WEBVTT

NOTE duration:"01:10:30"

NOTE recognizability:0.931

NOTE language:en-us

NOTE Confidence: 0.93622824

00:00:00.000 --> 00:00:00.720 So with that, I'm going

NOTE Confidence: 0.764310466666667

00:00:03.360 --> 00:00:05.238 to okay. Welcome

NOTE Confidence: 0.93824092

00:00:05.240 --> 00:00:06.040 to those who are seeing

NOTE Confidence: 0.9402536

00:00:06.040 --> 00:00:07.200 us on the recording.

NOTE Confidence: 0.93421556

00:00:10.680 --> 00:00:11.400 I'm going to turn now

NOTE Confidence: 0.9402536

00:00:11.400 --> 00:00:14.196 to our first first winner and

NOTE Confidence: 0.9402536

00:00:14.200 --> 00:00:16.720 1st Presenter AZ. I'll stop

NOTE Confidence: 0.9553487

00:00:17.840 --> 00:00:18.400 that anymore.

NOTE Confidence: 0.926835733333333

00:00:31.010 --> 00:00:31.730 Here we go.

NOTE Confidence: 0.890974393333333

00:00:34.130 --> 00:00:36.300 So Izzy Alsop is a graduating resident

NOTE Confidence: 0.890974393333333

00:00:36.300 --> 00:00:38.316 this year in the Neuroscience

NOTE Confidence: 0.890974393333333

00:00:38.316 --> 00:00:40.764 Research Training program and has

NOTE Confidence: 0.890974393333333

00:00:40.764 --> 00:00:43.049 really been a remarkable colleague,

NOTE Confidence: 0.890974393333333

00:00:43.050 --> 00:00:44.898 trainee and citizen of our community

NOTE Confidence: 0.890974393333333

00:00:44.898 --> 00:00:46.450 during his four years here.

NOTE Confidence: 0.890974393333333

00:00:46.450 --> 00:00:48.790 Now that doesn't surprise us.

NOTE Confidence: 0.890974393333333

00:00:48.790 --> 00:00:50.315 Because when we when we

NOTE Confidence: 0.890974393333333

00:00:50.315 --> 00:00:52.870 first saw his application,

NOTE Confidence: 0.890974393333333

00:00:52.870 --> 00:00:55.870 Aza did his his his bachelor's at North

NOTE Confidence: 0.890974393333333

00:00:55.870 --> 00:00:57.899 Carolina Central University before going

NOTE Confidence: 0.890974393333333

00:00:57.899 --> 00:01:01.270 to Harvard for his MD&MIT for his PhD,

NOTE Confidence: 0.890974393333333

00:01:01.270 --> 00:01:02.950 where he worked with K Ty,

NOTE Confidence: 0.890974393333333

00:01:02.950 --> 00:01:04.680 who's a truly brilliant neuroscientist

NOTE Confidence: 0.890974393333333

00:01:04.680 --> 00:01:05.718 who's done groundbreaking

NOTE Confidence: 0.890974393333333

00:01:05.718 --> 00:01:07.310 work over the last 20 years,

NOTE Confidence: 0.890974393333333

00:01:07.310 --> 00:01:08.750 work with some of the leading

NOTE Confidence: 0.890974393333333

00:01:08.750 --> 00:01:09.710 people in our field.

NOTE Confidence: 0.890974393333333

00:01:09.710 --> 00:01:11.789 And I read a lot of letters.

NOTE Confidence: 0.890974393333333

00:01:11.790 --> 00:01:13.750 I read a lot of strong letters.

NOTE Confidence: 0.890974393333333

00:01:13.750 --> 00:01:16.090 A Ty's letter kind of floated up above

NOTE Confidence: 0.890974393333333

00:01:16.090 --> 00:01:18.782 the table because because it was

NOTE Confidence: 0.890974393333333

00:01:18.782 --> 00:01:21.025 so strong and so we expected great

NOTE Confidence: 0.890974393333333

00:01:21.025 --> 00:01:23.480 things of a CA when he came here

NOTE Confidence: 0.890974393333333

00:01:23.480 --> 00:01:25.466 and we have not been disappointed.

NOTE Confidence: 0.93824092

00:01:28.060 --> 00:01:30.100 Aza You'll hear about his basic

NOTE Confidence: 0.93824092

00:01:30.100 --> 00:01:31.995 science grounded in the work he

NOTE Confidence: 0.93824092

00:01:31.995 --> 00:01:33.450 did his PhD student with Kay,

NOTE Confidence: 0.93824092

00:01:33.450 --> 00:01:35.020 and then going on through some innovative,

NOTE Confidence: 0.93824092

00:01:35.020 --> 00:01:35.888 exciting new work that

NOTE Confidence: 0.93824092

00:01:35.888 --> 00:01:36.973 he's done while he's here.

NOTE Confidence: 0.93824092

00:01:36.980 --> 00:01:38.116 So I want to emphasize a couple

NOTE Confidence: 0.93824092

00:01:38.116 --> 00:01:39.060 of the other things. Actually,

NOTE Confidence: 0.93824092

00:01:39.060 --> 00:01:40.460 I haven't gone through all your slides.

NOTE Confidence: 0.93824092

00:01:40.460 --> 00:01:41.699 I don't know exactly what you're covering,

NOTE Confidence: 0.93824092

00:01:41.700 --> 00:01:43.380 but that you might hear a

NOTE Confidence: 0.93824092

00:01:43.380 --> 00:01:44.780 little bit less of today.

NOTE Confidence: 0.93824092

00:01:45.700 --> 00:01:47.180 One is that in addition

NOTE Confidence: 0.946962533333333

00:01:47.180 --> 00:01:48.980 to continuing basic science work

NOTE Confidence: 0.946962533333333

00:01:48.980 --> 00:01:50.970 growing out of his PhD studies,

NOTE Confidence: 0.946962533333333

00:01:50.970 --> 00:01:53.888 Aza has grown and entirely

NOTE Confidence: 0.946962533333333

00:01:53.888 --> 00:01:56.510 new clinical research.

NOTE Confidence: 0.946962533333333

00:01:56.510 --> 00:01:58.750 Line of work in in collaboration with

NOTE Confidence: 0.946962533333333

00:01:58.750 --> 00:02:02.330 Joy Hirsch and that involves the the

NOTE Confidence: 0.946962533333333

00:02:02.330 --> 00:02:04.761 use of near infrared spectroscopy to

NOTE Confidence: 0.946962533333333

00:02:04.761 --> 00:02:07.435 image the brain and try to understand

NOTE Confidence: 0.946962533333333

00:02:07.435 --> 00:02:09.748 the interactions of the people in dyads

NOTE Confidence: 0.946962533333333

00:02:09.750 --> 00:02:12.305 and also how that interacts with music.

NOTE Confidence: 0.946962533333333

00:02:12.310 --> 00:02:13.443 And so this is the second thing

NOTE Confidence: 0.946962533333333

00:02:13.443 --> 00:02:14.507 I want to tell you about A ZA,

NOTE Confidence: 0.946962533333333

00:02:14.510 --> 00:02:16.110 which is a spectacular musician.

NOTE Confidence: 0.946962533333333

00:02:16.110 --> 00:02:19.230 He's released several albums he performs

NOTE Confidence: 0.946962533333333

00:02:19.230 --> 00:02:21.680 regularly around around New Haven.

NOTE Confidence: 0.946962533333333

00:02:21.680 --> 00:02:22.954 The third thing I want to,

NOTE Confidence: 0.946962533333333

00:02:22.954 --> 00:02:25.310 I want to say that you may not see in the

NOTE Confidence: 0.946962533333333

00:02:25.310 --> 00:02:27.400 slides today is what a wonderful clinician,

NOTE Confidence: 0.946962533333333

00:02:27.400 --> 00:02:29.759 clinical leader and clinical citizen he is.

NOTE Confidence: 0.946962533333333

00:02:29.760 --> 00:02:31.352 A ZA was one of the chief residents

NOTE Confidence: 0.946962533333333

00:02:31.352 --> 00:02:32.722 on the Clinical Neuroscience Research

NOTE Confidence: 0.946962533333333

00:02:32.722 --> 00:02:34.570 Unit this year which I directed

NOTE Confidence: 0.946962533333333

00:02:34.570 --> 00:02:36.514 on which Doctor Cho is one of the

NOTE Confidence: 0.946962533333333

00:02:36.514 --> 00:02:38.056 attendings and it ran incredibly

NOTE Confidence: 0.946962533333333

00:02:38.056 --> 00:02:40.196 smoothly and introduced new innovations

NOTE Confidence: 0.946962533333333

00:02:40.196 --> 00:02:43.036 and how the unit ran to try to meet

NOTE Confidence: 0.946962533333333

00:02:43.040 --> 00:02:44.552 patients needs while we were there

NOTE Confidence: 0.946962533333333

00:02:44.552 --> 00:02:45.560 which was true leadership.

NOTE Confidence: 0.954342254

00:02:47.520 --> 00:02:48.896 And finally, that that

NOTE Confidence: 0.954342254

00:02:48.896 --> 00:02:51.320 dedication to citizenship

NOTE Confidence: 0.936899033333333

00:02:51.320 --> 00:02:53.524 goes goes far beyond AZA's academic

NOTE Confidence: 0.936899033333333

00:02:53.524 --> 00:02:56.800 work to his work in in advocacy,

NOTE Confidence: 0.936899033333333

00:02:56.800 --> 00:02:58.680 in leadership, in the community,

NOTE Confidence: 0.936899033333333

00:02:58.680 --> 00:03:02.760 in antiracist work and so forth.

NOTE Confidence: 0.936899033333333

00:03:02.760 --> 00:03:04.260 Aza is also extraordinarily

NOTE Confidence: 0.936899033333333

00:03:04.260 --> 00:03:05.760 dedicated to his family.

NOTE Confidence: 0.936899033333333

00:03:05.760 --> 00:03:07.800 I just got a chance to meet his mom today.

NOTE Confidence: 0.936899033333333

00:03:07.800 --> 00:03:09.914 Thank you for being here with us.

NOTE Confidence: 0.936899033333333

00:03:09.920 --> 00:03:12.390 And. Really I I mean people

NOTE Confidence: 0.936899033333333

00:03:12.390 --> 00:03:13.222 talk about triple threats.

NOTE Confidence: 0.936899033333333

00:03:13.230 --> 00:03:14.406 I kind of lost track of how

NOTE Confidence: 0.936899033333333

00:03:14.406 --> 00:03:15.560 many threats we got out here.

NOTE Confidence: 0.936899033333333

00:03:15.560 --> 00:03:17.498 So, so anyway it's so it's been

NOTE Confidence: 0.936899033333333

00:03:17.498 --> 00:03:19.190 a great pleasure to get to know

NOTE Confidence: 0.936899033333333

00:03:19.190 --> 00:03:21.506 Aza over the last four years.

NOTE Confidence: 0.936899033333333

00:03:21.510 --> 00:03:23.204 It is a great pleasure to introduce

NOTE Confidence: 0.936899033333333

00:03:23.204 --> 00:03:24.777 him to give this presentation and

NOTE Confidence: 0.936899033333333

00:03:24.777 --> 00:03:27.166 and the award today and it is a great

NOTE Confidence: 0.936899033333333

00:03:27.166 --> 00:03:28.648 pleasure that he will be staying

NOTE Confidence: 0.936899033333333

00:03:28.648 --> 00:03:30.838 with us as an assistant professor

NOTE Confidence: 0.936899033333333

00:03:30.838 --> 00:03:32.948 transition formally on July 1st,

NOTE Confidence: 0.936899033333333

00:03:32.950 --> 00:03:33.950 but that's in process now.

NOTE Confidence: 0.936899033333333

00:03:33.950 --> 00:03:36.109 So we look forward to many more years

NOTE Confidence: 0.936899033333333

00:03:36.109 --> 00:03:38.827 of of of comradeship and collaboration.

NOTE Confidence: 0.936899033333333

00:03:38.830 --> 00:03:41.210 Congratulations on this award.

NOTE Confidence: 0.936899033333333

00:03:41.210 --> 00:03:44.489 And I'm going to keep

NOTE Confidence: 0.935780925555556

00:03:51.370 --> 00:03:52.114 you this down.

NOTE Confidence: 0.935780925555556

00:03:52.114 --> 00:03:54.103 Thank you so much for that introduction.

NOTE Confidence: 0.935780925555556

00:03:54.103 --> 00:03:56.568 I feel really, really humbled

NOTE Confidence: 0.935780925555556

00:03:56.570 --> 00:03:58.688 and and grateful to be here.

NOTE Confidence: 0.935780925555556

00:03:58.690 --> 00:04:00.286 Thank you to the most high.

NOTE Confidence: 0.935780925555556

00:04:00.290 --> 00:04:01.970 Thank you to my family for being here,

NOTE Confidence: 0.935780925555556

00:04:01.970 --> 00:04:04.546 my mom, sister, my nephew who you've

NOTE Confidence: 0.935780925555556

00:04:04.546 --> 00:04:06.434 already heard from my brother,

NOTE Confidence: 0.935780925555556

00:04:06.434 --> 00:04:08.394 my wife watching online and

NOTE Confidence: 0.935780925555556

00:04:08.394 --> 00:04:09.900 other family support and.

NOTE Confidence: 0.935780925555556

00:04:09.900 --> 00:04:12.306 Thank you to the Lesman family

NOTE Confidence: 0.935780925555556

00:04:12.306 --> 00:04:14.415 and the committee and this

NOTE Confidence: 0.935780925555556

00:04:14.415 --> 00:04:16.935 community which has been an amazing

NOTE Confidence: 0.935780925555556

00:04:16.935 --> 00:04:19.084 place to to be for residency.

NOTE Confidence: 0.935780925555556

00:04:19.084 --> 00:04:21.390 We're going to talk a little bit

NOTE Confidence: 0.935780925555556

00:04:21.390 --> 00:04:23.380 about some of my work that takes

NOTE Confidence: 0.935780925555556

00:04:23.380 --> 00:04:24.580 a computational framework and

NOTE Confidence: 0.935780925555556

00:04:24.580 --> 00:04:26.638 looking to see how can we better

NOTE Confidence: 0.935780925555556

00:04:26.638 --> 00:04:28.252 understand that the code the brain

NOTE Confidence: 0.935780925555556

00:04:28.252 --> 00:04:30.177 uses to represent social information

NOTE Confidence: 0.935780925555556

00:04:30.177 --> 00:04:31.777 across different model systems?

NOTE Confidence: 0.935780925555556

00:04:31.780 --> 00:04:33.236 And then how might we then use

NOTE Confidence: 0.935780925555556

00:04:33.236 --> 00:04:35.254 that to be able to start treating

NOTE Confidence: 0.935780925555556

00:04:35.254 --> 00:04:36.256 mental health symptoms?

NOTE Confidence: 0.946962533333333

00:04:38.610 --> 00:04:39.570 These are my conflict of interest,

NOTE Confidence: 0.946962533333333

00:04:39.570 --> 00:04:41.082 which are not relevant to the work

NOTE Confidence: 0.946962533333333

00:04:41.082 --> 00:04:42.290 that I'm talking about today,

NOTE Confidence: 0.946962533333333

00:04:42.290 --> 00:04:44.330 but is to other research.

NOTE Confidence: 0.946962533333333

00:04:44.330 --> 00:04:46.138 And I'm going to start by just setting

NOTE Confidence: 0.946962533333333

00:04:46.138 --> 00:04:47.919 a basic frame ground in some of the

NOTE Confidence: 0.946962533333333

00:04:47.919 --> 00:04:49.820 work that I did during grad school and

NOTE Confidence: 0.946962533333333

00:04:49.820 --> 00:04:51.928 post that because it kind of sets up

NOTE Confidence: 0.946962533333333

00:04:51.928 --> 00:04:54.320 the problem that I then was looking to

NOTE Confidence: 0.946962533333333

00:04:54.385 --> 00:04:57.049 solve with this project during residency.

NOTE Confidence: 0.946962533333333

00:04:57.050 --> 00:04:59.482 And the solution that we're working with is

NOTE Confidence: 0.946962533333333

00:04:59.482 --> 00:05:01.489 called Function Functional Encoding Units.

NOTE Confidence: 0.946962533333333

00:05:01.490 --> 00:05:03.149 I'll talk about why we think this

NOTE Confidence: 0.946962533333333

00:05:03.149 --> 00:05:05.404 might be a really useful way to

NOTE Confidence: 0.946962533333333

00:05:05.404 --> 00:05:06.888 help represent neural information.

NOTE Confidence: 0.946962533333333

00:05:06.890 --> 00:05:08.409 But before we get into the data,

NOTE Confidence: 0.946962533333333

00:05:08.410 --> 00:05:09.826 I just want to just kind of share

NOTE Confidence: 0.946962533333333

00:05:09.826 --> 00:05:10.850 yields land acknowledgement,

NOTE Confidence: 0.946962533333333

00:05:10.850 --> 00:05:11.850 which just says that,

NOTE Confidence: 0.946962533333333

00:05:11.850 --> 00:05:13.642 you know the cool research and cool

NOTE Confidence: 0.946962533333333

00:05:13.642 --> 00:05:15.287 community that we get to have and

NOTE Confidence: 0.946962533333333

00:05:15.287 --> 00:05:17.458 build comes that at a real price to to

NOTE Confidence: 0.946962533333333

00:05:17.458 --> 00:05:19.526 nations and people that we can't forget.

NOTE Confidence: 0.946962533333333

00:05:19.530 --> 00:05:21.504 That even as we celebrate the

NOTE Confidence: 0.946962533333333

00:05:21.504 --> 00:05:23.571 things that we're able to accomplish

NOTE Confidence: 0.946962533333333

00:05:23.571 --> 00:05:25.286 while here on this land,

NOTE Confidence: 0.946962533333333

00:05:25.290 --> 00:05:27.124 it's amazing to be in this environment.

