WEBVTT

NOTE duration:"01:06:06"

NOTE recognizability:0.890

NOTE language:en-us

NOTE Confidence: 0.862330445555556

00:00:00.000 -> 00:00:03.225 Hello everyone. Welcome to RT32.

NOTE Confidence: 0.862330445555556

00:00:03.225 --> 00:00:05.805 Presentation I mean sorry,

NOTE Confidence: 0.862330445555556

00:00:05.810 -> 00:00:06.814 excuse me well oops,

NOTE Confidence: 0.862330445555556

 $00:00:06.814 \longrightarrow 00:00:08.616$  that's a I'm I'm ready for the

NOTE Confidence: 0.862330445555556

 $00:00:08.616 \rightarrow 00:00:10.296$  next thing that I'm going to do.

NOTE Confidence: 0.862330445555556

 $00{:}00{:}10{.}300 \dashrightarrow 00{:}00{:}13{.}302$  Welcome to our grand rounds and

NOTE Confidence: 0.862330445555556

 $00:00:13.302 \longrightarrow 00:00:15.262$  it's my pleasure to introduce

NOTE Confidence: 0.862330445555556

00:00:15.262 --> 00:00:16.830 Doctor Jamie in Portland.

NOTE Confidence: 0.862330445555556

 $00:00:16.830 \longrightarrow 00:00:18.370$  I've known Jamie for into

NOTE Confidence: 0.862330445555556

 $00{:}00{:}18.370 \dashrightarrow 00{:}00{:}20.523$  our second decade and were Co

NOTE Confidence: 0.862330445555556

 $00:00:20.523 \rightarrow 00:00:22.167$  conspirators in electrophysiology.

NOTE Confidence: 0.862330445555556

 $00{:}00{:}22.170 \dashrightarrow 00{:}00{:}24.468$  We've collaborated at a fun time.

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 $00{:}00{:}24.470 \dashrightarrow 00{:}00{:}27.366$  I consider him a colleague and a friend

 $00:00:27.370 \rightarrow 00:00:31.375$  and so he'll be speaking to you about his.

NOTE Confidence: 0.862330445555556

 $00{:}00{:}31{.}380 \dashrightarrow 00{:}00{:}34{.}254$  He's a really impactful work progress

NOTE Confidence: 0.862330445555556

 $00:00:34.254 \rightarrow 00:00:36.170$  in biomarkers and development

NOTE Confidence: 0.862330445555556

00:00:36.246 --> 00:00:37.870 in autism spectrum disorder.

NOTE Confidence: 0.862330445555556

 $00:00:37.870 \longrightarrow 00:00:39.830$  It's really, you know,

NOTE Confidence: 0.862330445555556

 $00:00:39.830 \longrightarrow 00:00:42.422$  an amazing program of research and

NOTE Confidence: 0.862330445555556

00:00:42.422 --> 00:00:44.630 it's you know, world renowned.

NOTE Confidence: 0.862330445555556

 $00:00:44.630 \longrightarrow 00:00:46.450$  Before we get started,

NOTE Confidence: 0.862330445555556

 $00:00:46.450 \longrightarrow 00:00:48.331$  I just want to remind you that we have

NOTE Confidence: 0.862330445555556

 $00:00:48.331 \rightarrow 00:00:50.047$  another imperson grand rounds next week,

NOTE Confidence: 0.862330445555556

 $00:00:50.050 \rightarrow 00:00:52.829$  and that's going to be Teresa Betancourt

NOTE Confidence: 0.862330445555556

 $00:00:52.830 \rightarrow 00:00:55.044$  and the title of her talk will be the

NOTE Confidence: 0.862330445555556

 $00:00:55.044 \rightarrow 00:00:56.769$  promise of implementation science.

NOTE Confidence: 0.862330445555556

00:00:56.770 --> 00:00:58.730 Promotion of ECD play and

NOTE Confidence: 0.862330445555556

 $00{:}00{:}58.730 \dashrightarrow 00{:}01{:}00.298$  violence reduction in Rwanda.

NOTE Confidence: 0.862330445555556

 $00:01:00.300 \longrightarrow 00:01:01.400$  So without further ado.

- NOTE Confidence: 0.862330445555556
- 00:01:01.400 --> 00:01:01.950 Talking Portland
- NOTE Confidence: 0.894939993636364
- 00:01:06.370 --> 00:01:08.238 thank you Mike. OK,
- NOTE Confidence: 0.894939993636364
- $00{:}01{:}08.238 \dashrightarrow 00{:}01{:}11.770$  the I'm certain for me at least.
- NOTE Confidence: 0.894939993636364
- $00:01:11.770 \longrightarrow 00:01:14.560$  The hardest part of today is
- NOTE Confidence: 0.894939993636364
- 00:01:14.560 --> 00:01:17.377 going to be figuring out how
- NOTE Confidence: 0.894939993636364
- $00:01:17.377 \rightarrow 00:01:19.260$  to share my screen. Yeah.
- NOTE Confidence: 0.87003039875
- $00:01:23.300 \rightarrow 00:01:27.708$  Alright well that kinda. From what you see.
- NOTE Confidence: 0.968346586666667
- $00:01:30.940 \longrightarrow 00:01:32.388$  Alright, we're in business.
- NOTE Confidence: 0.968346586666667
- $00{:}01{:}32{.}388 \dashrightarrow 00{:}01{:}34{.}198$  So thank you so much.
- NOTE Confidence: 0.968346586666667
- 00:01:34.200 --> 00:01:35.970 It's really it's very special to
- NOTE Confidence: 0.968346586666667
- $00:01:35.970 \longrightarrow 00:01:38.400$  me to be here today and have the
- NOTE Confidence: 0.968346586666667
- $00:01:38.400 \longrightarrow 00:01:40.562$  chance to talk to you about the
- NOTE Confidence: 0.968346586666667
- $00:01:40.562 \rightarrow 00:01:42.488$  the work that we've been doing.
- NOTE Confidence: 0.968346586666667
- $00{:}01{:}42{.}490 \dashrightarrow 00{:}01{:}44{.}210$  I I looked back in the first time
- NOTE Confidence: 0.968346586666667
- 00:01:44.210 --> 00:01:45.930 that I ever gave grand Rounds.
- NOTE Confidence: 0.968346586666667

- $00:01:45.930 \longrightarrow 00:01:48.134$  Here was in 2008.
- NOTE Confidence: 0.968346586666667
- 00:01:48.134 --> 00:01:50.430 I was a research faculty.
- NOTE Confidence: 0.968346586666667
- 00:01:50.430 --> 00:01:52.350 I was not yet an assistant
- NOTE Confidence: 0.968346586666667
- $00:01:52.350 \longrightarrow 00:01:53.440$  professor and really,
- NOTE Confidence: 0.968346586666667
- $00:01:53.440 \longrightarrow 00:01:54.890$  my entire career has happened
- NOTE Confidence: 0.968346586666667
- 00:01:54.890 --> 00:01:56.780 here at the CHILD Study Center.
- NOTE Confidence: 0.968346586666667
- 00:01:56.780 --> 00:01:57.902 So it's really.
- NOTE Confidence: 0.968346586666667
- $00:01:57.902 \dashrightarrow 00:02:00.945$  It's fun for me and it's meaningful to
- NOTE Confidence: 0.968346586666667
- $00:02:00.945 \dashrightarrow 00:02:03.745$  be introduced by Mike to have the faces.
- NOTE Confidence: 0.968346586666667
- $00:02:03.750 \longrightarrow 00:02:04.644$  In the audience,
- NOTE Confidence: 0.968346586666667
- $00:02:04.644 \rightarrow 00:02:07.090$  be the very people that trained me here,
- NOTE Confidence: 0.9683465866666667
- $00:02:07.090 \rightarrow 00:02:09.124$  and I assume there hopefully face
- NOTE Confidence: 0.968346586666667
- $00:02:09.124 \rightarrow 00:02:10.870$  staring computer screens out there.
- NOTE Confidence: 0.968346586666667
- 00:02:10.870 --> 00:02:12.718 So thank you for today and
- NOTE Confidence: 0.968346586666667
- $00:02:12.718 \longrightarrow 00:02:13.950$  thank you for everything.
- NOTE Confidence: 0.968346586666667
- 00:02:13.950 --> 00:02:15.326 And it's fun to talk about this stuff.

- NOTE Confidence: 0.968346586666667
- $00:02:15.330 \longrightarrow 00:02:15.625$  Really.
- NOTE Confidence: 0.968346586666667
- 00:02:15.625 --> 00:02:17.395 What I'm going to talk about,
- NOTE Confidence: 0.968346586666667
- $00:02:17.400 \longrightarrow 00:02:19.204$  his progress in biomarker
- NOTE Confidence: 0.968346586666667
- $00:02:19.204 \rightarrow 00:02:20.557$  development in autism.
- NOTE Confidence: 0.9683465866666667
- 00:02:20.560 --> 00:02:21.439 The you know,
- NOTE Confidence: 0.968346586666667
- $00:02:21.439 \longrightarrow 00:02:22.904$  I don't think there's conflicts.
- NOTE Confidence: 0.968346586666667
- $00{:}02{:}22{.}910 \dashrightarrow 00{:}02{:}24{.}470$  These are the organizations and
- NOTE Confidence: 0.968346586666667
- 00:02:24.470 00:02:26.250 support my lab and support me,
- NOTE Confidence: 0.9683465866666667
- $00{:}02{:}26.250 \dashrightarrow 00{:}02{:}27.538$  but I don't think there's any conflicts.
- NOTE Confidence: 0.968346586666667
- $00:02:27.540 \longrightarrow 00:02:28.812$  Will talk about today in terms
- NOTE Confidence: 0.968346586666667
- $00:02:28.812 \longrightarrow 00:02:30.055$  of the content and this is
- NOTE Confidence: 0.9683465866666667
- $00{:}02{:}30.055 \dashrightarrow 00{:}02{:}31.266$  what I want to try to cover.
- NOTE Confidence: 0.968346586666667
- 00:02:31.270 --> 00:02:33.034 It's a lot I want to talk
- NOTE Confidence: 0.9683465866666667
- 00:02:33.034 --> 00:02:34.729 a little bit about autism.
- NOTE Confidence: 0.968346586666667
- $00:02:34.730 \dashrightarrow 00:02:36.962$  People know a lot about autism in this room.
- NOTE Confidence: 0.968346586666667

 $00:02:36.970 \longrightarrow 00:02:38.506$  Some of the things that are

NOTE Confidence: 0.968346586666667

 $00{:}02{:}38.506 \dashrightarrow 00{:}02{:}40.383$  really central to me and how to

NOTE Confidence: 0.9683465866666667

 $00:02:40.383 \longrightarrow 00:02:41.713$  approach the study of autism.

NOTE Confidence: 0.968346586666667

 $00:02:41.720 \longrightarrow 00:02:43.768$  I want to talk a little bit about

NOTE Confidence: 0.968346586666667

00:02:43.768 --> 00:02:45.369 biomarker but biomarker research,

NOTE Confidence: 0.968346586666667

00:02:45.370 --> 00:02:47.070 how we operationalize biomarkers

NOTE Confidence: 0.968346586666667

 $00{:}02{:}47.070 \dashrightarrow 00{:}02{:}49.195$  'cause I think there's some

NOTE Confidence: 0.968346586666667

 $00:02:49.195 \dashrightarrow 00:02:51.669$  really some kind of problematic

NOTE Confidence: 0.968346586666667

 $00{:}02{:}51{.}669 \dashrightarrow 00{:}02{:}53{.}649$  misunderstandings and simply and

NOTE Confidence: 0.968346586666667

 $00:02:53.649 \rightarrow 00:02:55.850$  simplifications that trouble our field.

NOTE Confidence: 0.968346586666667

 $00{:}02{:}55{.}850 \dashrightarrow 00{:}02{:}57{.}537$  I want to talk about some of

NOTE Confidence: 0.968346586666667

 $00{:}02{:}57{.}537 \dashrightarrow 00{:}02{:}59{.}604$  the things that I worry about

NOTE Confidence: 0.9683465866666667

 $00:02:59.604 \rightarrow 00:03:00.885$  in evaluating biomarkers

NOTE Confidence: 0.968346586666667

00:03:00.885 --> 00:03:02.166 scientifically and practically.

NOTE Confidence: 0.968346586666667

 $00:03:02.170 \rightarrow 00:03:04.807$  And then I'm gonna tell a story of progress.

NOTE Confidence: 0.968346586666667

 $00:03:04.810 \longrightarrow 00:03:06.366$  With a particular biomarker,

- NOTE Confidence: 0.968346586666667
- 00:03:06.366 --> 00:03:09.189 and 170 but I've been very involved
- NOTE Confidence: 0.968346586666667
- $00{:}03{:}09{.}189 \dashrightarrow 00{:}03{:}11.691$  with and then some obstacles to
- NOTE Confidence: 0.968346586666667
- $00{:}03{:}11.691 \dashrightarrow 00{:}03{:}13.802$  moving forward and then some paths
- NOTE Confidence: 0.968346586666667
- $00:03:13.802 \longrightarrow 00:03:15.559$  forward so you know that I put
- NOTE Confidence: 0.9683465866666667
- $00:03:15.559 \longrightarrow 00:03:17.669$  into the category of kind of better
- NOTE Confidence: 0.9683465866666667
- $00{:}03{:}17.669 \dashrightarrow 00{:}03{:}19.586$  studies and a particular one that
- NOTE Confidence: 0.968346586666667
- $00:03:19.586 \longrightarrow 00:03:21.554$  I'll talk about is the Autism
- NOTE Confidence: 0.968346586666667
- 00:03:21.554 --> 00:03:23.461 Biomarkers Consortium for clinical trials,
- NOTE Confidence: 0.968346586666667
- $00:03:23.461 \longrightarrow 00:03:25.546$  and then ways to innovate
- NOTE Confidence: 0.9683465866666667
- $00:03:25.550 \longrightarrow 00:03:27.130$  to look beyond just autism.
- NOTE Confidence: 0.968346586666667
- $00:03:27.130 \longrightarrow 00:03:29.185$  Way that biomarkers could be
- NOTE Confidence: 0.968346586666667
- $00:03:29.185 \rightarrow 00:03:30.829$  informative and transdiagnostic ways
- NOTE Confidence: 0.968346586666667
- $00:03:30.829 \longrightarrow 00:03:33.344$  to increase the reach of neuroscience
- NOTE Confidence: 0.968346586666667
- $00:03:33.344 \longrightarrow 00:03:35.164$  research in autism, which is.
- NOTE Confidence: 0.9683465866666667
- $00:03:35.164 \rightarrow 00:03:36.946$  Presently limited and then how we
- NOTE Confidence: 0.968346586666667

 $00:03:36.946 \rightarrow 00:03:39.482$  might be able to use some of these

NOTE Confidence: 0.968346586666667

00:03:39.482 --> 00:03:41.540 biomarkers to actually inform therapeutics,

NOTE Confidence: 0.968346586666667

 $00:03:41.540 \longrightarrow 00:03:43.328$  which is the goal.

NOTE Confidence: 0.9683465866666667

 $00:03:43.330 \longrightarrow 00:03:44.318$  Is that a question?

NOTE Confidence: 0.94230175

 $00:03:46.970 \longrightarrow 00:03:47.480$  Sure.

NOTE Confidence: 0.882743902352941

 $00{:}03{:}52{.}680 \dashrightarrow 00{:}03{:}54{.}045$  These are all these are the graphs

NOTE Confidence: 0.882743902352941

 $00{:}03{:}54.045 \dashrightarrow 00{:}03{:}55.079$  that have supported the research

NOTE Confidence: 0.882743902352941

 $00:03:55.079 \rightarrow 00:03:56.330$  that you hear about today, yeah?

NOTE Confidence: 0.78055227

 $00{:}04{:}04{.}270 \dashrightarrow 00{:}04{:}07{.}730$  Thanks Paul. Yeah yeah.

NOTE Confidence: 0.78055227

 $00:04:07.730 \longrightarrow 00:04:10.190$  So autism spectrum disorder.

NOTE Confidence: 0.78055227

 $00{:}04{:}10.190 \dashrightarrow 00{:}04{:}12.128$  So the DSM five defines autism

NOTE Confidence: 0.78055227

00:04:12.128 --> 00:04:13.957 spectrum disorder as a developmental

NOTE Confidence: 0.78055227

00:04:13.957 --> 00:04:16.297 condition that impacts you know,

NOTE Confidence: 0.78055227

00:04:16.300  $\operatorname{-->}$  00:04:17.684 they group it in two areas that we

NOTE Confidence: 0.78055227

 $00{:}04{:}17.684 \dashrightarrow 00{:}04{:}18.937$  could think of it as kind of three.

NOTE Confidence: 0.78055227

 $00:04:18.940 \rightarrow 00:04:21.433$  I think about it as kind of three social

- NOTE Confidence: 0.78055227
- $00{:}04{:}21{.}433 \dashrightarrow 00{:}04{:}23{.}103$  communicated function interests and

 $00{:}04{:}23.103 \dashrightarrow 00{:}04{:}25.328$  behavioral flexibility and sensory responses.

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00:04:25.330 --> 00:04:26.878 And I want to highlight when

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 $00:04:26.878 \rightarrow 00:04:27.910$  we say developmental condition,

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 $00:04:27.910 \longrightarrow 00:04:30.304$  one of the challenges of studying autism

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 $00:04:30.304 \dashrightarrow 00:04:33.238$  is that you it's always a moving target.

NOTE Confidence: 0.78055227

 $00:04:33.240 \rightarrow 00:04:35.600$  So whenever we look at anything in autism,

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 $00{:}04{:}35{.}600 \dashrightarrow 00{:}04{:}36{.}713$  behavior or brain.

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 $00:04:36.713 \longrightarrow 00:04:39.310$  We don't really know whether we see

NOTE Confidence: 0.78055227

00:04:39.385 --> 00:04:42.025 are seeing A cause of autism or a

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 $00:04:42.025 \rightarrow 00:04:44.559$  consequence of developing with autism, right?

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 $00{:}04{:}44{.}559 \dashrightarrow 00{:}04{:}45{.}435$  So that's really important

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 $00{:}04{:}45{.}435 \dashrightarrow 00{:}04{:}46{.}790$  for us to keep in mind.

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00:04:46.790 --> 00:04:48.589 What are the other things that I

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 $00{:}04{:}48.589 \dashrightarrow 00{:}04{:}50.640$  think are really important to keep in

 $00:04:50.640 \rightarrow 00:04:52.470$  mind when we're talking about autism?

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00:04:52.470 --> 00:04:53.080 Heterogeneity, right?

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 $00:04:53.080 \longrightarrow 00:04:54.605$  So when you say autism,

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 $00{:}04{:}54{.}610 \dashrightarrow 00{:}04{:}56{.}778$  you really don't know too much about the

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 $00:04:56.778 \rightarrow 00:04:58.705$  person that you're talking about, right?

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00:04:58.705 - 00:05:00.365 They could have an IQ of 150,

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 $00:05:00.365 \dashrightarrow 00:05:02.325$  an IQ of 50 could have fluent language,

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 $00:05:02.330 \longrightarrow 00:05:04.214$  could have no language.

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 $00{:}05{:}04{.}214 \dashrightarrow 00{:}05{:}06{.}098$  We know one thing.

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 $00{:}05{:}06{.}100 \dashrightarrow 00{:}05{:}08{.}348$  We know that they have some kind of

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 $00{:}05{:}08.348 \dashrightarrow 00{:}05{:}10.080$  difficulties with social communication,

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 $00:05:10.080 \longrightarrow 00:05:10.343$  right?

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00:05:10.343 - > 00:05:11.921 That is literally when we think

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 $00:05:11.921 \longrightarrow 00:05:13.190$  by the diagnostic criteria.

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 $00:05:13.190 \longrightarrow 00:05:14.690$  The only thing that you can

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 $00{:}05{:}14.690 \dashrightarrow 00{:}05{:}16.533$  take as a safe assumption about

- NOTE Confidence: 0.78055227
- 00:05:16.533 > 00:05:18.488 any given person with autism.

 $00{:}05{:}18{.}490 \dashrightarrow 00{:}05{:}20{.}434$  And that's where we choose to dig it.

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 $00:05:20.440 \longrightarrow 00:05:22.200$  And we think maybe will get the most

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 $00:05:22.200 \rightarrow 00:05:23.728$  traction and understanding a really,

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 $00:05:23.730 \rightarrow 00:05:26.315$  really complicated condition by focusing

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 $00:05:26.315 \dashrightarrow 00:05:30.480$  on that area of of common difficulty

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 $00:05:30.480 \rightarrow 00:05:33.160$  when we think about the biology of autism,

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 $00:05:33.160 \rightarrow 00:05:34.624$  it's not well understood,

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 $00:05:34.624 \longrightarrow 00:05:36.088$  but we do understand.

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 $00:05:36.090 \rightarrow 00:05:38.130$  Is that there's multiple causes.

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 $00:05:38.130 \longrightarrow 00:05:40.375$  There's probably many different kinds

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 $00{:}05{:}40.375 \dashrightarrow 00{:}05{:}42.620$  of mechanisms involved in autism.

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 $00{:}05{:}42.620 \dashrightarrow 00{:}05{:}45.530$  Autism isn't a biological thing,

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00:05:45.530 --> 00:05:45.770 right?

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 $00{:}05{:}45{.}770 \dashrightarrow 00{:}05{:}47{.}930$  So I'm going to talk to you today about

 $00:05:47.983 \longrightarrow 00:05:49.921$  how to make biomarkers for something

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00:05:49.921 --> 00:05:52.209 that isn't one biological thing challenging,

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00:05:52.210 --> 00:05:52.812 right?

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 $00{:}05{:}52{.}812 \dashrightarrow 00{:}05{:}57{.}273$  So if we have these in that situation,

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 $00:05:57.273 \longrightarrow 00:05:58.678$  what are we left with?

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00:05:58.680 --> 00:06:00.290 Or we're left with behavior,

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 $00:06:00.290 \rightarrow 00:06:03.195$  and so everything really everything

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00:06:03.195 --> 00:06:06.100 that we use as clinicians.

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 $00{:}06{:}06{.}100 \dashrightarrow 00{:}06{:}07{.}948$  To make decisions about autism is

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 $00{:}06{:}07{.}948 \dashrightarrow 00{:}06{:}10{.}432$  based on behavior and let me let me

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 $00:06:10.432 \rightarrow 00:06:12.214$  highlight this by showing you pictures.

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 $00:06:12.220 \rightarrow 00:06:14.980$  So in the lab there's many,

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 $00:06:14.980 \longrightarrow 00:06:16.630$  many different tools that we

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 $00:06:16.630 \longrightarrow 00:06:18.280$  can use for our science.

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 $00:06:18.280 \longrightarrow 00:06:20.600$  We can use electrophysiology,

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 $00:06:20.600 \rightarrow 00:06:22.340$  positron emission tomography,

- NOTE Confidence: 0.78055227
- 00:06:22.340 --> 00:06:24.720 functional near infrared spectroscopy,

00:06:24.720 --> 00:06:25.910 eye tracking,

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 $00:06:25.910 \longrightarrow 00:06:28.620$  lots of different powerful techniques

NOTE Confidence: 0.78055227

 $00:06:28.620 \rightarrow 00:06:32.040$  to learn different things about biology.

NOTE Confidence: 0.78055227

 $00:06:32.040 \longrightarrow 00:06:34.680$  When we go into the clinic and This

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 $00:06:34.680 \longrightarrow 00:06:36.725$  is why I show these slides a lot.

NOTE Confidence: 0.78055227

00:06:36.730 --> 00:06:38.770 Today I feel these slides.

NOTE Confidence: 0.78055227

00:06:38.770 --> 00:06:40.968 I came here directly from the clinic

NOTE Confidence: 0.78055227

 $00{:}06{:}40{.}968 \dashrightarrow 00{:}06{:}43{.}388$  and there is a family that I we

NOTE Confidence: 0.78055227

 $00:06:43.388 \longrightarrow 00:06:45.570$  worked with today that is struggling.

NOTE Confidence: 0.78055227

 $00{:}06{:}45{.}570 \dashrightarrow 00{:}06{:}48{.}474$  A child who is struggling and you

NOTE Confidence: 0.78055227

 $00{:}06{:}48.474 \dashrightarrow 00{:}06{:}51.162$  know what can't use single one of

NOTE Confidence: 0.78055227

 $00{:}06{:}51{.}162 \dashrightarrow 00{:}06{:}53{.}548$  these things to help this family.

NOTE Confidence: 0.78055227

 $00{:}06{:}53.550 \dashrightarrow 00{:}06{:}57.056$  What have I got? I've got my eyes.

NOTE Confidence: 0.78055227

 $00{:}06{:}57.056$  -->  $00{:}06{:}58.977$  I've got the parents eyes and what NOTE Confidence: 0.78055227

13

 $00:06:58.977 \rightarrow 00:07:00.895$  they can tell me about that child.

NOTE Confidence: 0.78055227

 $00{:}07{:}00{.}900 \dashrightarrow 00{:}07{:}03{.}525$  This literally the same tool

NOTE Confidence: 0.78055227

00:07:03.525 --> 00:07:06.150 that Lee O'Connor was using

NOTE Confidence: 0.901603751818182

 $00:07:06.252 \rightarrow 00:07:09.219$  in 1943, and that like those two pictures,

NOTE Confidence: 0.901603751818182

 $00{:}07{:}09{.}220 \dashrightarrow 00{:}07{:}11{.}060$  that's it. That's the goal of the lab

NOTE Confidence: 0.901603751818182

 $00:07:11.060 \dashrightarrow 00:07:13.331$  is to try to get some of those tools to

NOTE Confidence: 0.901603751818182

 $00:07:13.331 \rightarrow 00:07:15.595$  help us do a better job helping families.

NOTE Confidence: 0.901603751818182

 $00{:}07{:}15{.}600 \dashrightarrow 00{:}07{:}17{.}476$  'cause I think that we can do.

NOTE Confidence: 0.901603751818182

 $00{:}07{:}17{.}480 \dashrightarrow 00{:}07{:}18{.}356$  We've done great.

NOTE Confidence: 0.901603751818182

00:07:18.356 --> 00:07:20.067 Don't get me wrong like clinicians,

NOTE Confidence: 0.901603751818182

 $00{:}07{:}20.067 \dashrightarrow 00{:}07{:}22.043$  you know, I said a place like this.

NOTE Confidence: 0.901603751818182

 $00:07:22.050 \dashrightarrow 00:07:23.875$  Clinicians are powerful and they

NOTE Confidence: 0.901603751818182

 $00{:}07{:}23.875 \dashrightarrow 00{:}07{:}26.297$  can do great things, but I think.

NOTE Confidence: 0.901603751818182

 $00{:}07{:}26.297 \dashrightarrow 00{:}07{:}28.530$  There are inherent limitations to what we

NOTE Confidence: 0.901603751818182

 $00:07:28.595 \dashrightarrow 00:07:31.079$  can see and what parents can see and when.

NOTE Confidence: 0.901603751818182

 $00:07:31.080 \rightarrow 00:07:33.456$  That's the only thing guiding us.

00:07:33.460 --> 00:07:34.762 I don't think that we're doing

NOTE Confidence: 0.901603751818182

 $00:07:34.762 \longrightarrow 00:07:36.616$  the best we can possibly do the.

NOTE Confidence: 0.901603751818182

 $00:07:36.616 \dashrightarrow 00:07:39.300$  So what we want. We want biomarkers.

NOTE Confidence: 0.901603751818182

 $00:07:39.300 \rightarrow 00:07:40.660$  What is a biomarker?

NOTE Confidence: 0.901603751818182

 $00:07:40.660 \rightarrow 00:07:43.340$  This is how the FDA defines a biomarker,

NOTE Confidence: 0.901603751818182

 $00{:}07{:}43.340 \dashrightarrow 00{:}07{:}45.895$  a characteristic that is measured as an

NOTE Confidence: 0.901603751818182

00:07:45.895 --> 00:07:48.359 indicator of normal biological processes,

NOTE Confidence: 0.901603751818182

 $00:07:48.360 \rightarrow 00:07:50.096$  pathogenic processes or responses

NOTE Confidence: 0.901603751818182

 $00{:}07{:}50.096 \dashrightarrow 00{:}07{:}52.266$  to an exposure or intervention,

NOTE Confidence: 0.901603751818182

 $00:07:52.270 \rightarrow 00:07:53.290$  including therapeutic interventions.

NOTE Confidence: 0.901603751818182

00:07:53.290 --> 00:07:56.170 So a lot of words kind of jargony,

NOTE Confidence: 0.901603751818182

 $00{:}07{:}56{.}170 \dashrightarrow 00{:}07{:}57{.}778$  but think about it. What does it mean?

NOTE Confidence: 0.901603751818182

 $00{:}07{:}57{.}780 \dashrightarrow 00{:}07{:}59{.}890$  It's basically something about biology

NOTE Confidence: 0.901603751818182

 $00:07:59.890 \dashrightarrow 00:08:02.163$  that can be objectively measured, right?

NOTE Confidence: 0.901603751818182

 $00{:}08{:}02{.}163 \dashrightarrow 00{:}08{:}03{.}630$  But I think that's what I think about it.

 $00:08:03.630 \longrightarrow 00:08:05.212$  So like a picture of what a

NOTE Confidence: 0.901603751818182

00:08:05.212 --> 00:08:05.890 biomarker should be,

NOTE Confidence: 0.901603751818182

00:08:05.890 --> 00:08:07.568 it would be a picture of a ruler, right?

NOTE Confidence: 0.901603751818182

 $00:08:07.568 \rightarrow 00:08:09.234$  Something is objective that you can measure,

NOTE Confidence: 0.901603751818182

 $00:08:09.240 \longrightarrow 00:08:10.398$  and when two people use it,

NOTE Confidence: 0.901603751818182

 $00:08:10.400 \longrightarrow 00:08:12.680$  it gives you the same result.

NOTE Confidence: 0.901603751818182

00:08:12.680 --> 00:08:15.900 You can't, people do, but you can't.

NOTE Confidence: 0.901603751818182

 $00:08:15.900 \dashrightarrow 00:08:18.912$  You shouldn't promise me that you

NOTE Confidence: 0.901603751818182

 $00{:}08{:}18{.}912 \dashrightarrow 00{:}08{:}21{.}569$  won't think about biomarkers in the.

NOTE Confidence: 0.901603751818182

 $00{:}08{:}21.570 \dashrightarrow 00{:}08{:}24.342$  Dissociated from their purpose a biomarker

NOTE Confidence: 0.901603751818182

00:08:24.342 --> 00:08:27.023 could only be meaningfully considered when

NOTE Confidence: 0.901603751818182

 $00:08:27.023 \rightarrow 00:08:30.071$  you think about what you're using it for,

NOTE Confidence: 0.901603751818182

 $00:08:30.080 \longrightarrow 00:08:31.550$  so these are the kinds of

NOTE Confidence: 0.901603751818182

00:08:31.550 - 00:08:33.010 categories of use of the FDA.

NOTE Confidence: 0.901603751818182

 $00{:}08{:}33{.}010 \dashrightarrow 00{:}08{:}34{.}875$  Defines there are additional ones

NOTE Confidence: 0.901603751818182

00:08:34.875 --> 00:08:37.417 I've limited to these that that I

 $00:08:37.417 \rightarrow 00:08:39.545$  think of as being relevant to autism,

NOTE Confidence: 0.901603751818182

 $00:08:39.550 \dashrightarrow 00:08:41.854$  so one would be susceptibility or

NOTE Confidence: 0.901603751818182

 $00:08:41.854 \rightarrow 00:08:43.390$  risk something biological that

NOTE Confidence: 0.901603751818182

 $00:08:43.450 \longrightarrow 00:08:45.430$  you measure that tells you that

NOTE Confidence: 0.901603751818182

 $00{:}08{:}45{.}430 \dashrightarrow 00{:}08{:}47{.}254$  someone is an increased likelihood

NOTE Confidence: 0.901603751818182

 $00:08:47.254 \rightarrow 00:08:49.030$  of developing a condition.

NOTE Confidence: 0.901603751818182

 $00:08:49.030 \rightarrow 00:08:50.585$  Pharmacodynamic or response or another

NOTE Confidence: 0.901603751818182

 $00:08:50.585 \rightarrow 00:08:53.319$  way to put it would be target engagement,

NOTE Confidence: 0.901603751818182

00:08:53.320 --> 00:08:53.769 right?

NOTE Confidence: 0.901603751818182

 $00:08:53.769 \longrightarrow 00:08:57.361$  A biomarker that tells you a treatment is

NOTE Confidence: 0.901603751818182

 $00:08:57.361 \rightarrow 00:09:00.099$  activating a certain system in the body.

NOTE Confidence: 0.901603751818182

00:09:00.100 --> 00:09:02.205 Prognostic something that tells you

NOTE Confidence: 0.901603751818182

 $00:09:02.205 \rightarrow 00:09:05.190$  about the natural course of a condition,

NOTE Confidence: 0.901603751818182

 $00:09:05.190 \longrightarrow 00:09:06.621$  right how things,

NOTE Confidence: 0.901603751818182

 $00:09:06.621 \dashrightarrow 00:09:08.529$  how development will unfold.

 $00:09:08.530 \rightarrow 00:09:11.242$  Predictive something that tells you about

NOTE Confidence: 0.901603751818182

 $00:09:11.242 \rightarrow 00:09:14.180$  an anticipated response to an intervention.

NOTE Confidence: 0.901603751818182

00:09:14.180 --> 00:09:16.232 Who's going to do better with this kind of NOTE Confidence: 0.901603751818182

 $00:09:16.232 \rightarrow 00:09:17.819$  treatment versus that kind of treatment?

NOTE Confidence: 0.901603751818182

 $00:09:17.820 \longrightarrow 00:09:20.128$  And then lastly diagnostic.

NOTE Confidence: 0.901603751818182

00:09:20.128 --> 00:09:23.860 And this is what you know when people

NOTE Confidence: 0.901603751818182

 $00:09:23.860 \dashrightarrow 00:09:25.635$  think about biomarkers and autism.

