

33| Neuropsychology 3.0 – With Dr. Bob Bilder

December 1, 2019



This is an audio transcription of an episode on the Navigating Neuropsychology podcast. Visit www.NavNeuro.com for the show notes or to listen to the audio. It is also available on the following platforms:



Speakers: Bob Bilder, John Bellone, Ryan Van Patten



Intro Music 00:00



John Bellone 00:17

Welcome, everyone, to Navigating Neuropsychology: A voyage into the depths of the brain and behavior. I'm John Bellone...



Ryan Van Patten 00:23

...and I'm Ryan Van Patten. Today we're speaking with Dr. Robert Bilder about neuropsychology 3.0. This is all about future directions, new technology, innovation for our field so that we can go from where we are today to a better state and

provide better services. Just like any other field in healthcare or industry, neuropsychology certainly has room for growth. We think that we do great work every day and help a lot of people but we don't want to just do what we're doing now and be happy with the status quo. We want to always continue to improve and innovate and move forward. And there's literally no one better to talk to about this than Bob.

John Bellone 01:12



Yeah, there's always room for improvement and for optimization and, really, that's what we're trying to do here. There could be some software updates for the field and we're talking to Bob about what those might be.

Ryan Van Patten 01:25



For sure.

John Bellone 01:26



Whenever someone talks about new methods or ideas, it can get technical and complex. We do our best in the interview to define new concepts as they come up. Hang in there. In just a few weeks, we'll provide commentary where Ryan and I are going to break all this down and flesh these ideas out further. So stay tuned for that.

Bob is a professor in residence at UCLA, the University of California, Los Angeles. Among many of his leadership positions, Dr. Bilder directs the Medical Psychology Assessment Center, the MPAC, and the UCLA Semel Institute postdoc training program in neuropsychology. So without further ado, here's our conversation with Bob.



Transition Music 02:07



John Bellone 02:16

How would you like us to refer to you?



Bob Bilder 02:18

Bob.



John Bellone 02:18

Bob's good?



Bob Bilder 02:19

Yeah.



Ryan Van Patten 02:19

Okay.



Bob Bilder 02:19

Bob the builder.



John Bellone 02:20

[laughs] I'm sure you get that a lot.



Ryan Van Patten 02:24

[laughs]



Bob Bilder 02:24

I'm going to change my middle name to "the".



Ryan Van Patten 02:26

[laughs]



John Bellone 02:26

[laughs]

Ryan Van Patten 02:29

We're excited to talk to you about many different things. I want to start with your 2011 JINS paper, Neuropsychology 3.0. This will be a guiding framework for our conversation today. Specifically, we're interested in where neuropsychology has been in the past, where we are now, and, in particular, where we might be going in the future. We'll talk about that in terms of test development, test selection, integrating technology into neuropsych, and then hopefully get into talking about ontologies a little bit. We're very interested in that as well. John, you want to start us off?



John Bellone 03:03

I want to talk about your 2018 TCN paper for a second, with Stephen Rice. Is it "rice"?



Bob Bilder 03:07

/Reese/



John Bellone 03:08

/Reese/?



Bob Bilder 03:09

It should be Rice, as the correct German pronunciation, but he says /Reese/.



John Bellone 03:13

So that paper was all about the future of neuropsych testing. I'm curious what your thoughts are on the age of our clinical tests. You mentioned in the paper that some of them are 100 years old. Many are well into their geriatric stages of life. [laughs] What do you think about this?



Bob Bilder 03:27

I think it's embarrassing. I got some great slides that show how certain tests have a legacy that goes back to 1885 when Ebbinghaus first created and used the digit span test. Then you can see how through the Wechsler iterations all the instruments really stayed the same. You can pretty much prove that the bulk of what we do was pretty much in place by the end of World War I, and almost everything we do was in place already by the end of World War II. So, granted, that was a heyday for clinical neuropsychology, we had people with a lot of focal brain lesions. Thank God we're not being hit with shrapnel and bullets as much as was common at that time, but yet it is quite striking that we continue to rely on these antiquated instruments.



Ryan Van Patten 04:16

Yeah, for sure.



John Bellone 04:17

I think Jacobus Donders - he had said that if neurologists were using [the same] tests [from] back in the World War I era, they would be laughed out of town. [It's] kind of [the same] thing of some of the old tests. We have a ways to go.



Bob Bilder 04:30

Well, granted, they still do a lot of them.



John Bellone 04:31

Some of them.



Bob Bilder 04:32

Some are still, you know, banging with hammers.



John Bellone 04:35

[laughs]

Bob Bilder 04:35

Using von Frey hairs and stuff like that on them. But then there's neuroimaging that has certainly changed the way things are done. With other laboratory tests, I think that we would like to see those be more advanced. I think the big irony in neuropsychology is that we have a lot more sophisticated tools to be able to probe people's psychological and cognitive function. It's really amazing that we don't have more computerized tests given that we think that speed is actually important in judging certain cognitive functions. Yet we still have people clicking stop watches. I mean, it just doesn't make sense that we show people stimuli and expect them to remember that stuff yet we're showing them stimuli out of little dog eared, yellowing, spiral bound notebooks.



Ryan Van Patten 05:23

[laughs]



John Bellone 05:23

[laughs]

Bob Bilder 05:23

Meanwhile, we have computer displays that could show this stuff much more accurately, much more complicated material. All the adaptive capacities that we have in computer testing are completely ignored because humans can't keep in mind, "Oh, wow, if they passed items 7 and 5, that means I should be going to item 12." Humans are not able to do that, but computers easily do these things and extract the most information per unit time. I wish we were taking better advantage of that. That's what we did with Steve Rice, who's an expert in item response theory and particularly in computerized adaptive testing. A lot has been discovered since the 1950s in psychometrics. The whole approach of modern psychometric theory



relies on item response theory and other approaches to maximizing the information for every question. So far we don't do that. I wish we would.

Ryan Van Patten 06:16



We'll definitely dig into a lot of these concepts in more detail. What struck me is that the technology needed to advance neuropsychology to a great extent is already there. It almost sounds sci-fi when John and I have some of these conversations about what neuropsychology could look like, but, really, we have the tech to be there. It's more a matter of implementation, coordination on a large scale of neuropsychologists and putting into place.

Bob Bilder 06:44



I couldn't agree more. I think that it goes beyond the current kinds of assessments that we do with patients coming into offices or laboratories and getting examined. Maybe we'll talk later about the Internet of Things and how smart things, I think, really have an opportunity to revolutionize the way we go about assessing cognitive abilities.

Ryan Van Patten 07:04



Let's start with an important distinction you made in a paper, which is between physiological validity and ecological validity in neuropsych tests. There's a bit of tension there. Can you explain those concepts and maybe which one you think is more important? Or how we should design our tests?

