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Catalysing Cognition Research in Africa: A Novel Approach to Methods Development.

Dr. Anna Blumenthal, Postdoctoral Researcher, Université Laval, Canada

Dr. Caylee Cook, Postdoctoral Researcher, University of the Witwatersrand, South Africa

Really happy about that because you'll see that this project is very much a community project and dependent on all of us hopefully. So, I'm Anna. Just to explain the structure of today we're going to try to make this the part where we present the project very short so we have a lot of time for discussion. So, I'll just give you a general introduction and then Caylee will show some of the data from a survey we gave to the community and then there'll be plenty of time for questions and then for discussion. So, the project is called Catalysing Cognition Research in Africa: a novel approach to methods development, and it's funded by shark which is a Canadian social science research grant.

So, the project really came out of discussions amongst our own network about needing to develop measures when we wanted to do a specific project. So just for example using the emotional strip cast, it uses the IAP space database, but this is not relevant or made, or created, for Africans, and there's lots of examples like this, and so we wanted some time and money to focus on just measures and cognitive tool development.

Then, as you'll see the project grew in a different direction. So, it's a collaboration between ourselves. Our team is in Quebec and working a lot with the University of Goma, the Democratic Republic of the Congo, as well as Rwanda and we've teamed up with Caylee's team in South Africa.

So, what's the general idea of the project?

Our first goal was to create a community of practice to expand beyond our network and bring different researchers concerned with cognition research in Africa together. I should say that we're adult researchers. I'm doing some developmental work with Caylee's team so we wanted to have sort of adult and development included together, and well we very quickly achieved our first goal thanks to merging with Bosilijka in this network.

So, the other idea for the project is to use the community to identify what kinds of measures are most broadly useful that needs some developmental work; whether that's adaptation or simply more data, that's what we sort of are planning to figure out.

So, the idea is to try to identify measures that are broadly useful and then put some work into developing them. Having that project track, but our hope was that through doing that will also lend itself to community building. What we're hoping is that the community of practice will sort through that project also create infrastructure for a long-lasting community of practice where

we can work together on methods and measures development problems. Also, share existing measures and tools and protocols to harmonize data collection and just have a place to network effectively. So, in a little bit more specifics, our goal, our plan set will unfold in a few different phases. This is a two-year project but we're hoping that the community of practice is built long lasting and continues to change and grow.

In phase one, our goal is to create the community virtually and also to survey all of you to identify measures that are important for a broad range of researchers get some data on different issues that people are facing methodologically. Then the idea is that we'll take from that survey data and select a set of cognitive measures that look like they'd be broadly useful and develop tasks for us and start to put some work into them. So, whether that's adaptation or different types of adaptation or maybe there's just need for more data across different sites, so then the plan is to - once we have those cognitive measures in shape and what that will look like exactly is also something we'll need to figure out - but then to do a larger data collection with those measures and also some measures of sort adversity demographics and context so we can start to relate that data.

The idea is to share the entire process, the results with the community after each phase, get your feedback continuously and ultimately have a nice set of measures and protocols and have everything be open access and easy to use. I should also say that it's a work in progress, so if you have opinions on how to do this like we're very open to reshaping that based on what's useful for everyone.

So, where we're at now is that we've completed phase one and so many of you probably thankfully filled out our survey. So, today we're gonna show you just a summary of the results but I've also shared the raw data in case you're interested in looking at it more, which will show you where in our virtual community of practice.

Right, so I was amazed just because everyone's so busy so thank you all for taking the time to do the surveys. 42 people, and as you can see quite split between Africa and non-Africa. Here's a breakdown of where everybody came from.

I should say this is actually under representative of work that's going on in Africa because I just put people's primary affiliation here. Then in terms of the range of people who filled out this survey: mostly professors, well a range across career types and levels, so some clinicians and practitioners, mostly researchers, some graduate students, some professors. Then in terms of population age that people worked with, again really covered the lifespan. A lot of people, not surprisingly, in development working with children at all different age ranges. But also, we have some neuropsychologist working with older adults as well.

