Women at science conferences

Setting the stage for an evaluation of the impact of round-table discussion formats and one-on-one mentoring sessions on communication at science conferences

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NaturalScience.*Careers*
December 19, 2017

Abstract

Gender disparities exist in many academic disciplines, especially in the fields of science, technology, engineering and mathematics (STEM) (UNESCO, 2017). Despite efforts to confront inequalities, at higher career levels women in STEM subjects remain underrepresented. We understand conference participation to be a central component of any scholar's successful career. Up to date though, conferences still constitute a mostly male-dominated terrain and might therefore, for a multitude of reasons, be putting female scientists at disadvantage (Nature, 2016). We pose the question whether the standard conference design could be changed so that female participation increases. By implementing new conference formats — the round-table discussion format and one-on-one mentoring sessions — we want to evaluate its impact on communication and, more specifically, the networking experience of female attendees.

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1. Introduction

A special issue of *Nature* in 2013 reports:

> *Science remains institutionally sexist. Despite some progress, women scientists are still paid less, promoted less frequently, win fewer grants and are more likely to leave research than similarly qualified men.*

In 2017, the overall situation remains equally alerting. The goal of this research project is aimed at diminishing disadvantages of female scientists in academia. The advancement of gender equality and social justice in the sciences is fundamental for every discipline to reach its full potential and grant every individual equal opportunity to thrive (Bohnet, 2016, p. 10). With this research project, we aim to contribute towards closing the various gender gaps that continue to render female scientists at disadvantage in comparison to their male colleagues and push women out of their respective disciplines.[1]

As others before us (APA, 2007), we have identified science conferences as a central venue for every scientist's career development. As Egger and Capri (2011) state:

> *Scientific meetings are one of the primary venues for scientists to present their new work to their colleagues with the purpose of receiving feedback at an early stage of their research, and thus they are an integral part of the process of science. They serve as an informal peer review that can help researchers to develop, clarify, and refine their work as they proceed to write it up and submit it for formal review and final publication. In addition, meetings allow researchers to hear about what others in their field and related disciplines are doing, talk with colleagues from different institutions around the world, and learn about new research, tools, and techniques that might be relevant to their work.*

Sexism, be it deliberate or unconscious, can be found to influence all aspects of scientific careers. Therefore it also has an impact on the setting of conferences and meetings of scientific societies. In its extremes, a conference may be a space in which "women tend to be invisible" (Nature, 2016).

Proof for this is available on a broad spectrum: Female scientists are less frequently invited to give talks at conferences compared to male conference delegates (Martin, 2015; Settles&O'Connor, 2014). They also hold fewer talks at conferences (Nature, 2016), and, if attending, they are likely to ask less questions (Hinsley et al., 2017). Hence, it does not surprise that studies show that research conducted by female scientists, in general, obtains a significantly lower exposure than research conducted by their male colleagues (Schroeder et al., 2013). This decreased visibility of the work of female scientists has

[1] It is necessary to situate the discussion carefully and acknowledge the complexity of gender and communication. Gender is a multidimensional category for sociolinguistic research (Uchida, 1992). As researchers, we cannot speak for individual experiences female scientists make at conferences. As a mixed-gender team of researchers, we want to acknowledge potential biases in our perception and analysis. We want to stress that the *status quo* of the contemporary landscape of academic research is one entrenched in patriarchy, gender biases, sexism and racism. Hence, we would like to position ourselves as 'speaking nearby' instead of 'speaking for' female scientists experiences (Chen, 1991).

severe consequences: The same study hints that this could be a reason for the low proportion of academic senior positions filled by women.