NOTE Confidence: 0.946962533333333

00:05:27.130 --> 00:05:28.733 Because it's Chris said like I get

NOTE Confidence: 0.946962533333333

00:05:28.733 --> 00:05:30.489 to kind of bring the spiritual,

NOTE Confidence: 0.946962533333333

00:05:30.490 --> 00:05:31.655 the musical aspects of myself

NOTE Confidence: 0.946962533333333

00:05:31.655 --> 00:05:33.010 into the work that I do.

NOTE Confidence: 0.946962533333333

00:05:33.010 --> 00:05:34.220 And even though I won't

NOTE Confidence: 0.946962533333333

00:05:34.220 --> 00:05:35.188 talk about that research.

NOTE Confidence: 0.946962533333333

00:05:35.190 --> 00:05:37.157 It informs how I think about science

NOTE Confidence: 0.946962533333333

00:05:37.157 --> 00:05:39.055 and what kinds of questions to ask

NOTE Confidence: 0.946962533333333

00:05:39.055 --> 00:05:41.074 and how we might go about asking those

NOTE Confidence: 0.946962533333333

00:05:41.074 --> 00:05:42.908 questions because I'm going to talk about,

NOTE Confidence: 0.946962533333333

00:05:42.910 --> 00:05:43.332 you know,

NOTE Confidence: 0.946962533333333

00:05:43.332 --> 00:05:44.809 neurons in the brain while animals are

NOTE Confidence: 0.946962533333333

00:05:44.809 --> 00:05:46.508 doing things and we're recording from them.

NOTE Confidence: 0.946962533333333

00:05:46.510 --> 00:05:47.931 But none of that really gets at

NOTE Confidence: 0.946962533333333

00:05:47.931 --> 00:05:49.309 the hard problem of consciousness,

NOTE Confidence: 0.946962533333333

00:05:49.310 --> 00:05:51.430 which is how do we have the specific

NOTE Confidence: 0.946962533333333

00:05:51.430 --> 00:05:53.429 quality of our conscious experience.

NOTE Confidence: 0.946962533333333

00:05:53.430 --> 00:05:55.537 And I think asking those kinds of

NOTE Confidence: 0.946962533333333

00:05:55.537 --> 00:05:57.440 questions really kind of push us

NOTE Confidence: 0.946962533333333

00:05:57.440 --> 00:05:59.312 towards these ideas of like quantum

NOTE Confidence: 0.946962533333333

00:05:59.312 --> 00:06:00.948 psychology and quantum psychiatry,

NOTE Confidence: 0.946962533333333

00:06:00.950 --> 00:06:01.670 which I think.

NOTE Confidence: 0.946962533333333

00:06:01.670 --> 00:06:03.350 Might be very relevant to how we

NOTE Confidence: 0.946962533333333

00:06:03.410 --> 00:06:04.698 think about social information

NOTE Confidence: 0.946962533333333

00:06:04.698 --> 00:06:06.630 and the way that our experiences

NOTE Confidence: 0.946962533333333

00:06:06.689 --> 00:06:08.379 become entangled with each other.

NOTE Confidence: 0.946962533333333

00:06:08.380 --> 00:06:10.500 And so with that frame,

NOTE Confidence: 0.946962533333333

00:06:10.500 --> 00:06:12.252 I wanna jump into thinking about

NOTE Confidence: 0.946962533333333

00:06:12.252 --> 00:06:14.459 why we wanna study the social brain.

NOTE Confidence: 0.946962533333333

00:06:14.460 --> 00:06:17.162 It's really at the heart of culture

NOTE Confidence: 0.946962533333333

00:06:17.162 --> 00:06:20.417 and how we evolve our social norms.

NOTE Confidence: 0.946962533333333

00:06:20.420 --> 00:06:21.500 And many of the big problems

NOTE Confidence: 0.946962533333333

00:06:21.500 --> 00:06:22.500 we have to solve today,

NOTE Confidence: 0.946962533333333

00:06:22.500 --> 00:06:24.640 like the coordination challenge around

NOTE Confidence: 0.946962533333333

00:06:24.640 --> 00:06:26.780 climate crisis really will require

NOTE Confidence: 0.946962533333333

00:06:26.846 --> 00:06:30.263 us to be able to to evolve the ways

NOTE Confidence: 0.946962533333333

00:06:30.263 --> 00:06:32.230 in which we socially relate to each

NOTE Confidence: 0.946962533333333

00:06:32.292 --> 00:06:33.872 other to to guide group behavior.

NOTE Confidence: 0.946962533333333

00:06:33.872 --> 00:06:35.816 And obviously as a clinician across

NOTE Confidence: 0.946962533333333

00:06:35.816 --> 00:06:37.787 a number of different diagnosis

NOTE Confidence: 0.946962533333333

00:06:37.787 --> 00:06:39.379 in psychiatry and neurology,

NOTE Confidence: 0.946962533333333

00:06:39.380 --> 00:06:41.300 we see altered social cognition,

NOTE Confidence: 0.946962533333333

00:06:41.300 --> 00:06:43.675 some that even are somewhat

NOTE Confidence: 0.946962533333333

00:06:43.675 --> 00:06:46.699 defined by by alterations in in

NOTE Confidence: 0.946962533333333

00:06:46.699 --> 00:06:48.939 social cognition and behavior.

NOTE Confidence: 0.946962533333333

00:06:48.940 --> 00:06:49.132 But.

NOTE Confidence: 0.946962533333333

00:06:49.132 --> 00:06:50.668 When we try to look at the brain

NOTE Confidence: 0.946962533333333

00:06:50.668 --> 00:06:52.365 and look at the kind of circuits

NOTE Confidence: 0.946962533333333

00:06:52.365 --> 00:06:53.950 and networks that might be involved,

NOTE Confidence: 0.946962533333333

00:06:53.950 --> 00:06:55.590 we're looking at the rodent brain on the

NOTE Confidence: 0.946962533333333

00:06:55.590 --> 00:06:57.269 left and the human brain on the right.

NOTE Confidence: 0.946962533333333

00:06:57.270 --> 00:06:58.998 It's it's very complex and many

NOTE Confidence: 0.946962533333333

00:06:58.998 --> 00:07:00.775 of these regions do things that

NOTE Confidence: 0.946962533333333

00:07:00.775 --> 00:07:02.185 are non social as well.

NOTE Confidence: 0.946962533333333

00:07:02.190 --> 00:07:03.372 And so one of the things

NOTE Confidence: 0.946962533333333

00:07:03.372 --> 00:07:04.160 that appealed to me

NOTE Confidence: 0.941259939999999

00:07:04.211 --> 00:07:05.609 during Graduate School was this idea

NOTE Confidence: 0.941259939999999

00:07:05.609 --> 00:07:07.356 that we can use systems near science

NOTE Confidence: 0.941259939999999

00:07:07.356 --> 00:07:09.141 tools like optogenetics to look at a

NOTE Confidence: 0.941259939999999

00:07:09.150 --> 00:07:11.160 specific circuit and ask what that

NOTE Confidence: 0.941259939999999

00:07:11.160 --> 00:07:13.175 circuit does in some behavior and

NOTE Confidence: 0.941259939999999

00:07:13.175 --> 00:07:15.310 then from there build build up a

NOTE Confidence: 0.941259939999999

00:07:15.310 --> 00:07:16.498 circuit understanding of behavior.

NOTE Confidence: 0.941259939999999

00:07:16.498 --> 00:07:18.881 And so I wanted to apply this to

NOTE Confidence: 0.941259939999999

00:07:18.881 --> 00:07:20.507 social behavior for my thesis work.

NOTE Confidence: 0.941259939999999

00:07:20.510 --> 00:07:22.198 And so to kind of reduce our framework

NOTE Confidence: 0.941259939999999

00:07:22.198 --> 00:07:24.542 to be able to make these kinds of

NOTE Confidence: 0.941259939999999

00:07:24.542 --> 00:07:25.790 potential hypothesis and conclusions,

NOTE Confidence: 0.941259939999999

00:07:25.790 --> 00:07:27.841 we focus on a specific element of

NOTE Confidence: 0.941259939999999

00:07:27.841 --> 00:07:29.022 social behavior, social learning.

NOTE Confidence: 0.941259939999999

00:07:29.022 --> 00:07:31.094 It's so critical for animals to be

NOTE Confidence: 0.941259939999999

00:07:31.094 --> 00:07:33.353 able to learn about things in the

NOTE Confidence: 0.941259939999999

00:07:33.353 --> 00:07:34.621 environment that are happening,

NOTE Confidence: 0.941259939999999

00:07:34.630 --> 00:07:36.115 specifically the kinds of things

NOTE Confidence: 0.941259939999999

00:07:36.115 --> 00:07:37.560 that they should avoid, right.

NOTE Confidence: 0.941259939999999

00:07:37.560 --> 00:07:39.310 There's a high cost to certain lessons

NOTE Confidence: 0.941259939999999

00:07:39.310 --> 00:07:41.420 and you want to be able to use the

NOTE Confidence: 0.941259939999999

00:07:41.420 --> 00:07:43.040 experiences of other animals to learn.

NOTE Confidence: 0.941259939999999

00:07:43.040 --> 00:07:44.750 So while this baby element has

NOTE Confidence: 0.941259939999999

00:07:44.750 --> 00:07:45.990 definitely been traumatized,

NOTE Confidence: 0.941259939999999

00:07:45.990 --> 00:07:47.976 it hasn't been physically injured and

NOTE Confidence: 0.941259939999999

00:07:47.976 --> 00:07:50.190 that gives it some a much harder.

NOTE Confidence: 0.941259939999999

00:07:50.190 --> 00:07:51.374 Higher chance of survival.

NOTE Confidence: 0.941259939999999

00:07:51.374 --> 00:07:53.150 And we already knew from experimental

NOTE Confidence: 0.941259939999999

00:07:53.204 --> 00:07:54.686 paradigms in the past that rodents

NOTE Confidence: 0.941259939999999

00:07:54.686 --> 00:07:56.638 will do this, that kind of behavior,

NOTE Confidence: 0.941259939999999

00:07:56.638 --> 00:07:59.074 and you can measure it in a lab setting.

NOTE Confidence: 0.941259939999999

00:07:59.074 --> 00:08:01.185 And we knew that areas like the amygdala

NOTE Confidence: 0.941259939999999

00:08:01.185 --> 00:08:03.509 and the anterior single cortex were involved,

NOTE Confidence: 0.941259939999999

00:08:03.510 --> 00:08:04.746 because if you do something like

NOTE Confidence: 0.941259939999999

00:08:04.746 --> 00:08:06.049 put lidocaine in those regions so

NOTE Confidence: 0.941259939999999

00:08:06.049 --> 00:08:07.144 that they're no longer active,

NOTE Confidence: 0.941259939999999

00:08:07.150 --> 00:08:08.470 animals aren't able to learn.

NOTE Confidence: 0.941259939999999

00:08:08.470 --> 00:08:09.800 And you can see that in this

NOTE Confidence: 0.941259939999999

00:08:09.800 --> 00:08:11.821 white line here where freezing is,

NOTE Confidence: 0.941259939999999

00:08:11.821 --> 00:08:13.776 is on the Y axis.

NOTE Confidence: 0.941259939999999

00:08:13.780 --> 00:08:15.110 So we also knew that in humans

NOTE Confidence: 0.941259939999999

00:08:15.110 --> 00:08:16.060 these same two regions,

NOTE Confidence: 0.941259939999999

00:08:16.060 --> 00:08:17.416 anterior singlet cortex and the mega,

NOTE Confidence: 0.941259939999999

00:08:17.420 --> 00:08:19.240 are involved in social learning and there's

NOTE Confidence: 0.941259939999999

00:08:19.240 --> 00:08:20.939 just showing you one example of that.

NOTE Confidence: 0.941259939999999

00:08:20.940 --> 00:08:22.179 And so let's zoom in a little

NOTE Confidence: 0.941259939999999

00:08:22.179 --> 00:08:23.260 bit on those two regions.

NOTE Confidence: 0.941259939999999

00:08:23.260 --> 00:08:27.450 The cingulate is an area that seems to

NOTE Confidence: 0.941259939999999

00:08:27.450 --> 00:08:29.200 be kind of in between the subcortical

NOTE Confidence: 0.941259939999999

00:08:29.250 --> 00:08:30.750 and cortical regions in certain ways

NOTE Confidence: 0.941259939999999

00:08:30.750 --> 00:08:32.830 and it kind of can be thought of as

NOTE Confidence: 0.941259939999999

00:08:32.830 --> 00:08:34.859 a self other hub that helps to look

NOTE Confidence: 0.941259939999999

00:08:34.859 --> 00:08:36.524 at contingencies in the environment

NOTE Confidence: 0.941259939999999

00:08:36.524 --> 00:08:38.800 and then make appropriate decisions.

NOTE Confidence: 0.941259939999999

00:08:38.800 --> 00:08:41.344 The amygdala again also has some degree of

NOTE Confidence: 0.941259939999999

00:08:41.344 --> 00:08:43.358 homology across different model systems.

NOTE Confidence: 0.941259939999999

00:08:43.360 --> 00:08:45.925 And now we think of it as sort of

NOTE Confidence: 0.941259939999999

00:08:45.925 --> 00:08:48.476 a behavioral hub where appropriate

NOTE Confidence: 0.941259939999999

00:08:48.476 --> 00:08:51.395 actions can be initiated depending on

NOTE Confidence: 0.941259939999999

00:08:51.395 --> 00:08:53.520 the right stimuli and associations.

NOTE Confidence: 0.941259939999999

00:08:53.520 --> 00:08:55.200 And so they seem to be reasons that

NOTE Confidence: 0.941259939999999

00:08:55.200 --> 00:08:57.204 would be important for this kind of behavior.

NOTE Confidence: 0.941259939999999

00:08:57.204 --> 00:08:57.488 OK.

NOTE Confidence: 0.941259939999999

00:08:57.488 --> 00:08:59.476 So we know that they're important for

NOTE Confidence: 0.941259939999999

00:08:59.476 --> 00:09:01.133 social learning in rodents, primates.

NOTE Confidence: 0.941259939999999

00:09:01.133 --> 00:09:04.130 I didn't show you that data and also humans.

NOTE Confidence: 0.941259939999999

00:09:04.130 --> 00:09:06.139 And we knew that they have anatomically

NOTE Confidence: 0.941259939999999

00:09:06.139 --> 00:09:07.530 reciprocal connections to each other.

NOTE Confidence: 0.941259939999999

00:09:07.530 --> 00:09:09.843 And so a large part of my thesis work

NOTE Confidence: 0.941259939999999

00:09:09.843 --> 00:09:11.838 was looking in a specific version

NOTE Confidence: 0.941259939999999

00:09:11.838 --> 00:09:13.926 of social learning in rodents and

NOTE Confidence: 0.941259939999999

00:09:13.926 --> 00:09:16.626 asking how do neurons actually encode

NOTE Confidence: 0.941259939999999

00:09:16.626 --> 00:09:18.138 information during this paradigm.

NOTE Confidence: 0.941259939999999

00:09:18.138 --> 00:09:19.706 So I'll show you what this paradigm

NOTE Confidence: 0.941259939999999

00:09:19.706 --> 00:09:21.354 is because it sets A-frame for the

NOTE Confidence: 0.941259939999999

00:09:21.354 --> 00:09:22.718 some of the analytical tools that

NOTE Confidence: 0.941259939999999

00:09:22.718 --> 00:09:24.518 I'll show you in a little bit.

NOTE Confidence: 0.941259939999999

00:09:24.518 --> 00:09:26.300 And so here an observer mouse

NOTE Confidence: 0.941259939999999

00:09:26.371 --> 00:09:27.727 receives 1 foot shot.

NOTE Confidence: 0.941259939999999

00:09:27.730 --> 00:09:29.415 It's then transferred to a

NOTE Confidence: 0.941259939999999

00:09:29.415 --> 00:09:31.100 plastic floor where it will

NOTE Confidence: 0.90604308125

00:09:31.166 --> 00:09:33.290 no longer receive any foot shocks.

NOTE Confidence: 0.90604308125

00:09:33.290 --> 00:09:34.690 And then a demonstrator mouse who's a cage,

NOTE Confidence: 0.90604308125

00:09:34.690 --> 00:09:37.161 made this place and it goes undergoes

NOTE Confidence: 0.90604308125

00:09:37.161 --> 00:09:39.330 basically Pavlovian cue fear conditioning,

NOTE Confidence: 0.90604308125

00:09:39.330 --> 00:09:40.752 where a cue predicts the delivery

NOTE Confidence: 0.90604308125

00:09:40.752 --> 00:09:42.329 of for shock to that animal.

NOTE Confidence: 0.90604308125

00:09:42.330 --> 00:09:44.031 We can then test that animal on

NOTE Confidence: 0.90604308125

00:09:44.031 --> 00:09:45.979 its own where we just play the cue

NOTE Confidence: 0.90604308125

00:09:45.979 --> 00:09:47.849 and ask does it freeze to that cue.

NOTE Confidence: 0.90604308125

00:09:47.850 --> 00:09:49.614 If it does, we're saying it learned

NOTE Confidence: 0.90604308125

00:09:49.614 --> 00:09:50.668 that association through the

NOTE Confidence: 0.90604308125

00:09:50.668 --> 00:09:51.928 experience of the other animals.

NOTE Confidence: 0.90604308125

00:09:51.930 --> 00:09:52.968 We did a number of controls.

NOTE Confidence: 0.90604308125

00:09:52.970 --> 00:09:54.965 I won't show you to really convince

NOTE Confidence: 0.90604308125

00:09:54.965 --> 00:09:57.037 ourselves that that is indeed what was

NOTE Confidence: 0.90604308125

00:09:57.037 --> 00:09:58.890 happening at the behavioral level. OK.