Right, and then in terms of areas, it's not shocking since it reflects our areas and our communities, but it's a bigger range than I expected so I guess a little bit surprising. Again, a lot of people working in child development, psychology of work, neuropsychology, some social psychologists (I think that's reflecting our colleagues' network from Morocco). In terms of specific focus - a much bigger range mostly around cognition, mental health and whatnot. I

think I'm gonna let Caylee take over now and tell you about what people had to say about measurements and measurement development.

Great thanks, Anna. I think oh can I control it. I gave you the power I hope it works if not I'm happy to click for you. How does that work, that's quite cool. Does it work? No [Laughter]. You can just navigate for me if that's okay. Sure, I'll try to get my timing precisely.

All right. Thanks, Anna, for the intro and just because there was a comment that popped up in the chat, I wanted to just mention that the project that Anna and I are working on does span, or sort of, we're talking infants all the way up until older adults focusing on cognition. Obviously, through our contact with Bosilijka we realized there's a huge chunk of the development, of the Early Childhood group, trying to do the same thing with the AfriBCD. So, we thought it'd be worth joining through that. But obviously we have a whole other side of the adults that we're working with as well, so it really does include both. And there was just another quick question on the chats I saw "is the survey closed or do you still run responses". I will happily send the link. We still have the link so we can maybe send it around on an email again or I'll grab it in the chat at some point and give that to you.

So, these are the results of the survey. Those of you who did the survey will know what the questions were, those who didn't - we were asking what measurements people use or are currently using, what measurements they feel might need adaptation, and what types of adaptation or development is needed. So, really to just get an idea of what are people using, what do they feel needs to happen, and through this community then identify some that we feel like we could we could work on. So, for the first question again with these awesome word clouds which I love. This was what we're measuring: executive functioning. Obviously massively I think a lot of that is early childhood and then as you can see there's some more: memory came up a lot, reasoning, processing speed, early learning. So, really quite a broad range but very much still within the cognition world. Then just in terms of executive function, obviously that splits up into, the innovation working memory came up a lot, so there's some people working on the individual executive functions as well.

So, in terms of the measures that need work we have just split this up into the adults and the child because we thought it would be more beneficial that way, particularly because this group is an early childhood group. So, if we have a look at the child's group, or the child word cloud, we can see the ones that came up the most for those that need work. So, Matrix reasoning, which I actually am not that familiar with came about, but the early years toolbox and IDELA came up as tools that are currently being used but tools that might also need some additional work. The card sort tasks, Stroop, digit span, and even broader cognitive and intelligence tasks like the netbeans, pots and flowers, more executive function. Kaufman even came up so it was quite a broad range which is indicative of how much work needs to be done in terms of measurement within majority countries as well.

Then I've tried to summarize the work that needs to be done in the best way possible so we had people just write exactly what they think needs to happen. The biggest things that came up,

which is doesn't come as a surprise to anyone, is contextual adaptation for every task because the majority of the tasks that we're using were not developed in majority world countries or low- and middle-income countries and they were developed in the western world and so that contextual adaptation has become increasingly necessary. Something else that came up is also actually task creation. So, just developing new tasks from scratch within these settings. Another one that came up was accessibility. Many tasks are not open access, the software costs a lot, which means that access to the tools then becomes very limited for people working in low resource environments or in institutions that have limited funding as well.

So, that came up as quite an important point for development and translation came up repeatedly. I'm going to speak a bit more about that in the next slide, but translating the tools it's not an easy feat, it's not a simple feat. Needing to translate but then actually trying to understand whether that translation is feasible and still works is another story.

Construct validity came up a lot. I think that goes hand in hand with broader testing and local norms. So, needing to get bigger samples and actually develop local norms for the test that we're using. So, then you can just scan but if we have a look at executive function, specifically, what came up the most with that was contextual adaptation, developing local norms - because many people are collecting great executive function data within Africa even itself, yet most of us are using different tools or different things. But there is some crossover so being able to develop local norms, I think it's feasible and something that's that does need to be done.