2. Research on gender and communication

Gender and communication has been an extensively examined field of research for the past three decades (Maltz&Boker, 1982; Cameron, 2007). Questions on whether men and women communicate differently, if so, how differences are trace- and measurable, and whether distinct patterns of communication are socially constructed and/or partially due to biological predisposition remain controversial (Tannen, 1990; Hyde, 2005; Gray, 1992; O'Leary, 1988).[2]

Due to the vast amount of popular literature the idea that men and women 'speak different languages' has, as Deborah Cameron criticises, "become a dogma, treated not as a hypothesis […] but as an unquestioned article of faith" (2007, p. 3). In her 2007 publication *The Myth of Mars and Venus*, Cameron questions the basis on which many popular science literature authors — such as Deborah Tannen (*You Just Don't Understand*, 1990), John Gray (*Men Are From Mars, Women are From Venus*, 1992), Steven Pinker (*The Blank Slate*, 2002), or Anne and Bill Moir (*Why Men Don't Iron*, 1999) — place their arguments and observations. What these authors tend to do is to trace differences between the sexes back to an inherent, natural difference. With its overall focus on cross-gender differences, these 'nature versus nurture' debates conceal the degree of variations that occur within each gender group and rush to generalised and often sweeping conclusions. Recent findings underline that a majority of their claims on the way men and women 'are,' in terms of their communication behaviour are "at best only partial truths" (Cameron, 2007, p. 58).

A tentative summary of the current literature suggests that men and women do not differ fundamentally in the way they use language to communicate. It seems to be an exaggeration to refer to the gender language differences as speaking different languages, as Grey and Tannen imply. More recent research like Janet Hyde's 2005 Gender Similarity Hypothesis suggests that the majority of men's and women's communication is relatively congruent. What we acknowledge though are the results of empirical social research on behavioural differences that evaluate different behaviour patterns of men and women in public and private settings. For instance, Leaper and Robnett (2011) suggest that women use more tentative language when presenting their research results. Schroeder and colleagues' work proposes that women reject invitations to speak at conferences (2013). Other examples include studies showing that female scholars prefer teaching over conducting research (Winslow, 2010) or quote their own work less frequently (Maliniak et al., 2013). Taking first steps in the process of conducting a larger study project, we emphasise that we do not want to rush to any any hasty conclusions.

[2] For an extended overview of relevant literature, please see addendum.

In the following we will briefly highlight three issues which emerge to be of distinct importance for our research project's involvement with gender and communication.

First, verbal relationships between men and women are more than a merely observable differences, such relationships are cause and consequence of **power** differences (Uchida, 1992; Freed, 1992; Cameron, 2007). As much as differences may occur within cross-cultural communication, gender, as a social and performative act, is often about acts of dominance. The multidimensionality of language and gender is far too complex to be reduced into a binary culture-model but needs to be understood in larger power relations of patriarchy and inequalities.

Second, differing performances in speech are quickly utilised to explain a way men and women 'are.' A perspective often overseen or minimised is that the speech performance also has much to do with the **position and context** of the conversational setting. As in other situations, differences of race, ethnicity, class, and culture of origin account for what may be seen as standard or deviating behaviour for women and men (Cameron, 2007).

Third, the **conversational role** the interlocutors are immersed in. Katy O'Leary's research found out that the role of a speaker in the interaction is a better predictor for their communication patterns than their gender (1988). Hence, maybe a person's conversational role — much more than their gender — might reflect societal and situational expectations and arrangements which the individual is confronted to.

3. Goal of the research project

Our project aims to examine scientific conferences as an area in which female scientists' position can be improved effectively and efficiently. We are aiming at creating an intervention to established conference processes by introducing a modified conference design. We ask: **What needs to change so that female scientists' attendance at scientific conferences, in numbers, in talks given, presentations held, and in the quality of participation, improves?** Ideally, measures would not force either gender to (not) do anything, but create a more conducive and open environment for interaction. We choose not to target individual scientists' behaviour. Instead, our focus is on leaning in for structural changes of the conference set-ups themselves. In accord with behavioural design and gender equality expert Iris Bohnet, we are convinced that better design is the way to set impulses for a cultural change towards advanced gender equality. It is "[t]hrough behavioral design [that] we can move the needle towards creating equal opportunities […] for everyone" (Bohnet, 2016, p. 7).

So how can the design of a standard science conference setting be re-structured so that it provides a 'better fit' for everybody attending, especially female scientists? One central aspects to science conferences is interaction and communication between the people attending. As mentioned above, talking to fellow colleagues in person and hereby

learning about their current projects, tools and techniques is a core aspect of the meetings. On different levels, from formal keynote speeches to informal social events at the end of a conference day, communication and, specifically, the involved networking make up a successful conference attendance.