Bob Bilder 07:20



The way I see it is as a dimension that goes from things that are ecologically valid on one pole of that dimension to physiologically valid on the other pole of that dimension. So, basically, when I talk about physiologic validity, we're talking about if our goal is to understand how a particular test measures a brain function, then we want to get as close as possible to the functioning of that brain physiologic process. Now, we could talk about at what level we are interested in that physiologic process. If we're looking at the level of cellular function or intracellular function, then that's going to require probably very advanced techniques that include penetrating the skull and getting electrodes or other monitors onto the cells themselves. Now, as an intermediate, without getting through the skull, we can put electrodes on people's scalps, we can do MRI imaging, magnetoencephalography, and other imaging techniques to look at those kinds of functions. That gives us another perspective that's got a stronger physiological validity than do many of our neuropsychological techniques. However, on the other side, we had a brief chat

prior to our conversation about assessment of driving. Well, it's ironic that people come into the lab to have an assessment of driving using the Trail Making Test or some other instrument that really doesn't have that much to do with driving when that person has just come to us in an instrument that's measuring their responses with nanosecond accuracy in a completely real world scenario. If we want to know if somebody can drive a car, well, we should actually be having them drive the car. If we want to see if they can get on the bus, let's give them a problem that shows whether they can get on the bus or not. We don't have to extrapolate from whether they could solve more than three categories in the Wisconsin Card Sorting Test to figure out if they're going to get on the bus. I think that making that translation from knowing how brain functions relate to real world functions, though, is non-trivial. We don't have techniques that are well-validated from one to the other. There's a well-known initiative in schizophrenia research that's known as the CenTraks initiative. This is a follow up. There was a, back in the day, at the Matrix initiative run here at UCLA to come to consensus about what cognitive tests should be used to assess schizophrenia for clinical trials. After that, there was a concern that we didn't have enough focus on the physiologic processes and the cognitive and neurophysiology of schizophrenia. So a new initiative was developed to look at more detailed neurocognitive functions using fancy cognitive tasks. Well, it turns out in doing so, even though prior research has suggested neuropsychological tests are more closely related to outcomes than are the symptoms of schizophrenia, when we started doing these more detailed cognitive tests they did not relate as closely to the real world outcomes as did neuropsychological tests. The cruder more polyfactorial neuropsychological tests probably mix together more functions. So we take something like Digit Symbol. There, you've got to have good attention, you've got to be fast, you've got to be able to go back and forth from one set to another - it requires a lot of different cognitive functions as we all know. That's why it's the most sensitive to brain dysfunction almost anywhere in the brain. That test has a greater ecological validity than does a very fancy cognitive test that does a great job of extracting whether context dependence of decision making is what's impeding performance. I think that, as we decide what tasks to use, it depends on what is our purpose. If we want to know about detailed neurocognitive functioning and the functioning of discrete neurocognitive circuits, then I think we need to go in the direction of these more detailed neurocognitive tasks, probably validated with respect to brain imaging or other technologies. Whereas if we want to know whether somebody can drive their car, then we should be validated with respect to driving cars.



John Bellone 11:09

Do you think virtual reality could help that kind of a modality for testing?



Ryan Van Patten 11:14

Ecological validity in particular. Probably.



John Bellone 11:16

Right. So driving, for example, rather than - we're not going to go with them in their car, maybe occupational therapists would, but in terms of if we wanted to assess that ability in our office, do you think we could get closer than our paper and pencil tests?



Bob Bilder 11:28

I do. I do. I think that there's, for example, an instrument that Rich Keefe, good friend and colleague developed called the VRFCAT . It's a virtual reality task. I think that the downside of using VR to emulate the real world is that it's still not the real world. However, some of the VR can fake out pretty well and come closer to the real world. So I think that, to the extent that we do a good job of emulating the real world in VR, it can create a standardized way to get people into real world contexts. Because that's the one thing if we had a driving test here in LA, that's going to be different than a driving test in Rochester, New York or something like that. So if we have VR, it can help us to standardize certain real world contexts. We have the advantages of locking things down and the virtues we hope of ecological validity as well.



Ryan Van Patten 12:19

I spoke to Rich Keefe recently. An issue I've thought of in terms of VR tests is the technology changes so quickly in virtual reality that by the time we take something like the VRFCAT and study it and validate it and norm it and then use it, the new VR will be so much better and different. It's just such a rapidly dynamic field. Is there a way around that?



Bob Bilder 12:47

I think that the way to maybe make progress is to focus on the paradigms themselves, rather than on the technology used to deliver it. I think that if we thought of what are the key scenarios that need to be modeled - so you're driving, shopping, interacting with other people. Come up with certain model scenarios that's like a little catalog of the key things that you need to do to get by in the real world and then be able to sample those, I think you could come up with a pretty sound sampling scheme of real world activities. I mean, it could even be linked to a disability rating scale. Like the WHODAS 2.0 is a scale that we recommended to the NIMH to be included as a common data element across NIMH studies. So you

could imagine working backwards from that. If our interest is in trying to assess disability relevant functional capacity, then maybe something that is built backwards from those real world functioning domains that are assessed in disability rating scales, that would be one way to do it.

Ryan Van Patten 13:49



It's not that there's just one VR task and we must use it this way. There's like a platform and an ability that's tested and then when the technology improves, we can use the updated technology in that same platform and it will still be validated and normed.

Bob Bilder 14:06



I would think so. I think that starting with a disability framework, you could think of, "Okay, what are all the real world tasks?" You come up with a universe of real world tasks, say when you do other instrument development and say, "Okay, if I want to know about people's social interactions or various work skills, ability to manipulate things", or whatever we think that those domains are, make up a catalog of the kinds of activities that would be important. And then some of them could be like real world tasks. Then we could think about, "Oh, well, how could we replace this with VR?" Then you could think about enhancing the quality of that VR experience as the technology improves.

Ryan Van Patten 14:42



Yeah.

John Bellone 14:43



Yeah. As you alluded to, we have multiple roles, usually, and it depends on the setting often. We're diagnosticians. We are trying to predict behavior. We're trying to predict activities of daily living and identify strengths and weaknesses. Do you think we're going to have to have different tools based on the different roles that we have? Or do you think there are shared tools that would hit on all those?

Ryan Van Patten 15:06



Maybe some tests have more physiologic validity and are used in epilepsy presurgical batteries and other tests have more ecological validity and are used to predict vocational outcomes. Or I think you're asking about the same test we use for both.



John Bellone 15:19

Depending on the referral question and the needs of the patient.



Bob Bilder 15:22

Yeah, exactly. I think that's the key. Figuring out how to customize what we do to what's the real question at hand. Because there's a big difference between trying to collaborate with a neurosurgeon to talk about where you're going to cut as opposed to making a recommendation to a family for someone who needs help.



John Bellone 15:40

Right. And yet, we're using the same battery, a lot of us, for both.



Bob Bilder 15:43

Trail Making Test.



John Bellone 15:44

Yeah, exactly. [laughs]



Ryan Van Patten 15:44

It does everything.



John Bellone 15:45

[laughs]



Ryan Van Patten 15:48

Speaking of tests and old versus new, maybe we can transition and talk more about IRT, which we'd mentioned before. In a nutshell, we've talked about IRT before on NavNeuro, but the idea is that each item is measuring a relevant construct within a person, be that depression or math ability or something else. Obviously, there's a lot of complex math behind IRT and how it works. You don't have to get into it.



Bob Bilder 16:10

But I know you want to.



