Can VR Diagnose ADHD? The Next Generation of Neuropsychology Testing with Dr. Nichols, PhD Transcript

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Introduction to the Interview and Neuropsychology

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What is going on everybody? Welcome back to the channel. My name is Phil Sarpon. This is Phil's Guide to PsyD. This channel is dedicated to all things psychology, wellness, and graduate school.

Today we have a very special guest. His name is Dr. Nichols. He is a clinical neuropsychologist. He is here to talk about all things neuropsychology, VR-based virtual reality assessments.

Should you do it? Should you not do it? Is it the future? We're going to talk about AI. We're going to talk about technology and how it's integrating within the field of neuropsychology.

If you're going to become a neuropsychologist, this is definitely a conversation that you want to listen into because you might be integrating some of these VR-based assessments for yourself once you get into this profession.

And if you are already a clinical neuropsychologist, maybe this is something that you can also consider for your own practice as well. And so if you have not already, please subscribe to the channel.

You can like and share this video. But like I said, I am super excited to get into this interview today. So without further ado, we will go ahead and just jump right into it.

All right, Dr. Nichols, it is so good to have you here today. I am super excited to do this interview with you.

Dr. Nichols' Path into Clinical Neuropsychology

There are so many questions that I have about neuropsychology, so I really appreciate your time here today. My pleasure. Thank you for inviting me. So I was thinking, you know, before we talk about VR and virtual reality and neuropsychological testing and things like that, I'd love if you could just walk us through your journey into clinical and neuropsychology.

What got you into the field? Well, I didn't do well in school growing up. I seemed to Impress people with my intelligence, but my grades were always poor.

So as I got to graduate school, I latched on to a professor who had an interest in learning disabilities thinking maybe I have a learning disability. And this guy also was one of the first pediatric psychologists and go figure when I was a little boy, I had tuberculosis.

We became very close and I just started investigating how do we think about learning disorders and how the brain works and what are the concepts of executive functions.

So this was at a time we were changing from verbal and performance IQ into a finer-grained analysis of cognitive

skills. Gotcha. Yeah. No, that's great.

And I've seen kind of in your career, you've worked across medical centers, teaching hospitals, private practice. What are some of the biggest shifts that you've witnessed in terms of neuropsychological evaluations?

Because I can imagine some of the things that you were learning about in school and then throughout the decades, you know, how has that changed? Yes, the whole model of neuropsychology has evolved from originally measuring very specific cognitive functions like short-term memory to then having extensive batteries.

The Holstead right-hand battery was the first uh big battery of tests it took hours and hours and hours and it really focused on lots of things that weren't really important for most people so do you have fine murder skill coordination difficulties um etc so what happened is that we needed to change our assessment strategies to make them a little bit more efficient, more focused on the areas of concern.

And we needed to be able to take these tests to the patient rather than having them come to us. So if somebody is in a rehab center, we can't expect them to get out of bed and come to our office.

How Neuropsychological Assessment Has Evolved

We've got to go to them. We also need to develop the ability to write reports quickly and to answer the questions of the people who are referring to us.

So if a parent has a specific question about can Johnny read, that's different from a neurologist asking, does this look like a right middle cerebral artery stroke?

So we need to be more customer focused and responsive to the questions that are sent to us. Yeah, you know, one of the things that I've had the experience of as I was kind of going through some neuropsychology rotations in my own graduate program is that we did a lot of paper pencil tests.

And it was interesting because even during COVID, we were still doing in-person testing, but we would have the plexiglass that would keep people separated and things like that.

And it was interesting to say the least. But I'm wondering, as the field is growing, as the field is evolving, what are some things that you're excited about as it relates to virtual reality assessment and testing along with some of the traditional forms of testing that we have?

Well, I think it's allowing us to be more efficient and to focus on specific areas of need. So, for example, we started out with concepts. We wanted to measure language, for example.

But then as we moved on, we realized, well, there's receptive language and expressive language. And then language isn't always verbal. It could be nonverbal.

And what are the higher order processes of reasoning, et cetera? So our early neuropsych batteries tried to tap into each of these areas. So we were measuring individual skills.

Took a long time. Then it was up to us to integrate them. But what has happened is I think we've We're growing in our understanding that the brain is really made up of neural circuitries and networks so that the old localization concepts that expressive languages here really don't hold.