One important measure for evaluating successful conference participation might be the quality of communication, and especially the networking activities, in which the attendees were able to immerse themselves. In their 2014 study, Jones and colleagues analysed gender differences in conference presentation. They suggested that evaluation and identification of gender discrepancies in research have, so far, been focusing on "easily obtainable metrics, such as the number of publications citations, or grants received" (Jones et al., 2014, p. 2). These assessments, however, might be overlooking important dimensions that metric analysis cannot account for. Jones and colleagues' idea, to evaluate female scientists' visibility, sets the research focus on attendance, presentations, plenary talks, and media engagement. Their study, amongst others, makes a strong argument for the fact that conference visibility continues to be an aspect more favourable for male participants. Male academics continue to obtain a big part of a conference's visibility (Isbell et al., 2012) and women are often significantly underrepresented among invited speakers (Schroeder et al., 2013). Hence, enhancing visibility for female scientists in their discipline and respective community is an important step towards narrowing down gender inequalities. And this increased degree of visibility might improve opportunities for communication and interpersonal networking.

Another angle of investigation we are curious about derives from linguist Deborah Tannen's best-selling book *You Just Don't Understand: Women and Men in Conversation* (1990) (Bodewits et al., 2017). In the her 'difference theory' Tannen introduces a cultural model for understanding cross-sex communication as cross-cultural communication. This model suggests that, in terms of communication, men and women grow up and live in two different cultures. Misunderstandings occur, due to the cultural boundaries and a general unknowing of the other culture's communicative features. Recording behavioural differences, Tannen observes men to prefer a *report*-style language, which is highly compatible with monologues that underline status and power. Women, on the other hand, prefer *rapport*-style language, which is based on interactions. Tying this back to our research project, in a standard conference setting, this female communication style comes to play at the lower-status poster presentations, which puts women at a disadvantage. Following Tannen's argument, we may suggest that men prefer talks or monologues whereas women thrive more in dialogical and participatory settings. Drawing from her critiques (Freed, 1992; Uchida, 1992) and our knowledge of structural biases at play, we can conclude that the answer to explaining deviating conference and communication performances certainly involves a multitude of different factors, most notably, personal choice, socialisation, and structural biases. As we are at the beginning of this project, we do not want to draw any rushed conclusions and approach our empirical data analysis open-minded, following the results our study yields.

The central idea of our research question is that if we are able to improve female scientists' networking experience at conferences, we might be able to increase their visibility by increasing their positioning, reach and exposure at conferences. We believe that this, in the long run, can become one of many steps towards narrowing the various gender gaps in academia.

4. Introducing the new conference formats

4.1. Round-table discussions

As a tool for designing change structurally, we decided to make use of the round-table discussion format. It is a well-developed but not yet overly popular format for science conferences. We have identified the format of round-table discussions as a suitable candidate to test whether our hypothesis holds true: can round-table discussions contribute to a levelling of the conference playing field without putting anyone at a disadvantage?

A common round-table set up is that 6-10 participants get to interact for 20-30 minutes. One of the participants chairs the round-table, deciding on a theme and presenting results from his/her research. After a typically brief input — the round-table is not meant to be another form of lecturing presentation format — the table is open for questions and discussion. The size of the audience allows round-tables to be an "ideal format for networking and in-depth discussion on a particular topic" (American Evaluation Association, 2014). Beyond, the workshop format enables participants "discussion on issues of shared concern and [gives space] to generate ideas for action" (Scottish Health Council, 2014). Further, "participants in roundtable sessions generally find them energizing. They get to interact with several people, they usually get to contribute more, and they get to move around to fresh settings" (Hesse, 2015). Overall, the round-table discussion format mixes things up, in comparison to the standard presentation formats, and allows a valuable, more interpersonal way of interaction with fellow scientists. The Cambridge Dictionary even defines a round-table to be a setting in which "people meet and talk in conditions of equality", hence, a democratisation of structures is in process.