John Bellone 16:12

[laughs]



Ryan Van Patten 16:13

Be my guest. You're welcome to talk us through it. [laughs]



John Bellone 16:16

We'd get zero listeners for this. It would drop off right now. [laughs]



Bob Bilder 16:20

Quickly get your audience reduced. [laughs]



Ryan Van Patten 16:23

Maybe this will be like a sleep podcast. [laughs]



John Bellone 16:25

[laughs]



Ryan Van Patten 16:26

In your 2018 paper, you talked about several ways in which IRT has advantages over classical test theory for neuropsychology. The first one was the nominal response model. Can you describe that for us?



Bob Bilder 16:39

We leave a lot on the table by not considering what goes into every response. For many tests, there are different multiple choice options, for example. In fact, one of my favorite words that I learned from Steve Rice is polytomy - it sounds a little dirty, but it's not. It has to do with as opposed to dichotomous items where you have yes/no, true/false responses, polytomy refers to the scenario where you've got multiple different response options. If we take the matrix reasoning as an example, where you've got a number of different response options, right now we score all those items, true or false. Yet, what about the false response? There's five different ways to get it wrong when you've got six response options. Some of those choices are really bad and some of them are pretty close. You can see that somebody, for example, picked up on two or three dimensions of the matrix problem by certain choices, whereas other ones it's clear they didn't get it at all or they're just lured to some trivial property of the matrix. I think that's the kind of information we're leaving on the table. Sometimes if you see someone performing and they're picking a really bad response and clearly just guessing at what's going on, then you would know that their ability level is lower than it would be otherwise. It's not only every item that

gives you information about a person's performance at that trait level, it's every choice they make. It could also extend to examining the rapidity of their response. A fast response could either show a high level of ability or it could show rapidity of giving up because if you respond very quickly and give a really bad answer, that's a lot different. Now it's also related to another property that I think is of high interest, which is a person's fit statistics. Because there, and I think that while we're sticking with that matrix reasoning example, a great scenario was raised to me by Jim Holdnack who was one of the main people at Pearson during the development of the later Wechsler scales and really has a lot of experience in these areas. But we were talking about the value of this use of a graded response model and of the polytomy of responses in matrix reasoning. We're talking about how valuable it would be, once you've got a model of a person psychometrically, you know something about their ability level by the time they've gone through three, four, or five problems in matrix reasoning you've got a sense of where their ability is, what if then they take a really long time to give you a really bad response on question number six?



John Bellone 19:16

[laughs]



Ryan Van Patten 19:16

[laughs] What does that mean?



Bob Bilder 19:17

Well, isn't that telling you something about their engagement at the time. Now, it could tell you that they're actually intentionally performing poorly in the same way that below chance performance would. But I think as we move forward and try to understand performance validity, IRT opens up a whole new set of ways of looking at every question as basically an embedded validity indicator. I think that'll really make much more powerful our ability to detect when people are performing credibly and when they're not.



John Bellone 19:47

We're just throwing away data right now basically. There's way more that can be squeezed out of our tests, and we're just throwing it away.



Bob Bilder 19:53

Yep.

John Bellone 19:54



How about in terms of - I know you've talked about test linking and data alignment. They're absolutely critical for clinical neuropsych research. Can you explain these concepts and how can we use IRT and other psychometric approaches to achieve the test linking and data alignment?

Bob Bilder 20:09



Sure. I mean, this is one of the big problems we have in trying to draw inferences about the same basic constructs or concepts, even though we may use different tests. In neuropsychology, we talk a lot about different domains - and that's a whole other story. You shouldn't get me started on that.

Ryan Van Patten 20:24



Oh, we will. [laughs]

Bob Bilder 20:25



Because I'll go off. But we talk about assessing executive functions or something like this, whatever that means. But then people will say, "Oh, yeah, well, I assessed executive functions, and I use the Trail Making Test." Another person will say, "Oh, I assessed executive function, I use the Wisconsin Card Sorting Test", or whatever it happens to be - Category test. There's a big question, well are these really assessing the same things or not? I think that there's a lot of questions about whether those are assessing the same things. But there's another even more important question, I think, that we need to confront all the time. Well not really more important, but also really important. And that is, when we use the same test or what we think is the same test in a different population, how can we be sure that it's really assessing the same thing? If you use the Wisconsin Card Sorting Test in a United States educated college senior, is that the same thing as going into Mexico and assessing somebody who's had only six years of formal education, if that? Or assessing somebody in a totally different culture. What these various methods for looking at what's called "measurement invariance" do is figure out whether different tests are really measuring the same thing, even though they may be occurring in different contexts or different settings. Now it's also possible, even if the tests don't overlap in items, to determine if they're measuring the same thing by virtue of how they correlate with everything else. We had the opportunity to do a lot of this work in a big consortium for whole genome sequencing in psychiatric disorders, that's being conducted across a dozen countries and 20 different projects. People are interested there in psychiatric diagnoses. But it's interesting that they've used all different kinds of instruments - the SCID, the DIGS, a whole bunch of different

psychiatric diagnostic instruments. Almost all these instruments have roughly the same items, but they may use slightly different wording. They're being done in different languages, in different countries. So the question arises, well, are we really measuring the same thing across these countries? What we've been able to do with the help of Steve and other people is examine the similarity of individual items by looking at their covariance with other items. So if one question about depression, for example, like, "Have you been feeling down, sad or blue most of the day, nearly every day for two weeks or more?" Okay. Now, what if another one says, "Have you..." exactly the same wording, "three weeks or more?" Is that the same? Or what if they say only, "Have you been feeling sad?"



Ryan Van Patten 23:06

Yeah.

Bob Bilder 23:06

You can imagine all the iterations of this, and they all occur, I assure you. What we see is, "Oh, how does that relate to the other questions that we think measure depression, or that construct?" Fatigue, apathy. Once we look at the covariance of all these items that we think relate to each other, and if we can see that they correlate with each other exactly the same way, that the covariance structure is the same, then we have a lot more confidence that we're really measuring the same construct across that different item bank and we can look at different sites, different countries, different cultures. These techniques, I think, are really a powerful way for us to be able to tell, "Are we really measuring the same thing or not across the different settings?"



John Bellone 23:46

So for research purposes, you can combine that data essentially?



Bob Bilder 23:49

That's right. It tells you when you can and when you shouldn't.



John Bellone 23:52

Right. To increase your sample size and that's a really powerful tool.



Ryan Van Patten 23:55

Right.

Bob Bilder 23:56



That is a big challenge for a lot of our neuropsychological assessment goals. iMost of these techniques require large samples. By large, we're talking about, you know, you wouldn't even begin to look at an IRT model for a single construct without 500 or so cases. And for these bigger problems, thousands of people are really needed.

Ryan Van Patten 24:13



Right. For test linking, I'm thinking about typical neuropsych tests and I'm wondering which indices or scores may be close enough to be linked with each other. The example you use in the paper would be the delayed recall from two different word list learning tasks like CVLT and HVL. The delayed recall item is generally likely measuring a very similar construct across those two tests.