NOTE Confidence: 0.901603751818182

00:09:25.640 --> 00:09:26.286 Problematically,

NOTE Confidence: 0.901603751818182

 $00:09:26.286 \rightarrow 00:09:29.516$  almost everybody thinks about a

NOTE Confidence: 0.901603751818182

 $00:09:29.516 \dashrightarrow 00:09:31.654$  diagnostic biomarker and what

NOTE Confidence: 0.901603751818182

 $00{:}09{:}31{.}654 \dashrightarrow 00{:}09{:}34{.}762$  they think about is a diagnostic

NOTE Confidence: 0.901603751818182

 $00:09:34.762 \longrightarrow 00:09:37.218$  biomarker for the condition,

NOTE Confidence: 0.901603751818182

 $00:09:37.220 \longrightarrow 00:09:38.288$  right that this biomarker

NOTE Confidence: 0.901603751818182

 $00:09:38.288 \longrightarrow 00:09:39.623$  is going to tell you.

NOTE Confidence: 0.901603751818182

 $00:09:39.630 \rightarrow 00:09:42.036$  Who has autism and who doesn't?

NOTE Confidence: 0.901603751818182

 $00:09:42.040 \rightarrow 00:09:44.338$  And that's a really tall order

- NOTE Confidence: 0.901603751818182
- $00:09:44.338 \longrightarrow 00:09:46.290$  because autism isn't one thing
- NOTE Confidence: 0.901603751818182
- $00:09:46.290 \longrightarrow 00:09:48.342$  right another way that you could
- NOTE Confidence: 0.901603751818182
- $00:09:48.342 \rightarrow 00:09:50.370$  think about a diagnostic biomarker.
- NOTE Confidence: 0.901603751818182
- $00:09:50.370 \dashrightarrow 00:09:52.435$  And the FDA includes this in their
- NOTE Confidence: 0.901603751818182
- $00{:}09{:}52{.}435 \dashrightarrow 00{:}09{:}54{.}033$  definition is as being diagnostic
- NOTE Confidence: 0.901603751818182
- $00:09:54.033 \longrightarrow 00:09:55.983$  of a subtype of a condition.
- NOTE Confidence: 0.901603751818182
- $00:09:55.990 \dashrightarrow 00:09:58.110$  So if we think if we have this kind of
- NOTE Confidence: 0.901603751818182
- 00:09:58.172 --> 00:10:00.682 picture from a paper that I like by evil off,
- NOTE Confidence: 0.86905949375
- $00:10:00.690 \longrightarrow 00:10:02.025$  you could think about see
- NOTE Confidence: 0.86905949375
- $00:10:02.025 \rightarrow 00:10:02.826$  all the heterogeneity.
- NOTE Confidence: 0.86905949375
- 00:10:02.830 --> 00:10:04.811 Well, what if you had a diagnostic
- NOTE Confidence: 0.86905949375
- $00{:}10{:}04{.}811 \dashrightarrow 00{:}10{:}06{.}445$  biomarker that told you something
- NOTE Confidence: 0.86905949375
- $00:10:06.445 \rightarrow 00:10:08.460$  about subtypes so that you're seeing?
- NOTE Confidence: 0.86905949375
- $00{:}10{:}08.460 \dashrightarrow 00{:}10{:}09.581$  OK, may be these these.
- NOTE Confidence: 0.86905949375
- $00{:}10{:}09{.}581 \dashrightarrow 00{:}10{:}11{.}840$  People are going to have a different course.
- NOTE Confidence: 0.86905949375

 $00{:}10{:}11{.}840 \dashrightarrow 00{:}10{:}13{.}898$  Maybe some of these people are going

NOTE Confidence: 0.86905949375

 $00{:}10{:}13.898 \dashrightarrow 00{:}10{:}16.059$  to respond in a different way to

NOTE Confidence: 0.86905949375

00:10:16.059 --> 00:10:17.889 a treatment and that's really

NOTE Confidence: 0.86905949375

 $00:10:17.956 \longrightarrow 00:10:19.720$  this is the kind of biomarker.

NOTE Confidence: 0.86905949375

00:10:19.720 --> 00:10:21.480 That I am going to talk about today

NOTE Confidence: 0.86905949375

 $00{:}10{:}21{.}480 \dashrightarrow 00{:}10{:}23{.}233$  and this is also I think a great

NOTE Confidence: 0.86905949375

 $00:10:23.233 \rightarrow 00:10:24.859$  example when I say that I think

NOTE Confidence: 0.86905949375

 $00:10:24.859 \longrightarrow 00:10:26.323$  as clinicians we can do better.

NOTE Confidence: 0.86905949375

 $00{:}10{:}26{.}330 \dashrightarrow 00{:}10{:}28{.}850$  So as a clinician as a field of

NOTE Confidence: 0.86905949375

 $00:10:28.850 \rightarrow 00:10:31.656$  clinicians we had subtypes for autism right?

NOTE Confidence: 0.86905949375

00:10:31.660 -> 00:10:32.868 We had Asperger syndrome,

NOTE Confidence: 0.86905949375

 $00:10:32.868 \longrightarrow 00:10:35.280$  we had domino S, you know what?

NOTE Confidence: 0.86905949375

00:10:35.280 --> 00:10:38.598 They didn't work in 2013 with the DSM five.

NOTE Confidence: 0.86905949375

 $00:10:38.600 \rightarrow 00:10:40.944$  We got rid of them because what was

NOTE Confidence: 0.86905949375

 $00{:}10{:}40{.}944 \dashrightarrow 00{:}10{:}42{.}475$  more predictive of the diagnosis

NOTE Confidence: 0.86905949375

 $00:10:42.475 \rightarrow 00:10:44.239$  you would get was the clinic,

- NOTE Confidence: 0.86905949375
- $00:10:44.240 \longrightarrow 00:10:45.815$  the clinic that you were diagnosed at?
- NOTE Confidence: 0.86905949375
- 00:10:45.820 --> 00:10:47.296 Then your characteristics right?
- NOTE Confidence: 0.86905949375
- $00:10:47.296 \dashrightarrow 00:10:50.640$  And so do I think there aren't subtypes.
- NOTE Confidence: 0.86905949375
- $00:10:50.640 \longrightarrow 00:10:52.038$  No, I think there are subtypes,
- NOTE Confidence: 0.86905949375
- $00:10:52.040 \longrightarrow 00:10:53.360$  but I think maybe the answer
- NOTE Confidence: 0.86905949375
- $00:10:53.360 \longrightarrow 00:10:54.240$  is in the biology.
- NOTE Confidence: 0.86905949375
- $00:10:54.240 \rightarrow 00:10:55.760$  It's a place many, many,
- NOTE Confidence: 0.86905949375
- 00:10:55.760 --> 00:10:58.231 many as two clinical eyes have failed
- NOTE Confidence: 0.86905949375
- $00:10:58.231 \longrightarrow 00:11:00.534$  to find answers, so this is now.
- NOTE Confidence: 0.86905949375
- $00:11:00.534 \rightarrow 00:11:02.400$  This is not the FDA talking.
- NOTE Confidence: 0.86905949375
- $00:11:02.400 \rightarrow 00:11:03.738$  Now this is just me talking.
- NOTE Confidence: 0.86905949375
- $00:11:03.740 \longrightarrow 00:11:04.976$  What are some of the things
- NOTE Confidence: 0.86905949375
- 00:11:04.976 --> 00:11:05.800 that I think about?
- NOTE Confidence: 0.86905949375
- 00:11:05.800 --> 00:11:07.697 What have I studied and interrogating some
- NOTE Confidence: 0.86905949375
- $00{:}11{:}07{.}697 \dashrightarrow 00{:}11{:}09{.}779$  of the biomarkers that I'll talk about today?
- NOTE Confidence: 0.86905949375

00:11:09.780 --> 00:11:11.430 Well, I think a biomarker should

NOTE Confidence: 0.86905949375

00:11:11.430 --> 00:11:12.910 be sensitive to diagnostic status,

NOTE Confidence: 0.86905949375

 $00:11:12.910 \longrightarrow 00:11:16.907$  even if it's even if it's not.

NOTE Confidence: 0.86905949375

00:11:16.910 --> 00:11:19.625 Diagnostically, defining if it's not

NOTE Confidence: 0.86905949375

 $00:11:19.625 \rightarrow 00:11:22.340$  hanging together with the diagnosis,

NOTE Confidence: 0.86905949375

00:11:22.340 --> 00:11:24.386 you know compared to typical development,

NOTE Confidence: 0.86905949375

 $00:11:24.390 \rightarrow 00:11:26.742$  it may not be telling you something

NOTE Confidence: 0.86905949375

 $00:11:26.742 \rightarrow 00:11:28.420$  meaningful about the condition.

NOTE Confidence: 0.86905949375

 $00{:}11{:}28{.}420 \dashrightarrow 00{:}11{:}30{.}226$  You might want to biomarker to

NOTE Confidence: 0.86905949375

 $00:11:30.226 \rightarrow 00:11:31.430$  be associated with symptoms,

NOTE Confidence: 0.86905949375

 $00:11:31.430 \longrightarrow 00:11:33.022$  so if we think not even in the

NOTE Confidence: 0.86905949375

 $00:11:33.022 \rightarrow 00:11:34.448$  in the bins of diagnosis,

NOTE Confidence: 0.86905949375

 $00:11:34.450 \longrightarrow 00:11:36.977$  but if you think about in the

NOTE Confidence: 0.86905949375

00:11:36.977 --> 00:11:38.890 bins of functional processes,

NOTE Confidence: 0.86905949375

00:11:38.890 --> 00:11:39.179 right?

NOTE Confidence: 0.86905949375

 $00:11:39.179 \rightarrow 00:11:40.624$  Maybe there should be biomarkers

- NOTE Confidence: 0.86905949375
- $00:11:40.624 \rightarrow 00:11:42.445$  that are coding for something about
- NOTE Confidence: 0.86905949375
- $00{:}11{:}42{.}445 \dashrightarrow 00{:}11{:}44{.}269$  eye contact and biomarkers that are
- NOTE Confidence: 0.86905949375
- $00:11:44.269 \rightarrow 00:11:46.159$  coding for something about language.
- NOTE Confidence: 0.86905949375
- $00{:}11{:}46.160 \dashrightarrow 00{:}11{:}48.056$  And you might expect each of those to
- NOTE Confidence: 0.86905949375
- $00:11:48.056 \rightarrow 00:11:49.770$  associate with symptoms in those domains,
- NOTE Confidence: 0.86905949375
- $00:11:49.770 \longrightarrow 00:11:51.994$  but but in a way that may be
- NOTE Confidence: 0.86905949375
- $00:11:51.994 \rightarrow 00:11:53.519$  independent of the condition.
- NOTE Confidence: 0.86905949375
- $00:11:53.520 \rightarrow 00:11:55.186$  And then you'd also want to know
- NOTE Confidence: 0.86905949375
- $00{:}11{:}55{.}186 \dashrightarrow 00{:}11{:}56{.}552$  if we're thinking about biomarkers
- NOTE Confidence: 0.86905949375
- $00:11:56.552 \rightarrow 00:11:57.756$  in this more refined.
- NOTE Confidence: 0.86905949375
- 00:11:57.760 --> 00:12:00.119 Kind of our doc way about tracking
- NOTE Confidence: 0.86905949375
- $00{:}12{:}00{.}119 \dashrightarrow 00{:}12{:}01{.}750$  on to specific domains.
- NOTE Confidence: 0.86905949375
- $00{:}12{:}01.750 \dashrightarrow 00{:}12{:}04.342$  You might also want to know whether the
- NOTE Confidence: 0.86905949375
- $00:12:04.342 \rightarrow 00:12:06.130$  associations you see are functionally
- NOTE Confidence: 0.86905949375
- $00:12:06.130 \longrightarrow 00:12:07.935$  specific and it's an example.
- NOTE Confidence: 0.86905949375

 $00:12:07.940 \rightarrow 00:12:10.868$  If you had a biomarker that you thought

NOTE Confidence: 0.86905949375

00:12:10.868 --> 00:12:13.418 coded for something linguistic but

NOTE Confidence: 0.86905949375

 $00:12:13.418 \rightarrow 00:12:16.313$  actually coded for cognitive ability,

NOTE Confidence: 0.86905949375

00:12:16.320 --> 00:12:17.804 you'd see strong correlations

NOTE Confidence: 0.86905949375

 $00:12:17.804 \rightarrow 00:12:19.659$  between it and language right?

NOTE Confidence: 0.86905949375

 $00{:}12{:}19.660 \dashrightarrow 00{:}12{:}21.028$  'cause cognitive ability is going to

NOTE Confidence: 0.86905949375

00:12:21.028 --> 00:12:22.350 stealing your language in some ways,

NOTE Confidence: 0.86905949375

 $00:12:22.350 \longrightarrow 00:12:23.880$  but if you had a treatment,

NOTE Confidence: 0.86905949375

 $00{:}12{:}23.880 \dashrightarrow 00{:}12{:}25.830$  for example that you thought

NOTE Confidence: 0.86905949375

 $00{:}12{:}25{.}830 \dashrightarrow 00{:}12{:}27{.}780$  might that did improve language.

NOTE Confidence: 0.86905949375

00:12:27.780 --> 00:12:29.742 It didn't improve cognitive ability you

NOTE Confidence: 0.86905949375

 $00:12:29.742 \rightarrow 00:12:31.768$  your biomarker wouldn't track with it right?

NOTE Confidence: 0.86905949375

 $00:12:31.770 \longrightarrow 00:12:34.242$  So it's important to be thoughtful

NOTE Confidence: 0.86905949375

 $00:12:34.242 \longrightarrow 00:12:35.890$  about what they measure.

NOTE Confidence: 0.86905949375

 $00{:}12{:}35{.}890 \dashrightarrow 00{:}12{:}37{.}526$  We want to understand.

NOTE Confidence: 0.86905949375

 $00:12:37.526 \longrightarrow 00:12:39.980$  How biomarkers are or are not

- NOTE Confidence: 0.86905949375
- $00{:}12{:}40.060 \dashrightarrow 00{:}12{:}42.418$  consistent across development.

00:12:42.420 --> 00:12:43.790 So when I say autism,

NOTE Confidence: 0.96891057

 $00{:}12{:}43.790 \dashrightarrow 00{:}12{:}44.798$ you don't know who I'm talking about.

NOTE Confidence: 0.96891057

00:12:44.800 --> 00:12:46.492 A 3 year old, 30 year old or 60

NOTE Confidence: 0.96891057

 $00:12:46.492 \longrightarrow 00:12:48.048$  year old and if we just think

NOTE Confidence: 0.96891057

 $00:12:48.048 \rightarrow 00:12:49.609$  about the way the brain works,

NOTE Confidence: 0.96891057

 $00:12:49.610 \longrightarrow 00:12:50.609$  it works differently.

NOTE Confidence: 0.96891057

 $00:12:50.609 \rightarrow 00:12:53.290$  It looks differently at all of those ages,

NOTE Confidence: 0.96891057

 $00{:}12{:}53{.}290 \dashrightarrow 00{:}12{:}55{.}117$  and so we have to be thoughtful about that.

NOTE Confidence: 0.96891057

 $00{:}12{:}55{.}120 \dashrightarrow 00{:}12{:}58{.}081$  You might need different kinds of biomarkers

NOTE Confidence: 0.96891057

 $00:12:58.081 \rightarrow 00:13:00.410$  at different points in development.

NOTE Confidence: 0.96891057

00:13:00.410 --> 00:13:02.300 We want to think about biomarkers and

NOTE Confidence: 0.96891057

 $00:13:02.300 \rightarrow 00:13:04.418$  how they might be affected by behavior,

NOTE Confidence: 0.96891057

 $00{:}13{:}04{.}420 \dashrightarrow 00{:}13{:}06{.}136$  or whether the robust to variations

NOTE Confidence: 0.96891057

00:13:06.136 --> 00:13:07.280 in behavior doesn't matter

 $00:13:07.335 \longrightarrow 00:13:08.630$  for every kind of biomarker.

NOTE Confidence: 0.96891057

 $00{:}13{:}08{.}630 \dashrightarrow 00{:}13{:}10{.}470$  If it's a genetic biomarker,

NOTE Confidence: 0.96891057

 $00:13:10.470 \longrightarrow 00:13:11.916$  doesn't really matter what the child

NOTE Confidence: 0.96891057

00:13:11.916 --> 00:13:13.797 is doing during the blood draw the the

NOTE Confidence: 0.96891057

 $00{:}13{:}13{.}797 \dashrightarrow 00{:}13{:}15{.}524$  information you get is going to be the

NOTE Confidence: 0.96891057

 $00:13:15.524 \rightarrow 00:13:17.479$  same for the work that I'll talk about today.

NOTE Confidence: 0.96891057

00:13:17.479 --> 00:13:19.873 Like EG if a child is

NOTE Confidence: 0.96891057

00:13:19.873 --> 00:13:21.390 distressed during the EG.

NOTE Confidence: 0.96891057

00:13:21.390 --> 00:13:22.305 I'm not even measuring what

NOTE Confidence: 0.96891057

 $00{:}13{:}22{.}305 \dashrightarrow 00{:}13{:}23{.}037$  I think I'm measuring.

NOTE Confidence: 0.96891057

 $00:13:23.040 \rightarrow 00:13:24.714$  I'm just measuring the distress right

NOTE Confidence: 0.96891057

 $00{:}13{:}24{.}714 \dashrightarrow 00{:}13{:}27{.}285$  and so we want to understand how a

NOTE Confidence: 0.96891057

 $00{:}13{:}27{.}285 \dashrightarrow 00{:}13{:}28{.}681$  person's behavior during acquisition

NOTE Confidence: 0.96891057

 $00{:}13{:}28.681 \dashrightarrow 00{:}13{:}30.619$  of these functional biomarkers.

NOTE Confidence: 0.96891057

 $00{:}13{:}30{.}620 \dashrightarrow 00{:}13{:}32{.}860$  Could affect the biomarker measures.

NOTE Confidence: 0.96891057

 $00:13:32.860 \rightarrow 00:13:35.058$  And then we want we might want

- NOTE Confidence: 0.96891057
- $00:13:35.058 \rightarrow 00:13:36.485$  biomarkers that are sensitive
- NOTE Confidence: 0.96891057
- $00{:}13{:}36{.}485 \dashrightarrow 00{:}13{:}38{.}580$  to changes in clinical status.
- NOTE Confidence: 0.96891057
- $00:13:38.580 \longrightarrow 00:13:39.906$  So as a person gets better
- NOTE Confidence: 0.96891057
- $00:13:39.906 \longrightarrow 00:13:40.790$  soon things go down.
- NOTE Confidence: 0.96891057
- 00:13:40.790 --> 00:13:44.930 Maybe biomarker values become less extreme?
- NOTE Confidence: 0.96891057
- 00:13:44.930 --> 00:13:46.295 I'm gonna highlight two things
- NOTE Confidence: 0.96891057
- $00:13:46.295 \rightarrow 00:13:48.139$  that I think are really tragically
- NOTE Confidence: 0.96891057
- $00:13:48.139 \rightarrow 00:13:49.839$  underappreciated in our fields.
- NOTE Confidence: 0.96891057
- 00:13:49.840 --> 00:13:51.456 Biomarkers in autism are
- NOTE Confidence: 0.96891057
- $00:13:51.456 \rightarrow 00:13:53.810$  controversial for no good reason and,
- NOTE Confidence: 0.96891057
- $00{:}13{:}53{.}810 \dashrightarrow 00{:}13{:}56{.}120$  and I think the reason that they're
- NOTE Confidence: 0.96891057
- $00{:}13{:}56{.}120 \dashrightarrow 00{:}13{:}57{.}659$  controversial is 'cause people.
- NOTE Confidence: 0.96891057
- 00:13:57.660 --> 00:13:59.388 Take a look at a biomarker,
- NOTE Confidence: 0.96891057
- $00{:}13{:}59{.}390 \dashrightarrow 00{:}14{:}02{.}792$  and think does it do all of these things?
- NOTE Confidence: 0.96891057
- 00:14:02.800 --> 00:14:05.010 And a biomarker needn't do
- NOTE Confidence: 0.96891057

 $00:14:05.010 \rightarrow 00:14:07.220$  all of these things right?

NOTE Confidence: 0.96891057

00:14:07.220 --> 00:14:09.012 You don't need to do all of

NOTE Confidence: 0.96891057

 $00:14:09.012 \longrightarrow 00:14:10.440$  these things to be useful.

NOTE Confidence: 0.96891057

 $00{:}14{:}10{.}440 \dashrightarrow 00{:}14{:}12{.}904$  You could do a subset of things to

NOTE Confidence: 0.96891057

 $00{:}14{:}12{.}904 \dashrightarrow 00{:}14{:}15{.}235$  be useful and the subset that would

NOTE Confidence: 0.96891057

 $00{:}14{:}15{.}235 \dashrightarrow 00{:}14{:}17{.}720$  be useful is going to vary depending NOTE Confidence: 0.96891057

00:14:17.720 --> 00:14:20.030 on your context of use right?

NOTE Confidence: 0.96891057

00:14:20.030 --> 00:14:21.787 Which is another kind of FDA jargon

NOTE Confidence: 0.96891057

 $00{:}14{:}21.787 \dashrightarrow 00{:}14{:}23.344$  for those biomarker categories, right? NOTE Confidence: 0.96891057

00:14:23.344 --> 00:14:24.868 The purpose you use a biomarker

NOTE Confidence: 0.96891057

00:14:24.868 --> 00:14:26.611 and just give you 2 examples like

NOTE Confidence: 0.96891057

 $00:14:26.611 \longrightarrow 00:14:27.776$  if you had a biomarker.

NOTE Confidence: 0.96891057

 $00:14:27.780 \longrightarrow 00:14:29.892$  That you thought could be useful

NOTE Confidence: 0.96891057

 $00{:}14{:}29{.}892 \dashrightarrow 00{:}14{:}31{.}300$  diagnostically for the condition

NOTE Confidence: 0.96891057

 $00:14:31.358 \longrightarrow 00:14:32.278$  or for a subtype.

NOTE Confidence: 0.96891057

 $00:14:32.280 \rightarrow 00:14:34.331$  It might be really important for it

- NOTE Confidence: 0.96891057
- $00:14:34.331 \rightarrow 00:14:36.478$  to be sensitive to diagnostic status,

 $00{:}14{:}36{.}480 \dashrightarrow 00{:}14{:}39{.}408$  to associate with symptoms.

NOTE Confidence: 0.96891057

00:14:39.408 --> 00:14:41.596 But you may not want it to be

NOTE Confidence: 0.96891057

 $00:14:41.596 \rightarrow 00:14:43.095$  changed in clinic to be sensitive

NOTE Confidence: 0.96891057

 $00{:}14{:}43.095 \dashrightarrow 00{:}14{:}44.764$  to change in clinical status, right?

NOTE Confidence: 0.96891057

 $00{:}14{:}44.764 \dashrightarrow 00{:}14{:}46.284$  If it's defining the diagnostic

NOTE Confidence: 0.96891057

 $00:14:46.284 \rightarrow 00:14:48.090$  condition and it's bouncing up and

NOTE Confidence: 0.96891057

 $00:14:48.090 \rightarrow 00:14:49.445$  down every time someone responds

NOTE Confidence: 0.96891057

 $00:14:49.445 \longrightarrow 00:14:49.987$  to treatment,

NOTE Confidence: 0.96891057

 $00:14:49.990 \longrightarrow 00:14:51.618$  unless they're bouncing off

NOTE Confidence: 0.96891057

 $00:14:51.618 \longrightarrow 00:14:52.839$  the diagnostic spectrum,

NOTE Confidence: 0.96891057

 $00:14:52.840 \longrightarrow 00:14:55.140$  that would be a weakness, right?

NOTE Confidence: 0.96891057

 $00:14:55.140 \rightarrow 00:14:55.500$  Conversely,

NOTE Confidence: 0.96891057

 $00{:}14{:}55{.}500 \dashrightarrow 00{:}14{:}58{.}020$  if you had a biomarker that you

NOTE Confidence: 0.96891057

 $00:14:58.020 \longrightarrow 00:14:59.962$  wanted to evaluate for utility

00:14:59.962 --> 00:15:01.478 as a response biomarker,

NOTE Confidence: 0.96891057

 $00{:}15{:}01{.}480 \dashrightarrow 00{:}15{:}03{.}682$  seeing if a person is responding

NOTE Confidence: 0.96891057

 $00{:}15{:}03.682 \dashrightarrow 00{:}15{:}04.416$  to treatment.

NOTE Confidence: 0.96891057

 $00{:}15{:}04{.}420 \dashrightarrow 00{:}15{:}06{.}448$  Sensitivity to change in clinical status

NOTE Confidence: 0.96891057

00:15:06.448 --> 00:15:09.241 would be the most and maybe the only

NOTE Confidence: 0.96891057

 $00{:}15{:}09{.}241 \dashrightarrow 00{:}15{:}11{.}305$  really critical thing for the biomarker.

NOTE Confidence: 0.96891057

 $00:15:11.310 \longrightarrow 00:15:13.417$  So not only is it not necessary

NOTE Confidence: 0.96891057

 $00{:}15{:}13.417 \dashrightarrow 00{:}15{:}16.213$  to look at biomarkers in this kind

NOTE Confidence: 0.96891057

00:15:16.213 --> 00:15:18.483 of scoping and comprehensive way,

NOTE Confidence: 0.96891057

00:15:18.490 --> 00:15:20.310 I think it's counterproductive and

NOTE Confidence: 0.96891057

 $00{:}15{:}20{.}310 \dashrightarrow 00{:}15{:}22{.}550$  has impeded progress in our field.

NOTE Confidence: 0.96891057

00:15:22.550 --> 00:15:25.115 Today I also like to think

NOTE Confidence: 0.96891057

00:15:25.115 --> 00:15:26.150 keeping in mind what I

NOTE Confidence: 0.942322732105263

 $00:15:26.203 \rightarrow 00:15:27.339$  said before about getting

NOTE Confidence: 0.942322732105263

 $00:15:27.339 \longrightarrow 00:15:28.759$  these things to the clinic.

NOTE Confidence: 0.942322732105263

 $00{:}15{:}28.760 \dashrightarrow 00{:}15{:}31.476$  I like to think about practicalities like

- NOTE Confidence: 0.942322732105263
- $00{:}15{:}31.476 \dashrightarrow 00{:}15{:}34.486$  a biomarker for the field in which I work.
- NOTE Confidence: 0.942322732105263
- $00{:}15{:}34{.}490 \dashrightarrow 00{:}15{:}36{.}016$  Has to be viable in the people
- NOTE Confidence: 0.942322732105263
- $00:15:36.016 \longrightarrow 00:15:37.474$  that I work with, right?
- NOTE Confidence: 0.942322732105263
- $00{:}15{:}37{.}474$  -->  $00{:}15{:}41{.}346$  It has to be something tolerable and safe.
- NOTE Confidence: 0.942322732105263
- $00:15:41.350 \longrightarrow 00:15:43.054$  We want if for any biomarker
- NOTE Confidence: 0.942322732105263
- $00:15:43.054 \longrightarrow 00:15:44.650$  to have use its scale,
- NOTE Confidence: 0.942322732105263
- $00:15:44.650 \rightarrow 00:15:46.548$  it has to be cost effective, right?
- NOTE Confidence: 0.942322732105263
- 00:15:46.548 --> 00:15:48.494 If it's if it's being implemented at
- NOTE Confidence: 0.942322732105263
- $00{:}15{:}48{.}494 \dashrightarrow 00{:}15{:}50{.}840$  scale and then we would also need it to
- NOTE Confidence: 0.942322732105263
- $00:15:50.840 \rightarrow 00:15:52.897$  be accessible and just as an illustration,
- NOTE Confidence: 0.942322732105263
- $00:15:52.900 \rightarrow 00:15:55.924$  if you had a biomarker that could only be
- NOTE Confidence: 0.942322732105263
- 00:15:55.924 --> 00:15:58.526 quantified at an autism center of excellence,
- NOTE Confidence: 0.942322732105263
- 00:15:58.530 --> 00:15:59.700 this would be its reach.
- NOTE Confidence: 0.942322732105263
- 00:15:59.700 --> 00:16:02.130 And if you had a biomarker that could be
- NOTE Confidence: 0.942322732105263
- $00{:}16{:}02{.}130 \dashrightarrow 00{:}16{:}04{.}167$  quantified at any hospital, this would be.
- NOTE Confidence: 0.942322732105263

00:16:04.170 --> 00:16:04.788 It's reached right?

NOTE Confidence: 0.942322732105263

 $00:16:04.788 \longrightarrow 00:16:06.024$  And this is what we want.

NOTE Confidence: 0.942322732105263

 $00{:}16{:}06{.}030 \dashrightarrow 00{:}16{:}08{.}614$  We want to be able to make these

NOTE Confidence: 0.942322732105263

 $00:16:08.614 \rightarrow 00:16:10.109$  things accessible to everyone.

NOTE Confidence: 0.942322732105263

00:16:10.110 --> 00:16:12.840 I do a lot of work Mike mentioned in EG

NOTE Confidence: 0.942322732105263

 $00{:}16{:}12{.}910 \dashrightarrow 00{:}16{:}15{.}850$  and EG is stands for electroencephalogram.

NOTE Confidence: 0.942322732105263

 $00{:}16{:}15{.}850 \dashrightarrow 00{:}16{:}17{.}956$  It's a method of measuring brain

NOTE Confidence: 0.942322732105263

 $00:16:17.956 \rightarrow 00:16:20.285$  activity in which you record electrical

NOTE Confidence: 0.942322732105263

 $00{:}16{:}20.285 \dashrightarrow 00{:}16{:}22.865$  activity from neurons at the scalp.

NOTE Confidence: 0.942322732105263

 $00{:}16{:}22.870 \dashrightarrow 00{:}16{:}25.411$  So using a net like you see

NOTE Confidence: 0.942322732105263

 $00{:}16{:}25{.}411 \dashrightarrow 00{:}16{:}27{.}320$  here in this picture.

NOTE Confidence: 0.942322732105263

 $00{:}16{:}27{.}320 \dashrightarrow 00{:}16{:}30{.}170$  You can do it in two different kinds of ways.

NOTE Confidence: 0.942322732105263

 $00:16:30.170 \longrightarrow 00:16:30.507$  Really,

NOTE Confidence: 0.942322732105263

00:16:30.507 --> 00:16:32.866 you could measure someone's activity at rest,

NOTE Confidence: 0.942322732105263

 $00:16:32.870 \rightarrow 00:16:35.276$  or you could make discrete things

NOTE Confidence: 0.942322732105263

 $00:16:35.276 \rightarrow 00:16:37.690$  happen in the environment and record

- NOTE Confidence: 0.942322732105263
- $00{:}16{:}37.690 \dashrightarrow 00{:}16{:}39.892$  a person's brain response to those
- NOTE Confidence: 0.942322732105263
- $00:16:39.892 \longrightarrow 00:16:42.198$  to those events as they happen.
- NOTE Confidence: 0.942322732105263
- $00:16:42.200 \longrightarrow 00:16:43.520$  That latter thing is called
- NOTE Confidence: 0.942322732105263
- $00:16:43.520 \longrightarrow 00:16:44.576$  an event related potential,
- NOTE Confidence: 0.942322732105263
- $00{:}16{:}44{.}580 \dashrightarrow 00{:}16{:}47{.}420$  and I'll talk a lot about that today.
- NOTE Confidence: 0.942322732105263
- $00:16:47.420 \longrightarrow 00:16:48.160$  The way we do it,
- NOTE Confidence: 0.942322732105263
- 00:16:48.160 --> 00:16:49.630 let me just tell you really quickly
- NOTE Confidence: 0.942322732105263
- 00:16:49.630 --> 00:16:50.938 that little inset picture you see,
- NOTE Confidence: 0.942322732105263
- $00{:}16{:}50{.}940 \dashrightarrow 00{:}16{:}52{.}950$  that's what a natural ERP netizen
- NOTE Confidence: 0.942322732105263
- 00:16:52.950 --> 00:16:54.656 it's it's soft rubber pedestals
- NOTE Confidence: 0.942322732105263
- $00:16:54.656 \longrightarrow 00:16:56.176$  with a sponge in it.
- NOTE Confidence: 0.942322732105263
- $00{:}16{:}56{.}180 \dashrightarrow 00{:}16{:}58{.}754$  We soak the whole thing in salt water and
- NOTE Confidence: 0.942322732105263
- $00:16:58.754 \rightarrow 00:17:01.280$  then we stretch it over a person's head.
- NOTE Confidence: 0.942322732105263
- $00{:}17{:}01.280 \dashrightarrow 00{:}17{:}02.260$  Those those,
- NOTE Confidence: 0.942322732105263
- $00{:}17{:}02{.}260 \dashrightarrow 00{:}17{:}04{.}710$  those now saltwater moistened sponges
- NOTE Confidence: 0.942322732105263

 $00:17:04.710 \longrightarrow 00:17:06.180$  become electrically conductive

NOTE Confidence: 0.942322732105263

 $00:17:06.245 \longrightarrow 00:17:08.191$  and they pick up the activity so

NOTE Confidence: 0.942322732105263

 $00:17:08.191 \longrightarrow 00:17:10.059$  you know it's not comfortable.

NOTE Confidence: 0.942322732105263

 $00{:}17{:}10.060 \dashrightarrow 00{:}17{:}12.308$  It's not fun to wear EG net but

NOTE Confidence: 0.942322732105263

 $00:17:12.308 \rightarrow 00:17:14.745$  compared to other forms of measuring

NOTE Confidence: 0.942322732105263

 $00{:}17{:}14.745 \dashrightarrow 00{:}17{:}17.000$  brain activity it's pretty tolerable.

NOTE Confidence: 0.942322732105263

00:17:17.000 --> 00:17:17.885 Pretty user friendly.

NOTE Confidence: 0.942322732105263

 $00:17:17.885 \longrightarrow 00:17:19.950$  And that also makes it a really

NOTE Confidence: 0.942322732105263

00:17:20.015 - 00:17:21.019 viable technology.

