Sarah Sauve: Welcome to ReproducibiliTea, an open science podcast featuring early career researchers. I'm Sarah coming to you from Lincoln in the UK, where I'm an immigrant on the land of the people who colonized the land that have called home most of my life so-called Canada. Today I'm super excited to welcome a guest Nora Serres to ReproducibiliTea! Nora do wanna introduce yourself?

Nora: Yeah. Hi, thanks for having me on the podcast. I'm Nora, and a recent Masters graduate from the University of Oslo in developmental psychology, and I'll actually be starting my PhD in the fall at the RITMO Center at the University of Oslo as well, which I'm very excited for.

Sarah: Yeah, that's super cool! I, as a music scientist, I actually know the RITMO center pretty well, so that's an awesome connection.

Nora: Nice, cool.

Sarah: So this episode we are talking about Bayesian statistics and registered reports. So let's get started with our Appeteazer, which this week is brought to us by Nora.

Nora: Yes, so this week I actually pulled a paper on Bayesian statistics, which as we'll talk about later in the podcast, I've gotten quite into throughout my master's thesis and writing -

Sarah: Awesome.

Nora : - my registered report and I really like this paper. It's quite a consolidates kind of the basics of Bayesian statistics and also makes it digestible for us as well. And I think one thing that it's does a good job of explaining is this idea of a sequential design with the maximal number of participants and for all of us who have done research with people or requiring time or resources intensive data collection. It's a way to set up your design so that your evidence or the data that you collect goes towards this growing or Bayesian factor, Bayes factor that you move toward. And this sequential design essentially means that you are adding a participant, and as you're adding a participant, your data is being updated or your final Bayes factor so you're kind of putting them in the pool towards more likely for the H1 or the null and you're kind of, yeah, amassing evidence as you go and I thought it was a great explanation for this. So if you are hesitant about Bayes, this is a great first step.

Sarah: Thanks for sharing that. It's actually a new term to me this idea of sequential Bayes factor and my initial reaction as someone who typically uses frequentist stats is this like, wait you can't always do one - you can't just add a participant until you get to where you want to go, but it's just a whole different framework, right? So it means something completely different –

Nora: Totally, yeah.

Sarah: - and in the Bayesian framework you can do that, whereas in frequentist that's just like the biggest no-no.

Nora: Exactly.

Sarah: Or not he biggest, but one of the big no-no's.

Nora: Exactly. And I think that's - that's something where where you kind of get stuck up on. It's like, well, yeah, exactly. Like you said, kind of well, should I really just add participants until I get the number that I want? But kind of as we as we've been, yeah, talking about a bit before this as well is that you kind of you also have to get rid of your vocabulary of significance or insignificance.

Sarah: Yep.

Nora: So you're not really adding until you get to a significant level, but you're getting to the a level of, you know, enough evidence to call it likely, essentially, no matter what, because you could go get enough evidence that it's most likely not the case or part of the null. So but it yeah, I totally agree with you, it's kind of against every, every sort of, yeah, .05 we've ever been taught.

Sarah: Everything we've been taught since like undergrad psychology. But anyways that was a lovely snack to begin with. We will talk more about Bayesian later, but for now let's move on to filling up on sandwiches.

Nora: Perfect.

Sarah: So for this week's main course, we are discussing Nora's experience of doing a registered report for her master's thesis.

Nora: Yeah.

Sarah: So do you wanna – we'll start with that? With that, what what was your project and just tell us a little bit about your experience of doing that?

Nora: Awesome. Yeah. So as Sarah just mentioned, I wrote my master's thesis as a registered report. Thanks to my fabulous and ambitious who encouraged me that it wasn't too big of a task to take on and I'm really happy that I did. And so yeah, so I guess to start, so the my paper that I wrote or that I've submitted as the stage one acceptance was The role of dialect variability on mispronunciation sensitivity: an insight to influence early language development from a Norwegian contest, a context by myself, Julien Mayor and Natalia Kartushina.

And so essentially what we have looked at was actually dialectal variability and this is something that is really prevalent in Norwegian society today is this native dialectal variation. And what we focused on was mispronunciation sensitivity around 13 months of age. So to this point, there's been essentially no research done kind of below around the two year age or 20 months looking at this native dialectal variation and well essentially what we used was the intermodal preferential looking design, so showing 2 pictures side by side and giving a naming one of the two items and either the items were either correctly pronounced or mispronounced, and we analyzed the looking behavior both pre and post naming to this to see if infants accepted essentially accepted the pronunciate mispronunciation as a correct. So to give kind of a little bit of an example from Norwegian, like the word for **not** is both **iche, ?? ?? or ??** and you can use any of these. And there's also some dialectal words where, for example, the word to think I I think is yeah **??** or you can say **??** like **??** or **??.** But if you switch this with **mood** and **mood**, it is the difference between mother and wall. So and you've got this like medial vowel and in one instance it's totally acceptable and it's totally normal to just switch it out and in other cases, it's not at all or, using switching out a K fo a V like **kufur** or **??,** for Y, this is totally normal and it's quite interesting that, yeah, Norwegians are quite flexible and we're kind of looking at this young age, is this - how flexible is this or have they learned how to separate out so we used familiar words and didn't the IPL task and tested 99, we ended up with our Bayesian statistics, participants, uh, which, yeah, mono dialectical and bi-dialectical, which is quite interesting.

