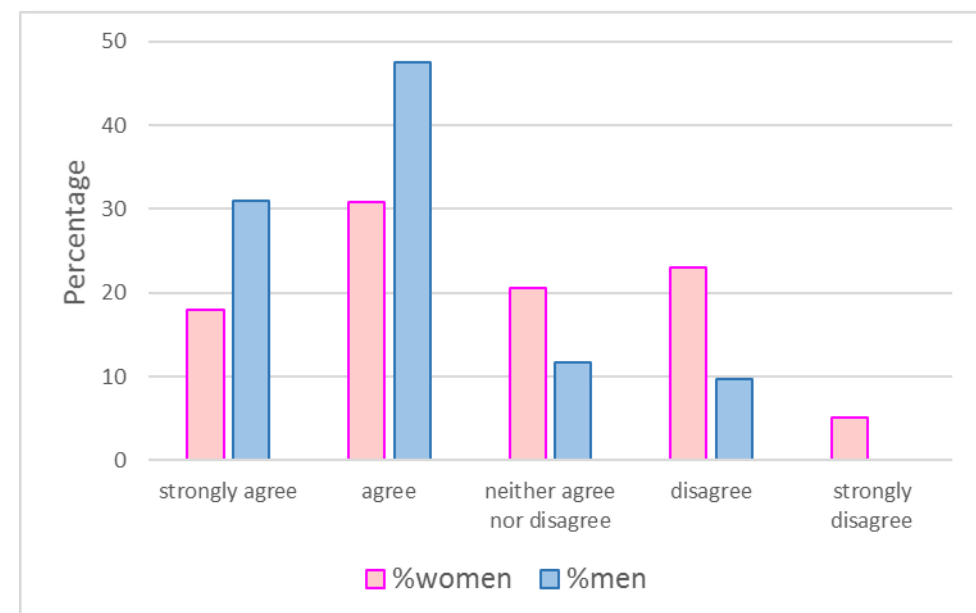
Our survey said:

QUESTION 1: WOMEN AND MEN IN MY FIELD HAVE EQUAL OPPORTUNITIES FOR CAREER ADVANCEMENT



- There is a clear imbalance between men's and women's views.
- 64% of women believe that they do not have equal opportunities to men.
- 14% of women believe this strongly.
- However, 56% of men believe there is no difference in opportunities.