NOTE Confidence: 0.942322732105263

00:17:21.020 --> 00:17:23.533 You know, across a wide range of

NOTE Confidence: 0.942322732105263

 $00:17:23.533 \rightarrow 00:17:25.090$  cognitive and developmental levels.

NOTE Confidence: 0.942322732105263

 $00:17:25.090 \rightarrow 00:17:25.523$  Noninvasive,

NOTE Confidence: 0.942322732105263

 $00:17:25.523 \longrightarrow 00:17:27.688$  pretty movement tolerant if a

NOTE Confidence: 0.942322732105263

00:17:27.688 --> 00:17:28.987 person moves around,

NOTE Confidence: 0.942322732105263

00:17:28.990 --> 00:17:30.726 you're going to lose data from those trials,

NOTE Confidence: 0.942322732105263

 $00:17:30.730 \longrightarrow 00:17:32.338$  but it's not going to ruin

- NOTE Confidence: 0.942322732105263
- $00:17:32.338 \longrightarrow 00:17:33.410$  an entire recording session.
- NOTE Confidence: 0.942322732105263
- 00:17:33.410 --> 00:17:35.110 And it's also really practical.
- NOTE Confidence: 0.942322732105263
- $00:17:35.110 \longrightarrow 00:17:36.350$  So EG, is cheap.
- NOTE Confidence: 0.942322732105263
- 00:17:36.350 --> 00:17:38.850 It's expensive to get in EG machine,
- NOTE Confidence: 0.942322732105263
- $00:17:38.850 \longrightarrow 00:17:39.850$  but when you have one,
- NOTE Confidence: 0.942322732105263
- $00{:}17{:}39{.}850 \dashrightarrow 00{:}17{:}41{.}906$  all it costs a saltwater and latex gloves
- NOTE Confidence: 0.942322732105263
- $00:17:41.906 \dashrightarrow 00:17:43.709$  to collect data and it's accessible.
- NOTE Confidence: 0.942322732105263
- 00:17:43.710 --> 00:17:45.372 There's an EEG system in every
- NOTE Confidence: 0.942322732105263
- $00:17:45.372 \longrightarrow 00:17:46.480$  hospital in this country.
- NOTE Confidence: 0.942322732105263
- $00:17:46.480 \rightarrow 00:17:48.628$  Eegs already used the population level.
- NOTE Confidence: 0.942322732105263
- $00:17:48.630 \rightarrow 00:17:49.454$  For screening,
- NOTE Confidence: 0.942322732105263
- $00:17:49.454 \longrightarrow 00:17:50.690$  for hearing difficulties
- NOTE Confidence: 0.942322732105263
- $00{:}17{:}50.690 \dashrightarrow 00{:}17{:}51.926$  in new born procedures.
- NOTE Confidence: 0.942322732105263
- $00:17:51.930 \longrightarrow 00:17:53.685$  So if there were something
- NOTE Confidence: 0.942322732105263
- $00{:}17{:}53.685 \dashrightarrow 00{:}17{:}55.089$  that was scientifically worthy,
- NOTE Confidence: 0.942322732105263

00:17:55.090 - 00:17:57.095 biomarker wise is a technology

NOTE Confidence: 0.942322732105263

00:17:57.095 --> 00:17:58.699 that could be useful.

NOTE Confidence: 0.942322732105263

 $00:17:58.700 \rightarrow 00:17:59.720$  And then lastly,

NOTE Confidence: 0.942322732105263

 $00{:}17{:}59{.}720 \dashrightarrow 00{:}18{:}01{.}760$  I've mentioned that I think social

NOTE Confidence: 0.942322732105263

 $00{:}18{:}01.760 \dashrightarrow 00{:}18{:}03.140$  communication is central to

NOTE Confidence: 0.942322732105263

 $00:18:03.140 \rightarrow 00:18:04.775$  understanding the biology of autism.

NOTE Confidence: 0.942322732105263

00:18:04.780 --> 00:18:05.108 Well,

NOTE Confidence: 0.942322732105263

 $00{:}18{:}05{.}108 \dashrightarrow 00{:}18{:}07{.}404$  ERP is a technology and a field

NOTE Confidence: 0.942322732105263

 $00:18:07.404 \longrightarrow 00:18:09.841$  that's really been useful in

NOTE Confidence: 0.942322732105263

 $00{:}18{:}09{.}841 \dashrightarrow 00{:}18{:}12{.}129$  understanding social communication and

NOTE Confidence: 0.942322732105263

 $00{:}18{:}12{.}129 \dashrightarrow 00{:}18{:}13{.}845$  typical developmental neuroscience.

NOTE Confidence: 0.88469954875

 $00:18:13.850 \rightarrow 00:18:16.818$  So this is an example of an ERP.

NOTE Confidence: 0.8159892

 $00:18:23.260 \longrightarrow 00:18:24.496$  This is when ERP looks like.

NOTE Confidence: 0.8159892

 $00{:}18{:}24{.}500 \dashrightarrow 00{:}18{:}26{.}444$  So when you when you see any RP,

NOTE Confidence: 0.8159892

 $00:18:26.450 \longrightarrow 00:18:27.980$  you're looking on the Y axis,

NOTE Confidence: 0.8159892

00:18:27.980 --> 00:18:29.100 you're seeing voltage so kind
- NOTE Confidence: 0.8159892
- $00:18:29.100 \longrightarrow 00:18:30.507$  of strength of signal and that
- NOTE Confidence: 0.8159892
- 00:18:30.507 -> 00:18:31.697 could be positive or negative,
- NOTE Confidence: 0.8159892
- $00:18:31.700 \rightarrow 00:18:32.832$  and there's nothing intrinsically
- NOTE Confidence: 0.8159892
- $00{:}18{:}32{.}832 \dashrightarrow 00{:}18{:}34{.}791$  meaningful by the positive ITI or the
- NOTE Confidence: 0.8159892
- 00:18:34.791 $\operatorname{-->}$ 00:18:36.543 negativity and then on the X axis you're
- NOTE Confidence: 0.8159892
- $00{:}18{:}36{.}543 \dashrightarrow 00{:}18{:}38{.}052$  looking at the timing and so these
- NOTE Confidence: 0.8159892
- $00{:}18{:}38{.}052 \dashrightarrow 00{:}18{:}39{.}596$  are things that happen really fast,
- NOTE Confidence: 0.8159892
- $00{:}18{:}39{.}596 \dashrightarrow 00{:}18{:}41{.}744$  so this timing is in milliseconds
- NOTE Confidence: 0.8159892
- $00:18:41.744 \longrightarrow 00:18:44.218$  and what you see highlighted there
- NOTE Confidence: 0.8159892
- 00:18:44.218 --> 00:18:46.333 in purple isn't event related
- NOTE Confidence: 0.8159892
- 00:18:46.333 --> 00:18:47.930 potential in ERP component.
- NOTE Confidence: 0.8159892
- 00:18:47.930 --> 00:18:49.354 Called an N 170,
- NOTE Confidence: 0.8159892
- $00:18:49.354 \rightarrow 00:18:52.054$  meaning that it happens at around 170
- NOTE Confidence: 0.8159892
- $00{:}18{:}52.054 \dashrightarrow 00{:}18{:}54.489$  milliseconds and it's negative going.
- NOTE Confidence: 0.8159892
- $00:18:54.490 \longrightarrow 00:18:57.350$  What it represents very well.
- NOTE Confidence: 0.8159892

00:18:57.350 --> 00:18:58.637 Studying typical developed.

NOTE Confidence: 0.8159892

 $00:18:58.637 \rightarrow 00:19:01.640$  The first study actually being done here

NOTE Confidence: 0.8159892

 $00:19:01.703 \rightarrow 00:19:03.775$  at Yale by Greg McCarthyism event and

NOTE Confidence: 0.8159892

 $00:19:03.775 \longrightarrow 00:19:06.940$  it is the brain acknowledging a face as such.

NOTE Confidence: 0.8159892

 $00{:}19{:}06{.}940 \dashrightarrow 00{:}19{:}08{.}510$  So not happy, not sad.

NOTE Confidence: 0.8159892

00:19:08.510 --> 00:19:10.178 Not mom, not neighbor.

NOTE Confidence: 0.8159892

 $00{:}19{:}10{.}178 \dashrightarrow 00{:}19{:}12{.}263$  Just this is a face.

NOTE Confidence: 0.8159892

 $00{:}19{:}12{.}270 \dashrightarrow 00{:}19{:}14{.}742$  And it's what's remarkable about it

NOTE Confidence: 0.8159892

 $00:19:14.742 \longrightarrow 00:19:18.490$  is that within 2/10 of a second,

NOTE Confidence: 0.8159892

 $00{:}19{:}18{.}490 \dashrightarrow 00{:}19{:}20{.}812$  our brains are treating faces really

NOTE Confidence: 0.8159892

 $00{:}19{:}20.812 \dashrightarrow 00{:}19{:}22.785$  qualitatively different from just about

NOTE Confidence: 0.8159892

 $00:19:22.785 \dashrightarrow 00:19:24.625$  everything else that comes online.

NOTE Confidence: 0.8159892

 $00:19:24.630 \longrightarrow 00:19:25.695$  Early in development.

NOTE Confidence: 0.8159892

 $00{:}19{:}25.695 \dashrightarrow 00{:}19{:}28.661$  We think it is critically important for our

NOTE Confidence: 0.8159892

 $00{:}19{:}28.661 \dashrightarrow 00{:}19{:}30.746$  ability to perceive social information.

NOTE Confidence: 0.8159892

 $00:19:30.750 \longrightarrow 00:19:32.286$  One of the first studies I did as

- NOTE Confidence: 0.8159892
- 00:19:32.286 --> 00:19:33.589 a graduate student is actually,

NOTE Confidence: 0.8159892

00:19:33.590 --> 00:19:34.030 you know,

NOTE Confidence: 0.8159892

 $00:19:34.030 \longrightarrow 00:19:35.570$  to to parallel my arc of the

NOTE Confidence: 0.8159892

00:19:35.570 --> 00:19:36.886 Child Study Center was published

NOTE Confidence: 0.8159892

 $00:19:36.886 \longrightarrow 00:19:39.073$  my first year here was to try to

NOTE Confidence: 0.8159892

00:19:39.073 - > 00:19:40.498 understand how this might look

NOTE Confidence: 0.8159892

 $00:19:40.498 \dashrightarrow 00:19:41.976$  different in people with autism.

NOTE Confidence: 0.8159892

 $00{:}19{:}41{.}976 \dashrightarrow 00{:}19{:}44{.}777$  And what we found way back when in two

NOTE Confidence: 0.8159892

 $00:19:44.777 \longrightarrow 00:19:47.420$  four 2004 is that there was a difference.

NOTE Confidence: 0.8159892

 $00:19:47.420 \longrightarrow 00:19:49.527$  And it was that the brains of

NOTE Confidence: 0.8159892

 $00:19:49.527 \rightarrow 00:19:51.175$  people with autism took longer

NOTE Confidence: 0.8159892

 $00{:}19{:}51{.}175 \dashrightarrow 00{:}19{:}52{.}875$  to respond to these faces.

NOTE Confidence: 0.8159892

 $00:19:52.880 \longrightarrow 00:19:55.728$  We we would say it has a longer

NOTE Confidence: 0.8159892

 $00{:}19{:}55{.}728 \dashrightarrow 00{:}19{:}57{.}548$  latency of their N 170.

NOTE Confidence: 0.8159892

 $00{:}19{:}57{.}550 \dashrightarrow 00{:}19{:}59{.}550$  And as I talk about a series of

NOTE Confidence: 0.8159892

 $00:19:59.550 \rightarrow 00:20:01.368$  studies over these next few slides,

NOTE Confidence: 0.8159892

00:20:01.370 --> 00:20:02.987 I'm gonna tie them back to some

NOTE Confidence: 0.8159892

 $00:20:02.987 \longrightarrow 00:20:04.352$  of those things that I said

NOTE Confidence: 0.8159892

 $00{:}20{:}04.352 \dashrightarrow 00{:}20{:}05.794$  that I think about in terms of

NOTE Confidence: 0.8159892

 $00{:}20{:}05{.}852 \dashrightarrow 00{:}20{:}07{.}280$  biomarker performance and so,

NOTE Confidence: 0.8159892

 $00{:}20{:}07{.}280 \dashrightarrow 00{:}20{:}10{.}196$  so this gives us some evidence that we see.

NOTE Confidence: 0.8159892

 $00:20:10.200 \rightarrow 00:20:12.588$  We see it hanging together with

NOTE Confidence: 0.8159892

00:20:12.588 --> 00:20:14.458 diagnostic status, not diagnostically.

NOTE Confidence: 0.8159892

00:20:14.458 --> 00:20:15.526 Defining right.

NOTE Confidence: 0.8159892

 $00:20:15.526 \rightarrow 00:20:17.402$  These are distributions, right?

NOTE Confidence: 0.8159892

 $00{:}20{:}17{.}402 \dashrightarrow 00{:}20{:}19{.}850$  So if you looked at its two bell curves

NOTE Confidence: 0.8159892

 $00:20:19.919 \rightarrow 00:20:22.030$  that overlap, and the people with autism,

NOTE Confidence: 0.8159892

 $00:20:22.030 \rightarrow 00:20:24.016$  or shifted, but there's a difference.

NOTE Confidence: 0.8159892

 $00:20:24.020 \longrightarrow 00:20:24.732$  On average.

NOTE Confidence: 0.8159892

 $00{:}20{:}24.732 \dashrightarrow 00{:}20{:}27.224$  We also saw again in this study.

NOTE Confidence: 0.8159892

 $00{:}20{:}27{.}230 \dashrightarrow 00{:}20{:}28{.}960$  This is adolescents and adults.

- NOTE Confidence: 0.8159892
- $00{:}20{:}28{.}960 \dashrightarrow 00{:}20{:}31{.}642$  That people with autism had more

NOTE Confidence: 0.8159892

 $00:20:31.642 \rightarrow 00:20:33.902$  trouble actually recognizing faces and

NOTE Confidence: 0.8159892

 $00:20:33.902 \longrightarrow 00:20:36.302$  their ability to recognize faces was

NOTE Confidence: 0.8159892

 $00{:}20{:}36{.}302 \dashrightarrow 00{:}20{:}38{.}977$  associated with how fast their N 170 was.

NOTE Confidence: 0.8159892

 $00:20:38.980 \longrightarrow 00:20:40.160$  So again, then we thought,

NOTE Confidence: 0.8159892

00:20:40.160 --> 00:20:40.518 OK,

NOTE Confidence: 0.8159892

00:20:40.518 --> 00:20:40.876 look,

NOTE Confidence: 0.8159892

 $00:20:40.876 \longrightarrow 00:20:43.024$  this is also something that hangs

NOTE Confidence: 0.8159892

 $00:20:43.024 \rightarrow 00:20:44.193$  together with symptomatology

NOTE Confidence: 0.8159892

 $00:20:44.193 \longrightarrow 00:20:46.509$  or social function in a way.

NOTE Confidence: 0.8159892

 $00{:}20{:}46{.}510 \dashrightarrow 00{:}20{:}48{.}750$  So we.

NOTE Confidence: 0.8159892

00:20:48.750 --> 00:20:48.954 Paul,

NOTE Confidence: 0.8159892

 $00{:}20{:}48.954 \dashrightarrow 00{:}20{:}50.586$  this is this is this is your last

NOTE Confidence: 0.8159892

 $00{:}20{:}50{.}586 \dashrightarrow 00{:}20{:}52{.}316$  free question before the Q&A session.

NOTE Confidence: 0.91052985

 $00:20:55.170 \longrightarrow 00:20:55.390$  This.

NOTE Confidence: 0.75279255

 $00:21:00.560 \rightarrow 00:21:02.336$  Restate the question. The question is,

NOTE Confidence: 0.75279255

00:21:02.340 --> 00:21:04.068 is it specific to our autism?

NOTE Confidence: 0.75279255

 $00{:}21{:}04.070 \dashrightarrow 00{:}21{:}06.278$  Is there common in many different

NOTE Confidence: 0.75279255

00:21:06.278 --> 00:21:07.750 disorders and the answer

NOTE Confidence: 0.75279255

 $00:21:07.816 \longrightarrow 00:21:09.526$  is both and thank you Paul.

NOTE Confidence: 0.75279255

 $00:21:09.530 \longrightarrow 00:21:10.810$  I for all you're wondering.

NOTE Confidence: 0.75279255

 $00:21:10.810 \longrightarrow 00:21:13.330$  He's not a plant.

NOTE Confidence: 0.75279255

 $00:21:13.330 \longrightarrow 00:21:14.710$  But he did perfectly illustrate

NOTE Confidence: 0.75279255

 $00{:}21{:}14.710 \dashrightarrow 00{:}21{:}16.831$  is why you just wait until the

NOTE Confidence: 0.75279255

 $00{:}21{:}16.831 \dashrightarrow 00{:}21{:}18.531$  question and answer session because

NOTE Confidence: 0.75279255

 $00{:}21{:}18.531 \dashrightarrow 00{:}21{:}20.479$  your questions may be answered in

NOTE Confidence: 0.75279255

 $00{:}21{:}20{.}479 \dashrightarrow 00{:}21{:}22{.}213$  the course of the existing slides.

NOTE Confidence: 0.9341575

 $00{:}21{:}25{.}290 \dashrightarrow 00{:}21{:}25{.}770$  So.

NOTE Confidence: 0.839417662222222

 $00:21:29.500 \longrightarrow 00:21:32.992$  OK, so the so so so then we wondered.

NOTE Confidence: 0.839417662222222

00:21:33.000 --> 00:21:34.638 OK, well what so we're seeing it

NOTE Confidence: 0.839417662222222

 $00:21:34.638 \longrightarrow 00:21:36.641$  slower to face is well is that

- NOTE Confidence: 0.839417662222222
- $00:21:36.641 \rightarrow 00:21:38.206$  telling us something about social
- NOTE Confidence: 0.839417662222222
- $00:21:38.206 \rightarrow 00:21:39.720$  communication which is what we think?
- NOTE Confidence: 0.839417662222222
- $00:21:39.720 \longrightarrow 00:21:41.340$  Or could this be telling us
- NOTE Confidence: 0.839417662222222
- $00{:}21{:}41{.}340 \dashrightarrow 00{:}21{:}43{.}224$  something about the pace of a brain
- NOTE Confidence: 0.839417662222222
- $00:21:43.224 \longrightarrow 00:21:44.712$  in autism which could be useful,
- NOTE Confidence: 0.839417662222222
- $00:21:44.720 \longrightarrow 00:21:46.164$  but is something different.
- NOTE Confidence: 0.839417662222222
- $00:21:46.164 \rightarrow 00:21:48.330$  So we wanted are the differences,
- NOTE Confidence: 0.839417662222222
- $00:21:48.330 \longrightarrow 00:21:49.641$  particularly social information.
- NOTE Confidence: 0.839417662222222
- 00:21:49.641 --> 00:21:51.389 Might they reflected general
- NOTE Confidence: 0.839417662222222
- $00:21:51.389 \longrightarrow 00:21:52.263$  perceptual slowing?
- NOTE Confidence: 0.839417662222222
- $00:21:52.270 \longrightarrow 00:21:54.646$  How could we test that we could
- NOTE Confidence: 0.839417662222222
- $00:21:54.646 \longrightarrow 00:21:56.238$  find something that works
- NOTE Confidence: 0.839417662222222
- $00:21:56.238 \longrightarrow 00:21:58.420$  well in people with autism?
- NOTE Confidence: 0.839417662222222
- $00{:}21{:}58{.}420 \dashrightarrow 00{:}22{:}01{.}020$  And see their N 170 works well and we did.
- NOTE Confidence: 0.839417662222222
- $00{:}22{:}01{.}020 \dashrightarrow 00{:}22{:}03{.}060$  We looked at reading because it turns out
- NOTE Confidence: 0.839417662222222

 $00:22:03.060 \rightarrow 00:22:05.078$  that when you learn to read a language,

NOTE Confidence: 0.839417662222222

00:22:05.080 --> 00:22:07.426 any language you start to get

NOTE Confidence: 0.839417662222222

 $00:22:07.426 \longrightarrow 00:22:10.120$  an end 170 left lateralized,

NOTE Confidence: 0.839417662222222

 $00:22:10.120 \rightarrow 00:22:12.170$  unlike right lateralized face face,

NOTE Confidence: 0.839417662222222

 $00:22:12.170 \longrightarrow 00:22:14.660$  and 172 letters that alphabet.

NOTE Confidence: 0.839417662222222

 $00{:}22{:}14.660 \dashrightarrow 00{:}22{:}15.997$  And so we did the kind of

NOTE Confidence: 0.839417662222222

 $00:22:15.997 \dashrightarrow 00:22:17.100$  experiment that we've done before.

NOTE Confidence: 0.839417662222222

00:22:17.100 --> 00:22:18.232 You know comparing faces

NOTE Confidence: 0.839417662222222

 $00:22:18.232 \longrightarrow 00:22:19.364$  with something non social,

NOTE Confidence: 0.839417662222222

 $00:22:19.370 \longrightarrow 00:22:21.926$  but then we compared letters highlighted

NOTE Confidence: 0.839417662222222

 $00{:}22{:}21{.}926 \dashrightarrow 00{:}22{:}24{.}275$  there in purple with pseudo letters.

NOTE Confidence: 0.839417662222222

00:22:24.275 --> 00:22:26.405 So I made up Alphabet and

NOTE Confidence: 0.839417662222222

 $00:22:26.405 \longrightarrow 00:22:28.616$  the idea being OK if this is.

NOTE Confidence: 0.839417662222222

00:22:28.620 --> 00:22:29.980 Telling us something unique

NOTE Confidence: 0.839417662222222

 $00:22:29.980 \longrightarrow 00:22:31.000$  about social processing,

NOTE Confidence: 0.839417662222222

 $00:22:31.000 \longrightarrow 00:22:32.080$  we should see differences

- NOTE Confidence: 0.839417662222222
- $00:22:32.080 \longrightarrow 00:22:33.160$  in people with autism.
- NOTE Confidence: 0.839417662222222
- $00:22:33.160 \longrightarrow 00:22:34.750$  We do this social experiment,
- NOTE Confidence: 0.839417662222222
- $00:22:34.750 \longrightarrow 00:22:36.530$  but they should look just
- NOTE Confidence: 0.839417662222222
- $00:22:36.530 \rightarrow 00:22:37.598$  like everybody else.
- NOTE Confidence: 0.839417662222222
- $00{:}22{:}37.600 \dashrightarrow 00{:}22{:}39.118$  We do the non social experiment.
- NOTE Confidence: 0.839417662222222
- 00:22:39.120 --> 00:22:41.580 Or conversely if it's generic problem.
- NOTE Confidence: 0.839417662222222
- $00:22:41.580 \longrightarrow 00:22:43.232$  We should see differences
- NOTE Confidence: 0.839417662222222
- $00:22:43.232 \rightarrow 00:22:44.058$  everywhere everywhere.
- NOTE Confidence: 0.839417662222222
- $00{:}22{:}44.060 \dashrightarrow 00{:}22{:}46.346$  We also use this as a chance to look
- NOTE Confidence: 0.839417662222222
- $00:22:46.346 \longrightarrow 00:22:48.522$  at how this phenomenon manifests in
- NOTE Confidence: 0.839417662222222
- $00:22:48.522 \rightarrow 00:22:51.230$  a younger cohort of kids with autism.
- NOTE Confidence: 0.839417662222222
- $00{:}22{:}51{.}230 \dashrightarrow 00{:}22{:}53{.}624$  So these were grade school kids and
- NOTE Confidence: 0.839417662222222
- $00:22:53.624 \rightarrow 00:22:56.056$  when we looked at the faces we saw NOTE Confidence: 0.839417662222222
- $00{:}22{:}56.056 \dashrightarrow 00{:}22{:}58.690$  the things that we had seen before.
- NOTE Confidence: 0.839417662222222
- $00:22:58.690 \rightarrow 00:23:01.306$  We saw that they were worse at face NOTE Confidence: 0.839417662222222

 $00:23:01.306 \rightarrow 00:23:03.263$  recognition and we saw that their

NOTE Confidence: 0.839417662222222

 $00{:}23{:}03.263 \dashrightarrow 00{:}23{:}05.630$  face processing or and 170 was slower,

NOTE Confidence: 0.839417662222222

 $00{:}23{:}05{.}630 \dashrightarrow 00{:}23{:}07{.}590$  so this was cool because it's also

NOTE Confidence: 0.839417662222222

 $00:23:07.590 \longrightarrow 00:23:09.212$  telling us look this phenomenon

NOTE Confidence: 0.839417662222222

 $00{:}23{:}09{.}212 \dashrightarrow 00{:}23{:}11{.}366$  that we've seen in adolescents and

NOTE Confidence: 0.839417662222222

 $00{:}23{:}11{.}366 \dashrightarrow 00{:}23{:}13{.}099$  adults seemed to be consistent.

NOTE Confidence: 0.839417662222222

00:23:13.100 --> 00:23:13.916 You know,

NOTE Confidence: 0.839417662222222

 $00:23:13.916 \rightarrow 00:23:16.364$  across a broader span of development.

NOTE Confidence: 0.839417662222222

 $00:23:16.370 \longrightarrow 00:23:19.592$  When we looked at the the non social things,

NOTE Confidence: 0.839417662222222

00:23:19.600 - 00:23:21.466 we had a very different picture.

NOTE Confidence: 0.839417662222222

 $00{:}23{:}21{.}470 \dashrightarrow 00{:}23{:}23{.}950$  We saw that the kids with autism they

NOTE Confidence: 0.839417662222222

 $00{:}23{:}23{.}950 \dashrightarrow 00{:}23{:}26{.}314$  did word reading and decoding on

NOTE Confidence: 0.839417662222222

 $00:23:26.314 \rightarrow 00:23:28.404$  par with their typical counterparts

NOTE Confidence: 0.839417662222222

 $00:23:28.404 \longrightarrow 00:23:30.801$  as we would expect based on their

NOTE Confidence: 0.839417662222222

 $00{:}23{:}30{.}801 \dashrightarrow 00{:}23{:}33{.}759$  IQ and then we also saw that their

NOTE Confidence: 0.839417662222222

 $00:23:33.759 \rightarrow 00:23:35.320$  brain activity wasn't slow.

- NOTE Confidence: 0.839417662222222
- $00:23:35.320 \rightarrow 00:23:36.881$  They responded to the to the letters
- NOTE Confidence: 0.839417662222222
- $00:23:36.881 \longrightarrow 00:23:38.220$  the way we would expect.
- NOTE Confidence: 0.839417662222222
- 00:23:38.220 --> 00:23:39.400 Which is really, you know,
- NOTE Confidence: 0.839417662222222
- $00:23:39.400 \longrightarrow 00:23:41.856$  if you look at this lower chart
- NOTE Confidence: 0.839417662222222
- $00{:}23{:}41{.}856 \dashrightarrow 00{:}23{:}44{.}678$  you see the purple is the purple is
- NOTE Confidence: 0.839417662222222
- $00{:}23{:}44.678 \dashrightarrow 00{:}23{:}47.080$  their brain response to an amplitude.
- NOTE Confidence: 0.839417662222222
- $00:23:47.080 \longrightarrow 00:23:47.797$  To the letters,
- NOTE Confidence: 0.839417662222222
- $00:23:47.797 \rightarrow 00:23:49.470$  the green to the pseudo letters and
- NOTE Confidence: 0.839417662222222
- 00:23:49.521 --> 00:23:51.257 you can see every<br/>body is showing a
- NOTE Confidence: 0.839417662222222
- $00:23:51.257 \rightarrow 00:23:53.018$  bigger response to letters showing
- NOTE Confidence: 0.839417662222222
- 00:23:53.018 00:23:53.980 effective specialization.
- NOTE Confidence: 0.839417662222222
- $00:23:53.980 \longrightarrow 00:23:55.250$  Latency is not shown there,
- NOTE Confidence: 0.839417662222222
- $00{:}23{:}55{.}250 \dashrightarrow 00{:}23{:}56{.}978$  but we didn't see differences in
- NOTE Confidence: 0.839417662222222
- $00{:}23{:}56{.}978 \dashrightarrow 00{:}23{:}58{.}820$  latency and the people with autism,
- NOTE Confidence: 0.839417662222222
- $00:23:58.820 \rightarrow 00:24:00.808$  and so this was kind of interesting
- NOTE Confidence: 0.839417662222222

 $00:24:00.808 \longrightarrow 00:24:02.524$  in that it's suggesting the

NOTE Confidence: 0.839417662222222

 $00{:}24{:}02{.}524 \dashrightarrow 00{:}24{:}04{.}534$  differences that we're seeing that

NOTE Confidence: 0.839417662222222

 $00:24:04.534 \rightarrow 00:24:06.748$  people with autism are slower that.

NOTE Confidence: 0.839417662222222

 $00:24:06.750 \longrightarrow 00:24:09.020$  This slowness corresponds to face

NOTE Confidence: 0.839417662222222

 $00:24:09.020 \longrightarrow 00:24:11.290$  recognition abilities is not just

NOTE Confidence: 0.839417662222222

 $00:24:11.361 \longrightarrow 00:24:13.256$  telling us they're not slow.

NOTE Confidence: 0.839417662222222

 $00:24:13.260 \rightarrow 00:24:14.631$  For everything else,

NOTE Confidence: 0.839417662222222

 $00:24:14.631 \longrightarrow 00:24:16.459$  they're fine for letters.

NOTE Confidence: 0.932834187857143

 $00:24:16.460 \longrightarrow 00:24:18.708$  So the next study that we did and

NOTE Confidence: 0.932834187857143

00:24:18.708 --> 00:24:20.965 when I'm also going to do again,

NOTE Confidence: 0.932834187857143

 $00{:}24{:}20.965 \dashrightarrow 00{:}24{:}23.395$  kind of a referencing my life

NOTE Confidence: 0.932834187857143

 $00{:}24{:}23{.}395 \dashrightarrow 00{:}24{:}25{.}250$  of the Child Study Center when I

NOTE Confidence: 0.932834187857143

 $00:24:25.300 \rightarrow 00:24:26.878$  can tell my first grand rounds,

NOTE Confidence: 0.932834187857143

00:24:26.880 --> 00:24:28.280 I was still a trainee and so today

NOTE Confidence: 0.932834187857143

00:24:28.280 --> 00:24:30.075 as I go through some of these talks,

NOTE Confidence: 0.932834187857143

 $00:24:30.080 \rightarrow 00:24:31.823$  I'm going to highlight some of the

- NOTE Confidence: 0.932834187857143
- $00{:}24{:}31.823 \dashrightarrow 00{:}24{:}33.138$  trainees who've been central to
- NOTE Confidence: 0.932834187857143
- $00:24:33.138 \longrightarrow 00:24:34.937$  realizing the papers that have come out.
- NOTE Confidence: 0.932834187857143
- $00:24:34.940 \longrightarrow 00:24:35.640$  And so there, you see?
- NOTE Confidence: 0.932834187857143
- $00:24:35.640 \longrightarrow 00:24:36.414$  Tamara Parker,
- NOTE Confidence: 0.932834187857143
- $00{:}24{:}36{.}414 \dashrightarrow 00{:}24{:}39{.}123$  who's a student in the PhD student
- NOTE Confidence: 0.932834187857143
- 00:24:39.123 --> 00:24:41.040 Rental Neuroscience program?
- NOTE Confidence: 0.932834187857143
- $00:24:41.040 \rightarrow 00:24:44.330$  And So what we did in this study was wonder
- NOTE Confidence: 0.932834187857143
- 00:24:44.415 --> 00:24:47.789 about how behavior during a biomarker assay.
- NOTE Confidence: 0.932834187857143
- $00:24:47.790 \longrightarrow 00:24:50.002$  Might affect the biomarker values and let
- NOTE Confidence: 0.932834187857143
- $00{:}24{:}50{.}002 \dashrightarrow 00{:}24{:}52{.}687$  me tell you why it's important for this.
- NOTE Confidence: 0.932834187857143
- 00:24:52.690 --> 00:24:55.010 So any 170 latency relates
- NOTE Confidence: 0.932834187857143
- $00:24:55.010 \longrightarrow 00:24:58.160$  to how you look at a face.
- NOTE Confidence: 0.932834187857143
- $00:24:58.160 \longrightarrow 00:25:01.538$  Eyes make your end 170 faster.
- NOTE Confidence: 0.932834187857143
- $00{:}25{:}01{.}540 \dashrightarrow 00{:}25{:}03{.}562$  I've just told you that people
- NOTE Confidence: 0.932834187857143
- $00:25:03.562 \rightarrow 00:25:06.018$  with autism have a slower and 170.
- NOTE Confidence: 0.932834187857143

 $00:25:06.020 \rightarrow 00:25:07.685$  Many if for those of you who've been in

NOTE Confidence: 0.932834187857143

 $00{:}25{:}07.685 \dashrightarrow 00{:}25{:}09.530$  this room, you know two decades ago,

NOTE Confidence: 0.932834187857143

 $00{:}25{:}09{.}530 \dashrightarrow 00{:}25{:}11{.}138$  you'd hear lots of people telling you people,

NOTE Confidence: 0.932834187857143

 $00:25:11.140 \longrightarrow 00:25:13.564$  autism don't look so much to the eyes.

NOTE Confidence: 0.932834187857143

 $00:25:13.570 \rightarrow 00:25:15.834$  So what if when we do an experiment,

NOTE Confidence: 0.932834187857143

 $00{:}25{:}15{.}840 \dashrightarrow 00{:}25{:}17{.}534$  people with autism and just looking at NOTE Confidence: 0.932834187857143

 $00:25:17.534 \rightarrow 00:25:19.410$  the faces on the screen differently?

NOTE Confidence: 0.932834187857143

00:25:19.410 --> 00:25:21.984 And I'm just doing an unnecessarily

NOTE Confidence: 0.932834187857143

 $00:25:21.984 \rightarrow 00:25:23.700$  complicated eye tracking experiment,

NOTE Confidence: 0.932834187857143

00:25:23.700 --> 00:25:24.150 right?