Bob Bilder 24:39



That's what we would hope. I think that we would really benefit from having some clear data where we do administer them all at the same time to the same people so that we get explicit linking. This has been done really nicely by the PROMIS group. There's the Patient Reported Outcomes Measurement Information Systems group funded by NIH to look at self-report measures. They did a project called PROsetta Stone. Nice pun.

Ryan Van Patten 25:07



[laughs] Nice.

Bob Bilder 25:07



What they did was they had the question about whether the new scales they were developing to measure depression, anxiety, and so forth, are they really the same as the Beck, the PHQ-9 and blah, blah, all these other depression assessment instruments. What they did is actually examine exactly how they behaved with respect to each other and then could develop the test characteristic functions. You can see exactly how much information you're getting from your Beck compared to how much information you're getting about that trait out of the PROMIS measures. So, there, you can show that if you ask the right 8 questions, you can get more information about depression as a trait than you do by giving the whole Beck with 21 items.

Ryan Van Patten 25:46



Right.



Bob Bilder 25:47

We could do the same in these clinical neuropsych measures. If we knew, for example, across the different list learning tests, are they really measuring the same thing? If we decide what that construct is, then we could determine, “Okay, can we really get away with the HVLT? Or do we need to do all the CVLT?” Are all these additional CVLT indices really paying off? And, if so, under what circumstances? What diagnostic decisions does all that extra time and burden on the patient and the examiner offer us?



Ryan Van Patten 26:15

Do you have a sense - I'm thinking of a Bayesian prior around different versions of theoretically the same test like D-KEFS Color Word Interference and a Golden Stroop. Do you think they would be amenable to test linking because they're probably measuring the same thing? Or D-KEFS Trails and the typical Trails. Do you think there's a lot of our tests that are similar enough that we could probably link them? Or you're really agnostic until we actually do the work?



Bob Bilder 26:41

I like the idea of being agnostic until we actually do the work. I think that's the safe bet.



Ryan Van Patten 26:46

Yeah.



Bob Bilder 26:47

But my sense is that there's a huge amount of redundancy in the kinds of assessments that we currently do. And that, in fact, by the time we finish assessing certain qualities or traits that we might consider *g*, that we're really nibbling around the edges of some other important things. That we don't do a very good job of eliminating the compounds with *g*, which is contaminating almost everything that we do and then we make a lot of interpretations based on art that's not actually evidence-based at all. That's my curmudgeonly, disagreeable suspicion about what we're doing and what'll come out of some of what we will see. I think that that will get us to things more rapidly. Well, some things probably really are important, like, delayed recall, like decrements on delayed recall that are like the model of amnesic syndrome. Maybe that is really something important. But then how do we get to that most rapidly? Because I think if we look at list learning paradigms, we're going to find that any of these paradigms is probably going to generate a decent index of list learning ability. But then what additional information can you get that's

actually relevant in helping understand different kinds of dementing syndromes or other kinds of specific and encoding problems? Well, getting to that point where we can clarify what are the decisions we want to make and then what are the tools that we need to make those decisions? I think that's what's important.



John Bellone 28:13

Right. Do we need that list B, the interference, for the CVLT? Is that really important? Or can we just do the HVLTL like you had mentioned.



Ryan Van Patten 28:20

Yeah.



Bob Bilder 28:21

Exactly. We haven't even gotten to the point where we know after you've given the MoCA how much more should we be doing.



John Bellone 28:28

Something to think about.



Bob Bilder 28:31

Well, we know President Trump got a perfect score.



John Bellone 28:35

That tells you all you need to know.

Ryan Van Patten 28:35

Yeah. 30 out of 30. [laughs] A follow-up question about person fit statistics. I love the idea that we could use different profiles in individual tests, like you described matrix reasoning to potentially identify in this context, performance validity questions, right? So, essentially, if someone easily gets hard questions right and then gets an easy question wrong, or if they're taking a long time to give you a response, there are certain types of responding - maybe certain of five or six options, if you select one of those options that's clearly incorrect after getting hard questions right before that's like data around potentially poor effort, etc. What might that look like if we were able to integrate that into a neuropsych battery, do you think? Each test would have this person fit statistics algorithm going on underneath and then afterwards we would get a validity coefficient that would come out at the end? Or how do you see it looking in clinical practice?



Bob Bilder 29:36



I think, ultimately, using adaptive methods, it would be done on the fly. I would estimate that even the first pass at a good adaptive battery is going to be half the time of the current neuropsychological exam, and the ones in the future could probably be at least five times more efficient. Then those validity questions also will pop up probably pretty rapidly. Within the first 15 to 20 minutes of you working with somebody, you're going to be able to say, "Hey, this isn't hanging together. You're not converging on the trait."



Ryan Van Patten 30:10

That's what we tell them. That's what we say to them.



John Bellone 30:12

[laughs]



Ryan Van Patten 30:12

[laughs]



Bob Bilder 30:12

Yeah, well. It takes that kind of, you know, relatedness, you know, really relating to your patients. Talking about their convergence. Everybody identifies with that, right?



Ryan Van Patten 30:23

[laughs]



John Bellone 30:23

[laughs] Yeah. It could even be an iterative process. We don't have to roll out all of the validity indices right away. We can add - it's kind of like the MMPI. The scales are developed after the main measure comes out. We can continue to do research and add new aspects to these batteries. These algorithms could continue to improve iteratively as we go along. I was thinking, like the performance validity, if that's one. Maybe an anxiety measure. So if someone does poorly on a five digit span and then later on they get like a seven or eight digit span correct, we can tell that probably it was due to anxiety the first time they heard it, that kind of thing. I can see just a lot of applications for these very nuanced variables that we'll get from this new type of testing. Let's talk about computerized versus paper-pencil testing because really to do this, the CAT and IRT, we need to be on the computer. What

are the main advantages of computerized tests outside of the CAT and IRT that you see over just our normal paper and pencil testing?

Bob Bilder 31:27



Well, I mean, I think that the precision with which they can present stimuli and collect responses is pretty impressive. I think that's really huge. The kinds of stimuli that can be presented. When we think about how many of these tests arose through history, the only way to show people stuff was on a piece of paper or card or something like that. We didn't have computer displays or you couldn't just show people movies - so just the capacity for presentation and recording accurate responses has just dramatically increased.

Ryan Van Patten 32:04



So much better. Yeah. How do you respond when people criticize computerized testing by saying that we won't have the behavioral observations, the qualitative observations that we have now? How do you think we might get around that?

Bob Bilder 32:15



Well, the hope is that if you actually want to be spending time observing the patient, which I like to do, and I think neuropsychologists should do, then there's nothing preventing you from being with them when they're working with a computer. The computer is just a tool. It's not replacing the neuropsychologist in that scenario. But I think that's not probably what most people are thinking of when they're thinking about replacing neuropsychologists or having people do stuff that's unsupervised, unmonitored, possibly online. Now, there, it's a whole different bunch of questions that continue to be problematic. How do you get valid responses from people online? In a lot of circumstances, you can get really good data. We've got plenty of examples of people responding just the way they do in the lab when they're sitting God knows where - in their home or on the freeway. [laughs]

John Bellone 33:08



Hopefully not. [laughs]

Bob Bilder 33:09



God forbid, but, yeah, who knows. We know that you can collect a lot of really good responses there. People are getting better and better at figuring out on the programming side how to detect when people are not playing the game properly. It's the so-called "cats on the keyboard" effect. That, yeah, a cat happening to walk

across the keyboard is not going to give you reliable person fit statistics on their response accuracy and the responses they're selecting, probably. Now my cats are very smart.



