

WEBVTT

NOTE duration:"01:01:15"

NOTE recognizability:0.796

NOTE language:en-us

NOTE Confidence: 0.906553975

00:00:00.000 --> 00:00:01.840 It just feels good

NOTE Confidence: 0.925857192222222

00:00:01.990 --> 00:00:03.826 to see all these people here in this room,

NOTE Confidence: 0.925857192222222

00:00:03.830 --> 00:00:06.562 and it feels even better to have the

NOTE Confidence: 0.925857192222222

00:00:06.562 --> 00:00:09.910 opportunity to introduce Doctor Adam Naples.

NOTE Confidence: 0.925857192222222

00:00:09.910 --> 00:00:11.597 So I have known Adam and worked

NOTE Confidence: 0.925857192222222

00:00:11.597 --> 00:00:13.500 closely with Adam for a long time.

NOTE Confidence: 0.925857192222222

00:00:13.500 --> 00:00:16.674 Adam is a is a long-term denizen

NOTE Confidence: 0.925857192222222

00:00:16.674 --> 00:00:19.110 of the Child Study Center.

NOTE Confidence: 0.925857192222222

00:00:19.110 --> 00:00:21.252 He through a kind of interesting

NOTE Confidence: 0.925857192222222

00:00:21.252 --> 00:00:22.323 and circuitous path.

NOTE Confidence: 0.925857192222222

00:00:22.330 --> 00:00:24.940 Adam started out as a musician,

NOTE Confidence: 0.925857192222222

00:00:24.940 --> 00:00:26.480 was admitted to the Berkeley School of

NOTE Confidence: 0.925857192222222

00:00:26.480 --> 00:00:28.503 Music and was there and got exposed to music

NOTE Confidence: 0.925857192222222

00:00:28.503 --> 00:00:30.195 therapy and found the psychology part.
NOTE Confidence: 0.9258571922222222

00:00:30.195 --> 00:00:31.698 Of the music therapy,
NOTE Confidence: 0.9258571922222222

00:00:31.700 --> 00:00:33.749 maybe more interesting than the music.
NOTE Confidence: 0.9258571922222222

00:00:33.749 --> 00:00:35.014 So he transferred to Cornell,
NOTE Confidence: 0.9258571922222222

00:00:35.020 --> 00:00:36.960 got his degree in psychology,
NOTE Confidence: 0.9258571922222222

00:00:36.960 --> 00:00:37.866 came to Yale,
NOTE Confidence: 0.9258571922222222

00:00:37.866 --> 00:00:39.678 got his PhD in cognitive science,
NOTE Confidence: 0.9258571922222222

00:00:39.680 --> 00:00:41.110 and has been here in various
NOTE Confidence: 0.9258571922222222

00:00:41.110 --> 00:00:43.780 ways until he was promoted to
NOTE Confidence: 0.9258571922222222

00:00:43.780 --> 00:00:46.160 assistant professor this past July.
NOTE Confidence: 0.9258571922222222

00:00:46.160 --> 00:00:50.164 As one might infer from making the pivot
NOTE Confidence: 0.9258571922222222

00:00:50.164 --> 00:00:52.584 from guitar to statistical genetics,
NOTE Confidence: 0.9258571922222222

00:00:52.584 --> 00:00:55.860 Adam is a person who is good
NOTE Confidence: 0.9258571922222222

00:00:55.860 --> 00:00:58.140 at a lot of different things.
NOTE Confidence: 0.9258571922222222

00:00:58.140 --> 00:00:59.850 Adam is very good at statistics
NOTE Confidence: 0.9258571922222222

00:00:59.850 --> 00:01:01.176 he's knowledge about. Genetics.

NOTE Confidence: 0.925857192222222

00:01:01.176 --> 00:01:03.040 He's knowledge about neuroscience,

NOTE Confidence: 0.925857192222222

00:01:03.040 --> 00:01:03.858 cognitive science.

NOTE Confidence: 0.925857192222222

00:01:03.858 --> 00:01:07.130 And I like to say if if anything

NOTE Confidence: 0.925857192222222

00:01:07.213 --> 00:01:09.379 operates using electricity,

NOTE Confidence: 0.925857192222222

00:01:09.380 --> 00:01:11.900 Adam understands it better than you and

NOTE Confidence: 0.925857192222222

00:01:11.900 --> 00:01:15.178 can make it work better than anybody else.

NOTE Confidence: 0.925857192222222

00:01:15.180 --> 00:01:17.602 He is wildly creative in the work

NOTE Confidence: 0.925857192222222

00:01:17.602 --> 00:01:19.540 that you'll hear about today.

NOTE Confidence: 0.925857192222222

00:01:19.540 --> 00:01:21.380 He has built experiments,

NOTE Confidence: 0.925857192222222

00:01:21.380 --> 00:01:22.760 he's built machines,

NOTE Confidence: 0.925857192222222

00:01:22.760 --> 00:01:24.380 he's built labs,

NOTE Confidence: 0.925857192222222

00:01:24.380 --> 00:01:25.588 and he's equivalently creative

NOTE Confidence: 0.925857192222222

00:01:25.588 --> 00:01:27.098 in terms of his ideas.

NOTE Confidence: 0.925857192222222

00:01:27.100 --> 00:01:28.180 And so you're going to hear

NOTE Confidence: 0.925857192222222

00:01:28.180 --> 00:01:31.090 very creative ideas as well.

NOTE Confidence: 0.925857192222222

00:01:31.090 --> 00:01:31.900 Adam is
NOTE Confidence: 0.7127450933333333

00:01:31.910 --> 00:01:34.190 a he's a a very.
NOTE Confidence: 0.845271328

00:01:34.940 --> 00:01:35.800 Prolific collaborator.
NOTE Confidence: 0.845271328

00:01:35.800 --> 00:01:39.240 He is known in in our field internationally
NOTE Confidence: 0.845271328

00:01:39.240 --> 00:01:40.990 for his expertise specifically in
NOTE Confidence: 0.845271328

00:01:40.990 --> 00:01:43.615 things like eye tracking and EEG which
NOTE Confidence: 0.845271328

00:01:43.615 --> 00:01:46.400 both these electricity and he Umm,
NOTE Confidence: 0.845271328

00:01:46.400 --> 00:01:48.920 yeah, I'm going to be quiet.
NOTE Confidence: 0.845271328

00:01:48.920 --> 00:01:51.413 I want to just highlight one thing it is,
NOTE Confidence: 0.845271328

00:01:51.420 --> 00:01:53.778 it is such a it's a such a great
NOTE Confidence: 0.845271328

00:01:53.778 --> 00:01:55.860 achievement for Adam to be here as
NOTE Confidence: 0.845271328

00:01:55.860 --> 00:01:57.738 an assistant professor and it's also
NOTE Confidence: 0.845271328

00:01:57.738 --> 00:01:59.670 such a great achievement for Yale
NOTE Confidence: 0.845271328

00:01:59.670 --> 00:02:01.525 because as we recognize one of the
NOTE Confidence: 0.845271328

00:02:01.525 --> 00:02:02.796 challenges of the academic system
NOTE Confidence: 0.845271328

00:02:02.796 --> 00:02:05.470 is being as collaborative as Adam.

NOTE Confidence: 0.845271328

00:02:05.470 --> 00:02:07.810 Can in weird ways be attention

NOTE Confidence: 0.845271328

00:02:07.810 --> 00:02:09.370 with the promotional process.

NOTE Confidence: 0.845271328

00:02:09.370 --> 00:02:10.870 And so Adam being here is

NOTE Confidence: 0.845271328

00:02:10.870 --> 00:02:11.870 an achievement for Adam,

NOTE Confidence: 0.845271328

00:02:11.870 --> 00:02:13.508 and it's also an achievement for Yale.

NOTE Confidence: 0.845271328

00:02:13.510 --> 00:02:15.272 And really embracing Team Science is

NOTE Confidence: 0.845271328

00:02:15.272 --> 00:02:17.970 what we we know that we need to do.

NOTE Confidence: 0.845271328

00:02:17.970 --> 00:02:19.524 And with that, I give you Adam,

NOTE Confidence: 0.845271328

00:02:19.530 --> 00:02:22.490 who is my closest colleague and my very,

NOTE Confidence: 0.845271328

00:02:22.490 --> 00:02:23.720 very dear friend.

NOTE Confidence: 0.851941065

00:02:39.650 --> 00:02:42.998 Thank you, Jamie, that.

NOTE Confidence: 0.851941065

00:02:43.000 --> 00:02:47.112 Is a lots to follow. It's it.

NOTE Confidence: 0.851941065

00:02:47.112 --> 00:02:49.867 It is. As Jamie mentioned,

NOTE Confidence: 0.851941065

00:02:49.870 --> 00:02:52.900 I've been here for years and

NOTE Confidence: 0.851941065

00:02:52.900 --> 00:02:55.350 it's it's pretty amazing to be

NOTE Confidence: 0.851941065

00:02:55.350 --> 00:02:57.150 giving this talk right now.
NOTE Confidence: 0.851941065

00:02:57.150 --> 00:03:00.636 I've seen a lot of very, I've seen
NOTE Confidence: 0.851941065

00:03:00.636 --> 00:03:03.380 a lot of amazing talks in this room.
NOTE Confidence: 0.851941065

00:03:03.380 --> 00:03:07.475 For maybe the past like 18 years or so,
NOTE Confidence: 0.851941065

00:03:07.480 --> 00:03:09.880 and I'm just going to disable some of
NOTE Confidence: 0.851941065

00:03:09.880 --> 00:03:11.468 these distracting things over here.
NOTE Confidence: 0.798551391

00:03:14.040 --> 00:03:15.680 So as you mentioned,
NOTE Confidence: 0.798551391

00:03:15.680 --> 00:03:18.140 I'm a cognitive psychologist by training.
NOTE Confidence: 0.798551391

00:03:18.140 --> 00:03:19.805 My research is really focused
NOTE Confidence: 0.798551391

00:03:19.805 --> 00:03:21.470 on using measurement and methods
NOTE Confidence: 0.798551391

00:03:21.525 --> 00:03:23.457 from cognitive psychology to
NOTE Confidence: 0.798551391

00:03:23.457 --> 00:03:24.906 understand individual differences.
NOTE Confidence: 0.798551391

00:03:24.910 --> 00:03:26.116 And today I'm going to talk
NOTE Confidence: 0.798551391

00:03:26.116 --> 00:03:28.093 to you about a lot of our work
NOTE Confidence: 0.798551391

00:03:28.093 --> 00:03:29.217 studying biomarkers and autism.
NOTE Confidence: 0.798551391

00:03:29.220 --> 00:03:30.560 And so if anything's unclear,

NOTE Confidence: 0.798551391

00:03:30.560 --> 00:03:32.506 ask me a question and I'll try

NOTE Confidence: 0.798551391

00:03:32.506 --> 00:03:34.542 to make it more clear. And then.

NOTE Confidence: 0.798551391

00:03:34.542 --> 00:03:35.879 All right, you can see my mouse.

NOTE Confidence: 0.798551391

00:03:35.880 --> 00:03:36.430 Great.

NOTE Confidence: 0.850434006

00:03:38.640 --> 00:03:40.608 So just a quick overview, just I'm

NOTE Confidence: 0.850434006

00:03:40.608 --> 00:03:42.106 going to tell you what biomarkers are,

NOTE Confidence: 0.850434006

00:03:42.110 --> 00:03:43.808 why they're important because we hear

NOTE Confidence: 0.850434006

00:03:43.808 --> 00:03:46.016 this word a lot and I use it a lot,

NOTE Confidence: 0.850434006

00:03:46.020 --> 00:03:47.686 but it's always good to be reminded.

NOTE Confidence: 0.877711795384615

00:03:49.970 --> 00:03:52.426 I'm going to talk to you about large

NOTE Confidence: 0.877711795384615

00:03:52.426 --> 00:03:54.402 scale biomarker research and autism that

NOTE Confidence: 0.877711795384615

00:03:54.402 --> 00:03:56.230 have done a lot and a lot of this work.

NOTE Confidence: 0.877711795384615

00:03:56.230 --> 00:03:56.920 All the work I need to

NOTE Confidence: 0.877711795384615

00:03:56.920 --> 00:03:57.590 talk to you about today.

NOTE Confidence: 0.877711795384615

00:03:57.590 --> 00:04:00.574 I've done with Jamie as a we've called

NOTE Confidence: 0.877711795384615

00:04:00.574 --> 00:04:02.590 collaborated very closely for years.
NOTE Confidence: 0.877711795384615

00:04:02.590 --> 00:04:04.918 Then I'm going to talk about some new
NOTE Confidence: 0.877711795384615

00:04:04.918 --> 00:04:07.065 experiments that we've designed to be
NOTE Confidence: 0.877711795384615

00:04:07.065 --> 00:04:08.950 more inclusive for traditionally very
NOTE Confidence: 0.877711795384615

00:04:08.950 --> 00:04:10.787 underserved group of kids with autism.
NOTE Confidence: 0.877711795384615

00:04:10.790 --> 00:04:12.596 And then finally I'm going to end
NOTE Confidence: 0.877711795384615

00:04:12.596 --> 00:04:14.575 with some novel biomarkers that we're
NOTE Confidence: 0.877711795384615

00:04:14.575 --> 00:04:16.485 exploring to study social cognition,
NOTE Confidence: 0.877711795384615

00:04:16.490 --> 00:04:19.226 but so, so what's a biomarker?
NOTE Confidence: 0.877711795384615

00:04:19.230 --> 00:04:20.160 It's a defined.
NOTE Confidence: 0.877711795384615

00:04:20.160 --> 00:04:21.090 Characteristic that's measured
NOTE Confidence: 0.877711795384615

00:04:21.090 --> 00:04:22.860 as an indicator of a process,
NOTE Confidence: 0.877711795384615

00:04:22.860 --> 00:04:24.228 a pathogenic process.
NOTE Confidence: 0.845615545

00:04:26.470 --> 00:04:27.774 You can look at this definition for a
NOTE Confidence: 0.845615545

00:04:27.774 --> 00:04:29.149 while and think of all kinds of things,
NOTE Confidence: 0.845615545

00:04:29.150 --> 00:04:31.369 but biomarkers are things like heart rate,

NOTE Confidence: 0.845615545

00:04:31.370 --> 00:04:33.586 blood glucose, blood pressure,

NOTE Confidence: 0.845615545

00:04:33.586 --> 00:04:35.248 their routine measurements,

NOTE Confidence: 0.845615545

00:04:35.250 --> 00:04:36.690 they're reliable measurements,

NOTE Confidence: 0.845615545

00:04:36.690 --> 00:04:38.610 and their objective measurements.

NOTE Confidence: 0.845615545

00:04:38.610 --> 00:04:40.199 So when you go to Quest Diagnostics

NOTE Confidence: 0.845615545

00:04:40.199 --> 00:04:41.489 and they take their blood,

NOTE Confidence: 0.845615545

00:04:41.490 --> 00:04:43.330 they take your blood or someone else's blood,

NOTE Confidence: 0.845615545

00:04:43.330 --> 00:04:44.709 and you get back to that e-mail

NOTE Confidence: 0.845615545

00:04:44.709 --> 00:04:46.432 with hundreds of numbers, and all of

NOTE Confidence: 0.845615545

00:04:46.432 --> 00:04:47.901 those things are biomarkers, right?

NOTE Confidence: 0.845615545

00:04:47.901 --> 00:04:51.960 And some of them are better or worse for.

NOTE Confidence: 0.845615545

00:04:51.960 --> 00:04:53.976 Different kinds of decisions you might make.

NOTE Confidence: 0.845615545

00:04:53.980 --> 00:04:55.148 And that's that's really

NOTE Confidence: 0.845615545

00:04:55.148 --> 00:04:56.316 why we need biomarkers,

NOTE Confidence: 0.845615545

00:04:56.320 --> 00:04:57.994 because we need to make decisions

NOTE Confidence: 0.845615545

00:04:57.994 --> 00:04:59.540 about all kinds of things.
NOTE Confidence: 0.845615545

00:04:59.540 --> 00:05:01.448 We need to make decisions about
NOTE Confidence: 0.845615545

00:05:01.448 --> 00:05:03.640 who gets an early intervention.
NOTE Confidence: 0.845615545

00:05:03.640 --> 00:05:04.748 And these are psychiatric
NOTE Confidence: 0.845615545

00:05:04.748 --> 00:05:06.133 biomarkers I'm talking about here.
NOTE Confidence: 0.845615545

00:05:06.140 --> 00:05:09.976 But it's not just for psychiatric biomarkers.
NOTE Confidence: 0.845615545

00:05:09.980 --> 00:05:11.668 We need biomarkers for
NOTE Confidence: 0.845615545

00:05:11.668 --> 00:05:12.934 more accurate diagnosis.
NOTE Confidence: 0.845615545

00:05:12.940 --> 00:05:14.980 We need them for treatment selection.
NOTE Confidence: 0.845615545

00:05:14.980 --> 00:05:17.398 We need them for individualized treatments,
NOTE Confidence: 0.845615545

00:05:17.400 --> 00:05:19.688 and we need them so we can understand
NOTE Confidence: 0.845615545

00:05:19.688 --> 00:05:21.242 how treatments are going to
NOTE Confidence: 0.845615545

00:05:21.242 --> 00:05:22.787 evaluate how well they're going.
NOTE Confidence: 0.845615545

00:05:22.790 --> 00:05:26.927 So now these are some of these decisions.
NOTE Confidence: 0.845615545

00:05:26.930 --> 00:05:28.865 That's sort of an abstract way of saying it.
NOTE Confidence: 0.845615545

00:05:28.870 --> 00:05:29.518 But we might think,

NOTE Confidence: 0.845615545

00:05:29.518 --> 00:05:31.165 like if you have a kid who's three years

NOTE Confidence: 0.845615545

00:05:31.165 --> 00:05:32.649 old and they're learning how to read,

NOTE Confidence: 0.845615545

00:05:32.650 --> 00:05:33.259 you might think,

NOTE Confidence: 0.845615545

00:05:33.259 --> 00:05:35.621 do I want to put that kid in an early

NOTE Confidence: 0.845615545

00:05:35.621 --> 00:05:36.809 reading intervention right now?

NOTE Confidence: 0.845615545

00:05:36.810 --> 00:05:38.340 Right. That's an expensive process.

NOTE Confidence: 0.845615545

00:05:38.340 --> 00:05:41.418 That's there's limited accessibility to them.

NOTE Confidence: 0.845615545

00:05:41.420 --> 00:05:42.862 And is that going to help your

NOTE Confidence: 0.845615545

00:05:42.862 --> 00:05:44.199 kid become a better reader?

NOTE Confidence: 0.845615545

00:05:44.200 --> 00:05:47.650 If you're worried your kids at risk, maybe.

NOTE Confidence: 0.845615545

00:05:47.650 --> 00:05:49.030 Or you might wonder, like,

NOTE Confidence: 0.845615545

00:05:49.030 --> 00:05:50.200 well, you know, somebody said,

NOTE Confidence: 0.845615545

00:05:50.200 --> 00:05:51.466 my kids not sitting still enough,

NOTE Confidence: 0.845615545

00:05:51.470 --> 00:05:52.920 should I give that kid?

NOTE Confidence: 0.845615545

00:05:52.920 --> 00:05:54.980 A stimulant medication for that,

NOTE Confidence: 0.845615545

00:05:54.980 --> 00:05:57.020 and that's a decision that
NOTE Confidence: 0.845615545

00:05:57.020 --> 00:05:58.652 many parents struggle with,
NOTE Confidence: 0.845615545

00:05:58.660 --> 00:05:59.644 many people struggle with,
NOTE Confidence: 0.845615545

00:05:59.644 --> 00:06:01.840 and it would be really great if we had good,
NOTE Confidence: 0.845615545

00:06:01.840 --> 00:06:03.319 solid, objective measurements
NOTE Confidence: 0.845615545

00:06:03.319 --> 00:06:06.277 to help us make those decisions.
NOTE Confidence: 0.845615545

00:06:06.280 --> 00:06:07.318 They can even be things like,
NOTE Confidence: 0.845615545

00:06:07.320 --> 00:06:08.360 should I eat cake?
NOTE Confidence: 0.845615545

00:06:08.360 --> 00:06:10.268 Right, for people with diabetes,
NOTE Confidence: 0.845615545

00:06:10.268 --> 00:06:11.916 there's Thanksgiving comes along,
NOTE Confidence: 0.845615545

00:06:11.920 --> 00:06:13.336 they're measuring their blood glucose level.
NOTE Confidence: 0.845615545

00:06:13.340 --> 00:06:14.607 And then the third cake comes out
NOTE Confidence: 0.845615545

00:06:14.607 --> 00:06:15.431 and they think, well,
NOTE Confidence: 0.845615545

00:06:15.431 --> 00:06:17.117 should I have this third cake?
NOTE Confidence: 0.845615545

00:06:17.120 --> 00:06:19.316 Let me check where I'm at,
NOTE Confidence: 0.845615545

00:06:19.320 --> 00:06:20.640 and I'm going to give you an example

NOTE Confidence: 0.845615545

00:06:20.640 --> 00:06:21.979 of a very concrete biomarker,

NOTE Confidence: 0.845615545

00:06:21.980 --> 00:06:23.828 and I'm going to come back to

NOTE Confidence: 0.845615545

00:06:23.828 --> 00:06:24.620 it repeatedly here.

NOTE Confidence: 0.845615545

00:06:24.620 --> 00:06:25.469 It's heart rate.

NOTE Confidence: 0.845615545

00:06:25.469 --> 00:06:27.450 And I like heart rate because I

NOTE Confidence: 0.845615545

00:06:27.517 --> 00:06:29.539 think probably half the people in

NOTE Confidence: 0.845615545

00:06:29.539 --> 00:06:31.567 this room are measuring their heart

NOTE Confidence: 0.845615545

00:06:31.567 --> 00:06:33.427 rate right now on their watch.

NOTE Confidence: 0.845615545

00:06:33.430 --> 00:06:36.940 And it's a. It's it's ubiquitous.

NOTE Confidence: 0.845615545

00:06:36.940 --> 00:06:37.450 It's so ubiquitous.

NOTE Confidence: 0.845615545

00:06:37.450 --> 00:06:38.640 You don't think about it as a

NOTE Confidence: 0.845615545

00:06:38.683 --> 00:06:39.309 biomarker anymore.

NOTE Confidence: 0.845615545

00:06:39.310 --> 00:06:41.030 We just think of it like it's a

NOTE Confidence: 0.845615545

00:06:41.030 --> 00:06:42.820 measurement and it's such a good and

NOTE Confidence: 0.845615545

00:06:42.820 --> 00:06:44.125 reliable measurement that people use

NOTE Confidence: 0.845615545

00:06:44.179 --> 00:06:46.278 it for all kinds of things that people, the,
NOTE Confidence: 0.845615545

00:06:46.278 --> 00:06:48.434 you know, initial studies of heart rate,
NOTE Confidence: 0.845615545

00:06:48.440 --> 00:06:51.168 which are in the prehistory at this point,
NOTE Confidence: 0.845615545

00:06:51.170 --> 00:06:52.778 probably never conceived of.
NOTE Confidence: 0.674047922

00:06:54.850 --> 00:06:56.218 Things about heart rate.
NOTE Confidence: 0.674047922

00:06:56.218 --> 00:06:57.420 Well, it's routine.
NOTE Confidence: 0.674047922

00:06:57.420 --> 00:07:00.430 I measure my heart rate every second.
NOTE Confidence: 0.674047922

00:07:00.430 --> 00:07:01.810 I think on my wrist.
NOTE Confidence: 0.674047922

00:07:01.810 --> 00:07:02.602 It's reliable.
NOTE Confidence: 0.674047922

00:07:02.602 --> 00:07:04.582 My heart rate is under
NOTE Confidence: 0.674047922

00:07:04.582 --> 00:07:05.770 the same circumstances,
NOTE Confidence: 0.674047922

00:07:05.770 --> 00:07:08.170 the same as it is the day before,
NOTE Confidence: 0.674047922

00:07:08.170 --> 00:07:08.893 and it's subjective.
NOTE Confidence: 0.674047922

00:07:08.893 --> 00:07:10.890 So it's signing a light through my wrist,
NOTE Confidence: 0.674047922

00:07:10.890 --> 00:07:12.830 it's measuring the blood reflectance,
NOTE Confidence: 0.674047922

00:07:12.830 --> 00:07:14.390 doing some math to those signals,

NOTE Confidence: 0.674047922

00:07:14.390 --> 00:07:17.267 and then coming back with a number.

NOTE Confidence: 0.674047922

00:07:17.270 --> 00:07:19.275 That's not to say that

NOTE Confidence: 0.674047922

00:07:19.275 --> 00:07:20.879 that process is perfect,

NOTE Confidence: 0.674047922

00:07:20.880 --> 00:07:22.476 but it always gives you the

NOTE Confidence: 0.674047922

00:07:22.476 --> 00:07:24.229 same output for the same input,

NOTE Confidence: 0.674047922

00:07:24.230 --> 00:07:26.245 and that way it's objective

NOTE Confidence: 0.674047922

00:07:26.245 --> 00:07:27.454 and very reliable.

NOTE Confidence: 0.674047922

00:07:27.460 --> 00:07:29.161 And so now that we have this

NOTE Confidence: 0.674047922

00:07:29.161 --> 00:07:30.400 biomarker that's on my wrist,

NOTE Confidence: 0.674047922

00:07:30.400 --> 00:07:32.820 we can use it for all kinds of fun things.

NOTE Confidence: 0.674047922

00:07:32.820 --> 00:07:33.580 So well,

NOTE Confidence: 0.674047922

00:07:33.580 --> 00:07:36.240 we can use it for early intervention.