NOTE Confidence: 0.90604308125

00:09:58.890 --> 00:10:00.642 So now we wanted to record from these

NOTE Confidence: 0.90604308125

00:10:00.642 --> 00:10:01.887 neurons using in vivo electrophysiology

NOTE Confidence: 0.90604308125

00:10:01.887 --> 00:10:03.405 to ask what are they doing,

NOTE Confidence: 0.90604308125

00:10:03.410 --> 00:10:04.810 doing this kind of task.

NOTE Confidence: 0.90604308125

00:10:04.810 --> 00:10:06.520 And we'll add this period called

NOTE Confidence: 0.90604308125

00:10:06.520 --> 00:10:08.338 habituation here in the Gray where

NOTE Confidence: 0.90604308125

00:10:08.338 --> 00:10:10.210 we're giving cues to the demonstrator,

NOTE Confidence: 0.90604308125

00:10:10.210 --> 00:10:12.328 but they don't predict anything happening.

NOTE Confidence: 0.90604308125

00:10:12.330 --> 00:10:14.087 And so those cues have no meaning.

NOTE Confidence: 0.90604308125

00:10:14.090 --> 00:10:15.415 Then we'll start actually paying

NOTE Confidence: 0.90604308125

00:10:15.415 --> 00:10:17.115 them to shock of the demonstrator

NOTE Confidence: 0.90604308125

00:10:17.115 --> 00:10:19.065 and asking how do neurons change

NOTE Confidence: 0.90604308125

00:10:19.065 --> 00:10:20.556 as animals actually learning that

NOTE Confidence: 0.90604308125

00:10:20.556 --> 00:10:22.322 this cue has a predictive value.

NOTE Confidence: 0.90604308125

00:10:22.322 --> 00:10:23.570 And so first,

NOTE Confidence: 0.90604308125

00:10:23.570 --> 00:10:24.834 I just want to give you the sense

NOTE Confidence: 0.90604308125

00:10:24.834 --> 00:10:25.944 these are rasters basically showing

NOTE Confidence: 0.90604308125

00:10:25.944 --> 00:10:27.204 what these neurons are doing,

NOTE Confidence: 0.90604308125

00:10:27.210 --> 00:10:27.783 doing this behavior.

NOTE Confidence: 0.90604308125

00:10:27.783 --> 00:10:29.395 And I just want to show you that

NOTE Confidence: 0.90604308125

00:10:29.395 --> 00:10:30.775 these neurons are responding to the

NOTE Confidence: 0.90604308125

00:10:30.775 --> 00:10:32.464 things that we need for animals to

NOTE Confidence: 0.90604308125

00:10:32.464 --> 00:10:33.360 make these associations, right?

NOTE Confidence: 0.90604308125

00:10:33.360 --> 00:10:35.838 The cue, the shock of the demonstrator.

NOTE Confidence: 0.90604308125

00:10:35.840 --> 00:10:37.265 And some neurons actually even

NOTE Confidence: 0.90604308125

00:10:37.265 --> 00:10:38.120 respond to both.

NOTE Confidence: 0.90604308125

00:10:38.120 --> 00:10:39.960 But I want you to already notice that

NOTE Confidence: 0.90604308125

00:10:39.960 --> 00:10:41.609 the actual sort of even aesthetics

NOTE Confidence: 0.90604308125

00:10:41.609 --> 00:10:43.307 of these waveforms and rasters look

NOTE Confidence: 0.90604308125

00:10:43.364 --> 00:10:45.239 different across the different neurons,

NOTE Confidence: 0.90604308125

00:10:45.240 --> 00:10:46.850 even if they're representing quote,

NOTE Confidence: 0.90604308125

00:10:46.850 --> 00:10:49.140 UN quote, the same thing.

NOTE Confidence: 0.90604308125

00:10:49.140 --> 00:10:51.012 We were really interested in these

NOTE Confidence: 0.90604308125

00:10:51.012 --> 00:10:52.260 neurons that during habituation

NOTE Confidence: 0.90604308125

00:10:52.313 --> 00:10:54.700 seemed to not really have a strong

NOTE Confidence: 0.90604308125

00:10:54.700 --> 00:10:55.820 response to the cue.

NOTE Confidence: 0.90604308125

00:10:55.820 --> 00:10:57.122 But then when animals are actually

NOTE Confidence: 0.90604308125

00:10:57.122 --> 00:10:58.418 learning about the meaning of the cue,

NOTE Confidence: 0.90604308125

00:10:58.420 --> 00:10:59.940 these neurons start to respond.

NOTE Confidence: 0.90604308125

00:10:59.940 --> 00:11:02.140 So these are the kinds of neurons that

NOTE Confidence: 0.90604308125

00:11:02.140 --> 00:11:03.406 might actually represent learning

NOTE Confidence: 0.90604308125

00:11:03.406 --> 00:11:05.066 because they change their response

NOTE Confidence: 0.90604308125

00:11:05.066 --> 00:11:07.359 to the cue as animals are learning.

NOTE Confidence: 0.90604308125

00:11:07.360 --> 00:11:09.583 And so we honed in on these neurons and

NOTE Confidence: 0.90604308125

00:11:09.583 --> 00:11:12.096 we wanted to take a tool from engineering.

NOTE Confidence: 0.90604308125

00:11:12.096 --> 00:11:14.797 This is the same kind of tool that

NOTE Confidence: 0.90604308125

00:11:14.797 --> 00:11:17.118 we use to look at GPS and ask,

NOTE Confidence: 0.90604308125

00:11:17.120 --> 00:11:19.144 can we use this sort of state space

NOTE Confidence: 0.90604308125

00:11:19.144 --> 00:11:20.747 approach to model how neurons are

NOTE Confidence: 0.90604308125

00:11:20.747 --> 00:11:22.680 not just firing at a given trial,

NOTE Confidence: 0.90604308125

00:11:22.680 --> 00:11:25.146 but how they actually change their

NOTE Confidence: 0.90604308125

00:11:25.146 --> 00:11:27.220 firing during this sort of task?

NOTE Confidence: 0.90604308125

00:11:27.220 --> 00:11:29.802 And it also allows us to get some

NOTE Confidence: 0.90604308125

00:11:29.802 --> 00:11:31.854 confidence about what these estimates are.

NOTE Confidence: 0.90604308125

00:11:31.860 --> 00:11:34.380 And so we can take the actual neuronal data,

NOTE Confidence: 0.90604308125

00:11:34.380 --> 00:11:35.460 run it through our model,

NOTE Confidence: 0.90604308125

00:11:35.460 --> 00:11:37.899 and it provides us an estimate at each trial.

NOTE Confidence: 0.90604308125

00:11:37.900 --> 00:11:38.932 And then over time,

NOTE Confidence: 0.90604308125

00:11:38.932 --> 00:11:40.900 we can track how these neurons change.

NOTE Confidence: 0.90604308125

00:11:40.900 --> 00:11:41.620 Just like a G PS:,

NOTE Confidence: 0.90604308125

00:11:41.620 --> 00:11:43.458 can track sort of your trajectory

NOTE Confidence: 0.90604308125

00:11:43.460 --> 00:11:46.540 along a certain a certain path.

NOTE Confidence: 0.90604308125

00:11:46.540 --> 00:11:48.100 So this is for one neuron.

NOTE Confidence: 0.90604308125

00:11:48.100 --> 00:11:50.382 It allows us to identify when do

NOTE Confidence: 0.90604308125

00:11:50.382 --> 00:11:51.780 these neurons actually learn.

NOTE Confidence: 0.90604308125

00:11:51.780 --> 00:11:53.110 But I want you to appreciate here

NOTE Confidence: 0.90604308125

00:11:53.110 --> 00:11:53.680 that when we

NOTE Confidence: 0.924827435333333

00:11:53.726 --> 00:11:55.336 record from multiple different neurons,

NOTE Confidence: 0.924827435333333

00:11:55.340 --> 00:11:57.405 we kind of run into a problem.

NOTE Confidence: 0.924827435333333

00:11:57.410 --> 00:11:59.490 You can look again just looking at the

NOTE Confidence: 0.924827435333333

00:11:59.490 --> 00:12:01.267 waveforms and the rasters that neurons

NOTE Confidence: 0.924827435333333

00:12:01.267 --> 00:12:03.067 that are excited or inhibited don't

NOTE Confidence: 0.924827435333333

00:12:03.125 --> 00:12:04.925 all do that in exactly the same way.

NOTE Confidence: 0.924827435333333

00:12:04.930 --> 00:12:06.610 And so we can take a gross approach and say,

NOTE Confidence: 0.924827435333333

00:12:06.610 --> 00:12:08.045 well, all of these neurons are inhibited,

NOTE Confidence: 0.924827435333333

00:12:08.050 --> 00:12:09.450 all these neurons are excited.

NOTE Confidence: 0.924827435333333

00:12:09.450 --> 00:12:11.459 We can say these neurons have basic

NOTE Confidence: 0.924827435333333

00:12:11.459 --> 00:12:13.729 responses or they have sustained responses.

NOTE Confidence: 0.924827435333333

00:12:13.730 --> 00:12:15.676 But that seems like a very gross

NOTE Confidence: 0.924827435333333

00:12:15.676 --> 00:12:17.567 level of analysis and unlikely to be

NOTE Confidence: 0.924827435333333

00:12:17.567 --> 00:12:19.561 the code that the brain is actually

NOTE Confidence: 0.924827435333333

00:12:19.561 --> 00:12:21.736 using to represent social information.

NOTE Confidence: 0.924827435333333

00:12:21.740 --> 00:12:23.740 If we dig down into each individual neuron,

NOTE Confidence: 0.924827435333333

00:12:23.740 --> 00:12:26.302 then it's also difficult to understand

NOTE Confidence: 0.924827435333333

00:12:26.302 --> 00:12:28.340 how each individual neuron will

NOTE Confidence: 0.924827435333333

00:12:28.340 --> 00:12:29.696 contribute to some sort of code.

NOTE Confidence: 0.924827435333333

00:12:29.700 --> 00:12:31.380 And so the idea that we had was,

NOTE Confidence: 0.924827435333333

00:12:31.380 --> 00:12:33.123 can we take the same kind of

NOTE Confidence: 0.924827435333333

00:12:33.123 --> 00:12:34.380 state space modeling approach,

NOTE Confidence: 0.924827435333333

00:12:34.380 --> 00:12:36.288 but combine it with unsupervised clustering

NOTE Confidence: 0.924827435333333

00:12:36.288 --> 00:12:38.428 approaches so that we can figure out

NOTE Confidence: 0.924827435333333

00:12:38.428 --> 00:12:40.060 in any given population of neurons,

NOTE Confidence: 0.924827435333333

00:12:40.060 --> 00:12:41.854 which ones are actually belonging together

NOTE Confidence: 0.924827435333333

00:12:41.854 --> 00:12:44.338 in terms of how they functional respond?

NOTE Confidence: 0.924827435333333

00:12:44.340 --> 00:12:46.230 Because these might be the putative

NOTE Confidence: 0.924827435333333

00:12:46.230 --> 00:12:47.847 actually units that are encoding

NOTE Confidence: 0.924827435333333

00:12:47.847 --> 00:12:49.641 the kind of information that the

NOTE Confidence: 0.924827435333333

00:12:49.641 --> 00:12:50.970 brain needs to encode.

NOTE Confidence: 0.924827435333333

00:12:50.970 --> 00:12:54.587 And so I teamed up with Alexander Lynn and

NOTE Confidence: 0.924827435333333

00:12:54.587 --> 00:12:57.825 and then Baba to create this pipeline for

NOTE Confidence: 0.924827435333333

00:12:57.825 --> 00:13:00.365 creating these functional encoding units.

NOTE Confidence: 0.924827435333333

00:13:00.370 --> 00:13:02.507 And so we can model the rate of each

NOTE Confidence: 0.924827435333333

00:13:02.507 --> 00:13:04.049 neuron like I showed you before.

NOTE Confidence: 0.924827435333333

00:13:04.050 --> 00:13:05.898 Then we're going to use an unsupervised

NOTE Confidence: 0.924827435333333

00:13:05.898 --> 00:13:07.279 clustering approach to figure out

NOTE Confidence: 0.924827435333333

00:13:07.279 --> 00:13:08.644 within this population of neurons,

NOTE Confidence: 0.924827435333333

00:13:08.650 --> 00:13:10.762 which neurons go together in terms

NOTE Confidence: 0.924827435333333

00:13:10.762 --> 00:13:12.170 of how they respond.

NOTE Confidence: 0.924827435333333

00:13:12.170 --> 00:13:14.266 And then this allows us to derive

NOTE Confidence: 0.924827435333333

00:13:14.266 --> 00:13:15.770 what the functional ensembles

NOTE Confidence: 0.924827435333333

00:13:15.770 --> 00:13:17.650 are within a given region.

NOTE Confidence: 0.924827435333333

00:13:17.650 --> 00:13:18.694 So the first thing we wanted

NOTE Confidence: 0.924827435333333

00:13:18.694 --> 00:13:20.210 to do was to test this and say,

NOTE Confidence: 0.924827435333333

00:13:20.210 --> 00:13:21.722 can it actually pull out ensembles

NOTE Confidence: 0.924827435333333

00:13:21.722 --> 00:13:23.688 if we know what the ensembles are?

NOTE Confidence: 0.924827435333333

00:13:23.690 --> 00:13:26.090 So we simulated 50 noisy neurons that we

NOTE Confidence: 0.924827435333333

00:13:26.090 --> 00:13:28.490 know belong to five ground truth clusters.

NOTE Confidence: 0.924827435333333

00:13:28.490 --> 00:13:30.008 Either they don't respond at all,

NOTE Confidence: 0.924827435333333

00:13:30.010 --> 00:13:31.198 they're excited either in

NOTE Confidence: 0.924827435333333

00:13:31.198 --> 00:13:32.683 a sustained or phasic way,

NOTE Confidence: 0.924827435333333

00:13:32.690 --> 00:13:35.567 or they're inhibited either in a sustained,

NOTE Confidence: 0.924827435333333

00:13:35.570 --> 00:13:37.208 yeah, a sustained or phasic way.

NOTE Confidence: 0.924827435333333

00:13:37.210 --> 00:13:39.780 And we want to ask, can this pick it out?

NOTE Confidence: 0.924827435333333

00:13:39.780 --> 00:13:40.620 So before I show you that,

NOTE Confidence: 0.924827435333333

00:13:40.620 --> 00:13:42.044 I just want to give you an example

NOTE Confidence: 0.924827435333333

00:13:42.044 --> 00:13:43.534 of what one of these functional

NOTE Confidence: 0.924827435333333

00:13:43.534 --> 00:13:44.899 encoding units actually look like.

NOTE Confidence: 0.924827435333333

00:13:44.900 --> 00:13:47.620 So this is an Fe from the ACC.

NOTE Confidence: 0.924827435333333

00:13:47.620 --> 00:13:49.364 That's 36 neurons in it and each color

NOTE Confidence: 0.924827435333333

00:13:49.364 --> 00:13:51.058 is an individual neuron and these

NOTE Confidence: 0.924827435333333

00:13:51.058 --> 00:13:53.220 rasters are just overlaid on each other.

NOTE Confidence: 0.924827435333333

00:13:53.220 --> 00:13:54.998 And for those of you familiar with

NOTE Confidence: 0.924827435333333

00:13:54.998 --> 00:13:57.136 looking at this sort of in vivo EFIS data,

NOTE Confidence: 0.924827435333333

00:13:57.140 --> 00:13:59.177 you'll see that it kind of resembles

NOTE Confidence: 0.924827435333333

00:13:59.177 --> 00:14:00.756 what a native neuron excitatory

NOTE Confidence: 0.924827435333333

00:14:00.756 --> 00:14:01.940 response would look like.

NOTE Confidence: 0.924827435333333

00:14:01.940 --> 00:14:02.740 It doesn't look like noise

NOTE Confidence: 0.924827435333333

00:14:02.740 --> 00:14:03.380 or anything like that.

NOTE Confidence: 0.924827435333333

00:14:03.380 --> 00:14:06.196 So this gives us some clue that we we

NOTE Confidence: 0.924827435333333

00:14:06.196 --> 00:14:07.930 might be moving in the right direction.

NOTE Confidence: 0.924827435333333

00:14:07.930 --> 00:14:08.157 OK,

NOTE Confidence: 0.924827435333333

00:14:08.157 --> 00:14:10.200 So what I'm going to show you here on

NOTE Confidence: 0.924827435333333

00:14:10.263 --> 00:14:12.351 the left is in green the parameters for

NOTE Confidence: 0.924827435333333

00:14:12.351 --> 00:14:14.928 each of these ensembles in the ground truth.

NOTE Confidence: 0.924827435333333

00:14:14.930 --> 00:14:16.490 And so these two parameters,

NOTE Confidence: 0.9055412325

00:14:16.490 --> 00:14:17.775 which would be important because

NOTE Confidence: 0.9055412325

00:14:17.775 --> 00:14:19.411 it allows us to actually make

NOTE Confidence: 0.9055412325

00:14:19.411 --> 00:14:20.635 intuitions and hypothesis about

NOTE Confidence: 0.9055412325

00:14:20.635 --> 00:14:22.165 what these ensembles are doing,

NOTE Confidence: 0.9055412325

00:14:22.170 --> 00:14:23.862 are jump and phasicity.

NOTE Confidence: 0.9055412325

00:14:23.862 --> 00:14:28.009 So jump says when a neuron actually responds,

NOTE Confidence: 0.9055412325

00:14:28.010 --> 00:14:30.964 how strong of a response is it,

NOTE Confidence: 0.9055412325

00:14:30.970 --> 00:14:33.930 and phasicity says how sustained.

NOTE Confidence: 0.9055412325

00:14:33.930 --> 00:14:35.298 Or Phasic is responsive,

NOTE Confidence: 0.9055412325

00:14:35.298 --> 00:14:37.342 it's above 5, we'll say that's phasic.