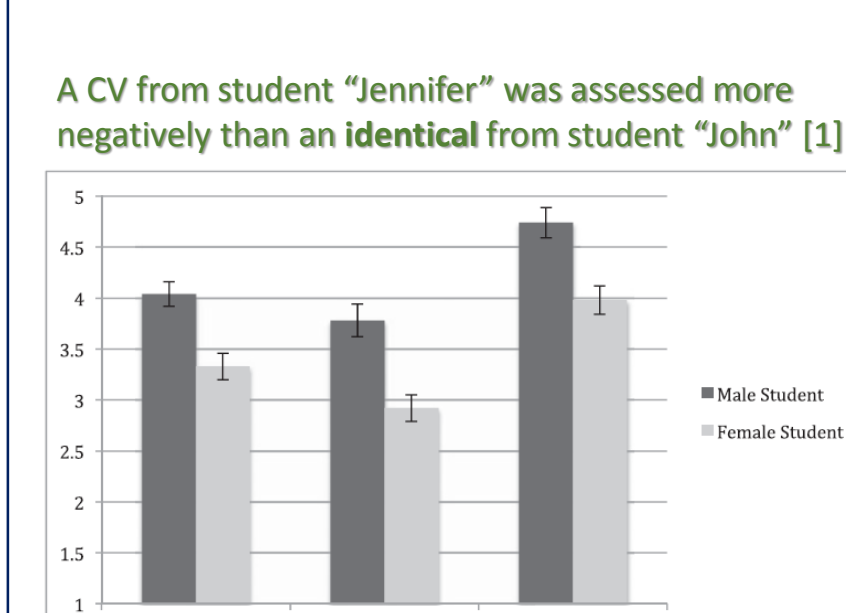
QUESTION 2: IN MY DEPARTMENT, STAFF ARE TREATED EQUALLY REGARDLESS OF GENDER



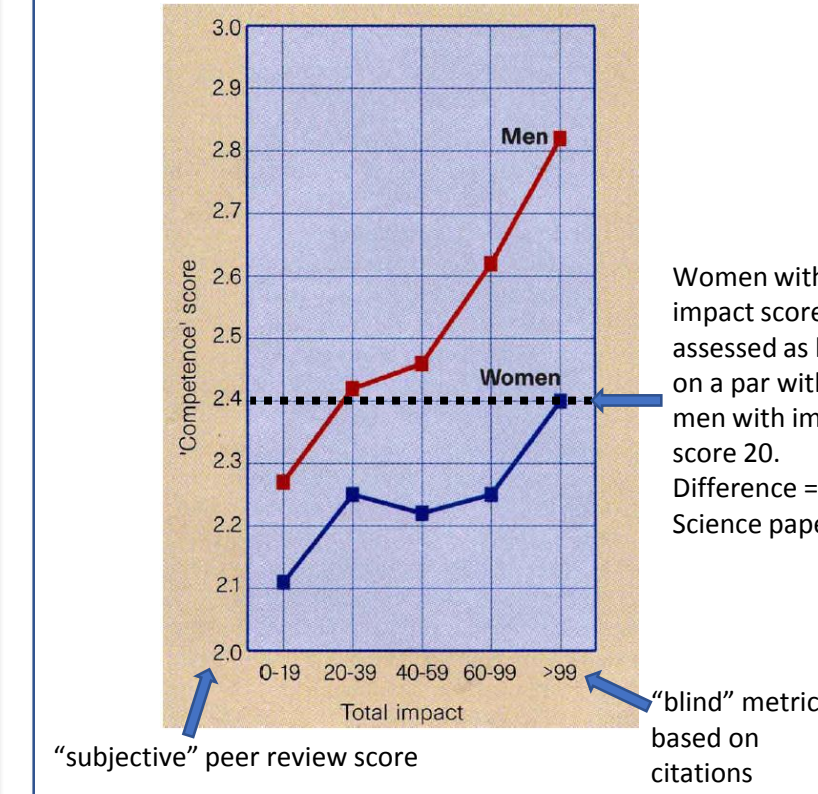
- 69% of all respondents believe that men and women are treated equally in their department.
- 79% of men believed that women and men are treated equally in their department or where they work, compared to 52% of women.
- However, 31% of women and 10% of men disagreed with this statement.

Independent Evidence Says:

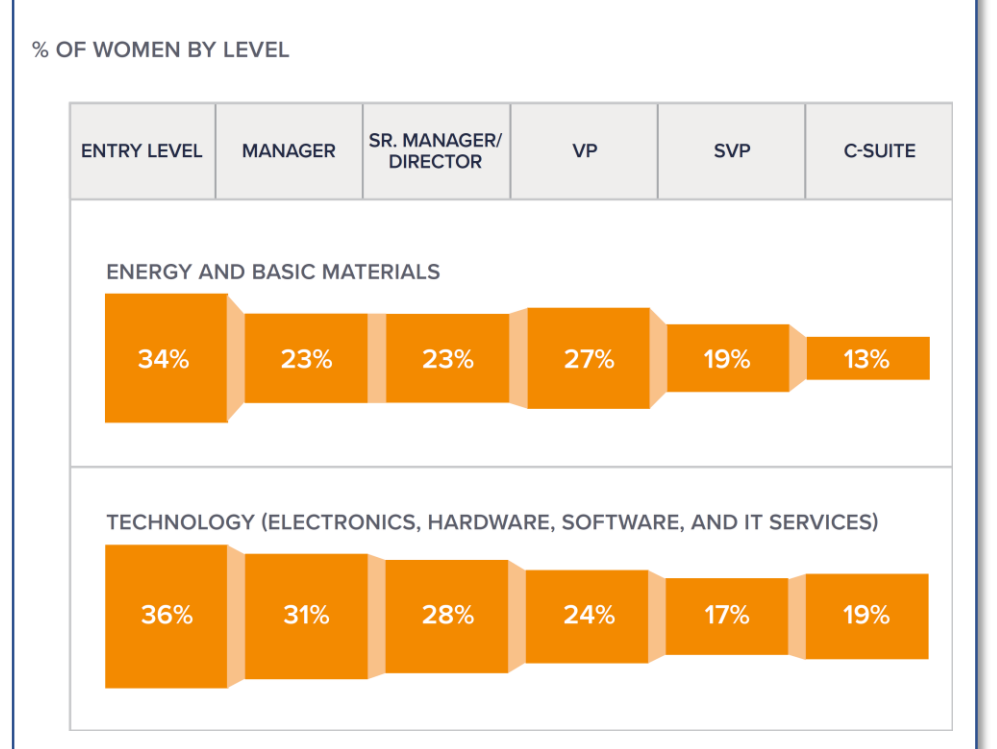
There is overwhelming evidence that women scientists and engineers face discrimination, here is a sample of the overwhelming evidence.