So essentially for my yeah, for my project I started kind of - it's a two years masters in - at the University of Oslo and for the first year they kind of set it up to start thinking about your thesis and have the second year geared towards working on the thesis. But I kind of approached my advisors early and they mentioned this registered report would be something that I could consider, and for me, this was really appealing. I like the idea of the challenge, but I also think that being able to write something that I could contribute to, yeah, the - the field which was really an exciting opportunity

and also I think I got to dive head first into what, yeah, open science is what registered reports are, how to choose reviewers -

Sarah: Mmmmmm

Nora: this - this is just like a big process or you know, I don't have an ORCID ID. How do I - how do I submit a paper?

Sarah: Yeah.

Nora: So it was, it was quite a challenge, but I think I really appreciated this process of um I guess when I'm setting up a project, you're really thinking through really thoroughly with the methodology and even from the statistical pipeline and what are you actually looking for? And when you are deciding what data to gather, what is -what is actually gonna be important to answer the questions you're asking? So yeah, I thought that this - the experience, it was quite a whirlwind. I also, yeah, did my thesis, I wrote my thesis and went through my master's program during the pandemic, and so it had his own challenges and it also I guess the - the amount of connection, but it really lowered the threshold for asking questions. I ended up sending emails cold emails to quite a lot of the authors of papers that I - I read to just ask them because I was unfamiliar with either the way that they went about it or the analysis or how they got to certain numbers, how they decided that enough participants is enough. Now this was before I, yeah, dipped into Bayesian statistics, but I think just kind of going forward and trying and I think if anybody else is considering going for a registered report, I think it's - it's totally worth it. And just for – it kind of gets you into the mindset of why, yeah, why, what - why you're going about this research, but also how you're going about the research. I think it's really important um and you're really - you can't afford to think about what your results will be because you have to get to this stage one first and so you are setting up your experiment with, yeah, with the method in mind and not the outcome. And I think that this is -

Sarah: Mmmmm.

Nora: - something that really helped me because in the end, in the end I didn't get the same results that I expected. Like I - I got a - a null result like my model, dialect will participants don't show mispronunciation sensitivity and I did not expect this at all. Even we got to the max amount of participants, but to me this is peanuts of my paper, I – I don’t care -

Sarah: Yeah.

Nora: - that I have a, you know, quote unquote a null because I think I'm more confident in how I went about testing them. And I think this is something that, yeah, it could be really helpful.

Sarah: And like, that's the evidence, right? Like you, you set it up in such a way that you could be quite confident in the result, and that's almost I dunno I - I feel like I'm going to say that's what science is about. Like we set it up to test a question and we're looking for an answer, but you know, ideally we're not looking for the answer that we want to find though we know that that's what a lot of the current incentives push us to do.

Nora: Mmm.

Sarah: I think it's a lot more interesting to ask a question and like, OK, what's the best way for me to gather evidence for this? And that's what we focus on.

Nora: Exactly, yeah.

Sarah: And then just like, see what happens.

Nora: Yeah. So I - I really found that that was - that was helpful. And I think also for uh, doing a masters and now I'll be starting PhD, so that also has a timeline and kind of a deadline for when you need to get papers done. And, and yeah, you can't - you can - you have to choose kind of where you can afford to be picky and where you really run it, yeah, spend your time finessing the approach and it's - and I think that really helped as well because you just you're focused on where you can make a strong framework and not necessarily how you can fiddle around on R until you get something that looks presentable.

Sarah: Yeah!

Nora: That we all like colors and color packages and something that makes you look like your line on your graph is a bit more sloped. But no, I think it's - it's really - I really had - I felt it was a really valuable experience.

Sarah: Awesome. I - I my biggest worry with the registered report is - is timeline. I'm sure you've come across this before. Could you speak maybe a little bit about how you manage that? Cause it's the same with like any kind of other paper, you don't know how long it's gonna take for the review to go through and if there's multiple rounds, like how do you navigate that within the confines of a program that has a deadline?

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Nora
Yeah, absolutely. Uh, I will say this is - I'm still get a little - I still get a little bit stressed thinking about it because I ended up so as I mentioned, you kind of have the second year of your masters to do your thesis and I ended up writing this stage one report and I submitted it the first yeah, I submitted this stage one report, June, so kind of before the summer break before my second year -

Sarah: Right.

