From: **London, Zachary** zlondon@med.umich.edu
Subject: RE: Hypotheses for gender disparities analysis
Date: November 1, 2018 at 2:48 PM
To: Burke, James (Jim) jamesbur@med.umich.edu, Mcdermott, Margaret (Mollie) mcdermom@med.umich.edu

I'm happy. ☺

From: Burke, James (Jim)
Sent: Thursday, November 1, 2018 2:18 PM
To: London, Zachary <zlondon@med.umich.edu>
Cc: Mcdermott, Margaret (Mollie) <mcdermom@med.umich.edu>
Subject: Re: Hypotheses for gender disparities analysis

so, are we happy with an analysis framed around those primary questions? i think we can go back and add additional post hoc secondary hypotheses (just need to call them that) if the story pushes us that way, but this seems to me like our primary set of questions and i think they'll be able to frame a manuscript however they turn out.

On Nov 1, 2018, at 1:12 PM, London, Zachary <zlondon@med.umich.edu> wrote:

% is probably more relevant than #, and we can figure it out pretty easily.

From: Burke, James (Jim)
Sent: Thursday, November 1, 2018 1:05 PM
To: London, Zachary <zlondon@med.umich.edu>
Cc: Mcdermott, Margaret (Mollie) <mcdermom@med.umich.edu>
Subject: Re: Hypotheses for gender disparities analysis

the first two are pretty easy to translate into secondary analyses – just change the outcome of our primary analysis from "any talk" to committees and honorifics.

how do we figure out which meetings have more women on course committees? is the relevant question the % of women on course committees or the # of women on course committees?

assuming its something like % women on course committees then we can repeat our primary analysis with an interaction between gender and the % of women on course committees...

On Nov 1, 2018, at 12:24 PM, London, Zachary <zlondon@med.umich.edu> wrote:

Sounds good. The other hypotheses that we haven't addressed are those that pertain to the type of talk or leadership role:

- Women will be under-represented on course committees (e.g. leadership roles) compared to men.
- Women will be under-represented in honorific talks, more so than in invited course talks, compared to men.
- Under-representation among speakers will be greater at meetings in which there are proportionally fewer women on course committees.

From: Burke, James (Jim)
Sent: Thursday, November 1, 2018 12:20 PM
To: Mcdermott, Margaret (Mollie) <mcdermom@med.umich.edu>
Cc: London, Zachary <zlondon@med.umich.edu>
Subject: Re: Hypotheses for gender disparities analysis

i think there are a couple questions here that we will have a hard time disentangling.

1. do gender effects differ between meetings? (e.g. the ISC has a large gender bias, but AES does not)

2. is subspecialty a predictor of meeting presentation, on the whole? within a given meeting (other than AAN), though, this one is hard to make a lot of sense of. at the AAN, it could be the case that epilepsy (to pick a random example) has an outsized influence and that if there are more female epileptologists than in other discliplines, that it makes the AAN meeting look less biased, when it might be that it really has a pro-epilepsy bias that women happen to benefit from. its also similarly possible that, some meetings on the whole bring in a larger fraction of the population of women as presenters — and if we include subspecialty that is something we could test for.

analytically, there are a couple things we need to figure out:
1. Should subspecialty go into our primary hypothesis model? I think it probably should, mostly because I think that some subspecialties may be more academic-leaning than others and that might lead to differential involvement by subspecialty. Putting in a fixed effect for meeting is going to do almost the same thing because subspecialty and meeting are going to be highly correlated. But, I think speciality adds a couple things — first, it'll give us an

angle into whether some subspecialties are ¨more academic´´ than others and second, it'll help us figure out what's happening at the AAN where subspecialty and meeting are less correlated. Its also going to be cleaner because we have that measure at the level of every provider, whereas we only have a meeting variable available for those that present.

2. We had talked about (and I think we should do) a separate analysis by meeting (to address question #1). The idea, I think, is to see if the magnitude of gender biases vary between meetings. We could do this a couple ways. The simplest is to stratify by meeting — basically repeating our primary model within the population for each meeting. That's actually kind of tricky because we need to figure out which people in the masterfile are relevant for a given meeting. We could stratify by speciality and map those to given meetings, but its a little messy.