And now all we need to be doing is measuring systems within the brain. And that's where I think the computerized testing is allowing us to move beyond a very narrow focus to appreciate bigger picture.

So just as an example, if you have a stroke, it might affect a very fine area of a specific cognitive function, depending on where the stroke occurred and how the brain was involved.

But it also might be much broader, have a wider influence. And it really depends on did this happen when you were an infant or did it happen when you were 60? And so a lot of our appreciation of neuropsychology is changing as we gain more knowledge about the brain.

We also realize that psychology's background is primarily European and American based. And with the advent of technologies and greater communication, There's incredible research coming out of Asia and Australia and Brazil that is, I think, helping us to broaden our understanding of what are the core skills and what are culturally dependent.

You know, I'm thinking about, you know, for you, you kind of mentioned a little bit about what some of those traditional assessments could look like. Let's say for an example of ADHD, back in your early career, let's say a child came in with some ADHD concerns.

Can you list some of the tests in terms of the battery that you would use for that particular patient? Well, sure. And when I first started out, the test that we used was the Wexler Intelligence Scale for Children revised.

The WISC-2, if you will. And at that point, we were no longer just looking at verbal and performance, but we identified something called freedom from distractibility, which measures some of the kinds of executive functions we now think are important.

ADHD Testing, Rating Scales, and Diagnosis

So My research in graduate school was looking at the difference between digits forwards and digits backwards and predicting ADHD and it's really works a whole lot better.

Of course, forever. We've only relied upon parent reports and questionnaire completion. But some of our more recent research says that that's important, but it often has nothing to do with how children do on specific cognitive tests.

So behavior is one aspect of ADHD. But we're now looking at different subtypes of ADHD. Do you have concentration problems or sustained attention problems?

Are you distracted by auditory information or visual information? What's your processing speed like? What's your inhibitory control like? And this is where some of the newer tests are really helping us to nail down subtypes and sub aspects of all kinds of neurodevelopmental disorders.

So I think what's interesting is when you talk about, I remember going through neuropsychology rotations and having to get questionnaires or screeners from parents, from teachers, and it was additional layers of information that we could use to kind of diagnose the problem.

For you, how important, because you mentioned it with the behavior, How important do you feel like those screeners or those measures are in terms of actually being able to diagnose the problem when you're collecting it from other people who might be observing the child?

Well, they're crucial. And it speaks to the issue of diagnosis. And so one aspect of diagnosis is, well, we've got the DSM and that gives us a list of, you know, you got to have six out of nine, column A, etc.

but other models of diagnosis like the research domain criteria for the National Institute of Health say we should be thinking at systems level, the individual, their environment, their family, their demands placed upon them, their physical health, etc.

So I think gathering lots of information from lots of different sources is very, very important. And often the best way to do that is through questionnaires and looking at background records, employment records, report cards, et cetera.

So I think we have to think of the family as the patient and family defined very broadly. How do different people see the issue or the possible difficulty?

And does a person's behavior change across the different environments or if they're around different people? Yeah, it's so interesting when I think about diagnosing things like ADHD, learning disorders, autism.

For you, over the decades, has your ability to kind of conceptualize those disorders and therefore pick certain tests, have they changed throughout time or have they stayed pretty consistent?

They change on an almost daily basis. And here again, I think it's important to take a big picture perspective. So for ADHD as an example, most of my colleagues are still stuck in the, is it the hyperactive impulsive subtype or is it the inattentive subtype?

Well, a couple years ago, there was a consensus drawn among leading figures from different countries and different continents who said, well, they're not two subtypes, there are at least four.

So we have inattentive, we have hyperactive, impulsive, but we also have sluggish cognitive temporal, what they now call a concentration deficit disorder.

And then there's another subtype called the emotionally reactive disorder, which is critical in appreciating what it's all about. So I think our tests help us to again subdivide what's going on.

If you're evaluating someone with an autism spectrum disorder, What are they showing? What brain systems are involved? We've gotten away from using the term Asperger's, but there used to be very good research saying that the cognitive profile of individuals with Asperger's disorder is very different from the cognitive profile of people with developmental autism.