NOTE Confidence: 0.932834187857143

 $00{:}25{:}24{.}150 \dashrightarrow 00{:}25{:}27{.}246$  So what we could do is we could

NOTE Confidence: 0.932834187857143

 $00{:}25{:}27{.}246 \dashrightarrow 00{:}25{:}29{.}220$  control the way people look at faces.

NOTE Confidence: 0.932834187857143

 $00{:}25{:}29{.}220 \dashrightarrow 00{:}25{:}31{.}920$  We could have crosshairs that ensure

NOTE Confidence: 0.932834187857143

 $00:25:31.920 \longrightarrow 00:25:33.900$  that a person is looking to the eyes or

NOTE Confidence: 0.932834187857143

 $00:25:33.957 \rightarrow 00:25:36.063$  looking to the nose and looking to them out.

NOTE Confidence: 0.932834187857143

00:25:36.070 --> 00:25:37.408 And what we want to understand

- NOTE Confidence: 0.932834187857143
- $00:25:37.408 \longrightarrow 00:25:39.072$  is what if when we make people
- NOTE Confidence: 0.932834187857143
- $00:25:39.072 \rightarrow 00:25:40.500$  with autism look to the eyes?
- NOTE Confidence: 0.932834187857143
- $00:25:40.500 \rightarrow 00:25:42.375$  These differences in brain activity
- NOTE Confidence: 0.932834187857143
- $00:25:42.375 \longrightarrow 00:25:44.862$  that we seek go away and we
- NOTE Confidence: 0.932834187857143
- $00{:}25{:}44.862 \dashrightarrow 00{:}25{:}46.698$  stop putting EG Nets on peoples
- NOTE Confidence: 0.932834187857143
- $00{:}25{:}46.698 \dashrightarrow 00{:}25{:}48.587$  heads and we just do I track.
- NOTE Confidence: 0.932834187857143
- $00:25:48.590 \longrightarrow 00:25:50.000$  It's not what we saw.
- NOTE Confidence: 0.932834187857143
- $00:25:50.000 \dashrightarrow 00:25:51.806$  We saw that what you would expect.
- NOTE Confidence: 0.932834187857143
- $00:25:51.810 \longrightarrow 00:25:53.500$  I'll explain this figure.
- NOTE Confidence: 0.932834187857143
- $00{:}25{:}53{.}500 \dashrightarrow 00{:}25{:}55{.}060$  It's a little bit complicated
- NOTE Confidence: 0.932834187857143
- 00:25:55.060 00:25:57.010 so you can see here eyes.
- NOTE Confidence: 0.932834187857143
- $00{:}25{:}57{.}010 \dashrightarrow 00{:}25{:}59{.}418$  You can see the mose see the mount.
- NOTE Confidence: 0.932834187857143
- $00:25:59.420 \longrightarrow 00:26:02.212$  This is where people are looking on the
- NOTE Confidence: 0.932834187857143
- $00{:}26{:}02{.}212$  -->  $00{:}26{:}05{.}018$  face you can see the end 170 latency.
- NOTE Confidence: 0.932834187857143
- $00:26:05.020 \rightarrow 00:26:07.476$  Of the people with autism shown in yellow,
- NOTE Confidence: 0.932834187857143

 $00:26:07.480 \longrightarrow 00:26:09.290$  the people with typical development

NOTE Confidence: 0.932834187857143

 $00{:}26{:}09{.}290 \dashrightarrow 00{:}26{:}12{.}876$  shown in blue and what you see is that.

NOTE Confidence: 0.932834187857143

 $00:26:12.880 \longrightarrow 00:26:16.120$  Looking to the eyes.

NOTE Confidence: 0.932834187857143

 $00:26:16.120 \rightarrow 00:26:18.136$  Does not make the people with autism

NOTE Confidence: 0.932834187857143

 $00:26:18.136 \longrightarrow 00:26:20.953$  speed up to be comparable to the

NOTE Confidence: 0.932834187857143

 $00:26:20.953 \rightarrow 00:26:22.369$  typically developing counterparts.

NOTE Confidence: 0.932834187857143

 $00:26:22.370 \longrightarrow 00:26:23.038$  In fact,

NOTE Confidence: 0.932834187857143

 $00:26:23.038 \rightarrow 00:26:25.376$  looking to the eyes speeds up the

NOTE Confidence: 0.932834187857143

 $00:26:25.376 \rightarrow 00:26:26.656$  typically developing counterparts

NOTE Confidence: 0.932834187857143

 $00{:}26{:}26{.}656 \dashrightarrow 00{:}26{:}29{.}278$  and actually makes this the slowness

NOTE Confidence: 0.932834187857143

 $00{:}26{:}29{.}278 \dashrightarrow 00{:}26{:}32{.}088$  that is from once the slowness comes.

NOTE Confidence: 0.932834187857143

 $00:26:32.090 \longrightarrow 00:26:33.282$  That's that actually enhances

NOTE Confidence: 0.932834187857143

 $00:26:33.282 \longrightarrow 00:26:34.772$  the differences that we see,

NOTE Confidence: 0.932834187857143

00:26:34.780 --> 00:26:36.320 and so in terms of our worrying

NOTE Confidence: 0.932834187857143

 $00:26:36.320 \longrightarrow 00:26:37.490$  about what we're measuring,

NOTE Confidence: 0.932834187857143

 $00{:}26{:}37{.}490 \dashrightarrow 00{:}26{:}39{.}779$  it seems that these N 170 differences

- NOTE Confidence: 0.932834187857143
- $00:26:39.779 \longrightarrow 00:26:42.467$  are not simply an artifact of the way
- NOTE Confidence: 0.932834187857143
- $00{:}26{:}42.467 \dashrightarrow 00{:}26{:}44.929$  people are visually taking in the stimuli,
- NOTE Confidence: 0.932834187857143
- $00:26:44.930 \longrightarrow 00:26:46.126$  but telling us something.
- NOTE Confidence: 0.932834187857143
- $00{:}26{:}46.126 \dashrightarrow 00{:}26{:}47.920$  Different about the way the brain
- NOTE Confidence: 0.932834187857143
- $00{:}26{:}47.976 \dashrightarrow 00{:}26{:}49.548$  response to social information,
- NOTE Confidence: 0.932834187857143
- $00{:}26{:}49{.}550 \dashrightarrow 00{:}26{:}51{.}365$  even when the same information
- NOTE Confidence: 0.932834187857143
- 00:26:51.365 --> 00:26:53.602 is reaching the retina and then
- NOTE Confidence: 0.932834187857143
- $00:26:53.602 \rightarrow 00:26:55.948$  the last really exciting but also
- NOTE Confidence: 0.932834187857143
- 00:26:55.948 --> 00:26:56.980 really preliminary work.
- NOTE Confidence: 0.932834187857143
- $00{:}26{:}56{.}980 \dashrightarrow 00{:}26{:}59{.}230$  And this is work that's been been LED in
- NOTE Confidence: 0.789527811666667
- 00:26:59.286 --> 00:27:01.122 Lambi Shashikala, a medical student.
- NOTE Confidence: 0.789527811666667
- $00:27:01.122 \longrightarrow 00:27:03.138$  Max rolison. Right here a soul
- NOTE Confidence: 0.789527811666667
- $00{:}27{:}03.138 \dashrightarrow 00{:}27{:}05.250$  mate fellow like not totally true.
- NOTE Confidence: 0.789527811666667
- $00{:}27{:}05{.}250 \dashrightarrow 00{:}27{:}06{.}970$  Also Sparrow fellow in lab.
- NOTE Confidence: 0.789527811666667
- $00{:}27{:}06{.}970 \dashrightarrow 00{:}27{:}08{.}530$  Also medical student in lab.
- NOTE Confidence: 0.789527811666667

 $00:27:08.530 \rightarrow 00:27:10.930$  Also high school student in labs.

NOTE Confidence: 0.789527811666667

00:27:10.930 --> 00:27:12.935 So I don't actually know

NOTE Confidence: 0.789527811666667

 $00{:}27{:}12{.}935 \dashrightarrow 00{:}27{:}15{.}370$  when Max did this work but.

NOTE Confidence: 0.7895278116666667

00:27:15.370 --> 00:27:18.184 But Pam Ventola, who's a colleague here,

NOTE Confidence: 0.789527811666667

00:27:18.190 --> 00:27:19.394 the CHILD Study Center,

NOTE Confidence: 0.789527811666667

 $00{:}27{:}19{.}394 \dashrightarrow 00{:}27{:}22{.}074$  who runs at a treatment program using an

NOTE Confidence: 0.789527811666667

00:27:22.074 --> 00:27:24.109 approach called pivotal response treatment,

NOTE Confidence: 0.789527811666667

 $00:27:24.110 \longrightarrow 00:27:25.840$  which is an empirically validated

NOTE Confidence: 0.789527811666667

 $00:27:25.840 \longrightarrow 00:27:27.570$  behavioral approach based on the

NOTE Confidence: 0.789527811666667

 $00:27:27.624 \rightarrow 00:27:29.248$  premise that teaching children,

NOTE Confidence: 0.789527811666667

00:27:29.250 --> 00:27:31.390 autism, core, social skills,

NOTE Confidence: 0.789527811666667

 $00:27:31.390 \longrightarrow 00:27:34.065$  and teaching them to have

NOTE Confidence: 0.7895278116666667

 $00:27:34.065 \longrightarrow 00:27:36.649$  fun using them works.

NOTE Confidence: 0.789527811666667

00:27:36.649 --> 00:27:38.698 It's naturalistic intervention,

NOTE Confidence: 0.789527811666667

 $00{:}27{:}38{.}700 \dashrightarrow 00{:}27{:}40{.}555$  and Pam did a course of treatment

NOTE Confidence: 0.789527811666667

 $00:27:40.555 \longrightarrow 00:27:42.674$  that was 14 weeks and what we did

- NOTE Confidence: 0.789527811666667
- $00:27:42.674 \longrightarrow 00:27:44.604$  is we worked with her so that
- NOTE Confidence: 0.789527811666667
- $00:27:44.604 \rightarrow 00:27:46.114$  we could measure anyone 70s.
- NOTE Confidence: 0.789527811666667
- $00{:}27{:}46.120 \dashrightarrow 00{:}27{:}48.145$  Before these kids came into
- NOTE Confidence: 0.789527811666667
- $00{:}27{:}48.145 \dashrightarrow 00{:}27{:}50.170$  treatment and then after treatment
- NOTE Confidence: 0.7895278116666667
- $00:27:50.170 \longrightarrow 00:27:52.599$  and what we found and this is,
- NOTE Confidence: 0.789527811666667
- 00:27:52.600 --> 00:27:53.380 I say, preliminary.
- NOTE Confidence: 0.789527811666667
- $00{:}27{:}53{.}380 \dashrightarrow 00{:}27{:}55{.}200$  This is a very small sample but
- NOTE Confidence: 0.789527811666667
- $00:27:55.253 \rightarrow 00:27:56.856$  really we I am excited about this
- NOTE Confidence: 0.7895278116666667
- $00{:}27{:}56.856 \dashrightarrow 00{:}27{:}58.804$  and we feel that this is something
- NOTE Confidence: 0.789527811666667
- 00:27:58.804 --> 00:28:00.309 important because these kind of
- NOTE Confidence: 0.789527811666667
- 00:28:00.309 --> 00:28:02.160 data don't really exist in autism.
- NOTE Confidence: 0.789527811666667
- $00{:}28{:}02{.}160 \dashrightarrow 00{:}28{:}04{.}900$  There are not a lot of kind of pre post
- NOTE Confidence: 0.789527811666667
- $00{:}28{:}04{.}970 \dashrightarrow 00{:}28{:}07{.}640$  treatment biomarker studies in autism.
- NOTE Confidence: 0.789527811666667
- $00:28:07.640 \longrightarrow 00:28:09.614$  There will be in a few years
- NOTE Confidence: 0.789527811666667
- $00:28:09.620 \longrightarrow 00:28:11.160$  but we found if so,
- NOTE Confidence: 0.789527811666667

 $00:28:11.160 \longrightarrow 00:28:13.236$  each line on this chart represents

NOTE Confidence: 0.789527811666667

 $00:28:13.236 \longrightarrow 00:28:15.202$  an individual child in the therapy

NOTE Confidence: 0.789527811666667

 $00:28:15.202 \rightarrow 00:28:17.290$  and so you can see there are 7.

NOTE Confidence: 0.789527811666667

 $00:28:17.290 \longrightarrow 00:28:19.299$  But what we see is pre on

NOTE Confidence: 0.789527811666667

 $00:28:19.299 \longrightarrow 00:28:21.190$  the left post on the right.

NOTE Confidence: 0.789527811666667

 $00:28:21.190 \longrightarrow 00:28:23.224$  Everybody got faster except for one

NOTE Confidence: 0.789527811666667

 $00{:}28{:}23{.}224 \dashrightarrow 00{:}28{:}25{.}638$  kid and so remember we're seeing the

NOTE Confidence: 0.789527811666667

 $00:28:25.638 \rightarrow 00:28:27.962$  difference is they tend to be slower.

NOTE Confidence: 0.789527811666667

 $00{:}28{:}27{.}970 \dashrightarrow 00{:}28{:}30{.}112$  This is direction we might expect if

NOTE Confidence: 0.789527811666667

 $00:28:30.112 \longrightarrow 00:28:32.482$  you know if increasing sociability and

NOTE Confidence: 0.789527811666667

 $00:28:32.482 \rightarrow 00:28:35.248$  treatment maps on to these biomarkers,

NOTE Confidence: 0.7895278116666667

 $00{:}28{:}35{.}250 \dashrightarrow 00{:}28{:}37{.}986$  so you know preliminary but provocative,

NOTE Confidence: 0.7895278116666667

 $00{:}28{:}37{.}990 \dashrightarrow 00{:}28{:}39{.}628$  I think worthy of further study.

NOTE Confidence: 0.7895278116666667

 $00:28:39.630 \longrightarrow 00:28:42.066$  Then 170 changes with clinical status.

NOTE Confidence: 0.789527811666667

00:28:42.070 -> 00:28:43.286 So let me review some of the things

NOTE Confidence: 0.789527811666667

 $00:28:43.286 \longrightarrow 00:28:44.337$  I've told you about the Edmund.

- NOTE Confidence: 0.789527811666667
- $00{:}28{:}44{.}340 \dashrightarrow 00{:}28{:}45{.}142$  70, so.
- NOTE Confidence: 0.789527811666667
- 00:28:45.142 --> 00:28:47.147 Thinking back to our checklist,
- NOTE Confidence: 0.789527811666667
- $00{:}28{:}47{.}150 \dashrightarrow 00{:}28{:}48{.}461$  we see that.
- NOTE Confidence: 0.7895278116666667
- $00{:}28{:}48{.}461 \dashrightarrow 00{:}28{:}50{.}209$  Sensitive diagnostic status it's
- NOTE Confidence: 0.7895278116666667
- $00:28:50.209 \rightarrow 00:28:52.915$  associated with symptoms in a way that
- NOTE Confidence: 0.789527811666667
- $00:28:52.915 \rightarrow 00:28:54.580$  seems to be functionally specific.
- NOTE Confidence: 0.789527811666667
- $00{:}28{:}54{.}580 \dashrightarrow 00{:}28{:}56{.}554$  It's the differences that we see
- NOTE Confidence: 0.789527811666667
- $00{:}28{:}56{.}554 \dashrightarrow 00{:}28{:}57{.}870$  are consistent across development.
- NOTE Confidence: 0.7895278116666667
- $00{:}28{:}57{.}870 \dashrightarrow 00{:}29{:}00{.}606$  Their robust to to certain kinds
- NOTE Confidence: 0.789527811666667
- 00:29:00.606 --> 00:29:03.255 of differences in behavior during
- NOTE Confidence: 0.7895278116666667
- 00:29:03.255 --> 00:29:04.749 biomarker acquisition.
- NOTE Confidence: 0.789527811666667
- $00{:}29{:}04.750 \dashrightarrow 00{:}29{:}06.466$  They are sensitive to changes in
- NOTE Confidence: 0.789527811666667
- $00{:}29{:}06{.}466 \dashrightarrow 00{:}29{:}08{.}011$  clinical status and then remember
- NOTE Confidence: 0.789527811666667
- 00:29:08.011 -> 00:29:09.379 the practical things too.
- NOTE Confidence: 0.789527811666667
- $00:29:09.380 \longrightarrow 00:29:10.420$  And this is a, e.g.,
- NOTE Confidence: 0.789527811666667

 $00:29:10.420 \longrightarrow 00:29:12.190$  so they're also they're viable.

NOTE Confidence: 0.789527811666667

00:29:12.190 --> 00:29:13.790 This is a biomarker technology

NOTE Confidence: 0.789527811666667

 $00{:}29{:}13.790 \dashrightarrow 00{:}29{:}16.361$  that we can use its cost effective

NOTE Confidence: 0.789527811666667

 $00:29:16.361 \longrightarrow 00:29:19.450$  and it's accessible. So.

NOTE Confidence: 0.789527811666667

 $00{:}29{:}19{.}450 \dashrightarrow 00{:}29{:}23{.}027$  This is kind of where things were.

NOTE Confidence: 0.789527811666667

 $00{:}29{:}23.030 \dashrightarrow 00{:}29{:}25.844$  It's a lots of evidence that that

NOTE Confidence: 0.789527811666667

 $00:29:25.844 \longrightarrow 00:29:28.777$  things like the N 170 can be useful.

NOTE Confidence: 0.789527811666667

 $00:29:28.780 \longrightarrow 00:29:30.508$  But why are we not at a place

NOTE Confidence: 0.789527811666667

 $00{:}29{:}30{.}508 \dashrightarrow 00{:}29{:}31{.}590$  where they are useful?

NOTE Confidence: 0.789527811666667

 $00:29:31.590 \rightarrow 00:29:33.165$  What are some of the remaining challenges?

NOTE Confidence: 0.789527811666667

 $00{:}29{:}33.170 \dashrightarrow 00{:}29{:}35.570$  First, I want to clarify that you know,

NOTE Confidence: 0.7895278116666667

 $00{:}29{:}35{.}570 \dashrightarrow 00{:}29{:}37{.}382$  in case it hasn't been evident

NOTE Confidence: 0.7895278116666667

00:29:37.382 --> 00:29:38.910 over my slides so far,

NOTE Confidence: 0.789527811666667

 $00:29:38.910 \longrightarrow 00:29:40.470$  I'm pretty involved with it.

NOTE Confidence: 0.789527811666667

 $00:29:40.470 \longrightarrow 00:29:42.297$  And 170, we've got a thing going,

NOTE Confidence: 0.789527811666667

 $00:29:42.300 \longrightarrow 00:29:43.980$  but there are many,

NOTE Confidence: 0.789527811666667

 $00:29:43.980 \rightarrow 00:29:47.130$  many biomarkers worthy of study in autism,

NOTE Confidence: 0.789527811666667

 $00{:}29{:}47{.}130 \dashrightarrow 00{:}29{:}49{.}594$  and so you could tell a similar story.

NOTE Confidence: 0.789527811666667

 $00:29:49.600 \rightarrow 00:29:51.637$  For something like an eye tracking biomarker,

NOTE Confidence: 0.789527811666667

00:29:51.640 --> 00:29:52.402 right, UM,

NOTE Confidence: 0.7895278116666667

 $00:29:52.402 \longrightarrow 00:29:54.688$  the truth for all of them.

NOTE Confidence: 0.946086423636364

 $00:29:54.690 \rightarrow 00:29:55.974$  Despite extensive promising evidence,

NOTE Confidence: 0.946086423636364

 $00:29:55.974 \rightarrow 00:29:58.320$  is that there's problems in one problem.

NOTE Confidence: 0.946086423636364

 $00:29:58.320 \rightarrow 00:30:01.008$  For all of them is limited reproducibility.

NOTE Confidence: 0.946086423636364

 $00{:}30{:}01{.}010 \dashrightarrow 00{:}30{:}03{.}138$  So at the bottom of the slide,

NOTE Confidence: 0.946086423636364

 $00{:}30{:}03{.}140 \dashrightarrow 00{:}30{:}06{.}580$  here are all the studies that I am

NOTE Confidence: 0.946086423636364

 $00:30:06.580 \longrightarrow 00:30:09.978$  aware of that have followed up on our

NOTE Confidence: 0.946086423636364

 $00:30:09.978 \longrightarrow 00:30:13.176$  initial finding of an M170 delay in 2004.

NOTE Confidence: 0.946086423636364

00:30:13.176 --> 00:30:14.756 So lots of studies right?

NOTE Confidence: 0.946086423636364

 $00{:}30{:}14.760 \dashrightarrow 00{:}30{:}16.548$  And there's one that I really

NOTE Confidence: 0.946086423636364

 $00:30:16.548 \rightarrow 00:30:18.394$  like this Kang one 2018,

NOTE Confidence: 0.946086423636364

 $00:30:18.394 \rightarrow 00:30:20.710$  which is actually a meta analysis.

NOTE Confidence: 0.946086423636364

 $00:30:20.710 \longrightarrow 00:30:22.110$  Which took all these studies.

NOTE Confidence: 0.946086423636364

 $00{:}30{:}22.110 \dashrightarrow 00{:}30{:}23.844$  Put him into a metal attic

NOTE Confidence: 0.946086423636364

 $00:30:23.844 \rightarrow 00:30:25.357$  analytic sausage grinder and said

NOTE Confidence: 0.946086423636364

 $00:30:25.357 \rightarrow 00:30:26.847$  wow across all these studies,

NOTE Confidence: 0.946086423636364

 $00:30:26.850 \rightarrow 00:30:29.418$  this difference seems to be real and true,

NOTE Confidence: 0.946086423636364

 $00{:}30{:}29{.}420 \dashrightarrow 00{:}30{:}31{.}922$  but there's also studies in this

NOTE Confidence: 0.946086423636364

 $00:30:31.922 \longrightarrow 00:30:34.769$  mix that didn't find it to be true.

NOTE Confidence: 0.946086423636364

 $00:30:34.770 \rightarrow 00:30:37.822$  Why is that? Maybe you know, I.

NOTE Confidence: 0.946086423636364

00:30:37.822 --> 00:30:39.490 I started out saying autism is

NOTE Confidence: 0.946086423636364

 $00:30:39.556 \rightarrow 00:30:41.320$  really heterogeneous condition.

NOTE Confidence: 0.946086423636364

 $00:30:41.320 \longrightarrow 00:30:42.600$  Just like you don't expect,

NOTE Confidence: 0.946086423636364

00:30:42.600 --> 00:30:44.160 just like you might see variation

NOTE Confidence: 0.946086423636364

 $00:30:44.160 \longrightarrow 00:30:45.200$  in language and autism.

NOTE Confidence: 0.946086423636364

 $00:30:45.200 \rightarrow 00:30:46.736$  Maybe you're going to see variation

NOTE Confidence: 0.946086423636364

 $00:30:46.736 \rightarrow 00:30:48.130$  in face processing in autism,

- NOTE Confidence: 0.946086423636364
- $00:30:48.130 \longrightarrow 00:30:49.565$  and maybe this is telling us that
- NOTE Confidence: 0.946086423636364
- $00:30:49.565 \rightarrow 00:30:50.960$  maybe some of these samples didn't
- NOTE Confidence: 0.946086423636364
- $00{:}30{:}50{.}960 \dashrightarrow 00{:}30{:}52{.}424$  have an impact to the neural
- NOTE Confidence: 0.946086423636364
- $00:30:52.424 \rightarrow 00:30:53.899$  system supporting face processing,
- NOTE Confidence: 0.946086423636364
- 00:30:53.900 --> 00:30:56.110 and I think that's OK.
- NOTE Confidence: 0.946086423636364
- $00{:}30{:}56{.}110 \dashrightarrow 00{:}30{:}57{.}727$  There are also problems with this literature.
- NOTE Confidence: 0.946086423636364
- $00:30:57.730 \rightarrow 00:31:00.406$  Some of these studies are underpowered,
- NOTE Confidence: 0.946086423636364
- 00:31:00.410 --> 00:31:00.802 right?
- NOTE Confidence: 0.946086423636364
- $00:31:00.802 \dashrightarrow 00:31:03.546$  Which could lead to null results or
- NOTE Confidence: 0.946086423636364
- $00:31:03.546 \rightarrow 00:31:06.423$  could lead to spurious false positive
- NOTE Confidence: 0.946086423636364
- $00:31:06.423 \rightarrow 00:31:09.360$  results and a third problem is that
- NOTE Confidence: 0.946086423636364
- $00:31:09.360 \longrightarrow 00:31:11.750$  there's tons of methodological variation.
- NOTE Confidence: 0.946086423636364
- $00:31:11.750 \longrightarrow 00:31:13.214$  We really don't know.
- NOTE Confidence: 0.946086423636364
- 00:31:13.214 --> 00:31:15.410 Doesn't matter if you use color
- NOTE Confidence: 0.946086423636364
- 00:31:15.482 --> 00:31:17.210 faces or grayscale faces,
- NOTE Confidence: 0.946086423636364

00:31:17.210 --> 00:31:18.850 happy faces, neutral faces,

NOTE Confidence: 0.946086423636364

 $00:31:18.850 \rightarrow 00:31:21.046$  and so the crosshairs, no crosshairs,

NOTE Confidence: 0.946086423636364

 $00:31:21.046 \rightarrow 00:31:23.903$  and so all those things are in the mix there

NOTE Confidence: 0.946086423636364

 $00:31:23.903 \rightarrow 00:31:26.175$  noise that we can never really pull out.

NOTE Confidence: 0.946086423636364

 $00:31:26.180 \longrightarrow 00:31:27.820$  From from this this,

NOTE Confidence: 0.946086423636364

00:31:27.820 --> 00:31:30.310 you know, mixed set of findings.

NOTE Confidence: 0.946086423636364

 $00:31:30.310 \longrightarrow 00:31:32.326$  There are other things too that there

NOTE Confidence: 0.946086423636364

 $00:31:32.326 \rightarrow 00:31:34.806$  are not just kind of noise in the story,

NOTE Confidence: 0.946086423636364

00:31:34.810 - 00:31:36.889 but are gaping holes in the story.

NOTE Confidence: 0.946086423636364

 $00:31:36.890 \rightarrow 00:31:38.775$  We didn't really understand reliability

NOTE Confidence: 0.946086423636364

 $00:31:38.775 \dashrightarrow 00:31:41.140$  of this measure within a person.

NOTE Confidence: 0.946086423636364

 $00{:}31{:}41{.}140 \dashrightarrow 00{:}31{:}42.820$  Overtime or practice effects.

NOTE Confidence: 0.946086423636364

00:31:42.820 --> 00:31:43.660 You know,

NOTE Confidence: 0.946086423636364

 $00:31:43.660 \rightarrow 00:31:45.988$  if you're going to be doing a biomarker,

NOTE Confidence: 0.946086423636364

 $00:31:45.990 \longrightarrow 00:31:46.776$  for example,

NOTE Confidence: 0.946086423636364

 $00:31:46.776 \rightarrow 00:31:49.134$  over the course of an intervention,

- NOTE Confidence: 0.946086423636364
- $00:31:49.140 \longrightarrow 00:31:51.499$  does the act of measuring the biomarker
- NOTE Confidence: 0.946086423636364
- 00:31:51.499 > 00:31:52.960 changed the biomarker values?
- NOTE Confidence: 0.946086423636364
- $00:31:52.960 \longrightarrow 00:31:55.180$  Those things are unknown.
- NOTE Confidence: 0.946086423636364
- $00{:}31{:}55{.}180 \dashrightarrow 00{:}31{:}57{.}652$  We also don't have any kind of normative
- NOTE Confidence: 0.946086423636364
- $00:31:57.652 \rightarrow 00:31:59.159$  reference which is challenging.
- NOTE Confidence: 0.946086423636364
- $00{:}31{:}59{.}160 \dashrightarrow 00{:}31{:}59{.}886$  So for.
- NOTE Confidence: 0.946086423636364
- $00:31:59.886 \longrightarrow 00:32:02.064$  And a contrast would be head
- NOTE Confidence: 0.946086423636364
- $00:32:02.064 \rightarrow 00:32:03.698$  circumference where you could go
- NOTE Confidence: 0.946086423636364
- $00:32:03.698 \rightarrow 00:32:06.023$  to the CDC website and say for any
- NOTE Confidence: 0.946086423636364
- $00:32:06.023 \rightarrow 00:32:08.463$  given child you know how they fall in
- NOTE Confidence: 0.946086423636364
- $00:32:08.463 \rightarrow 00:32:10.499$  terms of percentile rank for their head size.
- NOTE Confidence: 0.946086423636364
- $00{:}32{:}10.500 \dashrightarrow 00{:}32{:}12.705$  We don't know that for things like the N.
- NOTE Confidence: 0.946086423636364
- $00:32:12.710 \longrightarrow 00:32:15.246$  170 and so it makes it really hard
- NOTE Confidence: 0.946086423636364
- $00{:}32{:}15{.}246 \dashrightarrow 00{:}32{:}17{.}193$  your ability to infer a difference
- NOTE Confidence: 0.946086423636364
- $00:32:17.193 \longrightarrow 00:32:19.578$  is only as strong as the control
- NOTE Confidence: 0.946086423636364

 $00:32:19.578 \rightarrow 00:32:21.828$  sample in that particular study.

NOTE Confidence: 0.946086423636364

 $00:32:21.830 \longrightarrow 00:32:23.888$  All these things are things that

NOTE Confidence: 0.946086423636364

 $00:32:23.888 \longrightarrow 00:32:27.064$  I think of as problems that are

NOTE Confidence: 0.946086423636364

 $00:32:27.064 \rightarrow 00:32:29.364$  solvable through empirical research,

NOTE Confidence: 0.946086423636364

 $00{:}32{:}29{.}370 \dashrightarrow 00{:}32{:}31{.}810$  and So what I think we need are

NOTE Confidence: 0.946086423636364

 $00{:}32{:}31{.}810 \dashrightarrow 00{:}32{:}33{.}660$  studies that are more rigorous

NOTE Confidence: 0.946086423636364

 $00:32:33.660 \longrightarrow 00:32:35.610$  and where those could lead.

NOTE Confidence: 0.946086423636364

00:32:35.610 --> 00:32:36.144 You know,

NOTE Confidence: 0.946086423636364

 $00:32:36.144 \longrightarrow 00:32:37.479$  really what's the threshold that

NOTE Confidence: 0.946086423636364

 $00:32:37.479 \longrightarrow 00:32:39.670$  we have to get to before we have

NOTE Confidence: 0.946086423636364

 $00{:}32{:}39{.}670 \dashrightarrow 00{:}32{:}40{.}738$  useful biomarkers for autism

NOTE Confidence: 0.946086423636364

00:32:40.738 --> 00:32:42.268 is FDA qualification right?

NOTE Confidence: 0.946086423636364

00:32:42.270 -> 00:32:44.260 Because there are people who

NOTE Confidence: 0.946086423636364

 $00:32:44.260 \longrightarrow 00:32:46.250$  are really thinking about that.

NOTE Confidence: 0.946086423636364

 $00:32:46.250 \rightarrow 00:32:48.578$  What should those studies look like?

NOTE Confidence: 0.93335224375

 $00:32:48.580 \rightarrow 00:32:51.265$  Well, they should test well

- NOTE Confidence: 0.93335224375
- 00:32:51.265 --> 00:32:52.876 evidenced biomarkers right?
- NOTE Confidence: 0.93335224375
- 00:32:52.880 --> 00:32:54.360 And that's intuitive, right?
- NOTE Confidence: 0.93335224375
- $00:32:54.360 \longrightarrow 00:32:56.580$  That's what we should do well.
- NOTE Confidence: 0.93335224375
- $00:32:56.580 \rightarrow 00:32:58.828$  So those of you who also write grants,
- NOTE Confidence: 0.93335224375
- 00:32:58.830 --> 00:33:00.760 no, that's a challenge, right?
- NOTE Confidence: 0.93335224375
- $00:33:00.760 \longrightarrow 00:33:03.073$  It's really hard to get the 41st
- NOTE Confidence: 0.93335224375
- 00:33:03.073 -> 00:33:05.404 study of the N 170 funded because
- NOTE Confidence: 0.93335224375
- $00:33:05.404 \longrightarrow 00:33:07.848$  of the emphasis on innovation.
- NOTE Confidence: 0.93335224375
- $00:33:07.850 \longrightarrow 00:33:09.516$  I think we have a system that
- NOTE Confidence: 0.93335224375
- $00{:}33{:}09{.}516 \dashrightarrow 00{:}33{:}11{.}905$  sets us up to chase the next best
- NOTE Confidence: 0.93335224375
- $00:33:11.905 \rightarrow 00:33:13.951$  potential thing rather than dig in
- NOTE Confidence: 0.93335224375
- $00{:}33{:}13.951 \dashrightarrow 00{:}33{:}15.836$  and understand really solid things.
- NOTE Confidence: 0.93335224375
- $00:33:15.840 \longrightarrow 00:33:17.716$  But studies need to do to test.
- NOTE Confidence: 0.93335224375
- $00{:}33{:}17.720 \dashrightarrow 00{:}33{:}19.061$  Well, evidence biomarkers.
- NOTE Confidence: 0.93335224375
- $00{:}33{:}19.061 \dashrightarrow 00{:}33{:}21.296$  We need well characterized cohorts,
- NOTE Confidence: 0.93335224375

 $00{:}33{:}21{.}300 \dashrightarrow 00{:}33{:}23{.}505$  so we can understand relationships

NOTE Confidence: 0.93335224375

 $00:33:23.505 \rightarrow 00:33:24.551$  with symptomatology, right?

NOTE Confidence: 0.93335224375

 $00:33:24.551 \dashrightarrow 00:33:26.296$  If we don't measure it, we can't understand.