NOTE Confidence: 0.674047922

00:07:36.240 --> 00:07:38.312 And you can see there that little

NOTE Confidence: 0.674047922

00:07:38.312 --> 00:07:40.167 blue line by resting heart rate

NOTE Confidence: 0.674047922

00:07:40.167 --> 00:07:42.191 goes from 55 to 80 in a day,

NOTE Confidence: 0.674047922

00:07:42.191 --> 00:07:43.253 which is a little bit unusual.
NOTE Confidence: 0.674047922

00:07:43.260 --> 00:07:44.910 And that's when I got my
NOTE Confidence: 0.674047922

00:07:44.910 --> 00:07:46.112 second COVID booster right.
NOTE Confidence: 0.674047922

00:07:46.112 --> 00:07:47.972 The heart rate predicted the
NOTE Confidence: 0.674047922

00:07:47.972 --> 00:07:50.559 onset of a pretty prolonged and
NOTE Confidence: 0.674047922

00:07:50.559 --> 00:07:52.607 exciting experience dealing with
NOTE Confidence: 0.674047922

00:07:52.607 --> 00:07:54.120 that heart rate used in many,
NOTE Confidence: 0.674047922

00:07:54.120 --> 00:07:55.821 many diagnostic tests if you've been to
NOTE Confidence: 0.674047922

00:07:55.821 --> 00:07:58.097 a doctor and they've checked your heart rate.
NOTE Confidence: 0.674047922

00:07:58.100 --> 00:07:59.736 That's it.
NOTE Confidence: 0.674047922

00:07:59.736 --> 00:08:02.190 They follow it.
NOTE Confidence: 0.674047922

00:08:02.190 --> 00:08:03.990 I'm running out of time,
NOTE Confidence: 0.674047922

00:08:03.990 --> 00:08:05.544 so it's also used for treatment selection
NOTE Confidence: 0.674047922

00:08:05.544 --> 00:08:07.850 so I can go for a run on my watch and it
NOTE Confidence: 0.674047922

00:08:07.850 --> 00:08:09.584 suggests you know what you should do today?
NOTE Confidence: 0.674047922

00:08:09.590 --> 00:08:10.574 Based on my heart rate over

NOTE Confidence: 0.674047922

00:08:10.574 --> 00:08:11.520 the past couple of months,

NOTE Confidence: 0.674047922

00:08:11.520 --> 00:08:13.767 you should go for a 27 minute

NOTE Confidence: 0.674047922

00:08:13.767 --> 00:08:15.571 run at 11-5 minute mile,

NOTE Confidence: 0.674047922

00:08:15.571 --> 00:08:17.506 which is not very impressive.

NOTE Confidence: 0.674047922

00:08:17.510 --> 00:08:17.747 No,

NOTE Confidence: 0.674047922

00:08:17.747 --> 00:08:19.406 I don't have to follow this advice,

NOTE Confidence: 0.674047922

00:08:19.410 --> 00:08:21.426 but it's at least it's giving

NOTE Confidence: 0.674047922

00:08:21.426 --> 00:08:22.770 me an individualized treatment,

NOTE Confidence: 0.674047922

00:08:22.770 --> 00:08:23.360 right?

NOTE Confidence: 0.82523476875

00:08:25.480 --> 00:08:27.896 And then it evaluates how well I did,

NOTE Confidence: 0.82523476875

00:08:27.900 --> 00:08:28.804 and that treatment too.

NOTE Confidence: 0.82523476875

00:08:28.804 --> 00:08:30.460 So if I fail to follow that,

NOTE Confidence: 0.82523476875

00:08:30.460 --> 00:08:32.436 it uses the language of an NIH grant

NOTE Confidence: 0.82523476875

00:08:32.436 --> 00:08:34.686 reviewer and it tells me that my my

NOTE Confidence: 0.82523476875

00:08:34.686 --> 00:08:35.818 training status was unproductive.

NOTE Confidence: 0.82523476875

00:08:35.820 --> 00:08:38.712 So this is, I think, kind of a a
NOTE Confidence: 0.82523476875

00:08:38.712 --> 00:08:40.599 motivating example of once you get really,
NOTE Confidence: 0.82523476875

00:08:40.600 --> 00:08:42.304 really good, inexpensive,
NOTE Confidence: 0.82523476875

00:08:42.304 --> 00:08:44.576 reliable and effective measurements,
NOTE Confidence: 0.82523476875

00:08:44.580 --> 00:08:47.220 then they might not be used for whatever
NOTE Confidence: 0.82523476875

00:08:47.220 --> 00:08:49.916 you thought they were going to be used for.
NOTE Confidence: 0.82523476875

00:08:49.920 --> 00:08:51.180 But now they're tools,
NOTE Confidence: 0.82523476875

00:08:51.180 --> 00:08:51.810 they're screwdrivers,
NOTE Confidence: 0.82523476875

00:08:51.810 --> 00:08:52.338 they're hammers.
NOTE Confidence: 0.82523476875

00:08:52.338 --> 00:08:54.186 And so people can use them for
NOTE Confidence: 0.82523476875

00:08:54.186 --> 00:08:55.400 whatever their imaginations.
NOTE Confidence: 0.82523476875

00:08:55.400 --> 00:08:58.748 Guide them to their hypothesis generating,
NOTE Confidence: 0.82523476875

00:08:58.750 --> 00:09:00.556 but we're not talking about heart rate,
NOTE Confidence: 0.82523476875

00:09:00.560 --> 00:09:01.856 we're talking about autism.
NOTE Confidence: 0.82523476875

00:09:01.856 --> 00:09:04.709 So I'm going to get to that quickly.
NOTE Confidence: 0.82523476875

00:09:04.710 --> 00:09:05.416 All right,

NOTE Confidence: 0.82523476875

00:09:05.416 --> 00:09:06.828 so talk about autism.

NOTE Confidence: 0.859844898235294

00:09:09.190 --> 00:09:11.899 I think the first time I saw this slide

NOTE Confidence: 0.859844898235294

00:09:11.899 --> 00:09:14.516 was in this room maybe 20 years ago.

NOTE Confidence: 0.859844898235294

00:09:14.520 --> 00:09:16.110 Was diagnosed early in life.

NOTE Confidence: 0.859844898235294

00:09:16.110 --> 00:09:18.348 It's heterogeneous syndrome.

NOTE Confidence: 0.859844898235294

00:09:18.348 --> 00:09:21.386 It's described as defined by

NOTE Confidence: 0.859844898235294

00:09:21.386 --> 00:09:22.978 persistent challenges in social

NOTE Confidence: 0.859844898235294

00:09:22.978 --> 00:09:24.570 communication and social interaction,

NOTE Confidence: 0.859844898235294

00:09:24.570 --> 00:09:26.790 restricted repetitive patterns of behavior,

NOTE Confidence: 0.859844898235294

00:09:26.790 --> 00:09:27.668 sensory sensitivities.

NOTE Confidence: 0.859844898235294

00:09:27.668 --> 00:09:30.302 What's common among all diagnosis of

NOTE Confidence: 0.859844898235294

00:09:30.302 --> 00:09:33.256 autism is that they're associated with

NOTE Confidence: 0.859844898235294

00:09:33.256 --> 00:09:35.766 challenges and reciprocal social behavior.

NOTE Confidence: 0.859844898235294

00:09:35.770 --> 00:09:37.884 But the mechanisms for autism are unknown,

NOTE Confidence: 0.859844898235294

00:09:37.890 --> 00:09:39.800 and our current current tools

NOTE Confidence: 0.859844898235294

00:09:39.800 --> 00:09:41.328 for assessment are subjective.
NOTE Confidence: 0.859844898235294

00:09:41.330 --> 00:09:43.114 Report. They're subjective report
NOTE Confidence: 0.859844898235294

00:09:43.114 --> 00:09:44.898 from a person who's.
NOTE Confidence: 0.859844898235294

00:09:44.900 --> 00:09:45.324 You know,
NOTE Confidence: 0.859844898235294

00:09:45.324 --> 00:09:46.596 reporting on themselves from a parent,
NOTE Confidence: 0.859844898235294

00:09:46.600 --> 00:09:47.885 reporting on their child or
NOTE Confidence: 0.859844898235294

00:09:47.885 --> 00:09:48.913 caregiver on their child,
NOTE Confidence: 0.859844898235294

00:09:48.920 --> 00:09:50.630 someone interacting with the person.
NOTE Confidence: 0.859844898235294

00:09:50.630 --> 00:09:52.376 And it's not to say these
NOTE Confidence: 0.859844898235294

00:09:52.376 --> 00:09:53.540 aren't very good measures,
NOTE Confidence: 0.859844898235294

00:09:53.540 --> 00:09:55.345 but they're still not necessarily
NOTE Confidence: 0.859844898235294

00:09:55.345 --> 00:09:57.852 the same thing as the same exact
NOTE Confidence: 0.859844898235294

00:09:57.852 --> 00:10:00.372 output for the same input that we get
NOTE Confidence: 0.859844898235294

00:10:00.443 --> 00:10:02.809 from shining a light for your wrist.
NOTE Confidence: 0.859844898235294

00:10:02.810 --> 00:10:06.016 Umm. And so.
NOTE Confidence: 0.859844898235294

00:10:06.016 --> 00:10:07.780 With that heterogeneity,

NOTE Confidence: 0.859844898235294

00:10:07.780 --> 00:10:09.460 with that unknown mechanisms,

NOTE Confidence: 0.859844898235294

00:10:09.460 --> 00:10:11.980 there's there's many theories of what

NOTE Confidence: 0.859844898235294

00:10:12.047 --> 00:10:14.868 the underlying causal deficits are in autism.

NOTE Confidence: 0.859844898235294

00:10:14.870 --> 00:10:16.154 And I'm going to really briefly

NOTE Confidence: 0.859844898235294

00:10:16.154 --> 00:10:17.420 go over a couple of them.

NOTE Confidence: 0.859844898235294

00:10:17.420 --> 00:10:18.680 And the point here is to give

NOTE Confidence: 0.859844898235294

00:10:18.680 --> 00:10:20.287 you an idea of the breadth and

NOTE Confidence: 0.859844898235294

00:10:20.287 --> 00:10:21.562 how these theories hit different

NOTE Confidence: 0.859844898235294

00:10:21.562 --> 00:10:22.913 levels of abstraction rather than

NOTE Confidence: 0.859844898235294

00:10:22.913 --> 00:10:24.491 they go into detail about anyone,

NOTE Confidence: 0.859844898235294

00:10:24.500 --> 00:10:26.810 because that would be hours and hours,

NOTE Confidence: 0.859844898235294

00:10:26.810 --> 00:10:29.300 that would be a dissertation defense,

NOTE Confidence: 0.859844898235294

00:10:29.300 --> 00:10:31.030 so.

NOTE Confidence: 0.859844898235294

00:10:31.030 --> 00:10:33.706 I could talk about social motivation,

NOTE Confidence: 0.859844898235294

00:10:33.710 --> 00:10:34.494 predictive coding.

NOTE Confidence: 0.859844898235294

00:10:34.494 --> 00:10:36.846 These are different levels of analysis,
NOTE Confidence: 0.859844898235294

00:10:36.850 --> 00:10:38.668 just regulated arousal.
NOTE Confidence: 0.859844898235294

00:10:38.668 --> 00:10:42.304 And the imbalance or imbalance of
NOTE Confidence: 0.859844898235294

00:10:42.304 --> 00:10:45.498 excitation and inhibition in the brain.
NOTE Confidence: 0.859844898235294

00:10:45.500 --> 00:10:46.892 The social motivation which
NOTE Confidence: 0.859844898235294

00:10:46.892 --> 00:10:48.632 has a strong history here.
NOTE Confidence: 0.859844898235294

00:10:48.640 --> 00:10:51.335 Both Jamie and Cara published on it
NOTE Confidence: 0.859844898235294

00:10:51.335 --> 00:10:54.168 together here and at other universities.
NOTE Confidence: 0.859844898235294

00:10:54.170 --> 00:10:54.483 Briefly,
NOTE Confidence: 0.859844898235294

00:10:54.483 --> 00:10:56.048 and I'm terrified to talk
NOTE Confidence: 0.859844898235294

00:10:56.048 --> 00:10:58.089 about it in front of you guys,
NOTE Confidence: 0.859844898235294

00:10:58.090 --> 00:11:00.862 we can describe this as reduced motivation
NOTE Confidence: 0.859844898235294

00:11:00.862 --> 00:11:03.687 to interact and attend to other people.
NOTE Confidence: 0.859844898235294

00:11:03.690 --> 00:11:05.166 And this starts early in development.
NOTE Confidence: 0.859844898235294

00:11:05.170 --> 00:11:07.480 And so the cascading consequences of this
NOTE Confidence: 0.859844898235294

00:11:07.480 --> 00:11:10.467 are you pay less attention to other people,

NOTE Confidence: 0.859844898235294
00:11:10.470 --> 00:11:12.250 you interact with people less,
NOTE Confidence: 0.859844898235294
00:11:12.250 --> 00:11:13.986 and so you learn less about other people.
NOTE Confidence: 0.859844898235294
00:11:13.990 --> 00:11:16.342 And it's harder to develop sort of
NOTE Confidence: 0.859844898235294
00:11:16.342 --> 00:11:18.145 social mastery and expertise about
NOTE Confidence: 0.859844898235294
00:11:18.145 --> 00:11:20.317 other people if that's not the
NOTE Confidence: 0.859844898235294
00:11:20.317 --> 00:11:22.629 world that you're interacting with.
NOTE Confidence: 0.859844898235294
00:11:22.630 --> 00:11:24.250 So this is really, really.
NOTE Confidence: 0.859844898235294
00:11:24.250 --> 00:11:25.610 Primarily inspired by the
NOTE Confidence: 0.859844898235294
00:11:25.610 --> 00:11:26.970 social symptoms of autism.
NOTE Confidence: 0.88857067
00:11:29.950 --> 00:11:32.770 So. Secondly, I'm going to
NOTE Confidence: 0.88857067
00:11:32.770 --> 00:11:34.195 talk about what's called the
NOTE Confidence: 0.88857067
00:11:34.195 --> 00:11:35.627 predictive coding theory of autism.
NOTE Confidence: 0.88857067
00:11:35.630 --> 00:11:37.446 Predictive coding is a if you Google this,
NOTE Confidence: 0.88857067
00:11:37.450 --> 00:11:38.598 you get a lot of things that
NOTE Confidence: 0.88857067
00:11:38.598 --> 00:11:39.630 don't have autism to do with it.
NOTE Confidence: 0.88857067

00:11:39.630 --> 00:11:41.870 But the idea is that in the brain,
NOTE Confidence: 0.88857067

00:11:41.870 --> 00:11:43.210 the brain has worked.
NOTE Confidence: 0.88857067

00:11:43.210 --> 00:11:44.885 Brain works by continuously generating
NOTE Confidence: 0.88857067

00:11:44.885 --> 00:11:46.300 predictions about the environment,
NOTE Confidence: 0.88857067

00:11:46.300 --> 00:11:47.950 and these are implicit, not explicit.
NOTE Confidence: 0.88857067

00:11:47.950 --> 00:11:49.630 Like I'm going to make a prediction
NOTE Confidence: 0.88857067

00:11:49.630 --> 00:11:51.109 about what's going to happen today.
NOTE Confidence: 0.88857067

00:11:51.110 --> 00:11:53.450 These are things like low level
NOTE Confidence: 0.88857067

00:11:53.450 --> 00:11:55.910 sensory input all of the way up,
NOTE Confidence: 0.88857067

00:11:55.910 --> 00:11:58.150 and most of these predictions are wrong.
NOTE Confidence: 0.88857067

00:11:58.150 --> 00:12:01.244 And so we learn about the world.
NOTE Confidence: 0.88857067

00:12:01.250 --> 00:12:03.682 Based on how we deal with the amount
NOTE Confidence: 0.88857067

00:12:03.682 --> 00:12:05.658 of wrongness of these predictions,
NOTE Confidence: 0.88857067

00:12:05.660 --> 00:12:07.530 and there's some evidence that
NOTE Confidence: 0.88857067

00:12:07.530 --> 00:12:09.405 people autism learn from those
NOTE Confidence: 0.88857067

00:12:09.405 --> 00:12:10.530 prediction errors differently.

NOTE Confidence: 0.88857067

00:12:10.530 --> 00:12:13.500 And similarly to social motivation,

NOTE Confidence: 0.88857067

00:12:13.500 --> 00:12:14.780 this is happening early in

NOTE Confidence: 0.88857067

00:12:14.780 --> 00:12:15.804 development and it cascades.

NOTE Confidence: 0.88857067

00:12:15.810 --> 00:12:17.380 So starting from, you know,

NOTE Confidence: 0.88857067

00:12:17.380 --> 00:12:19.669 very young age.

NOTE Confidence: 0.88857067

00:12:19.670 --> 00:12:21.022 They're learning about the

NOTE Confidence: 0.88857067

00:12:21.022 --> 00:12:21.698 environment differently,

NOTE Confidence: 0.88857067

00:12:21.700 --> 00:12:23.212 but in this case it's not specific

NOTE Confidence: 0.88857067

00:12:23.212 --> 00:12:23.860 to social things.

NOTE Confidence: 0.88857067

00:12:23.860 --> 00:12:27.060 It's more kind of kind of about everything.

NOTE Confidence: 0.88857067

00:12:27.060 --> 00:12:29.444 And the a lot of the inspiration for

NOTE Confidence: 0.88857067

00:12:29.444 --> 00:12:31.769 these theories comes from the sort of

NOTE Confidence: 0.88857067

00:12:31.769 --> 00:12:33.434 sensory symptoms that people often

NOTE Confidence: 0.88857067

00:12:33.498 --> 00:12:35.066 report increased sensitivity sounds

NOTE Confidence: 0.88857067

00:12:35.066 --> 00:12:38.141 or people will also report that some

NOTE Confidence: 0.88857067

00:12:38.141 --> 00:12:41.746 kids have decreased sensitivity to.
NOTE Confidence: 0.88857067

00:12:41.750 --> 00:12:43.208 2 sounds to.
NOTE Confidence: 0.858379246923077

00:12:45.280 --> 00:12:48.016 All right. I just got a high heart rate
NOTE Confidence: 0.858379246923077

00:12:48.016 --> 00:12:50.706 alert from my walk and so it's a I'm going
NOTE Confidence: 0.858379246923077

00:12:50.706 --> 00:12:56.690 to take that off before it calls 911.
NOTE Confidence: 0.858379246923077

00:12:56.690 --> 00:13:00.140 So that that's predictive coding,
NOTE Confidence: 0.858379246923077

00:13:00.140 --> 00:13:01.355 not necessarily social,
NOTE Confidence: 0.858379246923077

00:13:01.360 --> 00:13:02.660 still about learning and learning
NOTE Confidence: 0.858379246923077

00:13:02.660 --> 00:13:03.700 differently about the world.
NOTE Confidence: 0.858379246923077

00:13:03.700 --> 00:13:05.041 And you'll see that most of the time we
NOTE Confidence: 0.858379246923077

00:13:05.041 --> 00:13:06.478 were talking about anything developmental,
NOTE Confidence: 0.858379246923077

00:13:06.480 --> 00:13:09.060 it's about learning about the world.
NOTE Confidence: 0.858379246923077

00:13:09.060 --> 00:13:10.392 Alright. Now dysregulated arousal,
NOTE Confidence: 0.858379246923077

00:13:10.392 --> 00:13:12.882 I've put these references here at the bottom
NOTE Confidence: 0.858379246923077

00:13:12.882 --> 00:13:14.855 just to show that in 1961 they're doing
NOTE Confidence: 0.858379246923077

00:13:14.855 --> 00:13:16.920 the same experiments that we're doing now.

NOTE Confidence: 0.858379246923077
00:13:16.920 --> 00:13:18.050 So we think about arousal,
NOTE Confidence: 0.858379246923077
00:13:18.050 --> 00:13:19.395 we're talking about these overall
NOTE Confidence: 0.858379246923077
00:13:19.395 --> 00:13:20.740 states of brain and body.
NOTE Confidence: 0.858379246923077
00:13:20.740 --> 00:13:24.876 We think and describing this sort of the way
NOTE Confidence: 0.858379246923077
00:13:24.876 --> 00:13:26.580 people describe or things like sweating,
NOTE Confidence: 0.858379246923077
00:13:26.580 --> 00:13:28.940 high heart rates, you know,
NOTE Confidence: 0.858379246923077
00:13:28.940 --> 00:13:29.560 behavioral activation,
NOTE Confidence: 0.858379246923077
00:13:29.560 --> 00:13:30.800 you can't sit still.
NOTE Confidence: 0.858379246923077
00:13:30.800 --> 00:13:31.216 Alternatively,
NOTE Confidence: 0.858379246923077
00:13:31.216 --> 00:13:32.464 insensitivity, you know,
NOTE Confidence: 0.858379246923077
00:13:32.464 --> 00:13:34.544 you're not sensitive to sounds
NOTE Confidence: 0.858379246923077
00:13:34.544 --> 00:13:36.509 or external stimuli or sleep,
NOTE Confidence: 0.858379246923077
00:13:36.510 --> 00:13:37.050 you're.
NOTE Confidence: 0.787306760555556
00:13:39.990 --> 00:13:41.538 It just less sensitive.
NOTE Confidence: 0.787306760555556
00:13:41.538 --> 00:13:44.756 So at the extreme ends we have sleep
NOTE Confidence: 0.787306760555556

00:13:44.756 --> 00:13:47.186 for arousals like the low end.
NOTE Confidence: 0.787306760555556

00:13:47.190 --> 00:13:49.140 And this there is evidence that
NOTE Confidence: 0.787306760555556

00:13:49.140 --> 00:13:51.449 these are always are typical in ASD,
NOTE Confidence: 0.787306760555556

00:13:51.450 --> 00:13:53.394 primarily from physiological research.
NOTE Confidence: 0.787306760555556

00:13:53.394 --> 00:13:56.310 So dysregulated Physiology and heart rate,
NOTE Confidence: 0.787306760555556

00:13:56.310 --> 00:14:00.350 sleep, sweating, pupil diameter,
NOTE Confidence: 0.787306760555556

00:14:00.350 --> 00:14:02.330 sound sensitivity, sound insensitivity,
NOTE Confidence: 0.787306760555556

00:14:02.330 --> 00:14:04.310 pain sensitive pain insensitivity.
NOTE Confidence: 0.86725499

00:14:07.090 --> 00:14:08.185 And then lastly,
NOTE Confidence: 0.86725499

00:14:08.185 --> 00:14:10.375 there's this theory of that autism.
NOTE Confidence: 0.86725499

00:14:10.380 --> 00:14:13.218 These symptoms emerge from an imbalance
NOTE Confidence: 0.86725499

00:14:13.218 --> 00:14:16.088 of excitation and inhibition in the brain.
NOTE Confidence: 0.86725499

00:14:16.090 --> 00:14:18.706 And the attractive thing about this
NOTE Confidence: 0.86725499

00:14:18.706 --> 00:14:21.619 theory about many of these is that.
NOTE Confidence: 0.86725499

00:14:21.620 --> 00:14:25.085 A dysregulation of excitation in the whole
NOTE Confidence: 0.86725499

00:14:25.085 --> 00:14:28.488 brain is going to impact everything.

NOTE Confidence: 0.86725499

00:14:28.490 --> 00:14:30.740 And autism is tremendously heterogeneous and

NOTE Confidence: 0.86725499

00:14:30.740 --> 00:14:33.200 their symptoms that emerge that are sensory,

NOTE Confidence: 0.86725499

00:14:33.200 --> 00:14:35.020 their cognition, their motor,

NOTE Confidence: 0.86725499

00:14:35.020 --> 00:14:37.295 which I haven't talked about.

NOTE Confidence: 0.86725499

00:14:37.300 --> 00:14:38.992 There's also an increased

NOTE Confidence: 0.86725499

00:14:38.992 --> 00:14:41.107 occurrence of seizures and autism.

NOTE Confidence: 0.86725499

00:14:41.110 --> 00:14:44.617 And so. That's the we call that

NOTE Confidence: 0.86725499

00:14:44.617 --> 00:14:47.210 the EI balance just for.

NOTE Confidence: 0.86725499

00:14:47.210 --> 00:14:48.278 So lots and lots of theories.

NOTE Confidence: 0.86725499

00:14:48.280 --> 00:14:49.232 They're hitting at different

NOTE Confidence: 0.86725499

00:14:49.232 --> 00:14:49.946 levels of abstraction.

NOTE Confidence: 0.86725499

00:14:49.950 --> 00:14:52.086 But, but I'm a cognitive psychologist.

NOTE Confidence: 0.86725499

00:14:52.090 --> 00:14:53.728 And so when I was an undergrad,

NOTE Confidence: 0.86725499

00:14:53.730 --> 00:14:54.495 somebody gave me this book

NOTE Confidence: 0.86725499

00:14:54.495 --> 00:14:55.390 and they said to read it,

NOTE Confidence: 0.86725499

00:14:55.390 --> 00:14:57.238 and I couldn't get too far
NOTE Confidence: 0.86725499

00:14:57.238 --> 00:14:59.475 and it was too hard for me.
NOTE Confidence: 0.86725499

00:14:59.475 --> 00:15:01.485 But all those theories are not
NOTE Confidence: 0.86725499

00:15:01.485 --> 00:15:03.170 really mutually exclusive.
NOTE Confidence: 0.86725499

00:15:03.170 --> 00:15:06.509 And this book came out and it's about vision.
NOTE Confidence: 0.86725499

00:15:06.510 --> 00:15:07.314 It's not about autism.
NOTE Confidence: 0.86725499

00:15:07.314 --> 00:15:09.098 But it gave sort of a rubric for
NOTE Confidence: 0.86725499

00:15:09.098 --> 00:15:10.946 thinking about lots and lots of theories.
NOTE Confidence: 0.86725499

00:15:10.950 --> 00:15:12.231 And if the idea is that, look,
NOTE Confidence: 0.86725499

00:15:12.231 --> 00:15:14.097 we can break down any information
NOTE Confidence: 0.86725499

00:15:14.097 --> 00:15:15.752 processing system and into how
NOTE Confidence: 0.86725499

00:15:15.752 --> 00:15:17.080 it's approaching its problems,
NOTE Confidence: 0.86725499

00:15:17.080 --> 00:15:18.858 there's a computational level which is just.
NOTE Confidence: 0.86725499

00:15:18.860 --> 00:15:19.874 What's the problem?
NOTE Confidence: 0.86725499

00:15:19.874 --> 00:15:21.226 It's trying to solve?
NOTE Confidence: 0.86725499

00:15:21.230 --> 00:15:22.450 There's the algorithmic level,

NOTE Confidence: 0.86725499

00:15:22.450 --> 00:15:24.570 which is the the individual steps that

NOTE Confidence: 0.86725499

00:15:24.570 --> 00:15:26.434 you have to take to solve this problem.