Nora: - and I didn't receive it back until late August, early September and then it was kind of like, OK well, this is expected. We're gonna get it back and then review, but we got major revisions and it was like I went from using pupillometry to, uh, international - intermodal preferential looking design because I was introducing too many new elements. And I think like looking back on it, it was really great because they kind of - the reviewers kind of had me narrow down how many new elements you're adding. And this is really important, but I guess the - all of the reviews and the revisions and the edits, I actually didn't get the last acceptance, uh, final acceptance before the end of February of my second year of my Masters, and so and I had like flyers and QR codes for gathering data and I'm gathering data with 13 month old participants and it's like a 10 day window for these kids to come in. And so it was quite stressful! But at the at the same time, I had spent so much time preparing for it that it was just kind of like all systems go and I ended up testing a lot of participants between yeah, March and - and mid April essentially and I had almost everything written up other than my kind of like plotting in where the results were to go and then kind of some bullet points of, OK, well, if it went this way, this is what I would consider if it went this way. But yeah, it was – it's quite stressful, but I think again, uh, having thought through so much like you're almost considering elements of a discussion when you are writing a registered report –

Sarah: Yep.

Nora: - because you have all of these considerations to take in mind and - and there are things that I would, you know, change or what I would look more closely in next time as are with all studies. But I think it was a crunch of a timeline, but it also helped you evaluate like, what's the important part of

the paper? Is it - umm yeah, is it the reasoning for why we need this and how you're gonna go about it? Or is it the actual numbers and those are quite small actually. And yeah, I spent a lot of time writing the script ahead of time, so this is something I think that's really important as well. And I used - I just - I made dummy data. And so this was also really helpful because you can use this in the time when you're waiting for your report.

Sarah: Yeah.

Nora: Unless they tear apart your statistical modelling –

Sarah: I mean..

Nora: - but I think like this is also something where it's like, R can be really time consuming if you want it to be. And I think like, yeah, you learning to use dummy data is - is something that really helped as well because that you can kind of like, model how - yeah, how - participant - potential participants could look.

Sarah: Yeah, that's awesome. One of the - part of what you're saying was like super relatable, like my - my master's thesis had way too many variables and I like did not have the participants to test that so it was just like kind of a complete flop because I was like, wait and no one told me. I'm like, I wish someone had told me –

Nora: Yeah.

Sarah: - to be like you can't test all of these things with all of these different levels is - it's just you're not gonna have the power.

Nora: Yeah.

Sarah: But it didn't - you know, I learned from it.

Nora: Yeah.

Sarah: But I sort of wish that I'd been told beforehand, but at the same time in the UK a masters is one year, so that really, really constrains the timeline, because I've thought about it like how do I incorporate open science with the students that I'm going to start supervising?

Nora: Yeah.

Sarah: You know, and I - to me, so far the only thing that I'm pretty sure I want to do is, uh, preregistration, because I think to me like, that's sort of the lowest bar because you're applying for ethics anyway so you might as well just do a pre-registration –

Nora: Yep.

Sarah: - but it would - it would be cool to try a registered report? I dunno. So I've tried one, once.

Nora: Mm-hmm?

Sarah: And it – it never happened because there was a request for pilot data, right as part of the submission.

Nora: Yes, OK.

Sarah: So I tried to pilot the study and we're trying to figure out the - the method, what we're going to do.

Nora: Mm-hmm.

Sarah: And we tried like 5 different things and in the end it's still like didn't do what we wanted. So it just sort of like died because it could - we couldn't figure out how to actually test what we actually wanted to test, so it never got submitted, so that was my first experience of registered reports and, you know, it's not that I don't want to do it again, I absolutely plan to do one again. It's just this particular one was a bit uh, a bit disappointing and I guess it's - it doesn't really question the timeline because if you have to have pilot data as part of the registered report that does require a bit more front loading work.

Nora: Yeah, I - I did not actually.

Sarah: You didn't, OK, maybe it was a journal -

Nora: Umm, but it was for stage one.

Sarah: Yeah, this was stage one.

Nora: Oh!

Sarah: I guess it depends on - on journals and it might have been a request that I sort of read as it's better if we do it so let's do it.

Nora: Yep.

Sarah: And it was good, because then I could walk through a bunch of things and you have to realize that this wasn't actually going to pan out.

Nora: Yeah, yeah.

Sarah: So it's a good process.

Nora: No, it's I - I think that's what you're saying is like, it's good because it kind of makes you consider, yeah, all of these parameters. But like you're saying, it is quite rigorous and I think that this is also something that uh, is really something to consider is like, it is time intensive, so you can't - you can't just pretend that it's not, or you can't assume like, well, maybe it is, but - but I could just rush or not rush through it, but, I think I've got enough evidence. I think you really - and for me, I feel like it was kind of blissful ignorance because this is the only paper I've ever submitted and written a registered report.

Sarah: Yeah, yeah.

Nora: And this is kind of my experience now with - with publication is doing a registered report.

Sarah: Right, that's pretty good, actually.