NOTE Confidence: 0.93335224375

 $00:33:26.296 \longrightarrow 00:33:27.856$  There's a relationship with face

NOTE Confidence: 0.93335224375

 $00{:}33{:}27.856 \dashrightarrow 00{:}33{:}29.309$  processing for face recognition.

NOTE Confidence: 0.93335224375

 $00:33:29.310 \longrightarrow 00:33:31.926$  For example, we need big samples,

NOTE Confidence: 0.93335224375

00:33:31.930 --> 00:33:34.065 including big samples of typical

NOTE Confidence: 0.93335224375

00:33:34.065 --> 00:33:35.346 typically developing kids.

NOTE Confidence: 0.93335224375

 $00:33:35.350 \rightarrow 00:33:37.793$  So we start to get that normative

NOTE Confidence: 0.93335224375

00:33:37.793 --> 00:33:39.610 reference that I described,

NOTE Confidence: 0.93335224375

 $00{:}33{:}39{.}610 \dashrightarrow 00{:}33{:}41{.}290$  and we need a longitudinal design

NOTE Confidence: 0.93335224375

 $00:33:41.290 \rightarrow 00:33:43.410$  that lets us look not longitudinal,

NOTE Confidence: 0.93335224375

 $00{:}33{:}43{.}410 \dashrightarrow 00{:}33{:}45{.}408$  like lifespan, but that'd be great.

NOTE Confidence: 0.93335224375

 $00{:}33{:}45{.}410 \dashrightarrow 00{:}33{:}47{.}336$  But logitudinal like let's us understand

NOTE Confidence: 0.93335224375

 $00:33:47.336 \rightarrow 00:33:49.467$  even the stability of some of these

NOTE Confidence: 0.93335224375

00:33:49.467 --> 00:33:51.051 markers over what would be the

- NOTE Confidence: 0.93335224375
- $00:33:51.051 \rightarrow 00:33:52.819$  length of a typical clinical trial.
- NOTE Confidence: 0.93335224375
- 00:33:52.820 --> 00:33:53.802 You know,
- NOTE Confidence: 0.93335224375
- $00:33:53.802 \longrightarrow 00:33:56.257$  six weeks to six months.
- NOTE Confidence: 0.93335224375
- $00:33:56.260 \rightarrow 00:33:59.324$  We would want to be methodologically tight
- NOTE Confidence: 0.93335224375
- $00{:}33{:}59{.}324 \dashrightarrow 00{:}34{:}02{.}489$  so that we don't have noise in our data,
- NOTE Confidence: 0.93335224375
- $00:34:02.490 \rightarrow 00:34:02.805$  right?
- NOTE Confidence: 0.93335224375
- 00:34:02.805 --> 00:34:04.065 Making sure we're being
- NOTE Confidence: 0.93335224375
- 00:34:04.065 --> 00:34:05.325 rigorous about the systems,
- NOTE Confidence: 0.93335224375
- $00{:}34{:}05{.}330 \dashrightarrow 00{:}34{:}07{.}170$  the EG systems we use the the way
- NOTE Confidence: 0.93335224375
- $00:34:07.170 \longrightarrow 00:34:08.983$  we think about stimulating and then
- NOTE Confidence: 0.93335224375
- $00{:}34{:}08{.}983 \dashrightarrow 00{:}34{:}10{.}921$  we want to use practical assays.
- NOTE Confidence: 0.93335224375
- $00{:}34{:}10{.}930 \dashrightarrow 00{:}34{:}13{.}702$  And these are all the different
- NOTE Confidence: 0.93335224375
- $00:34:13.702 \longrightarrow 00:34:16.074$  kinds of principles that were in
- NOTE Confidence: 0.93335224375
- $00:34:16.074 \longrightarrow 00:34:18.830$  the mix when they put out an RFA.
- NOTE Confidence: 0.93335224375
- 00:34:18.830 --> 00:34:19.141 Now,
- NOTE Confidence: 0.93335224375

 $00:34:19.141 \longrightarrow 00:34:21.629$  six years ago for to start a consortium

NOTE Confidence: 0.93335224375

 $00{:}34{:}21.629 \dashrightarrow 00{:}34{:}23.844$  to try to take biomarkers and get

NOTE Confidence: 0.93335224375

 $00:34:23.844 \rightarrow 00:34:26.260$  them to a place where they could.

NOTE Confidence: 0.93335224375

 $00:34:26.260 \rightarrow 00:34:28.270$  Actually be useful in clinical

NOTE Confidence: 0.93335224375

 $00:34:28.270 \longrightarrow 00:34:29.476$  trials and autism,

NOTE Confidence: 0.93335224375

 $00{:}34{:}29{.}480 \dashrightarrow 00{:}34{:}30{.}530$  and we've we've been doing

NOTE Confidence: 0.93335224375

 $00:34:30.530 \longrightarrow 00:34:31.890$  that for the past six years.

NOTE Confidence: 0.93335224375

 $00{:}34{:}31{.}890 \dashrightarrow 00{:}34{:}34{.}182$  It's called the Autism Biomarkers Consortium

NOTE Confidence: 0.93335224375

 $00{:}34{:}34{.}182 \dashrightarrow 00{:}34{:}36{.}152$  for clinical trials, and it there.

NOTE Confidence: 0.93335224375

 $00:34:36.152 \longrightarrow 00:34:37.796$  There are a number of unique

NOTE Confidence: 0.93335224375

 $00{:}34{:}37{.}796 \dashrightarrow 00{:}34{:}38{.}610$  features about it.

NOTE Confidence: 0.93335224375

 $00:34:38.610 \longrightarrow 00:34:40.460$  It's a multi site study.

NOTE Confidence: 0.93335224375

 $00:34:40.460 \longrightarrow 00:34:41.580$  It's a naturalistic study,

NOTE Confidence: 0.93335224375

 $00{:}34{:}41{.}580 \dashrightarrow 00{:}34{:}43{.}600$  meaning that it's not a clinical trial.

NOTE Confidence: 0.93335224375

00:34:43.600 - 00:34:45.013 There's no intervention,

NOTE Confidence: 0.93335224375

 $00:34:45.013 \rightarrow 00:34:46.426$  administer we passively.

- NOTE Confidence: 0.93335224375
- $00:34:46.430 \longrightarrow 00:34:47.369$  We measure intervention
- NOTE Confidence: 0.93335224375
- $00:34:47.369 \rightarrow 00:34:48.308$  the children received,
- NOTE Confidence: 0.93335224375
- $00:34:48.310 \longrightarrow 00:34:49.526$  but we really passively
- NOTE Confidence: 0.93335224375
- $00:34:49.526 \rightarrow 00:34:50.438$  observing these biomarkers.
- NOTE Confidence: 0.93335224375
- $00{:}34{:}50{.}440 \dashrightarrow 00{:}34{:}51{.}916$  Overtime it's it's structured
- NOTE Confidence: 0.93335224375
- $00{:}34{:}51{.}916 \dashrightarrow 00{:}34{:}53{.}392$  such that the administrative
- NOTE Confidence: 0.93335224375
- $00:34:53.392 \longrightarrow 00:34:55.247$  core is right here at Yale.
- NOTE Confidence: 0.93335224375
- $00{:}34{:}55{.}250 \dashrightarrow 00{:}34{:}57{.}054$  We have five sites.
- NOTE Confidence: 0.93335224375
- 00:34:57.054 --> 00:34:59.309 Duke UCLA University of Washington,
- NOTE Confidence: 0.93335224375
- $00:34:59.310 \dashrightarrow 00:35:02.070$ Boston Children's Hospital and hear
- NOTE Confidence: 0.93335224375
- $00:35:02.070 \rightarrow 00:35:04.290$  a data coordinating kick core that's
- NOTE Confidence: 0.93335224375
- $00{:}35{:}04.290 \dashrightarrow 00{:}35{:}06.988$  built here at and YCINY cast and
- NOTE Confidence: 0.93335224375
- $00:35:06.988 \rightarrow 00:35:09.018$  then a distributed data acquisition
- NOTE Confidence: 0.93335224375
- $00:35:09.018 \dashrightarrow 00:35:11.428$  analysis Corner that has components here.
- NOTE Confidence: 0.93335224375
- $00{:}35{:}11{.}430 \dashrightarrow 00{:}35{:}13{.}254$  But other places really taking the
- NOTE Confidence: 0.93335224375

 $00:35:13.254 \rightarrow 00:35:15.299$  people who are the best analysts

NOTE Confidence: 0.93335224375

 $00{:}35{:}15{.}299 \dashrightarrow 00{:}35{:}17{.}603$  and technologists for some of these

NOTE Confidence: 0.93335224375

 $00:35:17.603 \rightarrow 00:35:19.468$  biomarker methods like eye tracking,

NOTE Confidence: 0.93335224375

 $00:35:19.470 \longrightarrow 00:35:19.863$  e.g.,

NOTE Confidence: 0.93335224375

 $00:35:19.863 \dashrightarrow 00:35:23.007$  and pulling them in from wherever they are.

NOTE Confidence: 0.93335224375

00:35:23.010 --> 00:35:25.692 It was a big study in our in our

NOTE Confidence: 0.93335224375

 $00:35:25.692 \rightarrow 00:35:27.878$  first phase we saw 280 children.

NOTE Confidence: 0.93335224375

00:35:27.878 --> 00:35:28.746 With autism,

NOTE Confidence: 0.93335224375

 $00:35:28.746 \dashrightarrow 00:35:30.916$  119 children with typical development,

NOTE Confidence: 0.93335224375

 $00:35:30.920 \longrightarrow 00:35:33.776$  which is big for a for for

NOTE Confidence: 0.93335224375

 $00{:}35{:}33{.}776$  -->  $00{:}35{:}35{.}680$  neuroscience study in autism.

NOTE Confidence: 0.93335224375

00:35:35.680 --> 00:35:38.137 The age range was school age 6

NOTE Confidence: 0.93335224375

 $00{:}35{:}38{.}137 \dashrightarrow 00{:}35{:}41{.}114$  to 11 and IQ range of 60 to 150

NOTE Confidence: 0.93335224375

 $00{:}35{:}41{.}114 \dashrightarrow 00{:}35{:}43{.}178$  to include people who would fall

NOTE Confidence: 0.93335224375

 $00{:}35{:}43.178 \dashrightarrow 00{:}35{:}45.624$  in the range of an intellectual

NOTE Confidence: 0.93335224375

 $00:35:45.624 \rightarrow 00:35:48.294$  disability but also kind of balancing.

NOTE Confidence: 0.935156267272727

00:35:48.300 --> 00:35:48.912 Balancing throughput.

NOTE Confidence: 0.935156267272727

 $00{:}35{:}48{.}912 \dashrightarrow 00{:}35{:}51{.}640$  You know one of the trade offs is the.

NOTE Confidence: 0.935156267272727

00:35:51.640 --> 00:35:54.760 The more the the the more lower

NOTE Confidence: 0.935156267272727

 $00{:}35{:}54{.}760 \dashrightarrow 00{:}35{:}57{.}729$  IQ kids you include in a study,

NOTE Confidence: 0.935156267272727

 $00:35:57.730 \dashrightarrow 00:36:00.710$  the more data you will lose and so this is

NOTE Confidence: 0.935156267272727

 $00{:}36{:}00{.}789 \dashrightarrow 00{:}36{:}03{.}917$  the way we balance in this particular study.

NOTE Confidence: 0.935156267272727

 $00:36:03.920 \longrightarrow 00:36:05.688$  I'll tell you about a study that we're

NOTE Confidence: 0.935156267272727

 $00:36:05.688 \rightarrow 00:36:07.308$  that we're doing to try to fix that.

NOTE Confidence: 0.935156267272727

 $00{:}36{:}07{.}310 \dashrightarrow 00{:}36{:}08{.}942$  We use practical assays like EEG

NOTE Confidence: 0.935156267272727

 $00:36:08.942 \longrightarrow 00:36:10.808$  and I tracking a lot of tools.

NOTE Confidence: 0.935156267272727

 $00{:}36{:}10.810 \dashrightarrow 00{:}36{:}12.538$  I'm with the baseline in six weeks to let

NOTE Confidence: 0.935156267272727

 $00{:}36{:}12.538 \dashrightarrow 00{:}36{:}14.357$  us look at stability in the short term,

NOTE Confidence: 0.935156267272727

 $00{:}36{:}14{.}360 \dashrightarrow 00{:}36{:}15{.}932$  and then 24 weeks,

NOTE Confidence: 0.935156267272727

 $00{:}36{:}15{.}932 \dashrightarrow 00{:}36{:}18{.}290$  so six months to let us.

NOTE Confidence: 0.935156267272727

 $00{:}36{:}18.290 \dashrightarrow 00{:}36{:}20.030$  Potentially picked up unchanged with

NOTE Confidence: 0.935156267272727

 $00:36:20.030 \rightarrow 00:36:21.770$  development or change in response

NOTE Confidence: 0.935156267272727

 $00{:}36{:}21.821 \dashrightarrow 00{:}36{:}23.336$  to the interventions that these

NOTE Confidence: 0.935156267272727

 $00{:}36{:}23{.}336 \dashrightarrow 00{:}36{:}25{.}152$  children were receiving and a blood

NOTE Confidence: 0.935156267272727

 $00:36:25.152 \rightarrow 00:36:26.888$  draw so that we have the opportunity

NOTE Confidence: 0.935156267272727

 $00{:}36{:}26.888 \dashrightarrow 00{:}36{:}29.172$  to look at genetic information

NOTE Confidence: 0.935156267272727

 $00{:}36{:}29{.}172 \dashrightarrow 00{:}36{:}31{.}548$  alongside these biomarker data.

NOTE Confidence: 0.935156267272727

00:36:31.550 - 00:36:33.014 The other aspects of this study

NOTE Confidence: 0.935156267272727

 $00:36:33.014 \longrightarrow 00:36:34.390$  that we're kind of unique.

NOTE Confidence: 0.935156267272727

 $00{:}36{:}34{.}390 \dashrightarrow 00{:}36{:}35{.}950$  It's a it's funded by a

NOTE Confidence: 0.935156267272727

00:36:35.950 --> 00:36:37.280 mechanism called EU 19 was,

NOTE Confidence: 0.935156267272727

 $00{:}36{:}37{.}280 \dashrightarrow 00{:}36{:}39{.}030$  which is a cooperative agreement.

NOTE Confidence: 0.935156267272727

 $00:36:39.030 \longrightarrow 00:36:41.190$  So this study meets with

NOTE Confidence: 0.935156267272727

 $00:36:41.190 \longrightarrow 00:36:42.486$  the steering committee.

NOTE Confidence: 0.935156267272727

 $00:36:42.490 \longrightarrow 00:36:44.156$  Will I'll be on the phone with

NOTE Confidence: 0.935156267272727

 $00:36:44.156 \longrightarrow 00:36:46.094$  a whole bunch of people at 3:00

NOTE Confidence: 0.935156267272727

 $00:36:46.094 \rightarrow 00:36:47.846$  o'clock today and the the governance
00:36:47.903 - > 00:36:49.713 brings together people in these

NOTE Confidence: 0.935156267272727

 $00:36:49.713 \longrightarrow 00:36:51.523$  academic sites that I've described,

NOTE Confidence: 0.935156267272727

 $00:36:51.530 \dashrightarrow 00:36:53.396$  but also people who are scientists

NOTE Confidence: 0.935156267272727

 $00{:}36{:}53{.}396 \dashrightarrow 00{:}36{:}55{.}950$  at NIH and also people who are

NOTE Confidence: 0.935156267272727

 $00{:}36{:}55{.}950 \dashrightarrow 00{:}36{:}58{.}030$  scientists and industry and also

NOTE Confidence: 0.935156267272727

 $00:36:58.030 \rightarrow 00:36:59.738$  regulatory agencies like the FDA.

NOTE Confidence: 0.935156267272727

 $00:36:59.740 \dashrightarrow 00:37:01.644$  So lots and lots of diverse expertise.

NOTE Confidence: 0.935156267272727

 $00{:}37{:}01.650 \dashrightarrow 00{:}37{:}03.442$  Relevant to these to this to the

NOTE Confidence: 0.935156267272727

 $00{:}37{:}03{.}442 \dashrightarrow 00{:}37{:}04{.}838$  science and the regulatory process

NOTE Confidence: 0.935156267272727

00:37:04.838 --> 00:37:07.102 is brought to bear on the work and

NOTE Confidence: 0.935156267272727

00:37:07.161 - > 00:37:08.979 really another thing that we need.

NOTE Confidence: 0.935156267272727

00:37:08.980 --> 00:37:11.444 But the study is truly I don't

NOTE Confidence: 0.935156267272727

 $00:37:11.444 \longrightarrow 00:37:13.140$  use this word glibly,

NOTE Confidence: 0.935156267272727

00:37:13.140 --> 00:37:14.540 unprecedented level of rigor in

NOTE Confidence: 0.935156267272727

 $00{:}37{:}14.540 \dashrightarrow 00{:}37{:}16.539$  terms of we ran this study like

 $00{:}37{:}16{.}539 \dashrightarrow 00{:}37{:}17{.}884$  it was a clinical trial.

NOTE Confidence: 0.935156267272727

00:37:17.890 --> 00:37:18.540 You know,

NOTE Confidence: 0.935156267272727

 $00{:}37{:}18{.}540 \dashrightarrow 00{:}37{:}20{.}490$  like with site monitors coming in

NOTE Confidence: 0.935156267272727

 $00:37:20.490 \rightarrow 00:37:22.504$  and double checking which boxes are

NOTE Confidence: 0.935156267272727

 $00{:}37{:}22.504 \dashrightarrow 00{:}37{:}25.000$  checked in the checked on the folders.

NOTE Confidence: 0.935156267272727

00:37:25.000 --> 00:37:25.590 Methodologically,

NOTE Confidence: 0.935156267272727

00:37:25.590 - 00:37:28.323 every site you know, people,

NOTE Confidence: 0.935156267272727

 $00:37:28.323 \dashrightarrow 00:37:30.188$  people swapped out their monitors,

NOTE Confidence: 0.935156267272727

 $00{:}37{:}30{.}190 \dashrightarrow 00{:}37{:}32{.}233$  Even so that we would have the exact same.

NOTE Confidence: 0.935156267272727

 $00{:}37{:}32{.}240 \dashrightarrow 00{:}37{:}34{.}424$  Computers displaying the stimuli to the kids,

NOTE Confidence: 0.935156267272727

 $00{:}37{:}34{.}430 \dashrightarrow 00{:}37{:}36{.}215$  making sure that the temperatures in the

NOTE Confidence: 0.935156267272727

 $00:37:36.215 \rightarrow 00:37:38.220$  lights in the rooms are all equivalent.

NOTE Confidence: 0.935156267272727

 $00:37:38.220 \rightarrow 00:37:40.268$  So really being trying to limit as many

NOTE Confidence: 0.935156267272727

 $00:37:40.268 \dashrightarrow 00:37:42.270$  sources of potential noise as we could,

NOTE Confidence: 0.935156267272727

 $00{:}37{:}42.270 \dashrightarrow 00{:}37{:}44.050$  and then statistically you know,

NOTE Confidence: 0.935156267272727

 $00:37:44.050 \longrightarrow 00:37:44.960$  for those of you involved.

- NOTE Confidence: 0.935156267272727
- $00{:}37{:}44.960 \dashrightarrow 00{:}37{:}47.697$  In EG research you can output may
- NOTE Confidence: 0.935156267272727
- $00{:}37{:}47.697 \dashrightarrow 00{:}37{:}50.424$  be an infinite number of dependent
- NOTE Confidence: 0.935156267272727
- $00{:}37{:}50{.}424 \dashrightarrow 00{:}37{:}52{.}869$  variables from an experiment and
- NOTE Confidence: 0.935156267272727
- $00:37:52.869 \rightarrow 00:37:55.888$  what we did so that we would be,
- NOTE Confidence: 0.935156267272727
- $00{:}37{:}55{.}890 \dashrightarrow 00{:}37{:}57{.}552$  you know, above board and clear with
- NOTE Confidence: 0.935156267272727
- $00{:}37{:}57{.}552 \dashrightarrow 00{:}37{:}59{.}440$  the FDA about what we thought is,
- NOTE Confidence: 0.935156267272727
- 00:37:59.440 --> 00:38:01.498 you know, we picked one, e.g.,
- NOTE Confidence: 0.935156267272727
- $00{:}38{:}01{.}498 \dashrightarrow 00{:}38{:}01{.}996$  biomarkers.
- NOTE Confidence: 0.935156267272727
- $00{:}38{:}01{.}996 \dashrightarrow 00{:}38{:}04{.}486$  Primary one eye tracking biomarkers
- NOTE Confidence: 0.935156267272727
- 00:38:04.486 --> 00:38:06.484 primary picked one dependent
- NOTE Confidence: 0.935156267272727
- $00:38:06.484 \longrightarrow 00:38:08.619$  variable for each of those,
- NOTE Confidence: 0.935156267272727
- $00:38:08.620 \dashrightarrow 00:38:10.870$  and then made a directional hypothesis.
- NOTE Confidence: 0.935156267272727
- 00:38:10.870 --> 00:38:13.208 So lots and lots of data coming
- NOTE Confidence: 0.935156267272727
- $00{:}38{:}13.208 \dashrightarrow 00{:}38{:}14.809$  down essentially to at Test.
- NOTE Confidence: 0.935156267272727
- $00:38:14.810 \rightarrow 00:38:15.720$  To say whether it works,
- NOTE Confidence: 0.935156267272727

 $00{:}38{:}15{.}720 \dashrightarrow 00{:}38{:}17{.}030$  but at least it's unambiguous

NOTE Confidence: 0.935156267272727

 $00{:}38{:}17.030 \dashrightarrow 00{:}38{:}18.340$  they were not P hat.

NOTE Confidence: 0.935156267272727

 $00:38:18.340 \rightarrow 00:38:21.252$  And then lastly we harmonized our work with

NOTE Confidence: 0.935156267272727

 $00:38:21.252 \rightarrow 00:38:24.068$  a European consortium doing similar work.

NOTE Confidence: 0.935156267272727

00:38:24.070 --> 00:38:26.380 The European aims to trials at the

NOTE Confidence: 0.935156267272727

 $00{:}38{:}26{.}380 \dashrightarrow 00{:}38{:}28{.}729$  time was called EU aims so that

NOTE Confidence: 0.935156267272727

 $00:38:28.729 \dashrightarrow 00:38:30.667$  we now have two samples collected

NOTE Confidence: 0.883348044583333

 $00:38:30.738 \longrightarrow 00:38:32.518$  within some different ways,

NOTE Confidence: 0.883348044583333

 $00:38:32.520 \longrightarrow 00:38:34.806$  but using some of the exact

NOTE Confidence: 0.883348044583333

00:38:34.806 - 00:38:35.949 same biomarker assays,

NOTE Confidence: 0.883348044583333

 $00:38:35.950 \rightarrow 00:38:38.014$  which is really powerful in terms

NOTE Confidence: 0.883348044583333

00:38:38.014 --> 00:38:39.390 of understanding replik ability.

NOTE Confidence: 0.883348044583333

 $00:38:39.390 \longrightarrow 00:38:40.600$  I won't go through all

NOTE Confidence: 0.883348044583333

00:38:40.600 - 00:38:41.810 the things on this slide,

NOTE Confidence: 0.883348044583333

 $00:38:41.810 \dashrightarrow 00:38:44.820$  this is just to make the point that we did.

NOTE Confidence: 0.883348044583333

 $00:38:44.820 \rightarrow 00:38:48.340$  The status quo in our field is parent

- NOTE Confidence: 0.883348044583333
- $00:38:48.340 \rightarrow 00:38:50.430$  report measures and clinician rating
- NOTE Confidence: 0.883348044583333
- $00:38:50.430 \longrightarrow 00:38:53.494$  scales and we did the gauntlet of
- NOTE Confidence: 0.883348044583333
- $00:38:53.494 \rightarrow 00:38:56.194$  ones that are considered useful today.
- NOTE Confidence: 0.883348044583333
- $00:38:56.200 \rightarrow 00:38:57.694$  The eye tracking and EG measures
- NOTE Confidence: 0.883348044583333
- $00:38:57.694 \rightarrow 00:38:59.240$  that we use there were four,
- NOTE Confidence: 0.883348044583333
- $00:38:59.240 \longrightarrow 00:39:02.310$  e.g., measures.
- NOTE Confidence: 0.883348044583333
- 00:39:02.310 > 00:39:05.680 Five eye tracking measures we.
- NOTE Confidence: 0.883348044583333
- $00:39:05.680 \longrightarrow 00:39:07.288$  I won't go into all of them on.
- NOTE Confidence: 0.883348044583333
- $00:39:07.290 \dashrightarrow 00:39:09.330$  I'll continue the narrative that I've
- NOTE Confidence: 0.883348044583333
- $00:39:09.330 \longrightarrow 00:39:11.729$  started so far and clarify that the
- NOTE Confidence: 0.883348044583333
- $00:39:11.730 \rightarrow 00:39:14.690$  ERP's defaces is is one of those markers,
- NOTE Confidence: 0.883348044583333
- $00:39:14.690 \rightarrow 00:39:17.610$  and I'll show you what we learned about.
- NOTE Confidence: 0.883348044583333
- $00{:}39{:}17.610 \dashrightarrow 00{:}39{:}19.476$  In terms of that that marker.
- NOTE Confidence: 0.953269755384615
- $00:39:22.800 \longrightarrow 00:39:24.948$  So. Some of the things that
- NOTE Confidence: 0.953269755384615
- $00:39:24.948 \rightarrow 00:39:27.660$  that we we saw in this study.
- NOTE Confidence: 0.953269755384615

 $00:39:27.660 \rightarrow 00:39:30.620$  One is that we can get data reliably

NOTE Confidence: 0.953269755384615

 $00:39:30.620 \rightarrow 00:39:33.458$  from this population so you can see

NOTE Confidence: 0.953269755384615

00:39:33.458 --> 00:39:36.632 here we got valid signal from 97% of

NOTE Confidence: 0.953269755384615

 $00:39:36.632 \rightarrow 00:39:39.264$  the typical 11 kids to almost everybody

NOTE Confidence: 0.953269755384615

 $00{:}39{:}39{.}264 \dashrightarrow 00{:}39{:}41{.}500$  in 76% of the kids with autism.

NOTE Confidence: 0.953269755384615

 $00:39:41.500 \rightarrow 00:39:44.790$  So not everybody but 3/4.

NOTE Confidence: 0.953269755384615

 $00:39:44.790 \longrightarrow 00:39:46.824$  We saw our hypothesis that the

NOTE Confidence: 0.953269755384615

 $00:39:46.824 \rightarrow 00:39:49.432$  end 170 would be slower in people

NOTE Confidence: 0.953269755384615

 $00:39:49.432 \longrightarrow 00:39:51.000$  with autism was true.

NOTE Confidence: 0.953269755384615

00:39:51.000 - 00:39:52.692 So you can see this difference

NOTE Confidence: 0.953269755384615

 $00{:}39{:}52.692 \dashrightarrow 00{:}39{:}55.086$  around 210 to 100.

NOTE Confidence: 0.953269755384615

 $00:39:55.086 \rightarrow 00:39:58.470$  96 milliseconds in case people are wondering.

NOTE Confidence: 0.953269755384615

 $00:39:58.470 \longrightarrow 00:40:00.556$  Then once it's called the N 170,

NOTE Confidence: 0.953269755384615

 $00:40:00.560 \longrightarrow 00:40:02.296$  it's not a rule that it happens

NOTE Confidence: 0.953269755384615

00:40:02.296 --> 00:40:04.060 at anyone at 170 milliseconds,

NOTE Confidence: 0.953269755384615

 $00:40:04.060 \rightarrow 00:40:05.605$  and actually it doesn't really

- NOTE Confidence: 0.953269755384615
- 00:40:05.605 00:40:07.523 get to be 170 milliseconds until
- NOTE Confidence: 0.953269755384615
- $00:40:07.523 \longrightarrow 00:40:09.153$  people are around 14 years old.
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}09{.}153 \dashrightarrow 00{:}40{:}10{.}539$  Starts out much slower and then
- NOTE Confidence: 0.953269755384615
- $00:40:10.539 \rightarrow 00:40:11.708$  speeds up over development,
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}11.710 \dashrightarrow 00{:}40{:}14.896$  so these numbers aren't aren't unusual.
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}14{.}900 \dashrightarrow 00{:}40{:}16{.}185$  You know, these are reasonable
- NOTE Confidence: 0.953269755384615
- $00:40:16.185 \longrightarrow 00:40:17.470$  numbers for kids this age.
- NOTE Confidence: 0.953269755384615
- $00:40:17.470 \longrightarrow 00:40:20.445$  We got a sense of stability overtime,
- NOTE Confidence: 0.953269755384615
- $00:40:20.450 \longrightarrow 00:40:22.232$  which is OK.
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}22.232 \dashrightarrow 00{:}40{:}24.608$  Our statisticians cloud classified.
- NOTE Confidence: 0.953269755384615
- $00:40:24.610 \longrightarrow 00:40:25.495$  This is adequate,
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}25{.}495 \dashrightarrow 00{:}40{:}27{.}265$  so we measure this with an
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}27.265 \dashrightarrow 00{:}40{:}28.910$  interclass correlation coefficient.
- NOTE Confidence: 0.953269755384615
- $00{:}40{:}28{.}910 \dashrightarrow 00{:}40{:}29{.}914$  Six weeks,
- NOTE Confidence: 0.953269755384615
- $00:40:29.914 \rightarrow 00:40:32.749$  it's basically how well a person's
- NOTE Confidence: 0.953269755384615

 $00{:}40{:}32.749 \dashrightarrow 00{:}40{:}34.344$  values correlate with their own

NOTE Confidence: 0.953269755384615

 $00:40:34.344 \rightarrow 00:40:36.390$  values at a subsequent point in time,

NOTE Confidence: 0.953269755384615

 $00{:}40{:}36{.}390 \dashrightarrow 00{:}40{:}37{.}476$  and so for.

NOTE Confidence: 0.953269755384615

00:40:37.476 --> 00:40:39.440 Typically developing kids about .75

NOTE Confidence: 0.953269755384615

 $00:40:39.440 \longrightarrow 00:40:42.500$  for autism .66 and pretty similar

NOTE Confidence: 0.953269755384615

 $00:40:42.500 \longrightarrow 00:40:45.630$  over a longer period of time.

NOTE Confidence: 0.953269755384615

 $00:40:45.630 \longrightarrow 00:40:47.090$ .75 for the typically developing

NOTE Confidence: 0.953269755384615

 $00{:}40{:}47{.}090 \dashrightarrow 00{:}40{:}49{.}570$  kids and then .56 for the kids

NOTE Confidence: 0.953269755384615

 $00{:}40{:}49{.}570 \dashrightarrow 00{:}40{:}51{.}570$  with autism we saw relationship

NOTE Confidence: 0.953269755384615

 $00{:}40{:}51{.}570 \dashrightarrow 00{:}40{:}54{.}168$  with phenotype in a specific way.

NOTE Confidence: 0.953269755384615

 $00{:}40{:}54{.}170 \dashrightarrow 00{:}40{:}56{.}081$  The kinds of things that we've seen

NOTE Confidence: 0.953269755384615

 $00:40:56.081 \longrightarrow 00:40:58.035$  in prior studies that this was

NOTE Confidence: 0.953269755384615

 $00:40:58.035 \rightarrow 00:40:59.840$  associated specifically with face memory.

NOTE Confidence: 0.953269755384615

 $00:40:59.840 \longrightarrow 00:41:02.275$  And we also have predictive

NOTE Confidence: 0.953269755384615

 $00{:}41{:}02.275 \dashrightarrow 00{:}41{:}05.202$  relationships such that ones and 170

NOTE Confidence: 0.953269755384615

 $00:41:05.202 \rightarrow 00:41:08.288$  at a baseline told us something about

- NOTE Confidence: 0.953269755384615
- $00:41:08.288 \longrightarrow 00:41:11.412$  their their face memory 24 weeks
- NOTE Confidence: 0.953269755384615
- $00:41:11.412 \longrightarrow 00:41:12.900$  down the line, and so you can see,
- NOTE Confidence: 0.953269755384615
- $00:41:12.900 \rightarrow 00:41:13.810$  you know this is what it is.
- NOTE Confidence: 0.953269755384615
- $00:41:13.810 \longrightarrow 00:41:15.050$  Just another example of what
- NOTE Confidence: 0.953269755384615
- $00{:}41{:}15{.}050 \dashrightarrow 00{:}41{:}16{.}290$  an end 170 looks like.
- NOTE Confidence: 0.953269755384615
- 00:41:16.290 --> 00:41:17.920 You can see the people
- NOTE Confidence: 0.953269755384615
- $00{:}41{:}17{.}920 \dashrightarrow 00{:}41{:}19{.}224$  with autism are slower.
- NOTE Confidence: 0.953269755384615
- $00:41:19.230 \longrightarrow 00:41:20.542$  This is the distribution,
- NOTE Confidence: 0.953269755384615
- $00:41:20.542 \longrightarrow 00:41:22.991$  the the we we present our
- NOTE Confidence: 0.953269755384615
- 00:41:22.991 --> 00:41:24.639 data and stacked histograms,
- NOTE Confidence: 0.953269755384615
- $00:41:24.640 \rightarrow 00:41:26.551$  and so we're seeing the the people
- NOTE Confidence: 0.953269755384615
- $00{:}41{:}26{.}551 \dashrightarrow 00{:}41{:}28{.}799$  here eat the length of each bar is
- NOTE Confidence: 0.953269755384615
- $00{:}41{:}28.799 \dashrightarrow 00{:}41{:}30.810$  the number of people with the value.
- NOTE Confidence: 0.953269755384615
- 00:41:30.810 --> 00:41:33.204 The lower it is on the Y axis is,
- NOTE Confidence: 0.953269755384615
- $00:41:33.210 \rightarrow 00:41:36.830$  the faster than 170 and So what you see is,
- NOTE Confidence: 0.953269755384615

 $00:41:36.830 \longrightarrow 00:41:38.874$  the mean isn't marked on this chart.