Women had to have 3 Science papers more than men to be considered for fellowship in Sweden [2]



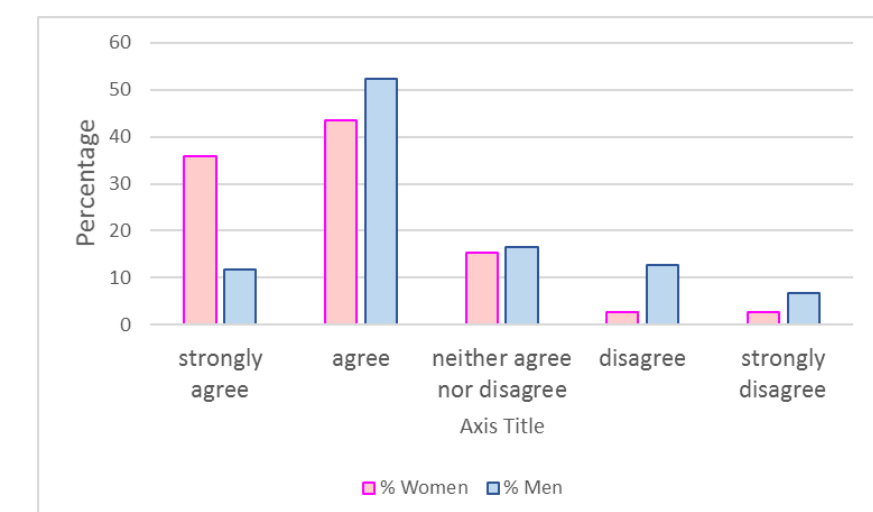
Female numbers are low across a wide range of technical subjects in the industrial and academic sector, getting worse with seniority. [3]



Implicit bias studies have revealed strong imbalances in what people say they believe and the unconscious decisions they make. This is consistent with hundreds of studies which show bias towards men, across the board.

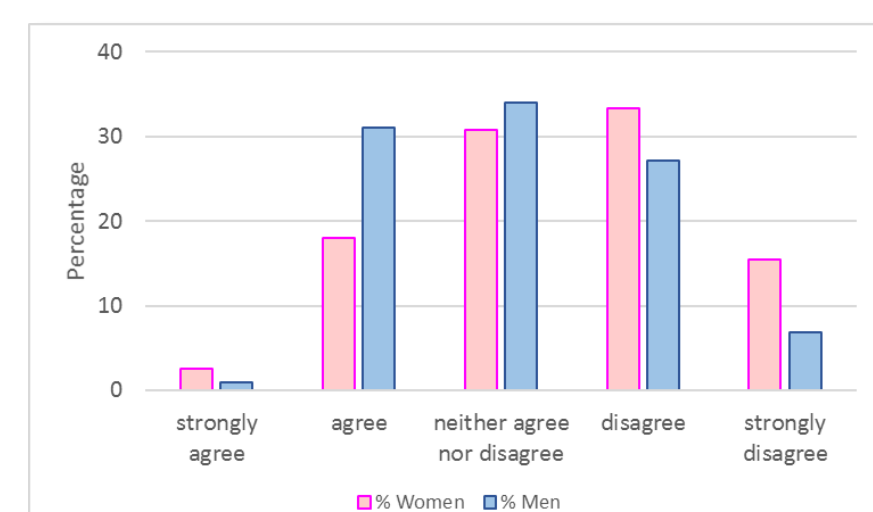
Our survey said:

QUESTION 4: WOMEN IN MY FIELD WITH YOUNG FAMILIES OR CARING RESPONSIBILITIES ARE DISADVANTAGED IN THEIR CAREER.



- There was a broad agreement (67%) that mothers and other female carers experience disadvantages in their career.
- Women highlighted this as a particular disadvantage, with 44% agreeing and 36% strongly agreeing that this is an issue.
- However, only 1% of all respondents felt strongly that male carers' experienced disadvantages.
- 49% of female respondents felt that male carers did not experience disadvantage, 15% of them female respondents felt strongly about this. Only 15% of women felt that male carers did experience disadvantage.
- Male opinions about male carers was more divided. 34% of male respondents did not feel there was a disadvantage but 32% felt that there was a disadvantage.

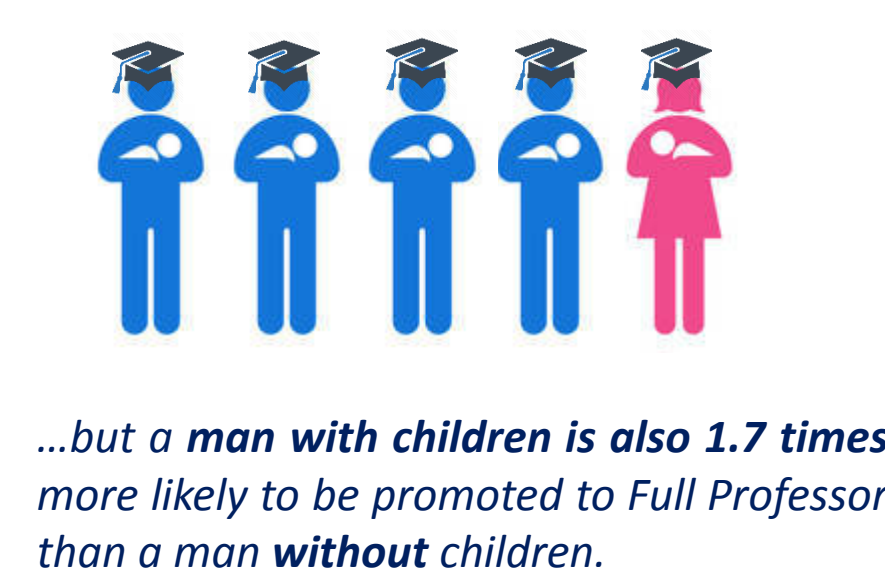
QUESTION 5: MEN IN MY FIELD WITH YOUNG FAMILIES OR CARING RESPONSIBILITIES ARE DISADVANTAGED IN THEIR CAREER.



Independent Evidence Says:

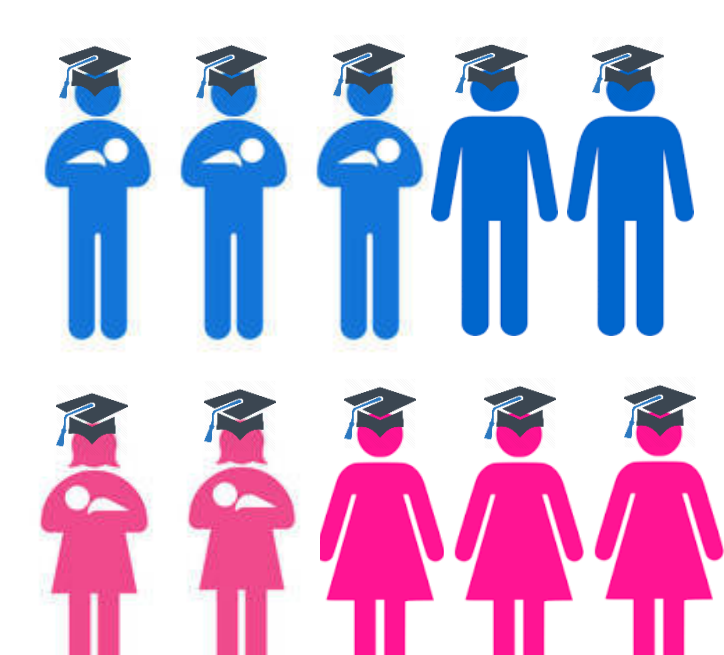
Men with children are the most successful academics, women with children are the least successful [4]

When comparing men and women with the same personal and professional characteristics (eg age, publications etc), the same academic productivity, and both with children, we see that having children affects women much more negatively: a man with children is 4 times more likely to be promoted to Full Professor than a woman with children...



...but a man with children is also 1.7 times more likely to be promoted to Full Professor than a man without children.

From the same study, around 69% of female professors have no children, while 63% of male professors have children.



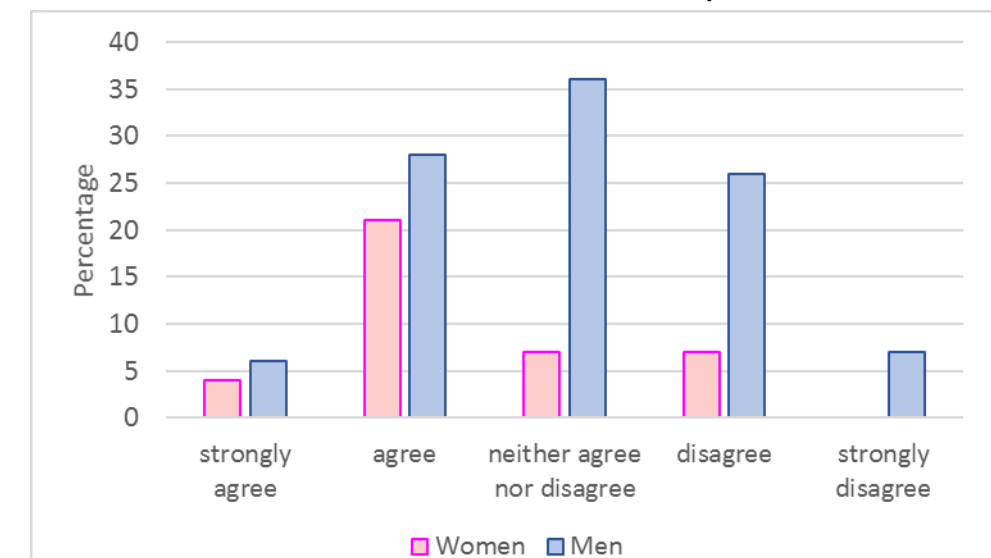
Mothers and fathers report difficulty in attending conferences after having children [5]



Do we always take fathers' caring responsibilities as seriously as mothers'?