NOTE Confidence: 0.9055412325

00:14:37.342 --> 00:14:38.607 If it's lower than five,

NOTE Confidence: 0.9055412325

00:14:38.610 --> 00:14:40.690 we'll say that that's sustained.

NOTE Confidence: 0.9055412325

00:14:40.690 --> 00:14:42.450 And So what you can see here is

NOTE Confidence: 0.9055412325

00:14:42.450 --> 00:14:44.059 that we're able to actually pull

NOTE Confidence: 0.9055412325

00:14:44.059 --> 00:14:45.727 out each of these five clusters

NOTE Confidence: 0.9055412325

00:14:45.781 --> 00:14:47.249 and estimate the parameters.

NOTE Confidence: 0.9055412325

00:14:47.250 --> 00:14:48.890 The parameter estimates aren't perfect,

NOTE Confidence: 0.9055412325

00:14:48.890 --> 00:14:51.308 but they're close and relatively they

NOTE Confidence: 0.9055412325

00:14:51.308 --> 00:14:53.520 retain the the relationship of the

NOTE Confidence: 0.9055412325

00:14:53.520 --> 00:14:55.380 ensembles and we have a 96% accuracy.

NOTE Confidence: 0.9055412325

00:14:55.380 --> 00:14:57.235 If you actually go into the data

NOTE Confidence: 0.9055412325

00:14:57.235 --> 00:14:59.087 where the algorithm makes a mistake,

NOTE Confidence: 0.9055412325

00:14:59.090 --> 00:14:59.918 it actually.

NOTE Confidence: 0.9055412325

00:14:59.918 --> 00:15:01.790 Has low confidence in that estimate.

NOTE Confidence: 0.9055412325

00:15:01.790 --> 00:15:03.540 And so you could actually intuit

NOTE Confidence: 0.9055412325

00:15:03.540 --> 00:15:05.080 from the covariance matrix that

NOTE Confidence: 0.9055412325

00:15:05.133 --> 00:15:06.876 it might be making a mistake here.

NOTE Confidence: 0.9055412325

00:15:06.880 --> 00:15:09.176 And so this then just gives us

NOTE Confidence: 0.9055412325

00:15:09.176 --> 00:15:10.596 a graphical representation of

NOTE Confidence: 0.9055412325

00:15:10.596 --> 00:15:11.718 that entire population.

NOTE Confidence: 0.9055412325

00:15:11.720 --> 00:15:13.480 And you can see when we pull out the rasters,

NOTE Confidence: 0.9055412325

00:15:13.480 --> 00:15:15.832 we see those five responses inhibited

NOTE Confidence: 0.9055412325

00:15:15.832 --> 00:15:17.720 in aphasic and sustained way,

NOTE Confidence: 0.9055412325

00:15:17.720 --> 00:15:20.079 excited in a sustained and phasic way,

NOTE Confidence: 0.9055412325

00:15:20.080 --> 00:15:20.780 and nonresponsive.

NOTE Confidence: 0.9055412325

00:15:20.780 --> 00:15:22.880 OK, so this is our simulation.

NOTE Confidence: 0.9055412325

00:15:22.880 --> 00:15:23.880 Now we wanted to say,

NOTE Confidence: 0.9055412325

00:15:23.880 --> 00:15:26.022 what can we learn by applying this

NOTE Confidence: 0.9055412325

00:15:26.022 --> 00:15:27.939 sort of method to actual data?

NOTE Confidence: 0.9055412325

00:15:27.940 --> 00:15:29.326 And so we went back to this

NOTE Confidence: 0.9055412325

00:15:29.326 --> 00:15:30.123 social learning experiment that

NOTE Confidence: 0.9055412325

00:15:30.123 --> 00:15:31.344 I told you about and said, OK,

NOTE Confidence: 0.9055412325

00:15:31.344 --> 00:15:33.540 if we take the neurons from the ACC and

NOTE Confidence: 0.9055412325

00:15:33.599 --> 00:15:35.699 the BLA and we cluster them together,

NOTE Confidence: 0.9055412325

00:15:35.700 --> 00:15:37.440 are neurons distributed across

NOTE Confidence: 0.9055412325

00:15:37.440 --> 00:15:39.615 ensembles or do they segregate?

NOTE Confidence: 0.9055412325

00:15:39.620 --> 00:15:41.162 In other words,

NOTE Confidence: 0.9055412325

00:15:41.162 --> 00:15:43.732 do neurons across different regions

NOTE Confidence: 0.9055412325

00:15:43.732 --> 00:15:46.340 actually share firing rate properties?

NOTE Confidence: 0.931738313076923

00:15:48.800 --> 00:15:50.284 And so when we look at the

NOTE Confidence: 0.931738313076923

00:15:50.284 --> 00:15:51.599 neurons in the ACC and BLA,

NOTE Confidence: 0.931738313076923

00:15:51.600 --> 00:15:53.770 indeed what we find is a distributed

NOTE Confidence: 0.931738313076923

00:15:53.770 --> 00:15:55.958 representation where you have these various

NOTE Confidence: 0.931738313076923

00:15:55.958 --> 00:15:57.558 ensembles with different properties,

NOTE Confidence: 0.931738313076923

00:15:57.560 --> 00:15:59.102 but you have neurons from both

NOTE Confidence: 0.931738313076923

00:15:59.102 --> 00:16:01.080 the ACC and the BLA within them.

NOTE Confidence: 0.931738313076923

00:16:01.080 --> 00:16:02.920 Now this makes sense intuitively,

NOTE Confidence: 0.931738313076923

00:16:02.920 --> 00:16:05.076 although no one had shown this before.

NOTE Confidence: 0.931738313076923

00:16:05.080 --> 00:16:06.835 If we think about the fact that these new,

NOTE Confidence: 0.931738313076923

00:16:06.840 --> 00:16:08.392 these regions have reciprocal.

NOTE Confidence: 0.931738313076923

00:16:08.392 --> 00:16:10.332 Anatomical connections with each other,

NOTE Confidence: 0.931738313076923

00:16:10.340 --> 00:16:11.618 and they're both involved in learning.

NOTE Confidence: 0.931738313076923

00:16:11.620 --> 00:16:13.240 One might hypothesize that

NOTE Confidence: 0.931738313076923

00:16:13.240 --> 00:16:14.860 they would share ensembles,

NOTE Confidence: 0.931738313076923

00:16:14.860 --> 00:16:16.150 but we were able to actually

NOTE Confidence: 0.931738313076923

00:16:16.150 --> 00:16:17.619 demonstrate that that is the case here.

NOTE Confidence: 0.931738313076923

00:16:17.620 --> 00:16:18.614 Interestingly, though,

NOTE Confidence: 0.931738313076923

00:16:18.614 --> 00:16:21.944 there's a different sort of distribution of

NOTE Confidence: 0.931738313076923

00:16:21.944 --> 00:16:24.054 that representation between the regions,

NOTE Confidence: 0.931738313076923

00:16:24.060 --> 00:16:26.620 and so you can still see that there's

NOTE Confidence: 0.931738313076923

00:16:26.620 --> 00:16:28.806 some separation in sort of the Fe

NOTE Confidence: 0.931738313076923

00:16:28.806 --> 00:16:30.286 code between these two regions.

NOTE Confidence: 0.931738313076923

00:16:30.290 --> 00:16:32.324 So we wanted to go back into this idea

NOTE Confidence: 0.931738313076923

00:16:32.324 --> 00:16:34.492 of that there's certain neurons in the

NOTE Confidence: 0.931738313076923

00:16:34.492 --> 00:16:36.434 ACC that are actually tracking learning,

NOTE Confidence: 0.931738313076923

00:16:36.434 --> 00:16:38.084 and I showed you sort of

NOTE Confidence: 0.931738313076923

00:16:38.084 --> 00:16:40.369 individual neuron example of that.

NOTE Confidence: 0.931738313076923

00:16:40.370 --> 00:16:43.072 We hypothesize that if this is actually

NOTE Confidence: 0.931738313076923

00:16:43.072 --> 00:16:45.143 picking up real ensemble dynamics,

NOTE Confidence: 0.931738313076923

00:16:45.143 --> 00:16:48.160 it should be able to find some.

NOTE Confidence: 0.931738313076923

00:16:48.160 --> 00:16:48.694 Excuse me,

NOTE Confidence: 0.931738313076923

00:16:48.694 --> 00:16:50.563 It should be able to find some

NOTE Confidence: 0.931738313076923

00:16:50.563 --> 00:16:52.291 differences in learning that occur

NOTE Confidence: 0.931738313076923

00:16:52.291 --> 00:16:53.586 between habituation and conditioning.

NOTE Confidence: 0.931738313076923

00:16:53.586 --> 00:16:54.758 And as a control,

NOTE Confidence: 0.931738313076923

00:16:54.760 --> 00:16:56.840 we basically take all of the same data,

NOTE Confidence: 0.931738313076923

00:16:56.840 --> 00:16:58.640 we divide the sessions the same,

NOTE Confidence: 0.931738313076923

00:16:58.640 --> 00:17:01.160 but we give a false cue to the algorithm.

NOTE Confidence: 0.931738313076923

00:17:01.160 --> 00:17:02.306 So a cue that actually wasn't

NOTE Confidence: 0.931738313076923

00:17:02.306 --> 00:17:02.879 there and asked,

NOTE Confidence: 0.931738313076923

00:17:02.880 --> 00:17:04.712 is it going to still say that something

NOTE Confidence: 0.931738313076923

00:17:04.712 --> 00:17:06.080 happened or not as our control?

NOTE Confidence: 0.931738313076923

00:17:06.080 --> 00:17:08.520 And So what I'm showing you on the left here,

NOTE Confidence: 0.931738313076923

00:17:08.520 --> 00:17:10.732 Gray is the ensemble

NOTE Confidence: 0.931738313076923

00:17:10.732 --> 00:17:12.240 representation doing habituation,

NOTE Confidence: 0.931738313076923

00:17:12.240 --> 00:17:14.240 and in red is conditioning,

NOTE Confidence: 0.931738313076923

00:17:14.240 --> 00:17:15.976 and you can see that there's a shift.

NOTE Confidence: 0.931738313076923

00:17:15.980 --> 00:17:18.241 From this low phasicity space into a

NOTE Confidence: 0.931738313076923

00:17:18.241 --> 00:17:20.294 high phasicity space that occurs during

NOTE Confidence: 0.931738313076923

00:17:20.294 --> 00:17:22.334 learning this idea that neurons are

NOTE Confidence: 0.931738313076923

00:17:22.340 --> 00:17:24.422 kind of tightening their response to

NOTE Confidence: 0.931738313076923

00:17:24.422 --> 00:17:27.060 to the queue and you don't see that

NOTE Confidence: 0.931738313076923

00:17:27.060 --> 00:17:29.496 when you look at the control condition.

NOTE Confidence: 0.931738313076923

00:17:29.500 --> 00:17:31.100 And so if you just break this down

NOTE Confidence: 0.931738313076923

00:17:31.100 --> 00:17:32.780 into a uni dimensional analysis,

NOTE Confidence: 0.931738313076923

00:17:32.780 --> 00:17:35.220 you can see that there is a significant

NOTE Confidence: 0.931738313076923

00:17:35.220 --> 00:17:36.883 difference in the phasicity parameter

NOTE Confidence: 0.931738313076923

00:17:36.883 --> 00:17:39.609 for learning when you look at the actual

NOTE Confidence: 0.931738313076923

00:17:39.609 --> 00:17:41.220 queue versus the the control condition.

NOTE Confidence: 0.931738313076923

00:17:41.220 --> 00:17:43.094 And so we we can use this to

NOTE Confidence: 0.931738313076923

00:17:43.094 --> 00:17:44.588 start looking at the kinds of

NOTE Confidence: 0.931738313076923

00:17:44.588 --> 00:17:45.980 parameters that an ensemble might.

NOTE Confidence: 0.931738313076923

00:17:45.980 --> 00:17:48.580 Be using to represent learning

NOTE Confidence: 0.931738313076923

00:17:48.580 --> 00:17:50.730 as as animals are actually

NOTE Confidence: 0.931738313076923

00:17:50.730 --> 00:17:52.020 behaviorally demonstrating it.

NOTE Confidence: 0.931738313076923

00:17:52.020 --> 00:17:53.812 What's powerful is this is that we

NOTE Confidence: 0.931738313076923

00:17:53.812 --> 00:17:55.597 can then take these parameters and

NOTE Confidence: 0.931738313076923

00:17:55.597 --> 00:17:57.517 begin to form hypothesis about the

NOTE Confidence: 0.931738313076923

00:17:57.517 --> 00:17:59.575 kind of biological or bi physical

NOTE Confidence: 0.931738313076923

00:17:59.575 --> 00:18:01.255 properties that might be necessary

NOTE Confidence: 0.931738313076923

00:18:01.260 --> 00:18:02.820 to undergo this kind of change.

NOTE Confidence: 0.931738313076923

00:18:02.820 --> 00:18:04.956 And so we wanted to actually go into

NOTE Confidence: 0.931738313076923

00:18:04.956 --> 00:18:07.334 the data and see if that might be true.

NOTE Confidence: 0.931738313076923

00:18:07.340 --> 00:18:09.460 And so to look at that we're going

NOTE Confidence: 0.931738313076923

00:18:09.460 --> 00:18:11.436 to use a molecular biology approach

NOTE Confidence: 0.931738313076923

00:18:11.436 --> 00:18:14.150 here which is a a Krylox V system.

NOTE Confidence: 0.931738313076923

00:18:14.150 --> 00:18:17.360 To be able to express channel

NOTE Confidence: 0.931738313076923

00:18:17.360 --> 00:18:19.303 adoption within a specific circuit.

NOTE Confidence: 0.931738313076923

00:18:19.303 --> 00:18:21.049 And here we're looking at the

NOTE Confidence: 0.931738313076923

00:18:21.049 --> 00:18:23.514 anterior singlet neurons that project

NOTE Confidence: 0.931738313076923

00:18:23.514 --> 00:18:25.866 monosynaptically to the amygdala.

NOTE Confidence: 0.931738313076923

00:18:25.870 --> 00:18:27.790 And so we can express channel adoption here.

NOTE Confidence: 0.93824092

00:18:27.790 --> 00:18:28.710 And when we shine light,

NOTE Confidence: 0.93824092

00:18:28.710 --> 00:18:30.186 we see different populations.

NOTE Confidence: 0.93824092

00:18:30.186 --> 00:18:32.400 Neurons that are in this monosynaptic

NOTE Confidence: 0.93824092

00:18:32.461 --> 00:18:33.833 projection show very shortly

NOTE Confidence: 0.93824092

00:18:33.833 --> 00:18:35.548 and see responses to light,

NOTE Confidence: 0.93824092

00:18:35.550 --> 00:18:36.880 whereas neurons that are in

NOTE Confidence: 0.93824092

00:18:36.880 --> 00:18:38.650 this excited network and so they

NOTE Confidence: 0.93824092

00:18:38.650 --> 00:18:40.198 receive either reciprocal feedback.

NOTE Confidence: 0.93824092

00:18:40.200 --> 00:18:43.080 Or collaterals from these excitatory neurons,

NOTE Confidence: 0.93824092

00:18:43.080 --> 00:18:44.485 they show light responses that

NOTE Confidence: 0.93824092

00:18:44.485 --> 00:18:46.360 are a little bit longer latency,

NOTE Confidence: 0.93824092

00:18:46.360 --> 00:18:48.418 and then these inhibited network neurons are

NOTE Confidence: 0.93824092

00:18:48.418 --> 00:18:50.559 within the network but not directly involved,

NOTE Confidence: 0.93824092

00:18:50.560 --> 00:18:51.480 and they show inhibited

NOTE Confidence: 0.93824092

00:18:51.480 --> 00:18:52.400 responses to the light.

NOTE Confidence: 0.93824092

00:18:52.400 --> 00:18:54.440 OK, so we're able to record from neurons,

NOTE Confidence: 0.93824092

00:18:54.440 --> 00:18:56.036 identify where they are in the circuit,

NOTE Confidence: 0.93824092

00:18:56.040 --> 00:18:57.272 and the question is,

NOTE Confidence: 0.93824092

00:18:57.272 --> 00:18:59.590 will we see a difference in our

NOTE Confidence: 0.93824092

00:18:59.590 --> 00:19:01.580 ensemble representation when we are

NOTE Confidence: 0.93824092

00:19:01.580 --> 00:19:03.707 informing it about the anatomical

NOTE Confidence: 0.93824092

00:19:03.707 --> 00:19:07.020 properties of the neurons involved?

NOTE Confidence: 0.93824092

00:19:07.020 --> 00:19:08.455 And so sort of give you the

NOTE Confidence: 0.93824092

00:19:08.455 --> 00:19:09.698 graphical sense of what this is.

NOTE Confidence: 0.93824092

00:19:09.700 --> 00:19:11.086 This is the same population that

NOTE Confidence: 0.93824092

00:19:11.086 --> 00:19:12.606 we were looking at before where

NOTE Confidence: 0.93824092

00:19:12.606 --> 00:19:13.966 there's this low phasicity space

NOTE Confidence: 0.93824092

00:19:13.966 --> 00:19:15.740 that goes away during conditioning.

NOTE Confidence: 0.93824092

00:19:15.740 --> 00:19:17.340 But now we're also looking

NOTE Confidence: 0.93824092

00:19:17.340 --> 00:19:18.620 at the individual neurons,

NOTE Confidence: 0.93824092

00:19:18.620 --> 00:19:20.060 What network are they in?

NOTE Confidence: 0.93824092

00:19:20.060 --> 00:19:22.230 And So what is the distance that

NOTE Confidence: 0.93824092

00:19:22.230 --> 00:19:24.618 they travel as neurons are learning.