NOTE Confidence: 0.953269755384615

 $00:41:38.880 \longrightarrow 00:41:40.250$  But then there's this tail.

NOTE Confidence: 0.953269755384615

 $00:41:40.250 \longrightarrow 00:41:41.890$  The distribution where people

NOTE Confidence: 0.953269755384615

 $00:41:41.890 \rightarrow 00:41:43.940$  are slower that is predominantly

NOTE Confidence: 0.953269755384615

 $00{:}41{:}43{.}940 \dashrightarrow 00{:}41{:}45{.}659$  populated by people with autism,

NOTE Confidence: 0.953269755384615

00:41:45.660 --> 00:41:47.505 and this is a great example of the kinds

NOTE Confidence: 0.953269755384615

 $00{:}41{:}47{.}505 \dashrightarrow 00{:}41{:}49{.}438$  of things that I I was saying earlier.

NOTE Confidence: 0.953269755384615

 $00{:}41{:}49{.}440 \dashrightarrow 00{:}41{:}52{.}023$  This would not be a useful biomarker

NOTE Confidence: 0.953269755384615

 $00:41:52.023 \rightarrow 00:41:54.117$  of the diagnostic condition, right?

NOTE Confidence: 0.953269755384615

 $00:41:54.117 \rightarrow 00:41:56.410$  'cause if you look when a person has an end,

NOTE Confidence: 0.953269755384615

 $00:41:56.410 \longrightarrow 00:41:58.200$  170 of you know whatever.

NOTE Confidence: 0.953269755384615

 $00:41:58.200 \longrightarrow 00:42:01.000$  This is 225, you know they could be.

NOTE Confidence: 0.953269755384615

00:42:01.000 -> 00:42:02.216 They're slower than average,

NOTE Confidence: 0.953269755384615

 $00:42:02.216 \longrightarrow 00:42:03.736$  but they could be typically

NOTE Confidence: 0.953269755384615

 $00:42:03.736 \longrightarrow 00:42:04.449$  developing as well,

NOTE Confidence: 0.953269755384615

 $00{:}42{:}04{.}450 \dashrightarrow 00{:}42{:}06{.}410$  so but I'll tell you in a

- NOTE Confidence: 0.953269755384615
- $00:42:06.410 \longrightarrow 00:42:08.613$  moment the way we do think it
- NOTE Confidence: 0.953269755384615
- $00:42:08.613 \longrightarrow 00:42:10.545$  could be useful as a biomarker.
- NOTE Confidence: 0.953269755384615
- 00:42:10.550 --> 00:42:11.846 And we're doing OK for time,
- NOTE Confidence: 0.953269755384615
- $00:42:11.850 \longrightarrow 00:42:14.526$  so I'll mention one of the
- NOTE Confidence: 0.953269755384615
- $00:42:14.526 \longrightarrow 00:42:17.150$  things that's that is that is.
- NOTE Confidence: 0.937707968
- $00:42:17.150 \longrightarrow 00:42:20.240$  This design is naturalistic study.
- NOTE Confidence: 0.937707968
- $00:42:20.240 \longrightarrow 00:42:23.198$  Of grade school kids. There's not.
- NOTE Confidence: 0.937707968
- $00:42:23.200 \longrightarrow 00:42:26.056$  We found there was not a ton of
- NOTE Confidence: 0.937707968
- $00:42:26.056 \rightarrow 00:42:27.919$  clinical change in these kids,
- NOTE Confidence: 0.937707968
- $00:42:27.920 \longrightarrow 00:42:30.080$  which is is not totally unexpected.
- NOTE Confidence: 0.937707968
- $00{:}42{:}30{.}080 \dashrightarrow 00{:}42{:}31{.}820$  And kids who are getting treatment
- NOTE Confidence: 0.937707968
- $00{:}42{:}31{.}820 \dashrightarrow 00{:}42{:}33{.}540$  as usual and have been now.
- NOTE Confidence: 0.937707968
- 00:42:33.540 --> 00:42:34.494 Hopefully you know,
- NOTE Confidence: 0.937707968
- $00{:}42{:}34{.}494 \dashrightarrow 00{:}42{:}36{.}720$  since they were three years old and
- NOTE Confidence: 0.937707968
- $00{:}42{:}36{.}778 \dashrightarrow 00{:}42{:}39{.}118$  so our data set does not give us an
- NOTE Confidence: 0.937707968

 $00:42:39.118 \longrightarrow 00:42:40.997$  excellent opportunity to understand

NOTE Confidence: 0.937707968

 $00{:}42{:}40{.}997 \dashrightarrow 00{:}42{:}42{.}557$  relationships between biomarkers

NOTE Confidence: 0.937707968

 $00:42:42.557 \rightarrow 00:42:44.637$  and predicting change overtime.

NOTE Confidence: 0.937707968

00:42:44.640 --> 00:42:46.620 Or quantifying how biomarkers

NOTE Confidence: 0.937707968

 $00:42:46.620 \rightarrow 00:42:49.095$  parallel changes in clinical status.

NOTE Confidence: 0.937707968

 $00:42:49.100 \longrightarrow 00:42:50.264$  So what they did.

NOTE Confidence: 0.937707968

 $00:42:50.264 \longrightarrow 00:42:53.181$  Give us though is is a level of

NOTE Confidence: 0.937707968

 $00:42:53.181 \rightarrow 00:42:55.926$  assuredness that these findings are

NOTE Confidence: 0.937707968

 $00{:}42{:}55{.}926$  -->  $00{:}42{:}58{.}660$  biologically meaningful and again.

NOTE Confidence: 0.937707968

 $00:42:58.660 \rightarrow 00:43:00.208$  As a person who's been studying

NOTE Confidence: 0.937707968

 $00{:}43{:}00{.}208 \dashrightarrow 00{:}43{:}01{.}810$  neuroscience and autism for a long time,

NOTE Confidence: 0.937707968

00:43:01.810 --> 00:43:04.768 who's been studying the N 170 since 2004,

NOTE Confidence: 0.937707968

00:43:04.768 --> 00:43:05.187 right?

NOTE Confidence: 0.937707968

 $00{:}43{:}05{.}187 \dashrightarrow 00{:}43{:}09{.}051$  This was the first time I felt like we've

NOTE Confidence: 0.937707968

 $00:43:09.051 \rightarrow 00:43:13.010$  got something like this is not a small study.

NOTE Confidence: 0.937707968

 $00:43:13.010 \rightarrow 00:43:15.606$  This is not a fluke with, you know,

- NOTE Confidence: 0.937707968
- $00:43:15.606 \rightarrow 00:43:18.322$  we said this was going to happen.
- NOTE Confidence: 0.937707968
- $00{:}43{:}18{.}330 \dashrightarrow 00{:}43{:}20{.}297$  There's a lot of people watching us.
- NOTE Confidence: 0.937707968
- 00:43:20.300 --> 00:43:21.611 Nothing funny happened.
- NOTE Confidence: 0.937707968
- 00:43:21.611 -> 00:43:24.670 This is this is a biological truth,
- NOTE Confidence: 0.937707968
- $00{:}43{:}24.670 \dashrightarrow 00{:}43{:}27.510$  and with that we felt we
- NOTE Confidence: 0.937707968
- $00{:}43{:}27{.}510 \dashrightarrow 00{:}43{:}28{.}730$  were in a position to.
- NOTE Confidence: 0.937707968
- $00:43:28.730 \longrightarrow 00:43:30.836$  To go to the FDA so the FDA has
- NOTE Confidence: 0.937707968
- $00{:}43{:}30{.}836 \dashrightarrow 00{:}43{:}33{.}507$  a program designed to evaluate
- NOTE Confidence: 0.937707968
- $00{:}43{:}33{.}507 \dashrightarrow 00{:}43{:}35{.}274$  biomarkers for qualification,
- NOTE Confidence: 0.937707968
- $00:43:35.280 \longrightarrow 00:43:36.159$  there's three steps.
- NOTE Confidence: 0.937707968
- $00{:}43{:}36{.}159 \dashrightarrow 00{:}43{:}37{.}624$  The first step is to
- NOTE Confidence: 0.937707968
- $00{:}43{:}37{.}624 \dashrightarrow 00{:}43{:}39{.}268$  submit a letter of intent,
- NOTE Confidence: 0.937707968
- $00:43:39.270 \longrightarrow 00:43:40.630$  basically presenting the data
- NOTE Confidence: 0.937707968
- $00:43:40.630 \longrightarrow 00:43:42.990$  that you have so far and and,
- NOTE Confidence: 0.937707968
- $00{:}43{:}42{.}990 \dashrightarrow 00{:}43{:}45{.}240$  and the FDA can say kind of thumbs up.
- NOTE Confidence: 0.937707968

 $00:43:45.240 \longrightarrow 00:43:47.304$  We want to hear more about this or,

NOTE Confidence: 0.937707968

00:43:47.310 --> 00:43:48.190 you know, thumbs down.

NOTE Confidence: 0.937707968

00:43:48.190 --> 00:43:48.850 It just doesn't.

NOTE Confidence: 0.937707968

00:43:48.850 -> 00:43:50.608 Doesn't seem like it has potential,

NOTE Confidence: 0.937707968

 $00:43:50.610 \longrightarrow 00:43:52.644$  and for both the N 170 and an eye

NOTE Confidence: 0.937707968

 $00:43:52.644 \rightarrow 00:43:54.387$  tracking index that I didn't talk

NOTE Confidence: 0.937707968

 $00:43:54.387 \longrightarrow 00:43:55.842$  about today called the active

NOTE Confidence: 0.937707968

 $00{:}43{:}55{.}902 \dashrightarrow 00{:}43{:}57{.}627$  Remote Index of case Human Faces,

NOTE Confidence: 0.937707968

 $00{:}43{:}57{.}630 \dashrightarrow 00{:}43{:}59{.}275$  which is exactly what it sounds like.

NOTE Confidence: 0.937707968

 $00:43:59.280 \rightarrow 00:44:01.548$  How much people look at the faces on screen?

NOTE Confidence: 0.937707968

 $00:44:01.550 \longrightarrow 00:44:03.066$  They accepted both so.

NOTE Confidence: 0.937707968

 $00:44:03.066 \rightarrow 00:44:05.340$  This does not mean anything in

NOTE Confidence: 0.937707968

 $00:44:05.418 \longrightarrow 00:44:07.683$  terms of the practical utility

NOTE Confidence: 0.937707968

 $00:44:07.683 \longrightarrow 00:44:09.495$  of these biomarkers today.

NOTE Confidence: 0.937707968

 $00{:}44{:}09{.}500 \dashrightarrow 00{:}44{:}12{.}790$  But what it does mean is that.

NOTE Confidence: 0.937707968

 $00{:}44{:}12.790 \dashrightarrow 00{:}44{:}13.756$  These are the.

- NOTE Confidence: 0.937707968
- $00:44:13.756 \longrightarrow 00:44:15.688$  It's a milestone in that these
- NOTE Confidence: 0.937707968
- $00{:}44{:}15.688 \dashrightarrow 00{:}44{:}18.111$  are the first two biomarkers for
- NOTE Confidence: 0.937707968
- $00:44:18.111 \rightarrow 00:44:20.146$  any psychiatric condition to have
- NOTE Confidence: 0.937707968
- $00:44:20.217 \rightarrow 00:44:23.297$  been welcomed by the FDA into this
- NOTE Confidence: 0.937707968
- 00:44:23.297 --> 00:44:24.617 biomarker qualification program.
- NOTE Confidence: 0.937707968
- $00:44:24.620 \longrightarrow 00:44:27.430$  So we've got a lot.
- NOTE Confidence: 0.937707968
- 00:44:27.430 --> 00:44:30.006 A lot of work to do before they
- NOTE Confidence: 0.937707968
- $00:44:30.006 \rightarrow 00:44:30.650$  get qualified,
- NOTE Confidence: 0.937707968
- $00{:}44{:}30{.}650 \dashrightarrow 00{:}44{:}33{.}163$  but it's encouraging that this is the
- NOTE Confidence: 0.937707968
- $00:44:33.163 \rightarrow 00:44:36.176$  first time the FDA said is go the work.
- NOTE Confidence: 0.937707968
- 00:44:36.180 --> 00:44:37.110 And that's what we're doing.
- NOTE Confidence: 0.937707968
- $00{:}44{:}37{.}110 \dashrightarrow 00{:}44{:}38{.}568$  The way that we've described it
- NOTE Confidence: 0.937707968
- $00:44:38.568 \rightarrow 00:44:40.410$  is that maybe when we think about
- NOTE Confidence: 0.937707968
- $00:44:40.410 \longrightarrow 00:44:41.775$  this tail of the distribution,
- NOTE Confidence: 0.937707968
- $00{:}44{:}41.780 \dashrightarrow 00{:}44{:}43.340$  this represents a subgroup that
- NOTE Confidence: 0.937707968

 $00:44:43.340 \longrightarrow 00:44:45.190$  could be useful in some way.

NOTE Confidence: 0.937707968

00:44:45.190 - 00:44:47.350 So maybe there are biology

NOTE Confidence: 0.937707968

 $00:44:47.350 \longrightarrow 00:44:48.646$  is more homogeneous,

NOTE Confidence: 0.937707968

 $00:44:48.650 \rightarrow 00:44:52.328$  and maybe then by by struck,

NOTE Confidence: 0.937707968

 $00{:}44{:}52{.}330 \dashrightarrow 00{:}44{:}54{.}270$  using them as a stratification

NOTE Confidence: 0.937707968

 $00:44:54.270 \longrightarrow 00:44:55.822$  factor in clinical trials,

NOTE Confidence: 0.937707968

 $00:44:55.830 \longrightarrow 00:44:57.430$  we could reduce heterogeneity and

NOTE Confidence: 0.937707968

 $00:44:57.430 \longrightarrow 00:44:59.631$  have more power to Dec differences

NOTE Confidence: 0.937707968

 $00{:}44{:}59{.}631 \dashrightarrow 00{:}45{:}01{.}260$  associated with treatment.

NOTE Confidence: 0.937707968

00:45:01.260 --> 00:45:01.989 We've, you know,

NOTE Confidence: 0.937707968

 $00:45:01.989 \longrightarrow 00:45:03.447$  this is one of the things

NOTE Confidence: 0.937707968

 $00{:}45{:}03{.}447 \dashrightarrow 00{:}45{:}04{.}588$  that's really fun about.

NOTE Confidence: 0.937707968

 $00:45:04.590 \longrightarrow 00:45:06.460$  This is that, you know.

NOTE Confidence: 0.937707968

00:45:06.460 --> 00:45:07.876 We don't know what we're doing,

NOTE Confidence: 0.937707968

 $00:45:07.880 \longrightarrow 00:45:09.860$  but really nobody does like the

NOTE Confidence: 0.937707968

00:45:09.860 --> 00:45:12.229 FDA is figuring out how you

- NOTE Confidence: 0.937707968
- $00:45:12.229 \rightarrow 00:45:14.185$  think about qualifying biomarkers
- NOTE Confidence: 0.937707968
- $00:45:14.185 \longrightarrow 00:45:15.652$  by psychiatric conditions,
- NOTE Confidence: 0.937707968
- $00:45:15.660 \rightarrow 00:45:17.316$  and so this is something very
- NOTE Confidence: 0.937707968
- $00{:}45{:}17{.}316 \dashrightarrow 00{:}45{:}18{.}420$  much that we're all
- NOTE Confidence: 0.867533435
- $00:45:18.420 \rightarrow 00:45:21.258$  we afield are figuring out together,
- NOTE Confidence: 0.867533435
- $00{:}45{:}21{.}260 \dashrightarrow 00{:}45{:}23{.}348$  and so we've gotten two grants from the
- NOTE Confidence: 0.867533435
- 00:45:23.348 --> 00:45:25.121 FDA really just support our communication
- NOTE Confidence: 0.867533435
- $00{:}45{:}25{.}121 \dashrightarrow 00{:}45{:}27{.}553$  with them to kind of think about these
- NOTE Confidence: 0.867533435
- $00{:}45{:}27{.}553 \dashrightarrow 00{:}45{:}29{.}317$  things and develop the next step,
- NOTE Confidence: 0.867533435
- $00{:}45{:}29{.}320 \dashrightarrow 00{:}45{:}31{.}120$  which the biomarker qualification
- NOTE Confidence: 0.867533435
- 00:45:31.120 --> 00:45:33.820 plan and it's hard and exciting.
- NOTE Confidence: 0.867533435
- $00{:}45{:}33{.}820 \dashrightarrow 00{:}45{:}35{.}276$  The kinds of things that just to
- NOTE Confidence: 0.867533435
- $00:45:35.276 \rightarrow 00:45:37.160$  give you a taste of the things that.
- NOTE Confidence: 0.867533435
- $00{:}45{:}37{.}160 \dashrightarrow 00{:}45{:}38{.}188$  We wrangle with it.
- NOTE Confidence: 0.867533435
- $00{:}45{:}38.188 \dashrightarrow 00{:}45{:}40.162$  I'm gonna again that I'll be wrangling
- NOTE Confidence: 0.867533435

 $00:45:40.162 \rightarrow 00:45:42.037$  with three o'clock this afternoon

NOTE Confidence: 0.867533435

 $00:45:42.037 \rightarrow 00:45:43.831$  and a big teleconferences. How?

NOTE Confidence: 0.867533435

 $00{:}45{:}43{.}831 \dashrightarrow 00{:}45{:}46{.}450$  What kind of data do we provide to show NOTE Confidence: 0.867533435

 $00:45:46.522 \rightarrow 00:45:48.946$  that that purple highlighted group is

NOTE Confidence: 0.867533435

 $00:45:48.946 \rightarrow 00:45:51.689$  different from the rest of them somehow?

NOTE Confidence: 0.867533435

00:45:51.690 --> 00:45:53.610 And how do I decide where to draw

NOTE Confidence: 0.867533435

 $00:45:53.610 \longrightarrow 00:45:55.298$  the line of the purple right?

NOTE Confidence: 0.867533435

00:45:55.300 --> 00:45:56.574 I just did it 'cause it looked

NOTE Confidence: 0.867533435

 $00{:}45{:}56{.}574 \dashrightarrow 00{:}45{:}58{.}018$  nice at that place in the figure,

NOTE Confidence: 0.867533435

 $00{:}45{:}58{.}020 \dashrightarrow 00{:}45{:}59{.}340$  but there should be a more

NOTE Confidence: 0.867533435

 $00:45:59.340 \longrightarrow 00:46:00.400$  sophisticated way to do it.

NOTE Confidence: 0.867533435

 $00:46:00.400 \longrightarrow 00:46:03.400$  How do we? How do we validate it?

NOTE Confidence: 0.867533435

 $00{:}46{:}03{.}400 \dashrightarrow 00{:}46{:}05{.}056$  Like if if that's a subgroup,

NOTE Confidence: 0.867533435

 $00{:}46{:}05{.}060 \dashrightarrow 00{:}46{:}07{.}284$  what do you do like when our clinical

NOTE Confidence: 0.867533435

 $00:46:07.284 \rightarrow 00:46:08.957$  measures are all that we've got?

NOTE Confidence: 0.867533435

 $00:46:08.960 \longrightarrow 00:46:10.605$  Should I be doing brain should be

- NOTE Confidence: 0.867533435
- $00:46:10.605 \rightarrow 00:46:12.169$  doing imaging scans and show that

 $00:46:12.169 \longrightarrow 00:46:13.524$  their brain structure is different?

NOTE Confidence: 0.867533435

 $00:46:13.530 \longrightarrow 00:46:14.108$  Some way,

NOTE Confidence: 0.867533435

 $00:46:14.108 \rightarrow 00:46:16.131$  like how can I externally validate this

NOTE Confidence: 0.867533435

 $00{:}46{:}16.131 \dashrightarrow 00{:}46{:}17.738$  thing that appears to be meaningful

NOTE Confidence: 0.867533435

 $00:46:17.738 \longrightarrow 00:46:19.690$  with the N 170 and then lastly,

NOTE Confidence: 0.867533435

 $00{:}46{:}19.690 \dashrightarrow 00{:}46{:}21.058$  how do I make sure and this is

NOTE Confidence: 0.867533435

00:46:21.058 --> 00:46:21.910 a real challenge?

NOTE Confidence: 0.867533435

 $00{:}46{:}21{.}910 \dashrightarrow 00{:}46{:}23{.}953$  How do we make sure that people who do

NOTE Confidence: 0.867533435

 $00{:}46{:}23{.}953 \dashrightarrow 00{:}46{:}25{.}767$  things with with without an unprecedented

NOTE Confidence: 0.867533435

 $00:46:25.767 \rightarrow 00:46:28.220$  level of rigor are getting the same results?

NOTE Confidence: 0.867533435

00:46:28.220 --> 00:46:30.004 Do you need to use our EG system?

NOTE Confidence: 0.867533435

 $00:46:30.010 \longrightarrow 00:46:32.106$  Do you need to use our like manuals

NOTE Confidence: 0.867533435

 $00{:}46{:}32.106 \dashrightarrow 00{:}46{:}32.630$  and procedures?

NOTE Confidence: 0.867533435

 $00:46:32.630 \longrightarrow 00:46:34.238$  We don't know?

- 00:46:34.240 --> 00:46:35.686 In July 2020,
- NOTE Confidence: 0.867533435
- $00{:}46{:}35{.}686 \dashrightarrow 00{:}46{:}39{.}810$  the ABC was funded for a second phase.
- NOTE Confidence: 0.867533435
- $00:46:39.810 \longrightarrow 00:46:41.454$  This new this second phase is
- NOTE Confidence: 0.867533435
- $00:46:41.454 \rightarrow 00:46:42.950$  going to have three parts.
- NOTE Confidence: 0.867533435
- $00{:}46{:}42.950 \dashrightarrow 00{:}46{:}44.840$  One is going to be a follow-up
- NOTE Confidence: 0.867533435
- $00:46:44.840 \rightarrow 00:46:46.954$  study of that original cohort coming
- NOTE Confidence: 0.867533435
- $00:46:46.954 \longrightarrow 00:46:49.656$  back 2 1/2 years to four years
- NOTE Confidence: 0.867533435
- $00:46:49.656 \rightarrow 00:46:51.180$  after their original enrollment.
- NOTE Confidence: 0.867533435
- 00:46:51.180 --> 00:46:52.818 This will let us look at
- NOTE Confidence: 0.867533435
- $00{:}46{:}52.818 \dashrightarrow 00{:}46{:}54.240$  stability over the longer term.
- NOTE Confidence: 0.867533435
- $00{:}46{:}54{.}240 \dashrightarrow 00{:}46{:}55{.}410$  It might, as I said,
- NOTE Confidence: 0.867533435
- $00:46:55.410 \longrightarrow 00:46:57.066$  that we were not a study
- NOTE Confidence: 0.867533435
- 00:46:57.066 --> 00:46:58.870 designed to pick up unchanged,
- NOTE Confidence: 0.867533435
- 00:46:58.870 -> 00:47:00.263 but there may be more change that
- NOTE Confidence: 0.867533435
- $00:47:00.263 \rightarrow 00:47:01.768$  happens over this longer period of time,
- NOTE Confidence: 0.867533435
- $00:47:01.770 \rightarrow 00:47:03.778$  so we might look into some and it'll

- NOTE Confidence: 0.867533435
- $00:47:03.778 \rightarrow 00:47:05.822$  also for sure give us an opportunity

 $00:47:05.822 \rightarrow 00:47:08.062$  to look at how biomarkers you know

NOTE Confidence: 0.867533435

 $00:47:08.062 \rightarrow 00:47:09.817$  whether they have prognostic value.

NOTE Confidence: 0.867533435

 $00:47:09.820 \rightarrow 00:47:10.970$  Whether they tell you something

NOTE Confidence: 0.867533435

00:47:10.970 --> 00:47:12.120 about how prisons gonna look,

NOTE Confidence: 0.867533435

 $00{:}47{:}12.120 \dashrightarrow 00{:}47{:}15.288$  use down the line we started in May and

NOTE Confidence: 0.867533435

 $00:47:15.288 \longrightarrow 00:47:18.718$  we're 144 kids in which is mahnomen.

NOTE Confidence: 0.867533435

 $00{:}47{:}18.720 \dashrightarrow 00{:}47{:}21.440$  ABCD is a is an ambitious and hard

NOTE Confidence: 0.867533435

 $00{:}47{:}21{.}440 \dashrightarrow 00{:}47{:}24{.}266$  study to do without COVID and I

NOTE Confidence: 0.867533435

 $00{:}47{:}24.266 \dashrightarrow 00{:}47{:}26.761$  cannot tell you how impressed I

NOTE Confidence: 0.867533435

 $00:47:26.761 \longrightarrow 00:47:29.253$  am with the work that the team

NOTE Confidence: 0.867533435

 $00{:}47{:}29{.}253 \dashrightarrow 00{:}47{:}31{.}626$  here yelling all the sites has

NOTE Confidence: 0.867533435

 $00:47:31.626 \longrightarrow 00:47:34.110$  done to make this happen today.

NOTE Confidence: 0.867533435

 $00:47:34.110 \rightarrow 00:47:36.828$  The second part is confirmation study,

NOTE Confidence: 0.867533435

 $00:47:36.830 \longrightarrow 00:47:38.810$  which is basically to do that

 $00:47:38.810 \longrightarrow 00:47:40.804$  first study over again and make

NOTE Confidence: 0.867533435

 $00:47:40.804 \rightarrow 00:47:42.925$  sure that we get the same results.

NOTE Confidence: 0.867533435

 $00{:}47{:}42.930 \dashrightarrow 00{:}47{:}46.094$  Only difference really is we're going to.

NOTE Confidence: 0.867533435

 $00:47:46.100 \longrightarrow 00:47:48.572$  Do a an even balance of kids with

NOTE Confidence: 0.867533435

 $00{:}47{:}48.572 \dashrightarrow 00{:}47{:}50.705$  autism and typically having kids so

NOTE Confidence: 0.867533435

00:47:50.705 --> 00:47:53.143 200 in each which actually having NOTE Confidence: 0.867533435

00:47:53.143 --> 00:47:54.947 more typically governed kids,

NOTE Confidence: 0.903756688

 $00:47:54.950 \longrightarrow 00:47:56.775$  makes it much more powerful

NOTE Confidence: 0.903756688

 $00{:}47{:}56.775 \dashrightarrow 00{:}47{:}59.175$  for us to determine how kids

NOTE Confidence: 0.903756688

 $00{:}47{:}59{.}175 \dashrightarrow 00{:}48{:}01{.}179$  with autism differ materially.

NOTE Confidence: 0.903756688

 $00:48:01.180 \longrightarrow 00:48:02.662$  11 kids, so that's really important

NOTE Confidence: 0.903756688

 $00{:}48{:}02{.}662 \dashrightarrow 00{:}48{:}05{.}197$  for us and then also tossing one of the

NOTE Confidence: 0.903756688

 $00{:}48{:}05{.}197 \dashrightarrow 00{:}48{:}07{.}348$  the assays that didn't work so well.

NOTE Confidence: 0.903756688

 $00:48:07.350 \longrightarrow 00:48:09.778$  A biological motion essay.

NOTE Confidence: 0.903756688

 $00:48:09.780 \rightarrow 00:48:12.468$  And in the last study is a feasibility

NOTE Confidence: 0.903756688

 $00:48:12.468 \longrightarrow 00:48:14.983$  study in which will come across

- NOTE Confidence: 0.903756688
- $00:48:14.983 \rightarrow 00:48:17.454$  the consortium C25 kids with autism
- NOTE Confidence: 0.903756688
- 00:48:17.454 --> 00:48:19.038 25 typically developing kids
- NOTE Confidence: 0.903756688
- $00:48:19.038 \rightarrow 00:48:21.290$  between three to five years old and
- NOTE Confidence: 0.903756688
- $00:48:21.290 \longrightarrow 00:48:22.986$  see whether we can weather this
- NOTE Confidence: 0.903756688
- $00:48:22.986 \rightarrow 00:48:24.714$  battery is viable in that group,
- NOTE Confidence: 0.903756688
- $00:48:24.720 \longrightarrow 00:48:25.503$  whether it's feasible,
- NOTE Confidence: 0.903756688
- $00:48:25.503 \rightarrow 00:48:27.330$  and I'm going to segue the last
- NOTE Confidence: 0.903756688
- $00{:}48{:}27{.}378 \dashrightarrow 00{:}48{:}28{.}827$  two things I want to talk about
- NOTE Confidence: 0.903756688
- 00:48:28.827 --> 00:48:30.826 are kind of new directions, right?
- NOTE Confidence: 0.903756688
- $00:48:30.826 \longrightarrow 00:48:35.238$  So the the abcte is it is it is
- NOTE Confidence: 0.903756688
- 00:48:35.238 --> 00:48:37.380 glamorous only in its scope, right?
- NOTE Confidence: 0.903756688
- $00:48:37.380 \longrightarrow 00:48:39.480$  It's taking the things that we.
- NOTE Confidence: 0.903756688
- $00{:}48{:}39{.}480 \dashrightarrow 00{:}48{:}41{.}415$  Think we understand and double
- NOTE Confidence: 0.903756688
- $00:48:41.415 \longrightarrow 00:48:42.963$  and triple checking right?
- NOTE Confidence: 0.903756688
- $00:48:42.970 \longrightarrow 00:48:44.476$  And the next few things I'll
- NOTE Confidence: 0.903756688

 $00:48:44.476 \longrightarrow 00:48:46.335$  talk about are seeing if we can

NOTE Confidence: 0.903756688

 $00{:}48{:}46{.}335 \dashrightarrow 00{:}48{:}47{.}399$  understand some new things.

NOTE Confidence: 0.903756688

 $00:48:47.400 \longrightarrow 00:48:49.157$  So one thing is is this is

NOTE Confidence: 0.903756688

 $00:48:49.157 \longrightarrow 00:48:50.599$  what Paul alluded to earlier.

NOTE Confidence: 0.903756688

 $00{:}48{:}50{.}600 \dashrightarrow 00{:}48{:}53{.}165$  The N 170 is an output of a brain

NOTE Confidence: 0.903756688

 $00{:}48{:}53.165 \dashrightarrow 00{:}48{:}55.642$  system that supports social perception NOTE Confidence: 0.903756688

00:48:55.642 --> 00:48:58.282 and social perception is probably

NOTE Confidence: 0.903756688

 $00:48:58.282 \rightarrow 00:49:00.855$  affected in in every disorder studied

NOTE Confidence: 0.903756688

00:49:00.855 --> 00:49:03.338 at the Child Study Center, right?

NOTE Confidence: 0.903756688

 $00:49:03.338 \rightarrow 00:49:05.928$  And one example is schizophrenia.

NOTE Confidence: 0.903756688

 $00:49:05.930 \longrightarrow 00:49:07.940$  And so this is work.

NOTE Confidence: 0.903756688

 $00:49:07.940 \longrightarrow 00:49:09.620$  That is being carried out now.

NOTE Confidence: 0.903756688

 $00{:}49{:}09{.}620 \dashrightarrow 00{:}49{:}10{.}592$  Play Gloria hard.

NOTE Confidence: 0.903756688

 $00{:}49{:}10.592 \dashrightarrow 00{:}49{:}12.536$  There's a hillerbrand postdoc in the

NOTE Confidence: 0.903756688

 $00{:}49{:}12.536 \dashrightarrow 00{:}49{:}14.539$  lab and in collaboration with Jenn

NOTE Confidence: 0.903756688

 $00:49:14.539 \rightarrow 00:49:16.609$  phosphide who was a postdoc in lab,

- NOTE Confidence: 0.903756688
- $00:49:16.610 \longrightarrow 00:49:18.320$  and now as an assistant professor
- NOTE Confidence: 0.903756688
- $00{:}49{:}18.320 \dashrightarrow 00{:}49{:}19.175$  at Mount Sinai.
- NOTE Confidence: 0.903756688
- $00:49:19.180 \longrightarrow 00:49:21.854$  But what we've done is really collect,
- NOTE Confidence: 0.903756688
- 00:49:21.860 --> 00:49:24.980 kind of lots of different symptom
- NOTE Confidence: 0.903756688
- $00:49:24.980 \rightarrow 00:49:27.720$  measures for schizophrenia for autism,
- NOTE Confidence: 0.903756688
- 00:49:27.720 --> 00:49:29.028 and the N 170,
- NOTE Confidence: 0.903756688
- $00{:}49{:}29{.}028 \dashrightarrow 00{:}49{:}32{.}680$  and done it in a group of people who
- NOTE Confidence: 0.903756688
- 00:49:32.680 --> 00:49:35.335 have autism or have schizophrenia,
- NOTE Confidence: 0.903756688
- $00:49:35.340 \longrightarrow 00:49:37.772$  and this will get give us a chance
- NOTE Confidence: 0.903756688
- $00:49:37.772 \longrightarrow 00:49:39.791$  to understand the way that the
- NOTE Confidence: 0.903756688
- $00:49:39.791 \longrightarrow 00:49:40.796$  kinds of behavioral.
- NOTE Confidence: 0.903756688
- 00:49:40.800 00:49:42.760 Behavioral phenotypes that we
- NOTE Confidence: 0.903756688
- $00:49:42.760 \longrightarrow 00:49:45.210$  see relate to these biomarker.
- NOTE Confidence: 0.903756688
- $00{:}49{:}45{.}210 \dashrightarrow 00{:}49{:}48{.}250$  These biomarkers in a way that is not
- NOTE Confidence: 0.903756688
- 00:49:48.250 --> 00:49:50.260 disorder specific because you know,
- NOTE Confidence: 0.903756688

 $00:49:50.260 \longrightarrow 00:49:52.528$  uh Oh my goodness Paul left.

NOTE Confidence: 0.903756688

 $00{:}49{:}52{.}530 \dashrightarrow 00{:}49{:}53{.}850$  He told me he had to leave and

NOTE Confidence: 0.903756688

 $00:49:53.850 \longrightarrow 00:49:55.514$  then I gave him a hard time by

NOTE Confidence: 0.903756688

 $00:49:55.514 \rightarrow 00:49:56.869$  asking questions and now he's gone.