NOTE Confidence: 0.86725499

00:15:26.440 --> 00:15:28.316 And anyone who is in a cognitive

NOTE Confidence: 0.86725499

00:15:28.316 --> 00:15:29.850 psychology class in the late 90s,

NOTE Confidence: 0.86725499

00:15:29.850 --> 00:15:31.090 there's lots and lots of

NOTE Confidence: 0.86725499

00:15:31.090 --> 00:15:32.330 boxes and arrows for lots,

NOTE Confidence: 0.86725499

00:15:32.330 --> 00:15:34.622 you know these these super complicated

NOTE Confidence: 0.86725499

00:15:34.622 --> 00:15:37.240 models that did chess and cooking and,

NOTE Confidence: 0.86725499

00:15:37.240 --> 00:15:39.280 you know flight path organization and

NOTE Confidence: 0.86725499

00:15:39.280 --> 00:15:41.708 said this is how the brain works.

NOTE Confidence: 0.86725499

00:15:41.710 --> 00:15:43.205 And then there's the implementation

NOTE Confidence: 0.86725499

00:15:43.205 --> 00:15:45.042 level and that's what what's actually

NOTE Confidence: 0.86725499

00:15:45.042 --> 00:15:46.764 doing the computing in a computer,

NOTE Confidence: 0.86725499

00:15:46.770 --> 00:15:49.115 it's silicon chips and a brain, it's.

NOTE Confidence: 0.86725499

00:15:49.115 --> 00:15:49.620 Green.

NOTE Confidence: 0.7385762222222222

00:15:52.740 --> 00:15:55.404 So I feel like I think about these things,
NOTE Confidence: 0.7385762222222222

00:15:55.410 --> 00:15:57.003 and I said, can we align them in kind
NOTE Confidence: 0.7385762222222222

00:15:57.003 --> 00:15:58.819 of a meta theory because they're
NOTE Confidence: 0.7385762222222222

00:15:58.819 --> 00:16:00.095 not necessarily mutually exclusive?
NOTE Confidence: 0.7385762222222222

00:16:00.100 --> 00:16:02.340 We can think about social motivation as sort
NOTE Confidence: 0.7385762222222222

00:16:02.340 --> 00:16:04.259 of addressing this computational problem,
NOTE Confidence: 0.7385762222222222

00:16:04.260 --> 00:16:05.490 right? We want to make friends.
NOTE Confidence: 0.7385762222222222

00:16:05.490 --> 00:16:06.659 We want to learn about other people.
NOTE Confidence: 0.7385762222222222

00:16:06.660 --> 00:16:08.508 What are the steps we go through
NOTE Confidence: 0.7385762222222222

00:16:08.508 --> 00:16:12.960 to do that predictive coding is?
NOTE Confidence: 0.7385762222222222

00:16:12.960 --> 00:16:15.200 You know, really fits in sort of
NOTE Confidence: 0.7385762222222222

00:16:15.200 --> 00:16:16.892 this algorithmic level and it's
NOTE Confidence: 0.7385762222222222

00:16:16.892 --> 00:16:19.216 aligned with these sort of low level
NOTE Confidence: 0.7385762222222222

00:16:19.216 --> 00:16:20.695 information processing demands where
NOTE Confidence: 0.7385762222222222

00:16:20.695 --> 00:16:23.222 we deploy our eye movements and seems
NOTE Confidence: 0.7385762222222222

00:16:23.230 --> 00:16:26.247 how we learn from different kinds of

NOTE Confidence: 0.7385762222222222

00:16:26.247 --> 00:16:28.289 statistical regularities in the world.

NOTE Confidence: 0.7385762222222222

00:16:28.290 --> 00:16:30.186 And then from the implementation level,

NOTE Confidence: 0.7385762222222222

00:16:30.190 --> 00:16:32.320 we have excitation and EI and

NOTE Confidence: 0.7385762222222222

00:16:32.320 --> 00:16:34.360 we have just regulated arousal.

NOTE Confidence: 0.7385762222222222

00:16:34.360 --> 00:16:37.976 Cells firing you know too much or body

NOTE Confidence: 0.7385762222222222

00:16:37.976 --> 00:16:41.139 state and brain state up or down.

NOTE Confidence: 0.7385762222222222

00:16:41.140 --> 00:16:41.660 Right.

NOTE Confidence: 0.7385762222222222

00:16:41.660 --> 00:16:44.780 So these theories generate a lot

NOTE Confidence: 0.7385762222222222

00:16:44.780 --> 00:16:45.820 of hypotheses,

NOTE Confidence: 0.7385762222222222

00:16:45.820 --> 00:16:47.852 but what we don't know and so I

NOTE Confidence: 0.7385762222222222

00:16:47.852 --> 00:16:49.652 was briefly went through this but

NOTE Confidence: 0.7385762222222222

00:16:49.652 --> 00:16:51.494 you know hundreds of papers on

NOTE Confidence: 0.7385762222222222

00:16:51.560 --> 00:16:52.980 on many of these topics.

NOTE Confidence: 0.7385762222222222

00:16:52.980 --> 00:16:54.625 There's a lot of research in autism

NOTE Confidence: 0.7385762222222222

00:16:54.625 --> 00:16:56.280 as I'm sure you are all aware,

NOTE Confidence: 0.7385762222222222

00:16:56.280 --> 00:16:58.440 but we we need to kind of know which
NOTE Confidence: 0.7385762222222222

00:16:58.440 --> 00:17:00.788 ones work before we put it on our wrist.
NOTE Confidence: 0.7385762222222222

00:17:00.790 --> 00:17:02.050 And even then it's not perfect.
NOTE Confidence: 0.7385762222222222

00:17:02.050 --> 00:17:03.500 It's almost called the police.
NOTE Confidence: 0.7385762222222222

00:17:03.500 --> 00:17:04.970 So I'm going to talk about biomarker,
NOTE Confidence: 0.7385762222222222

00:17:04.970 --> 00:17:05.786 not the police,
NOTE Confidence: 0.7385762222222222

00:17:05.786 --> 00:17:07.146 just just 911 in general.
NOTE Confidence: 0.7385762222222222

00:17:07.150 --> 00:17:09.150 And ASD, I'm going to talk to you
NOTE Confidence: 0.7385762222222222

00:17:09.150 --> 00:17:11.046 about the tools that we use here.
NOTE Confidence: 0.7385762222222222

00:17:11.050 --> 00:17:11.822 All right.
NOTE Confidence: 0.7385762222222222

00:17:11.822 --> 00:17:14.524 So EG what's EG EEG is let
NOTE Confidence: 0.7385762222222222

00:17:14.524 --> 00:17:17.327 me know if I stray too far.
NOTE Confidence: 0.7385762222222222

00:17:17.330 --> 00:17:19.675 It's the sum of the ongoing cortical
NOTE Confidence: 0.7385762222222222

00:17:19.675 --> 00:17:21.603 activity recorded of the scalp
NOTE Confidence: 0.7385762222222222

00:17:21.603 --> 00:17:23.748 reflects the excitatory and inhibitory
NOTE Confidence: 0.7385762222222222

00:17:23.748 --> 00:17:25.750 postsynaptic activity in the cortex.

NOTE Confidence: 0.7385762222222222
00:17:25.750 --> 00:17:27.647 Way we measure it is we take
NOTE Confidence: 0.7385762222222222
00:17:27.647 --> 00:17:29.558 this soft spongy cap with little
NOTE Confidence: 0.7385762222222222
00:17:29.558 --> 00:17:30.934 electrodes in the wires.
NOTE Confidence: 0.7385762222222222
00:17:30.940 --> 00:17:32.740 You put it on your head and we use
NOTE Confidence: 0.7385762222222222
00:17:32.740 --> 00:17:34.595 those little electrodes with a very
NOTE Confidence: 0.7385762222222222
00:17:34.595 --> 00:17:36.195 expensive amplifier to amplify the
NOTE Confidence: 0.7385762222222222
00:17:36.253 --> 00:17:37.753 very faint electrical signals generated
NOTE Confidence: 0.7385762222222222
00:17:37.753 --> 00:17:39.642 by your brain into a recording.
NOTE Confidence: 0.7385762222222222
00:17:39.642 --> 00:17:41.934 And the recording looks like this.
NOTE Confidence: 0.7385762222222222
00:17:41.940 --> 00:17:44.064 So each one of these wiggly
NOTE Confidence: 0.7385762222222222
00:17:44.064 --> 00:17:45.480 lines is the voltage.
NOTE Confidence: 0.7385762222222222
00:17:45.480 --> 00:17:48.378 Measure your scalp, and this is amplitude.
NOTE Confidence: 0.7385762222222222
00:17:48.380 --> 00:17:50.156 So how loud, how big the voltage is.
NOTE Confidence: 0.7385762222222222
00:17:50.160 --> 00:17:50.988 And this is time,
NOTE Confidence: 0.7385762222222222
00:17:50.988 --> 00:17:52.023 and this is in milliseconds.
NOTE Confidence: 0.7385762222222222

00:17:52.030 --> 00:17:52.934 This is really, really,
NOTE Confidence: 0.7385762222222222

00:17:52.934 --> 00:17:54.366 really, really, really fast.
NOTE Confidence: 0.7385762222222222

00:17:54.366 --> 00:17:56.778 A lot of lines means we're
NOTE Confidence: 0.7385762222222222

00:17:56.778 --> 00:17:58.708 using lots of electrodes.
NOTE Confidence: 0.7385762222222222

00:17:58.710 --> 00:18:00.447 And we can learn a lot of things from
NOTE Confidence: 0.7385762222222222

00:18:00.447 --> 00:18:02.394 this ongoing EG even when people are just,
NOTE Confidence: 0.7385762222222222

00:18:02.400 --> 00:18:04.470 when they're not doing anything.
NOTE Confidence: 0.7385762222222222

00:18:04.470 --> 00:18:06.882 One way is we can look at the relative
NOTE Confidence: 0.7385762222222222

00:18:06.882 --> 00:18:08.739 contribution of the different frequencies.
NOTE Confidence: 0.7385762222222222

00:18:08.740 --> 00:18:11.548 So the fast wiggles and the slow wiggles.
NOTE Confidence: 0.7385762222222222

00:18:11.550 --> 00:18:13.290 And what's really interesting is
NOTE Confidence: 0.7385762222222222

00:18:13.290 --> 00:18:15.030 that the excitatory and inhibitory
NOTE Confidence: 0.7385762222222222

00:18:15.082 --> 00:18:16.666 neurotransmitters in the brain
NOTE Confidence: 0.7385762222222222

00:18:16.666 --> 00:18:18.250 have different time constants,
NOTE Confidence: 0.7385762222222222

00:18:18.250 --> 00:18:20.206 which means that the really lines
NOTE Confidence: 0.7385762222222222

00:18:20.206 --> 00:18:21.893 wiggle at different speeds for

NOTE Confidence: 0.7385762222222222
00:18:21.893 --> 00:18:23.849 excitation and they do for inhibition.
NOTE Confidence: 0.7385762222222222
00:18:23.850 --> 00:18:24.806 So, and I apologize,
NOTE Confidence: 0.7385762222222222
00:18:24.806 --> 00:18:26.570 I think the language of wiggly lines.
NOTE Confidence: 0.7385762222222222
00:18:26.570 --> 00:18:28.570 So there's people here who are like serious.
NOTE Confidence: 0.7385762222222222
00:18:28.570 --> 00:18:30.385 EG computational researchers
NOTE Confidence: 0.7385762222222222
00:18:30.385 --> 00:18:32.200 and they're like,
NOTE Confidence: 0.7385762222222222
00:18:32.200 --> 00:18:32.686 you know,
NOTE Confidence: 0.7385762222222222
00:18:32.686 --> 00:18:33.415 throwing their coffee
NOTE Confidence: 0.7385762222222222
00:18:33.415 --> 00:18:34.630 on the floor angrily and
NOTE Confidence: 0.761197408181818
00:18:34.673 --> 00:18:37.060 leading. But this is still we need to agree,
NOTE Confidence: 0.761197408181818
00:18:37.060 --> 00:18:39.157 this is still just a lot of wiggly lines.
NOTE Confidence: 0.761197408181818
00:18:39.160 --> 00:18:42.160 Lots of them. So.
NOTE Confidence: 0.761197408181818
00:18:42.160 --> 00:18:43.408 Sitting and doing nothing.
NOTE Confidence: 0.761197408181818
00:18:43.408 --> 00:18:45.550 It's like a great experiment because we
NOTE Confidence: 0.761197408181818
00:18:45.550 --> 00:18:47.270 can use it to measure the I balance,
NOTE Confidence: 0.761197408181818

00:18:47.270 --> 00:18:48.995 and this is what's called
NOTE Confidence: 0.761197408181818
00:18:48.995 --> 00:18:50.375 the power spectral density.
NOTE Confidence: 0.761197408181818
00:18:50.380 --> 00:18:53.299 So what it's measuring on the left
NOTE Confidence: 0.761197408181818
00:18:53.299 --> 00:18:56.090 are the volume of the amplitude.
NOTE Confidence: 0.761197408181818
00:18:56.090 --> 00:18:58.637 I'm using my hand again of the slow wiggles,
NOTE Confidence: 0.761197408181818
00:18:58.640 --> 00:19:01.464 and over here the fast wiggles and
NOTE Confidence: 0.761197408181818
00:19:01.464 --> 00:19:03.784 this relative activity across the
NOTE Confidence: 0.761197408181818
00:19:03.784 --> 00:19:05.916 frequencies indexes this balance, right?
NOTE Confidence: 0.761197408181818
00:19:05.916 --> 00:19:07.020 Like how much excitation,
NOTE Confidence: 0.761197408181818
00:19:07.020 --> 00:19:08.720 how much inhibition you have.
NOTE Confidence: 0.761197408181818
00:19:08.720 --> 00:19:12.082 Shallower slopes, yes, shallower.
NOTE Confidence: 0.761197408181818
00:19:12.082 --> 00:19:14.366 Groups are more excitation,
NOTE Confidence: 0.761197408181818
00:19:14.370 --> 00:19:15.730 steeper slopes are more
NOTE Confidence: 0.761197408181818
00:19:15.730 --> 00:19:17.430 inhibition and this also changes.
NOTE Confidence: 0.761197408181818
00:19:17.430 --> 00:19:19.327 So this is a pretty reliable effect
NOTE Confidence: 0.761197408181818
00:19:19.327 --> 00:19:21.813 if you give people different kinds

NOTE Confidence: 0.761197408181818
00:19:21.813 --> 00:19:23.427 of pharmacological interventions.
NOTE Confidence: 0.761197408181818
00:19:23.430 --> 00:19:25.098 So if you give people Ambien,
NOTE Confidence: 0.761197408181818
00:19:25.100 --> 00:19:26.648 well actually goes the other way,
NOTE Confidence: 0.761197408181818
00:19:26.650 --> 00:19:28.030 so it gets much steeper.
NOTE Confidence: 0.761197408181818
00:19:28.030 --> 00:19:29.548 So if people are giving Ambien,
NOTE Confidence: 0.761197408181818
00:19:29.550 --> 00:19:30.218 given benzodiazepine,
NOTE Confidence: 0.761197408181818
00:19:30.218 --> 00:19:31.888 you see these inhibitions really,
NOTE Confidence: 0.761197408181818
00:19:31.890 --> 00:19:35.330 really ramp up. Also this happens in sleep.
NOTE Confidence: 0.761197408181818
00:19:35.330 --> 00:19:36.370 So that's one way.
NOTE Confidence: 0.761197408181818
00:19:36.370 --> 00:19:41.000 We can look at the EEG 2nd way and this is
NOTE Confidence: 0.761197408181818
00:19:41.000 --> 00:19:43.456 again the computational neuroscientists.
NOTE Confidence: 0.761197408181818
00:19:43.460 --> 00:19:46.561 You think this is too basic our
NOTE Confidence: 0.761197408181818
00:19:46.561 --> 00:19:48.210 event related potentials so.
NOTE Confidence: 0.761197408181818
00:19:48.210 --> 00:19:50.250 This is where we average the EEG activity
NOTE Confidence: 0.761197408181818
00:19:50.250 --> 00:19:51.977 around repeated presentations of an event.
NOTE Confidence: 0.761197408181818

00:19:51.980 --> 00:19:53.198 Like we show you pictures of face,
NOTE Confidence: 0.761197408181818

00:19:53.200 --> 00:19:54.936 we show you pictures of a house,
NOTE Confidence: 0.761197408181818

00:19:54.940 --> 00:19:56.818 and then we average the activity.
NOTE Confidence: 0.761197408181818

00:19:56.820 --> 00:19:59.598 And so these little chunks of
NOTE Confidence: 0.761197408181818

00:19:59.598 --> 00:20:02.240 those activity of these wiggles.
NOTE Confidence: 0.761197408181818

00:20:02.240 --> 00:20:03.482 And what that does is it gets rid of
NOTE Confidence: 0.761197408181818

00:20:03.482 --> 00:20:04.608 the wiggles that don't have anything
NOTE Confidence: 0.761197408181818

00:20:04.608 --> 00:20:06.080 to do with what you're interested in.
NOTE Confidence: 0.761197408181818

00:20:06.080 --> 00:20:06.833 And it accentuates,
NOTE Confidence: 0.761197408181818

00:20:06.833 --> 00:20:08.339 it amplifies the wiggles that you
NOTE Confidence: 0.761197408181818

00:20:08.339 --> 00:20:10.071 do care about and you get what's
NOTE Confidence: 0.761197408181818

00:20:10.071 --> 00:20:11.520 called an event related potential,
NOTE Confidence: 0.761197408181818

00:20:11.520 --> 00:20:13.900 which has relatively few wiggles.
NOTE Confidence: 0.761197408181818

00:20:13.900 --> 00:20:15.556 But those wiggles end up having
NOTE Confidence: 0.761197408181818

00:20:15.556 --> 00:20:16.996 names and they're important for
NOTE Confidence: 0.761197408181818

00:20:16.996 --> 00:20:18.470 learning about brain activity.

NOTE Confidence: 0.761197408181818
00:20:18.470 --> 00:20:22.110 And down here time this is in milliseconds.
NOTE Confidence: 0.761197408181818
00:20:22.110 --> 00:20:23.970 So this is really really fast.
NOTE Confidence: 0.761197408181818
00:20:23.970 --> 00:20:26.258 So I want to highlight this is like
NOTE Confidence: 0.761197408181818
00:20:26.258 --> 00:20:28.600 that's a feature about EEG and ERP's
NOTE Confidence: 0.761197408181818
00:20:28.600 --> 00:20:32.570 that is not captured in many other. Umm.
NOTE Confidence: 0.761197408181818
00:20:32.570 --> 00:20:34.028 Somebody put something in the chat.
NOTE Confidence: 0.761197408181818
00:20:34.030 --> 00:20:37.500 I'm going to try not to be distracted by it.
NOTE Confidence: 0.761197408181818
00:20:37.500 --> 00:20:39.892 And we're going to talk to you about
NOTE Confidence: 0.761197408181818
00:20:39.892 --> 00:20:41.849 now probably the most important ERP
NOTE Confidence: 0.761197408181818
00:20:41.849 --> 00:20:45.820 for this talk, which is the N 170.
NOTE Confidence: 0.761197408181818
00:20:45.820 --> 00:20:48.964 So the N 170 and it's in this
NOTE Confidence: 0.761197408181818
00:20:48.964 --> 00:20:50.929 red circle right here.
NOTE Confidence: 0.761197408181818
00:20:50.930 --> 00:20:53.858 When we show people faces compared to almost
NOTE Confidence: 0.761197408181818
00:20:53.858 --> 00:20:56.496 any other visual object in the world.
NOTE Confidence: 0.761197408181818
00:20:56.500 --> 00:20:57.040 Almost.
NOTE Confidence: 0.761197408181818

00:20:57.040 --> 00:21:00.280 You get this much more negative.
NOTE Confidence: 0.761197408181818

00:21:00.280 --> 00:21:03.000 Even the negative ones we call peaks much
NOTE Confidence: 0.761197408181818

00:21:03.000 --> 00:21:05.517 earlier peak to faces than anything else.
NOTE Confidence: 0.761197408181818

00:21:05.520 --> 00:21:06.640 We called the N 170.
NOTE Confidence: 0.761197408181818

00:21:06.640 --> 00:21:08.648 This is 170 milliseconds.
NOTE Confidence: 0.761197408181818

00:21:08.648 --> 00:21:10.656 This is really fast,
NOTE Confidence: 0.761197408181818

00:21:10.660 --> 00:21:11.322 right?
NOTE Confidence: 0.761197408181818

00:21:11.322 --> 00:21:16.618 We other kinds of measures that are slower.
NOTE Confidence: 0.761197408181818

00:21:16.620 --> 00:21:17.630 Are reflecting some different kind
NOTE Confidence: 0.761197408181818

00:21:17.630 --> 00:21:19.131 of thing like if you hit a button
NOTE Confidence: 0.761197408181818

00:21:19.131 --> 00:21:19.886 when you see a face,
NOTE Confidence: 0.761197408181818

00:21:19.890 --> 00:21:20.968 that's like what you saw the face.
NOTE Confidence: 0.761197408181818

00:21:20.970 --> 00:21:22.205 But then decision process has
NOTE Confidence: 0.761197408181818

00:21:22.205 --> 00:21:24.237 worked in this is at the level of
NOTE Confidence: 0.761197408181818

00:21:24.237 --> 00:21:25.225 like action right now.
NOTE Confidence: 0.761197408181818

00:21:25.230 --> 00:21:27.090 This is what is probably,

NOTE Confidence: 0.832502840909091
00:21:27.090 --> 00:21:28.446 we think subserving how we interact
NOTE Confidence: 0.832502840909091
00:21:28.446 --> 00:21:29.890 with people in the world, right.
NOTE Confidence: 0.832502840909091
00:21:29.890 --> 00:21:30.850 When you look around,
NOTE Confidence: 0.832502840909091
00:21:30.850 --> 00:21:32.248 every time I see a face,
NOTE Confidence: 0.832502840909091
00:21:32.250 --> 00:21:34.234 that part of brain is sort of firing
NOTE Confidence: 0.832502840909091
00:21:34.234 --> 00:21:36.454 up and saying up face something bigger
NOTE Confidence: 0.832502840909091
00:21:36.454 --> 00:21:39.780 right there and it's it's meaningful.
NOTE Confidence: 0.832502840909091
00:21:39.780 --> 00:21:44.306 Umm. So it's a selective to faces.
NOTE Confidence: 0.832502840909091
00:21:44.310 --> 00:21:46.380 It's really very early, which I'll
NOTE Confidence: 0.832502840909091
00:21:46.380 --> 00:21:48.450 keep saying it's sensitive to context.
NOTE Confidence: 0.832502840909091
00:21:48.450 --> 00:21:49.698 So if I tell you that like I'm
NOTE Confidence: 0.832502840909091
00:21:49.698 --> 00:21:51.082 going to show you a bunch of faces
NOTE Confidence: 0.832502840909091
00:21:51.082 --> 00:21:52.290 of people who are judging you,
NOTE Confidence: 0.832502840909091
00:21:52.290 --> 00:21:53.382 judging how you dress.
NOTE Confidence: 0.832502840909091
00:21:53.382 --> 00:21:55.020 In fact was a recent study,
NOTE Confidence: 0.832502840909091

00:21:55.020 --> 00:21:56.568 you're 170 is different,
NOTE Confidence: 0.832502840909091

00:21:56.568 --> 00:21:58.503 it's sensitive to gaze too.
NOTE Confidence: 0.832502840909091

00:21:58.510 --> 00:21:59.450 So if gays changes,
NOTE Confidence: 0.832502840909091

00:21:59.450 --> 00:22:01.150 when you look at a person's face
NOTE Confidence: 0.832502840909091

00:22:01.150 --> 00:22:03.230 and they look away, you get in 170.
NOTE Confidence: 0.832502840909091

00:22:03.230 --> 00:22:05.610 So movements of eyes seem to be really,
NOTE Confidence: 0.832502840909091

00:22:05.610 --> 00:22:07.150 really important for understanding
NOTE Confidence: 0.832502840909091

00:22:07.150 --> 00:22:09.460 this really early brain activity which
NOTE Confidence: 0.832502840909091

00:22:09.517 --> 00:22:11.467 is meaningful and social interaction.
NOTE Confidence: 0.832502840909091

00:22:11.470 --> 00:22:12.994 Guys are important.
NOTE Confidence: 0.832502840909091

00:22:12.994 --> 00:22:15.026 Can they move fast?
NOTE Confidence: 0.832502840909091

00:22:15.030 --> 00:22:17.410 So Umm,
NOTE Confidence: 0.832502840909091

00:22:17.410 --> 00:22:19.335 now just briefly this is 1 slide
NOTE Confidence: 0.832502840909091

00:22:19.335 --> 00:22:21.146 and it's not nearly enough on
NOTE Confidence: 0.832502840909091

00:22:21.146 --> 00:22:23.288 EEG findings and ASD that are not
NOTE Confidence: 0.832502840909091