NOTE Confidence: 0.93824092

00:19:24.620 --> 00:19:26.156 This is another way of looking at it

NOTE Confidence: 0.93824092

00:19:26.156 --> 00:19:27.870 to just illustrate the point that when

NOTE Confidence: 0.93824092

00:19:27.870 --> 00:19:29.859 we know the network identity of the neurons,

NOTE Confidence: 0.93824092

00:19:29.860 --> 00:19:32.530 we're able to pick out significant

NOTE Confidence: 0.93824092

00:19:32.530 --> 00:19:34.757 differences in the parameters by

NOTE Confidence: 0.93824092

00:19:34.757 --> 00:19:36.752 which they're encoding learning.

NOTE Confidence: 0.93824092

00:19:36.752 --> 00:19:39.954 And here we provide evidence at the

NOTE Confidence: 0.93824092

00:19:39.954 --> 00:19:41.609 ensemble level to the hypothesis

NOTE Confidence: 0.93824092

00:19:41.609 --> 00:19:43.891 that people have had that I actually

NOTE Confidence: 0.93824092

00:19:43.891 --> 00:19:45.534 gabourgic signaling in the cortex

NOTE Confidence: 0.93824092

00:19:45.534 --> 00:19:47.490 and how that is shifting parameter

NOTE Confidence: 0.93824092

00:19:47.490 --> 00:19:49.242 responses that are enabling animals

NOTE Confidence: 0.93824092

00:19:49.242 --> 00:19:51.822 to learn during this sort of process.

NOTE Confidence: 0.93824092

00:19:51.822 --> 00:19:53.542 This ensemble data provides evidence

NOTE Confidence: 0.93824092

00:19:53.542 --> 00:19:54.230 for that,

NOTE Confidence: 0.93824092

00:19:54.230 --> 00:19:55.698 that sort of hypothesis.

NOTE Confidence: 0.93824092

00:19:55.698 --> 00:19:58.421 Could we see the greatest changes in

NOTE Confidence: 0.93824092

00:19:58.421 --> 00:20:00.671 phasicity actually happening within the

NOTE Confidence: 0.93824092

00:20:00.671 --> 00:20:02.980 inhibited network versus the others?

NOTE Confidence: 0.93824092

00:20:02.980 --> 00:20:05.640 And so a major motivation for developing

NOTE Confidence: 0.93824092

00:20:05.640 --> 00:20:08.236 this sort of approach was that it

NOTE Confidence: 0.93824092

00:20:08.236 --> 00:20:11.241 might be a very useful way to begin

NOTE Confidence: 0.93824092

00:20:11.241 --> 00:20:13.093 looking at the translational problem.

NOTE Confidence: 0.93824092

00:20:13.093 --> 00:20:14.948 And that problem is that,

NOTE Confidence: 0.93824092

00:20:14.950 --> 00:20:15.598 you know,

NOTE Confidence: 0.93824092

00:20:15.598 --> 00:20:17.866 we are able to look at behavioral

NOTE Confidence: 0.93824092

00:20:17.870 --> 00:20:19.310 systems across mics,

NOTE Confidence: 0.93824092

00:20:19.310 --> 00:20:20.750 humans and primates,

NOTE Confidence: 0.93824092

00:20:20.750 --> 00:20:21.900 but there's really differences in

NOTE Confidence: 0.93824092

00:20:21.900 --> 00:20:23.604 the ways in which they can behave

NOTE Confidence: 0.93824092

00:20:23.604 --> 00:20:24.869 and we're looking and searching.

NOTE Confidence: 0.93824092

00:20:24.870 --> 00:20:26.568 I'm collaborating with Steve China to

NOTE Confidence: 0.93824092

00:20:26.568 --> 00:20:28.698 really think about ways that one might

NOTE Confidence: 0.93824092

00:20:28.698 --> 00:20:29.958 develop social behavioral experiments

NOTE Confidence: 0.93824092

00:20:29.958 --> 00:20:32.390 that can go across a model systems.

NOTE Confidence: 0.93824092

00:20:32.390 --> 00:20:32.694 However,

NOTE Confidence: 0.93824092

00:20:32.694 --> 00:20:33.910 for humans and primates,

NOTE Confidence: 0.93824092

00:20:33.910 --> 00:20:36.136 we can actually design one to one

NOTE Confidence: 0.93824092

00:20:36.136 --> 00:20:37.392 human behavioral paradigms and

NOTE Confidence: 0.93824092

00:20:37.392 --> 00:20:39.107 I'll show you an example of that.

NOTE Confidence: 0.93824092

00:20:39.110 --> 00:20:41.060 We can get different kinds of

NOTE Confidence: 0.93824092

00:20:41.060 --> 00:20:42.360 neurophysiology data across these

NOTE Confidence: 0.93824092

00:20:42.412 --> 00:20:44.540 different model systems and that has led

NOTE Confidence: 0.93824092

00:20:44.540 --> 00:20:46.587 to different sorts of ways of analyzing.

NOTE Confidence: 0.93824092

00:20:46.590 --> 00:20:47.590 And we're hoping that this

NOTE Confidence: 0.93824092

00:20:47.590 --> 00:20:48.590 sort of states based approach,

NOTE Confidence: 0.93824092

00:20:48.590 --> 00:20:51.122 because it allows you to take

NOTE Confidence: 0.93824092

00:20:51.122 --> 00:20:53.347 neural observations and then derive

NOTE Confidence: 0.93824092

00:20:53.347 --> 00:20:55.572 actual state formulations for how

NOTE Confidence: 0.93824092

00:20:55.572 --> 00:20:57.308 population activity is changing,

NOTE Confidence: 0.93824092

00:20:57.310 --> 00:20:59.123 might provide a window to be able

NOTE Confidence: 0.93824092

00:20:59.123 --> 00:21:00.791 to ask across different model

NOTE Confidence: 0.93824092

00:21:00.791 --> 00:21:02.861 systems and different kinds of

NOTE Confidence: 0.93824092

00:21:02.861 --> 00:21:04.717 neuronal representations how animals

NOTE Confidence: 0.93824092

00:21:04.717 --> 00:21:07.162 representing social information and so.

NOTE Confidence: 0.93824092

00:21:07.162 --> 00:21:08.108 Towards this,

NOTE Confidence: 0.93824092

00:21:08.110 --> 00:21:09.094 I won't talk about the human

NOTE Confidence: 0.93824092

00:21:09.094 --> 00:21:09.750 side of this today,

NOTE Confidence: 0.93824092

00:21:09.750 --> 00:21:12.070 but I wanted to show you some of the work

NOTE Confidence: 0.93824092

00:21:12.130 --> 00:21:13.354 we're doing with primate

NOTE Confidence: 0.93824092

00:21:13.354 --> 00:21:15.190 data to apply this this tool.

NOTE Confidence: 0.93824092

00:21:15.190 --> 00:21:16.150 And so like I showed you,

NOTE Confidence: 0.93824092

00:21:16.150 --> 00:21:17.890 Steve Chang has developed this

NOTE Confidence: 0.93824092

00:21:17.890 --> 00:21:19.518 model where primates can look at

NOTE Confidence: 0.93824092

00:21:19.518 --> 00:21:21.278 each other or an object while he's

NOTE Confidence: 0.93824092

00:21:21.278 --> 00:21:22.838 recording from these different brain

NOTE Confidence: 0.93824092

00:21:22.838 --> 00:21:24.920 regions and importantly 2 of the same

NOTE Confidence: 0.93824092

00:21:24.920 --> 00:21:26.230 regions that we're interested in,

NOTE Confidence: 0.93824092

00:21:26.230 --> 00:21:30.829 the anti single cortex and the amygdala.

NOTE Confidence: 0.93824092

00:21:30.830 --> 00:21:32.573 He published this paper in Neuron where

NOTE Confidence: 0.93824092

00:21:32.573 --> 00:21:34.127 they're able to look at individual

NOTE Confidence: 0.93824092

00:21:34.127 --> 00:21:35.898 neuro responses and show a variety of

NOTE Confidence: 0.93824092

00:21:35.951 --> 00:21:37.983 ways in which neurons are responding to face.

NOTE Confidence: 0.93824092

00:21:37.990 --> 00:21:39.710 Eyes are object, but again,

NOTE Confidence: 0.93824092

00:21:39.710 --> 00:21:42.986 they have to really start to define a neuron

NOTE Confidence: 0.93824092

00:21:42.986 --> 00:21:46.607 as responding to face or object or eyes and.

NOTE Confidence: 0.93824092

00:21:46.610 --> 00:21:48.227 They're missing a lot of the nuances

NOTE Confidence: 0.93824092

00:21:48.227 --> 00:21:49.889 that are happening at the ensemble level,

NOTE Confidence: 0.93824092

00:21:49.890 --> 00:21:51.170 even though they're able to

NOTE Confidence: 0.93824092

00:21:51.170 --> 00:21:52.825 describe at the single unit level

NOTE Confidence: 0.93824092

00:21:52.825 --> 00:21:54.129 what's happening really well.

NOTE Confidence: 0.93824092

00:21:54.130 --> 00:21:56.010 And so we wanted to apply it to this data.

NOTE Confidence: 0.93824092

00:21:56.010 --> 00:21:57.624 And here's an example from the

NOTE Confidence: 0.93824092

00:21:57.624 --> 00:21:58.700 anterior singlet cortex where

NOTE Confidence: 0.93824092

00:21:58.745 --> 00:22:00.089 we see some things that again,

NOTE Confidence: 0.93824092

00:22:00.090 --> 00:22:01.203 intuitively make sense.

NOTE Confidence: 0.93824092

00:22:01.203 --> 00:22:03.058 There's some overlap between the

NOTE Confidence: 0.93824092

00:22:03.058 --> 00:22:05.010 face and eyes representation,

NOTE Confidence: 0.93824092

00:22:05.010 --> 00:22:06.810 although there's some places where

NOTE Confidence: 0.93824092

00:22:06.810 --> 00:22:08.250 we have segregated ensembles,

NOTE Confidence: 0.93824092

00:22:08.250 --> 00:22:09.447 And when we look at the object,

NOTE Confidence: 0.93824092

00:22:09.450 --> 00:22:11.770 we see that it's really sort of spatially

NOTE Confidence: 0.93824092

00:22:11.770 --> 00:22:15.750 distinct from the other representations.

NOTE Confidence: 0.93824092

00:22:15.750 --> 00:22:17.455 And again we can look at this at at

NOTE Confidence: 0.93824092

00:22:17.455 --> 00:22:19.265 the uni in the uni dimensional way

NOTE Confidence: 0.93824092

00:22:19.265 --> 00:22:21.220 and see that there's these trends to

NOTE Confidence: 0.93824092

00:22:21.220 --> 00:22:22.978 for these parameters to be different

NOTE Confidence: 0.93824092

00:22:22.978 --> 00:22:24.789 when animals are looking at social

NOTE Confidence: 0.93824092

00:22:24.789 --> 00:22:26.547 stimuli versus on non social stimuli.

NOTE Confidence: 0.93824092

00:22:26.550 --> 00:22:29.084 And we've now applied this to various

NOTE Confidence: 0.93824092

00:22:29.084 --> 00:22:30.910 regions including the dorsomedia,

NOTE Confidence: 0.93824092

00:22:30.910 --> 00:22:33.390 prefrontal cortex and the OFC.

NOTE Confidence: 0.93824092

00:22:33.390 --> 00:22:34.825 And again you begin to see that

NOTE Confidence: 0.93824092

00:22:34.825 --> 00:22:36.184 there might be different strategies

NOTE Confidence: 0.93824092

00:22:36.184 --> 00:22:37.924 where there's much more segregation

NOTE Confidence: 0.93824092

00:22:37.924 --> 00:22:39.584 in the representation between the

NOTE Confidence: 0.93824092

00:22:39.584 --> 00:22:41.009 ACC and the dorsomedio prefrontal

NOTE Confidence: 0.93824092

00:22:41.009 --> 00:22:42.572 cortex where there might be more

NOTE Confidence: 0.93824092

00:22:42.572 --> 00:22:44.548 overlap in the area like the amygdala

NOTE Confidence: 0.93824092

00:22:44.550 --> 00:22:45.750 or the orbital frontal cortex.

NOTE Confidence: 0.93824092

00:22:45.750 --> 00:22:48.742 And so we can kind of derive hypothesis

NOTE Confidence: 0.93824092

00:22:48.742 --> 00:22:51.138 about what this might mean and how

NOTE Confidence: 0.93824092

00:22:51.138 --> 00:22:53.040 these sorts of parameters across model

NOTE Confidence: 0.93824092

00:22:53.099 --> 00:22:55.001 systems are changing as animals are

NOTE Confidence: 0.93824092

00:22:55.001 --> 00:22:57.143 engaged in these sort of social behaviors.

NOTE Confidence: 0.93824092

00:22:57.143 --> 00:22:59.334 And so I've shown you some behavioral

NOTE Confidence: 0.93824092

00:22:59.334 --> 00:23:01.368 data in rodents and some behavioral

NOTE Confidence: 0.93824092

00:23:01.368 --> 00:23:03.755 data in non human primates where we're

NOTE Confidence: 0.93824092

00:23:03.755 --> 00:23:05.946 able to record from neurons as animals

NOTE Confidence: 0.93824092

00:23:05.946 --> 00:23:07.956 are engaged in social behavior and

NOTE Confidence: 0.93824092

00:23:07.956 --> 00:23:10.020 have now derived a new analytical

NOTE Confidence: 0.93824092

00:23:10.090 --> 00:23:12.547 approach that lets us know from these

NOTE Confidence: 0.93824092

00:23:12.547 --> 00:23:15.138 recordings what are the groups of ensembles.

NOTE Confidence: 0.93824092

00:23:15.140 --> 00:23:17.006 We can assign parameters to ensembles

NOTE Confidence: 0.93824092

00:23:17.006 --> 00:23:19.419 and then use that to begin better

NOTE Confidence: 0.93824092

00:23:19.419 --> 00:23:21.259 understanding how brains across model

NOTE Confidence: 0.93824092

00:23:21.259 --> 00:23:23.700 systems are are representing information.

NOTE Confidence: 0.93824092

00:23:23.700 --> 00:23:25.650 We think that this will be

NOTE Confidence: 0.93824092

00:23:25.650 --> 00:23:27.414 important for for translation.

NOTE Confidence: 0.93824092

00:23:27.414 --> 00:23:28.848 In the future.

NOTE Confidence: 0.93824092

00:23:28.850 --> 00:23:32.010 So I want to thank all of my mentors

NOTE Confidence: 0.93824092

00:23:32.010 --> 00:23:32.930 here in the department.

NOTE Confidence: 0.93824092

00:23:32.930 --> 00:23:34.880 This again has been really an

NOTE Confidence: 0.93824092

00:23:34.880 --> 00:23:35.986 amazing place to train.

NOTE Confidence: 0.93824092

00:23:35.986 --> 00:23:39.689 I feel really grateful to be able to

NOTE Confidence: 0.93824092

00:23:39.690 --> 00:23:42.610 to be here and to continue to think

NOTE Confidence: 0.93824092

00:23:42.610 --> 00:23:44.850 critically with everyone about how we

NOTE Confidence: 0.93824092

00:23:44.850 --> 00:23:47.490 can progress and evolve our community.

NOTE Confidence: 0.93824092

00:23:47.490 --> 00:23:51.096 And then my collaborator Steve Chang Demba,

NOTE Confidence: 0.93824092

00:23:51.096 --> 00:23:53.274 my PhD advisor,

NOTE Confidence: 0.93824092

00:23:53.274 --> 00:23:56.180 K Tai and.

NOTE Confidence: 0.93824092

00:23:56.180 --> 00:23:57.450 Many people have been able

NOTE Confidence: 0.93824092

00:23:57.450 --> 00:23:58.720 to work with me while

NOTE Confidence: 0.9164979875

00:23:58.776 --> 00:24:00.258 I was here and really enable

NOTE Confidence: 0.928177632

00:24:00.500 --> 00:24:03.620 a lot of this work. So thank you all

NOTE Confidence: 0.928177632

00:24:03.620 --> 00:24:05.060 for listening and I appreciate it.

NOTE Confidence: 0.932333685

00:24:25.680 --> 00:24:27.936 I was wondering since you see most of

NOTE Confidence: 0.932333685

00:24:27.936 --> 00:24:30.107 the changes at least in these brain

NOTE Confidence: 0.932333685

00:24:30.107 --> 00:24:32.258 areas and phasicity and you have that

NOTE Confidence: 0.932333685

00:24:32.258 --> 00:24:34.088 baseline change between the excited

NOTE Confidence: 0.932333685

00:24:34.088 --> 00:24:36.616 and the inhibited in terms of jump.

NOTE Confidence: 0.932333685

00:24:36.620 --> 00:24:39.360 What what would you predict

NOTE Confidence: 0.932333685

00:24:39.360 --> 00:24:40.700 across other brain regions?

NOTE Confidence: 0.932333685

00:24:40.700 --> 00:24:42.120 Is phasicity the thing that

NOTE Confidence: 0.932333685

00:24:42.120 --> 00:24:43.540 would change most with learning?

NOTE Confidence: 0.932333685

00:24:43.540 --> 00:24:44.780 Is jump more stable?

NOTE Confidence: 0.932333685

00:24:44.780 --> 00:24:47.020 What would it take to change jump?

NOTE Confidence: 0.94931066

00:24:48.260 --> 00:24:50.708 Those are exactly the kinds of

NOTE Confidence: 0.94931066

00:24:50.708 --> 00:24:52.340 questions that we're asking.

NOTE Confidence: 0.94931066

00:24:52.340 --> 00:24:54.470 Phasicity seems like it might be

NOTE Confidence: 0.94931066

00:24:54.470 --> 00:24:55.890 a really interesting parameter

NOTE Confidence: 0.94931066

00:24:55.947 --> 00:24:57.297 when we think about how.

NOTE Confidence: 0.94931066

00:24:57.300 --> 00:24:59.210 Neurons might use things like

NOTE Confidence: 0.94931066

00:24:59.210 --> 00:25:00.738 oscillations to communicate information.