John Bellone 33:42

[laughs]



Ryan Van Patten 33:42

[laughs]

Bob Bilder 33:43

But usually those kinds of things can be built in. Increasingly, I think, it goes from the cool to creepy, but we do have cameras on most of our monitors nowadays. So the question arises, "Okay, why doesn't the computer assessment also do a good job of monitoring people's engagement performance, eye movements, etc?" I haven't seen that done well yet. But I think that it would - I'm sure somebody already has prototypes and I would expect that to be common within five years, where you got a computer that's actually codifying what would be human observations. Also our National Neuropsychology Network, we just decided we're going to try to take a bite at the behavioral observation apple and see if we can, in the same way we just created with Lucia Cavanagh, taking the lead in the development of a structured history protocol for neuropsychology. It really locks down all the questions. We're going to put it online so everybody will have the same history questions to be asked and then it automatically goes into your report. Well, here, all you want to do is have the same things like a checklist you can have on your iPad, that you have behavioral observations for the most common things you could note. But just at least have the examiner check them off. I hadn't thought about it until right now that the next step would be, "Oh, well, why couldn't a machine do that?" I mean, the machine can tell if you look sleepy. We got computers that can analyze your facial affect, to see how well oxygenated you are in terms of how pink your face is. Whether your pupils dilate and respond - they can do a lot of stuff.



Ryan Van Patten 35:19

Eye tracking.



John Bellone 35:20

I was going to say that Ryan's very oxygenated right now. [laughs]



Bob Bilder 35:23

[laughs]



John Bellone 35:25

Can you tell? [laughs]



Ryan Van Patten 35:25

If a computer with...



John Bellone 35:26

I don't even need a computer to tell that. [laughs]

Bob Bilder 35:30

They might do some things even better than humans can usually do. I think it raises a really interesting point. I tried to emphasize this in other talks. I think, as technology develops, we need to focus on what's uniquely human about what we do. Because I think that throughout many fields in medicine, computers, machines are actively taking over. I just heard Google announce their new quantum computing system.



Ryan Van Patten 35:57

Yeah, I heard that.

Bob Bilder 35:57

So anyhow, we're not going to stop nor should we want to stop progress like that. The question is, "What are the things that these machines are good at?" Well, they're good at picking the next item, if you want to get maximum information about a construct. I think they're probably really good at doing differential diagnosis and picking up rare diseases. Like if you had to choose between having your doctor look at a lab test panel or a machine looking at it to see all the possible combinations of metabolic parameters, give me the machine. I love my doctor. He's the best.



Ryan Van Patten 36:33

[laughs]



John Bellone 36:33

[laughs]



Bob Bilder 36:34

But, still, in terms of picking up on these things, I think the machines are really incredible. I think we have to think about what is uniquely human so far? And all the components of human interaction, figure out, "Well, where's the problem for my patient right now? What is really wrong?" And how do we go beyond just the acquisition of test scores and stuff?



John Bellone 36:55

That could be where we come in. Because people can think that this is going to eliminate neuropsychology, right? That, technologically, we will eventually get to the point where we don't need neuropsychologists. But that's not necessarily the case, right? We can do what we do best all the time rather than having to do the things that the computer could do best.



Bob Bilder 37:13

That's right. I think that the future of neuropsychology is for neuropsychologists to be experts in all the things about the brain and behavioral functioning. Then our patients will come in with digital profiles coming from their car, from their house, from the refrigerator, their phone, their computer, that's recorded all this information about them. Oh, yes, smart clothing, the stuff that they're wearing is going to have recorded all their actions and how much they're perspiring in certain situations. It's all about their mood and their behavior. They'll have a profile and then come and say, "Doc, what do I do about this?" And then the neuropsychologist, the expert says, "Oh, yeah, well, you've got this brain syndrome and this is the kind of stuff that you should be working on."



Ryan Van Patten 37:55

Right. We can spend more time with them in the room. Feedback, talking through brain health recommendations.



John Bellone 38:00

Personalizing it to their situation. Yeah. This is a couple steps ahead right now.



Bob Bilder 38:07

We do that all the time in our clinic.



John Bellone 38:09

Do you? [laughs]



Bob Bilder 38:09

Isn't that what you guys do in San Diego? [laughs]



John Bellone 38:12

You got the jumpsuit that the patients wear when they come in. [laughs]



Bob Bilder 38:15

Yeah, sure. Sure. [laughs]



John Bellone 38:17

But for now many neuropsychologists aren't even doing computerized testing at all in the clinic. So that seems like the first step would be to get more buy in there. But many people aren't, like I mentioned. Why do you think they aren't using more computerized tests? Are there downsides that you can anticipate for the computerized testing model?



Bob Bilder 38:41

I think that our field is characterized by a lot of inertia. I really struggled to understand why we are so reticent to move to new technologies. I remember when Pearson first came out with Q-Interactive, I went to a nice session, Dean Delis was there as one of the real academic developers and the whole Pearson crew was there and they showed us the new Q-Interactive things with the iPad. I was so disappointed because I thought, "Oh, this is the same thing as the old WAIS. Nothing is new. The only thing that's different is this now it's on an iPad." Meanwhile, I then came to realize that my reaction was atypical. That there were other people who thought, "Oh, this is going too far."



Ryan Van Patten 39:23

[laughs]



Bob Bilder 39:23

"How do we really know that when you're looking at this stimulus on the iPad that it's not..." And I said, "Oh, my God." So thank God Pearson did go ahead and collect validity data so that we know that it looks like the iPad presentations are performing very much the same way as the paper and pencil version does. It's

enhancing the efficiency of that. But I think that neuropsychologists rightly want to stick with validity data that they can trust, that they know about. Our legacy instruments have a legacy. All the validity data going back through history is on these tests. That's why we developed the National Neuropsychology Network using current tests. The thinking was that if we could get enough data at the item level into a shared data archive that we could then begin to find out what the current tests are measuring. So then it would be inarguable that we could replace them with other stuff that's more efficient and faster and better. Because, right now, the majority of neuropsychological test data, following the termination of the battery, and informing the patient go directly into...



John Bellone 40:36

The drawer. [laughs]



Bob Bilder 40:37

The filing cabinet! The desk drawer, yeah, whatever. It's such a shame because while the NIH has developed a data archive, which is pulling all research data, still, those research studies are a little Baroque or arcane. They're not using all the instruments that are widely used in clinical practice. Meanwhile, about 500,000 exams are done every year in the United States alone. If we could get even just a fraction of that data into a National data archive, we'll have... - So, anyhow, we've started this across the sites with the University of Florida, Medical College of Wisconsin, Emory, and UCLA together. We figure if we could prototype and pilot test this kind of operation in these places, it'll help. So we're using Q-Interactive...



John Bellone 41:22

That's what I was going to ask. They're all computerized?