Nora: Yeah. So, but I feel like it's blissful ignorance because it's - it's like it was quite a lot of work. And just thinking like, oh, my gosh, I'm gonna do three of these for my PhD! And that's not necessarily the case for most people, but yeah, so I think it is in a way maybe it's good, but it's also considering the timeline, it's – it can be… But there is a type of registered report I think uh where you can get it kind of rushed where you can, where you can apply for a pre some - it's something that is, yeah, with it - within the time constraint, you can apply for it for a stage one with the time constraints. So I'll have to look more into that

Sarah: Ok, that’s good to know. Yeah, I might suggest it to my students and we'll see. And I mean, I actually just remembered we've just been matched with our undergrad students -

Nora: Ohhh

Sarah: - who also have a year. But, I say now - now is May. I don’t know when this is going to be published, so now is May, for us, recording time. And so, you know, we - we could, if anyone wants to start now –

Nora: Mmm

Sarah: - and have like the summer to submit something –

Nora: Mhm.

Sarah: - and then move on to - to next year.

Nora: Yeah, that's essentially what I did, I guess, yeah.

Sarah: Oh, yeah, yeah, OK. OK, this is becoming like more possible as - as we talk through it, I'm like how –

Nora: Yes!

Sarah: - how could we possibly to do this?

Nora: Well, and it's like you never know, but I guess I was one of those students as well where they were like, well, you could in your free time – I – work on a registered report in the summer, you know, work on your edits in the summer and I'm like perfect, that sounds great, I'd love to! You know, I'd love to get hit the ground running, so for - yeah, I don't know how many, how many there are out there who would say yes to that. But I think like opening it up, I think, yeah, as somebody who's just starting, it's kind of tough to know how to take the first step. And I think for a lot of - for a lot of people, at least those who I've talked to, it's like, well, they've had a professor who has let them contribute in the discussion. And that's kind of how they've gotten an authorship on a on a first paper or something or first contribution or kind of been a part of this, yeah, the writing up or being a part of - a part of a paper. And so I think knowing that there's more than one way to get into it? Get into, yeah, that first paper I think then it seems a little less daunting as well. Umm.

Sarah: That's what I probably what I love about, you know, from the point of view of a now supervisor is that I - I would love if, like these students’ first experience of doing science was to do a registered report, like, that's all you know, you don’t have to, like, unlearn a whole bunch of other things.

Nora: Yeah.

Sarah : This is - this is the - the standard and it seems to have really benefited you. You also talked earlier about how helpful the framework was, can you tell us a little bit more about that?

Nora: Yeah. So I would say when you're using kind of a stage one submission for the registered report, this framework where you have to, I guess their framework is where you develop the idea and you design the study and then you have to go through the stage one the peer review and then you're collecting and analyzing the data. Um, but with this designed study, they require that you have outlined an argument for why this research is, yeah, needed or why it's important? But then you also have to outline how you will go about it, what kind of data you are actually planning on collectin, and

what it's going to be used for. So they kind of require that every and kind of thread that you're putting out there in terms of a yeah data collection, but also what questions you're asking. It has to be followed up like the kind of the string has to be tied with some sort of outcome or some sort of analysis. And I think that this was really helpful because you are operating within this framework that requires you to consider and where you'll be using all of these, all of these parts and also what's feasible and also what's required to learn to get there –

Sarah: Mmmm

Nora: - when you're looking at statistics. And I think understanding I think early, especially during bachelor - my bachelor's degree where it was like you can use ANOVA, you can you know like you're - you're getting all of these different statistical tests and you're kind of learning what they are based on, what they're gonna give you as an outcome but you don't necessarily take the time to learn like how you're planning out how you're collecting yeah, the start points. Umm, and why that's important how you tie it together to the outcome. So I think this was really important and helpful for me too. It's like, OK, well, if I'm collecting some sort of data on, for example, the different dialects, like, how am I going about that and how am I asking because I'm going to be using it to analyze these kind of groups and these clusters and that was helpful. And also to be able - I think one thing that I also was thinking about is looking at other academic papers for people who have written in the same similar field on how they've kind of structured it as well. So you have a lot of different structures that you can be inspired by, I guess.

Sarah: Right. Yeah, I guess it might help make it a little bit less, less daunting, and I don't know, it feels as you're talking through it, it feels to me like it really forces you to deeply understand what you're doing.

Nora: Mmm.

Sarah: Not to say that we generally like mindlessly repeat things. But like, I've certainly been guilty in the past and be like, oh, that's a cool paper, they did a cool thing, let me just do it too!

Nora: Yep.

Sarah: Without, like really deeply understanding why, you know?

Nora: Yeah, definitely, definitely. So I - I feel it was - it was a really good experience as well and especially for, uh, learning what it's all about, I think, yeah, open - open science as well, this is also something where it's like, OK, well, if you're gonna write something that is going to be quote unquote good enough or clear enough, I guess I should say for other people to understand and for other people to use like, this is also another step where it's not just you presenting your work, but it's also how - how would somebody else use what you were doing right now too? And I think that that is something where maybe it's not as easy to consider like how the next person will use what you are outlining, like how easy it is that, so..