There was a need to develop self-report measures for executive function. I think that was slightly more needed for the older children and adult population. But that's something that doesn't really exist at the moment and needs development and creation. Then broader validation of the tools. So, being able to show that these tools really do work and that they're measuring what we think they're measuring.

We can send this around if anyone wants to have a look at the data more closely but as you can see many of them are just contextual adaptation, broader testing, and local norms.

Then, we also asked people for any additional comments based on the questions that we'd asked them and the work that they do. I pulled out some of the ones that I thought were really interesting and things that we could possibly discuss, and as a community even start to tackle these questions that we all face on a daily basis when we're doing our work.

The first comment was about multilingualism and code switching. Is it a positive or negative thing? In many of the African countries there's more than one language, there's multiple languages happening at one time and there's really a need to start to look at that more closely and understand how that affects both measurements - cognitive measurement as well as how that's affecting development.

Then, complexities of translation. Cathy and I have gone on about this quite a lot in the recent work that we've been doing, in the sense that we've realized that direct translation doesn't

always work perfectly and then when you don't directly translate the tool loses its validity it's no longer the gold standard, you've now changed the tool and it doesn't count. We even faced that issue when it came to the strengths and difficulties questionnaire in English. We've decided that some of the British English doesn't actually match the South African English but we weren't allowed to change it because then it was no longer the strengths and difficulties questionnaire. So, translation is a really difficult task and something that I think as a community we can really all learn from each other and discuss and find the best way forward.

Another thing that comes up a lot when you're working in Africa, particularly if you're flying in and I know I've even experienced it as a white researcher in a rural community; a lot of children or participants get really shy or they don't want to participate. How do we make people feel comfortable and when it comes to testing how do we do this in a way that doesn't create anxiety with our participants Africa.

Then one I've touched on already as well is portable devices and software that can support neuropsych tools are too expensive. So, that's one of the things we really with this project, we're hoping to create, maybe Anna can jump in and just tell us about the tools that we're wanting to work on once I've gone through these.

Then, the next one is informed consent. That came up a lot. In fact, informed consent is often presented at too high of a level because our ethics boards need it to be written in a specific way. Through the community we can determine the best way to present the research and to present this informed consent to our participants.

Then, complexities of interpreting cultural level variation in cognitive outcomes from an ethical perspective. This could probably be a whole discussion on its own but that's when it comes to a cultural level, who is better who is worse, how are we interpreting these scores based on the cultural sensitivities as well.

Then, ecological validity of the measures, cognitive skills are often assumed to be universally important skills. That's not always the case though we know that in different cultures that may differ and this has implications for intervention if we're prioritizing certain skills that are maybe not actually prioritize priorities within those settings. Then, the nuances of creating a tool that is appropriate across cultures. Is it actually possible? Is it worth it? There's a lot of give and take when it comes to that so it's not an easy task and I think when you come together as a community we can maybe work on that a bit more.

Then, obviously what came up is funding and costs of research, again. So, many African institutions do not have local funding and getting funding to run projects in Africa, it takes a few more steps than it would normally. So, that came up a lot as well.

So, those were just some of the additional comments and Anna, if you want to jump in and quickly talk about the tools. Yes, so one thing that we're doing in this project that I'm excited about and I think will be broadly useful (can't help with the cost of portable devices but can