Bob Bilder 41:25

Well, the tests aren't computerized. That would be a step too far.



Ryan Van Patten 41:30

[laughs]



John Bellone 41:30

[laughs]

Bob Bilder 41:31

The key sticking point was really at, "Well, how do we get item level data into a database without creating a huge burden?" Because the first approach was, "Okay, how many research assistants will we need to go into the clinics and start to take all the data that all of our trainees have already recorded and do it again and put it into.." This is just like a non-starter I think. So what if we could get item level data from Q-Interactive? And then it's like, well, what about all the stuff that's not in Q-Interactive? What we got funding for was not only to work together with Pearson, but also to create iPad versions of the scoring systems. So that rather than putting stuff on paper, we're getting the permissions to record everything on iPad. So the same responses, but at least we're getting it all input right away. From the testers perspective, it's better because they get the scores back right away. They don't have to go through and start looking them up in all the manuals and crazy stuff that we currently do. So it's more efficient from the examiner's perspective. And then it's automatically getting the data input. That's the point there. It's not as radical as I would like to see the progress. But I think it's a necessary step in finding out for our legacy instruments, what are they really measuring? What could more efficient versions of those look like? Then once we have that down, then we can begin to introduce new content. The same way, like, why is it that ETS can develop measurements of the SAT over decades and know exactly what's the back compatibility of every new version? They keep putting in 20% new content. Why can't we do that with neuropsychological instruments? Just keep on adding in 20% new stuff. See if it's more reliable, more valid, more efficient. That's the way we could begin to bridge. What if it's more valid with respect to these physiological questions? Let's begin to bring in the good cognitive neuroscience stuff on top of the traditional stuff. That way we know how it relates to the legacy instruments and how it enhances our validity in picking up on the new brain stuff.



Ryan Van Patten 43:33

This is great. So, right now, the National Neuropsychology Network has University of Florida, Medical College of Wisconsin, and UCLA.



John Bellone 43:40

And Emory.



Ryan Van Patten 43:41

And Emory. Yeah. Two questions. I'm wondering what the timeline is, what your expectations of this grant will be in the next few years? And if other sites might come on board if people become interested?





Bob Bilder 43:51

Yeah, absolutely. We're just getting close to ending the first year. So during that first year, we've solved all kinds of incredible IRB problems.



John Bellone 44:04

[laughs]



Ryan Van Patten 44:04

[laughs]

Bob Bilder 44:04

And inter-institutional problems and data use and sharing agreements, and oh, my God. We knew that that would be part of the process and one of the obstacles, but I think that that was one goal we wanted to have before trying to ramp out a whole national system. We wanted to lock down, "Okay, what are the issues?" Four sample institutions, we're going to hit the top 80% of problems. Then we'll know what are the solutions to those that we can share out with others. Then also, we've established the databases, so that we've created all the data dictionaries that are compatible with the NIMH data archive, figured out the pipeline to get the data from Pearson to here, and from here to NIH. So we're doing that. Then we're also beefing up common data elements. I mentioned the SHIP-NP, or the structured history protocol. We want to make that freely available, so anybody could use it. And then we want to support the use of other common data elements. So like the PROMIS assessment instruments, we'd like to see everybody using the most efficient possible assessments for depression, anxiety, a whole bunch of other stuff.



Ryan Van Patten 45:07

They use IRT and PROMIS and CAT so it's much more efficient.

Bob Bilder 45:10

That's right. Even just using the standard short forms, we know that just a fixed short form of 8 items gives you the same information about depression as a trait as does the 21 item Beck, and it's free. So, I mean, would you be interested in using it? We think that some people would. So we want to flush out all that. Then our goal is to make it all completely available to anybody who'd like to participate, all the short form CATs and the common data elements would be available right away. Then what we'd like to see is a model whereby people would be totally open to participate by sending data and what they would get back from it would be scored



protocols - not only with respect to the typical norms, but also with respect to other published material that occurred after the norms are published. I know you've seen some of the programs that people have created to look at various test scores, according to many different testing protocols. So there's Enrique Lopez's neuropsych norms project. There's also a great pirate program on the - I guess it's out of date now because it's for the old FBS scale for the MMPI, but there's a program going around, like an Excel spreadsheet where you put in their FBS scores and then you'd get like, according to 20 or 30 different published papers, exactly where that score falls with respect to each one of those published reference lists. We've done the same thing and are looking for the genetic correlates of cognitive problems. So these kinds of databases can be really helpful and can become available to people. Once they input scores, wouldn't it be nice to get in all the possible normative comparisons you want just by checking off boxes and saying, "Oh, I want this age group. I want this cultural group, etc."



John Bellone 46:56

It's such a large sample size at that point. To hit each of those numbers in each cell, you would have large cell sizes.



Bob Bilder 47:03

The existing network of four sites, we estimate will generate about 10,000 cases over four years for the most frequently used measures - digit span, ironically, the original Ebbinghaus version.



Ryan Van Patten 47:14

[laughs]



Bob Bilder 47:14

No, it's the current version. [laughs] But that we probably get about 10,000 records for. Then it goes down to - we didn't include anything that didn't have at least about 1000 records over the four year period. The top 49 tests that are administered across our clinics, which overlap almost 100% with the Raven et al review article from 2016. I think one of the fun things is that while most of us talk about being flexible in our approach to neuropsychology...



Ryan Van Patten 47:46

We use the same tests.



Bob Bilder 47:46

Everybody is using the same.



Ryan Van Patten 47:46

[laughs]



John Bellone 47:50

I was going to ask. [laughs]



Bob Bilder 47:51

WAIS, WMS, D-KEFS, CVLT.



Ryan Van Patten 47:52

Trails.



Bob Bilder 47:53

Trails, finger tapping, grooved pegboard, and we're done. [laughs]



John Bellone 47:55

I was going to ask, clinically, what would you do. That would be interesting to me, I think, too.



Bob Bilder 48:00

Yeah, I'm pretty darn conventional.



John Bellone 48:02

Yeah. Like most of us.

Bob Bilder 48:03



Yeah, I think so. The things that I do that diverge probably have more to do with assessment for psychopathology and that kind of stuff. It depends on what the purpose is, but I've been encouraging trainees to be using more of the PROMIS assessment measures instead of some of the other older instruments for looking at depression, anxiety, those kinds of constructs. I like to use the WHODAS for assessing disability just because I think that that should be a common data element, that's sort of a principle decision. Then in personality, it's interesting, I've been trying to migrate some folks to using the PID-5. How many people have used

that? It's in your DSM-5, and it stems from a different dimensional approach to understanding psychopathology that's becoming more popular in the world psychiatric community. Really, it is based more on trying to see internalizing and externalizing as being top level dimensional disorders and then other syndromes emanating from that. But a lot of the variance is explained just on the internalizing externalizing poles.



Ryan Van Patten 48:05

The Kruger and Marken, that dichotomy.



Bob Bilder 48:13

That's right. The HiTOP model.



Ryan Van Patten 48:36

Yeah, HiTOP. Very powerful factor analytic.