It's the same, but it changes almost every day, so I think it's very important for people who go under this realm to go to conferences, to read, to stay up on what's new.

It's very easy to get complacent and do the same thing every day, but our knowledge changes frequently and we have to try to keep up. in my own kind of early career, just being able to see all of the different ways to get into clinical psychology, to do things like health psychology, pediatric neuropsychology, health psychology.

And I see, you know, with AI, and technology kind of growing and advancing, I feel like this is a really exciting time to kind of go into the field of neuropsychology because AI and technology can really actually be very well integrated within this field.

Why VR Assessments Improve Ecological Validity

And so I'm curious, what are your personal perspectives on just in general, things like virtual reality based assessments? How do you feel like they kind of fit into the landscape of neuropsychology?

Well, it speaks to the issue of ecological validity. So the traditional approach to evaluating ADHD in a young child is we use what's called a continuous performance test.

You have to look at a computer screen and press a button when you see an X, only if it's followed by an A. And my experience over the years is that these are just shoot me boring, horrible tests that people want to throw at you after a few minutes.

Okay, they have good research base. It says, yes, this person has a problem. But I have trouble with the, uh, so what question, I guess, and what the virtual reality measures do is to make it seem more realistic.

Um, so, uh, you brought up Nesbora. One of the Nesbora tests for attention in children, uh, has you, uh, as a child, you're sitting in a classroom of 35 other kids.

There are kids all around you. There's a teacher up at the front. Um, your job is to pay attention to the blackboard and press a button when you see or hear certain things but the whole time there are distractions there are people walking around people are talking somebody's throwing a paper airplane across the glass a fire engine drives by or the kid sitting behind is going hey hey hey and and throughout all this you have to ignore the distractions stay focused and we measure all these variables so For each of them, as far as us, when I administer them to people, I've never had somebody want to quit in the middle.

They want to keep going when I said, OK, time's up. I said, no, let's do more. So there is an interest factor that they want to be taking the test. They think it's realistic.

And then when it's all over, they say things like, wow, this is just so cool. This is just like real life. So I think the virtual reality process has a great deal to help us think about realistic situations in which testing can occur.

There are some other measures coming out. I read an article recently about a virtual reality email sorting task where you are sitting in front of a computer but you have to read emails and say reply, delete file somewhere else, and it goes pretty quickly in their distractions.

Great idea. The sample size was very small and it was just in one setting, but I think more and more we're going to be looking at how do we know that our tests are relevant to the situation in which we're working.

A lot of our prior tests just don't seem to be. Yeah, I think those everyday components are so, so important and yeah, that's amazing. Like with the email kind of assessment situation, I imagine that could also be helpful for young adults too who are starting out in work and you can get actual realistic data in terms of how they might process information in real time.

You know, I think one of the things I am definitely very excited about some of these VR based platforms like Nesplora and others. I'm wondering for you because it sounds like, you know, it sounds like the most ideal situation is that you could actually go into the school, go into the classroom of the student, observe them yourself and provide certain neuropsychological assessments based on their environment.

And unfortunately, you know, not often is that possible or very realistic. And so it does seem like the VR-based platforms can at least bridge that aspect.

And I like what you said in that for these kids. It feels like a game. It doesn't feel like they're just losing their attention. I think even someone who doesn't have ADHD would probably struggle with some of those traditional computer games like we give those kids for ADHD assessment.

And so for you, how do you see this type of assessment? Do you see it kind of integrating within the natural, how we think about neuropsychological assessment?

Do you think it's going to replace certain assessments completely? or how should we kind of think about them? Well, I think it's an evolution of the science and, if you will, the art of psychology.

I had a couple thoughts about things you were just saying, attentive to the issue of what's called performance validity. How do we know that the results we're getting out of any given test are actually valid?

that they measure what we're asking them to measure. And many of the current neuropsychological tests don't measure effort or cooperation or performance validity.

There are some that have some built-in measures, but the Nespora suite all has embedded symptom validity tests and some of our research says that kids lie, parents don't try and if in fact they score poorly on those embedded validity indices, the results don't really make sense and they're not realistic.

Secondly, in terms of your saying how engaging it is and how realistic it is, the Nesfora ice cream test is fascinating because what it does, it puts you in an ice cream shop at the beach and customers come in as a group of people

and they order one of four different kinds of ice creams and they want it either in a cup or a cone, so you have to take all this in, listen to what they say, remember it, sequence it because you have to then serve them in a certain order.