4.2. One-on-one mentoring sessions

The conference organisers are reserving time and space for young scientists to meet more experienced scientists of their choice. In this mentoring session additional networking opportunities are granted for anybody interested in making use of them. Since the 1990s, private mentorship programs for women have been a popular and method of the human resources sector. Kaiser-Belz (2009) categorises mentoring as a technique widely used in Germany to counter structural disadvantages women in the workforce encounter, with success. We presume equal effects of the private one-on-one meetings in the setting of a science conference.

5. Study design

Whether new formats have direct impact on gender equality measures at conferences is causally hard to prove. Put differently, gender equality, in our setting, is hardly measurable and, as our hypothesis below show, we do not aim to do so. A meaningful indicator we focus on is the degree and quality of personal interaction and networking. We set our study's focus on evaluating the communication in form of networking between conference participants. We assume that the report of an increased degree of communication and an increased quality of communication for female scientists is an indicator that the women attending the conference have been able to engage more actively than usually.

In this specific study design for the International Conference on "Spatiotemporal Organization of Bacterial Cells"[3] taking place March 16-18, 2018 in Marburg, Germany, we are evaluating the impact of private one-on-one mentoring sessions and round-table discussions.

In addition to the quantitative data analysis we are aiming at conducting qualitative research in form of interviews with female participants and observations during the three-day long conference. We hope that qualitative data will enhance our understanding of the research project and complement the results from the questionnaires.

Also important for the entire project is our close connection to the organisational team of the conference with Devid Mrusek as our contact person. We are invited to assess all relevant organisational information that accumulate in the process of planning the event. Relevant data for us to observe includes, for example, the number of female speakers invited and the number of speakers accepting the invitation.

6. Hypothesis

Hypothesis 1
The new conference formats have an effect on the networking experience of the participant at the conference.

Hypothesis 1.1
The round table discussion format has an effect on the networking experience of the participant at the conference.

Hypothesis 1.2
The mentoring session has an effect on the networking experience of the participant at the conference.

[3] Conference website: http://www.trr174.org

Hypothesis 2
The new conference formats mostly have an effect on the networking experience of women compared to men.

Hypothesis 2.1
The round-table discussion format mostly has an effect on the networking experience of women compared to men.

Hypothesis 2.2
The mentoring session mostly has an effect on the networking experience of women compared to men.

7. Addendum

7.1. Operationalisation

Variables: Networking, Round-table, mentoring session, gender.

Hypothesis 1

Hypothesis 2

7.2. Annotated questionnaire

	Introductory questions	Background
1	**All in all, how satisfied are you with the conference?** (Scale 1: Very satisfied, satisfied, neutral, dissatisfied, very dissatisfied)	Introductory question, common for evaluation forms.
2	**How satisfied are you with the conference in regard to the following issues?** - Conference content (Scale 1, 6-fold, including "I don't know) - Choice of speakers (Scale) - Poster presentations (Scale) - Round-table sessions (Scale) - Mentoring session (Scale) - Online registration on Eventbrite and check-in (Scale) - Schedule - Venue (Scale) - Catering (Scale)	Here the variables RT and mentoring session are introduced. The option to answer "I don't know" is important, due to the fact that some participants might not have been able to participate in everything offered.
3	**How did you find out about the conference?** - Our website (www.trr174.org) - Mailed invitation - Colleague - Twitter - Printed poster - Other	This is a question the conference organising team has requested.
4	**What was the main reason for you to attend the conference?** - Content - Networking - Scientific development - Specific speakers - Collaboration - Recruiting - Other (Blank) (One answer only)	This question by itself is not directly relevant for the research question. In combination with question five it makes sense though, due to an evaluation of the overall networking experience. "Recruiting" and "collaboration" were answers asked for by the conference team.
5	**For the reason stated in question 4, was it worthwhile attending the conference?** (Scale 2: Strongly agree, agree, neutral, disagree, strongly	