Sarah: Yeah, I feel like it's- it's always - it's hard to know because I always think I'm giving enough information for somebody else, but then there's so many times while read other people's papers and I'm like there's missing information, why didn't they include this? And like I don't, I probably don't either because it's - it's not really convention in some cases and it's hard with that amount of detail. But I guess that comes with if you share your procedures, if you share your code –

Nora: Yep.

Sarah: - then those sorts of things become a little bit less of a concern, like still be as clear as you can obviously in the paper.

Nora: Yep.

Sarah: But, if you have access to all the materials then it helps a lot with being transparent and with facilitating replications, right?

Nora: Yeah, actually that's a really, it's a really great point you bring up and it just - that it's just like seamlessly, you know, transitions to this paper. So I mentioned I just emailed all of these authors and one of the authors, it was this big meta analysis they had done and part of their code I didn't quite understand and I didn't understand where this - where these numbers were coming from and I didn't quite understand where what was written in the paper where that was, where you could find that and in the script. And so I just emailed them and we ended up being a really good discussion and like, oh, I just use this, you know, series of code when I want this – when I want this sort of graph to display these error bars or this, like, this kind of trend. But didn't realize that I hadn't explained that at all - all of a sudden it was just like, it just hopped over to this random - seemingly random group of, yeah, lines of code and - and it totally made sense to them as writing it because they've used it before and they just adopted it in this new meta analysis. And I think that that's also really helpful for everybody to understand. And I think you have much more experience in this, but I think like within this open science community, it's like if it's not just for the sake of complaining, like I love critique –

Sarah: Yes.

Nora: - because I think it - it really helps - It really helps to learn and I think like within this kind of open science field is, I found at least that the people who I have been in communication with are much more open to - to this kind of form of building up, yeah, this resource network instead of, yeah, there's not - I don't know if you could consider it like traditional pride, but yeah, it's quite - it's, I found it's been really helpful I think and maybe that helps us being like a young or like just stepping into the field as well is like I - I'm at - I come from the perspective of I'm not sure, so I would love feedback and I think that this is - I'm going to use this as much as I can –

Sarah: Yeah, absolutely!

Nora: - before I can be called the so-called expert.

Sarah: I - I love the advice of emailing the authors. Like that's actually really, really good advice. It doesn't occur to me sometimes and I should do that more like we - we're here to talk to each other, right? That's what 0 That's what papers are, and that's what you would hope think. I don't know. I feel like that's what the community of scientists is we're here to talk to each other, build off of each other, work together.

Nora: Yeah.

Sarah: So yeah, let's talk to each other. Not that I, you know, particularly want a whole lot more emails because just in terms of workload but I think that that's the more fun the emails, the more interesting things to get in your inbox.

Nora: Yeah! Yeah, and I think, well, I guess while we're on this topic and maybe it's - maybe it's a, I don't know if I can say generational, but I think it's also like maybe more emails are not more fun. But I think like lowering the threshold for OK, well, I'm am actually walking to work at this point so if you have a question on my paper, we can just chat about it, you know, on a phone call or call me between this time and this time and I know it's not always easy to say you're gonna be open for virtual office

hours, but I think and it kinda makes you feel closer. We had discussed this kind of when you've only seen somebody's name as an author on a paper and you meet them in real life, speaking at a conference and just kind of - it's kind of mind-blowing. It's like when you're young and you see your teacher at the grocery store. It's like –

Sarah: Yep!

Nora: - why do you exist outside of the realms of the classroom like this is insane! So like I think yeah, understanding that there's there are also people behind these scientific arguments as well as kind of kind of fun to yeah, maybe uh email more and to get advice because as - as people have written papers ourselves, like we have ideas and thoughts and - and words and conversations beyond just the paragraphs in our - in our articles that we write and so, so does everyone else then.

Sarah: Exactly. Yeah, it would be really nice to just in general lower that barrier to access to academia –

Nora: Mm

Sarah: - to just generally invite more conversation.

Nora: Yeah.

Sarah: Maybe we can, I dunno, be more explicit about having our inboxes open to that. Maybe it's something I can put on my on my social media or something to yeah to lower that barrier, because I think there's definitely an element of… uhh, I dunno about inferiority? Is that the right word of like, ooh, should I like bother this person? They're like this really big famous person and like, do they have time for me?

Nora: Oh, yeah

Sarah: And should I really email them? It's like, yeah, why not?

Nora: Oh, yeah

Sarah: The worst that can happen is that nothing - you get nothing back. But like I think in most cases, everyone that I've heard talk about this is like actually I love this kind of question. Like, please talk to me. I love talking about my work and like which one of us doesn't love to talk about our work?

Nora: Yeah. Yeah, exactly, and I think it's - and it's a really awesome opportunity as well to like you were saying get to - get to know somebody as well and how they think and how they talk and - and just learning from each other I think is really can be really helpful like you know shout out, shout out to Twitter like: feeling like ranting about Bayesian statistics? Like, you know, DM and we could talk about it, you know, and then you just you end up having this more open conversation as well. And I think it's it can be helpful as well or just asking when you have a question, I think instead of waiting until it's the right time or you've got enough of a - enough of a background to ask this question, I think.