00:22:23.353 --> 00:22:25.278 all of them and but are relevant

NOTE Confidence: 0.832502840909091
00:22:25.278 --> 00:22:27.214 to this talk which is one.
NOTE Confidence: 0.832502840909091
00:22:27.214 --> 00:22:30.370 I guess I'll start with the 4th point,
NOTE Confidence: 0.832502840909091
00:22:30.370 --> 00:22:32.794 which is in general patterns of
NOTE Confidence: 0.832502840909091
00:22:32.794 --> 00:22:34.410 findings are heterogeneous and
NOTE Confidence: 0.832502840909091
00:22:34.475 --> 00:22:36.687 that's the case in in many fields.
NOTE Confidence: 0.832502840909091
00:22:36.690 --> 00:22:38.510 But the most consistent among
NOTE Confidence: 0.832502840909091
00:22:38.510 --> 00:22:40.330 inconsistent findings is is delayed
NOTE Confidence: 0.832502840909091
00:22:40.394 --> 00:22:42.592 in 170 that people with autism it's
NOTE Confidence: 0.832502840909091
00:22:42.592 --> 00:22:44.659 less efficient phase processing or less.
NOTE Confidence: 0.832502840909091
00:22:44.660 --> 00:22:46.556 Less fluent space processing.
NOTE Confidence: 0.832502840909091
00:22:46.556 --> 00:22:48.926 There's also evidence that that
NOTE Confidence: 0.832502840909091
00:22:48.926 --> 00:22:51.266 the profile that spectral profile
NOTE Confidence: 0.832502840909091
00:22:51.266 --> 00:22:53.496 is atypical in that it's.
NOTE Confidence: 0.832502840909091
00:22:53.500 --> 00:22:56.475 It's the shape seems to be different.
NOTE Confidence: 0.832502840909091
00:22:56.480 --> 00:22:58.960 Specific features of how it's
NOTE Confidence: 0.832502840909091

00:22:58.960 --> 00:23:01.440 different can vary among studies.
NOTE Confidence: 0.832502840909091

00:23:01.440 --> 00:23:04.216 All right, so there's EG now eye tracking.
NOTE Confidence: 0.832502840909091

00:23:04.220 --> 00:23:05.015 So eye tracking,
NOTE Confidence: 0.832502840909091

00:23:05.015 --> 00:23:06.870 and I think this is this is
NOTE Confidence: 0.832502840909091

00:23:06.932 --> 00:23:08.520 actually really intimidating to
NOTE Confidence: 0.832502840909091

00:23:08.520 --> 00:23:10.902 even eye track we're talking here.
NOTE Confidence: 0.832502840909091

00:23:10.910 --> 00:23:12.179 Ever take a video of your eye and use
NOTE Confidence: 0.832502840909091

00:23:12.179 --> 00:23:13.597 it to figure out where you're looking?
NOTE Confidence: 0.857803316666667

00:23:15.860 --> 00:23:17.580 And you end up with a really long
NOTE Confidence: 0.857803316666667

00:23:17.580 --> 00:23:18.760 spreadsheet, just of coordinates
NOTE Confidence: 0.857803316666667

00:23:18.760 --> 00:23:20.360 of where someone is looking.
NOTE Confidence: 0.857803316666667

00:23:20.360 --> 00:23:21.795 But it's really, really useful
NOTE Confidence: 0.857803316666667

00:23:21.795 --> 00:23:23.527 because with that information you can
NOTE Confidence: 0.857803316666667

00:23:23.527 --> 00:23:24.782 figure out where someone's looking
NOTE Confidence: 0.857803316666667

00:23:24.782 --> 00:23:26.637 at a social scene the faces are not.
NOTE Confidence: 0.857803316666667

00:23:26.640 --> 00:23:30.267 You can also look to see how that attention

NOTE Confidence: 0.857803316666667
00:23:30.267 --> 00:23:32.492 unfolds over time. And as a bonus,
NOTE Confidence: 0.857803316666667
00:23:32.492 --> 00:23:33.920 you can look at pupil diameter,
NOTE Confidence: 0.857803316666667
00:23:33.920 --> 00:23:37.238 which is a nice measure of arousal.
NOTE Confidence: 0.857803316666667
00:23:37.240 --> 00:23:40.180 Eye tracking ASD again.
NOTE Confidence: 0.857803316666667
00:23:40.180 --> 00:23:46.400 In a nutshell. Wow. God, I spoiled it.
NOTE Confidence: 0.857803316666667
00:23:46.400 --> 00:23:47.474 General attenuated looking
NOTE Confidence: 0.857803316666667
00:23:47.474 --> 00:23:48.548 to social information.
NOTE Confidence: 0.857803316666667
00:23:48.550 --> 00:23:50.765 This is replicated across many, many,
NOTE Confidence: 0.857803316666667
00:23:50.765 --> 00:23:53.240 many studies with different stimuli.
NOTE Confidence: 0.857803316666667
00:23:53.240 --> 00:23:54.759 Again, with any one of these papers,
NOTE Confidence: 0.857803316666667
00:23:54.760 --> 00:23:56.470 I guarantee you can find another
NOTE Confidence: 0.857803316666667
00:23:56.470 --> 00:23:57.945 paper showing an opposite pattern
NOTE Confidence: 0.857803316666667
00:23:57.945 --> 00:23:59.340 or a failure to replicate,
NOTE Confidence: 0.857803316666667
00:23:59.340 --> 00:24:01.762 but these are fairly consistent and also
NOTE Confidence: 0.857803316666667
00:24:01.762 --> 00:24:03.299 attenuated pupil constriction to light,
NOTE Confidence: 0.857803316666667

00:24:03.300 --> 00:24:04.560 and this goes back to the 60s.
NOTE Confidence: 0.857803316666667

00:24:04.560 --> 00:24:06.816 The idea is that arousal is too high,
NOTE Confidence: 0.857803316666667

00:24:06.820 --> 00:24:08.038 and so when you flash the
NOTE Confidence: 0.857803316666667

00:24:08.038 --> 00:24:08.850 light in someone's eyes,
NOTE Confidence: 0.857803316666667

00:24:08.850 --> 00:24:10.190 there's more norepinephrine kind
NOTE Confidence: 0.857803316666667

00:24:10.190 --> 00:24:11.865 of going through the brain,
NOTE Confidence: 0.857803316666667

00:24:11.870 --> 00:24:13.286 and so it just won't constrict a lot.
NOTE Confidence: 0.82107267

00:24:16.070 --> 00:24:21.810 So briefly. Want to point out that these.
NOTE Confidence: 0.82107267

00:24:21.810 --> 00:24:23.690 Findings target different levels of
NOTE Confidence: 0.82107267

00:24:23.690 --> 00:24:25.570 abstraction but they reflect pretty
NOTE Confidence: 0.82107267

00:24:25.629 --> 00:24:27.729 modest sample sizes and it's in
NOTE Confidence: 0.82107267

00:24:27.729 --> 00:24:29.129 heterogeneous patterns of finding.
NOTE Confidence: 0.82107267

00:24:29.130 --> 00:24:31.580 So we got to find out which ones hold up
NOTE Confidence: 0.82107267

00:24:31.644 --> 00:24:34.580 and then I introduce you to the Autism
NOTE Confidence: 0.82107267

00:24:34.580 --> 00:24:36.608 Biomarkers Consortium for clinical trials.
NOTE Confidence: 0.82107267

00:24:36.610 --> 00:24:38.536 Jamie Mcpartland here is the principal

NOTE Confidence: 0.82107267

00:24:38.536 --> 00:24:40.349 investigator of this and the goal

NOTE Confidence: 0.82107267

00:24:40.349 --> 00:24:41.994 of this project is to test these

NOTE Confidence: 0.82107267

00:24:41.994 --> 00:24:43.684 well evidenced biomarkers and A5

NOTE Confidence: 0.82107267

00:24:43.684 --> 00:24:45.530 slight clinical trial model using

NOTE Confidence: 0.82107267

00:24:45.530 --> 00:24:48.170 egg and I tracking because they're

NOTE Confidence: 0.82107267

00:24:48.170 --> 00:24:50.490 inexpensive and practical like my watch.

NOTE Confidence: 0.82107267

00:24:50.490 --> 00:24:51.894 Targeting social community performance,

NOTE Confidence: 0.82107267

00:24:51.894 --> 00:24:53.298 but not only that,

NOTE Confidence: 0.82107267

00:24:53.300 --> 00:24:56.071 so we have some other measures in there and.

NOTE Confidence: 0.82107267

00:24:56.071 --> 00:24:59.368 The characteristics of the kids are there.

NOTE Confidence: 0.82107267

00:24:59.370 --> 00:25:01.008 I'm going to talk to you about

NOTE Confidence: 0.82107267

00:25:01.008 --> 00:25:02.220 some of the results,

NOTE Confidence: 0.82107267

00:25:02.220 --> 00:25:03.730 primarily in the context of

NOTE Confidence: 0.82107267

00:25:03.730 --> 00:25:05.240 the theories I talked about.

NOTE Confidence: 0.82107267

00:25:05.240 --> 00:25:08.447 So social motivation dysregulated arousal and

NOTE Confidence: 0.82107267

00:25:08.447 --> 00:25:09.896 tell you about what the experiments were.

NOTE Confidence: 0.82107267

00:25:09.900 --> 00:25:12.303 So. I've talked a lot about the inland 70s.

NOTE Confidence: 0.82107267

00:25:12.310 --> 00:25:14.190 The first thing we had to do was

NOTE Confidence: 0.82107267

00:25:14.190 --> 00:25:15.959 just show kids a bunch of faces

NOTE Confidence: 0.82107267

00:25:15.959 --> 00:25:17.700 and just look at their address.

NOTE Confidence: 0.82107267

00:25:17.700 --> 00:25:19.278 70, but not like few kids.

NOTE Confidence: 0.82107267

00:25:19.280 --> 00:25:23.394 We, as you saw two hundred 399 kids.

NOTE Confidence: 0.82107267

00:25:23.394 --> 00:25:23.851 Umm,

NOTE Confidence: 0.82107267

00:25:23.851 --> 00:25:25.679 there's evidence that's delayed,

NOTE Confidence: 0.82107267

00:25:25.680 --> 00:25:27.493 but we really want to know and

NOTE Confidence: 0.82107267

00:25:27.493 --> 00:25:29.133 escalate like what the characteristics

NOTE Confidence: 0.82107267

00:25:29.133 --> 00:25:30.749 of this measurement are.

NOTE Confidence: 0.82107267

00:25:30.750 --> 00:25:32.558 And we think about this as sort of

NOTE Confidence: 0.82107267

00:25:32.558 --> 00:25:34.289 measurement for indexing social innovation.

NOTE Confidence: 0.82107267

00:25:34.290 --> 00:25:35.402 And this is really,

NOTE Confidence: 0.82107267

00:25:35.402 --> 00:25:37.619 this is the experiment that the kids see.

NOTE Confidence: 0.82107267

00:25:37.620 --> 00:25:39.748 So just so we can all sort of

NOTE Confidence: 0.82107267

00:25:39.748 --> 00:25:41.929 have some audience participation.

NOTE Confidence: 0.82107267

00:25:41.930 --> 00:25:42.930 Then with eye tracking,

NOTE Confidence: 0.82107267

00:25:42.930 --> 00:25:44.430 we looked at what's called the

NOTE Confidence: 0.82107267

00:25:44.484 --> 00:25:45.828 composite Ocular Motor Index.

NOTE Confidence: 0.82107267

00:25:45.830 --> 00:25:47.720 So again evidence that people thought

NOTE Confidence: 0.82107267

00:25:47.720 --> 00:25:50.129 some look less to social information.

NOTE Confidence: 0.82107267

00:25:50.130 --> 00:25:51.858 So we showed people different kinds

NOTE Confidence: 0.82107267

00:25:51.858 --> 00:25:53.843 of dynamic and static scenes and we

NOTE Confidence: 0.82107267

00:25:53.843 --> 00:25:55.649 just measured how much people look at

NOTE Confidence: 0.82107267

00:25:55.703 --> 00:25:57.726 faces and then average that across that.

NOTE Confidence: 0.82107267

00:25:57.730 --> 00:26:00.318 So you can see.

NOTE Confidence: 0.82107267

00:26:00.320 --> 00:26:02.450 So these.

NOTE Confidence: 0.82107267

00:26:02.450 --> 00:26:04.376 Overlays here indicate sort of the

NOTE Confidence: 0.82107267

00:26:04.376 --> 00:26:06.440 regions of interest for our analysis.

NOTE Confidence: 0.74732839375

00:26:08.560 --> 00:26:09.895 Again, social interest.
NOTE Confidence: 0.74732839375

00:26:09.895 --> 00:26:12.120 Then we look at arousal,
NOTE Confidence: 0.74732839375

00:26:12.120 --> 00:26:13.488 pupillary light response.
NOTE Confidence: 0.74732839375

00:26:13.488 --> 00:26:14.856 Very simple experiment.
NOTE Confidence: 0.74732839375

00:26:14.860 --> 00:26:16.780 We have this really intriguing little
NOTE Confidence: 0.74732839375

00:26:16.780 --> 00:26:18.982 circle thing in the middle that sort
NOTE Confidence: 0.74732839375

00:26:18.982 --> 00:26:21.016 of loops around the noise, nice noise.
NOTE Confidence: 0.74732839375

00:26:21.016 --> 00:26:22.476 And then for 66 milliseconds
NOTE Confidence: 0.74732839375

00:26:22.476 --> 00:26:24.160 of white flash on the screen.
NOTE Confidence: 0.74732839375

00:26:24.160 --> 00:26:25.640 All we're doing is we're
NOTE Confidence: 0.74732839375

00:26:25.640 --> 00:26:27.499 measuring how fast your pupil can
NOTE Confidence: 0.74732839375

00:26:27.499 --> 00:26:29.099 starts to constrict after that.
NOTE Confidence: 0.74732839375

00:26:29.100 --> 00:26:31.260 And there it is.
NOTE Confidence: 0.74732839375

00:26:31.260 --> 00:26:31.950 And finally,
NOTE Confidence: 0.74732839375

00:26:31.950 --> 00:26:33.675 we love this experiment because
NOTE Confidence: 0.74732839375

00:26:33.675 --> 00:26:35.720 no one has to do anything.

NOTE Confidence: 0.74732839375
00:26:35.720 --> 00:26:38.096 We just show these little screen
NOTE Confidence: 0.74732839375
00:26:38.096 --> 00:26:40.862 savers and for for two minutes and
NOTE Confidence: 0.74732839375
00:26:40.862 --> 00:26:42.314 we just measure your resting EEG.
NOTE Confidence: 0.74732839375
00:26:42.320 --> 00:26:44.693 So we can look at the slope
NOTE Confidence: 0.74732839375
00:26:44.693 --> 00:26:47.151 of the resting EEG as a marker
NOTE Confidence: 0.74732839375
00:26:47.151 --> 00:26:49.185 as an index of EI balance.
NOTE Confidence: 0.74732839375
00:26:49.190 --> 00:26:52.136 So the bridge results on these.
NOTE Confidence: 0.74732839375
00:26:52.140 --> 00:26:55.694 On these experiments SO1 participants
NOTE Confidence: 0.74732839375
00:26:55.694 --> 00:26:58.880 with ASDF slower and 170 so on the left.
NOTE Confidence: 0.74732839375
00:26:58.880 --> 00:27:01.680 This is our waveform ASE is in green.
NOTE Confidence: 0.74732839375
00:27:01.680 --> 00:27:03.750 TD's in blue.
NOTE Confidence: 0.74732839375
00:27:03.750 --> 00:27:07.950 You can see that the group of kids
NOTE Confidence: 0.74732839375
00:27:07.950 --> 00:27:09.725 with autism is significantly later.
NOTE Confidence: 0.74732839375
00:27:09.730 --> 00:27:11.428 All the results are I'm showing
NOTE Confidence: 0.74732839375
00:27:11.428 --> 00:27:13.526 you will hold up even when we
NOTE Confidence: 0.74732839375

00:27:13.526 --> 00:27:15.031 include age and cognitive ability
NOTE Confidence: 0.74732839375

00:27:15.031 --> 00:27:17.109 as a covariance on the right.
NOTE Confidence: 0.74732839375

00:27:17.110 --> 00:27:19.374 This is a sort of a stacked histogram
NOTE Confidence: 0.74732839375

00:27:19.374 --> 00:27:21.444 of anyone 70 so you can see a SD
NOTE Confidence: 0.74732839375

00:27:21.444 --> 00:27:23.327 on the left and TD on the right.
NOTE Confidence: 0.74732839375

00:27:23.330 --> 00:27:26.010 We see this sort of longer term not
NOTE Confidence: 0.74732839375

00:27:26.010 --> 00:27:28.325 relative a decent chunk of variety
NOTE Confidence: 0.74732839375

00:27:28.325 --> 00:27:30.683 of kids with autism will reach
NOTE Confidence: 0.74732839375

00:27:30.758 --> 00:27:35.170 show this slower and with 70s so.
NOTE Confidence: 0.74732839375

00:27:35.170 --> 00:27:36.710 The Ocular motor index.
NOTE Confidence: 0.74732839375

00:27:36.710 --> 00:27:39.452 There's a very large effect size that
NOTE Confidence: 0.74732839375

00:27:39.452 --> 00:27:41.979 kids with autism look less two faces.
NOTE Confidence: 0.74732839375

00:27:41.980 --> 00:27:43.484 So this is again,
NOTE Confidence: 0.74732839375

00:27:43.484 --> 00:27:45.740 controlling for age and cognitive ability.
NOTE Confidence: 0.74732839375

00:27:45.740 --> 00:27:47.833 And in line with what we know
NOTE Confidence: 0.74732839375

00:27:47.833 --> 00:27:49.302 about social motivation is that

NOTE Confidence: 0.74732839375

00:27:49.302 --> 00:27:50.826 the less you look at people,

NOTE Confidence: 0.74732839375

00:27:50.830 --> 00:27:52.060 the less you learn about people.

NOTE Confidence: 0.74732839375

00:27:52.060 --> 00:27:54.076 And so here's evidence for just

NOTE Confidence: 0.74732839375

00:27:54.076 --> 00:27:56.080 less interest in looking at people.

NOTE Confidence: 0.74732839375

00:27:56.080 --> 00:27:58.960 For the PLR, slower PLR construction.

NOTE Confidence: 0.74732839375

00:27:58.960 --> 00:28:00.834 So this is a latency, I'm sorry,

NOTE Confidence: 0.74732839375

00:28:00.834 --> 00:28:02.219 it's a little delayed here,

NOTE Confidence: 0.74732839375

00:28:02.220 --> 00:28:04.474 the latency of the PLR and autism

NOTE Confidence: 0.74732839375

00:28:04.474 --> 00:28:06.534 and in typical development and we

NOTE Confidence: 0.74732839375

00:28:06.534 --> 00:28:08.928 see that kids with autism have a

NOTE Confidence: 0.74732839375

00:28:08.997 --> 00:28:10.595 slower constriction to pillar and we

NOTE Confidence: 0.74732839375

00:28:10.595 --> 00:28:12.731 think this is an index of increased

NOTE Confidence: 0.74732839375

00:28:12.731 --> 00:28:14.060 sympathetic noradrenergic activity.

NOTE Confidence: 0.810969499230769

00:28:16.170 --> 00:28:18.246 And finally, the shallower EEG slope

NOTE Confidence: 0.810969499230769

00:28:18.246 --> 00:28:20.829 that we find in kids with autism,

NOTE Confidence: 0.810969499230769

00:28:20.830 --> 00:28:22.948 it's a little hard to see,
NOTE Confidence: 0.810969499230769

00:28:22.950 --> 00:28:25.458 but that green line is significantly
NOTE Confidence: 0.810969499230769

00:28:25.458 --> 00:28:27.550 different than the blue line,
NOTE Confidence: 0.810969499230769

00:28:27.550 --> 00:28:30.454 which shows us that we have more excitation
NOTE Confidence: 0.810969499230769

00:28:30.454 --> 00:28:32.897 relative to inhibition in this group.
NOTE Confidence: 0.822148324285714

00:28:35.560 --> 00:28:38.808 One nice interesting thing we found out.
NOTE Confidence: 0.822148324285714

00:28:38.810 --> 00:28:40.673 And we hope to find out was that this
NOTE Confidence: 0.822148324285714

00:28:40.673 --> 00:28:42.450 also this the slope and the shape of
NOTE Confidence: 0.822148324285714

00:28:42.450 --> 00:28:45.294 the EEG's are tremendously reliable.
NOTE Confidence: 0.822148324285714

00:28:45.294 --> 00:28:48.806 So these shapes, this is just one
NOTE Confidence: 0.822148324285714

00:28:48.806 --> 00:28:50.710 person's power spectrum plot.
NOTE Confidence: 0.822148324285714

00:28:50.710 --> 00:28:51.977 The blue are on one day and
NOTE Confidence: 0.822148324285714

00:28:51.977 --> 00:28:53.268 the red are on another day.
NOTE Confidence: 0.822148324285714

00:28:53.270 --> 00:28:55.710 And these shapes are idiosyncratic.
NOTE Confidence: 0.822148324285714

00:28:55.710 --> 00:28:58.014 You can pick them apart and like put
NOTE Confidence: 0.822148324285714

00:28:58.014 --> 00:29:00.146 them together like it's a matching game.

NOTE Confidence: 0.822148324285714
00:29:00.150 --> 00:29:02.494 And so that's very just cool to see
NOTE Confidence: 0.822148324285714
00:29:02.494 --> 00:29:05.011 but also lets us know that this is a
NOTE Confidence: 0.822148324285714
00:29:05.011 --> 00:29:07.593 this is like a functional of reliable
NOTE Confidence: 0.822148324285714
00:29:07.593 --> 00:29:09.214 index of functional. Activity.
NOTE Confidence: 0.822148324285714
00:29:09.214 --> 00:29:11.218 So it's not like we're measuring.
NOTE Confidence: 0.822148324285714
00:29:11.220 --> 00:29:12.590 We're going up to the kids and we're like up.
NOTE Confidence: 0.822148324285714
00:29:12.590 --> 00:29:13.706 Their head still has the weird
NOTE Confidence: 0.822148324285714
00:29:13.706 --> 00:29:14.949 bump on it two days later,
NOTE Confidence: 0.822148324285714
00:29:14.950 --> 00:29:15.940 like when they go to sleep.
NOTE Confidence: 0.822148324285714
00:29:15.940 --> 00:29:17.330 This whole, EG power spectrum,
NOTE Confidence: 0.822148324285714
00:29:17.330 --> 00:29:19.316 like shifts over. They're asleep, right?
NOTE Confidence: 0.822148324285714
00:29:19.316 --> 00:29:20.980 When they wake up, it's different.
NOTE Confidence: 0.822148324285714
00:29:20.980 --> 00:29:23.710 But when they're kind of at their daily idol,
NOTE Confidence: 0.822148324285714
00:29:23.710 --> 00:29:26.488 everybody has the same sort of
NOTE Confidence: 0.822148324285714
00:29:26.488 --> 00:29:28.340 functional pattern of activity.
NOTE Confidence: 0.822148324285714

00:29:28.340 --> 00:29:28.625 Alright,
NOTE Confidence: 0.822148324285714

00:29:28.625 --> 00:29:31.190 So what did we see there is that there's
NOTE Confidence: 0.822148324285714

00:29:31.253 --> 00:29:33.485 evidence for reduced sodium motion by
NOTE Confidence: 0.822148324285714

00:29:33.485 --> 00:29:35.678 social motivation from the 170 and OI,
NOTE Confidence: 0.822148324285714

00:29:35.680 --> 00:29:36.716 increased arousal,
NOTE Confidence: 0.822148324285714

00:29:36.716 --> 00:29:37.752 increased excitation.
NOTE Confidence: 0.822148324285714

00:29:37.752 --> 00:29:40.342 The different biomarkers are hitting
NOTE Confidence: 0.822148324285714

00:29:40.342 --> 00:29:42.228 different levels of abstraction,
NOTE Confidence: 0.822148324285714

00:29:42.230 --> 00:29:44.600 so these aren't really mutually exclusive,
NOTE Confidence: 0.822148324285714

00:29:44.600 --> 00:29:45.905 but there's evidence for multiple
NOTE Confidence: 0.822148324285714

00:29:45.905 --> 00:29:46.949 mechanisms to work here.
NOTE Confidence: 0.893961846666667

00:29:49.140 --> 00:29:51.750 OK. So what are our next steps with that?
NOTE Confidence: 0.893961846666667

00:29:51.750 --> 00:29:53.406 Well, right now we're working on
NOTE Confidence: 0.893961846666667

00:29:53.406 --> 00:29:55.205 replication and larger sample looking at
NOTE Confidence: 0.893961846666667

00:29:55.205 --> 00:29:56.825 long-term stability of these biomarkers.
NOTE Confidence: 0.893961846666667

00:29:56.830 --> 00:29:58.678 So we've got kids back over,

NOTE Confidence: 0.893961846666667

00:29:58.680 --> 00:30:01.776 you know, past a year at this point.

NOTE Confidence: 0.893961846666667

00:30:01.780 --> 00:30:03.908 And a feasibility study in a younger age

NOTE Confidence: 0.893961846666667

00:30:03.908 --> 00:30:05.844 group and feasibility is really important

NOTE Confidence: 0.893961846666667

00:30:05.844 --> 00:30:08.179 for any kind of measure because you

NOTE Confidence: 0.893961846666667

00:30:08.179 --> 00:30:10.041 want to make sure that your biomarker

NOTE Confidence: 0.893961846666667

00:30:10.041 --> 00:30:12.561 can work in people who need it, right.

NOTE Confidence: 0.893961846666667

00:30:12.561 --> 00:30:14.009 So if you want to do early intervention,

NOTE Confidence: 0.893961846666667

00:30:14.010 --> 00:30:15.662 then you want to be able to

NOTE Confidence: 0.893961846666667

00:30:15.662 --> 00:30:17.379 want to make sure that these,

NOTE Confidence: 0.893961846666667

00:30:17.380 --> 00:30:18.590 you can use these biomarkers

NOTE Confidence: 0.893961846666667

00:30:18.590 --> 00:30:20.409 and a kid and a kid who's,

NOTE Confidence: 0.893961846666667

00:30:20.410 --> 00:30:22.524 you know, three or two years old.