NOTE Confidence: 0.94931066

00:25:00.740 --> 00:25:02.580 And so in shifting phasicity,

NOTE Confidence: 0.94931066

00:25:02.580 --> 00:25:04.165 you might better enable neurons

NOTE Confidence: 0.94931066

00:25:04.165 --> 00:25:06.334 within a certain ensemble to be able

NOTE Confidence: 0.94931066

00:25:06.334 --> 00:25:07.918 to oscillate at a certain frequency

NOTE Confidence: 0.94931066

00:25:07.918 --> 00:25:10.978 or get inputs at a certain timing.

NOTE Confidence: 0.94931066

00:25:10.980 --> 00:25:14.130 Whereas jump might be more defined by

NOTE Confidence: 0.94931066

00:25:14.130 --> 00:25:17.380 sort of what kinds of ion channels you have,

NOTE Confidence: 0.94931066

00:25:17.380 --> 00:25:18.780 how you know great of

NOTE Confidence: 0.936899133333333

00:25:19.380 --> 00:25:20.736 and how many spikes can you

NOTE Confidence: 0.937728247222222

00:25:21.180 --> 00:25:22.923 generate. And so some of what we're

NOTE Confidence: 0.937728247222222

00:25:22.923 --> 00:25:25.100 going to do actually is to use

NOTE Confidence: 0.937728247222222

00:25:25.100 --> 00:25:26.476 optogenetics to actually entrain.

NOTE Confidence: 0.937728247222222

00:25:26.480 --> 00:25:27.520 Different circuits at specific

NOTE Confidence: 0.937728247222222

00:25:27.520 --> 00:25:29.666 frequencies and ask how does that change

NOTE Confidence: 0.937728247222222

00:25:29.666 --> 00:25:31.746 and shift the phasicity parameter?

NOTE Confidence: 0.937728247222222

00:25:31.746 --> 00:25:33.558 If we over expressed time adoption,

NOTE Confidence: 0.937728247222222

00:25:33.560 --> 00:25:35.478 how does that shift the jump parameter

NOTE Confidence: 0.937728247222222

00:25:35.478 --> 00:25:37.528 to really start getting at this question

NOTE Confidence: 0.937728247222222

00:25:37.528 --> 00:25:39.346 of how are these parameters directly

NOTE Confidence: 0.937728247222222

00:25:39.346 --> 00:25:41.200 related to biophysical properties

NOTE Confidence: 0.844705651666667

00:25:41.200 --> 00:25:42.556 of the ensembles, which I think

NOTE Confidence: 0.943128802857143

00:25:42.560 --> 00:25:44.317 is probably one of the most exciting

NOTE Confidence: 0.943128802857143

00:25:44.320 --> 00:25:45.400 ways this could be helpful.

NOTE Confidence: 0.9201268

00:25:51.840 --> 00:25:53.520 I was really struck in the earlier

NOTE Confidence: 0.94226628

00:25:53.520 --> 00:25:56.304 slide by the effect where it seemed

NOTE Confidence: 0.94226628

00:25:56.304 --> 00:25:58.248 that the intrasingulate response

NOTE Confidence: 0.94226628

00:25:58.248 --> 00:26:00.870 to the observed cue was much more

NOTE Confidence: 0.94226628

00:26:00.870 --> 00:26:02.705 sustained as compared with the BLA

NOTE Confidence: 0.94226628

00:26:02.705 --> 00:26:04.796 and I think the similar thing has

NOTE Confidence: 0.94226628

00:26:04.796 --> 00:26:06.516 been observed in predator threat.

NOTE Confidence: 0.94226628

00:26:06.520 --> 00:26:08.560 So I I just was curious your

NOTE Confidence: 0.941511525

00:26:08.560 --> 00:26:10.800 speculation as to why there is a sustained

NOTE Confidence: 0.96289625

00:26:10.800 --> 00:26:12.280 response in prefrontal cortical

NOTE Confidence: 0.96289625

00:26:12.280 --> 00:26:13.760 circuits to these aversive

NOTE Confidence: 0.96289625

00:26:13.760 --> 00:26:15.160 or socially aversive stimuli?

NOTE Confidence: 0.942668816

00:26:17.330 --> 00:26:18.704 Actually this question is part of

NOTE Confidence: 0.942668816

00:26:18.704 --> 00:26:20.030 what got me interested in this

NOTE Confidence: 0.942668816

00:26:20.030 --> 00:26:21.134 work like looking at in vivo

NOTE Confidence: 0.942668816

00:26:21.134 --> 00:26:22.460 data and seeing that there's some

NOTE Confidence: 0.942668816

00:26:22.460 --> 00:26:24.410 new other seem very sustained,

NOTE Confidence: 0.942668816

00:26:24.410 --> 00:26:26.090 some that seem very basic.

NOTE Confidence: 0.942668816

00:26:26.090 --> 00:26:28.238 It's like what is the different

NOTE Confidence: 0.942668816

00:26:28.238 --> 00:26:29.670 strategy for representation that

NOTE Confidence: 0.942668816

00:26:29.734 --> 00:26:31.750 And so one idea I think is that the

NOTE Confidence: 0.942668816

00:26:31.750 --> 00:26:33.689 more sustained firing is how the

NOTE Confidence: 0.942668816

00:26:33.690 --> 00:26:35.830 brain might represent state shifts.

NOTE Confidence: 0.942668816

00:26:35.830 --> 00:26:38.256 So now I'm in an aversive state or

NOTE Confidence: 0.942668816

00:26:38.256 --> 00:26:40.446 now I need to attend to the state

NOTE Confidence: 0.942668816

00:26:40.450 --> 00:26:42.202 of this other animal that might

NOTE Confidence: 0.942668816

00:26:42.202 --> 00:26:43.782 be better represented by something

NOTE Confidence: 0.942668816

00:26:43.782 --> 00:26:45.700 that has like a very sustained.

NOTE Confidence: 0.942668816

00:26:45.700 --> 00:26:49.180 Property, while a stimuli that comes

NOTE Confidence: 0.937157104615385

00:26:49.180 --> 00:26:50.750 on or off or that comes in and out of

NOTE Confidence: 0.937157104615385

00:26:50.801 --> 00:26:52.188 attention might better be represented

NOTE Confidence: 0.937157104615385

00:26:52.188 --> 00:26:55.260 by sort of more phasic property

NOTE Confidence: 0.951323285

00:26:55.260 --> 00:26:56.700 and that's something that we can

NOTE Confidence: 0.951323285

00:26:56.700 --> 00:26:57.820 like actually directly test. Thank

NOTE Confidence: 0.93019015

00:27:03.900 --> 00:27:04.100 you.

NOTE Confidence: 0.917718008

00:27:06.300 --> 00:27:08.028 Any other questions? No.

NOTE Confidence: 0.917718008

00:27:08.028 --> 00:27:10.548 OK, we will move on then.

NOTE Confidence: 0.917718008

00:27:10.548 --> 00:27:13.020 Thank you a CA for a great presentation.

NOTE Confidence: 0.933544566666667

00:27:18.880 --> 00:27:21.640 So our next tree is there.

NOTE Confidence: 0.933544566666667

00:27:21.640 --> 00:27:23.285 Jefferson is a wonderful rising

NOTE Confidence: 0.933544566666667

00:27:23.285 --> 00:27:25.270 third year resident Alex Pond is

NOTE Confidence: 0.933544566666667

00:27:25.270 --> 00:27:28.559 going to introduce her over Zoom.

NOTE Confidence: 0.933544566666667

00:27:28.560 --> 00:27:31.800 So I think Alex, if you're able to,

NOTE Confidence: 0.9402535

00:27:37.640 --> 00:27:39.560 yeah. Are we ready? It works.

NOTE Confidence: 0.928752467142857

00:27:44.720 --> 00:27:46.876 Yeah, we can see. I hear you.

NOTE Confidence: 0.928752467142857

00:27:46.880 --> 00:27:48.700 That's. I'm on my. I

NOTE Confidence: 0.880673145

00:27:52.300 --> 00:27:53.338 just have to end this show.

NOTE Confidence: 0.9330654

00:27:57.580 --> 00:28:00.660 We'll do it like this for now.

NOTE Confidence: 0.9330654

00:28:00.660 --> 00:28:04.500 OK. You're good. Alex. Go ahead.

NOTE Confidence: 0.9330654

00:28:04.500 --> 00:28:06.820 OK. Yeah. It is a pleasure

NOTE Confidence: 0.962896185

00:28:06.820 --> 00:28:09.820 to introduce Sarah Jefferson.

NOTE Confidence: 0.962896185

00:28:09.820 --> 00:28:11.740 Sarah received her MD,

NOTE Confidence: 0.962896185

00:28:11.740 --> 00:28:13.660 PhD from Penn State.

NOTE Confidence: 0.962896185

00:28:13.660 --> 00:28:14.896 She came to Yale.

NOTE Confidence: 0.962896185

00:28:14.896 --> 00:28:16.441 About three years ago to

NOTE Confidence: 0.962896185

00:28:16.441 --> 00:28:18.370 start her residency with NRTP.

NOTE Confidence: 0.946962475

00:28:19.250 --> 00:28:20.690 Yeah, I remember when we recruited

NOTE Confidence: 0.945285244

00:28:20.690 --> 00:28:22.190 her, everyone was very thrilled

NOTE Confidence: 0.945285244

00:28:22.190 --> 00:28:23.690 because of her PhD work,

NOTE Confidence: 0.945285244

00:28:23.690 --> 00:28:25.766 which involved a series of very

NOTE Confidence: 0.945285244

00:28:25.766 --> 00:28:27.976 elegant study on how GABA ergic

NOTE Confidence: 0.945285244

00:28:27.976 --> 00:28:30.250 in the neurons is involved with

NOTE Confidence: 0.945285244

00:28:30.250 --> 00:28:32.609 depression and antidepressant actions.

NOTE Confidence: 0.945285244

00:28:32.610 --> 00:28:34.416 And there's obviously a long history

NOTE Confidence: 0.945285244

00:28:34.416 --> 00:28:36.089 on this research topic at Yale,

NOTE Confidence: 0.945285244

00:28:36.090 --> 00:28:37.875 starting from work with John

NOTE Confidence: 0.945285244

00:28:37.875 --> 00:28:40.030 Crystal and Peter Muharram And then.

NOTE Confidence: 0.945285244

00:28:40.030 --> 00:28:41.934 Later on on Ron Duman and then

NOTE Confidence: 0.945285244

00:28:41.934 --> 00:28:43.229 more recently myself as well.

NOTE Confidence: 0.945285244

00:28:43.230 --> 00:28:45.400 So it's very exciting to see that

NOTE Confidence: 0.945285244

00:28:45.400 --> 00:28:47.690 Sarah can carry this torch and then

NOTE Confidence: 0.945285244

00:28:47.690 --> 00:28:49.628 also move it to new directions.

NOTE Confidence: 0.945285244

00:28:49.630 --> 00:28:51.222 Sarah's current research focused

NOTE Confidence: 0.945285244

00:28:51.222 --> 00:28:52.814 on the potential therapeutic

NOTE Confidence: 0.945285244

00:28:52.814 --> 00:28:54.390 effects of psychedelics.

NOTE Confidence: 0.945285244

00:28:54.390 --> 00:28:56.750 So today, as you see in the title,

NOTE Confidence: 0.945285244

00:28:56.750 --> 00:28:59.434 she'll talk about her work on one

NOTE Confidence: 0.945285244

00:28:59.434 --> 00:29:02.248 of the more classic but also lesser

NOTE Confidence: 0.945285244

00:29:02.248 --> 00:29:05.246 study compound called 5 Methoxy DMT.

NOTE Confidence: 0.945285244

00:29:05.250 --> 00:29:06.475 And I think there's a lot of

NOTE Confidence: 0.945285244

00:29:06.475 --> 00:29:07.441 opportunity with this area, right.

NOTE Confidence: 0.945285244

00:29:07.441 --> 00:29:09.289 And Sarah will tell you more about it.

NOTE Confidence: 0.945285244

00:29:09.290 --> 00:29:11.265 But this compound has several

NOTE Confidence: 0.945285244

00:29:11.265 --> 00:29:12.450 very fascinating properties.

NOTE Confidence: 0.945285244

00:29:12.450 --> 00:29:15.308 Its effect is very short lasting in humans.

NOTE Confidence: 0.945285244

00:29:15.308 --> 00:29:17.191 It only lasts for on the order

NOTE Confidence: 0.945285244

00:29:17.191 --> 00:29:18.448 of 10s of minutes.

NOTE Confidence: 0.945285244

00:29:18.450 --> 00:29:20.210 And then the subjective experience

NOTE Confidence: 0.945285244

00:29:20.210 --> 00:29:21.970 also very intense and nonvisual,

NOTE Confidence: 0.945285244

00:29:21.970 --> 00:29:23.890 very unlike other psychedelics

NOTE Confidence: 0.945285244

00:29:23.890 --> 00:29:25.810 like psilocybin and LSC.

NOTE Confidence: 0.945285244

00:29:25.810 --> 00:29:28.242 Currently there are a number of phase two

NOTE Confidence: 0.945285244

00:29:28.242 --> 00:29:30.127 clinical trials to study this compound,

NOTE Confidence: 0.945285244

00:29:30.130 --> 00:29:32.146 but there's really not a whole lot

NOTE Confidence: 0.945285244

00:29:32.146 --> 00:29:34.009 known about it in neurobiology.

NOTE Confidence: 0.945285244

00:29:34.010 --> 00:29:35.648 So what Sarah will tell you,

NOTE Confidence: 0.945285244

00:29:35.650 --> 00:29:37.512 I believe is actually one of the

NOTE Confidence: 0.945285244

00:29:37.512 --> 00:29:38.983 first more rigorous published study

NOTE Confidence: 0.945285244

00:29:38.983 --> 00:29:40.518 that actually looks very closely

NOTE Confidence: 0.945285244

00:29:40.518 --> 00:29:42.646 now at what this compound does in

NOTE Confidence: 0.945285244

00:29:42.646 --> 00:29:44.368 terms of its neural and behavioral

NOTE Confidence: 0.945285244

00:29:44.370 --> 00:29:47.650 effects in an animal model.

NOTE Confidence: 0.945285244

00:29:47.650 --> 00:29:49.450 So beyond, you know, just the work itself,

NOTE Confidence: 0.945285244

00:29:49.450 --> 00:29:51.818 I want to mention that, you know,

NOTE Confidence: 0.945285244

00:29:51.818 --> 00:29:53.238 Sarah started this project at

NOTE Confidence: 0.945285244

00:29:53.238 --> 00:29:54.090 a difficult time.

NOTE Confidence: 0.945285244

00:29:54.090 --> 00:29:54.504 I mean,

NOTE Confidence: 0.945285244

00:29:54.504 --> 00:29:56.448 my lab was just about to move and she

NOTE Confidence: 0.945285244

00:29:56.448 --> 00:29:58.344 had to complete all of the things we

NOTE Confidence: 0.945285244

00:29:58.344 --> 00:30:00.248 should tell you actually within a year.

NOTE Confidence: 0.945285244

00:30:00.250 --> 00:30:02.980 So this really shows you.

NOTE Confidence: 0.945285244

00:30:02.980 --> 00:30:06.476 How a sense in terms of his her

NOTE Confidence: 0.945285244

00:30:06.476 --> 00:30:08.260 ability to just lean and execute.

NOTE Confidence: 0.945285244

00:30:08.260 --> 00:30:10.436 She had to learn new methods in terms

NOTE Confidence: 0.945285244

00:30:10.436 --> 00:30:12.737 of using two photon microscopy and then

NOTE Confidence: 0.945285244

00:30:12.737 --> 00:30:15.020 also do all the experiment analysis.

NOTE Confidence: 0.945285244

00:30:15.020 --> 00:30:17.008 She's also extremely innovative

NOTE Confidence: 0.945285244

00:30:17.008 --> 00:30:19.493 now working with Al K,

NOTE Confidence: 0.945285244

00:30:19.500 --> 00:30:22.420 Chris Pinger and Marina Paciotto.

NOTE Confidence: 0.945285244

00:30:22.420 --> 00:30:24.442 She's now trying to combine these

NOTE Confidence: 0.945285244

00:30:24.442 --> 00:30:26.250 microscopy methods with molecular methods.

NOTE Confidence: 0.945285244

00:30:26.250 --> 00:30:28.068 To continue studying 5 MU DMT

NOTE Confidence: 0.945285244

00:30:28.068 --> 00:30:30.210 as well as other psychedelics.

NOTE Confidence: 0.945285244

00:30:30.210 --> 00:30:31.566 So I really look forward to,

NOTE Confidence: 0.945285244

00:30:31.570 --> 00:30:33.802 you know, seeing what should achieve

NOTE Confidence: 0.945285244

00:30:33.802 --> 00:30:35.290 in the coming years.

NOTE Confidence: 0.945285244

00:30:35.290 --> 00:30:36.220 So with that,

NOTE Confidence: 0.945285244

00:30:36.220 --> 00:30:36.530 yeah,

NOTE Confidence: 0.945285244

00:30:36.530 --> 00:30:38.186 Please join me to congratulate

NOTE Confidence: 0.945285244

00:30:38.186 --> 00:30:39.850 and welcome Sarah Jefferson.

NOTE Confidence: 0.945285244

00:30:39.850 --> 00:30:39.930 All

NOTE Confidence: 0.93824085

00:30:48.970 --> 00:30:50.543 right. Thank you so much, Alex.

NOTE Confidence: 0.93824085

00:30:50.543 --> 00:30:58.320 When I get this up, here we go. OK.

NOTE Confidence: 0.93824085

00:30:58.320 --> 00:30:59.648 So you know, first of all, just I,

NOTE Confidence: 0.93824085

00:30:59.648 --> 00:31:01.280 I really want to thank the Lessman family,

NOTE Confidence: 0.93824085

00:31:01.280 --> 00:31:02.276 the Lessman Award Committee.