Sarah: Mm-hmmm.

Nora: So, yes, I got good at writing emails during the pandemic asking questions saying I really don't know exactly how to ask this question, but I see in your scripts something that I don't understand, could you please explain it to me? And I think that, yeah, I - I felt a bit foolish writing the email, but I got an answer so I guess I feel validated in that.

Sarah: Yeah! I mean, I'm thinking if I got a question like that I'd be like someone read my work, ooh! Someone's actually interested? Awesome!

Nora: You read page 27!

Sarah: I like - of course I would want engage with that person! That's this is like a form of flattery in academia, like ooh wow. It feels like - I don't have that many papers out, but they're just like out in the void. I don't know who reads them or engages with them, so it feels like what I do has like, no impact, but I don't know.

Nora: Yeah, and - and I think.

Sarah: Like there's no way of knowing

Nora: Yeah, I think that's a really - that's a really interesting thing that you say too. It is kind of maybe a topic for a different podcast, is like how do you feel about work just floating there and you're not exactly sure about, you know how it's being received and how you can look more about, yeah, the reception of that. So I think, but yeah, it was - I felt I had a really if there's anything I can give advice to, it is to just yeah, email about that weird graph on page 27.

Sarah: Yeah.

Nora: It's great. You get a lot of good conversation, and yeah, I think it's - I think it can be really helpful as well.

Sarah: Ooof, so now we're proper full of new knowledge and awesome advice; time to wash it down now with some tea in Spill the tea! Nora, what do you want to rant about?

Nora: Yes. Well, I would love a cup of tea, but I also think that Bayesian statistics are awesome!

Sarah: Whoo!

Nora: And yeah, this is one thing that I really learned through my paper as well is adopting Bayesian statistics. Umm, thanks to an email from one of my advisors who had gone to - had gone to a talk and said, hey, what, what's this Bayesian statistics thing? Maybe we can just apply it. Umm. And so I - I went through -

Sarah: Love that.

Nora: So I quickly learned a lot of Bayesian statistics and uh I'm by no means an expert, but I can - in addition to that paper I mentioned the very beginning, I think I've sent a couple of, yeah, resources to Sarah can put in the show notes, but it's **Name of blogger** has this great blog and essentially Bayesian statistics is not what we, I guess what he talks about is, it's kind of Bayesian inference or this Bayesian statistics is common - common sense expressed in numbers. And so we are looking at two what he calls kind of rival accounts and this is the H1 and the null and what you're looking for with this like, uh, learning cycle kind of within Bayesian statistics is you are doing deduction and induction, so you have like your prior knowledge about the world and then you make a prediction from this. You're gathering the data and you're looking at kind of this how that data lines up with your prediction. You adjust your new base of knowledge based on this so say you've got, yeah, you've got kind of a clump of you have where you thought your evidence would lie. And then you gather this data and you get this clump of evidence that's maybe a bit to the left if you're looking at a horizontal timeline - or line and then you kind of update where you expect new data to be if all of this prior data has come in, so you're – it's this cyclical process where you're always updating. So kind of like what we're talking about where you can't just add data until you get a significant number. This is kind of

the reasoning behind that is where you're just adding more data to give you more - more evidence, not necessarily towards one place. And as I mentioned briefly before my mon- my mono dialectal participants, they - I ended up getting kind of anecdotal evidence for the null, so I actually ended up most of my participants having evidence to support the null than I expected and that's just where they ended up. So the more participants I added, the closer to the null they got.

Sarah: Mmmm

Nora: So, it doesn't actually lead you to, yeah, to prevalence here. But I - I think it's and what's really I really love about Bayesian statistics as well is that you are you're constantly updating, but you're also looking at with this sequential Bayes when you're constantly updating a lot of the designs use a maximal end. So it's not a power analysis, it's for example in my paper it's set to 60, this is - I used it on, based on some previous papers that it set the maximal *n* to 60 as well, participants and at this point you've got, yeah, you've got quite a lot of evidence to either support or not support. But, and this is really helpful when, for example, in my study I was testing, yeah, 13 month old participants and this in a really strict time window and it's - you don't wanna have to test more participants then you need to and so this is really helpful when you are like, yeah, you're you've only got a certain amount. And actually for the reverse, I only had to test 20 participants for my bidialectal infants. And you'd think, how can you test 20 participants and this is enough? Like this would never be enough in a power analysis, but all this evidence was just so strongly and yeah, pointing towards the Bayesian factor and it was high above the inference criterion so you're also able to stop earlier, which is something that I think saves you time and resources where if the evidence shows kind of, you know, like if you not necessarily in poking a pizza but back to a pizza analogy.