NOTE Confidence: 0.893961846666667

00:30:22.530 --> 00:30:25.866 So in our process of putting

NOTE Confidence: 0.893961846666667

00:30:25.866 --> 00:30:27.534 these analysis together,

NOTE Confidence: 0.893961846666667

00:30:27.540 --> 00:30:30.580 we really dug into things like data quality,

NOTE Confidence: 0.893961846666667

00:30:30.580 --> 00:30:32.548 which I'm sure is riveting and I'm about
NOTE Confidence: 0.893961846666667

00:30:32.548 --> 00:30:34.660 to go into it more, but it's important.
NOTE Confidence: 0.893961846666667

00:30:34.660 --> 00:30:37.175 And I'm going to talk to you about
NOTE Confidence: 0.893961846666667

00:30:37.175 --> 00:30:39.290 data loss and biomarker measurement.
NOTE Confidence: 0.893961846666667

00:30:39.290 --> 00:30:41.941 So we had 399 kids, nine,
NOTE Confidence: 0.893961846666667

00:30:41.941 --> 00:30:44.904 399 kids came in for three visits.
NOTE Confidence: 0.893961846666667

00:30:44.904 --> 00:30:46.416 Each visit was two days each.
NOTE Confidence: 0.893961846666667

00:30:46.420 --> 00:30:48.275 That's a lot of people coming in.
NOTE Confidence: 0.893961846666667

00:30:48.280 --> 00:30:49.948 It's a tremendous amount of work.
NOTE Confidence: 0.893961846666667

00:30:49.950 --> 00:30:51.360 I'm looking at the clinician
NOTE Confidence: 0.893961846666667

00:30:51.360 --> 00:30:52.770 right now who's seen probably.
NOTE Confidence: 0.893961846666667

00:30:52.770 --> 00:30:54.639 Hundred of those kids nodding at me
NOTE Confidence: 0.893961846666667

00:30:54.639 --> 00:30:56.942 saying yes, I did all of that and
NOTE Confidence: 0.893961846666667

00:30:56.942 --> 00:30:58.776 it was a tremendous amount of work.
NOTE Confidence: 0.893961846666667

00:30:58.780 --> 00:31:01.314 And our failure on the eye tracking
NOTE Confidence: 0.893961846666667

00:31:01.314 --> 00:31:05.016 end is that even though we got 399 kids in,

NOTE Confidence: 0.893961846666667

00:31:05.016 --> 00:31:08.194 we didn't get usable EEG data on or

NOTE Confidence: 0.893961846666667

00:31:08.194 --> 00:31:11.920 eye tracking data on those 399 kids.

NOTE Confidence: 0.893961846666667

00:31:11.920 --> 00:31:14.678 So, and it turns out that this,

NOTE Confidence: 0.893961846666667

00:31:14.680 --> 00:31:16.836 this data aren't really missing by random,

NOTE Confidence: 0.893961846666667

00:31:16.840 --> 00:31:17.065 right?

NOTE Confidence: 0.893961846666667

00:31:17.065 --> 00:31:18.865 The kids were the most impaired are the

NOTE Confidence: 0.893961846666667

00:31:18.865 --> 00:31:20.636 kids who were missing the most data on.

NOTE Confidence: 0.893961846666667

00:31:20.640 --> 00:31:22.554 So we decided that we needed

NOTE Confidence: 0.893961846666667

00:31:22.554 --> 00:31:24.650 to quantify this a little bit.

NOTE Confidence: 0.893961846666667

00:31:24.650 --> 00:31:26.110 And I'm going to,

NOTE Confidence: 0.893961846666667

00:31:26.110 --> 00:31:28.300 I'll skip through most of this.

NOTE Confidence: 0.893961846666667

00:31:28.300 --> 00:31:29.462 This is just sort of you know

NOTE Confidence: 0.893961846666667

00:31:29.462 --> 00:31:30.569 how you get like how much,

NOTE Confidence: 0.893961846666667

00:31:30.570 --> 00:31:32.268 how you add up your data.

NOTE Confidence: 0.893961846666667

00:31:32.270 --> 00:31:34.146 But here's the the.

NOTE Confidence: 0.893961846666667

00:31:34.146 --> 00:31:36.491 Important thing is this thing
NOTE Confidence: 0.893961846666667

00:31:36.491 --> 00:31:38.478 called valid data right?
NOTE Confidence: 0.893961846666667

00:31:38.480 --> 00:31:40.279 You need to have enough valid data,
NOTE Confidence: 0.893961846666667

00:31:40.280 --> 00:31:41.604 which is usable data.
NOTE Confidence: 0.893961846666667

00:31:41.604 --> 00:31:43.590 Data you can analyze to in
NOTE Confidence: 0.893961846666667

00:31:43.665 --> 00:31:45.600 order to make a measurement.
NOTE Confidence: 0.893961846666667

00:31:45.600 --> 00:31:49.600 And if we compare groups on valid data,
NOTE Confidence: 0.893961846666667

00:31:49.600 --> 00:31:52.200 this is you don't have to look at,
NOTE Confidence: 0.893961846666667

00:31:52.200 --> 00:31:53.570 just look at this column.
NOTE Confidence: 0.893961846666667

00:31:53.570 --> 00:31:55.508 It's the P values for comparing
NOTE Confidence: 0.893961846666667

00:31:55.508 --> 00:31:57.613 the groups on amount of valid
NOTE Confidence: 0.893961846666667

00:31:57.613 --> 00:31:59.478 data and it's always significant.
NOTE Confidence: 0.893961846666667

00:31:59.480 --> 00:32:01.055 And kids with autism always
NOTE Confidence: 0.893961846666667

00:32:01.055 --> 00:32:02.315 have less valid data.
NOTE Confidence: 0.893961846666667

00:32:02.320 --> 00:32:04.480 And this continues even
NOTE Confidence: 0.893961846666667

00:32:04.480 --> 00:32:07.180 when you control for age,

NOTE Confidence: 0.893961846666667

00:32:07.180 --> 00:32:09.658 cognitive ability and data collection site,

NOTE Confidence: 0.893961846666667

00:32:09.660 --> 00:32:10.820 which is a ton of.

NOTE Confidence: 0.893961846666667

00:32:10.820 --> 00:32:12.722 It's like now we're just almost

NOTE Confidence: 0.893961846666667

00:32:12.722 --> 00:32:14.544 throwing things in the model to

NOTE Confidence: 0.893961846666667

00:32:14.544 --> 00:32:16.512 try to make that P value go away,

NOTE Confidence: 0.893961846666667

00:32:16.520 --> 00:32:17.474 but we weren't.

NOTE Confidence: 0.893961846666667

00:32:17.474 --> 00:32:19.064 These are being valid measures

NOTE Confidence: 0.893961846666667

00:32:19.064 --> 00:32:19.980 to control for,

NOTE Confidence: 0.893961846666667

00:32:19.980 --> 00:32:21.408 but it's still a big effect.

NOTE Confidence: 0.8671384925

00:32:23.420 --> 00:32:24.792 But I think you know many of

NOTE Confidence: 0.8671384925

00:32:24.792 --> 00:32:26.120 you would have predicted that.

NOTE Confidence: 0.8671384925

00:32:26.120 --> 00:32:28.064 So this maybe you would have

NOTE Confidence: 0.8671384925

00:32:28.064 --> 00:32:30.092 predicted this too though which is

NOTE Confidence: 0.8671384925

00:32:30.092 --> 00:32:32.108 that in this sea of significant

NOTE Confidence: 0.8671384925

00:32:32.108 --> 00:32:33.982 correlations it shows that the

NOTE Confidence: 0.8671384925

00:32:33.982 --> 00:32:37.776 amount of valid data you have is
NOTE Confidence: 0.8671384925

00:32:37.776 --> 00:32:39.607 reflects clinical severity across
NOTE Confidence: 0.8671384925

00:32:39.607 --> 00:32:42.610 all of the clinical measures we did.
NOTE Confidence: 0.8671384925

00:32:42.610 --> 00:32:43.422 The take home point.
NOTE Confidence: 0.8671384925

00:32:43.422 --> 00:32:45.080 We lose the most data from the kids.
NOTE Confidence: 0.8671384925

00:32:45.080 --> 00:32:46.000 We're the most impaired.
NOTE Confidence: 0.797942474285714

00:32:48.440 --> 00:32:50.295 And it's the rule, not the exception,
NOTE Confidence: 0.797942474285714

00:32:50.300 --> 00:32:52.412 so it's significantly correlated
NOTE Confidence: 0.797942474285714

00:32:52.412 --> 00:32:54.524 with their individual differences.
NOTE Confidence: 0.797942474285714

00:32:54.530 --> 00:32:56.916 And then this one is, is even more fun,
NOTE Confidence: 0.797942474285714

00:32:56.916 --> 00:32:58.410 which is that we're losing most
NOTE Confidence: 0.797942474285714

00:32:58.470 --> 00:32:59.934 data from those kids who are
NOTE Confidence: 0.797942474285714

00:32:59.934 --> 00:33:01.480 looking at least at the faces.
NOTE Confidence: 0.797942474285714

00:33:01.480 --> 00:33:03.768 So that's the thing that we think is
NOTE Confidence: 0.797942474285714

00:33:03.768 --> 00:33:06.185 the most important marker of clinical
NOTE Confidence: 0.797942474285714

00:33:06.185 --> 00:33:08.410 characterization and it turns out.

NOTE Confidence: 0.797942474285714
00:33:08.410 --> 00:33:10.356 So the kids who are looking the
NOTE Confidence: 0.797942474285714
00:33:10.356 --> 00:33:12.543 least at the faces are the ones
NOTE Confidence: 0.797942474285714
00:33:12.543 --> 00:33:14.475 we're losing the most data from.
NOTE Confidence: 0.797942474285714
00:33:14.480 --> 00:33:15.404 So the question is,
NOTE Confidence: 0.797942474285714
00:33:15.404 --> 00:33:16.790 how do you know that they're
NOTE Confidence: 0.797942474285714
00:33:16.841 --> 00:33:18.479 looking the least at the faces if,
NOTE Confidence: 0.797942474285714
00:33:18.480 --> 00:33:20.184 and that's kind of you take
NOTE Confidence: 0.797942474285714
00:33:20.184 --> 00:33:21.320 this out far enough,
NOTE Confidence: 0.797942474285714
00:33:21.320 --> 00:33:26.216 you don't your your measurement precision.
NOTE Confidence: 0.797942474285714
00:33:26.220 --> 00:33:28.170 Is the worst in the people
NOTE Confidence: 0.797942474285714
00:33:28.170 --> 00:33:30.750 you want it to be the best in.
NOTE Confidence: 0.797942474285714
00:33:30.750 --> 00:33:32.631 Um, it's like a this is kind of like
NOTE Confidence: 0.797942474285714
00:33:32.631 --> 00:33:34.370 an ECG system that stops working
NOTE Confidence: 0.797942474285714
00:33:34.370 --> 00:33:36.060 when your heart rate goes up.
NOTE Confidence: 0.797942474285714
00:33:36.060 --> 00:33:37.100 Right. It's really, really,
NOTE Confidence: 0.797942474285714

00:33:37.100 --> 00:33:38.400 really great when you're kind
NOTE Confidence: 0.797942474285714

00:33:38.400 --> 00:33:39.838 of like a sleep or if you're,
NOTE Confidence: 0.797942474285714

00:33:39.840 --> 00:33:40.527 you know, really,
NOTE Confidence: 0.797942474285714

00:33:40.527 --> 00:33:41.443 really healthy and you're
NOTE Confidence: 0.797942474285714

00:33:41.443 --> 00:33:42.130 running a triathlon.
NOTE Confidence: 0.797942474285714

00:33:42.130 --> 00:33:44.560 But if you go in for a stress test,
NOTE Confidence: 0.797942474285714

00:33:44.560 --> 00:33:46.060 it just starts to fall apart.
NOTE Confidence: 0.797942474285714

00:33:46.060 --> 00:33:47.580 You think that's really when we want it,
NOTE Confidence: 0.797942474285714

00:33:47.580 --> 00:33:49.490 though.
NOTE Confidence: 0.797942474285714

00:33:49.490 --> 00:33:49.680 Alright.
NOTE Confidence: 0.797942474285714

00:33:49.680 --> 00:33:51.200 But also I want to I've just talked
NOTE Confidence: 0.797942474285714

00:33:51.200 --> 00:33:52.560 a lot about the missing data.
NOTE Confidence: 0.797942474285714

00:33:52.560 --> 00:33:54.960 This is not specific to the ABC TV.
NOTE Confidence: 0.797942474285714

00:33:54.960 --> 00:33:56.170 When I first started doing
NOTE Confidence: 0.797942474285714

00:33:56.170 --> 00:33:57.138 eye tracking research here,
NOTE Confidence: 0.797942474285714

00:33:57.140 --> 00:33:59.480 a very senior person came up to me and said,

NOTE Confidence: 0.797942474285714
00:33:59.480 --> 00:34:01.139 oh man, you lose so much data.
NOTE Confidence: 0.797942474285714
00:34:01.140 --> 00:34:02.388 Nobody ever tells you about it.
NOTE Confidence: 0.797942474285714
00:34:02.390 --> 00:34:04.078 And they were just there sort of crestfallen,
NOTE Confidence: 0.797942474285714
00:34:04.080 --> 00:34:05.840 like they work so hard and so the
NOTE Confidence: 0.797942474285714
00:34:05.840 --> 00:34:07.414 kids are just like looking at
NOTE Confidence: 0.797942474285714
00:34:07.414 --> 00:34:09.340 something in the corner of the room.
NOTE Confidence: 0.797942474285714
00:34:09.340 --> 00:34:10.915 But we have so much data that
NOTE Confidence: 0.797942474285714
00:34:10.915 --> 00:34:12.280 we can really quantify it.
NOTE Confidence: 0.797942474285714
00:34:12.280 --> 00:34:14.176 Now usually this is a byline
NOTE Confidence: 0.797942474285714
00:34:14.176 --> 00:34:16.070 like kids who looked less than
NOTE Confidence: 0.797942474285714
00:34:16.070 --> 00:34:18.055 50% of the screen were excluded
NOTE Confidence: 0.797942474285714
00:34:18.055 --> 00:34:19.480 from our analysis and it's.
NOTE Confidence: 0.797942474285714
00:34:19.480 --> 00:34:20.480 Maybe three or five kids.
NOTE Confidence: 0.797942474285714
00:34:20.480 --> 00:34:22.300 So you can't really quantify
NOTE Confidence: 0.797942474285714
00:34:22.300 --> 00:34:24.120 it in the same way,
NOTE Confidence: 0.797942474285714

00:34:24.120 --> 00:34:24.600 so.
NOTE Confidence: 0.41816604

00:34:27.090 --> 00:34:30.910 Umm. This is data loss from
NOTE Confidence: 0.41816604

00:34:30.910 --> 00:34:32.900 kids in the ACT 6 to 11.
NOTE Confidence: 0.41816604

00:34:32.900 --> 00:34:35.945 Their IQ's are from 60 to 140
NOTE Confidence: 0.41816604

00:34:35.945 --> 00:34:39.220 and you know it's. Still really,
NOTE Confidence: 0.41816604

00:34:39.220 --> 00:34:41.700 really, really good data quality.
NOTE Confidence: 0.41816604

00:34:41.700 --> 00:34:43.695 But we've thought about this a lot.
NOTE Confidence: 0.41816604

00:34:43.700 --> 00:34:45.470 And so a few years ago, well,
NOTE Confidence: 0.41816604

00:34:45.470 --> 00:34:47.640 kind of working on this for more
NOTE Confidence: 0.41816604

00:34:47.640 --> 00:34:49.324 than a few years, you know,
NOTE Confidence: 0.41816604

00:34:49.324 --> 00:34:50.859 Jamie and I came up with the idea of like,
NOTE Confidence: 0.41816604

00:34:50.860 --> 00:34:53.356 how can we include these kids?
NOTE Confidence: 0.41816604

00:34:53.360 --> 00:34:56.100 Thank you. 60 to 140,
NOTE Confidence: 0.41816604

00:34:56.100 --> 00:34:58.393 that's kind of not higher IQ's,
NOTE Confidence: 0.41816604

00:34:58.393 --> 00:34:59.791 but there's a lot of kids
NOTE Confidence: 0.41816604

00:34:59.791 --> 00:35:01.039 who still don't hit those,

NOTE Confidence: 0.41816604

00:35:01.040 --> 00:35:03.290 those targets, they're more impaired.

NOTE Confidence: 0.41816604

00:35:03.290 --> 00:35:05.670 And so how can we make these

NOTE Confidence: 0.41816604

00:35:05.670 --> 00:35:06.690 experiments like work?

NOTE Confidence: 0.41816604

00:35:06.690 --> 00:35:08.580 And how can this system operate

NOTE Confidence: 0.41816604

00:35:08.580 --> 00:35:10.845 for kids who don't have an IQ of

NOTE Confidence: 0.41816604

00:35:10.845 --> 00:35:12.807 like 120 and are really motivated

NOTE Confidence: 0.41816604

00:35:12.807 --> 00:35:16.090 by \$100 in a Lego set coming in?

NOTE Confidence: 0.41816604

00:35:16.090 --> 00:35:17.707 And that we don't give Lego sets.

NOTE Confidence: 0.41816604

00:35:17.710 --> 00:35:19.026 And I want to make that clear

NOTE Confidence: 0.41816604

00:35:19.026 --> 00:35:19.990 because I'm being recorded.

NOTE Confidence: 0.41816604

00:35:19.990 --> 00:35:21.172 It was sort of there's an

NOTE Confidence: 0.41816604

00:35:21.172 --> 00:35:21.566 illustrative moment,

NOTE Confidence: 0.41816604

00:35:21.570 --> 00:35:23.362 but I do not want to that to

NOTE Confidence: 0.41816604

00:35:23.362 --> 00:35:25.190 sort of be false advertising.

NOTE Confidence: 0.41816604

00:35:25.190 --> 00:35:25.393 So.

NOTE Confidence: 0.41816604

00:35:25.393 --> 00:35:27.220 So I got to think about a group of
NOTE Confidence: 0.41816604

00:35:27.276 --> 00:35:29.467 kids that's in significant need of study,
NOTE Confidence: 0.41816604

00:35:29.470 --> 00:35:32.655 kids with autism and intellectual
NOTE Confidence: 0.41816604

00:35:32.655 --> 00:35:33.929 disability and.
NOTE Confidence: 0.41816604

00:35:33.930 --> 00:35:36.604 So approximately 30% of kids with autism
NOTE Confidence: 0.41816604

00:35:36.604 --> 00:35:38.410 have significant intellectual disability.
NOTE Confidence: 0.41816604

00:35:38.410 --> 00:35:39.240 They're very,
NOTE Confidence: 0.41816604

00:35:39.240 --> 00:35:40.900 very underrepresented in neuroscience
NOTE Confidence: 0.41816604

00:35:40.900 --> 00:35:43.154 research and I would argue the
NOTE Confidence: 0.41816604

00:35:43.154 --> 00:35:45.274 reason why is that it's hard to get.
NOTE Confidence: 0.41816604

00:35:45.280 --> 00:35:47.212 Usable brain data, and I'm going to
NOTE Confidence: 0.41816604

00:35:47.212 --> 00:35:49.277 give you some numbers to come into.
NOTE Confidence: 0.41816604

00:35:49.280 --> 00:35:51.424 It's a real issue.
NOTE Confidence: 0.41816604

00:35:51.424 --> 00:35:53.760 So I did some pub Med searching.
NOTE Confidence: 0.41816604

00:35:53.760 --> 00:35:55.216 From 2020 to now,
NOTE Confidence: 0.41816604

00:35:55.216 --> 00:35:57.400 molecular Autism is a great journal.

NOTE Confidence: 0.41816604
00:35:57.400 --> 00:35:58.870 Published 214 articles.
NOTE Confidence: 0.41816604
00:35:58.870 --> 00:36:01.320 Autism, which is another journal,
NOTE Confidence: 0.41816604
00:36:01.320 --> 00:36:02.704 published 193.
NOTE Confidence: 0.41816604
00:36:02.704 --> 00:36:05.163 Autism Research published 140.
NOTE Confidence: 0.41816604
00:36:05.163 --> 00:36:07.078 In that same time span,
NOTE Confidence: 0.41816604
00:36:07.080 --> 00:36:09.664 if you go through all the papers and
NOTE Confidence: 0.41816604
00:36:09.664 --> 00:36:12.033 search for kids with IQ of less than
NOTE Confidence: 0.41816604
00:36:12.033 --> 00:36:14.579 60 who were in a study with an EEG,
NOTE Confidence: 0.41816604
00:36:14.580 --> 00:36:15.234 all the papers.
NOTE Confidence: 0.41816604
00:36:15.234 --> 00:36:16.750 You know, this is not just those journals.
NOTE Confidence: 0.41816604
00:36:16.750 --> 00:36:19.750 This is JCP and you just add up all the kids.
NOTE Confidence: 0.41816604
00:36:19.750 --> 00:36:22.129 That's 66 kids.
NOTE Confidence: 0.41816604
00:36:22.130 --> 00:36:23.162 That's 66 papers.
NOTE Confidence: 0.41816604
00:36:23.162 --> 00:36:27.206 There's not a paper with 66 kids, 66 kids.
NOTE Confidence: 0.41816604
00:36:27.206 --> 00:36:30.478 There's like that's crazy.
NOTE Confidence: 0.41816604

00:36:30.480 --> 00:36:33.576 This is this is 3 journals,
NOTE Confidence: 0.41816604

00:36:33.580 --> 00:36:36.390 548 seven or eight 45147 articles and
NOTE Confidence: 0.41816604

00:36:36.390 --> 00:36:37.930 those are like the other review articles.
NOTE Confidence: 0.41816604

00:36:37.930 --> 00:36:40.186 Those are opinions,
NOTE Confidence: 0.41816604

00:36:40.186 --> 00:36:40.938 but.
NOTE Confidence: 0.41816604

00:36:40.940 --> 00:36:42.986 It's it's still a tremendous amount
NOTE Confidence: 0.41816604

00:36:42.986 --> 00:36:45.560 of work to even just put those
NOTE Confidence: 0.41816604

00:36:45.560 --> 00:36:49.118 articles out there. Only 66 kids.
NOTE Confidence: 0.41816604

00:36:49.120 --> 00:36:50.560 So, so what's happening?
NOTE Confidence: 0.41816604

00:36:50.560 --> 00:36:54.217 Well, it's really hard to get usable data.
NOTE Confidence: 0.41816604

00:36:54.220 --> 00:36:55.512 So people know this,
NOTE Confidence: 0.41816604

00:36:55.512 --> 00:36:57.127 it's hard and that's why
NOTE Confidence: 0.41816604

00:36:57.127 --> 00:36:58.920 there's probably only 60s kids.
NOTE Confidence: 0.41816604

00:36:58.920 --> 00:37:01.060 So for characterization you need,
NOTE Confidence: 0.41816604

00:37:01.060 --> 00:37:02.356 you know, specialized staff.
NOTE Confidence: 0.41816604

00:37:02.356 --> 00:37:04.697 And Christine is a BC BA works

NOTE Confidence: 0.41816604

00:37:04.697 --> 00:37:06.677 with us and a psychologist and

NOTE Confidence: 0.41816604

00:37:06.677 --> 00:37:08.470 Julie are experts on this in

NOTE Confidence: 0.41816604

00:37:08.470 --> 00:37:10.466 the world and they're flexible

NOTE Confidence: 0.41816604

00:37:10.466 --> 00:37:11.972 with complex characterization

NOTE Confidence: 0.41816604

00:37:11.972 --> 00:37:13.980 situations and behavioral demands.

NOTE Confidence: 0.41816604

00:37:13.980 --> 00:37:16.430 The experiments need to be able to

NOTE Confidence: 0.41816604

00:37:16.430 --> 00:37:17.870 accommodate the participants needs.

NOTE Confidence: 0.41816604

00:37:17.870 --> 00:37:19.574 So a lot of experiments will say like.

NOTE Confidence: 0.41816604

00:37:19.580 --> 00:37:20.720 It's still and press a button

NOTE Confidence: 0.41816604

00:37:20.720 --> 00:37:21.700 when you see a dog.

NOTE Confidence: 0.41816604

00:37:21.700 --> 00:37:24.325 If a kid doesn't have useful language,

NOTE Confidence: 0.41816604

00:37:24.330 --> 00:37:25.460 doesn't understand what you're saying,

NOTE Confidence: 0.803470286666667

00:37:25.460 --> 00:37:26.828 can't read that on the screen,

NOTE Confidence: 0.803470286666667

00:37:26.830 --> 00:37:30.586 that it's not going to work.

NOTE Confidence: 0.803470286666667

00:37:30.590 --> 00:37:32.550 And then the data are usually messier.

NOTE Confidence: 0.803470286666667

00:37:32.550 --> 00:37:34.300 And so just the analysis.
NOTE Confidence: 0.803470286666667

00:37:34.300 --> 00:37:35.610 And this is like the, you know,
NOTE Confidence: 0.803470286666667

00:37:35.610 --> 00:37:37.530 the people who are in the back room with,
NOTE Confidence: 0.803470286666667

00:37:37.530 --> 00:37:38.462 you know, 50 computers.
NOTE Confidence: 0.803470286666667

00:37:38.462 --> 00:37:40.246 And like, we need to come up with a
NOTE Confidence: 0.803470286666667

00:37:40.246 --> 00:37:41.877 new kind of experimental pipeline in
NOTE Confidence: 0.803470286666667

00:37:41.877 --> 00:37:43.893 order to accommodate this data from
NOTE Confidence: 0.803470286666667

00:37:43.893 --> 00:37:45.866 these kids because they move so much.
NOTE Confidence: 0.803470286666667

00:37:45.870 --> 00:37:47.470 You typically need more people
NOTE Confidence: 0.803470286666667

00:37:47.470 --> 00:37:50.320 and your staff. But that's like.
NOTE Confidence: 0.803470286666667

00:37:50.320 --> 00:37:51.720 That's manageable.
NOTE Confidence: 0.803470286666667

00:37:51.720 --> 00:37:53.820 And another way,
NOTE Confidence: 0.803470286666667

00:37:53.820 --> 00:37:56.076 it's really hard for the families,
NOTE Confidence: 0.803470286666667

00:37:56.080 --> 00:37:57.564 like for any of you who have
NOTE Confidence: 0.803470286666667

00:37:57.564 --> 00:37:59.653 come to New Haven and tried to
NOTE Confidence: 0.803470286666667

00:37:59.653 --> 00:38:00.700 park somewhere comfortably.