NOTE Confidence: 0.903756688

00:49:56.870 --> 00:50:00.150 He wins. I feel guilty.

NOTE Confidence: 0.903756688

 $00:50:00.150 \longrightarrow 00:50:02.238$  But though so I don't think.

NOTE Confidence: 0.903756688

00:50:02.240 --> 00:50:02.910 And again,

NOTE Confidence: 0.903756688

 $00:50:02.910 \longrightarrow 00:50:05.255$  I don't think that we need to

NOTE Confidence: 0.903756688

 $00{:}50{:}05{.}255 \dashrightarrow 00{:}50{:}06{.}490$  have biomarkers.

NOTE Confidence: 0.903756688

 $00{:}50{:}06{.}490 \dashrightarrow 00{:}50{:}07{.}930$  That sort of we don't have

NOTE Confidence: 0.903756688

 $00:50:07.930 \longrightarrow 00:50:09.310$  to sort of specific brains.

NOTE Confidence: 0.903756688

 $00:50:09.310 \rightarrow 00:50:10.930$  Why would measuring the brain,

NOTE Confidence: 0.903756688

 $00:50:10.930 \rightarrow 00:50:12.290$  although some give you something

NOTE Confidence: 0.903756688

00:50:12.290 --> 00:50:13.422 this disorder specific, right?

NOTE Confidence: 0.903756688

 $00{:}50{:}13.422 \dashrightarrow 00{:}50{:}15.294$  It's the same systems that are

NOTE Confidence: 0.903756688

 $00:50:15.294 \rightarrow 00:50:16.230$  supporting information processing

- NOTE Confidence: 0.903756688
- 00:50:16.281 --> 00:50:17.469 across all these disorders,
- NOTE Confidence: 0.903756688
- $00{:}50{:}17{.}470 \dashrightarrow 00{:}50{:}19{.}210$  and so this is an in.
- NOTE Confidence: 0.903756688
- $00:50:19.210 \longrightarrow 00:50:21.616$  Gloria is also very talented mathematician
- NOTE Confidence: 0.903756688
- $00:50:21.616 \rightarrow 00:50:23.694$  and is applying network analysis,
- NOTE Confidence: 0.903756688
- $00{:}50{:}23.694 \dashrightarrow 00{:}50{:}25.442$  which I'm reasonably confident
- NOTE Confidence: 0.903756688
- $00:50:25.442 \longrightarrow 00:50:27.814$  I will understand by the time
- NOTE Confidence: 0.903756688
- $00:50:27.814 \longrightarrow 00:50:29.476$  she moves on from the lab.
- NOTE Confidence: 0.903756688
- $00:50:29.480 \longrightarrow 00:50:32.441$  Another approach that we're taking is it's
- NOTE Confidence: 0.903756688
- $00:50:32.441 \rightarrow 00:50:35.438$  really a problem in our field that many,
- NOTE Confidence: 0.903756688
- $00:50:35.440 \rightarrow 00:50:35.879$  many,
- NOTE Confidence: 0.903756688
- $00:50:35.879 \rightarrow 00:50:38.513$  many people with autism have Co
- NOTE Confidence: 0.903756688
- 00:50:38.513 --> 00:50:39.830 occurring intellectual disability,
- NOTE Confidence: 0.903756688
- $00:50:39.830 \longrightarrow 00:50:41.385$  and they're really not included
- NOTE Confidence: 0.903756688
- $00{:}50{:}41{.}385 \dashrightarrow 00{:}50{:}42{.}318$  in neuroscience research.
- NOTE Confidence: 0.903756688
- $00:50:42.320 \longrightarrow 00:50:44.378$  So what we're doing is failing to
- NOTE Confidence: 0.903756688

 $00:50:44.378 \rightarrow 00:50:46.410$  study a group that could perhaps

NOTE Confidence: 0.903756688

 $00{:}50{:}46{.}410 \dashrightarrow 00{:}50{:}48{.}220$  benefit most from the things

NOTE Confidence: 0.903756688

 $00:50:48.220 \longrightarrow 00:50:50.330$  that we're trying to understand.

NOTE Confidence: 0.903756688

 $00:50:50.330 \rightarrow 00:50:51.810$  And there's there's many,

NOTE Confidence: 0.903756688

 $00{:}50{:}51{.}810 \dashrightarrow 00{:}50{:}52{.}920$  many good reasons

NOTE Confidence: 0.9158741

 $00:50:52.920 \rightarrow 00:50:54.084$  for them being excluded.

NOTE Confidence: 0.9158741

00:50:54.084 --> 00:50:55.352 You know, many good,

NOTE Confidence: 0.9158741

 $00:50:55.352 \rightarrow 00:50:56.716$  practical reasons that is,

NOTE Confidence: 0.9158741

 $00{:}50{:}56{.}720 \dashrightarrow 00{:}50{:}59{.}180$  but we have ideas how we can improve on this,

NOTE Confidence: 0.9158741

 $00:50:59.180 \longrightarrow 00:50:59.920$  and this is work that.

NOTE Confidence: 0.9158741

 $00{:}50{:}59{.}920 \dashrightarrow 00{:}51{:}01{.}688$  Led by Adam Naples, who many of you

NOTE Confidence: 0.9158741

 $00{:}51{:}01{.}688 \dashrightarrow 00{:}51{:}03{.}483$  know who I've worked with for over a

NOTE Confidence: 0.9158741

 $00{:}51{:}03{.}483 \dashrightarrow 00{:}51{:}05{.}359$  decade and is a research scientist,

NOTE Confidence: 0.9158741

 $00{:}51{:}05{.}360 \dashrightarrow 00{:}51{:}07{.}360$  having started in the lab as a postdoc.

NOTE Confidence: 0.9158741

 $00:51:07.360 \longrightarrow 00:51:08.730$  But what we've we've thought

NOTE Confidence: 0.9158741

 $00:51:08.730 \longrightarrow 00:51:10.100$  about is over the years.

- NOTE Confidence: 0.9158741
- $00{:}51{:}10{.}100 \dashrightarrow 00{:}51{:}12{.}700$  We have ideas about how EGS could be

 $00:51:12.700 \rightarrow 00:51:14.977$  made easier for people with autism,

NOTE Confidence: 0.9158741

 $00:51:14.980 \rightarrow 00:51:17.236$  and so a few things changing the way

NOTE Confidence: 0.9158741

 $00:51:17.236 \rightarrow 00:51:18.988$  we administer experiments so that,

NOTE Confidence: 0.9158741

00:51:18.990 --> 00:51:21.270 for example, it's a silly thing.

NOTE Confidence: 0.9158741

00:51:21.270 --> 00:51:23.385 But if you show 50 faces in a row

NOTE Confidence: 0.9158741

 $00:51:23.385 \longrightarrow 00:51:25.785$  and then you show 50 houses in a row,

NOTE Confidence: 0.9158741

 $00:51:25.790 \longrightarrow 00:51:27.589$  it gets a lot more boring than

NOTE Confidence: 0.9158741

00:51:27.589 --> 00:51:29.695 if you go back and forth, right?

NOTE Confidence: 0.9158741

00:51:29.695 --> 00:51:31.170 So like. Little silly things.

NOTE Confidence: 0.9158741

 $00{:}51{:}31{.}170 \dashrightarrow 00{:}51{:}33{.}354$  Thinking about how a person can

NOTE Confidence: 0.9158741

 $00{:}51{:}33{.}354 \dashrightarrow 00{:}51{:}34{.}810$  experience can improve things.

NOTE Confidence: 0.9158741

 $00{:}51{:}34{.}810 \dashrightarrow 00{:}51{:}37{.}138$  We also would. Adam has done his is.

NOTE Confidence: 0.9158741

 $00{:}51{:}37{.}140 \dashrightarrow 00{:}51{:}38{.}827$  He gets mad when I call it

NOTE Confidence: 0.9158741

 $00{:}51{:}38{.}827 \dashrightarrow 00{:}51{:}39{.}550$  an artificial intelligence.

00:51:39.550 --> 00:51:40.930 But I'm going to anyway.

NOTE Confidence: 0.9158741

 $00:51:40.930 \rightarrow 00:51:43.506$  He's built a way of kind of quantifying

NOTE Confidence: 0.9158741

 $00:51:43.506 \rightarrow 00:51:45.079$  simultaneously a person's movement

NOTE Confidence: 0.9158741

 $00:51:45.079 \rightarrow 00:51:46.807$  automatically where their faces

NOTE Confidence: 0.9158741

 $00:51:46.807 \rightarrow 00:51:49.297$  oriented where their eyes are looking

NOTE Confidence: 0.9158741

 $00{:}51{:}49{.}297 \dashrightarrow 00{:}51{:}51{.}052$  and basically putting that into

NOTE Confidence: 0.9158741

 $00{:}51{:}51{.}052 \dashrightarrow 00{:}51{:}53{.}052$  an algorithm that creates a net.

NOTE Confidence: 0.9158741

00:51:53.052 --> 00:51:53.680 You know,

NOTE Confidence: 0.9158741

 $00{:}51{:}53.680 \dashrightarrow 00{:}51{:}54.008$  net.

NOTE Confidence: 0.9158741

 $00:51:54.008 \rightarrow 00:51:56.304$  How much is this person moving around

NOTE Confidence: 0.9158741

 $00{:}51{:}56{.}304 \dashrightarrow 00{:}51{:}59{.}144$  and then what we do is we just use

NOTE Confidence: 0.9158741

 $00{:}51{:}59{.}144 \dashrightarrow 00{:}52{:}00{.}959$  behavioral shaping in a non person.

NOTE Confidence: 0.9158741

 $00{:}52{:}00{.}960 \dashrightarrow 00{:}52{:}03{.}360$  Based way Nonexperimental based way

NOTE Confidence: 0.9158741

 $00:52:03.360 \longrightarrow 00:52:07.354$  to to create a set up so that the

NOTE Confidence: 0.9158741

 $00:52:07.354 \dashrightarrow 00:52:10.310$  you know the less they move around.

NOTE Confidence: 0.9158741

 $00:52:10.310 \rightarrow 00:52:12.560$  The less tolerant the experimental

- NOTE Confidence: 0.9158741
- $00:52:12.560 \longrightarrow 00:52:15.316$  setup becomes of movement and the

 $00{:}52{:}15{.}316 \dashrightarrow 00{:}52{:}17{.}890$  incentive is that their favorite videos

NOTE Confidence: 0.9158741

 $00:52:17.890 \longrightarrow 00:52:20.449$  play when they're not moving a lot,

NOTE Confidence: 0.9158741

 $00:52:20.450 \longrightarrow 00:52:22.669$  so there's no one saying sit still,

NOTE Confidence: 0.9158741

 $00{:}52{:}22.670 \dashrightarrow 00{:}52{:}23.834$  look at the screen,

NOTE Confidence: 0.9158741

 $00:52:23.834 \rightarrow 00:52:26.549$  it just is a inergen kind of ergonomics,

NOTE Confidence: 0.9158741

 $00:52:26.550 \rightarrow 00:52:27.990$  right? And and it works.

NOTE Confidence: 0.9158741

 $00:52:27.990 \rightarrow 00:52:30.965$  So we're getting data now from kids.

NOTE Confidence: 0.9158741

 $00:52:30.970 \longrightarrow 00:52:32.334$  This is just example,

NOTE Confidence: 0.9158741

 $00:52:32.334 \rightarrow 00:52:35.869$  this is a person who had an IQ of I believe.

NOTE Confidence: 0.9158741

 $00{:}52{:}35{.}870 \dashrightarrow 00{:}52{:}36{.}718$  I'm actually not sure.

NOTE Confidence: 0.9158741

00:52:36.718 --> 00:52:37.990 I know we've had people come

NOTE Confidence: 0.9158741

 $00:52:38.040 \longrightarrow 00:52:39.244$  through the Iqs as low as 22.

NOTE Confidence: 0.9158741

 $00{:}52{:}39{.}250 \dashrightarrow 00{:}52{:}40{.}748$  I don't know who's David this is.

NOTE Confidence: 0.9158741

 $00{:}52{:}40{.}750 \dashrightarrow 00{:}52{:}42{.}311$  But but it's working and you can

 $00:52:42.311 \rightarrow 00:52:44.004$  see you know we we don't have

NOTE Confidence: 0.9158741

 $00{:}52{:}44.004 \dashrightarrow 00{:}52{:}45.462$  enough heated data yet to notice

NOTE Confidence: 0.9158741

 $00:52:45.512 \longrightarrow 00:52:46.947$  he kind of group differences.

NOTE Confidence: 0.9158741

 $00{:}52{:}46{.}950 \dashrightarrow 00{:}52{:}48{.}910$  But we do see that we see the N 170

NOTE Confidence: 0.9158741

 $00{:}52{:}48{.}974 \dashrightarrow 00{:}52{:}50{.}745$  that we expect and then the last

NOTE Confidence: 0.9158741

 $00{:}52{:}50{.}745 \dashrightarrow 00{:}52{:}52{.}637$  thing in one that I'm really excited

NOTE Confidence: 0.9158741

 $00{:}52{:}52{.}637 \dashrightarrow 00{:}52{:}55{.}136$  about is is may be we can use some of

NOTE Confidence: 0.9158741

 $00:52:55.136 \rightarrow 00:52:56.888$  these biomarkers to actually guide care.

NOTE Confidence: 0.9158741

 $00{:}52{:}56{.}890 \dashrightarrow 00{:}52{:}59{.}008$  And here I'll highlight two residents,

NOTE Confidence: 0.9158741

00:52:59.010 --> 00:52:59.860 Cherub Syringa,

NOTE Confidence: 0.9158741

 $00:52:59.860 \longrightarrow 00:53:01.560$  who's in the audience,

NOTE Confidence: 0.9158741

 $00{:}53{:}01{.}560 \dashrightarrow 00{:}53{:}02{.}848$  and also AZ Alsop.

NOTE Confidence: 0.9158741

 $00{:}53{:}02{.}848 \dashrightarrow 00{:}53{:}05{.}659$  And this is work really when we think

NOTE Confidence: 0.9158741

 $00:53:05.659 \rightarrow 00:53:07.669$  about the treatments for autism,

NOTE Confidence: 0.9158741

 $00{:}53{:}07{.}670 \dashrightarrow 00{:}53{:}09{.}238$  they have a few things in common.

NOTE Confidence: 0.9158741

 $00:53:09.240 \rightarrow 00:53:11.778$  They tend to target social function.

- NOTE Confidence: 0.9158741
- 00:53:11.780 --> 00:53:13.610 And we know from you know,

 $00:53:13.610 \longrightarrow 00:53:14.670$  not a lot of studies,

NOTE Confidence: 0.9158741

 $00{:}53{:}14.670 \dashrightarrow 00{:}53{:}16.080$  but a few suggestive studies that

NOTE Confidence: 0.9158741

 $00:53:16.080 \longrightarrow 00:53:17.509$  a particular part of the brain,

NOTE Confidence: 0.9158741

 $00:53:17.510 \rightarrow 00:53:19.580$  called the superior temporal sulcus,

NOTE Confidence: 0.9158741

 $00{:}53{:}19{.}580 \dashrightarrow 00{:}53{:}21{.}686$  is is enhanced in activity when

NOTE Confidence: 0.9158741

 $00:53:21.686 \rightarrow 00:53:23.840$  people get better in treatment.

NOTE Confidence: 0.9158741

 $00:53:23.840 \longrightarrow 00:53:26.018$  This is also happened to be one of the

NOTE Confidence: 0.9158741

 $00:53:26.018 \dashrightarrow 00:53:28.085$  places that we think generates then 170,

NOTE Confidence: 0.88407976875

 $00:53:28.090 \rightarrow 00:53:30.306$  and an idea that that isn't just ours.

NOTE Confidence: 0.88407976875

 $00:53:30.310 \longrightarrow 00:53:31.546$  Other groups are doing.

NOTE Confidence: 0.88407976875

 $00:53:31.546 \longrightarrow 00:53:32.782$  We're actually collaborating with

NOTE Confidence: 0.88407976875

 $00:53:32.782 \longrightarrow 00:53:34.601$  a group running clinical trial in

NOTE Confidence: 0.88407976875

00:53:34.601 --> 00:53:36.031 Australia is we could directly

NOTE Confidence: 0.88407976875

 $00{:}53{:}36{.}031 \dashrightarrow 00{:}53{:}37{.}890$  use direct brain stimulation with

 $00:53:37.890 \rightarrow 00:53:39.033$  transcranial magnetic stimulation

NOTE Confidence: 0.88407976875

 $00{:}53{:}39{.}033 \dashrightarrow 00{:}53{:}41{.}104$  TMS to stimulate the tests and and.

NOTE Confidence: 0.88407976875

 $00{:}53{:}41{.}104 \dashrightarrow 00{:}53{:}42{.}785$  You know a couple of studies that

NOTE Confidence: 0.88407976875

 $00:53:42.785 \rightarrow 00:53:44.472$  have been done so far suggests that

NOTE Confidence: 0.88407976875

 $00{:}53{:}44{.}472 \dashrightarrow 00{:}53{:}45{.}937$  it could improve social behavior

NOTE Confidence: 0.88407976875

 $00:53:45.937 \longrightarrow 00:53:47.797$  that it could reduce kind of

NOTE Confidence: 0.88407976875

 $00{:}53{:}47.797 \dashrightarrow 00{:}53{:}49.232$  repetitive behaviors and autism.

NOTE Confidence: 0.88407976875

 $00:53:49.232 \rightarrow 00:53:51.850$  But what we're trying to do really

NOTE Confidence: 0.88407976875

 $00{:}53{:}51{.}924 \dashrightarrow 00{:}53{:}53{.}960$  is leverage our proficiency

NOTE Confidence: 0.88407976875

 $00:53:53.960 \rightarrow 00:53:56.223$  in using biomarkers, right?

NOTE Confidence: 0.88407976875

 $00:53:56.223 \dashrightarrow 00:53:59.146$  And so maybe, you know, we could maybe.

NOTE Confidence: 0.88407976875

 $00:53:59.146 \longrightarrow 00:54:02.854$  And 170 maybe eye tracking could be a

NOTE Confidence: 0.88407976875

 $00:54:02.854 \rightarrow 00:54:06.478$  useful way of quantifying in a shorter term,

NOTE Confidence: 0.88407976875

 $00{:}54{:}06{.}480 \dashrightarrow 00{:}54{:}07{.}788$  whether these treatments are

NOTE Confidence: 0.88407976875

 $00:54:07.788 \rightarrow 00:54:09.410$  going to be effective, right?

NOTE Confidence: 0.88407976875

 $00:54:09.410 \longrightarrow 00:54:10.960$  Because to measure change in

- NOTE Confidence: 0.88407976875
- $00:54:10.960 \longrightarrow 00:54:12.870$  social behavior is a tall order,
- NOTE Confidence: 0.88407976875
- 00:54:12.870 --> 00:54:15.903 like I can if you had a pill that
- NOTE Confidence: 0.88407976875
- $00:54:15.903 \rightarrow 00:54:17.455$  dramatically changed someones
- NOTE Confidence: 0.88407976875
- 00:54:17.455 --> 00:54:19.168 social brain function.
- NOTE Confidence: 0.88407976875
- $00:54:19.170 \longrightarrow 00:54:20.982$  It's not like they would leave
- NOTE Confidence: 0.88407976875
- $00:54:20.982 \longrightarrow 00:54:21.888$  your lab reporting.
- NOTE Confidence: 0.88407976875
- $00:54:21.890 \rightarrow 00:54:23.969$  They have more friends write these things.
- NOTE Confidence: 0.88407976875
- $00{:}54{:}23{.}970 \dashrightarrow 00{:}54{:}25{.}520$  It's an intersection of brain
- NOTE Confidence: 0.88407976875
- 00:54:25.520 --> 00:54:26.450 systems and environment,
- NOTE Confidence: 0.88407976875
- $00:54:26.450 \rightarrow 00:54:28.410$  and so you know that's a tall order.
- NOTE Confidence: 0.88407976875
- $00:54:28.410 \rightarrow 00:54:29.415$  Maybe we could see differences
- NOTE Confidence: 0.88407976875
- $00{:}54{:}29{.}415 \dashrightarrow 00{:}54{:}30{.}219$  here that would be.
- NOTE Confidence: 0.88407976875
- $00{:}54{:}30{.}220 \dashrightarrow 00{:}54{:}31{.}276$  Predictive about the differences
- NOTE Confidence: 0.88407976875
- $00{:}54{:}31{.}276 \dashrightarrow 00{:}54{:}32{.}068$  and maybe also,
- NOTE Confidence: 0.88407976875
- $00{:}54{:}32.070 \dashrightarrow 00{:}54{:}33.942$  we could see predictions about who's
- NOTE Confidence: 0.88407976875

 $00:54:33.942 \rightarrow 00:54:36.247$  going to respond at all and who's not.

NOTE Confidence: 0.88407976875

 $00{:}54{:}36{.}250 \dashrightarrow 00{:}54{:}37{.}832$  Maybe the people with the slowest and

NOTE Confidence: 0.88407976875

 $00:54:37.832 \longrightarrow 00:54:39.975$  70s are the ones that we should be

NOTE Confidence: 0.88407976875

 $00:54:39.975 \rightarrow 00:54:41.385$  providing direct brain stimulation to.

NOTE Confidence: 0.88407976875

 $00:54:41.390 \longrightarrow 00:54:42.098$  Maybe the opposite.

NOTE Confidence: 0.88407976875

00:54:42.098 --> 00:54:43.750 We don't know what we see so

NOTE Confidence: 0.88407976875

00:54:43.806 - 00:54:44.986 far and just pilot data.

NOTE Confidence: 0.88407976875

 $00:54:44.990 \longrightarrow 00:54:46.838$  And this is work will start.

NOTE Confidence: 0.88407976875

 $00{:}54{:}46{.}840 \dashrightarrow 00{:}54{:}48{.}650$  This will start seeing participants

NOTE Confidence: 0.88407976875

 $00:54:48.650 \rightarrow 00:54:53.008$  really in earnest in in December.

NOTE Confidence: 0.88407976875

00:54:53.010 --> 00:54:54.216 These are pilot data that were

NOTE Confidence: 0.88407976875

 $00{:}54{:}54{.}216$  -->  $00{:}54{:}55{.}870$  part of a grand was recently funded

NOTE Confidence: 0.88407976875

00:54:55.870 -> 00:54:57.210 by the Department of Defense,

NOTE Confidence: 0.88407976875

 $00{:}54{:}57{.}210 \dashrightarrow 00{:}54{:}59{.}346$  but the but we see even in people

NOTE Confidence: 0.88407976875

 $00{:}54{:}59{.}346 \dashrightarrow 00{:}55{:}00{.}690$  who don't have autism,

NOTE Confidence: 0.88407976875

 $00:55:00.690 \longrightarrow 00:55:02.706$  that it tends to move the needle.
$00{:}55{:}02.710 \dashrightarrow 00{:}55{:}04.900$  The biomarker needle in the directions

NOTE Confidence: 0.88407976875

 $00{:}55{:}04{.}900 \dashrightarrow 00{:}55{:}07{.}644$  that we would expect we see and when

NOTE Confidence: 0.88407976875

 $00:55:07.644 \rightarrow 00:55:09.462$  70s get faster when you stimulate

NOTE Confidence: 0.88407976875

 $00:55:09.533 \dashrightarrow 00:55:11.612$  VSTS and we see people looking more

NOTE Confidence: 0.88407976875

 $00:55:11.612 \rightarrow 00:55:13.251$  to eyes when you stimulate VSTS.

NOTE Confidence: 0.88407976875

 $00:55:13.251 \longrightarrow 00:55:14.733$  It's also not on this slide,

NOTE Confidence: 0.88407976875

 $00:55:14.740 \longrightarrow 00:55:16.028$  but one of the things I'm really,

NOTE Confidence: 0.88407976875

00:55:16.030 --> 00:55:18.182 really, really, really, really,

NOTE Confidence: 0.88407976875

 $00:55:18.182 \rightarrow 00:55:21.740$  really excited about is that CHERUB is.

NOTE Confidence: 0.88407976875

 $00:55:21.740 \longrightarrow 00:55:23.637$  Is it already an expert in TMS?

NOTE Confidence: 0.88407976875

 $00{:}55{:}23.640 \dashrightarrow 00{:}55{:}26.214$  Because TMS is an FDA approved

NOTE Confidence: 0.88407976875

 $00{:}55{:}26{.}214 \dashrightarrow 00{:}55{:}27{.}930$  treatment for treatment resistant

NOTE Confidence: 0.88407976875

 $00{:}55{:}28.002 \dashrightarrow 00{:}55{:}29.934$  depression and this is a place

NOTE Confidence: 0.88407976875

 $00{:}55{:}29{.}934 \dashrightarrow 00{:}55{:}32{.}230$  where he has lots of experience.

NOTE Confidence: 0.88407976875

 $00{:}55{:}32{.}230 \dashrightarrow 00{:}55{:}33{.}634$  He lives in our lab half time

 $00:55:33.634 \rightarrow 00:55:34.999$  and he lives at the VA,

NOTE Confidence: 0.88407976875

 $00{:}55{:}35{.}000 \dashrightarrow 00{:}55{:}36{.}405$  working in the treatment resistant

NOTE Confidence: 0.88407976875

 $00{:}55{:}36{.}405 \dashrightarrow 00{:}55{:}37{.}248$  depression clinics there.

NOTE Confidence: 0.88407976875

 $00:55:37.250 \longrightarrow 00:55:38.888$  The other half of the time

NOTE Confidence: 0.88407976875

 $00{:}55{:}38{.}888 \dashrightarrow 00{:}55{:}40{.}835$  and depression is a very very

NOTE Confidence: 0.88407976875

00:55:40.835 --> 00:55:42.419 significant problem in autism.

NOTE Confidence: 0.88407976875

 $00:55:42.420 \rightarrow 00:55:44.845$  Many the typical treatments for

NOTE Confidence: 0.88407976875

 $00{:}55{:}44.845 \dashrightarrow 00{:}55{:}47.727$  depression and autism are not effective

NOTE Confidence: 0.88407976875

 $00{:}55{:}47.727 \dashrightarrow 00{:}55{:}50.695$  for a host of reasons and TMS is

NOTE Confidence: 0.88407976875

 $00:55:50.700 \rightarrow 00:55:53.717$  from my perspective holds great promise for.

NOTE Confidence: 0.88407976875

 $00{:}55{:}53.720 \dashrightarrow 00{:}55{:}55.164$  Addressing depression and autism.

NOTE Confidence: 0.88407976875

 $00{:}55{:}55{.}164 \dashrightarrow 00{:}55{:}56{.}608$  And that's something that

NOTE Confidence: 0.88407976875

 $00:55:56.608 \rightarrow 00:55:58.259$  sheriff is literally shared,

NOTE Confidence: 0.88407976875

00:55:58.260 --> 00:55:59.010 but you would agree, right?

NOTE Confidence: 0.88407976875

 $00{:}55{:}59{.}010 \dashrightarrow 00{:}56{:}00{.}160$  You're probably the best person

NOTE Confidence: 0.88407976875

 $00:56:00.160 \longrightarrow 00:56:01.700$  on Earth to solve that problem,

00:56:01.700 --> 00:56:02.960 right?

NOTE Confidence: 0.88407976875

 $00{:}56{:}02{.}960 \dashrightarrow 00{:}56{:}04{.}580$  But that's something that we're going

NOTE Confidence: 0.88407976875

 $00:56:04.580 \longrightarrow 00:56:06.798$  to be working on next as well and

NOTE Confidence: 0.88407976875

 $00:56:06.798 \rightarrow 00:56:08.158$  shrubs they Hillebrand fell off.

NOTE Confidence: 0.88407976875

 $00:56:08.160 \longrightarrow 00:56:08.892$  Forgot to mention,

NOTE Confidence: 0.88407976875

 $00{:}56{:}08{.}892 \dashrightarrow 00{:}56{:}10{.}600$  but that's what I wanted to talk

NOTE Confidence: 0.934299440909091

 $00:56:10.652 \rightarrow 00:56:13.020$  about. I'm despite my enthusiasm and

NOTE Confidence: 0.934299440909091

 $00:56:13.020 \rightarrow 00:56:14.415$  loquaciousness, I'm glad to see I've

NOTE Confidence: 0.934299440909091

 $00{:}56{:}14.415 \dashrightarrow 00{:}56{:}15.880$  saved a few minutes for questions.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}15.880 \dashrightarrow 00{:}56{:}20.040$  I I do want to thank a few groups because.

NOTE Confidence: 0.934299440909091

 $00:56:20.040 \rightarrow 00:56:21.580$  Mentioned at the outset, you know this.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}21.580 \dashrightarrow 00{:}56{:}23.788$  This work exists between the clinic

NOTE Confidence: 0.934299440909091

 $00{:}56{:}23.790 \dashrightarrow 00{:}56{:}25.295$  and the lab, and the consortium is.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}25{.}300 \dashrightarrow 00{:}56{:}26{.}740$  There's a lot of people involved.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}26{.}740 \dashrightarrow 00{:}56{:}28{.}858$  The most important people involved are

 $00:56:28.858 \longrightarrow 00:56:31.536$  the the the, the people with autism,

NOTE Confidence: 0.934299440909091

 $00{:}56{:}31{.}536 \dashrightarrow 00{:}56{:}33{.}960$  and the families that go through

NOTE Confidence: 0.934299440909091

 $00{:}56{:}34.035 \dashrightarrow 00{:}56{:}36.243$  the trouble of spending long boring

NOTE Confidence: 0.934299440909091

 $00:56:36.243 \longrightarrow 00:56:38.800$  days with us to help us learn.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}38{.}800 \dashrightarrow 00{:}56{:}41{.}188$  And we're we're realistic about it.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}41{.}190 \dashrightarrow 00{:}56{:}44{.}284$  In fact, my kids are participants in

NOTE Confidence: 0.934299440909091

 $00{:}56{:}44{.}284 \dashrightarrow 00{:}56{:}47{.}645$  the abcte and my wife lets me know

NOTE Confidence: 0.934299440909091

00:56:47.645 --> 00:56:50.739 just how annoying my my studies are.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}50{.}740 \dashrightarrow 00{:}56{:}52{.}720$  And so and she and we've got a stake in it,

NOTE Confidence: 0.934299440909091

 $00:56:52.720 \dashrightarrow 00:56:55.478$  so we're very grateful for their time.

NOTE Confidence: 0.934299440909091

 $00{:}56{:}55{.}480 \dashrightarrow 00{:}56{:}57{.}376$  We're really grateful for the clinicians

NOTE Confidence: 0.934299440909091

 $00{:}56{:}57{.}376 \dashrightarrow 00{:}56{:}59{.}000$  in the development disabilities clinic.

NOTE Confidence: 0.934299440909091

00:56:59.000 - 00:57:00.836 Who are are truly world class.

NOTE Confidence: 0.934299440909091

 $00:57:00.840 \longrightarrow 00:57:01.604$  And that's, I think,

NOTE Confidence: 0.934299440909091

 $00{:}57{:}01.604 \dashrightarrow 00{:}57{:}02.559$  where all this research begins.

NOTE Confidence: 0.934299440909091

00:57:02.560 --> 00:57:04.066 Because it's probably part of the

 $00:57:04.066 \rightarrow 00:57:05.317$  reason that people are willing

NOTE Confidence: 0.934299440909091

 $00:57:05.317 \longrightarrow 00:57:06.724$  to come in and work with us.

NOTE Confidence: 0.934299440909091

00:57:06.730 --> 00:57:09.362 The Autism Biomarkers Consortium,

NOTE Confidence: 0.934299440909091

 $00:57:09.362 \rightarrow 00:57:12.576$  which is really it, is a it is.

NOTE Confidence: 0.934299440909091

 $00{:}57{:}12.580 \dashrightarrow 00{:}57{:}14.338$  It's been a an amazing experience

NOTE Confidence: 0.934299440909091

 $00:57:14.338 \rightarrow 00:57:16.499$  to work with this group of people

NOTE Confidence: 0.934299440909091

 $00:57:16.499 \rightarrow 00:57:18.669$  because they're truly in in autism the

NOTE Confidence: 0.934299440909091

 $00:57:18.730 \longrightarrow 00:57:20.745$  best at what they do in the world.

NOTE Confidence: 0.934299440909091

 $00{:}57{:}20.750 \dashrightarrow 00{:}57{:}23.170$  And yet they are selfless, tireless,

NOTE Confidence: 0.934299440909091

 $00:57:23.170 \dashrightarrow 00:57:25.414$  and generous without limits.

NOTE Confidence: 0.934299440909091

 $00{:}57{:}25{.}414 \dashrightarrow 00{:}57{:}29{.}050$  And then the people in the lab who who

NOTE Confidence: 0.934299440909091

00:57:29.050 --> 00:57:31.842 this was our first lab meeting after we

NOTE Confidence: 0.934299440909091

 $00{:}57{:}31{.}920 \dashrightarrow 00{:}57{:}34{.}664$  were able to all come back in person.

NOTE Confidence: 0.934299440909091

 $00{:}57{:}34.670 \dashrightarrow 00{:}57{:}36.294$  But this these are the people who are

NOTE Confidence: 0.934299440909091

 $00{:}57{:}36{.}294 \dashrightarrow 00{:}57{:}38{.}022$  doing the work that I have the pleasure

 $00:57:38.022 \rightarrow 00:57:39.610$  of talking with you all about today.

NOTE Confidence: 0.934299440909091

 $00{:}57{:}39{.}610 \dashrightarrow 00{:}57{:}41{.}465$  So thank you all for your attention

NOTE Confidence: 0.934299440909091

 $00:57:41.465 \rightarrow 00:57:43.299$  and thank you all for your help.

NOTE Confidence: 0.771427025

 $00:57:51.400 \longrightarrow 00:57:54.999$  Sure, for. I think thank

NOTE Confidence: 0.771427025

00:57:54.999 - 00:57:57.464 you very high level here.