Bob Bilder 48:59

I've messed around with it clinically and find it to be surprisingly useful. We see inpatient cases here at UCLA and I've worked with some of our trainees. So they would be learning and I would be learning, [laughs] how does it behave in those contexts? What we found is a surprising agreement between what makes sense clinically and use of this kind of instrument.



Ryan Van Patten 49:35

I wanted to review a few things we just went over to clarify and then ask follow up questions. A really important and powerful piece of the National Neuropsych Network is that it's not just that data is being collected from neuropsych tests, it's that item level data that is being collected. That's what we don't have that we need for IRT. You can't just get a total score on matrix reasoning or some other things in order to do IRT and CAT and get all these advantages. We need their response to each item. That's a big, important aspect of the National Neuropsych Norms and you're doing that through the iPad administration or scoring.



Bob Bilder 50:14

That's right. By using the combination of Q-Interactive we pick up all those Pearson measures and get the item level responses and then we're creating these iPad recording forms, basically, so that we get all the other item level data in without

adding any burden on the examiner but capturing those data. Seems like it's working pretty well.

Ryan Van Patten 50:34



This is a really exciting initiative. Then, a moment ago, we were talking about the norms and what this would be. It's not norms like we're used to - flipping through a manual that has stayed the same since it was published. These are living norms. As people are contributing more data to the National Neuropsych Network, norms are being updated every day. So if I look up my patient's normative score in a week, the comparison is even more accurate than it was today because more people have been added, right?

Bob Bilder 51:02



There's a couple of fine points to put on that. One is that we hope to have all the existing norms also included so those can be used as a reference. That requires negotiation with each one of the people who acquire those norms but I think that's working out relatively well, so that we can provide that. Then, additionally, when people are seeing cases that aren't norms, those are abnorms, right? So then the first question arises, "Well, how confident are we about the diagnostics in those cases?" As we grow the network, what we're aiming to do is to have clinical qualifications stated, so that we can understand with what precision different kinds of diagnostic decisions were made. In the database we have, there's a pre-exam diagnosis and a post-exam diagnosis. Some critical set of questions is, "Okay, how much did each one of these test variables contribute to the transition from the pre-diagnosis to the post-diagnosis? How much positive predictive power did each item have of getting us from what we thought before we had the exam to after they had the exam?" That's important. As we grow the network, then we'll know for all the post diagnoses of Hallervorden-Spatz disease or Lewy body, then we'd say, "Oh, this is the profile of other people in the network who concluded that their patient had this syndrome." But then we'll have different degrees of confidence in some of those. Some of them will have post mortem validation, some of them have imaging validation, some will have other laboratory test validation. We'll be able to show what kind of confidence there is and where the data came from.

John Bellone 52:42



That will be so helpful. Why do you think that hasn't been rolled out yet? Just the inertia problem? Do you see other problems?

Bob Bilder 52:49



Well, I think one of the things is that up until the advent of these platforms for acquiring the item level data, it's just been too cumbersome to do. It would require a huge data entry effort that no one felt would be really worthwhile, I guess. I wasn't sure that Pearson would work with us to do this but I think that they've been a great partner. I think that their interest is in actually weaning neuropsychology off of all those old paper things. I mean, I think any company would rather be in the software business than be in print publishing nowadays. I don't want to speak for Pearson and their business purposes. [laughs]



John Bellone 53:26

[laughs]

Bob Bilder 53:26



But I think that they've been eager to see people use Q-Interactive more. The uptake I don't think has been as robust as they would have hoped, due to the inertia problems and it's that that's made a big difference. Then it meant the lift for us to program all the other stuff was relatively minor and enough that we could do it in the context of an NIH grant.



John Bellone 53:45

Well, good. Well, now's the time. I mean, we need to start moving forward. [laughs]



Bob Bilder 53:48

I hope so. I hope so.

Ryan Van Patten 53:49



This is really exciting. I'm going to go back to the common data elements for a moment. I imagine this will be just a new way of thinking for a lot of people. You mention the history, would this also be included in the clinical interview? It sounds like a checklist way to conduct your clinical interview where yours is the same as mine is the same as John's, where there certainly could be some on the cuff follow up questions, right, for your particular patient, but we're all also asking a set of standardized questions so that the same data can be pulled for each interview and aggregated together. Is that right?

Bob Bilder 54:25

Sort of. I think that we're focused less on the clinical interview, per se. That's even harder to standardize. But what we felt was that the history that we get - I mean, it's quite amazing. I came here to UCLA and found that we had an adult neuropsych history form. It's got all the questions about your medical history, your social history, educational history, military, blah, blah, blah. Then everybody fills us up. And then there were two versions of it. I'm just in this one clinic alone. I had my own version that I had and I found that oh, wow, there's probably like a 92% overlap in the questions but of course, they're all formatted differently. Even the two forms we had in this clinic were different. So the attempt to standardize that to something that everybody could agree upon was what we thought would be a good idea. Then Lucia went through and did an incredible job of mapping every question that we get from history forms and putting it onto the common data elements that come out of all the work that's been on NIH. There's something called Phoenix, the phenotype assessment system that was developed by the National Human Genome Research Institute. They want to find what are all the phenotypes we could find out about. So anyway, there's a lot of standardization of the data dictionaries. You'd be amazed at how difficult it is just asking questions about sex and gender if everybody's asking the questions in different ways - oh, are you a one or a zero? Or a two? I mean, what does that mean? It's unbelievable how much time it takes just to harmonize these data sets. So, anyhow, the hope is we could agree on some of these formats for these items. If everybody did it the same way, then we could pull data right away without the burden of trying to figure, "Oh, this is what you meant when you said you were this many years old, or this sex or this race or ethnicity." So getting all those questions into one format helps to streamline that. It also gets it to be done by patients at their home in advance of the session. All that information is coming in. And Lucia further developed the algorithms to create a text output. So you can get all the information from the questionnaire and rather than looking at a questionnaire and typing it into your report, it just creates a report. So you got it, and you can edit it if you want to. But, anyhow, all the data are there.



Ryan Van Patten 56:33

That's so much better.



John Bellone 56:34

That's like, yeah, I'm dreaming right now. [laughs] That would be awesome.

Bob Bilder 56:37



So there's that. Then for the self-reports also. So that person before they come in, they could already have done the PROMIS depression scale, anxiety scale. We also wanted to build in - there's a DSM level one cross cutting measure, which has 20-something items, and basically it goes through depression, anxiety, psychotic symptoms, etc. at a top level, and then it triggers level two screenings. So it's like a PHQ-2/9 kind of thing, where if you answer a couple questions about depression in the affirmative, then it brings you to the whole instrument and you get it fleshed out. I think that staircase method to getting clinical self-report of symptoms out, you have all that before the exam even takes place. Then I think you could probably go into your clinical interview and spend the time at the clinical interview, asking the really important stuff. Like how are you getting along with your family? How's work?

Ryan Van Patten 57:28



You don't have to check all the boxes that have already been filled out. We'll actually have time to get to know the person, develop rapport, and dig into the complex stuff.

Bob Bilder 57:36



That's right.

Ryan Van Patten 57:37



Well, I'm sold on the National Neuropsych Network.

Bob Bilder 57:40



All right. You guys have got to sign up.