NOTE Confidence: 0.803470286666667

00:38:00.700 --> 00:38:02.296 Now imagine that you're doing that,

NOTE Confidence: 0.803470286666667

00:38:02.300 --> 00:38:04.064 and you have a child who's in

NOTE Confidence: 0.803470286666667

00:38:04.064 --> 00:38:05.770 an unfamiliar place who has

NOTE Confidence: 0.803470286666667

00:38:05.770 --> 00:38:07.105 difficulty difficulty navigating

NOTE Confidence: 0.803470286666667

00:38:07.105 --> 00:38:08.440 these unfamiliar situations.

NOTE Confidence: 0.803470286666667

00:38:08.440 --> 00:38:10.576 You take you're missing a day of school.

NOTE Confidence: 0.803470286666667

00:38:10.580 --> 00:38:12.868 You're trying to find a place for lunch.

NOTE Confidence: 0.803470286666667

00:38:12.870 --> 00:38:15.089 Then it's really hard for the kids

NOTE Confidence: 0.803470286666667

00:38:15.089 --> 00:38:16.549 because they're going to some,

NOTE Confidence: 0.803470286666667

00:38:16.550 --> 00:38:18.671 because then they sit in front of

NOTE Confidence: 0.803470286666667

00:38:18.671 --> 00:38:20.084 this experiment that says press

NOTE Confidence: 0.803470286666667

00:38:20.084 --> 00:38:21.876 a button if you see a dog and

NOTE Confidence: 0.803470286666667

00:38:21.937 --> 00:38:23.337 you know what's going on.

NOTE Confidence: 0.803470286666667

00:38:23.340 --> 00:38:27.050 So. When I say usable data,

NOTE Confidence: 0.803470286666667

00:38:27.050 --> 00:38:27.930 that's going to be clear.

NOTE Confidence: 0.803470286666667

00:38:27.930 --> 00:38:29.379 These are nice wiggly lines up here.
NOTE Confidence: 0.803470286666667

00:38:29.380 --> 00:38:30.706 That's what we want to see.
NOTE Confidence: 0.803470286666667

00:38:30.710 --> 00:38:31.945 This is what happens when
NOTE Confidence: 0.803470286666667

00:38:31.945 --> 00:38:32.933 someone's moving their head.
NOTE Confidence: 0.803470286666667

00:38:32.940 --> 00:38:35.070 And that's like, they're just like,
NOTE Confidence: 0.803470286666667

00:38:35.070 --> 00:38:35.560 you know,
NOTE Confidence: 0.803470286666667

00:38:35.560 --> 00:38:37.030 adjusting their neck and it's unusable.
NOTE Confidence: 0.803470286666667

00:38:37.030 --> 00:38:38.815 It's muscle activity.
NOTE Confidence: 0.803470286666667

00:38:38.815 --> 00:38:41.195 This is most of.
NOTE Confidence: 0.803470286666667

00:38:41.200 --> 00:38:42.460 This is what happens when
NOTE Confidence: 0.803470286666667

00:38:42.460 --> 00:38:43.720 you're not you don't know.
NOTE Confidence: 0.803470286666667

00:38:43.720 --> 00:38:44.980 You have to sit still and
NOTE Confidence: 0.803470286666667

00:38:44.980 --> 00:38:45.820 you're not sitting still,
NOTE Confidence: 0.803470286666667

00:38:45.820 --> 00:38:49.676 and then you can't use this for anything.
NOTE Confidence: 0.803470286666667

00:38:49.680 --> 00:38:51.900 The task demands of these experiments,
NOTE Confidence: 0.803470286666667

00:38:51.900 --> 00:38:53.940 following verbal or written instructions.

NOTE Confidence: 0.803470286666667
00:38:53.940 --> 00:38:54.217 Again,
NOTE Confidence: 0.803470286666667
00:38:54.217 --> 00:38:56.433 I'm sitting still is like it's not trivial,
NOTE Confidence: 0.803470286666667
00:38:56.440 --> 00:38:57.400 but I keep repeating it,
NOTE Confidence: 0.803470286666667
00:38:57.400 --> 00:38:59.120 sustaining your attention and
NOTE Confidence: 0.803470286666667
00:38:59.120 --> 00:39:00.840 tolerating an unfamiliar set.
NOTE Confidence: 0.803470286666667
00:39:00.840 --> 00:39:03.279 And so our approach to all of this was
NOTE Confidence: 0.803470286666667
00:39:03.279 --> 00:39:05.496 instead of just saying it's really hard,
NOTE Confidence: 0.803470286666667
00:39:05.500 --> 00:39:05.844 you know,
NOTE Confidence: 0.803470286666667
00:39:05.844 --> 00:39:06.360 tough it out,
NOTE Confidence: 0.803470286666667
00:39:06.360 --> 00:39:07.945 which I think would probably
NOTE Confidence: 0.803470286666667
00:39:07.945 --> 00:39:08.896 not be effective,
NOTE Confidence: 0.803470286666667
00:39:08.900 --> 00:39:10.214 it was just to try to make it easy.
NOTE Confidence: 0.803470286666667
00:39:10.220 --> 00:39:12.512 So we developed what we call
NOTE Confidence: 0.803470286666667
00:39:12.512 --> 00:39:14.532 Pelican is the the probabilistic
NOTE Confidence: 0.803470286666667
00:39:14.532 --> 00:39:16.276 and active learning infrastructure
NOTE Confidence: 0.803470286666667

00:39:16.276 --> 00:39:18.020 for characterization neuro typing.
NOTE Confidence: 0.803470286666667

00:39:18.020 --> 00:39:19.934 So it's an experimental system that
NOTE Confidence: 0.803470286666667

00:39:19.934 --> 00:39:21.210 reacts to participants movements,
NOTE Confidence: 0.803470286666667

00:39:21.210 --> 00:39:22.980 their eye movements, their attention.
NOTE Confidence: 0.803470286666667

00:39:22.980 --> 00:39:24.660 It adaptively teaches participants to
NOTE Confidence: 0.803470286666667

00:39:24.660 --> 00:39:26.671 attend to the experiment and monitors
NOTE Confidence: 0.803470286666667

00:39:26.671 --> 00:39:28.596 the data quality so it can adapt
NOTE Confidence: 0.803470286666667

00:39:28.596 --> 00:39:30.220 what they're seeing in real time.
NOTE Confidence: 0.803470286666667

00:39:30.220 --> 00:39:31.825 There's no explicit.
NOTE Confidence: 0.803470286666667

00:39:31.825 --> 00:39:32.360 Instructions.
NOTE Confidence: 0.803470286666667

00:39:32.360 --> 00:39:34.500 And it's personalized reinforcers.
NOTE Confidence: 0.803470286666667

00:39:34.500 --> 00:39:36.400 And I'm going to show you just how it works.
NOTE Confidence: 0.803470286666667

00:39:36.400 --> 00:39:39.200 So you come in, well, first of all,
NOTE Confidence: 0.803470286666667

00:39:39.200 --> 00:39:40.794 someone calls you on the phone, the parent,
NOTE Confidence: 0.803470286666667

00:39:40.794 --> 00:39:42.383 the child, the parent on the phone.
NOTE Confidence: 0.803470286666667

00:39:42.390 --> 00:39:43.210 And they say, you know,

NOTE Confidence: 0.803470286666667
00:39:43.210 --> 00:39:45.314 what movies does your son or daughter like,
NOTE Confidence: 0.803470286666667
00:39:45.320 --> 00:39:45.636 right.
NOTE Confidence: 0.803470286666667
00:39:45.636 --> 00:39:47.920 And they say, oh, Bob the Builder.
NOTE Confidence: 0.803470286666667
00:39:47.920 --> 00:39:49.280 So maybe not anymore.
NOTE Confidence: 0.803470286666667
00:39:49.280 --> 00:39:50.840 But let's just say it's like,
NOTE Confidence: 0.803470286666667
00:39:50.840 --> 00:39:52.130 really, really like Bob the Builder.
NOTE Confidence: 0.803470286666667
00:39:52.130 --> 00:39:53.720 They've all PBS VHS tapes.
NOTE Confidence: 0.803470286666667
00:39:53.720 --> 00:39:55.048 So they come in, we sit them down,
NOTE Confidence: 0.803470286666667
00:39:55.050 --> 00:39:56.380 we put this cap on their head.
NOTE Confidence: 0.803470286666667
00:39:56.380 --> 00:39:57.232 And that red,
NOTE Confidence: 0.803470286666667
00:39:57.232 --> 00:39:59.220 that red mist doesn't mean that they're
NOTE Confidence: 0.735601223538462
00:39:59.279 --> 00:40:00.029 hot or smells.
NOTE Confidence: 0.735601223538462
00:40:00.030 --> 00:40:01.420 It means they're moving, right.
NOTE Confidence: 0.735601223538462
00:40:01.420 --> 00:40:03.709 So they're they're moving and it's plan.
NOTE Confidence: 0.735601223538462
00:40:03.710 --> 00:40:05.201 Because they start to move too much
NOTE Confidence: 0.735601223538462

00:40:05.201 --> 00:40:07.198 or they look away from the screen and
NOTE Confidence: 0.735601223538462

00:40:07.198 --> 00:40:08.508 we're measuring this with cameras.
NOTE Confidence: 0.735601223538462

00:40:08.510 --> 00:40:10.463 We're measuring this with a chair that
NOTE Confidence: 0.735601223538462

00:40:10.463 --> 00:40:12.560 kind of like monitors acceleration.
NOTE Confidence: 0.735601223538462

00:40:12.560 --> 00:40:14.816 We're measuring it with head movement.
NOTE Confidence: 0.735601223538462

00:40:14.820 --> 00:40:16.056 So you start moving too much,
NOTE Confidence: 0.735601223538462

00:40:16.060 --> 00:40:18.356 Bob stops, all right?
NOTE Confidence: 0.735601223538462

00:40:18.356 --> 00:40:19.540 So you start moving a little bit less,
NOTE Confidence: 0.735601223538462

00:40:19.540 --> 00:40:21.168 Bob starts playing again.
NOTE Confidence: 0.735601223538462

00:40:21.168 --> 00:40:24.868 So the idea is that whenever you attend and
NOTE Confidence: 0.735601223538462

00:40:24.868 --> 00:40:27.698 sit Stiller than you were before, right?
NOTE Confidence: 0.735601223538462

00:40:27.698 --> 00:40:29.504 Because having someone go from moving around,
NOTE Confidence: 0.735601223538462

00:40:29.510 --> 00:40:32.177 sitting completely still is a tall order.
NOTE Confidence: 0.735601223538462

00:40:32.180 --> 00:40:33.940 You get reinforced by this.
NOTE Confidence: 0.735601223538462

00:40:33.940 --> 00:40:35.176 Personalized reinforcer.
NOTE Confidence: 0.735601223538462

00:40:35.176 --> 00:40:37.030 Bob the Builder.

NOTE Confidence: 0.735601223538462

00:40:37.030 --> 00:40:38.462 So what this works out to be is

NOTE Confidence: 0.735601223538462

00:40:38.462 --> 00:40:39.985 we get attention in this word that

NOTE Confidence: 0.735601223538462

00:40:39.985 --> 00:40:41.620 I never know how to pronounce.

NOTE Confidence: 0.735601223538462

00:40:41.620 --> 00:40:42.460 Quiescence,

NOTE Confidence: 0.735601223538462

00:40:42.460 --> 00:40:45.820 stillness without verbal instructions.

NOTE Confidence: 0.735601223538462

00:40:45.820 --> 00:40:47.890 Umm.

NOTE Confidence: 0.735601223538462

00:40:47.890 --> 00:40:49.962 Always positive reinforcement and

NOTE Confidence: 0.735601223538462

00:40:49.962 --> 00:40:52.034 then the personalized reinforcers.

NOTE Confidence: 0.735601223538462

00:40:52.040 --> 00:40:54.044 Actually, this is much more effective

NOTE Confidence: 0.735601223538462

00:40:54.044 --> 00:40:55.979 than we thought it would be.

NOTE Confidence: 0.735601223538462

00:40:55.980 --> 00:40:57.876 So it's a very unfamiliar place.

NOTE Confidence: 0.735601223538462

00:40:57.880 --> 00:40:59.217 But you come in and something very,

NOTE Confidence: 0.735601223538462

00:40:59.220 --> 00:41:01.476 very familiar to you is happening.

NOTE Confidence: 0.735601223538462

00:41:01.480 --> 00:41:03.223 And it turns out that there's no

NOTE Confidence: 0.735601223538462

00:41:03.223 --> 00:41:04.531 way you can have one-size-fits-all.

NOTE Confidence: 0.735601223538462

00:41:04.531 --> 00:41:06.699 I mean, we have kids who love Moana.
NOTE Confidence: 0.735601223538462

00:41:06.700 --> 00:41:09.437 We have kids who love 80s action
NOTE Confidence: 0.735601223538462

00:41:09.437 --> 00:41:11.280 sort of sitcom dramas.
NOTE Confidence: 0.735601223538462

00:41:11.280 --> 00:41:12.360 These are all real.
NOTE Confidence: 0.735601223538462

00:41:12.360 --> 00:41:13.852 You know, these are not participants,
NOTE Confidence: 0.735601223538462

00:41:13.852 --> 00:41:15.280 but these are choices of participants.
NOTE Confidence: 0.735601223538462

00:41:15.280 --> 00:41:17.960 And then we have the Chicago bus system.
NOTE Confidence: 0.735601223538462

00:41:17.960 --> 00:41:19.344 And we'd never know.
NOTE Confidence: 0.735601223538462

00:41:19.344 --> 00:41:21.074 We would have never picked
NOTE Confidence: 0.735601223538462

00:41:21.074 --> 00:41:22.398 these up on our own.
NOTE Confidence: 0.735601223538462

00:41:22.400 --> 00:41:24.602 But it really helps to navigate
NOTE Confidence: 0.735601223538462

00:41:24.602 --> 00:41:26.480 the uncertainty of the room.
NOTE Confidence: 0.735601223538462

00:41:26.480 --> 00:41:28.220 And then the last thing is
NOTE Confidence: 0.735601223538462

00:41:28.220 --> 00:41:29.380 that adaptive trial delivery.
NOTE Confidence: 0.735601223538462

00:41:29.380 --> 00:41:30.850 So we're watching how you're watching
NOTE Confidence: 0.735601223538462

00:41:30.850 --> 00:41:32.599 the computer because if we're watching it,

NOTE Confidence: 0.735601223538462
00:41:32.600 --> 00:41:34.055 we're too slow,
NOTE Confidence: 0.735601223538462
00:41:34.055 --> 00:41:35.510 we're too inattentive.
NOTE Confidence: 0.735601223538462
00:41:35.510 --> 00:41:37.082 We're monitoring if you're moving around
NOTE Confidence: 0.735601223538462
00:41:37.082 --> 00:41:38.958 when a face pops up on the screen,
NOTE Confidence: 0.735601223538462
00:41:38.960 --> 00:41:39.908 right, look for showing your face.
NOTE Confidence: 0.735601223538462
00:41:39.910 --> 00:41:40.722 So if you are,
NOTE Confidence: 0.735601223538462
00:41:40.722 --> 00:41:42.536 we know that we're never going to be
NOTE Confidence: 0.735601223538462
00:41:42.536 --> 00:41:44.162 able to measure effect brain activity
NOTE Confidence: 0.735601223538462
00:41:44.162 --> 00:41:45.710 effectively from that trial from that,
NOTE Confidence: 0.735601223538462
00:41:45.710 --> 00:41:46.652 you know,
NOTE Confidence: 0.735601223538462
00:41:46.652 --> 00:41:47.594 50 milliseconds,
NOTE Confidence: 0.735601223538462
00:41:47.594 --> 00:41:48.536 20 milliseconds.
NOTE Confidence: 0.811816744666667
00:41:51.020 --> 00:41:53.024 But the way European experiments typically
NOTE Confidence: 0.811816744666667
00:41:53.024 --> 00:41:55.782 work is we just show you like 100 faces
NOTE Confidence: 0.811816744666667
00:41:55.782 --> 00:41:57.707 or 200 faces and figure we're going
NOTE Confidence: 0.811816744666667

00:41:57.707 --> 00:41:59.977 to some of those are going to be OK.
NOTE Confidence: 0.811816744666667

00:41:59.977 --> 00:42:02.476 So those of you who have been in an ERP
NOTE Confidence: 0.811816744666667

00:42:02.476 --> 00:42:04.860 experiment in college to earn 20 or \$30,
NOTE Confidence: 0.811816744666667

00:42:04.860 --> 00:42:06.806 you probably fell asleep in it because
NOTE Confidence: 0.811816744666667

00:42:06.806 --> 00:42:08.459 they're long and they're boring.
NOTE Confidence: 0.811816744666667

00:42:08.460 --> 00:42:12.157 But imagine if we knew. That you watched.
NOTE Confidence: 0.811816744666667

00:42:12.157 --> 00:42:13.760 You were sitting still and looking when
NOTE Confidence: 0.811816744666667

00:42:13.802 --> 00:42:15.286 twenty faces popped up on the screen.
NOTE Confidence: 0.811816744666667

00:42:15.290 --> 00:42:17.324 Well, then we'd be done with that right now.
NOTE Confidence: 0.811816744666667

00:42:17.330 --> 00:42:18.140 I'll show you some houses.
NOTE Confidence: 0.811816744666667

00:42:18.140 --> 00:42:19.388 Now we'll show you something else.
NOTE Confidence: 0.811816744666667

00:42:19.390 --> 00:42:22.132 So we can actually make the
NOTE Confidence: 0.811816744666667

00:42:22.132 --> 00:42:24.412 experiment shorter for these kids
NOTE Confidence: 0.811816744666667

00:42:24.412 --> 00:42:26.124 than what the standard is.
NOTE Confidence: 0.811816744666667

00:42:26.124 --> 00:42:28.582 Would they end up being much longer
NOTE Confidence: 0.811816744666667

00:42:28.582 --> 00:42:30.826 than they would normally be for,

NOTE Confidence: 0.811816744666667

00:42:30.830 --> 00:42:31.914 like a compliant kid,

NOTE Confidence: 0.811816744666667

00:42:31.914 --> 00:42:35.380 you know, with a higher IQ?

NOTE Confidence: 0.811816744666667

00:42:35.380 --> 00:42:37.588 So this really reduces the burden.

NOTE Confidence: 0.811816744666667

00:42:37.590 --> 00:42:39.318 And so I'm going to talk to you about

NOTE Confidence: 0.811816744666667

00:42:39.318 --> 00:42:40.937 this is our twelve kids we've seen.

NOTE Confidence: 0.811816744666667

00:42:40.940 --> 00:42:42.470 Unfortunately this was funded during

NOTE Confidence: 0.811816744666667

00:42:42.470 --> 00:42:45.019 there's a little bit of pandemic happening.

NOTE Confidence: 0.811816744666667

00:42:45.020 --> 00:42:47.582 So we weren't in the lab as

NOTE Confidence: 0.811816744666667

00:42:47.582 --> 00:42:49.870 much as we'd hoped to be.

NOTE Confidence: 0.811816744666667

00:42:49.870 --> 00:42:52.190 But as you can see from these numbers,

NOTE Confidence: 0.811816744666667

00:42:52.190 --> 00:42:55.150 this is a fairly impaired group of kids.

NOTE Confidence: 0.811816744666667

00:42:55.150 --> 00:42:58.950 These are the averages are 100 for these

NOTE Confidence: 0.811816744666667

00:42:58.950 --> 00:43:02.280 numbers and these are not near there.

NOTE Confidence: 0.811816744666667

00:43:02.280 --> 00:43:04.940 The experiments we used we adopted 2

NOTE Confidence: 0.811816744666667

00:43:04.940 --> 00:43:07.670 from the ACT, so the faces task and

NOTE Confidence: 0.811816744666667

00:43:07.670 --> 00:43:10.239 170 faces and the static social scene.
NOTE Confidence: 0.811816744666667

00:43:10.240 --> 00:43:11.360 So we're just showing faces,
NOTE Confidence: 0.811816744666667

00:43:11.360 --> 00:43:13.628 we're showing scenes.
NOTE Confidence: 0.811816744666667

00:43:13.630 --> 00:43:15.846 And then the results, what do we get?
NOTE Confidence: 0.811816744666667

00:43:15.850 --> 00:43:17.242 So run it works.
NOTE Confidence: 0.811816744666667

00:43:17.242 --> 00:43:18.650 Oh God, I left it up there.
NOTE Confidence: 0.811816744666667

00:43:18.650 --> 00:43:20.350 So yes, but it's exciting.
NOTE Confidence: 0.811816744666667

00:43:20.350 --> 00:43:21.250 What these are,
NOTE Confidence: 0.811816744666667

00:43:21.250 --> 00:43:22.750 are these are little trajectories
NOTE Confidence: 0.811816744666667

00:43:22.750 --> 00:43:23.950 through the experiment.
NOTE Confidence: 0.811816744666667

00:43:23.950 --> 00:43:25.018 Each one of these,
NOTE Confidence: 0.811816744666667

00:43:25.018 --> 00:43:27.310 this is time along the X axis here.
NOTE Confidence: 0.811816744666667

00:43:27.310 --> 00:43:29.030 And this is 1 kid on the top and a
NOTE Confidence: 0.811816744666667

00:43:29.087 --> 00:43:30.862 different kids trajectory on the
NOTE Confidence: 0.811816744666667

00:43:30.862 --> 00:43:32.637 bottom because the experiment adapts.
NOTE Confidence: 0.811816744666667

00:43:32.640 --> 00:43:34.404 So everybody sees different things in

NOTE Confidence: 0.811816744666667
00:43:34.404 --> 00:43:35.819 different orders at different times
NOTE Confidence: 0.811816744666667
00:43:35.819 --> 00:43:37.331 and you want some way to look back
NOTE Confidence: 0.811816744666667
00:43:37.331 --> 00:43:38.837 at that and see how things went.
NOTE Confidence: 0.811816744666667
00:43:38.840 --> 00:43:40.928 These blue lines right here indicate
NOTE Confidence: 0.811816744666667
00:43:40.928 --> 00:43:42.985 when you're moving too much or
NOTE Confidence: 0.811816744666667
00:43:42.985 --> 00:43:44.797 you're not looking at the screen,
NOTE Confidence: 0.811816744666667
00:43:44.800 --> 00:43:46.645 and the lollipops indicate when
NOTE Confidence: 0.811816744666667
00:43:46.645 --> 00:43:48.873 the system was determined you were
NOTE Confidence: 0.811816744666667
00:43:48.873 --> 00:43:50.763 sitting still enough that we could
NOTE Confidence: 0.811816744666667
00:43:50.763 --> 00:43:52.679 move on with the experiment.
NOTE Confidence: 0.811816744666667
00:43:52.680 --> 00:43:54.590 So.
NOTE Confidence: 0.811816744666667
00:43:54.590 --> 00:43:55.580 On top kid,
NOTE Confidence: 0.811816744666667
00:43:55.580 --> 00:43:58.449 you can see sort of kid on the
NOTE Confidence: 0.811816744666667
00:43:58.449 --> 00:44:00.769 represented by the top line.
NOTE Confidence: 0.811816744666667
00:44:00.770 --> 00:44:02.340 Definitely had some periods of
NOTE Confidence: 0.811816744666667

00:44:02.340 --> 00:44:04.270 time where he's still learning the
NOTE Confidence: 0.811816744666667

00:44:04.270 --> 00:44:05.710 contingencies of the experiment,
NOTE Confidence: 0.811816744666667

00:44:05.710 --> 00:44:09.212 but towards the end. Figured it out.
NOTE Confidence: 0.811816744666667

00:44:09.212 --> 00:44:11.876 And we have a stable presentation
NOTE Confidence: 0.811816744666667

00:44:11.880 --> 00:44:12.816 of the stimuli.
NOTE Confidence: 0.811816744666667

00:44:12.816 --> 00:44:15.480 This kid at the bottom learned things really,
NOTE Confidence: 0.811816744666667

00:44:15.480 --> 00:44:16.455 really, really quickly.
NOTE Confidence: 0.811816744666667

00:44:16.455 --> 00:44:18.730 And what's cool is that so these
NOTE Confidence: 0.811816744666667

00:44:18.789 --> 00:44:20.617 different colored lollipops are
NOTE Confidence: 0.811816744666667

00:44:20.617 --> 00:44:22.902 different kinds of experimental trials.
NOTE Confidence: 0.811816744666667

00:44:22.910 --> 00:44:24.056 We're all done with the lime,
NOTE Confidence: 0.811816744666667

00:44:24.060 --> 00:44:25.750 felt like the lime ones.
NOTE Confidence: 0.811816744666667

00:44:25.750 --> 00:44:26.910 They've seen enough, good enough,
NOTE Confidence: 0.811816744666667

00:44:26.910 --> 00:44:28.894 good data so we didn't have to keep
NOTE Confidence: 0.811816744666667

00:44:28.894 --> 00:44:30.604 showing that again and we could focus
NOTE Confidence: 0.811816744666667

00:44:30.604 --> 00:44:32.648 on just the ERP face and house tasks.

NOTE Confidence: 0.885016526

00:44:35.090 --> 00:44:36.850 And we can get measurements.

NOTE Confidence: 0.885016526

00:44:36.850 --> 00:44:40.603 So this is a grand average ERP and it

NOTE Confidence: 0.885016526

00:44:40.603 --> 00:44:43.846 doesn't look as clean as 1 from 299 kids,

NOTE Confidence: 0.885016526

00:44:43.846 --> 00:44:45.932 but from 12 kids we're getting sort

NOTE Confidence: 0.885016526

00:44:45.932 --> 00:44:48.073 of expected negative deflections that

NOTE Confidence: 0.885016526

00:44:48.073 --> 00:44:50.458 are earlier for faces, for houses.

NOTE Confidence: 0.885016526

00:44:50.458 --> 00:44:52.586 And then if we compare these kids,

NOTE Confidence: 0.885016526

00:44:52.590 --> 00:44:54.865 in the end, 170 latency

NOTE Confidence: 0.885016526

00:44:54.865 --> 00:44:56.958 against age matched age match,

NOTE Confidence: 0.885016526

00:44:56.958 --> 00:44:59.870 kids with autism and controls from the ACT,

NOTE Confidence: 0.885016526

00:44:59.870 --> 00:45:02.990 we see this same pattern of extended latency,

NOTE Confidence: 0.885016526

00:45:02.990 --> 00:45:04.260 which is really, really exciting.