The other way to do it, which is probably what makes the most sense is to put in interaction terms between gender and specific meetings. This would allow us to model, in the whole population, whether some the gender effect varies by meeting. This should help us a tiny bit with statistical power as well. The trick is that its a little harder to interpret the effects (i.e. if the OR for meeting presentation is 0.5 at ISC and 1.0 at AES, its pretty easy to see that ISC is worse), but I think we can work around that with average marginal effects.

Tentative analytic plan:
1. Primary analysis testing the hypothesis outlined below. Question is whether to include subspecialty
2. Prespecified secondary analysis - repeat primary analysis including an interaction between meeting and gender.

What other secondary analyses should be on there? Other thoughts?

Once we nail this down, I just need to clear out a day to knock out the analysis…
Jim

On Nov 1, 2018, at 11:20 AM, Mcdermott, Margaret (Mollie) <[redacted]> wrote:

(Mollie) <mcdermom@med.umich.edu> wrote:

I think we will capture that through the fixed effect for meeting?

From: London, Zachary
Sent: Thursday, November 01, 2018 11:20 AM
To: Mcdermott, Margaret (Mollie) <mcdermom@med.umich.edu>; Burke, James (Jim) <jamesbur@med.umich.edu>
Subject: RE: Hypotheses for gender disparities analysis

I think it is worth looking at subspecialty, at least as a secondary hypothesis. There may be different cultures in different fields. For instance, If there is a greater disparity at the ISC than the AES, it might support the hypothesis that vascular neurology is more of an old boys club than epilepsy.

From: Mcdermott, Margaret (Mollie)
Sent: Thursday, November 1, 2018 11:13 AM
To: Burke, James (Jim) <jamesbur@med.umich.edu>; London, Zachary <zlondon@med.umich.edu>
Subject: RE: Hypotheses for gender disparities analysis

I like this plan.

Women are underrepresented in invited conference presentations compared to men, after adjusting for years since medical school graduation, rank, and number of publications.

Finding a difference between men and women could suggest an impact from the old-boys'-club-AAN-bowtie thing. I'm not sure what adjusting for subspecialty adds.

From: Burke, James (Jim)
Sent: Tuesday, October 23, 2018 2:03 PM
To: London, Zachary <zlondon@med.umich.edu>
Cc: Mcdermott, Margaret (Mollie) <mcdermom@med.umich.edu>
Subject: Re: Hypotheses for gender disparities analysis

i'm going to start a new thread…i haven't seen the intro — is it in the box directory? i see some methods

drafts, but no intro...

primary hypothesis
i think the most interesting hypothesis is that under-representation exists and that it is most likely related to discrimination-by-neglect mediated through the old boys network. i think that conferences are different than publications – while both are susceptible to gender biasses, those biases are stronger when it comes to invited conference presentations. invited conference presentations are about who you know and your reputation in the field. both are related to networking (something that men generally do more than women). both are related to self-promotion (something than men generally do more than women) and both are related to who you know and given that men have historically held more positions of power and its easier for men to know men than for women to know men.

we don't have a direct measure of discrimination and the mechanism that i'm imagining isn't directly discriminatory (its less likely that organizers consider equally qualified men and women and then pick the men), but rather its a more subtle discrimination based on access. so, i don't think we can directly test that hypothesis.

however, we can test a pretty close related one — conference presentation isn't explained by factors that could potentially justify differences in presentation presentation by gender — years of experience, rank, subspecialty, and publications. so my preferred version of the hypothesis is "Women are under-repressed in invited conference presentations compared to men, after adjusting for years of experience, rank, subspecialty and number of publications."

i like this version of the hypothesis for a couple reasons. first, i think its the most sharp-edged. second, i think it leads to relatively clear changes in behavior. if there are differences that exist, after accounting for possible substantive reasons for invites — then we need overt anti-discrimination measures. if, instead, there are differences, but they go away after adjusting for substantive factors, then we need to understand the reasons that women are less likely to move up in academic neurology and obtain those "substantive"

academic neurology and obtain those "substantive measures. third, without knowing a ton about this subject…i'd be surprised if there wasn't at least a small effect along those lines — we're going to have lots of statistical power here…and, if this version of the hypothesis isn't falsified, then we have a big time publication on our hands.