John Bellone 57:41



We're going to link to it for all of our listeners. Go to our website, we'll have it there.

Bob Bilder 57:45



There is a place where you can sign up and we'll send out information to folks. As soon as we have available different things like the SHiP-NP, other common data elements that people can use and white papers about how to use them. That's the kind of stuff that we want to have on the site.

Ryan Van Patten 58:01



Yeah.



John Bellone 58:01

Excellent.



Ryan Van Patten 58:02

This is a great way for the field to start to come together to solve some of these problems and move forward.



Bob Bilder 58:07

We hope so.



Ryan Van Patten 58:08

Yeah. Very cool.



John Bellone 58:09

So, yeah, this is great. We have a couple bonus questions for you.



Bob Bilder 58:13

Bonus questions.



John Bellone 58:14

[laughs]



Bob Bilder 58:14

Is the timer on? [laughs]



John Bellone 58:16

The rapid fire.



Ryan Van Patten 58:18

[laughs]



John Bellone 58:18

This is going to be tough, I know we've been talking about this throughout the whole conversation today so far, but if you can choose one thing to improve about the field of neuropsychology, what do you think is the priority right now?

Bob Bilder 58:30



I think that the efficiency issue is one of the big obstacles that we face very immediately and for which there's a relatively immediate solution. And that's why we're doing this National Neuropsychology Network project. Because I think that because neuropsychology, neuropsychological assessment is so cumbersome and costly, it limits access. We have an aging population where, if anything, what we need is universal access to the tools of neuropsychology. I see this as an approach to getting neuropsychology to be much more accessible by a much larger number of people so that we can really serve the population better.

Ryan Van Patten 59:12



Yep, that's good.

John Bellone 59:14



What is one bit of advice that you wish someone had told you when you were training, or maybe someone did tell you that really made a big difference? Just an actionable step for trainees.

Bob Bilder 59:23



Always do what your professors tell you to do.

John Bellone 59:29



[laughs]

Bob Bilder 59:29



I think not to be afraid. I think that people often make decisions based on worrying that something's not going to go right. They want to make sure they don't close any doors if they make certain choices. And so that, I think, is associated to conservatism in decision making and risk taking that - Yeah, look, guys, if you've already made it through a Ph.D. program in clinical neuropsychology, you're probably going to be okay. You're going to be employed and employable and you're a creative smart person. Oh, you know what? I'll tell you. I'll give you a quote. You ever heard of Aldous Huxley?

John Bellone 1:00:09



Sure.

Bob Bilder 1:00:10



He's well known for Brave New World, probably his best known work. But he has a lesser known work that's called Island. And in contrast to Brave New World, which is a dystopian novel, Island is a utopian novel where everyone is well-adjusted. All the children are happy and all the people are happy and everyone gets along with each other. They have a "notes on what's what" - they don't have a Bible or a Quran, they have a "notes on what's what". And in the "notes on what's what" it says, "Nobody needs to go anywhere else. We are all, if we only knew it, already there." So I think if all you neuropsychologists out there can recognize you're already there, you're going to be good. [laughs] So if you follow the things that you're the most passionate about and that truly stimulates your curiosity and creativity, that you'll probably end up being happier.

John Bellone 1:01:03



Specific to, hopefully, we're on the verge of this Neuropsychology 3.0 phase. We're going to make real significant progress in the next 10 years. What would you tell students who are considering entering the field, high schoolers or college undergrads? It's hard to imagine what the field might look like when those students end up finishing their doctorates. How would they know if their training and interests are still going to be aligned with the field when they get there?

Bob Bilder 1:01:29



They won't. No one's going to know. Remember what Yogi Berra said. He said, "Prognostication is very difficult, especially when it comes to the future."

John Bellone 1:01:40



[laughs]

Ryan Van Patten 1:01:40



[laughs]

Bob Bilder 1:01:40



I think that one thing we can be confident about is that the future careers are going to be unimaginable. I do think that rather than trying to replicate or master old technology, it's better to focus on what's uniquely human. That those are the skills of the future. I've been so lucky. I got an endowed chair in creativity research and I really believe that focusing on creativity, if anything, is more valuable than focusing on other more discrete skill sets.

Ryan Van Patten 1:02:14



Yeah, Max Tegmark talks about this really well. When talking about automation, AI taking away jobs, and people wonder, like, what jobs are being taken away first, and am I safe? Like, will my job still be around? What he posits will be the last jobs to be automated, taken over by robots and AI, will be those jobs that are uniquely human. Those jobs that require problem solving, human interaction, creativity, those sorts of things. A lot of what we do, that you've been talking about today, that's not like flipping pages of a book or adding ones and zeros, but is the human element. That's what's safer from being taken over by AI.

John Bellone 1:02:57



Yeah, awesome. So much of our conversation was about what could be changed about the fields of psychology, what improvements we could make. And it might seem to sound like we're picking on neuropsychology, but we're neuropsychologists, we're the most equipped to see the potential flaws, the areas of improvement.

Ryan Van Patten 1:03:15



Every field could use criticism, improvement, and big ideas.

John Bellone 1:03:19



Right, exactly. There's plenty to say about medicine or physics or any other field. But I just wanted to give you the opportunity too if you had any thoughts about that. About whether the criticism was too much or is bad for the field in any way.

Bob Bilder 1:03:34



Yeah. I am, by nature, a person who's low on agreeableness.

Ryan Van Patten 1:03:41



[laughs]

John Bellone 1:03:41



[laughs]

Bob Bilder 1:03:41



I know it's on my five factor personality profile and everything. I know all the things we've been talking about are a little curmudgeonly in talking about ways things can be changed. But that's the point of talking about them as to try to move things

forward. I think it's really quite impressive what neuropsychology has accomplished. It's also really impressive to me to see how young people coming into the field are really making amazing progress and have a really open mind about where things can be going. I think that our ability to get to the next stage of neuropsychological evolution is really, really bright. The energy coming into the field is fantastic. The aggregation of scientific knowledge is really positioning us to make some great breakthroughs and to take advantage of the technologies as they develop and to move things forward for the betterment of all of our patients.



John Bellone 1:04:36

Excellent. Well, thanks so much, Bob, for your time today. Really appreciate it.



Bob Bilder 1:04:40

Well, thank you guys so much for coming to visit. It's been a lot of fun to talk.



Ryan Van Patten 1:04:44

Likewise.



Transition Music 1:04:44



Ryan Van Patten 1:04:48

Well, that does it for our conversation with Bob. Stay tuned because we will have more content with him coming up in a few weeks. And, as always, join us next time as we continue to navigate the brain and behavior.



Exit Music 1:05:02



John Bellone 1:05:25

The Navigating Neuropsychology podcast and all the linked content is intended for general educational purposes only, and does not constitute the practice of psychology or any other professional healthcare advice and services.



Ryan Van Patten 1:05:37

No professional relationship is formed between us, John Bellone and Ryan Van Patten, and the listeners of this podcast. The information provided in Navigating Neuropsychology in the materials linked to the podcasts are used at listeners' own risk. Users should always seek appropriate medical and psychological care from the appropriate licensed healthcare provider.

End of Audio 1:05:55