And if you get it wrong, they throw it on the floor and say, I didn't order that. So you jump and it's like so realistic and so true to life that I think is a whole lot different from some of the other cognitive flexibility tests like the Wisconsin Card Sort Test.

Okay, great test. But I just think these new VR measures are are much better. So I think we're going to be seeing more and more of this kind of an approach to evaluation.

Validity, Observation, and Standardized Administration

And with AI and with broader normative samples, I think we're going to be much better at fine-tuning what it is we're asking about and what the results are telling us.

When I would give those paper and pencil tests, you can gather so much information by the child either not paying attention, talking while you're talking, interrupting you, and there's so much information that you can gather by just observing them.

When it comes to some of those VR-based assessments, do you feel like they're removing a layer of just being able to still give those paper and pencil tests and observe the child, or do you feel like they're adding to the collective I guess information that you can gather as you assess the child.

No, I think they're just a part of the process and an important part, but you still need the other forms of assessment. I tell my graduate students that tests give you a number clinicians do the evaluation and it's dependent upon your awareness, your experience, if you will, your wisdom in picking up what's going on.

So in my training, there was a woman named Edith Kaplan who talked about the Boston process approach to neuropsych assessment. And so she would give the example of if you take block design, for example, you can fail a block design subtest by going one second over the time limit.

You can fail it by having one block rotated. You can fail it by losing the two by two or three by three configuration. You can fail it if you eat one of the blocks.

So how you get the score is often much more important than what the score is. And so I think it's important four examiners who use VR testing to stay in the room and take behavioral observations and notice how are they responding to the test.

We find that a lot of people talk back to the computer and they argue with the computer as they're going along. Well, that's an interesting observation.

And yet the tests are so engaging that it's really an independently run test. So you set the person up, you get the headset on them, you flip a switch and you have nothing more to do.

The test runs itself for about 20 minutes. So that's removing a lot of the factors that we might consider to be examiner interference or influence on the person's testing.

A simple example is if you look at digit spam, if you read the digits one per second, you get a different result than if you read them two per second.

So having a standardized administration process allows us to eliminate a lot of examiner bias and the influence of non-test variables. But again I think it's for me the biggest factor is you get the engagement from the person who's taking the test.

They're interested, they want to do well and the tests are difficult. I mean I've taken them and thought oh man I failed this one miserably. So People are very interested.

And you said earlier, how do we generalize this? We're currently connecting with a local community college who would like to incorporate these kinds of tests into their overall student wellness programming.

So it's not that we're looking for disabilities or disorders or diagnoses. We're thinking this tells you about how you learn, what your strengths are, And are there some things that you can do to enhance your performance in college and be more successful?

So that's taking it to the next step, I think. And I think it's going to be much more useful on a day-to-day basis. I love that because I often feel like with what you mentioned earlier, it's not often talked about like when you're giving the waste or the whisk.

Yes, it's standardizing that you're kind of following this protocol. But like you mentioned, if you're asking the question a little bit off or in a certain way or probing in a certain way, you might give a response and two examiners could test the same person and get certain maybe nuanced different perspectives.

And so I do appreciate that the VR assessments can sort of neutralize that and really help you to still be able to notice how the person interacts with the assessment by that observation.

But then you're getting that objective data through the assessment that they're taking through the VR headset. So very, yeah, very, very interesting. So I guess the other thing I'm wondering, too, is that for people like me who I didn't really get formal training in graduate school in terms of VR based assessments.

And when you're thinking about neuropsychologists who have been doing their traditional forms of assessments for decades and decades, what would you say is the learning curve as a clinician to learn these assessments and then also integrate them into their practice?

Two answers. The first is like any of our tests, um, you have to read the manual. You have to actually practice it. You should have somebody who knows what they're doing, observe you doing it, giving you feedback, et cetera.

So, uh, the same is true with any new test that comes out. Um, I think we get arrogant. We think, Oh, I can do this. Uh, and we don't read the manual, uh, which, which is a big problem.

Um, But then secondly, I think once you once you've learned how to use the actual equipment itself, you need continuing education as to what does it mean?