NOTE Confidence: 0.885016526

00:45:04.260 --> 00:45:06.312 The the, I guess the the

NOTE Confidence: 0.885016526

00:45:06.312 --> 00:45:07.650 really important part, it's,

NOTE Confidence: 0.885016526

00:45:07.650 --> 00:45:09.820 it's important that the 170 is later,

NOTE Confidence: 0.885016526

00:45:09.820 --> 00:45:11.200 but I think it's more important
NOTE Confidence: 0.885016526

00:45:11.200 --> 00:45:12.800 that we can measure it all at all.
NOTE Confidence: 0.885016526

00:45:12.800 --> 00:45:14.669 Because now we can know it's later,
NOTE Confidence: 0.885016526

00:45:14.670 --> 00:45:15.336 but who knows,
NOTE Confidence: 0.885016526

00:45:15.336 --> 00:45:16.890 like there's all kinds of other things.
NOTE Confidence: 0.885016526

00:45:16.890 --> 00:45:18.885 If we don't know that we can
NOTE Confidence: 0.885016526

00:45:18.885 --> 00:45:21.448 now know we have this tool that
NOTE Confidence: 0.885016526

00:45:21.448 --> 00:45:23.084 is like wildly applicable.
NOTE Confidence: 0.885016526

00:45:23.090 --> 00:45:25.466 And so in our next steps,
NOTE Confidence: 0.885016526

00:45:25.470 --> 00:45:28.158 we've just submitted this for an hour one
NOTE Confidence: 0.885016526

00:45:28.158 --> 00:45:30.850 ready to deploy it in a larger sample,
NOTE Confidence: 0.885016526

00:45:30.850 --> 00:45:32.080 tighten up some parts that are
NOTE Confidence: 0.885016526

00:45:32.080 --> 00:45:33.468 still a little rough on the edges,
NOTE Confidence: 0.885016526

00:45:33.470 --> 00:45:34.336 eye tracking,
NOTE Confidence: 0.885016526

00:45:34.336 --> 00:45:36.501 calibration and then incorporate in
NOTE Confidence: 0.885016526

00:45:36.501 --> 00:45:38.369 other biomarker experiments for that.

NOTE Confidence: 0.885016526
00:45:38.370 --> 00:45:40.634 OK, this is going to be very fast,
NOTE Confidence: 0.885016526
00:45:40.640 --> 00:45:42.854 but because I'm.
NOTE Confidence: 0.885016526
00:45:42.854 --> 00:45:45.690 Sorry, slow enemies like a heart rate.
NOTE Confidence: 0.885016526
00:45:45.690 --> 00:45:47.076 So the heart rate rate changes
NOTE Confidence: 0.885016526
00:45:47.076 --> 00:45:48.000 in response to me.
NOTE Confidence: 0.885016526
00:45:48.000 --> 00:45:52.088 When you go up steps it gets faster.
NOTE Confidence: 0.885016526
00:45:52.090 --> 00:45:52.794 When you go downstairs,
NOTE Confidence: 0.885016526
00:45:52.794 --> 00:45:54.520 it gets slower so and you can learn a
NOTE Confidence: 0.885016526
00:45:54.520 --> 00:45:55.565 lot about somebody's cardiac health
NOTE Confidence: 0.885016526
00:45:55.565 --> 00:45:57.026 by putting them on a treadmill and
NOTE Confidence: 0.885016526
00:45:57.026 --> 00:45:58.031 then measuring their heart rate.
NOTE Confidence: 0.885016526
00:45:58.040 --> 00:46:00.344 That's perhaps some of you have
NOTE Confidence: 0.885016526
00:46:00.344 --> 00:46:01.880 been in those situations.
NOTE Confidence: 0.885016526
00:46:01.880 --> 00:46:05.784 So I'd argue that anyone 70 is also.
NOTE Confidence: 0.885016526
00:46:05.790 --> 00:46:07.710 Responsive to changes in the environment.
NOTE Confidence: 0.885016526

00:46:07.710 --> 00:46:09.326 And we can learn a lot about somebody's
NOTE Confidence: 0.885016526

00:46:09.326 --> 00:46:10.846 brain from how it changes in response
NOTE Confidence: 0.885016526

00:46:10.846 --> 00:46:12.450 to different things in the environment,
NOTE Confidence: 0.885016526

00:46:12.450 --> 00:46:14.930 like such that I guess,
NOTE Confidence: 0.885016526

00:46:14.930 --> 00:46:15.272 well,
NOTE Confidence: 0.885016526

00:46:15.272 --> 00:46:18.008 what's what are the stairs for the Inman
NOTE Confidence: 0.885016526

00:46:18.008 --> 00:46:21.010 70 and I think it's social interactions.
NOTE Confidence: 0.885016526

00:46:21.010 --> 00:46:23.042 Social behavior is interactive.
NOTE Confidence: 0.885016526

00:46:23.042 --> 00:46:25.074 We do know that.
NOTE Confidence: 0.885016526

00:46:25.080 --> 00:46:25.488 You know,
NOTE Confidence: 0.885016526

00:46:25.488 --> 00:46:27.340 I gave you the list of the laundry list
NOTE Confidence: 0.885016526

00:46:27.340 --> 00:46:29.174 of all of the of all the challenges
NOTE Confidence: 0.885016526

00:46:29.174 --> 00:46:30.629 and symptoms of autism before,
NOTE Confidence: 0.885016526

00:46:30.630 --> 00:46:32.278 one of them wasn't sitting in a room
NOTE Confidence: 0.885016526

00:46:32.278 --> 00:46:34.163 alone and watching faces on a screen, right?
NOTE Confidence: 0.885016526

00:46:34.163 --> 00:46:34.589 That's TV.

NOTE Confidence: 0.885016526

00:46:34.589 --> 00:46:36.351 And a lot of the kids who come

NOTE Confidence: 0.885016526

00:46:36.351 --> 00:46:37.629 in are really good at it.

NOTE Confidence: 0.885016526

00:46:37.630 --> 00:46:39.158 A lot of us in this room are

NOTE Confidence: 0.885016526

00:46:39.158 --> 00:46:40.210 also really good at that.

NOTE Confidence: 0.885016526

00:46:40.210 --> 00:46:41.910 But in social interactions are

NOTE Confidence: 0.885016526

00:46:41.910 --> 00:46:43.610 where we have these challenges.

NOTE Confidence: 0.885016526

00:46:43.610 --> 00:46:44.826 So if social interactions

NOTE Confidence: 0.885016526

00:46:44.826 --> 00:46:46.650 are the stairs for the 170,

NOTE Confidence: 0.885016526

00:46:46.650 --> 00:46:48.900 it would be great to throw EEG caps on

NOTE Confidence: 0.885016526

00:46:48.900 --> 00:46:51.843 all of you in here at a cost like 170,000.

NOTE Confidence: 0.885016526

00:46:51.843 --> 00:46:53.629 That person.

NOTE Confidence: 0.885016526

00:46:53.630 --> 00:46:55.196 But it would be great if we could have

NOTE Confidence: 0.885016526

00:46:55.196 --> 00:46:57.022 like a version of the stress test in our lab,

NOTE Confidence: 0.885016526

00:46:57.030 --> 00:46:57.870 like a Stairmaster.

NOTE Confidence: 0.885016526

00:46:57.870 --> 00:46:58.150 What?

NOTE Confidence: 0.885016526

00:46:58.150 --> 00:46:59.830 A Stairmaster for the end 170.
NOTE Confidence: 0.885016526

00:46:59.830 --> 00:47:01.888 So how would we do that?
NOTE Confidence: 0.885016526

00:47:01.890 --> 00:47:02.212 Well,
NOTE Confidence: 0.885016526

00:47:02.212 --> 00:47:04.144 let's go back to predictive coding.
NOTE Confidence: 0.885016526

00:47:04.150 --> 00:47:05.460 So again,
NOTE Confidence: 0.885016526

00:47:05.460 --> 00:47:10.045 evidence that prediction is different in ASD.
NOTE Confidence: 0.885016526

00:47:10.050 --> 00:47:11.520 But also remember the 170
NOTE Confidence: 0.885016526

00:47:11.520 --> 00:47:12.990 sensitive to changes in gays.
NOTE Confidence: 0.870114472

00:47:12.990 --> 00:47:14.853 And if I tell you that this face on
NOTE Confidence: 0.870114472

00:47:14.853 --> 00:47:17.127 the screen is like your friend or is
NOTE Confidence: 0.870114472

00:47:17.127 --> 00:47:18.892 judging your clothes, it changes.
NOTE Confidence: 0.870114472

00:47:18.892 --> 00:47:21.598 So the animal 70s also sensitive
NOTE Confidence: 0.870114472

00:47:21.598 --> 00:47:23.809 to expectation and and context.
NOTE Confidence: 0.870114472

00:47:23.810 --> 00:47:25.928 So how do we build this?
NOTE Confidence: 0.870114472

00:47:25.930 --> 00:47:26.872 And 170 Stairmaster?
NOTE Confidence: 0.870114472

00:47:26.872 --> 00:47:30.018 We can do that by trying to simulate the

NOTE Confidence: 0.870114472

00:47:30.018 --> 00:47:32.664 relevant parts of the social interaction.

NOTE Confidence: 0.870114472

00:47:32.670 --> 00:47:34.026 So how do we do that?

NOTE Confidence: 0.870114472

00:47:34.030 --> 00:47:36.263 We have these very simple experiments where

NOTE Confidence: 0.870114472

00:47:36.263 --> 00:47:39.178 we use eye tracking and EEG simultaneously.

NOTE Confidence: 0.870114472

00:47:39.180 --> 00:47:42.420 Such that when you look at a face,

NOTE Confidence: 0.870114472

00:47:42.420 --> 00:47:44.280 there's a that's a fun animation.

NOTE Confidence: 0.870114472

00:47:44.280 --> 00:47:47.040 Right now, that's your eye movement.

NOTE Confidence: 0.870114472

00:47:47.040 --> 00:47:48.777 When you look at the eyes of the face,

NOTE Confidence: 0.870114472

00:47:48.780 --> 00:47:50.580 the face looks back at you.

NOTE Confidence: 0.870114472

00:47:50.580 --> 00:47:51.520 So this is a really,

NOTE Confidence: 0.870114472

00:47:51.520 --> 00:47:52.536 really subtle visual change.

NOTE Confidence: 0.870114472

00:47:52.536 --> 00:47:53.298 It's a really,

NOTE Confidence: 0.870114472

00:47:53.300 --> 00:47:54.392 really meaningful visual change.

NOTE Confidence: 0.870114472

00:47:54.392 --> 00:47:57.077 So if you're sitting on a bus and you look

NOTE Confidence: 0.870114472

00:47:57.077 --> 00:48:00.350 at somebody's face and this happens, this is.

NOTE Confidence: 0.870114472

00:48:00.350 --> 00:48:00.578 Meaningful.
NOTE Confidence: 0.870114472

00:48:00.578 --> 00:48:01.490 I don't know how.
NOTE Confidence: 0.870114472

00:48:01.490 --> 00:48:03.090 Depending on the bus context,
NOTE Confidence: 0.870114472

00:48:03.090 --> 00:48:04.416 it's going to mean who knows
NOTE Confidence: 0.870114472

00:48:04.416 --> 00:48:05.490 what kind of things is,
NOTE Confidence: 0.870114472

00:48:05.490 --> 00:48:07.750 but you shouldn't ignore it.
NOTE Confidence: 0.870114472

00:48:07.750 --> 00:48:09.969 So in our experiments we can control,
NOTE Confidence: 0.870114472

00:48:09.970 --> 00:48:10.848 control, predictability,
NOTE Confidence: 0.870114472

00:48:10.848 --> 00:48:13.043 to make eye contact either
NOTE Confidence: 0.870114472

00:48:13.043 --> 00:48:14.360 predictable or unpredictable.
NOTE Confidence: 0.870114472

00:48:14.360 --> 00:48:15.722 We're going to show you the
NOTE Confidence: 0.870114472

00:48:15.722 --> 00:48:16.630 designs of two experiments.
NOTE Confidence: 0.870114472

00:48:16.630 --> 00:48:18.934 So in the first one we made
NOTE Confidence: 0.870114472

00:48:18.934 --> 00:48:20.050 eye contact unpredictable.
NOTE Confidence: 0.870114472

00:48:20.050 --> 00:48:22.255 These experiments are all a little bit.
NOTE Confidence: 0.870114472

00:48:22.260 --> 00:48:23.877 Quirky because of the way they operate,

NOTE Confidence: 0.870114472

00:48:23.880 --> 00:48:25.884 but briefly, we showed people an

NOTE Confidence: 0.870114472

00:48:25.884 --> 00:48:28.558 arrow on a screen followed by a face,

NOTE Confidence: 0.870114472

00:48:28.560 --> 00:48:30.639 and if the arrow is pointing up or down,

NOTE Confidence: 0.870114472

00:48:30.640 --> 00:48:31.977 that queued them to look to the

NOTE Confidence: 0.870114472

00:48:31.977 --> 00:48:33.399 eyes or the mouth of the face.

NOTE Confidence: 0.870114472

00:48:33.400 --> 00:48:35.056 And then one of two things could happen.

NOTE Confidence: 0.870114472

00:48:35.060 --> 00:48:36.397 The thing they look at could open.

NOTE Confidence: 0.870114472

00:48:36.400 --> 00:48:37.648 So they could look at the eyes and

NOTE Confidence: 0.870114472

00:48:37.648 --> 00:48:38.937 the eyes open and make eye contact,

NOTE Confidence: 0.870114472

00:48:38.940 --> 00:48:39.962 or they could look at the eyes

NOTE Confidence: 0.870114472

00:48:39.962 --> 00:48:40.640 and the mouth opens,

NOTE Confidence: 0.870114472

00:48:40.640 --> 00:48:42.060 or they could look at the mouth in the mouth.

NOTE Confidence: 0.870114472

00:48:42.060 --> 00:48:43.503 So four things.

NOTE Confidence: 0.870114472

00:48:43.503 --> 00:48:44.946 4 outcomes there.

NOTE Confidence: 0.870114472

00:48:44.950 --> 00:48:46.180 What's important is you can't

NOTE Confidence: 0.870114472

00:48:46.180 --> 00:48:47.410 predict what's going to happen.
NOTE Confidence: 0.870114472

00:48:47.410 --> 00:48:49.574 You might get eye contact, you might not.
NOTE Confidence: 0.870114472

00:48:49.574 --> 00:48:52.308 It's 50% of the time.
NOTE Confidence: 0.870114472

00:48:52.310 --> 00:48:55.257 This is our video of it.
NOTE Confidence: 0.870114472

00:48:55.257 --> 00:48:57.135 So on the right you see gaze and
NOTE Confidence: 0.870114472

00:48:57.135 --> 00:48:58.990 on the left you see the sort of
NOTE Confidence: 0.870114472

00:48:58.990 --> 00:49:00.670 washed out video of what the
NOTE Confidence: 0.870114472

00:49:00.670 --> 00:49:01.680 participant is seeing.
NOTE Confidence: 0.885819474285714

00:49:03.780 --> 00:49:06.328 And I apologize for the iPhone quality,
NOTE Confidence: 0.885819474285714

00:49:06.330 --> 00:49:12.560 the 2012 iPhone quality, but the.
NOTE Confidence: 0.885819474285714

00:49:12.560 --> 00:49:13.440 So that's our first one.
NOTE Confidence: 0.885819474285714

00:49:13.440 --> 00:49:15.230 So we're looking at eye
NOTE Confidence: 0.885819474285714

00:49:15.230 --> 00:49:16.304 contact to unpredictable.
NOTE Confidence: 0.885819474285714

00:49:16.310 --> 00:49:18.710 Second, now we're making it predictable.
NOTE Confidence: 0.885819474285714

00:49:18.710 --> 00:49:19.766 So crossair peers.
NOTE Confidence: 0.885819474285714

00:49:19.766 --> 00:49:22.690 You look to the eyes of the face.

NOTE Confidence: 0.885819474285714

00:49:22.690 --> 00:49:23.461 After you look,

NOTE Confidence: 0.885819474285714

00:49:23.461 --> 00:49:24.489 for about 500 milliseconds,

NOTE Confidence: 0.885819474285714

00:49:24.490 --> 00:49:25.214 the gaze will shift.

NOTE Confidence: 0.885819474285714

00:49:25.214 --> 00:49:26.300 Now it's looking away from you,

NOTE Confidence: 0.885819474285714

00:49:26.300 --> 00:49:27.056 it's going to look at you,

NOTE Confidence: 0.885819474285714

00:49:27.060 --> 00:49:27.780 it's looking at you,

NOTE Confidence: 0.885819474285714

00:49:27.780 --> 00:49:29.050 it's going to look away from you.

NOTE Confidence: 0.885819474285714

00:49:29.050 --> 00:49:29.940 Totally predictable.

NOTE Confidence: 0.52673995

00:49:32.790 --> 00:49:34.060 And.

NOTE Confidence: 0.748141898

00:49:39.420 --> 00:49:41.206 I look at the mouth. Nothing happens.

NOTE Confidence: 0.748141898

00:49:41.206 --> 00:49:43.996 Yeah, it's visually really subtle,

NOTE Confidence: 0.748141898

00:49:44.000 --> 00:49:46.130 but when you get looked at, you feel it.

NOTE Confidence: 0.807789128571428

00:49:48.810 --> 00:49:52.884 OK, we did experiment in two samples.

NOTE Confidence: 0.807789128571428

00:49:52.890 --> 00:49:55.405 Finally, able adult with autism

NOTE Confidence: 0.807789128571428

00:49:55.405 --> 00:49:56.914 and theoretical controls.

NOTE Confidence: 0.807789128571428

00:49:56.920 --> 00:49:58.395 And we also measured continuous
NOTE Confidence: 0.807789128571428

00:49:58.395 --> 00:49:59.575 measures of symptom severity,
NOTE Confidence: 0.807789128571428

00:49:59.580 --> 00:50:03.210 so we have the the cast.
NOTE Confidence: 0.807789128571428

00:50:03.210 --> 00:50:06.970 The SSS calibrated severity score.
NOTE Confidence: 0.807789128571428

00:50:06.970 --> 00:50:09.178 Back anxiety inventory. The gas flow.
NOTE Confidence: 0.807789128571428

00:50:09.180 --> 00:50:10.584 Glasgow Sensory inventory,
NOTE Confidence: 0.807789128571428

00:50:10.584 --> 00:50:13.392 sort of a measure of sensory
NOTE Confidence: 0.807789128571428

00:50:13.392 --> 00:50:14.820 hydrogen sensitivity.
NOTE Confidence: 0.807789128571428

00:50:14.820 --> 00:50:16.053 Here's our results.
NOTE Confidence: 0.807789128571428

00:50:16.053 --> 00:50:18.930 So when I I contact is unpredictable.
NOTE Confidence: 0.807789128571428

00:50:18.930 --> 00:50:20.490 You actually get a much
NOTE Confidence: 0.807789128571428

00:50:20.490 --> 00:50:22.050 bigger and 170 in autism.
NOTE Confidence: 0.807789128571428

00:50:22.050 --> 00:50:25.866 No latency differences and across groups.
NOTE Confidence: 0.807789128571428

00:50:25.870 --> 00:50:27.882 The difference between mouth
NOTE Confidence: 0.807789128571428

00:50:27.882 --> 00:50:30.397 movement and eye contact was
NOTE Confidence: 0.807789128571428

00:50:30.397 --> 00:50:32.830 associated with sensory sensitivity,

NOTE Confidence: 0.807789128571428
00:50:32.830 --> 00:50:35.710 autism severity and anxiety.
NOTE Confidence: 0.807789128571428
00:50:35.710 --> 00:50:39.310 This is an unpredictable situations.
NOTE Confidence: 0.807789128571428
00:50:39.310 --> 00:50:41.880 So and this is the N 170 here in Gray,
NOTE Confidence: 0.807789128571428
00:50:41.880 --> 00:50:47.180 this darker colors ASD and the caramel STD.
NOTE Confidence: 0.807789128571428
00:50:47.180 --> 00:50:49.360 When it's predictable eye contact.
NOTE Confidence: 0.807789128571428
00:50:49.360 --> 00:50:50.896 We now see this later and
NOTE Confidence: 0.807789128571428
00:50:50.896 --> 00:50:52.678 170 that we see in the ACT,
NOTE Confidence: 0.807789128571428
00:50:52.680 --> 00:50:54.458 although the morphology is a bit different,
NOTE Confidence: 0.807789128571428
00:50:54.460 --> 00:50:55.768 there's no amplitude differences
NOTE Confidence: 0.807789128571428
00:50:55.768 --> 00:50:57.403 between the groups and there's
NOTE Confidence: 0.807789128571428
00:50:57.403 --> 00:50:59.359 also no correlation with the
NOTE Confidence: 0.807789128571428
00:50:59.359 --> 00:51:00.145 clinical characteristics.
NOTE Confidence: 0.807789128571428
00:51:00.150 --> 00:51:01.390 Those are our clinical characteristics
NOTE Confidence: 0.807789128571428
00:51:01.390 --> 00:51:03.119 and we're going to jump over those.
NOTE Confidence: 0.807789128571428
00:51:03.120 --> 00:51:04.383 But in summary,
NOTE Confidence: 0.807789128571428

00:51:04.383 --> 00:51:06.488 so when I contact unpredictable,
NOTE Confidence: 0.807789128571428

00:51:06.490 --> 00:51:08.572 we get these bigger responses associated
NOTE Confidence: 0.807789128571428

00:51:08.572 --> 00:51:10.500 with anxiety and sensory symptoms,
NOTE Confidence: 0.807789128571428

00:51:10.500 --> 00:51:11.984 but when it's predictable,
NOTE Confidence: 0.807789128571428

00:51:11.984 --> 00:51:13.839 we don't see any differences.
NOTE Confidence: 0.807789128571428

00:51:13.840 --> 00:51:16.030 And we think this means that.
NOTE Confidence: 0.807789128571428

00:51:16.030 --> 00:51:17.805 You know real social interactions
NOTE Confidence: 0.807789128571428

00:51:17.805 --> 00:51:19.580 are aren't perfectly predictable or
NOTE Confidence: 0.807789128571428

00:51:19.641 --> 00:51:21.391 unpredictable but how you integrate
NOTE Confidence: 0.807789128571428

00:51:21.391 --> 00:51:22.791 that information is different
NOTE Confidence: 0.807789128571428

00:51:22.791 --> 00:51:24.320 in autism and it's happening
NOTE Confidence: 0.807789128571428

00:51:24.320 --> 00:51:27.190 at less than 200 milliseconds.
NOTE Confidence: 0.807789128571428

00:51:27.190 --> 00:51:28.618 It might not be faced specific
NOTE Confidence: 0.807789128571428

00:51:28.618 --> 00:51:30.711 but the way if you think when two
NOTE Confidence: 0.807789128571428

00:51:30.711 --> 00:51:32.061 people are interacting if one
NOTE Confidence: 0.807789128571428

00:51:32.061 --> 00:51:33.926 of them's jitter like is slower,

NOTE Confidence: 0.807789128571428

00:51:33.930 --> 00:51:35.175 think about when you're talking

NOTE Confidence: 0.807789128571428

00:51:35.175 --> 00:51:36.748 to someone on zoom is actually

NOTE Confidence: 0.807789128571428

00:51:36.748 --> 00:51:38.434 a great example and there are

NOTE Confidence: 0.807789128571428

00:51:38.434 --> 00:51:39.849 like 200 milliseconds behind you.

NOTE Confidence: 0.807789128571428

00:51:39.850 --> 00:51:41.482 Just most of the time just give up

NOTE Confidence: 0.807789128571428

00:51:41.482 --> 00:51:43.097 just like look you put in the chat.

NOTE Confidence: 0.807789128571428

00:51:43.100 --> 00:51:46.196 We'll talk later because that temporal.

NOTE Confidence: 0.807789128571428

00:51:46.200 --> 00:51:49.300 Asynchrony is just tanks the

NOTE Confidence: 0.807789128571428

00:51:49.300 --> 00:51:50.540 social interaction,

NOTE Confidence: 0.807789128571428

00:51:50.540 --> 00:51:52.924 so that might be sort of the kind

NOTE Confidence: 0.807789128571428

00:51:52.924 --> 00:51:54.850 of things happening in here.

NOTE Confidence: 0.807789128571428

00:51:54.850 --> 00:51:56.980 So.

NOTE Confidence: 0.807789128571428

00:51:56.980 --> 00:51:58.924 Our next steps were we're exploring

NOTE Confidence: 0.807789128571428

00:51:58.924 --> 00:52:01.014 how shifts in Gaze might impact

NOTE Confidence: 0.807789128571428

00:52:01.014 --> 00:52:03.216 impact brain response and looking at

NOTE Confidence: 0.807789128571428

00:52:03.220 --> 00:52:04.860 emotional faces and brain response.
NOTE Confidence: 0.807789128571428

00:52:04.860 --> 00:52:06.642 Basically, different stairmasters,
NOTE Confidence: 0.807789128571428

00:52:06.642 --> 00:52:10.206 treadmills, tilt tables for the M70.
NOTE Confidence: 0.807789128571428

00:52:10.210 --> 00:52:11.002 In summary,
NOTE Confidence: 0.807789128571428

00:52:11.002 --> 00:52:12.982 we've got different theories hitting
NOTE Confidence: 0.807789128571428

00:52:12.982 --> 00:52:14.930 different levels of abstraction,
NOTE Confidence: 0.807789128571428

00:52:14.930 --> 00:52:19.088 evidence for multiple systems being impacted,
NOTE Confidence: 0.807789128571428

00:52:19.090 --> 00:52:19.601 and.
NOTE Confidence: 0.807789128571428

00:52:19.601 --> 00:52:21.645 Promising biomarkers for more
NOTE Confidence: 0.807789128571428

00:52:21.645 --> 00:52:25.060 for many of them as well as,
NOTE Confidence: 0.807789128571428

00:52:25.060 --> 00:52:26.716 I think pretty good success in
NOTE Confidence: 0.807789128571428

00:52:26.716 --> 00:52:28.623 measure in in measuring and designing
NOTE Confidence: 0.807789128571428

00:52:28.623 --> 00:52:30.488 experiments for an underserved group.
NOTE Confidence: 0.807789128571428

00:52:30.490 --> 00:52:30.960 Umm.
NOTE Confidence: 0.807789128571428

00:52:30.960 --> 00:52:33.780 And I think that I'll briefly
NOTE Confidence: 0.807789128571428

00:52:33.780 --> 00:52:37.014 just say that the research and

NOTE Confidence: 0.807789128571428

00:52:37.014 --> 00:52:39.310 progress that I'm going.