help with the software side). So, we've been working with PsychoPy which for those of you who don't know is an open access tool to run. You can create basically any kind of psychology experiment and the challenge is they don't have, they didn't now they do, have a way to use it to run experiments offline. So, we've worked with them to basically develop a way that you can, you need internet one time to load an experiment but then you can go with a computer or a tablet, which you still have to find money to buy unfortunately, but then you can use this software free open access to create whatever you want. Then, go into the field and run it offline on a tablet or computer and whenever you're back connected to internet it'll upload automatically to the secure cycle Pi server. This is something they wanted to develop and it was pretty easy and they showed me like a prototype recently so they'll be getting back to me with the version that we can play around with and give them feedback but it'll be an Open Access tool for everyone to use. Then, with the support and the documentation of PsychoPy which is great. So, I think that'll be really helpful. I was personally very frustrated getting into this field and realizing that there's no offline touch screen Open Access tool, so that will be helpful that we've done that. Then also for whatever we develop in this project, we can use and share on PsychoPy along with instructions. So, part of it is to make everything easy. I'm excited about that if anyone has any questions, let me know.

Just to say, we were trying to use E Prime and E Prime only runs on a Microsoft Surface Pro, which is a very expensive portable tablet to take up into the field. Whereas, sort of your cheaper Android tablets or even iPads are much easier and cheaper than a Surface Pro tablet to take out. So, with PsychoPy then being able to potentially to run these tasks on tablets that aren't Surface Pros will also create hopefully create a bit more access to tools. All right Anna, you can go to the next one. You can run it on anything too so you don't have to get a certain kind of tool to match with.

So, Anna has given the outline of the project, but I thought it'd be helpful to give the exact next steps. So, we've done the survey, perhaps we can actually send it out again. I'll put the link in so if anyone here who wants to do the survey once again, we can do that. Basically, from the measures that came up in the survey that people highlighted needed some sort of work; as a community we hope to select a few of those that we can then either develop on PsychoPy to make it open access and help to develop and adapt these tools. Then, using the tools that we've chosen and adapted - actually collect more data. Again, for those tasks that people mentioned needed broader testing or validation or local norms, we can then collect data at our sites. So, currently it's in the Democratic Republic of Congo, in South Africa and then in Quebec City but as a community, if anyone else would like to also collect some data and have the capacity to do that that would be even cooler. We would share tasks, share protocols with the community and then people would be able to go out and collect some data. Then, through this community of practice we'll invite ongoing development with the community and we also will do a website hopefully and we've decided to kind of merge this with Bosilijka and create a shared website and the space for the community.

Then, we have started to create the community of practice in Microsoft teams. We actually did ask this as a question - what platform people would like the community to sit on. I think we

gave the options of teams, base camp and then just if people had any others and the only other ones that came up was slack. So, it appeared that people wanted to use something they already were familiar with so we're really going to test it out on teams see how feasible it is. Hopefully if this community of practice and this project in itself can just keep growing.

So, I'll just quickly show, it's just a skeleton version, and the idea is that everyone can adapt it to be as useful as possible.

People who did the survey, there was an option to be invited to the virtual community of practice. I guess we'll send out something else again to the listserv so you can consent to get an invitation or maybe we'll just send an invitation. you could So, I put a general description of the project here in files.

I put this presentation, as well as the full grant if anyone wants more details. I'll put the raw data in survey responses so if anyone wants to look at all the information in the survey it's interesting and useful. Then I created channels, this was based on our ideas in the grant, as well as um some of the things Bosilijka mentioned that she wanted to do. So, a channel that'll be related to data sharing open science. Also, people can share data in folders and files if there's something they want to do and they're ready for. I created some of these guides that are just blank Word documents. I can populate some of them and also everybody should be able to add to things if they want to. Just information on what Open Access databases there are that could be useful, funding resources, again having a guide to different types of funding resources, Grant resources and information also people can always post information they want to share with the community in the main post page and these different topics. Then, we made a channel for this measures development project so if people want to join those task forces or just specific input we'll grow that part of the project here. Then, a place to share measures, passing tools; I started some, compiling information like lists of cognition and adversity measures, very short summary so if you're looking for something new or want to know what people are using, what your options are, it's all in one place. This should be first which is just if you wanted to write like a brief introduction to yourself. Again, like if people want to add channels or think something's unnecessary it's meant to be a work in progress that is shaped like Wikipedia, made amazing by the community.