And but it's kind of like if you order - if you say, you know cheese pizza and you get a cheese pizza and you order, you say this three times and it's correct every time, lLike, are you gonna order a fourth just because you need to be proven that you're gonna get cheese when you say cheese like you're at some point you have enough to show that it's most likely gonna be the case. And so, uh, yeah, it's, I guess what **Name of blogger** sometimes says, like, the level of surprise is kind of what is adjusting this so like if you're if it's kind of on par with what you're thinking, it's also gathering evidence to be within this same, yeah, the same hypothesis where it is so, umm, what I also think is really interesting is talking about - I guess I've mentioned this as well too umm that you have the weight of a null hypothesis where there isn't significance or insignificance. It's just where the evidence lies, and I think that this can kind of help us to restructure what we're thinking about when we're thinking about, well, where what are my results, are they - it's not necessarily that they're significant or insignificant, you kind of see where the where the data points fall, essentially, and then this is where you this is what you've got in the end instead of looking if they are heading one way or another. I think this is, yeah, I think this is really powerful as well. And yeah, so I don't - I don't know how to make Bayesian work, Bayesian statistics more convincing other than the fact that now there's Bayes packages on R so you don't have to write this script yourselves.

Sarah: Yeah, that helps

Nora: My script will be up on the OSF page so I think yeah, and it's a Bayesian t-test. It's quite - it's quite simple and elegant in terms of like R scripts so yeah, Bayesian statistics relative predictive performance, it's not frequentist.

Sarah: No, and what I understand also from that is that Bayesian allows you to make it really specific predictions and then test all those specific predictions.

Nora: Mm-hmm

Sarah: To, OK to look at this hypothesis, does it match the data or how much? What's the Bayes factor for that? Let's try a different hypothesis. How does it match the data? And so you can sort of look around and modify your prediction and just see how well it fits –

Nora: Yep

Sarah: - with your data, which is something that is like again a big no-no in frequentist. You don't do that because multiple testing is a problem, right?

Nora: Yeah.

Sarah: But that's just not a problem in Bayes so like I - I'm super convinced. I was convinced years ago, honestly, but I've just not gotten around to implementing it! So this is giving me like that extra an extra kick of like trying to - to do that again to –

Nora: Yeah!

Sarah: - to implement Bayesian stats in - in future work. I don't really have anything started up yet in this new job, but there will be. So I can - I can think about, yeah, learning and then applying, well, the implementation I - I think I have a pretty good grasp on - on the theory of like why and how it works. And yeah, I'm totally convinced.

Nora: Cool.

Sarah: I - for me, it was Understanding psychology as a science by Zoltan Dienes that like really cemented that for me where I was like, yeah, this makes total sense – cool – I'm on board.

Nora: Bayes!! Yeah, it's actually in my previous life I worked as a healthcare consultant and we did, yeah, there we had some statisticians who used Bayesian statistics and I kind of - it was one of those things that was it made total sense and I was so convinced but I was just not ready to dive into that world. And then little did I know that this is where I would end up.

Sarah: Yep!

Nora: So it's I think it's, yeah, it's really interesting. And like you were saying too, it's where - it's not necessarily that you have this idea and then you get data and it's significant or it's not. But it's also it's looking at like, well, what about this hypothesis? What about this model of? It's kind of like what about this model of our understanding of the world? OK, here's our data. How well does that fit with those two? So you're - you're essentially like, you know, those gel slides where you can cover lights to make different colors.

Sarah: Yeah.

Nora: It's kind of like, well, how well do these fit together? How much did this match up with what you were expecting about the world and to see the world through and how? Yeah. So I think it's - it's definitely much more statistics-y, I guess if you can say this? But it - it because it forces you to also get a better grasp and understanding what what's statistics actually is as well I feel, um, because of this, yeah, you have to understand the model of - from which you are - for which you are applying the data to.

Sarah: Hmm, I find it a lot more intuitive cause this idea of like oh that hypothesis. How about this other world view? How about this other worldview? Let's try this other model like. Like, why - why couldn't you do that, right?

Nora: Mm-hmm

Sarah: Like it's just - it's unintuitive to say that like, nope, you can only try one thing and that is it. Cause that's the way that frequentists is set up, it's long term probabilities.

Nora: Yep.

Sarah: And because of the error rates within a family like you can't, but that seems like the intuitive thing to do in everyday life.

Nora: Yeah.

Sarah: You have this evidence and you go OK, does this explain it? No? OK, let's try this other thing. Let's try this other thing like, yeah, it - Bayesian's just so much more intuitive!

Nora: Yeah.

Sarah: So much more sense!

Nora: Yes, exactly! Yeah. So I - I - I definitely suggest checking out the Bayesian spectacle's blog. I, yeah, I really am a big fan so I think it's - it's really, really something that I - I'm ranting about in the best way.

Sarah: Yeah

Nora: Try Bayes!

Sarah: Alright, so you heard it from us, listeners. Here at ReproducibiliTea, hope we've convinced you: everyone should be doing Bayesian stats - go!

Nora: Yes, exactly.

Sarah: Alright, that was a delicious spot of tea, so let's balance out this whole meal with some delectable desserts. What I wanted to bring this week was something that I learned at a SIPS conference. It was last year, so SIPS 2022 had to think about that for a second.