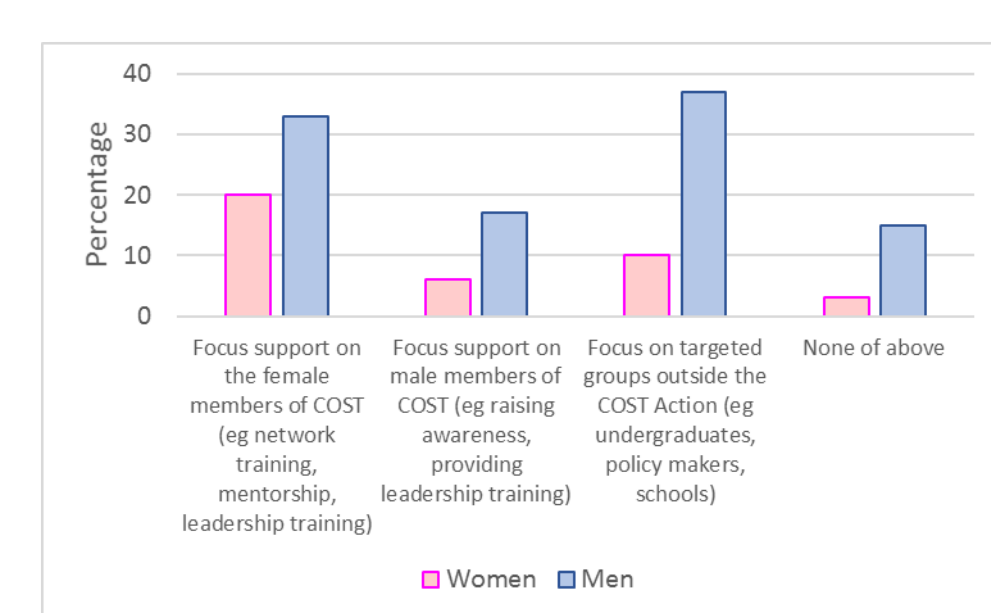
Our survey said:

QUESTION 8: I PERSONALLY UNDERTAKE ACTIVITIES TO SUPPORT GENDER EQUALITY (EG MENTORING, RAISING AWARENESS, GENDER SPECIFIC OUTREACH)



- A high percentage of women (64%) reported undertaking some kind of activity related to gender equality.
- Approximately half the percentage of men (33%) reported the same.
- Acting as a mentor was the most common activity reported by women, followed by outreach activities.
- In contrast, the most common activities reported by men were in ensuring gender balance in invited talk lists and recruitment, as well as awareness raising.

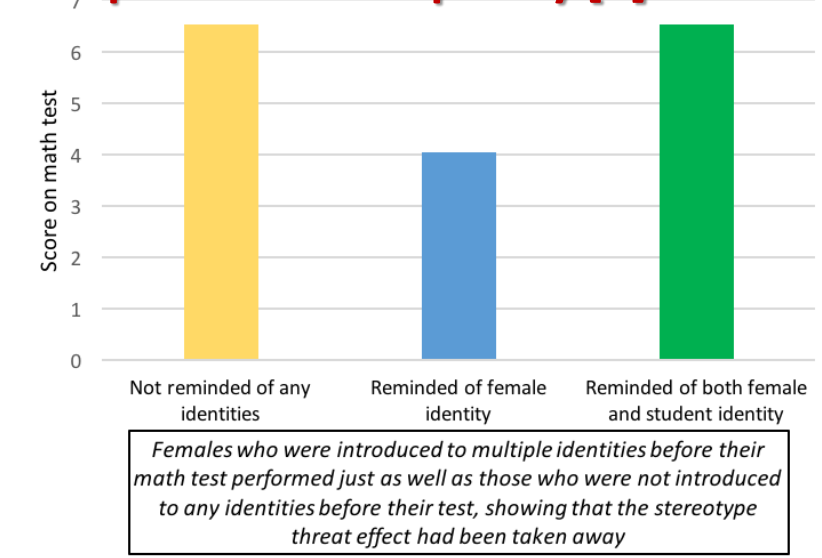
QUESTION 9: IF WE WERE TO FOCUS EFFORT ON ONE ACTIVITY TO IMPROVE GENDER EQUALITY IN THIS COST ACTION IT WOULD BE:



- Most respondents felt that more focus should be on women rather than men. 51% of women and 32% of men felt that this would be the most useful.
- The least popular option was to focus on men. Only 15% of women and 17% of men felt that this would be most useful.
- Many felt that focusing on groups outside of COST would be most useful
- Only a minority (8% of women, 15% of men) felt that none of the options here were worth pursuing.