How does it work? I'm a big fan of going to conferences like National Academy of Neuropsychology, the American Academy of Clinical Neuropsychology or the American Academy of pediatric neuropsychology.

And in the last few years, all of those conferences have at least two or three presentations about the use of technology and virtual reality. So I think as a profession, Neuropsychology is recognizing this is where we're going.

So the continuing education courses are increasingly focusing upon those. And that speaks to what are the pitfalls? What are the landmines in terms of using these things?

What about ethics?

Learning VR Tools and the Role of Ethics

So Dan Taub from the APA Insurance Trust I gave a talk at the pediatric neuropsych conference about the ethics of using artificial intelligence methods as we perform our job.

And boy, you could just tell everybody's butt was clenching as he starts going through all the potential problems

there can be with using new technologies, artificial intelligence, et cetera.

I like AI. I think it's very helpful, but I think there needs to be a very huge red light that says, be careful, stop and think, check your work, talk with other people, go to conferences, read the literature, because it's just too easy to think that the answer you get when you put something to chat GBT is right.

And my experience is a lot of time it's not right. It's an evolving process, but I think a good one. It seems like a lot of the VR-based assessments, they're common in certain places.

So even in other countries, it seems like they've gotten the normative sample size, they've collected a lot of data, it's kind of way more integrated into their training.

Then here in the US, even I was actually reaching out to some of my neuropsychology professors and clinicians who supervised me, and they had very limited knowledge of VR-based assessments.

Like you mentioned, it's so important to go to these conferences and educate ourselves. What do you think for clinicians here in the US who are starting to use VR-based assessments Even though there's not necessarily a huge normative sample size in regards to a lot of clinicians doing it, what do you think about maybe some of the ethics there in terms of integrating it for people's personal practice here in the US?

Sure. This goes back to what we were talking about earlier too about Uh, many of the approaches to neuropsych assessment anymore are global in nature.

And some of the, um, better research I'm reading is coming out of China, uh, coming out of Australia. And so that goes back to the question of, well, what are we really measuring and how much is what we're measuring culture based.

So I use the example of, uh, uh, hypertension. If you have high blood pressure in Dublin, you're probably going to have high blood pressure in Nairobi.

I think some of our brain-based neuropsych measures, especially some of these newer measures, are relatively culture-free. I like Nesplora because you can have the test in, I think, 17 different languages if you want, but the actual measures themselves I think reflect brain and not necessarily culture.

So Nesbora is gathering normative data in America. We have a plan for multi-center studies of lots of individuals of different ages. We're looking at condition-based normative data gathering.

So my practice is working with a local school for high functioning individuals with autism in high school, and we're working on a study with them to gather specific data and normative data on those students.

Just as we are, I said earlier, the community college students. So I don't know that The lack of a broad-based normative sample in America that you might find from Pearson or PAR or whatever right now is a problem because if you look at some of the other measures that measure similar kinds of skills, their normative samples are very small too.

So one test is based entirely on students from Minnesota. Another test has norms from Belgium. So I think you have to be aware of this and you have to take it all with a grain of salt.

Be aware, you have to read the manual. Be aware of what you're getting. I'm just finding that these kinds of tests really confirm my clinical impressions and add to what I'm doing, how I understand the patient.

And then when I give feedback to the individual or to the parents or to the pediatrician, They go, oh, yeah, that makes perfect sense. And that's great.

Nobody's ever really explained it in that way for me before. So that leads me to feel like there's customer

acceptance that you can translate the results into English in short words.

And then you can cut and paste and drop it right into your report. And we're getting away from the kinds of reports where you're listing tables of scores and confidence intervals and Nobody ever understands or reads Let's give our results in short sentences addressing the questions that people came in to see you with And I think this kind of an approach makes sense It's easy to understand and it has great acceptance by the people we give it to How would you integrate VR-based assessment training, whether it's in practicum settings or in school settings, so that as the next generation of neuropsychologists are coming up, they're familiar with the work and they're able to sort of implement it flawlessly once they start practicing?

Sure, well, it certainly can be taught in assessment classes, but in the practicum training setting, I think we have to be using the tests and we have to show the students and involve them in the process.

Getting back to an explorer, I've used it in my practice now for two years, and we constantly have graduate students, practicum students, early career people coming in.