	disagree)	
	Main questions	
6.1	**The conference had a supportive environment for sharing my research results and interests with other participants.** (Scale 2)	Q 5-7: Here we're targeting our variable networking in its three core aspects.
6.2	**The conference had a supportive environment for discussion.** (Scale 2)	
6.3	T**he conference enabled me to establish productive relationships for future research.** (Scale 2)	
	Round-table specific	
7	**I participated in one or more round-table sessions.** (Yes/No)	This is an important question that allows us to sort participants into two categories: Those that participated in RT(s) and those that did not.
8.1	**The round-table format created a supportive environment for sharing my research results and interests with other participants.** (Scale 2)	Q 9-11: Evaluation of the networking capabilities and quality of the RTs.
8.2	**The round-table format was as a supportive environment for discussion.** (Scale 2)	
8.3	**The round-table format enabled me to establish productive relationships for future research.** (Scale 2)	
	Mentoring session specific	
9	**I participated in mentoring session.** (Yes/No)	Sorting: Those that participated in 1on1's and those that did not.

10.1	**The mentoring session created a supportive environment for sharing my research results and interests with the interlocutor.** (Scale 2)	Q 13-15: Evaluation of the networking capabilities and quality of the 1on1 meetings.
10.2	**The mentoring session was as a supportive environment for discussion.** (Scale 2)	
10.3	**The mentoring session enabled me to establish productive relationships for future research.** (Scale 2)	
	<u>Closing</u>	
11	**When you are contributing to a conference, what is your preferred way to do so?** - Long presentation/lecture - Short presentation/lecture - Poster presentation - Other	Do men/women prefer different types of presentations?
12	**Which part of the conference was most helpful for you to network?** - Oral presentation - Poster presentations - Round-table sessions - Mentoring session - Social events - Coffee breaks and evening activities - Other	Included because we also asked this in the other questionnaire.
13	**Was there a topic you missed at the conference?** (Yes/No)	Organisers added this question.
14	**Got any further comments?** (Blank)	Organisers.
15	<u>Personal information</u>	
	Gender - Male - Female - (fill the blank)	

	Academic degree - Bachelor - Master - PhD - Post-doc - Professor	
	Age	
	Country of employment	

7.3. Further literature

The following section provides a brief overview of relevant literature for this study project (and gender equality at conferences and in academia in general) that has not been mentioned throughout the report.

Importance of conferences

McQuillin and Leon (2016) conducted a study, making use of a hurricane that led to the cancellation of a conference to find out that presenting papers at a conference increases the likelihood of being cited by 5%.

Countering gender bias at conferences

In her 2015 ScienceMag article, Carrie Arnold lists some striking arguments on how the playing field of conferences can be levelled. A successfully empirically tested idea is to include more female conveners for conference planning teams. Arnold states that a “better gender balance among conference planners is associated with a better gender balance among speakers” (2015). She is building upon the 2014 study by Casadevall and Handelsman titled “The Presence of Female Conveners Correlates with a Higher Proportion of Female Speakers at Scientific Symposia” (also Casadevall, 2015). Just one female convener in a planning board increases women’s participation at conferences whereas a all-male group is more likely to create an all-male panel group. One female committee member increased the proportion of female speakers by 72% in comparison with those events organised by only men. Other studies (Sardelis&Drew, 2016) show the same: There is a significant positive relationship between the number of of women speaking and organising an event. For Casadevall, just getting and gathering data and presenting them to conference planners helps to level the field a little. Also important is to understand why people decline talks to invitations (and work towards solutions, e.g. child care reimbursement, scheduling issues). Promoting guidelines and asking the organisers what their guidelines are may also be a measure pressing for structural change (Benderly,

2014). For the cases where there is room for improvement, participants could lobby for change or even boycott the conferences (Martin, 2014).

Further useful literature on this includes Martin's "Ten Simple Rules" (2014), Best et al.'s paper on "Gender and STEM in Germany: Policies Enhancing Women's Participation in Academia" (2013), Carnes 2012 and 2015 paper suggesting ideas on how to promote institutional change through bias literacy, and Eastoe's manifesto on why gender balance at conferences should become the new normal (2016).

A comprehensive overview of relevant literature on why women leave academic research is given by Easterly&Ricard.

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