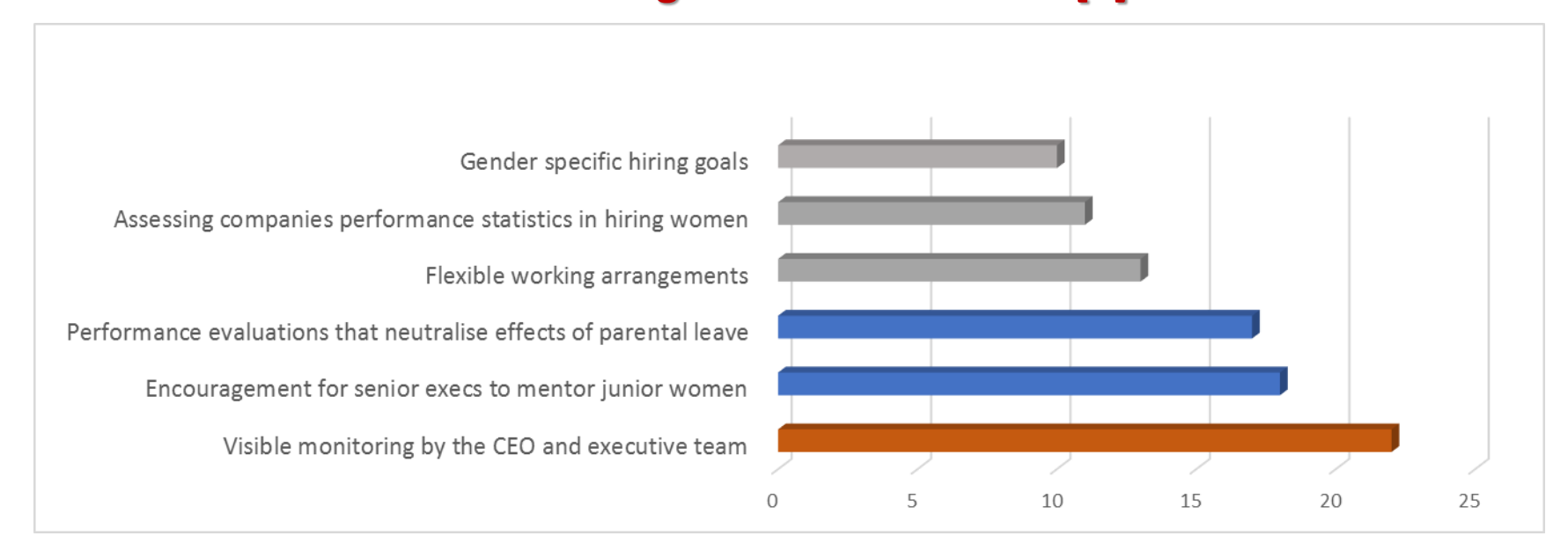
Independent Evidence Says:

Stereotype threat: Reminding women of their gender means they perform more poorly [6]



- Reminding a woman of the lack of success of women may inadvertently cause a stereotype threat – when a female scientist's gender is explicitly highlighted, she performs more poorly.
- Are many gender intervention activities guilty of highlighting a female scientist by gender, not as scientist foremost?
 - Being highlighted as a woman speaker at outreach events?
 - Attending women-only leadership courses?
 - Being gender balance advisors for schools, universities or companies?

Active support by CEOs and senior executives are in top most effective gender interventions [7]



- Support from the very top members of an organisation (CEOs, senior executives) shown to be most effective
- Strong commitment from the organisation is also needed
- In STEM: we need commitment and action from gate-keepers with influence
 - Professors
 - Funding councils
 - Senior University/Institution management
 - Statistically, these roles are still filled mainly by male scientists/academics, the demographic that most gender interventions target the least!
- Targeted support is also needed for employees with families

Where do we go from here?

What doesn't work and what does?