And my hope is that this is going to become the new normal, and there's going to be an expectation that neuropsychologists move away from the tests that their supervisor's supervisor taught them by candlelight 100 years ago.

Let's move into the current world and use the technologies that are available to us. They're so useful.

Norms, Culture, and Clinical Acceptance

They're so understandable. They just make sense. And so it's easier to move from test results to what does this tell us about this person? And do they have a problem?

What kind of a problem? and break it down below the level of diagnosis more to systems assessment and ideally straight into the recommendations about what are we gonna do.

Where you see AI and technology also advancing into other different types of specialties within clinical psychology. So whether that's health psychology, forensic psychology, how would you see VR based assessments in some of those other different types of specialties?

As a health psychologist, again, I went back to big systems thinking. So in my training, I spent a period of time working in an anesthesia pain clinic.

And the anesthesiologist might administer nerve blocks, but what we were involved in was looking at things like activity level, depression. What is the family system like?

And I think that it is not a reach to say that virtual reality and AI measures can help assess those kinds of variables. A lot of people are talking about using wearables now.

no idea how many steps I walk. But if I have a watch on and that counts them, then that's giving me feedback and possibly even prompting me to stand up, move around, get going.

So I think the future is very bright. It's a technology and different areas of science are going to start using those technologies increasingly. So diabetes care, for example, the current standard is you wear a blood glucose monitor and you may have an implanted insulin pump.

So that's really changed health care for primary care physicians. I think for psychologists as well that we can do similar things. We make it more evidence-based and specifically getting away from some of our older theories which are great but don't always apply.

Yeah, it's really exciting to see what could happen. And, you know, I saw that you have some forensic background

in forensic psychology. How would you say that AI or technology could also be integrated there currently or even in the future?

Sure. Yeah. Attorneys contact people like us because they want to know what damages has this person sustained and how can they incorporate that into their case in terms of a settlement or whatever?

And unfortunately, I think a lot of psychological experts in the legal field take the kind of well, I said so and that therefore it must be real. I have all this wisdom and experience and I think it's X, Y and Z.

Whereas I think the move is now towards proven. And we have to utilize symptom and performance validity measures in our testing. We have to say that this result is demonstrable in a certain way.

And I think juries are very interested in that kind of thing as well. So the typical case I get is a motor vehicle accident that maybe crease their bumper but the person said they have a horrible concussion that's going to ruin the rest of their life and that doesn't fit with reality or the scientific literature about concussions which generally get better in a week and you should have zero symptoms within three months.

Can we measure those symptoms? It's one thing to say I have a slower speed of processing, my thinking is slower. It's an entirely different thing to show that through the use of some kind of engaging process that measures your processing speed and shows compared to other people where do you stand.

Some people have brain injuries. They have very slow processing speed or very poor short-term working memory prove that and show direct evidence so that we are empowering the jury and the judge to make informed decisions and not just based on My having a lot of certificates and plaques and saying well, I'm an expert which really doesn't hold You know, Dr.

Training the Next Generation and Expanding Uses

Nichols, with all of your knowledge and your expertise over the years, you know, if you were to go back in time, if you were just starting out college and wanting to become a neuropsychologist, what advice would you give your younger self, whether in college or in graduate school, in terms of the knowledge that you you have now?

I think it's important to attach yourself to someone in the field. So go to a professor at the university and say, hey, can I come sort papers in your lab?

It doesn't matter really what you're doing, but you are surrounding yourself by people in the field and the professors have graduate students or fellows working with them.

And you become a part of the system. I think that's the best kind of education. Secondly, as we talked about, I think you should go to as many conferences as you can.

There are often very reasonable student rates to attend conferences. I know a lot of the organizations you can trade off being a badge scanner for admission to the conference, something like that.

And then I think an important consideration is to become a part of psychology. And the best way to do that is to find your local or state or regional psychological association and be a student member.

Get on a committee, start working with people, and again, surround yourself by people who have been successful in the field and who can model for you what it really takes.

I think unfortunately a lot of psychologists get their degree, they see people in their office hour after hour, I always see the same people at conferences and I always don't see the same people at conferences.

So, it's easy to get complacent, but I think if you become a student member of an ethics committee in a local psych association, that's engaging and it's empowering and it makes you think and I think that's the way to go.