the primary analysis then is a logistic regression predicting conference presentation and adjusting for years of experience, rank, subspecialty, number of pubs + a fixed effect for meeting. we'd present the analyses that serially adjust for each of those factors so that you could see if a gender difference exist at baseline (seems likely) and then serially add factors and see which of them change the magnitude of the gender effect…all while denoting the fully adjusted analysis as the "primary"

what say y'all? mollie? particularly seeing as how you're the person that actually has looked at the prior research on the topic…i'm hpyothesizing with only vague notions of what is known.

> On Oct 23, 2018, at 9:35 AM, London, Zachary <zlondon@med.umich.edu> wrote:
>
> 1. which of these should be the single primary hypothesis that we build our analysis (and p-value interpretation) around?
> a) There is under-representation that is not accounted for by differences in years since medical school graduation, OR
> b) There is under-representation that is not accounted for by the overall gender distribution of neurologists within each specialty.
>
> The second is probably more likely to be true, but the first would be more interesting.
>
> 2. i think it'd be helpful to sketch out the rationale for some of these as well. some are relatively obvious, i think. but, in

general, i think that we need a “because” clause for these. for some of them, i’m not sure i can infer the “because. so, if we think that promotions are predominantly accounted for by publications…why wouldn’t talks also be accounted for by publications? my intuition would have been that similar factors are at play. Probably true. I don’t think that particular hypothesis is as likely to play out as some of the others, but I think we should include it in the analysis because a) we went to a lot of trouble to get pubs and h-index data, and b) if it WERE true, that would make a plausible case for an unmeasurable factor like gender bias. what would be the mechanism of under-representation if its not accounted for by academic rank, years since medical school graduation or # of publications? See prior comment.

3. what do we know about the literature on this question. has this been looked at with talks in other disciplines? i’ve heard a lot about manels lately…is that based on research in social science and humanities?how can that inform #2? Mollie included some of this in the intro she wrote. Have you seen this yet?

4. i’d add to the list:

“Women will be under-represented more in invited talks (which are awarded based on reputation in the field and relationships with meeting leadership) compared to peer reviewed research talks (which are awarded more on the basis of research quality) at the ISC because women have equal research productivity to men, but have less visibility to leaders in the field, relative to their level of research productivity.
Sounds good, as long as we have enough

data to do this analysis.

5. one additional thought – probably not for this analysis. if we linked a bunch of data sources (i.e. medicare + NIH reporter data + masterfile + pub med) we could potentially come up with a description of how work types differ across neurology (i.e. clinical vs. research proportions) and how those vary by gender. so, amongst people without grants in NIH reporter (and thus not likely to be funded researchers), how do clinical RVUs vary across subspecialties?

might be an interesting next step.
Cool idea. Sounds like something to work on at a bar in Rotterdam. I'm in.

> On Oct 22, 2018, at 9:52 AM, London, Zachary <zlondon@med.umich.edu> wrote:
>
> Here are the hypotheses I could come up with that we should be able to answer with our data. What needs to be changed or added?
>
> - Women will be under-represented in all invited talks compared to men.
> - Women will be under-represented on course committees (e.g. leadership roles) compared to men.
> - Women will be under-represented in honorific talks, more so than in invited course talks, compared to

men.

- Under-representation will be more than expected based on the self-described subspecialty among AAN members (sleep neurologists (Sleep), neuro-oncologists (SNO), epileptologists (AES), and stroke neurologists (ISC), all members (AAN).
- Under-representation will be more than expected based on the overall populations of neurologists based on board certification. (Using ABPN neurology certification for AAN, and subspecialty boards, when available, for the others.)
- Under-representation will not be accounted for by differences in years since medical school graduation.
- Under-representation will not be accounted for by differences in academic rank.
- Under-representation will not be accounted for by differences in number of publications or h-index.
- Under-representation among speakers will be greater at meetings in which there are proportionally fewer women on course committees.