NOTE Confidence: 0.807789128571428

00:52:39.310 --> 00:52:41.459 Jump over really fast is kind of

NOTE Confidence: 0.807789128571428

00:52:41.459 --> 00:52:42.759 an integrating different levels

NOTE Confidence: 0.807789128571428

00:52:42.759 --> 00:52:43.728 of that analysis.

NOTE Confidence: 0.867643786875

00:52:45.890 --> 00:52:48.402 But I just want to thank this is

NOTE Confidence: 0.867643786875

00:52:48.402 --> 00:52:50.975 like some of the people in the ACT.

NOTE Confidence: 0.867643786875

00:52:50.980 --> 00:52:52.870 It's a lot. I mean they're all

NOTE Confidence: 0.867643786875

00:52:52.870 --> 00:52:54.268 everybody's really really really important

NOTE Confidence: 0.867643786875

00:52:54.268 --> 00:52:56.352 in it somehow only these really,

NOTE Confidence: 0.867643786875

00:52:56.352 --> 00:52:58.680 really really important people got on

NOTE Confidence: 0.867643786875

00:52:58.750 --> 00:53:01.078 this this slide and this is Jamie's lab

NOTE Confidence: 0.867643786875

00:53:01.078 --> 00:53:03.815 and this is a I don't know if this is

NOTE Confidence: 0.867643786875

00:53:03.815 --> 00:53:05.610 everybody's on here but it's a little

NOTE Confidence: 0.867643786875

00:53:05.610 --> 00:53:07.602 I think it's if you haven't you're

NOTE Confidence: 0.867643786875

00:53:07.602 --> 00:53:10.148 not on this list I apologize and then

NOTE Confidence: 0.867643786875

00:53:10.148 --> 00:53:11.618 I just acknowledge that participants

NOTE Confidence: 0.867643786875

00:53:11.618 --> 00:53:13.320 in the families and our support.

NOTE Confidence: 0.867643786875

00:53:13.320 --> 00:53:14.550 So thank you.

NOTE Confidence: 0.8413794325

00:53:25.070 --> 00:53:27.355 All right. Should I turn

NOTE Confidence: 0.8413794325

00:53:27.355 --> 00:53:30.810 off the chair? Good. Thank

NOTE Confidence: 0.747404196842105

00:53:30.820 --> 00:53:31.656 you so much, Adam.

NOTE Confidence: 0.747404196842105

00:53:31.656 --> 00:53:32.701 And I'm actually the distractor

NOTE Confidence: 0.747404196842105

00:53:32.701 --> 00:53:34.049 in the middle of your talk

NOTE Confidence: 0.747404196842105

00:53:34.049 --> 00:53:34.925 was from Linda Drozdowicz,

NOTE Confidence: 0.747404196842105

00:53:34.930 --> 00:53:36.604 who was just complimenting you on

NOTE Confidence: 0.747404196842105

00:53:36.604 --> 00:53:38.260 how accessible you were making EG.

NOTE Confidence: 0.747404196842105

00:53:38.260 --> 00:53:39.575 So you're getting compliments

NOTE Confidence: 0.747404196842105

00:53:39.575 --> 00:53:41.285 in the chat questions for Adam.

NOTE Confidence: 0.38272825

00:53:50.190 --> 00:53:51.152 Adam, that was really great.

NOTE Confidence: 0.38272825

00:53:51.152 --> 00:53:52.619 I really learned a lot from you today.

NOTE Confidence: 0.38272825

00:53:52.620 --> 00:53:55.210 As always, I appreciate that.

NOTE Confidence: 0.38272825

00:53:55.210 --> 00:53:56.942 Just a quick question about eye contact.

NOTE Confidence: 0.38272825

00:53:56.942 --> 00:53:58.914 So I understand the difference of it

NOTE Confidence: 0.38272825

00:53:58.914 --> 00:54:00.202 being predictable or not predictable

NOTE Confidence: 0.38272825

00:54:00.202 --> 00:54:01.910 what the response is going to be,

NOTE Confidence: 0.38272825

00:54:01.910 --> 00:54:04.745 but what about desirable or not desirable?

NOTE Confidence: 0.38272825

00:54:04.750 --> 00:54:07.679 In some people they like eye contact, right?

NOTE Confidence: 0.38272825

00:54:07.679 --> 00:54:10.262 But I have some patience and some

NOTE Confidence: 0.38272825

00:54:10.262 --> 00:54:12.989 friends who really dislike eye contact.

NOTE Confidence: 0.38272825

00:54:12.990 --> 00:54:16.482 And So what does that do to to make

NOTE Confidence: 0.38272825

00:54:16.482 --> 00:54:18.522 your data even more complicated?

NOTE Confidence: 0.38272825

00:54:18.530 --> 00:54:20.150 I'm, I was surprised at

NOTE Confidence: 0.38272825

00:54:20.150 --> 00:54:21.446 how complicated it is.

NOTE Confidence: 0.38272825

00:54:21.450 --> 00:54:24.183 But more complicated, you know, so,

NOTE Confidence: 0.38272825

00:54:24.183 --> 00:54:27.027 but that desirability back there, you know,

NOTE Confidence: 0.38272825

00:54:27.027 --> 00:54:28.966 some people like it and some don't.

NOTE Confidence: 0.38272825

00:54:28.970 --> 00:54:29.410 Thank you.
NOTE Confidence: 0.85739891

00:54:31.200 --> 00:54:36.490 Should I talk into this? Is that OK so.
NOTE Confidence: 0.85739891

00:54:36.490 --> 00:54:39.696 I guess so on one level like.
NOTE Confidence: 0.85739891

00:54:39.700 --> 00:54:41.304 Things like desirability might
NOTE Confidence: 0.85739891

00:54:41.304 --> 00:54:43.710 be the kind of context I'm
NOTE Confidence: 0.85739891

00:54:43.788 --> 00:54:46.370 talking about right today. They.
NOTE Confidence: 0.927531271111111

00:54:49.020 --> 00:54:51.960 Those are the kinds of factors that
NOTE Confidence: 0.927531271111111

00:54:51.960 --> 00:54:53.718 are probably, I think probably.
NOTE Confidence: 0.927531271111111

00:54:53.718 --> 00:54:55.248 So I think they're probably.
NOTE Confidence: 0.790150861764706

00:54:57.810 --> 00:54:59.652 Sort of charging up that piece
NOTE Confidence: 0.790150861764706

00:54:59.652 --> 00:55:01.992 of brain where the end 170 is
NOTE Confidence: 0.790150861764706

00:55:01.992 --> 00:55:03.388 being generated from really,
NOTE Confidence: 0.790150861764706

00:55:03.390 --> 00:55:05.322 really early or not.
NOTE Confidence: 0.790150861764706

00:55:05.322 --> 00:55:07.737 So I don't know that.
NOTE Confidence: 0.80569804

00:55:10.200 --> 00:55:10.460 Like.
NOTE Confidence: 0.680630815

00:55:12.800 --> 00:55:15.098 You know, the M70, it's this,

NOTE Confidence: 0.680630815

00:55:15.100 --> 00:55:17.638 it's this peak that can be larger or smaller,

NOTE Confidence: 0.680630815

00:55:17.640 --> 00:55:20.016 earlier or later. So it's not.

NOTE Confidence: 0.680630815

00:55:20.020 --> 00:55:22.796 There's only so many places it can go.

NOTE Confidence: 0.680630815

00:55:22.800 --> 00:55:26.436 So I. I guess like that's as I think

NOTE Confidence: 0.680630815

00:55:26.436 --> 00:55:28.918 about this task, like the Stairmaster,

NOTE Confidence: 0.680630815

00:55:28.918 --> 00:55:31.630 that might be like the tilt Table, right?

NOTE Confidence: 0.680630815

00:55:31.630 --> 00:55:34.870 There might be other ways you can sort of.

NOTE Confidence: 0.680630815

00:55:34.870 --> 00:55:38.769 Poken product. Thank you. Now

NOTE Confidence: 0.889657085714286

00:55:38.780 --> 00:55:40.236 you're making me get my steps in,

NOTE Confidence: 0.889657085714286

00:55:40.240 --> 00:55:41.750 so my heart rate is going to be going up.

NOTE Confidence: 0.868913124545454

00:55:44.450 --> 00:55:47.404 I wonder about has there been any

NOTE Confidence: 0.868913124545454

00:55:47.404 --> 00:55:49.570 experiment or data comparing,

NOTE Confidence: 0.868913124545454

00:55:49.570 --> 00:55:51.938 I mean kids with autism in terms of

NOTE Confidence: 0.868913124545454

00:55:51.938 --> 00:55:53.886 their eye tracking data when they

NOTE Confidence: 0.868913124545454

00:55:53.886 --> 00:55:56.258 are or they are doing the experiment

NOTE Confidence: 0.868913124545454

00:55:56.258 --> 00:55:58.848 on screen versus in the real life,
NOTE Confidence: 0.868913124545454

00:55:58.850 --> 00:56:02.028 I mean as an in person experiment.
NOTE Confidence: 0.868913124545454

00:56:02.030 --> 00:56:07.790 Yeah, we did one here years and years ago.
NOTE Confidence: 0.868913124545454

00:56:07.790 --> 00:56:11.545 So. Here's the here's the big
NOTE Confidence: 0.868913124545454

00:56:11.545 --> 00:56:13.610 caveat to all of those experiments.
NOTE Confidence: 0.868913124545454

00:56:13.610 --> 00:56:16.250 So when I play you a movie on the screen,
NOTE Confidence: 0.868913124545454

00:56:16.250 --> 00:56:17.270 it's the same movie.
NOTE Confidence: 0.868913124545454

00:56:17.270 --> 00:56:19.648 Every kid who comes in sees the same movie.
NOTE Confidence: 0.868913124545454

00:56:19.650 --> 00:56:21.486 When I put an eye tracker on your head,
NOTE Confidence: 0.868913124545454

00:56:21.490 --> 00:56:22.870 it looks like just, you know,
NOTE Confidence: 0.868913124545454

00:56:22.870 --> 00:56:24.977 now they can just look like glasses.
NOTE Confidence: 0.868913124545454

00:56:24.980 --> 00:56:27.396 But if I put an eye tracker on
NOTE Confidence: 0.868913124545454

00:56:27.396 --> 00:56:29.517 your head and I send you out?
NOTE Confidence: 0.868913124545454

00:56:29.520 --> 00:56:32.400 I who knows where, where you're going to go?
NOTE Confidence: 0.868913124545454

00:56:32.400 --> 00:56:35.940 So there's this.
NOTE Confidence: 0.868913124545454

00:56:35.940 --> 00:56:36.717 It you you,

NOTE Confidence: 0.868913124545454

00:56:36.717 --> 00:56:38.924 you can find that people might be less

NOTE Confidence: 0.868913124545454

00:56:38.924 --> 00:56:40.898 prone to engage in social interactions

NOTE Confidence: 0.868913124545454

00:56:40.898 --> 00:56:43.039 and then they look less at faces.

NOTE Confidence: 0.868913124545454

00:56:43.040 --> 00:56:44.923 But probably what you want to know

NOTE Confidence: 0.868913124545454

00:56:44.923 --> 00:56:46.966 is for those people who weren't

NOTE Confidence: 0.868913124545454

00:56:46.966 --> 00:56:48.534 going to social interactions,

NOTE Confidence: 0.868913124545454

00:56:48.540 --> 00:56:50.716 what would they have done if they were

NOTE Confidence: 0.868913124545454

00:56:50.716 --> 00:56:52.480 in those socially charged situations

NOTE Confidence: 0.868913124545454

00:56:52.480 --> 00:56:54.796 that the other people went into?

NOTE Confidence: 0.868913124545454

00:56:54.800 --> 00:56:57.830 So it's sort of a.

NOTE Confidence: 0.868913124545454

00:56:57.830 --> 00:57:01.560 Long way of also saying I don't

NOTE Confidence: 0.868913124545454

00:57:01.560 --> 00:57:02.820 know and it's complicated.

NOTE Confidence: 0.70523650625

00:57:05.420 --> 00:57:07.025 Methadol just also just in

NOTE Confidence: 0.70523650625

00:57:07.025 --> 00:57:07.988 measurement and methodology,

NOTE Confidence: 0.70523650625

00:57:07.990 --> 00:57:09.703 measurement and methodology.

NOTE Confidence: 0.70523650625

00:57:09.703 --> 00:57:13.129 It's really hard to do that.
NOTE Confidence: 0.70523650625

00:57:13.130 --> 00:57:14.895 And get really accurate and
NOTE Confidence: 0.70523650625

00:57:14.895 --> 00:57:17.170 meaningful data for a single person.
NOTE Confidence: 0.70523650625

00:57:17.170 --> 00:57:18.980 When you have a 50 kids or 20 kids and
NOTE Confidence: 0.70523650625

00:57:19.035 --> 00:57:20.899 then you average it across all of them,
NOTE Confidence: 0.70523650625

00:57:20.900 --> 00:57:22.490 then you know, smooth it,
NOTE Confidence: 0.70523650625

00:57:22.490 --> 00:57:23.834 they smooth it again.
NOTE Confidence: 0.70523650625

00:57:23.834 --> 00:57:26.110 Then there's things come out of it.
NOTE Confidence: 0.70523650625

00:57:26.110 --> 00:57:29.870 But then at the individual level like this,
NOTE Confidence: 0.70523650625

00:57:29.870 --> 00:57:30.990 this issue of data loss,
NOTE Confidence: 0.70523650625

00:57:30.990 --> 00:57:33.206 again these are they start to creep in,
NOTE Confidence: 0.70523650625

00:57:33.210 --> 00:57:34.758 people make their own experiments and
NOTE Confidence: 0.70523650625

00:57:34.758 --> 00:57:36.055 usually they're not the experiments
NOTE Confidence: 0.70523650625

00:57:36.055 --> 00:57:37.609 that you wanted them to be in.
NOTE Confidence: 0.83801496

00:57:40.910 --> 00:57:41.200 Mike.
NOTE Confidence: 0.814049212142857

00:57:46.340 --> 00:57:47.464 Adam loved your talk,

NOTE Confidence: 0.814049212142857
00:57:47.464 --> 00:57:49.580 great out of the park with all
NOTE Confidence: 0.814049212142857
00:57:49.580 --> 00:57:52.160 the highly innovative approaches.
NOTE Confidence: 0.814049212142857
00:57:52.160 --> 00:57:55.540 I've several questions. I'll
NOTE Confidence: 0.879711234
00:57:53.790 --> 00:57:55.530 just ask the first one, which
NOTE Confidence: 0.866891256666667
00:57:55.540 --> 00:57:57.292 is, have you thought about with
NOTE Confidence: 0.866891256666667
00:57:57.292 --> 00:58:00.880 your your new shaping paradigm,
NOTE Confidence: 0.893656392
00:58:00.880 --> 00:58:03.365 do you think that it changes the
NOTE Confidence: 0.893656392
00:58:03.365 --> 00:58:05.090 brains of these kids in any way where
NOTE Confidence: 0.864120732
00:58:05.100 --> 00:58:06.460 you might see that their
NOTE Confidence: 0.864120732
00:58:06.460 --> 00:58:07.781 inhibitory controls improved?
NOTE Confidence: 0.864120732
00:58:07.781 --> 00:58:09.287 Do you see any applications of
NOTE Confidence: 0.864120732
00:58:09.287 --> 00:58:10.570 this beyond your experiment?
NOTE Confidence: 0.808575886363636
00:58:13.630 --> 00:58:16.591 So. Yes, I don't think in the
NOTE Confidence: 0.808575886363636
00:58:16.591 --> 00:58:18.370 sessions we're doing that.
NOTE Confidence: 0.808575886363636
00:58:18.370 --> 00:58:20.224 There's like measurements of that we're
NOTE Confidence: 0.808575886363636

00:58:20.224 --> 00:58:22.211 going to be measure like inhibitory
NOTE Confidence: 0.808575886363636

00:58:22.211 --> 00:58:23.941 control changing because the amount
NOTE Confidence: 0.808575886363636

00:58:23.941 --> 00:58:25.885 of change that happens within the
NOTE Confidence: 0.808575886363636

00:58:25.885 --> 00:58:27.866 experiment is going to be driven by
NOTE Confidence: 0.808575886363636

00:58:27.870 --> 00:58:29.333 how far away they were from sitting
NOTE Confidence: 0.808575886363636

00:58:29.333 --> 00:58:30.858 still at the beginning, right.
NOTE Confidence: 0.808575886363636

00:58:30.858 --> 00:58:32.490 So you're sort of.
NOTE Confidence: 0.808575886363636

00:58:32.490 --> 00:58:34.400 It's like you're that baseline
NOTE Confidence: 0.808575886363636

00:58:34.400 --> 00:58:37.265 is always going to be a predictor
NOTE Confidence: 0.808575886363636

00:58:37.265 --> 00:58:39.025 of your outcome measure.
NOTE Confidence: 0.808575886363636

00:58:39.030 --> 00:58:40.850 And but yeah, and I think it's,
NOTE Confidence: 0.808575886363636

00:58:40.850 --> 00:58:42.294 I think it's a.
NOTE Confidence: 0.808575886363636

00:58:42.294 --> 00:58:44.460 I do think it's a different
NOTE Confidence: 0.808575886363636

00:58:44.552 --> 00:58:46.148 kind of experiment.
NOTE Confidence: 0.808575886363636

00:58:46.150 --> 00:58:49.438 And I don't know there's like better or
NOTE Confidence: 0.808575886363636

00:58:49.438 --> 00:58:52.730 worse than kind of the traditional ones,

NOTE Confidence: 0.808575886363636
00:58:52.730 --> 00:58:53.918 but it's different.
NOTE Confidence: 0.808575886363636
00:58:53.918 --> 00:58:56.690 And I don't know that we know
NOTE Confidence: 0.808575886363636
00:58:56.690 --> 00:58:59.986 exactly every way in which those
NOTE Confidence: 0.808575886363636
00:58:59.986 --> 00:59:02.050 differences might be important.
NOTE Confidence: 0.808575886363636
00:59:02.050 --> 00:59:02.700 Sometimes,
NOTE Confidence: 0.822287083333333
00:59:02.710 --> 00:59:03.862 and I've abandoned this,
NOTE Confidence: 0.822287083333333
00:59:03.862 --> 00:59:05.302 we would say to participants,
NOTE Confidence: 0.822287083333333
00:59:05.310 --> 00:59:06.462 try not to blink.
NOTE Confidence: 0.822287083333333
00:59:06.462 --> 00:59:07.902 And you're layering your layering
NOTE Confidence: 0.822287083333333
00:59:07.902 --> 00:59:09.908 on whatever your instructions are.
NOTE Confidence: 0.822287083333333
00:59:09.910 --> 00:59:11.198 You know, someone is has those on
NOTE Confidence: 0.822287083333333
00:59:11.198 --> 00:59:12.340 board while they're doing your task.
NOTE Confidence: 0.822287083333333
00:59:12.340 --> 00:59:13.390 You really don't know how
NOTE Confidence: 0.822287083333333
00:59:13.390 --> 00:59:14.110 much they're doing it.
NOTE Confidence: 0.822287083333333
00:59:14.110 --> 00:59:15.115 So it's some ways similar
NOTE Confidence: 0.822287083333333

00:59:15.115 --> 00:59:15.919 to what you're doing.
NOTE Confidence: 0.8222870833333333

00:59:15.920 --> 00:59:16.448 You're just doing it
NOTE Confidence: 0.76932535

00:59:16.460 --> 00:59:17.471 implicitly. If, well,
NOTE Confidence: 0.76932535

00:59:17.471 --> 00:59:19.830 I'll say it having been my own
NOTE Confidence: 0.76932535

00:59:19.902 --> 00:59:21.850 participant hundreds of times,
NOTE Confidence: 0.76932535

00:59:21.850 --> 00:59:23.810 it feels really different, right?
NOTE Confidence: 0.76932535

00:59:23.810 --> 00:59:26.969 This is responding faster than your N 170 is.
NOTE Confidence: 0.76932535

00:59:26.970 --> 00:59:29.450 So it feels, I mean it feels like,
NOTE Confidence: 0.76932535

00:59:29.450 --> 00:59:31.506 you know, we've tied strings on to you
NOTE Confidence: 0.76932535

00:59:31.506 --> 00:59:33.369 and they're hooked into the computer.
NOTE Confidence: 0.76932535

00:59:33.370 --> 00:59:35.780 And that level of like.
NOTE Confidence: 0.76932535

00:59:35.780 --> 00:59:38.560 That level of latency,
NOTE Confidence: 0.76932535

00:59:38.560 --> 00:59:44.310 or lack of latency and perfect contingency.
NOTE Confidence: 0.76932535

00:59:44.310 --> 00:59:46.035 It's it's you have it's
NOTE Confidence: 0.76932535

00:59:46.035 --> 00:59:47.070 very implicit learning.
NOTE Confidence: 0.76932535

00:59:47.070 --> 00:59:49.006 You don't think like oh I have to

NOTE Confidence: 0.76932535

00:59:49.006 --> 00:59:51.600 sit still like you just sort of

NOTE Confidence: 0.76932535

00:59:51.600 --> 00:59:54.736 it's a little bit for me I sort of

NOTE Confidence: 0.76932535

00:59:54.736 --> 00:59:57.115 just freeze not freeze up that just

NOTE Confidence: 0.76932535

00:59:57.115 --> 00:59:59.191 stopped moving and I don't think

NOTE Confidence: 0.76932535

00:59:59.191 --> 01:00:01.057 about it explicitly so you think

NOTE Confidence: 0.8332465

01:00:01.070 --> 01:00:04.372 do you feel it. The reason why I'm

NOTE Confidence: 0.8332465

01:00:04.372 --> 01:00:06.418 asking is because we've done some

NOTE Confidence: 0.8332465

01:00:06.418 --> 01:00:08.880 stuff with biofeedback and we'd relax

NOTE Confidence: 0.8332465

01:00:08.880 --> 01:00:10.680 to keep a ball from when you relax,

NOTE Confidence: 0.8332465

01:00:10.680 --> 01:00:12.440 a ball levitates. And with me,

NOTE Confidence: 0.8332465

01:00:12.440 --> 01:00:13.460 every time it would levitate,

NOTE Confidence: 0.8332465

01:00:13.460 --> 01:00:15.972 I get excited, then it would drop and so.

NOTE Confidence: 0.8332465

01:00:15.972 --> 01:00:18.500 But I was thinking that, you know,

NOTE Confidence: 0.8332465

01:00:18.500 --> 01:00:21.290 you could use this as a as an intervention in

NOTE Confidence: 0.8133715475

01:00:21.300 --> 01:00:23.408 some ways your approach.

NOTE Confidence: 0.8133715475

01:00:23.410 --> 01:00:25.410 Yeah, sounds like that.
NOTE Confidence: 0.8133715475

01:00:25.410 --> 01:00:27.478 Yeah, yeah, definitely have kids.
NOTE Confidence: 0.8133715475

01:00:27.478 --> 01:00:28.980 When, like, their favorite movie comes on,
NOTE Confidence: 0.8133715475

01:00:28.980 --> 01:00:29.832 they start getting excited.
NOTE Confidence: 0.8133715475

01:00:29.832 --> 01:00:31.512 And then you're like, OK, this is.
NOTE Confidence: 0.8133715475

01:00:31.512 --> 01:00:33.430 And you feel bad and it's like,
NOTE Confidence: 0.8133715475

01:00:33.430 --> 01:00:34.558 oh man, what have you done?
NOTE Confidence: 0.16491112

01:00:37.770 --> 01:00:39.510 Wonderful. We're just about at time,
NOTE Confidence: 0.828551552857143

01:00:39.510 --> 01:00:40.924 so we'll have a captive audience here.
NOTE Confidence: 0.828551552857143

01:00:40.930 --> 01:00:42.530 I just like to remind you that we'll
NOTE Confidence: 0.828551552857143

01:00:42.530 --> 01:00:44.285 be back here in the Cohen for grand
NOTE Confidence: 0.828551552857143

01:00:44.285 --> 01:00:46.070 rounds next week for Doctor Lisa Gallia.
NOTE Confidence: 0.828551552857143

01:00:46.070 --> 01:00:47.394 And previously at UBC,
NOTE Confidence: 0.828551552857143

01:00:47.394 --> 01:00:50.109 now recently appointed by Camp H in Toronto,
NOTE Confidence: 0.828551552857143

01:00:50.110 --> 01:00:51.688 we'll be talking about the impact
NOTE Confidence: 0.828551552857143

01:00:51.688 --> 01:00:53.429 of biological sex on brain health.

NOTE Confidence: 0.828551552857143

01:00:53.430 --> 01:00:54.930 So please join us for that.

NOTE Confidence: 0.828551552857143

01:00:54.930 --> 01:00:57.490 But just to thank Doctor Naples for a

NOTE Confidence: 0.828551552857143

01:00:57.490 --> 01:00:59.202 wonderfully accessible deep dive into

NOTE Confidence: 0.828551552857143

01:00:59.202 --> 01:01:01.350 biomarkers in a really important area.

NOTE Confidence: 0.828551552857143

01:01:01.350 --> 01:01:02.420 So thank you so much.

NOTE Confidence: 0.739999696666667

01:01:02.910 --> 01:01:03.660 Thank you, guys.

NOTE Confidence: 0.791224942

01:01:09.550 --> 01:01:10.720 Do I do something here?