What still excites you about this field after all this time of being in the field? I still don't know why I have trouble learning and I'm still working to figure it out.

I've got a lot of better answers than I used to and I've got some strategies I can use but I think it's the brave new world. We don't know a whole lot about a whole lot.

And when it comes to the brain, I'm just, I'm always fascinated. Why did they do that? What made that happen? How does that work? And then what is the influence of XYZ event, lesion, accident, et cetera?

How does that change things? And how doesn't it change things? So I work with a lot of developmental disorders and we see micro premature babies who By all rights should have died at a few days of age.

And then years later, they've got advanced degrees and they're running companies. Why are those people successful in spite of all of the factors that set out to ruin their life in the beginning?

How do we get around that? What is resilience all about? I keep telling myself that I'm retiring and they just laugh at me. I'm still here. I feel like I've been fascinated by that question too.

I'm currently specifically in a PTSD clinic and it's just interesting to see for people who experience all types of trauma, sometimes the same forms of trauma, what symptoms are, what they're presenting with.

And then also, for some people, how they could live their life as if the trauma never happened. For some people to go through treatment and to be in a better state than before as if they've just surpassed their baseline.

And then also for some people to have a little bit harder time, you know, being able to deal with their trauma. And I feel like, of course, a lot of clinicians will say, well, that's the intersection of genetics and environment and social support and resiliency, like you mentioned.

But it is interesting to see how the brain reacts to all of that based on so many different factors, you know. Very true, very true. It's like you're making a delicious, complicated meal.

How hot was the pan? How much cream?

Advice for Students, Resilience, and Closing Thoughts

Fresh there are so many variables that determine the outcome most of the time it tastes pretty good And I think we can do a pretty good job with most people but yeah, there's so much to learn and I'm excited for you to be on the the front end of that And I'm grateful for the opportunity.

I've had to be on the back end Yeah. Well, let me ask this. What would you say is your favorite neuropsychology test to administer if you had to pick one?

Edith Kaplan has something she called the clock drawing test. And it's losing its validity because everything's digital anymore. But she would ask you to draw a round clock, put the numbers on there, put the hands at a certain time.

And it just measures so many things. One of her famous quotes was, if you know what you're doing as a neuropsychologist, you can do an evaluation on a deserted island with just a coconut and a stick.

So I don't know that it's necessarily the tests that lead you to be good at what you do. It's what are the tests doing? What information does it get you?

How do you incorporate that into your understanding of the individual? What happened to them? Et cetera. So it's it's in dimensional deep, which is another reason I think computers are important because We don't really think beyond three dimensions, maybe four, but that's where I don't think it's the test.

I think it's the integration of all this noise. We're getting there. Yeah. Yeah. Dr. Nichols, with all that you do, I'd love to know what do you do for yourself, whether for just wellness, for body, mind, spirit?

How do you take care of yourself as you take care of others? I have a wonderful wife. We like to go, go, go. And so a month ago we were in Bali and Indonesia and Dubai and a couple weeks I'm going to England for a couple weeks.

So I think travel is a very important thing for me. Exercise is very important too. My goal is to not rust. So I've got to try to keep moving. But I really love my job and my job is exciting to me and it keeps me going and talking to people like you keeps me going.

I love that. Well, Dr. Nichols, overall, thank you so much for this conversation. I feel like I've learned so much. I feel like you've enlightened us in regards to where some of these VR based assessments are going.

I feel like you've also I'm sure you've inspired people in regards to the future of where AI and technology can blend together and integrate with neuropsychology.

And I get so many questions asked about students wanting to go into neuropsychology, how to become a neuropsychologist. And I feel like this is a really exciting time to go into this field because it's just developing so quickly.

And so I appreciate all of the knowledge you shared today. Thank you again so much for your time. But yeah, this has been just an unbelievable conversation.

So thank you. Well, it's my pleasure. And if anybody would like to learn more about Nesflora, which is kind of my current interest, the website is nesflora.com.

And there's a way to contact me and or us directly, be happy to answer any questions people have. Awesome. Yeah, we will definitely leave down the links below so people can check that out and out to you all.

So thank you once again. Well, thank you for inviting me. I've enjoyed this.