Nora: It's already last year.

Sarah: Time is confusing. Yeah.

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Sarah Sauve
Umm, in Victoria, I learned that you can appeal rejections! From journals and from conferences. It never occurred to me that you can appeal something like that. To me, rejection was always just like, Oh well, that's it, they said no, but that's - it blew my mind. And I actually have used it for the first time recently.

Nora: Nice.

Sarah: A paper was rejected from a conference and some of the feedback was – it was just, it wasn't generous, like it was a mis- a bad faith reading of our paper and so we wrote to the conference organizers, and we appealed on that basis. We said like, look, we think that this is in bad faith. This is only an abstract, what you're extrapolating isn't founded, or what the reviewer is extrapolating isn't founded and this thing is - this is excluding a critical view because it - it was like talking about ideology, which can be scary. When you're challenging the status quo, sometimes you know you tend

to get shut out, umm yeah, on the basis of exclusion as well, and they accepted the appeal, which is awesome!

Nora: Yeah.

Sarah: So we now get to present this work.

Nora: Yeah, congrats!

Sarah: So, we're really glad that the organizers were accepting of this, this appeal. And you know heard our argument and actually responded in a positive way. And from what I hear, when you also appeal to journal editors, rejections, and things, you have a good chance of the decision being reversed, so it's worth a try.

Nora: That's a huge - I feel like that is a untapped piece of, you know, knowledge out there that's just like you were saying when it blew your mind. Where it's you're, yeah, when you, when you hear no, it's kind of like, alright, well, I guess I gave it a shot, you know but I think what you were what you were explaining to is that when you are sending an appeal it also helps you to kind of revise well - well I think my work is important, and you know like sharing your work and especially I think when you have something like ideology and challenging the status quo is like well that's exactly the opportunity where it needs to be shared to more than when you were saying, you know, you send out a paper into the void. You know, this is these are the types of papers that are - are challenging and important and I think that when you're appealing rejections, I think, yeah, we can all learn from you and be a little bit more bold and - and saying, well, maybe if it's a no because it - it might be and - and like you were saying and it said, you know, having a bad faith reading and - and everybody can experience that from both sides as well.

Sarah: Yeah.

Nora: And I think it's - it's good for us to know, you know, and remember that we can appeal it, especially if it's something we are passionate about wanting to share and - and also for reviewers and understanding that like, oh yeah, maybe I didn't think about this or consider this point from a - from an author when I was reviewing this as well so I think, yeah, yeah, no, that's a huge - that's a good slice of cake right there!

Sarah: Yeah, that was a great learning for me. I think - it just occurred to me, but what about funding, I - I don't think you could appeal a funding decision? I think that one's a little bit harder.

Nora: Give more money.

Sarah: I don't know if anyone tried? Umm, but I suspect that would be a lot more difficult, whereas journals and conferences, it's often colleagues, it's - it's a bit more collegial just in general, I think.

Sarah: Do you feel like we have we covered everything - anything else that you want to - to raise?

Nora: Uhhh. No. I - I guess if I yeah or final sum up, I would say that registered reports are - they are time intensive and they are lengthy. And so I think like also respecting that it will take a lot of time too, because I think for - for example, your master's students who maybe only have a year and having it be a flop like having - having the experience of writing a flop is also not amazing either. So I think, but I think that there are a lot more motivated younger people out there as well and like being given this opportunity, I think it was really, really a motivator for me to also continue. Um and I - going into like I feel more prepared starting a PhD. And also yeah considering like what steps I have to do when I'm thinking about an outline for my next three or four years is like is, will this be a part of it? Like,

taking time to post all my at least pre registrations is - is something where I'm planning on doing it. I think that this is really helpful just for like a mindset moving forward as well.

Sarah: Yeah. Awesome. Thank you so, so much for coming on to our podcast and sharing your experience, I think we're gonna take a lot from what you've shared, lots of great advice in there as well. If anyone wants to follow you more, what? Where can they find you online?

Nora: Ooh, I am more of a follower than a tweeter on Twitter, but I'm just that @norraserres and on Instagram as well @noraserres there you can see more about my - in my quote unquote free time I compete in Ultra Trail running and have chickens, so if you are interested in that maybe I'll do some like Bayesian statistics on colour of eggs. We'll see. But yeah, so if you are looking at some, yeah, some mountain inspired academia, then head over to my Instagram. And if you're looking into more - so into more, yeah, straight science then I would go for Twitter, but both @noraserres.

Sarah: Wonderful! Wonderful, thank you.

Nora: Yes.

Sarah: So, you can follow ReproducibiliTea on Twitter, @ReproducibiliTea. If you wanna follow me, I'm @sarah_sauve or @madomyyt, M-A-D-O-M-Y-Y-T on TikTok where I'm talking about my day to day life at work. That wraps our episode for today. Thank you so much for listening and thank you so much Nora for coming on!

Nora: Yeah.

Sarah Sauve
See you next time!

Nora
Bye! Thanks Sarah for hosting a good platform!