When interventions go wrong [7]:

Type of program	White		Black		Hispanic		Asian	
	Men	Women	Men	Women	Men	Women	Men	Women
Mandatory diversity training			-9.2		-4.5		-5.4	
Job tests	-3.8	-10.2	-9.1	-6.7	-8.8		-9.3	
Grievance systems	-2.7	-7.3	-4.8		-4.7		-11.3	-4.1

- The backlash effect:**
Hiring/promotion of women and ethnic minorities decreased when the following interventions were used:
- Mandatory diversity training was often signalled as remedial (the employee has a problem that needs fixing), and conveyed negative messages (the legal implications, not the positive effects for the company).
 - Hiring tests to assess competence are often not applied to everyone (people known to the hiring committee are not tested) and results are interpreted inconsistently, with bias against the unknown party.
 - Grievance procedures are often not carried through correctly, result in retaliation, and employees who lose faith in system.

Doing it right [7]:

Type of program	White		Black		Hispanic		Asian	
	Men	Women	Men	Women	Men	Women	Men	Women
Voluntary training			+13.3		+9.1		+9.3	+12.6
Self-managed teams	-2.8	+5.6	+3.4	+3.9				+3.6
Cross-training	-1.4	+3.0	+2.7	+3.0	-3.9		+6.5	+4.1
College recruitment: women*	-2.0	+10.2	+7.9	+8.7	+10.0		+18.3	+8.6
College recruitment: minorities**			+7.7	+8.9				
Mentoring			+18.0	+9.1	+23.7		+18.0	+24.0
Diversity task forces	-3.3	+11.6	+8.7	+22.7	+12.0	+16.2	+30.2	+24.2
Diversity managers		+7.5	+17.0	+11.1		+18.2	+10.3	+13.6

- Voluntary diversity training empowers employees and makes them feel instrumental in driving the solution instead of being part of the problem.
- Contact between minorities and colleagues builds a common identity that overcomes bias, particularly when working towards a common goal.
- Mentoring of minorities chips away at senior managers' biases. Note that mentoring can be open to all but is often taken up more by minorities.
- External diversity task forces who monitor diversity increase social accountability.
- Task forces allow identification and elimination of specific roadblocks for the minority.

In the COST Action Nanoscale Quantum Optics we will:

- Provide effective advice for senior scientific leaders. Most senior scientific leaders are men, the target group that was felt to be least important to target by this survey. However the decisions made about structure of the working environment, who to hire and promote, are overwhelmingly made by senior men, "gate-keepers". Targeting these people will have the greatest influence by far.
- Providing an effective support network for women. Over half the women felt that this was needed.
- Provide an effective support network for carers. This was the most important issue highlighted by the respondents. We will target both mothers and fathers, as well as other carers.
- Promote dialogue between male and female scientists about gender issues. There is clearly a gender divide about the opinions in this survey that likely arises due to a lack of knowledge. Promoting dialogue in a safe environment, and making sure that all members of the community agree on courses of action is vital to ensuring that action is implemented effectively.
- Provide feedback and recommendations to institutions and funding councils. The EU is fully committed to achieving better gender equality in Horizon 2020. We hope to provide grass-root evidence of the problems faced by scientist in the community, and how the community best feels these could be tackled.
- More information can be found at: http://www.cost-nqo.eu/wp-content/uploads/2016/10/COST-NQO-Gender-Survey_1010.pdf

References: Independent evidence is our most convincing weapon against inequality! Here are the sources used in this poster:

- [1] Moss-Racusin et al. "Science faculty's subtle gender biases favor male students" PNAS 109 16474 (2012)
- [2] Wenneras and Wold, "Nepotism and sexism in peer review" Nature 387, 341 (1997)
- [3] "Women in the workplace in 2016", McKinsey and Company
- [4] Spanish White Paper on Women in Academia: http://www.idi.mineco.gob.es/stfs/MICINN/Ministerio/FICHIEROS/UMYC/WhitePaper_interactive.pdf
- [5] Institute of Physics Childcare Report 2010 http://www.iop.org/publications/iop/2010/page_45280.html
- [6] Rydell, R. J., McConnell, A. R., & Beilock, S. L. (2009). "Multiple social identities and stereotype threat: Imbalance, accessibility, and working memory. Journal of Personality and Social Psychology", 96, 949-966.
- [7] F. Dobbin and A. Kalev "Why Diversity Programs Fail" <https://hbr.org/2016/07/why-diversity-programs-fail> (2016)