NOTE Confidence: 0.93824085

00:31:02.276 --> 00:31:04.654 It's such an honor to be here and be able

NOTE Confidence: 0.93824085

00:31:04.654 --> 00:31:06.559 to share this work with all of you today.

NOTE Confidence: 0.93824085

00:31:06.560 --> 00:31:08.975 And it's also an honor to follow

NOTE Confidence: 0.93824085

00:31:08.975 --> 00:31:10.570 such an incredible neuroscience

NOTE Confidence: 0.93824085

00:31:10.570 --> 00:31:13.500 neuroscientist and person as a ZA.

NOTE Confidence: 0.93824085

00:31:13.500 --> 00:31:17.000 So I'm really grateful for this opportunity.

NOTE Confidence: 0.93824085

00:31:17.000 --> 00:31:18.468 So as Alex mentioned,

NOTE Confidence: 0.93824085

00:31:18.468 --> 00:31:21.482 I'm going to be discussing a study that

NOTE Confidence: 0.93824085

00:31:21.482 --> 00:31:24.442 was completed in his lab and I'm now

NOTE Confidence: 0.93824085

00:31:24.442 --> 00:31:27.660 carrying for this work in Al K's group.

NOTE Confidence: 0.93824085

00:31:27.660 --> 00:31:30.271 And it's focused on the short acting

NOTE Confidence: 0.93824085

00:31:30.271 --> 00:31:32.590 psychedelic called 5 Methoxy DMT and

NOTE Confidence: 0.93824085

00:31:32.590 --> 00:31:35.460 its effects on any behaviors and on

NOTE Confidence: 0.93824085

00:31:35.460 --> 00:31:37.498 structural plasticity and mouse models.

NOTE Confidence: 0.93396387125

00:31:41.020 --> 00:31:42.380 In terms of disclosures,

NOTE Confidence: 0.93396387125

00:31:42.380 --> 00:31:45.408 I do have an SRA with Freedom

NOTE Confidence: 0.93396387125

00:31:45.408 --> 00:31:48.188 Biosciences looking at this drug.

NOTE Confidence: 0.93396387125

00:31:48.190 --> 00:31:50.630 So as many people in this room know,

NOTE Confidence: 0.93396387125

00:31:50.630 --> 00:31:52.850 psychedelics have really been the the

NOTE Confidence: 0.93396387125

00:31:52.850 --> 00:31:55.133 focus of this resurgence and interest

NOTE Confidence: 0.93396387125

00:31:55.133 --> 00:31:57.353 in their potential uses as therapeutics

NOTE Confidence: 0.93396387125

00:31:57.353 --> 00:31:59.709 for range of mental health disorders

NOTE Confidence: 0.93396387125

00:31:59.710 --> 00:32:01.828 ranging from mood disorders to PTSD,

NOTE Confidence: 0.93396387125

00:32:01.830 --> 00:32:04.590 substance use disorders and beyond.

NOTE Confidence: 0.93396387125

00:32:04.590 --> 00:32:06.350 And I think you know thorough review of

NOTE Confidence: 0.93396387125

00:32:06.350 --> 00:32:07.987 that topic is beyond our scope today,

NOTE Confidence: 0.93396387125

00:32:07.990 --> 00:32:10.078 but I wanted to point out.

NOTE Confidence: 0.93396387125

00:32:10.080 --> 00:32:12.474 That two of these drugs have now

NOTE Confidence: 0.93396387125

00:32:12.474 --> 00:32:14.628 reached phase three clinical trials and

NOTE Confidence: 0.93396387125

00:32:14.628 --> 00:32:17.212 those are MDMA for PTSD and psilocybin

NOTE Confidence: 0.93396387125

00:32:17.212 --> 00:32:18.836 for treatment resistant depression,

NOTE Confidence: 0.93396387125

00:32:18.840 --> 00:32:22.146 and these are both used in

NOTE Confidence: 0.93396387125

00:32:22.146 --> 00:32:23.799 combination with psychotherapy.

NOTE Confidence: 0.93396387125

00:32:23.800 --> 00:32:25.648 And my interests have,

NOTE Confidence: 0.93396387125

00:32:25.648 --> 00:32:27.034 as Alex said,

NOTE Confidence: 0.93396387125

00:32:27.040 --> 00:32:29.525 been in understanding the neurobiology

NOTE Confidence: 0.93396387125

00:32:29.525 --> 00:32:32.078 of depression in particular and in

NOTE Confidence: 0.93396387125

00:32:32.078 --> 00:32:33.473 the development of novel therapeutics

NOTE Confidence: 0.93396387125

00:32:33.473 --> 00:32:35.360 for treating a resistant depression.

NOTE Confidence: 0.93396387125

00:32:35.360 --> 00:32:37.720 So I'm going to really focus on on

NOTE Confidence: 0.93396387125

00:32:37.720 --> 00:32:39.824 this category called the tryptamine

NOTE Confidence: 0.93396387125

00:32:39.824 --> 00:32:41.756 structural class of psychedelics,

NOTE Confidence: 0.93396387125

00:32:41.760 --> 00:32:43.845 of which psilocybin is probably

NOTE Confidence: 0.93396387125

00:32:43.845 --> 00:32:45.513 the best known member.

NOTE Confidence: 0.93396387125

00:32:45.520 --> 00:32:48.536 But I'm going to be talking more about

NOTE Confidence: 0.93396387125

00:32:48.536 --> 00:32:51.610 this less studied but very interesting

NOTE Confidence: 0.93396387125

00:32:51.610 --> 00:32:53.762 compound called fibrothoxy DMT.

NOTE Confidence: 0.93396387125

00:32:53.770 --> 00:32:55.858 So you know what is the evidence from

NOTE Confidence: 0.93396387125

00:32:55.858 --> 00:32:57.799 the clinical studies look like for the

NOTE Confidence: 0.93396387125

00:32:57.799 --> 00:32:59.578 use of psychedelics in the treatment

NOTE Confidence: 0.93396387125

00:32:59.578 --> 00:33:01.408 of mood disorders in particular.

NOTE Confidence: 0.93396387125

00:33:01.410 --> 00:33:03.433 So there have now been a number

NOTE Confidence: 0.93396387125

00:33:03.433 --> 00:33:05.086 of clinical trials through phase

NOTE Confidence: 0.93396387125

00:33:05.086 --> 00:33:07.270 two and into phase three with

NOTE Confidence: 0.93396387125

00:33:07.270 --> 00:33:08.624 psilocybin assisted psychotherapy

NOTE Confidence: 0.93396387125

00:33:08.624 --> 00:33:10.888 for treatment resistant depression.

NOTE Confidence: 0.93396387125

00:33:10.890 --> 00:33:13.020 And some of the more remarkable

NOTE Confidence: 0.93396387125

00:33:13.020 --> 00:33:15.128 aspects of these these drugs are

NOTE Confidence: 0.93396387125

00:33:15.128 --> 00:33:17.204 their ability to induce a very

NOTE Confidence: 0.93396387125

00:33:17.204 --> 00:33:19.089 rapid antidepressant effect,

NOTE Confidence: 0.93396387125

00:33:19.090 --> 00:33:22.990 so one day after a single dose or two doses.

NOTE Confidence: 0.93396387125

00:33:22.990 --> 00:33:25.945 As well as their enduring benefits and

NOTE Confidence: 0.93396387125

00:33:25.945 --> 00:33:28.785 these vary from study to study a bit,

NOTE Confidence: 0.93396387125

00:33:28.790 --> 00:33:31.110 but the earlier studies showed

NOTE Confidence: 0.93396387125

00:33:31.110 --> 00:33:33.430 antidepressant effects of psilocybin out

NOTE Confidence: 0.93396387125

00:33:33.498 --> 00:33:36.305 to three months following a dosing session.

NOTE Confidence: 0.93396387125

00:33:36.310 --> 00:33:37.326 So that's pretty remarkable.

NOTE Confidence: 0.93396387125

00:33:37.326 --> 00:33:39.179 And even in the phase two COMPASS

NOTE Confidence: 0.93396387125

00:33:39.179 --> 00:33:40.589 trial that I'm showing here,

NOTE Confidence: 0.93396387125

00:33:40.590 --> 00:33:42.844 we do see that the effects continue

NOTE Confidence: 0.93396387125

00:33:42.844 --> 00:33:45.238 to be quite enduring even with

NOTE Confidence: 0.93396387125

00:33:45.238 --> 00:33:46.450 these larger studies.

NOTE Confidence: 0.93396387125

00:33:46.450 --> 00:33:48.620 The drawback with the use of psilocybin

NOTE Confidence: 0.93396387125

00:33:48.620 --> 00:33:50.904 in a clinical setting is that these

NOTE Confidence: 0.93396387125

00:33:50.904 --> 00:33:53.250 dosing sessions take at least six hours.

NOTE Confidence: 0.93396387125

00:33:53.250 --> 00:33:53.862 You know,

NOTE Confidence: 0.93396387125

00:33:53.862 --> 00:33:55.086 they're very labor intensive.

NOTE Confidence: 0.93396387125

00:33:55.090 --> 00:33:56.806 A trained therapist needs to be

NOTE Confidence: 0.93396387125

00:33:56.806 --> 00:33:58.689 with the person the entire time.

NOTE Confidence: 0.93396387125

00:33:58.690 --> 00:34:00.334 So if we're thinking about ways

NOTE Confidence: 0.93396387125

00:34:00.334 --> 00:34:01.725 that we could potentially translate

NOTE Confidence: 0.93396387125

00:34:01.725 --> 00:34:03.447 the use of these to the clinic,

NOTE Confidence: 0.93396387125

00:34:03.450 --> 00:34:06.642 the way in terms of scaling up and

NOTE Confidence: 0.93396387125

00:34:06.642 --> 00:34:08.928 improving access for more patients,

NOTE Confidence: 0.93396387125

00:34:08.930 --> 00:34:12.171 I think looking at a shorter acting

NOTE Confidence: 0.93396387125

00:34:12.171 --> 00:34:14.929 compound does potentially very interesting.

NOTE Confidence: 0.93396387125

00:34:14.930 --> 00:34:16.210 So with that in mind,

NOTE Confidence: 0.93396387125

00:34:16.210 --> 00:34:19.297 I began this work on this short

NOTE Confidence: 0.93396387125

00:34:19.297 --> 00:34:20.620 acting seritinergic psychedelic

NOTE Confidence: 0.93396387125

00:34:20.698 --> 00:34:22.170 called 5 Methoxy DMD.

NOTE Confidence: 0.93396387125

00:34:22.170 --> 00:34:23.248 If you've heard of this at all,

NOTE Confidence: 0.93396387125

00:34:23.250 --> 00:34:25.480 you've probably seen the association

NOTE Confidence: 0.93396387125

00:34:25.480 --> 00:34:27.710 with the Colorado River toad

NOTE Confidence: 0.93396387125

00:34:27.780 --> 00:34:29.288 that I'm showing here.

NOTE Confidence: 0.93396387125

00:34:29.290 --> 00:34:31.290 This produces this compound

NOTE Confidence: 0.93396387125

00:34:31.290 --> 00:34:34.058 and its parotid glands and now

NOTE Confidence: 0.93396387125

00:34:34.058 --> 00:34:35.210 it's mostly synthesized

NOTE Confidence: 0.943608066666667

00:34:37.570 --> 00:34:40.444 synthetically so. So you know,

NOTE Confidence: 0.943608066666667

00:34:40.444 --> 00:34:43.250 we we don't get it from the toads anymore.

NOTE Confidence: 0.943608066666667

00:34:43.250 --> 00:34:45.272 And what's? Some of the pharmacokinetics

NOTE Confidence: 0.943608066666667

00:34:45.272 --> 00:34:47.560 are really what make this remarkable.

NOTE Confidence: 0.943608066666667

00:34:47.560 --> 00:34:51.760 So this drug is typically used either through

NOTE Confidence: 0.943608066666667

00:34:51.760 --> 00:34:53.520 inhalation or intranasal insufflation.

NOTE Confidence: 0.943608066666667

00:34:53.520 --> 00:34:56.795 So the onset of action is very rapid and

NOTE Confidence: 0.943608066666667

00:34:56.795 --> 00:34:59.635 the duration of the effects are very short,

NOTE Confidence: 0.943608066666667

00:34:59.640 --> 00:35:01.596 usually resolving in about 20 minutes.

NOTE Confidence: 0.943608066666667

00:35:01.600 --> 00:35:03.610 So this makes this really appealing

NOTE Confidence: 0.943608066666667

00:35:03.610 --> 00:35:05.354 if we're thinking about potentially

NOTE Confidence: 0.943608066666667

00:35:05.354 --> 00:35:07.430 getting this drug to more patients

NOTE Confidence: 0.943608066666667

00:35:07.430 --> 00:35:09.508 and being able to really effectively

NOTE Confidence: 0.943608066666667

00:35:09.508 --> 00:35:12.316 implement this in the clinical setting.

NOTE Confidence: 0.943608066666667

00:35:12.320 --> 00:35:14.957 And I just wanted to point out that in

NOTE Confidence: 0.943608066666667

00:35:14.957 --> 00:35:17.516 terms of the pharmacology of this drug,

NOTE Confidence: 0.943608066666667

00:35:17.520 --> 00:35:20.280 it targets serotonin 2A receptors

NOTE Confidence: 0.943608066666667

00:35:20.280 --> 00:35:22.650 just like all of these classical

NOTE Confidence: 0.943608066666667

00:35:22.650 --> 00:35:23.835 serotonergic psychedelics do.

NOTE Confidence: 0.943608066666667

00:35:23.840 --> 00:35:25.772 The 2A receptors are thought to be

NOTE Confidence: 0.943608066666667

00:35:25.772 --> 00:35:27.680 responsible for the psychedelic effects.

NOTE Confidence: 0.943608066666667

00:35:27.680 --> 00:35:29.432 There's still, I think,

NOTE Confidence: 0.943608066666667

00:35:29.432 --> 00:35:31.622 an ongoing debate about their

NOTE Confidence: 0.943608066666667

00:35:31.622 --> 00:35:33.799 necessity for therapeutic effects.

NOTE Confidence: 0.943608066666667

00:35:33.800 --> 00:35:36.810 And this drug also targets serotonin 1A

NOTE Confidence: 0.943608066666667

00:35:36.810 --> 00:35:38.400 receptors with a pretty high affinity,

NOTE Confidence: 0.943608066666667

00:35:38.400 --> 00:35:41.220 which makes it a little unique

NOTE Confidence: 0.943608066666667

00:35:41.220 --> 00:35:42.630 compared to psilocybin.

NOTE Confidence: 0.943608066666667

00:35:42.630 --> 00:35:45.372 So looking at clinical studies of

NOTE Confidence: 0.943608066666667

00:35:45.372 --> 00:35:48.149 five methoxy DMT as Alex said,

NOTE Confidence: 0.943608066666667

00:35:48.150 --> 00:35:50.870 sorry these are are pretty early.

NOTE Confidence: 0.943608066666667

00:35:50.870 --> 00:35:53.198 We have a few observational studies

NOTE Confidence: 0.943608066666667

00:35:53.198 --> 00:35:55.718 that do suggest that a single dose

NOTE Confidence: 0.943608066666667

00:35:55.718 --> 00:35:58.434 of this drug can produce relief of

NOTE Confidence: 0.943608066666667

00:35:58.434 --> 00:36:00.741 depression and anxiety symptoms and

NOTE Confidence: 0.943608066666667

00:36:00.741 --> 00:36:02.367 potentially a long lasting way at

NOTE Confidence: 0.943608066666667

00:36:02.367 --> 00:36:04.168 least from the data that we have.

NOTE Confidence: 0.943608066666667

00:36:04.170 --> 00:36:05.899 And the day that I'm showing here

NOTE Confidence: 0.943608066666667

00:36:05.899 --> 00:36:07.801 is from an observational study in

NOTE Confidence: 0.943608066666667

00:36:07.801 --> 00:36:09.631 a naturalistic setting where people

NOTE Confidence: 0.943608066666667

00:36:09.631 --> 00:36:11.854 use an inhaled form of five methoxy

NOTE Confidence: 0.943608066666667

00:36:11.854 --> 00:36:13.758 DMT and then they self reported

NOTE Confidence: 0.943608066666667

00:36:13.758 --> 00:36:15.162 symptoms of depression,

NOTE Confidence: 0.943608066666667

00:36:15.162 --> 00:36:18.034 anxiety and stress at various time points.

NOTE Confidence: 0.943608066666667

00:36:18.034 --> 00:36:20.995 And they did see improvement in all of

NOTE Confidence: 0.943608066666667

00:36:20.995 --> 00:36:23.763 these measures at 30 days following the drug.

NOTE Confidence: 0.943608066666667

00:36:23.770 --> 00:36:24.926 As Alex also mentioned,

NOTE Confidence: 0.943608066666667

00:36:24.926 --> 00:36:26.660 there have been some phase two

NOTE Confidence: 0.943608066666667

00:36:26.714 --> 00:36:27.570 clinical trials.

NOTE Confidence: 0.943608066666667

00:36:27.570 --> 00:36:29.050 There's one that's been completed.

NOTE Confidence: 0.943608066666667

00:36:29.050 --> 00:36:31.606 So far we don't have the full data set,

NOTE Confidence: 0.943608066666667

00:36:31.610 --> 00:36:34.010 but based on the press release.

NOTE Confidence: 0.943608066666667

00:36:34.010 --> 00:36:36.350 They had some promising results and

NOTE Confidence: 0.943608066666667

00:36:36.350 --> 00:36:38.769 that was published from GH Research.

NOTE Confidence: 0.943608066666667

00:36:38.770 --> 00:36:41.906 It's a study of eight patients with

NOTE Confidence: 0.943608066666667

00:36:41.906 --> 00:36:43.250 treatment resistant depression.