NOTE Confidence: 0.71676125875

 $00:57:59.750 \rightarrow 00:58:03.334$  Uhm, a lot of your question is fascinating,

NOTE Confidence: 0.71676125875

 $00:58:03.340 \longrightarrow 00:58:06.652$  but a lot of your questions about specificity

NOTE Confidence: 0.71676125875

 $00:58:06.652 \rightarrow 00:58:08.959$  about whether it labels a subtype,

NOTE Confidence: 0.71676125875

 $00{:}58{:}08{.}960 \dashrightarrow 00{:}58{:}10{.}692$  whether it's disorder specific,

NOTE Confidence: 0.71676125875

 $00{:}58{:}10.692 \dashrightarrow 00{:}58{:}12.857$  how label it isn't stable.

NOTE Confidence: 0.71676125875

 $00:58:12.860 \longrightarrow 00:58:14.490$  It is, could be answered.

NOTE Confidence: 0.71676125875

00:58:14.490 --> 00:58:15.758 Perhaps if you talk,

NOTE Confidence: 0.71676125875

 $00{:}58{:}15.758 \dashrightarrow 00{:}58{:}18.680$  or if we know about the neuroscience.

NOTE Confidence: 0.71676125875

00:58:18.680 --> 00:58:22.190 Of N 170, right and.

NOTE Confidence: 0.71676125875

 $00{:}58{:}22.190 \dashrightarrow 00{:}58{:}24.647$  I'm sure it's been measured in animals

NOTE Confidence: 0.71676125875

 $00{:}58{:}24.650 \dashrightarrow 00{:}58{:}26.330$  including primates, and I'm sure

- NOTE Confidence: 0.71676125875
- $00:58:26.330 \rightarrow 00:58:28.410$  people have looked more in depth.

 $00:58:28.410 \longrightarrow 00:58:29.164$  For example,

NOTE Confidence: 0.71676125875

 $00:58:29.164 \rightarrow 00:58:31.426$  does it arise in sensory cortices?

NOTE Confidence: 0.71676125875

 $00:58:31.430 \longrightarrow 00:58:33.146$  But you're talking more about this

NOTE Confidence: 0.71676125875

 $00{:}58{:}33.146 \dashrightarrow 00{:}58{:}35.800$  is a more maybe more of an emotional

NOTE Confidence: 0.71676125875

 $00{:}58{:}35{.}800 \dashrightarrow 00{:}58{:}37{.}966$  response rather than a cognitive response,

NOTE Confidence: 0.71676125875

00:58:37.970 --> 00:58:39.220 or even a sensory response,

NOTE Confidence: 0.71676125875

 $00{:}58{:}39{.}220 \dashrightarrow 00{:}58{:}42{.}460$  so I'm a little confused about was it,

NOTE Confidence: 0.71676125875

 $00:58:42.460 \rightarrow 00:58:44.784$  what is it from a neuroscience standpoint?

NOTE Confidence: 0.71676125875

 $00:58:44.790 \longrightarrow 00:58:46.150$  Because that could really address

NOTE Confidence: 0.71676125875

 $00:58:46.150 \longrightarrow 00:58:47.618$  all of these questions, right?

NOTE Confidence: 0.71676125875

00:58:47.618 --> 00:58:49.508 It might, I don't know.

NOTE Confidence: 0.71676125875

 $00{:}58{:}49{.}510 \dashrightarrow 00{:}58{:}51{.}246$  I mean, I think it's it's it's attractive.

NOTE Confidence: 0.71676125875

 $00{:}58{:}51{.}250 \dashrightarrow 00{:}58{:}51{.}820$  The idea?

NOTE Confidence: 0.71676125875

 $00{:}58{:}51{.}820 \dashrightarrow 00{:}58{:}53{.}815$  So, so I hope every one here floor

 $00:58:53.815 \rightarrow 00:58:56.066$  is very good question and if I would

NOTE Confidence: 0.71676125875

00:58:56.066 --> 00:58:58.499 if I could paraphrase your question,

NOTE Confidence: 0.71676125875

 $00{:}58{:}58{.}500 \dashrightarrow 00{:}59{:}00{.}663$  it would be like what is the

NOTE Confidence: 0.71676125875

 $00:59:00.663 \dashrightarrow 00:59:02.758$  mechanism that is indexed by the N

NOTE Confidence: 0.71676125875

 $00{:}59{:}02.758 \dashrightarrow 00{:}59{:}05.219$  170 and the answer is we don't know.

NOTE Confidence: 0.71676125875

00:59:05.220 --> 00:59:05.632 You know,

NOTE Confidence: 0.71676125875

 $00:59:05.632 \rightarrow 00:59:07.870$  we know we know kind of where it comes from,

NOTE Confidence: 0.71676125875

 $00:59:07.870 \rightarrow 00:59:08.160$  right?

NOTE Confidence: 0.71676125875

 $00:59:08.160 \rightarrow 00:59:09.900$  It comes from occipital temporal cortex.

NOTE Confidence: 0.71676125875

00:59:09.900 --> 00:59:11.930 It's an EEG measure, right?

NOTE Confidence: 0.71676125875

00:59:11.930 --> 00:59:14.080 And so it's probably reflecting,

NOTE Confidence: 0.71676125875

 $00:59:14.080 \longrightarrow 00:59:15.212$  not probably.

NOTE Confidence: 0.71676125875

 $00:59:15.212 \longrightarrow 00:59:18.042$  It is reflecting activity in

NOTE Confidence: 0.71676125875

 $00:59:18.042 \rightarrow 00:59:19.475$  different places, right?

NOTE Confidence: 0.71676125875

00:59:19.475 --> 00:59:21.540 So it's probably STS as I said,

NOTE Confidence: 0.71676125875

 $00:59:21.540 \longrightarrow 00:59:22.520$  but maybe also fuse.

 $00:59:22.520 \rightarrow 00:59:24.332$  From Jirus you know we don't have

NOTE Confidence: 0.71676125875

 $00{:}59{:}24{.}332 \dashrightarrow 00{:}59{:}25{.}757$  really perfect ways of measuring

NOTE Confidence: 0.71676125875

 $00{:}59{:}25{.}757 \dashrightarrow 00{:}59{:}27{.}234$  from where a signal recorded

NOTE Confidence: 0.71676125875

 $00:59:27.234 \rightarrow 00:59:28.908$  scalp comes from in the brain.

NOTE Confidence: 0.860961210909091

00:59:32.190 - > 00:59:33.750 We know same things like that's

NOTE Confidence: 0.860961210909091

 $00:59:33.750 \longrightarrow 00:59:35.360$  where it comes like occipital,

NOTE Confidence: 0.860961210909091

00:59:35.360 --> 00:59:36.924 temporal cortex like fusiform

NOTE Confidence: 0.860961210909091

00:59:36.924 --> 00:59:38.097 gyrus across species.

NOTE Confidence: 0.860961210909091

 $00{:}59{:}38{.}100 \dashrightarrow 00{:}59{:}40{.}764$  But even when we know that what then

NOTE Confidence: 0.860961210909091

 $00:59:40.764 \longrightarrow 00:59:42.780$  what like what do we do with that?

NOTE Confidence: 0.860961210909091

 $00:59:42.780 \longrightarrow 00:59:44.532$  That's the problem right?

NOTE Confidence: 0.860961210909091

 $00{:}59{:}44{.}532 \dashrightarrow 00{:}59{:}47{.}699$  It's like the we in autism we're

NOTE Confidence: 0.860961210909091

 $00{:}59{:}47.699 \dashrightarrow 00{:}59{:}50.870$  making all of our decisions based on.

NOTE Confidence: 0.860961210909091

 $00{:}59{:}50{.}870 \dashrightarrow 00{:}59{:}51{.}872$  Perception of behavior.

NOTE Confidence: 0.860961210909091

 $00{:}59{:}51{.}872 \dashrightarrow 00{:}59{:}53{.}876$  One of the things that's nice,

 $00:59:53.880 \rightarrow 00:59:56.336$  I mean to take the other extreme right?

NOTE Confidence: 0.860961210909091

 $00{:}59{:}56{.}340 \dashrightarrow 00{:}59{:}58{.}097$  Like if we could find a difference

NOTE Confidence: 0.860961210909091

00:59:58.097 --> 00:59:59.725 in a synapse in autism, right?

NOTE Confidence: 0.860961210909091

 $00:59:59.725 \longrightarrow 01:00:01.150$  That would be a beautiful

NOTE Confidence: 0.860961210909091

 $01{:}00{:}01{.}150 \dashrightarrow 01{:}00{:}02{.}290$  illustration of a mechanism.

NOTE Confidence: 0.860961210909091

 $01:00:02.290 \rightarrow 01:00:04.570$  But it wouldn't tell me at all what to do.

NOTE Confidence: 0.860961210909091

01:00:04.570 --> 01:00:05.908 When I go into the clinic,

NOTE Confidence: 0.860961210909091

 $01:00:05.910 \longrightarrow 01:00:08.006$  and so I think of this as occupying

NOTE Confidence: 0.860961210909091

 $01:00:08.006 \rightarrow 01:00:09.962$  kind of an important translational

NOTE Confidence: 0.860961210909091

 $01:00:09.962 \rightarrow 01:00:12.362$  space between the really, really

NOTE Confidence: 0.860961210909091

 $01:00:12.362 \rightarrow 01:00:15.854$  subjective things that we use presently.

NOTE Confidence: 0.860961210909091

 $01:00:15.860 \rightarrow 01:00:18.422$  To things that are convergently presumably

NOTE Confidence: 0.860961210909091

 $01:00:18.422 \rightarrow 01:00:21.917$  valid in terms of mapping to those things.

NOTE Confidence: 0.860961210909091

 $01:00:21.920 \rightarrow 01:00:23.492$  And closer to mechanism,

NOTE Confidence: 0.860961210909091

 $01:00:23.492 \rightarrow 01:00:25.064$  but not mechanisms yet.

NOTE Confidence: 0.860961210909091

 $01{:}00{:}25.070 \dashrightarrow 01{:}00{:}27.198$  But that's that's the challenge I mean.

 $01:00:27.200 \longrightarrow 01:00:28.978$  And you mean you're uniquely qualified to

NOTE Confidence: 0.860961210909091

 $01:00:28.978 \rightarrow 01:00:30.988$  help me think about how we could define,

NOTE Confidence: 0.860961210909091

01:00:30.988 --> 01:00:33.494 you, know, just to elucidate the mechanism,

NOTE Confidence: 0.860961210909091

 $01:00:33.500 \rightarrow 01:00:35.698$  namely 70, but we don't know yet.

NOTE Confidence: 0.860961210909091

01:00:35.700 --> 01:00:35.981 Jamie,

NOTE Confidence: 0.860961210909091

 $01{:}00{:}35{.}981 \dashrightarrow 01{:}00{:}37{.}667$  I think this really dove tails quite

NOTE Confidence: 0.860961210909091

 $01{:}00{:}37.667 \dashrightarrow 01{:}00{:}39.432$  nicely with the question that we had

NOTE Confidence: 0.860961210909091

 $01:00:39.432 \rightarrow 01:00:41.420$  come in on the chat from Zoran Zamolo,

NOTE Confidence: 0.860961210909091

 $01{:}00{:}41{.}420 \dashrightarrow 01{:}00{:}43{.}296$  and he was asking about whether or

NOTE Confidence: 0.860961210909091

 $01:00:43.296 \longrightarrow 01:00:45.288$  not an increased latency of the N 170

NOTE Confidence: 0.860961210909091

 $01:00:45.288 \longrightarrow 01:00:47.188$  above 250 milliseconds actually is

NOTE Confidence: 0.860961210909091

 $01{:}00{:}47.188 \dashrightarrow 01{:}00{:}49.273$  associated with increased severity of

NOTE Confidence: 0.860961210909091

 $01{:}00{:}49{.}273 \dashrightarrow 01{:}00{:}51{.}255$  clinical presentation or increased

NOTE Confidence: 0.860961210909091

 $01{:}00{:}51{.}255 \dashrightarrow 01{:}00{:}53{.}259$  difficulty with social communication.

NOTE Confidence: 0.860961210909091

 $01:00:53.260 \longrightarrow 01:00:55.980$  No, so this is the thing that is

- $01:00:55.980 \longrightarrow 01:00:57.419$  this stymied us right?
- NOTE Confidence: 0.860961210909091
- $01:00:57.420 \longrightarrow 01:00:58.484$  So and we have,
- NOTE Confidence: 0.860961210909091
- 01:00:58.484 --> 01:00:59.016 like really,
- NOTE Confidence: 0.860961210909091
- $01:00:59.020 \rightarrow 01:01:00.956$  really great clever statisticians
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}00.956 \dashrightarrow 01{:}01{:}03.860$  thinking we did every clinical measure.
- NOTE Confidence: 0.860961210909091
- 01:01:03.860 --> 01:01:05.280 And you know what?
- NOTE Confidence: 0.860961210909091
- 01:01:05.280 --> 01:01:07.526 Wouldn't it be a we some if we
- NOTE Confidence: 0.860961210909091
- $01:01:07.526 \longrightarrow 01:01:09.178$  took this in 170?
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}09{.}180 \dashrightarrow 01{:}01{:}11{.}724$  We said look this difference that we thought
- NOTE Confidence: 0.860961210909091
- $01:01:11.724 \rightarrow 01:01:14.526$  was true in this big rigorous study is true,
- NOTE Confidence: 0.860961210909091
- 01:01:14.530 $\operatorname{-->}$ 01:01:16.480 and it associate's with the
- NOTE Confidence: 0.860961210909091
- $01:01:16.480 \longrightarrow 01:01:18.800$  phenotype in a really high way.
- NOTE Confidence: 0.860961210909091
- 01:01:18.800 --> 01:01:19.189 Nope,
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}19{.}189 \dashrightarrow 01{:}01{:}21{.}523$  you know what associate's with it
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}21{.}523 \dashrightarrow 01{:}01{:}24.008$  associates with how well you recognize.
- NOTE Confidence: 0.860961210909091
- $01:01:24.010 \longrightarrow 01:01:25.453$  Faces which is.

- NOTE Confidence: 0.860961210909091
- $01:01:25.453 \rightarrow 01:01:26.896$  Telling us something,
- NOTE Confidence: 0.860961210909091
- 01:01:26.900 --> 01:01:28.993 I think right when we think what
- NOTE Confidence: 0.860961210909091
- $01:01:28.993 \rightarrow 01:01:31.291$  does it mean to say that something
- NOTE Confidence: 0.860961210909091
- 01:01:31.291 --> 01:01:33.283 I measure like and 170 would
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}33{.}359 \dashrightarrow 01{:}01{:}35{.}287$  associate with the phenotype.
- NOTE Confidence: 0.860961210909091
- $01:01:35.290 \rightarrow 01:01:36.952$  What's the phenotype?
- NOTE Confidence: 0.860961210909091
- $01:01:36.952 \rightarrow 01:01:38.060$  It's it's.
- NOTE Confidence: 0.860961210909091
- 01:01:38.060 --> 01:01:41.150 It's I contact right, its language,
- NOTE Confidence: 0.860961210909091
- $01:01:41.150 \longrightarrow 01:01:43.898$  its flexibility of behavior.
- NOTE Confidence: 0.860961210909091
- 01:01:43.898 --> 01:01:45.959 It's sensory response.
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}45{.}960 \dashrightarrow 01{:}01{:}48{.}858$  What are the odds that one readout
- NOTE Confidence: 0.860961210909091
- 01:01:48.860 01:01:51.860 of one neural system happening?
- NOTE Confidence: 0.860961210909091
- 01:01:51.860 --> 01:01:52.466 You know,
- NOTE Confidence: 0.860961210909091
- 01:01:52.466 --> 01:01:53.072 short latency,
- NOTE Confidence: 0.860961210909091
- $01:01:53.072 \longrightarrow 01:01:54.587$  so it's pretty perceptual is
- NOTE Confidence: 0.860961210909091

- $01:01:54.587 \rightarrow 01:01:56.176$  going to capture all of those.
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}56{.}180 \dashrightarrow 01{:}01{:}58{.}256$  Things we wanted it to happen.
- NOTE Confidence: 0.860961210909091
- $01{:}01{:}58.260 \dashrightarrow 01{:}02{:}00.020$  It didn't happen and I think we have
- NOTE Confidence: 0.860961210909091
- $01:02:00.020 \rightarrow 01:02:01.668$  to accept that and understand
- NOTE Confidence: 0.860961210909091
- $01{:}02{:}01{.}668 \dashrightarrow 01{:}02{:}03{.}108$  that it's telling us something
- NOTE Confidence: 0.860961210909091
- $01:02:03.108 \longrightarrow 01:02:04.500$  about the biology of autism.
- NOTE Confidence: 0.860961210909091
- $01:02:04.500 \longrightarrow 01:02:07.020$  And again, that's a great like that.
- NOTE Confidence: 0.860961210909091
- $01:02:07.020 \longrightarrow 01:02:07.604$  Question is,
- NOTE Confidence: 0.860961210909091
- $01{:}02{:}07{.}604 \dashrightarrow 01{:}02{:}09{.}356$  that's why we got to think
- NOTE Confidence: 0.860961210909091
- $01:02:09.356 \longrightarrow 01:02:10.938$  really carefully about how we
- NOTE Confidence: 0.860961210909091
- $01:02:10.938 \longrightarrow 01:02:11.877$  think about biomarkers.
- NOTE Confidence: 0.860961210909091
- 01:02:11.880 --> 01:02:13.674 That doesn't mean I don't think
- NOTE Confidence: 0.860961210909091
- $01:02:13.674 \rightarrow 01:02:15.870$  maybe the animal 70 won't be useful,
- NOTE Confidence: 0.860961210909091
- $01:02:15.870 \longrightarrow 01:02:16.680$  but for now,
- NOTE Confidence: 0.860961210909091
- $01:02:16.680 \longrightarrow 01:02:18.570$  it's one of the few things that
- NOTE Confidence: 0.860961210909091
- $01:02:18.641 \rightarrow 01:02:20.669$  we can presume to be really

- NOTE Confidence: 0.860961210909091
- $01:02:20.669 \longrightarrow 01:02:22.426$  consistently true about how the
- NOTE Confidence: 0.860961210909091
- 01:02:22.426 --> 01:02:24.116 brain is different in autism,
- NOTE Confidence: 0.860961210909091
- 01:02:24.120 --> 01:02:25.108 and so you know,
- NOTE Confidence: 0.860961210909091
- $01{:}02{:}25{.}108 \dashrightarrow 01{:}02{:}26{.}343$  to me it makes sense.
- NOTE Confidence: 0.8748344
- $01:02:26.350 \longrightarrow 01:02:27.148$  To look at all the ways,
- NOTE Confidence: 0.8748344
- $01:02:27.150 \longrightarrow 01:02:28.809$  could you be useful 'cause we have
- NOTE Confidence: 0.8748344
- $01:02:28.809 \rightarrow 01:02:30.209$  nothing better by that standard,
- NOTE Confidence: 0.8748344
- $01:02:30.210 \longrightarrow 01:02:32.576$  but is it a proxy for autism?
- NOTE Confidence: 0.8748344
- 01:02:32.580 --> 01:02:34.330 Per say no? And I don't know
- NOTE Confidence: 0.8748344
- $01:02:34.330 \longrightarrow 01:02:35.906$  that we're going to find a
- NOTE Confidence: 0.8748344
- $01:02:35.906 \longrightarrow 01:02:37.430$  biomarker of this type that is.
- NOTE Confidence: 0.845363396153846
- $01{:}02{:}41{.}140 \dashrightarrow 01{:}02{:}42{.}616$  Jamie, that was fantastic.
- NOTE Confidence: 0.845363396153846
- 01:02:42.616 --> 01:02:44.092 You're as passionate as
- NOTE Confidence: 0.845363396153846
- $01{:}02{:}44.092 \dashrightarrow 01{:}02{:}45.709$  you were as an intern.
- NOTE Confidence: 0.845363396153846
- $01:02:45.710 \longrightarrow 01:02:47.230$  I remember so well.
- NOTE Confidence: 0.845363396153846

 $01:02:47.230 \longrightarrow 01:02:49.130$  Quick thing you said that

NOTE Confidence: 0.845363396153846

 $01{:}02{:}49{.}130 \dashrightarrow 01{:}02{:}50{.}288$  biomarkers are controversial.

NOTE Confidence: 0.845363396153846

 $01{:}02{:}50{.}288 \dashrightarrow 01{:}02{:}52{.}604$  Are there safe guards about the misuse

NOTE Confidence: 0.845363396153846

 $01:02:52.604 \rightarrow 01:02:54.980$  of biomarkers so that you know people?

NOTE Confidence: 0.845363396153846

 $01:02:54.980 \longrightarrow 01:02:57.680$  Can you know inappropriately be diagnosed?

NOTE Confidence: 0.845363396153846

 $01{:}02{:}57.680 \dashrightarrow 01{:}02{:}59.500$  You know, there's a lot of stigma

NOTE Confidence: 0.845363396153846

 $01{:}02{:}59{.}500 \dashrightarrow 01{:}03{:}01{.}193$  that goes along with these diagnosis

NOTE Confidence: 0.845363396153846

 $01{:}03{:}01{.}193 \dashrightarrow 01{:}03{:}03{.}195$  and you know too many people feel

NOTE Confidence: 0.845363396153846

01:03:03.256 --> 01:03:05.111 that if you have autism you can't

NOTE Confidence: 0.845363396153846

 $01:03:05.111 \dashrightarrow 01:03:07.756$  really feel or relate or learn much.

NOTE Confidence: 0.845363396153846

01:03:07.760 --> 01:03:09.308 You know any any.

NOTE Confidence: 0.845363396153846

 $01{:}03{:}09{.}308 \dashrightarrow 01{:}03{:}10.856$  Safeguards against the misuse

NOTE Confidence: 0.845363396153846

 $01{:}03{:}10.856 \dashrightarrow 01{:}03{:}13.082$  of these biomarkers. It's a.

NOTE Confidence: 0.845363396153846

 $01:03:13.082 \dashrightarrow 01:03:15.273$  It's a what a great question, Larry.

NOTE Confidence: 0.845363396153846

 $01:03:15.273 \rightarrow 01:03:17.857$  I mean, first we just agree with you

NOTE Confidence: 0.845363396153846

 $01:03:17.857 \rightarrow 01:03:20.381$  that thinking about the ethical use

- NOTE Confidence: 0.845363396153846
- 01:03:20.381 --> 01:03:22.373 of biomarkers is critical, right?
- NOTE Confidence: 0.845363396153846
- $01:03:22.373 \longrightarrow 01:03:24.637$  We have one of the we have an
- NOTE Confidence: 0.845363396153846
- 01:03:24.637 --> 01:03:26.369 external Advisory Board for the
- NOTE Confidence: 0.845363396153846
- 01:03:26.370 --> 01:03:28.530 ABCT and John Elder Robison.
- NOTE Confidence: 0.845363396153846
- $01:03:28.530 \longrightarrow 01:03:30.650$  Who's a man with autism?
- NOTE Confidence: 0.845363396153846
- 01:03:30.650 --> 01:03:32.310 And also a uh,
- NOTE Confidence: 0.845363396153846
- $01:03:32.310 \longrightarrow 01:03:34.745$  a very an author and very thoughtful
- NOTE Confidence: 0.845363396153846
- 01:03:34.745 01:03:37.058 person is active and kind of being a,
- NOTE Confidence: 0.845363396153846
- $01:03:37.060 \longrightarrow 01:03:37.586$  you know,
- NOTE Confidence: 0.845363396153846
- $01:03:37.586 \longrightarrow 01:03:39.427$  a voice of a person with autism
- NOTE Confidence: 0.845363396153846
- $01:03:39.427 \longrightarrow 01:03:41.129$  in the context of science,
- NOTE Confidence: 0.845363396153846
- $01:03:41.130 \dashrightarrow 01:03:42.480$  and he's been immensely helpful.
- NOTE Confidence: 0.845363396153846
- $01:03:42.480 \longrightarrow 01:03:44.433$  And we had a meeting a few weeks ago,
- NOTE Confidence: 0.845363396153846
- $01:03:44.440 \longrightarrow 01:03:45.652$  and that's one of the things
- NOTE Confidence: 0.845363396153846
- $01:03:45.652 \rightarrow 01:03:46.460$  he expressed was concerned.
- NOTE Confidence: 0.845363396153846

01:03:46.460 --> 01:03:46.736 Like.

NOTE Confidence: 0.845363396153846

 $01:03:46.736 \longrightarrow 01:03:48.668$  What are people going to put the

NOTE Confidence: 0.845363396153846

01:03:48.668 --> 01:03:50.442 cart before the horse and say the

NOTE Confidence: 0.845363396153846

01:03:50.442 --> 01:03:52.378 point is to get your N 170 faster?

NOTE Confidence: 0.845363396153846

 $01{:}03{:}52{.}380 \dashrightarrow 01{:}03{:}54{.}480$  And might that put people with autism

NOTE Confidence: 0.845363396153846

 $01{:}03{:}54{.}480 \dashrightarrow 01{:}03{:}56{.}517$  in an unfortunate spot where they're

NOTE Confidence: 0.845363396153846

 $01:03:56.517 \rightarrow 01:03:58.665$  being put through maybe treatments that.

NOTE Confidence: 0.845363396153846

 $01:03:58.670 \longrightarrow 01:03:59.696$  Are actually useful,

NOTE Confidence: 0.845363396153846

 $01:03:59.696 \rightarrow 01:04:02.090$  improving their quality of lives and so.

NOTE Confidence: 0.845363396153846

 $01:04:02.090 \rightarrow 01:04:03.750$  And we agree, we don't.

NOTE Confidence: 0.845363396153846

 $01:04:03.750 \longrightarrow 01:04:05.444$  I hope it's evident that it's not

NOTE Confidence: 0.845363396153846

 $01:04:05.444 \rightarrow 01:04:07.338$  that we don't see these biomarkers as

NOTE Confidence: 0.845363396153846

 $01:04:07.338 \longrightarrow 01:04:09.270$  an end unto themselves in that way,

NOTE Confidence: 0.845363396153846

01:04:09.270 --> 01:04:11.022 but I don't know the answer

NOTE Confidence: 0.845363396153846

 $01:04:11.022 \rightarrow 01:04:12.190$  to your question like.

NOTE Confidence: 0.845363396153846

 $01{:}04{:}12.190 \dashrightarrow 01{:}04{:}15.400$  I don't know that as scientists.

- NOTE Confidence: 0.845363396153846
- 01:04:15.400 --> 01:04:16.608 You know there I,
- NOTE Confidence: 0.845363396153846
- 01:04:16.608 --> 01:04:19.572 I guess I Arby's RR safeguard against
- NOTE Confidence: 0.845363396153846
- $01{:}04{:}19.572 \dashrightarrow 01{:}04{:}23.076$  kind of ethical misuse of biomarkers,
- NOTE Confidence: 0.845363396153846
- $01:04:23.080 \rightarrow 01:04:25.420$  but ultimately, you know this.
- NOTE Confidence: 0.845363396153846
- $01:04:25.420 \longrightarrow 01:04:28.080$  It's what people do, Yep.
- NOTE Confidence: 0.845363396153846
- $01{:}04{:}28.080 \dashrightarrow 01{:}04{:}30.346$  And people having being thoughtful one
- NOTE Confidence: 0.845363396153846
- 01:04:30.346 --> 01:04:32.954 last quick question from Bob King on Zoom.
- NOTE Confidence: 0.845363396153846
- 01:04:32.960 --> 01:04:33.474 Yes,
- NOTE Confidence: 0.845363396153846
- $01{:}04{:}33{.}474 \dashrightarrow 01{:}04{:}36{.}558$  I was wondering about people with
- NOTE Confidence: 0.845363396153846
- $01:04:36.558 \rightarrow 01:04:38.890$  prosopagnosia as one of them.
- NOTE Confidence: 0.845363396153846
- $01:04:38.890 \longrightarrow 01:04:41.265$  I think of otherwise normal
- NOTE Confidence: 0.845363396153846
- $01:04:41.265 \longrightarrow 01:04:43.165$  social skills and intelligence.
- NOTE Confidence: 0.845363396153846
- $01:04:43.170 \longrightarrow 01:04:47.130$  Do you do we have abnormal and one 70s.
- NOTE Confidence: 0.845363396153846
- $01:04:47.130 \longrightarrow 01:04:48.230$  It's a good question Bob.
- NOTE Confidence: 0.845363396153846
- $01{:}04{:}48.230 \dashrightarrow 01{:}04{:}49.718$  And there's a handful of studies
- NOTE Confidence: 0.845363396153846

01:04:49.718 --> 01:04:51.479 that I haven't read in a long time,

NOTE Confidence: 0.845363396153846

 $01:04:51.480 \rightarrow 01:04:53.881$  and people who don't know prosopagnosia is

NOTE Confidence: 0.845363396153846

 $01:04:53.881 \rightarrow 01:04:56.001$  a selective inability to recognize faces

NOTE Confidence: 0.845363396153846

 $01:04:56.001 \rightarrow 01:04:58.402$  despite being able to recognize other things.

NOTE Confidence: 0.845363396153846

 $01{:}04{:}58{.}410 \dashrightarrow 01{:}04{:}58{.}856$  And honestly,

NOTE Confidence: 0.845363396153846

 $01:04:58.856 \longrightarrow 01:04:59.079$  Bob,

NOTE Confidence: 0.845363396153846

 $01{:}04{:}59{.}079 \dashrightarrow 01{:}05{:}01{.}230$  I have to go and check the literature there

NOTE Confidence: 0.845363396153846

 $01{:}05{:}01{.}230 \dashrightarrow 01{:}05{:}03{.}862$  is there is a literature both on kind of

NOTE Confidence: 0.845363396153846

 $01{:}05{:}03.862 \dashrightarrow 01{:}05{:}05.610$  acquired and developmental prosopagnosia.

NOTE Confidence: 0.845363396153846

01:05:05.610 --> 01:05:07.590 And I actually want to say,

NOTE Confidence: 0.845363396153846

01:05:07.590 --> 01:05:08.630 you know, someone can.

NOTE Confidence: 0.845363396153846

01:05:08.630 --> 01:05:10.790 Email me and tell me that I'm wrong,

NOTE Confidence: 0.845363396153846

01:05:10.790 --> 01:05:12.547 but I actually think that they that

NOTE Confidence: 0.845363396153846

 $01{:}05{:}12.547 \dashrightarrow 01{:}05{:}14.382$  we don't see differences in there and

NOTE Confidence: 0.845363396153846

 $01:05:14.382 \rightarrow 01:05:16.450$  170 and they do show and when 70s,

NOTE Confidence: 0.845363396153846

 $01:05:16.450 \rightarrow 01:05:16.689$  right?

- NOTE Confidence: 0.845363396153846
- $01{:}05{:}16.689 \dashrightarrow 01{:}05{:}17.167$  That is.
- NOTE Confidence: 0.845363396153846
- $01{:}05{:}17{.}167 \dashrightarrow 01{:}05{:}18{.}601$  This is something pretty and when
- NOTE Confidence: 0.845363396153846
- 01:05:18.601 -> 01:05:20.358 we think about it actually when we
- NOTE Confidence: 0.845363396153846
- $01:05:20.358 \rightarrow 01:05:21.960$  think about the kinds of cognitive
- NOTE Confidence: 0.845363396153846
- $01:05:21.960 \rightarrow 01:05:23.688$  processes and the way you understand,
- NOTE Confidence: 0.845363396153846
- $01{:}05{:}23.690 \dashrightarrow 01{:}05{:}25.394$  how do you understand what the
- NOTE Confidence: 0.845363396153846
- $01:05:25.394 \rightarrow 01:05:26.530$  cognitive process indexed by
- NOTE Confidence: 0.892859581428571
- $01:05:26.587 \longrightarrow 01:05:27.359$  and 170 is like?
- NOTE Confidence: 0.892859581428571
- $01:05:27.360 \longrightarrow 01:05:29.084$  You do experimental manipulations
- NOTE Confidence: 0.892859581428571
- 01:05:29.084 --> 01:05:31.239 like show familiar and unfamiliar
- NOTE Confidence: 0.892859581428571
- $01:05:31.239 \rightarrow 01:05:33.796$  faces and then 170 is not really
- NOTE Confidence: 0.892859581428571
- $01:05:33.796 \dashrightarrow 01:05:35.168$  tracking with face recognition.
- NOTE Confidence: 0.892859581428571
- $01{:}05{:}35{.}170 \dashrightarrow 01{:}05{:}36{.}918$  Although in our behaviourally
- NOTE Confidence: 0.892859581428571
- $01{:}05{:}36{.}918 \dashrightarrow 01{:}05{:}39{.}540$  right it does but in experiments.
- NOTE Confidence: 0.892859581428571
- 01:05:39.540 --> 01:05:42.252 The N 170 seems to index
- NOTE Confidence: 0.892859581428571

- 01:05:42.252 --> 01:05:43.608 face structural encoding,
- NOTE Confidence: 0.892859581428571
- $01{:}05{:}43.610 \dashrightarrow 01{:}05{:}45.788$  whereas later components like an end
- NOTE Confidence: 0.892859581428571
- $01:05:45.788 \longrightarrow 01:05:48.480$  to end 250 index face recognition.
- NOTE Confidence: 0.892859581428571
- $01:05:48.480 \longrightarrow 01:05:50.056$  Does that make sense?
- NOTE Confidence: 0.892859581428571
- 01:05:50.056 --> 01:05:50.890 Yeah, thank you.
- NOTE Confidence: 0.854062070625
- $01{:}05{:}58{.}860 \dashrightarrow 01{:}06{:}00{.}404$  And just thank you to all the joined
- NOTE Confidence: 0.854062070625
- $01{:}06{:}00{.}404 \dashrightarrow 01{:}06{:}02{.}219$  us on zoom but also in person today.
- NOTE Confidence: 0.854062070625
- $01:06:02.220 \longrightarrow 01:06:03.210$  This is a fantastic talk.
- NOTE Confidence: 0.854062070625
- 01:06:03.210 --> 01:06:05.998 Thanks again from apartment.