NOTE Confidence: 0.943608066666667

00:36:43.250 --> 00:36:45.527 And the data that we have so far showed

NOTE Confidence: 0.943608066666667

00:36:45.527 --> 00:36:47.743 that seven out of eight patients

NOTE Confidence: 0.943608066666667

00:36:47.743 --> 00:36:49.643 achieved remission in their depressive

NOTE Confidence: 0.943608066666667

00:36:49.703 --> 00:36:51.870 symptoms at seven days following an

NOTE Confidence: 0.943608066666667

00:36:51.870 --> 00:36:54.570 escalating dose regimen of this drug.

NOTE Confidence: 0.943608066666667

00:36:54.570 --> 00:36:57.020 So they basically gave them enough to

NOTE Confidence: 0.943608066666667

00:36:57.020 --> 00:36:59.521 achieve a strong psychedelic effect and

NOTE Confidence: 0.943608066666667

00:36:59.521 --> 00:37:02.287 then looked at their depression symptoms.

NOTE Confidence: 0.943608066666667

00:37:02.290 --> 00:37:03.970 So I'm really interested in

NOTE Confidence: 0.943608066666667

00:37:03.970 --> 00:37:05.650 understanding on a mechanistic level,

NOTE Confidence: 0.943608066666667

00:37:05.650 --> 00:37:07.876 how a single dose of a psychedelic

NOTE Confidence: 0.943608066666667

00:37:07.876 --> 00:37:10.227 drug can produce these very long

NOTE Confidence: 0.943608066666667

00:37:10.227 --> 00:37:12.007 lasting improvements and symptoms.

NOTE Confidence: 0.943608066666667

00:37:12.010 --> 00:37:14.572 And one potential explanation for this is

NOTE Confidence: 0.943608066666667

00:37:14.572 --> 00:37:16.650 through enhancement of neuroplasticity.

NOTE Confidence: 0.943608066666667

00:37:16.650 --> 00:37:18.585 So neuroplasticity is generally an

NOTE Confidence: 0.943608066666667

00:37:18.585 --> 00:37:21.564 increase in the number or the strength

NOTE Confidence: 0.943608066666667

00:37:21.564 --> 00:37:24.004 of synaptic connections between neurons.

NOTE Confidence: 0.943608066666667

00:37:24.010 --> 00:37:26.100 Deficits in neuroplasticity have been

NOTE Confidence: 0.943608066666667

00:37:26.100 --> 00:37:28.190 noted in patients with depression.

NOTE Confidence: 0.943608066666667

00:37:28.190 --> 00:37:29.096 And furthermore,

NOTE Confidence: 0.943608066666667

00:37:29.096 --> 00:37:31.361 we know that antidepressants can

NOTE Confidence: 0.943608066666667

00:37:31.361 --> 00:37:33.380 enhance neural plasticity on a

NOTE Confidence: 0.943608066666667

00:37:33.380 --> 00:37:35.150 time scale that seems to correlate

NOTE Confidence: 0.943608066666667

00:37:35.150 --> 00:37:36.546 with their therapeutic effects.

NOTE Confidence: 0.943608066666667

00:37:36.546 --> 00:37:39.416 So if we're looking at measures of sort

NOTE Confidence: 0.943608066666667

00:37:39.416 --> 00:37:41.216 of antidepressant efficacy that can

NOTE Confidence: 0.943608066666667

00:37:41.216 --> 00:37:43.349 translate across from humans to rodents,

NOTE Confidence: 0.943608066666667

00:37:43.350 --> 00:37:45.550 this is a useful one to look at.

NOTE Confidence: 0.943608066666667

00:37:45.550 --> 00:37:47.626 We know that chronic use of

NOTE Confidence: 0.943608066666667

00:37:47.626 --> 00:37:49.010 fluoxetine that can increase

NOTE Confidence: 0.941303815625

00:37:49.078 --> 00:37:51.430 the density of these dendrotic spines,

NOTE Confidence: 0.941303815625

00:37:51.430 --> 00:37:55.206 which is are these protrusions where most of

NOTE Confidence: 0.941303815625

00:37:55.206 --> 00:37:57.890 synaptic connections form on the dendrite.

NOTE Confidence: 0.941303815625

00:37:57.890 --> 00:38:00.500 And antidepressant doses of ketamine acutely

NOTE Confidence: 0.941303815625

00:38:00.569 --> 00:38:03.005 increase the density of these spines.

NOTE Confidence: 0.941303815625

00:38:03.010 --> 00:38:05.040 So again, this correlates with the time

NOTE Confidence: 0.941303815625

00:38:05.040 --> 00:38:07.049 scale of their therapeutic effects.

NOTE Confidence: 0.941303815625

00:38:07.050 --> 00:38:09.939 So what do we know about the effects of

NOTE Confidence: 0.941303815625

00:38:09.939 --> 00:38:11.928 psychedelics on neuroplasticity so far?

NOTE Confidence: 0.941303815625

00:38:11.930 --> 00:38:14.394 So this is taken from a really

NOTE Confidence: 0.941303815625

00:38:14.394 --> 00:38:16.849 nice paper that was published in

NOTE Confidence: 0.941303815625

00:38:16.849 --> 00:38:18.322 Neuron from Alex's group.

NOTE Confidence: 0.941303815625

00:38:18.322 --> 00:38:20.730 It was led by Link Shaw Show.

NOTE Confidence: 0.941303815625

00:38:20.730 --> 00:38:23.730 And they looked at changes in the density

NOTE Confidence: 0.941303815625

00:38:23.730 --> 00:38:26.382 of dendritic spines over a prolonged time

NOTE Confidence: 0.941303815625

00:38:26.382 --> 00:38:29.330 period after a single dose of psilocybin.

NOTE Confidence: 0.941303815625

00:38:29.330 --> 00:38:30.730 They're focused on the mouse

NOTE Confidence: 0.941303815625

00:38:30.730 --> 00:38:31.570 medial frontal cortex,

NOTE Confidence: 0.941303815625

00:38:31.570 --> 00:38:34.226 which is an area that's been shown to

NOTE Confidence: 0.941303815625

00:38:34.226 --> 00:38:36.689 be modulated by antidepressants before.

NOTE Confidence: 0.941303815625

00:38:36.690 --> 00:38:40.170 And if you focus on the the red graph here,

NOTE Confidence: 0.941303815625

00:38:40.170 --> 00:38:42.410 you can see that after a single dose,

NOTE Confidence: 0.941303815625

00:38:42.410 --> 00:38:43.898 an injection of psilocybin,

NOTE Confidence: 0.941303815625

00:38:43.898 --> 00:38:46.130 they had noticed an increase in

NOTE Confidence: 0.941303815625

00:38:46.193 --> 00:38:48.395 dendritic spine density at one day.

NOTE Confidence: 0.941303815625

00:38:48.400 --> 00:38:50.236 And this persisted very long term,

NOTE Confidence: 0.941303815625

00:38:50.240 --> 00:38:51.638 over a month after that fall,

NOTE Confidence: 0.941303815625

00:38:51.640 --> 00:38:53.095 that single injection.

NOTE Confidence: 0.941303815625

00:38:53.095 --> 00:38:55.520 So that was pretty remarkable.

NOTE Confidence: 0.941303815625

00:38:55.520 --> 00:38:57.176 So the question that we wanted

NOTE Confidence: 0.941303815625

00:38:57.176 --> 00:38:59.299 to answer in my study was whether

NOTE Confidence: 0.941303815625

00:38:59.299 --> 00:39:01.394 this psychedelic was very short

NOTE Confidence: 0.941303815625

00:39:01.394 --> 00:39:03.070 acting psychedelic effects could

NOTE Confidence: 0.941303815625

00:39:03.137 --> 00:39:05.117 similarly alter neural plasticity.

NOTE Confidence: 0.941303815625

00:39:05.120 --> 00:39:05.752 If so,

NOTE Confidence: 0.941303815625

00:39:05.752 --> 00:39:07.332 what are the time scales

NOTE Confidence: 0.941303815625

00:39:07.332 --> 00:39:09.040 of those effects and.

NOTE Confidence: 0.924126500769231

00:39:11.400 --> 00:39:13.171 The first thing that we needed to

NOTE Confidence: 0.924126500769231

00:39:13.171 --> 00:39:14.990 do in this study was to evaluate,

NOTE Confidence: 0.924126500769231

00:39:14.990 --> 00:39:16.850 you know, what is a psychedelic

NOTE Confidence: 0.924126500769231

00:39:16.850 --> 00:39:18.757 dose of this drug in a mouse.

NOTE Confidence: 0.924126500769231

00:39:18.760 --> 00:39:20.440 You know, there's sort of limited

NOTE Confidence: 0.924126500769231

00:39:20.440 --> 00:39:22.296 literature on this drug prior to

NOTE Confidence: 0.924126500769231

00:39:22.296 --> 00:39:24.504 this and obviously we can't ask

NOTE Confidence: 0.924126500769231

00:39:24.504 --> 00:39:27.068 the mouse if it's experiencing

NOTE Confidence: 0.924126500769231

00:39:27.068 --> 00:39:29.978 mystical type experiences or oceanic

NOTE Confidence: 0.924126500769231

00:39:29.978 --> 00:39:31.440 boundlessness as we do in people.

NOTE Confidence: 0.924126500769231

00:39:31.440 --> 00:39:33.258 So we focus on this particular

NOTE Confidence: 0.924126500769231

00:39:33.258 --> 00:39:34.934 behavior that we can measure

NOTE Confidence: 0.924126500769231

00:39:34.934 --> 00:39:36.919 called the head twitch response.

NOTE Confidence: 0.924126500769231

00:39:36.920 --> 00:39:38.594 And as you can see here in this video,

NOTE Confidence: 0.924126500769231

00:39:38.600 --> 00:39:40.802 it's this rapid side to side

NOTE Confidence: 0.924126500769231

00:39:40.802 --> 00:39:42.270 motion of the head.

NOTE Confidence: 0.924126500769231

00:39:42.270 --> 00:39:45.142 That has typically been used as a marker

NOTE Confidence: 0.924126500769231

00:39:45.142 --> 00:39:47.630 of psychedelic effects in rodent studies.

NOTE Confidence: 0.924126500769231

00:39:47.630 --> 00:39:49.652 Obviously, this doesn't really have peace

NOTE Confidence: 0.924126500769231

00:39:49.652 --> 00:39:51.510 validity for psychedelic effects in humans.

NOTE Confidence: 0.924126500769231

00:39:51.510 --> 00:39:52.950 This isn't what psychedelic

NOTE Confidence: 0.924126500769231

00:39:52.950 --> 00:39:54.750 effects look like in humans,

NOTE Confidence: 0.924126500769231

00:39:54.750 --> 00:39:56.226 but has some predictability.

NOTE Confidence: 0.924126500769231

00:39:56.226 --> 00:39:58.440 We know that drugs that target

NOTE Confidence: 0.924126500769231

00:39:58.507 --> 00:40:00.757 the serotonin to a receptor that

NOTE Confidence: 0.924126500769231

00:40:00.757 --> 00:40:02.826 have psychedelic effects in humans

NOTE Confidence: 0.924126500769231

00:40:02.826 --> 00:40:04.826 induced this behavioral response,

NOTE Confidence: 0.924126500769231

00:40:04.830 --> 00:40:06.936 whereas drugs that target those same

NOTE Confidence: 0.924126500769231

00:40:06.936 --> 00:40:08.713 receptors that lack psychedelic effects

NOTE Confidence: 0.924126500769231

00:40:08.713 --> 00:40:10.925 in humans do not produce this behavioral.

NOTE Confidence: 0.924126500769231

00:40:10.930 --> 00:40:11.330 Change.

NOTE Confidence: 0.944124138461539

00:40:14.130 --> 00:40:16.530 So the first part of the study was

NOTE Confidence: 0.944124138461539

00:40:16.530 --> 00:40:18.449 measuring the head twitch response

NOTE Confidence: 0.944124138461539

00:40:18.450 --> 00:40:20.431 with a range of doses of five

NOTE Confidence: 0.944124138461539

00:40:20.431 --> 00:40:22.478 methoxy DMT and we compared to

NOTE Confidence: 0.944124138461539

00:40:22.478 --> 00:40:24.363 psilocybin as a positive control.

NOTE Confidence: 0.944124138461539

00:40:24.370 --> 00:40:26.610 Psilocybin's been better characterized

NOTE Confidence: 0.944124138461539

00:40:26.610 --> 00:40:29.906 in this assay before and we're actually

NOTE Confidence: 0.944124138461539

00:40:29.906 --> 00:40:32.370 able to do this using an automated

NOTE Confidence: 0.944124138461539

00:40:32.370 --> 00:40:36.120 magnetic ear tag based technique.

NOTE Confidence: 0.944124138461539

00:40:36.120 --> 00:40:37.576 This was initially developed

NOTE Confidence: 0.944124138461539

00:40:37.576 --> 00:40:39.396 in Javier Gonzalez Myzo's lab,

NOTE Confidence: 0.944124138461539

00:40:39.400 --> 00:40:41.668 and it was actually kind of built

NOTE Confidence: 0.944124138461539

00:40:41.668 --> 00:40:43.439 from scratch by Mark Dibbs,

NOTE Confidence: 0.944124138461539

00:40:43.440 --> 00:40:45.281 one of the students who was rotating

NOTE Confidence: 0.944124138461539

00:40:45.281 --> 00:40:46.800 in the lab at the time.

NOTE Confidence: 0.944124138461539

00:40:46.800 --> 00:40:48.935 This takes advantage of the fact that

NOTE Confidence: 0.944124138461539

00:40:48.935 --> 00:40:51.115 the movement of a magnet within a

NOTE Confidence: 0.944124138461539

00:40:51.115 --> 00:40:53.357 copper coil can generate A voltage that

NOTE Confidence: 0.944124138461539

00:40:53.357 --> 00:40:55.277 can then be automatically detected,

NOTE Confidence: 0.944124138461539

00:40:55.280 --> 00:40:58.170 and we essentially just place the

NOTE Confidence: 0.944124138461539

00:40:58.170 --> 00:40:59.760 magnetic ear tag on the mouse.

NOTE Confidence: 0.944124138461539

00:40:59.760 --> 00:41:01.559 We put it into a container that's

NOTE Confidence: 0.944124138461539

00:41:01.559 --> 00:41:03.677 lined with a copper coil and we get.

NOTE Confidence: 0.944124138461539

00:41:03.680 --> 00:41:05.444 An output on the number of head

NOTE Confidence: 0.944124138461539

00:41:05.444 --> 00:41:07.092 twitches which is allows us to

NOTE Confidence: 0.944124138461539

00:41:07.092 --> 00:41:08.760 really ramp these experiments up and

NOTE Confidence: 0.944124138461539

00:41:08.760 --> 00:41:10.635 look at an extended period of time.

NOTE Confidence: 0.944124138461539

00:41:10.640 --> 00:41:12.800 So first we just validated this

NOTE Confidence: 0.944124138461539

00:41:12.800 --> 00:41:15.068 approach with a range of doses of

NOTE Confidence: 0.944124138461539

00:41:15.068 --> 00:41:17.480 five methoxy DMT and with psilocybin

NOTE Confidence: 0.944124138461539

00:41:17.480 --> 00:41:19.304 and compared to hands board videos

NOTE Confidence: 0.944124138461539

00:41:19.304 --> 00:41:20.928 and showed that this automated

NOTE Confidence: 0.944124138461539

00:41:20.928 --> 00:41:22.678 system is working very well.

NOTE Confidence: 0.944124138461539

00:41:22.680 --> 00:41:26.372 Those two measures are highly correlated and

NOTE Confidence: 0.944124138461539

00:41:26.372 --> 00:41:28.280 then if we get into the actual data here,

NOTE Confidence: 0.944124138461539

00:41:28.280 --> 00:41:30.896 so this is our time course over 60

NOTE Confidence: 0.944124138461539

00:41:30.896 --> 00:41:33.439 minutes of the head twitch response.

NOTE Confidence: 0.944124138461539

00:41:33.440 --> 00:41:36.275 And you can see the doses of five methoxy

NOTE Confidence: 0.944124138461539

00:41:36.275 --> 00:41:38.838 DMT in blue with psilocybin in red.

NOTE Confidence: 0.944124138461539

00:41:38.840 --> 00:41:40.840 And the two things that I think are

NOTE Confidence: 0.944124138461539

00:41:40.840 --> 00:41:42.435 important to take away from this

NOTE Confidence: 0.944124138461539

00:41:42.435 --> 00:41:44.188 are number 15 Methoxy DMT induces

NOTE Confidence: 0.944124138461539

00:41:44.188 --> 00:41:46.030 a head twitch response that is

NOTE Confidence: 0.944124138461539

00:41:46.097 --> 00:41:47.276 consistently brief regardless

NOTE Confidence: 0.944124138461539

00:41:47.276 --> 00:41:49.634 of the dose that we're testing,

NOTE Confidence: 0.944124138461539

00:41:49.640 --> 00:41:52.640 usually results within about 10 minutes.

NOTE Confidence: 0.944124138461539

00:41:52.640 --> 00:41:55.545 And that's compared to psilocybin that has

NOTE Confidence: 0.944124138461539

00:41:55.545 --> 00:41:58.909 this more long kind of protracted response.

NOTE Confidence: 0.944124138461539

00:41:58.910 --> 00:41:59.293 Interestingly,

NOTE Confidence: 0.944124138461539

00:41:59.293 --> 00:42:01.591 increasing doses of the drug produce

NOTE Confidence: 0.944124138461539

00:42:01.591 --> 00:42:03.429 increasing amounts of head twitch.

NOTE Confidence: 0.944124138461539

00:42:03.430 --> 00:42:06.083 This seems to indicate that this behavior

NOTE Confidence: 0.944124138461539

00:42:06.083 --> 00:42:08.386 could correlate also with the intensity

NOTE Confidence: 0.944124138461539

00:42:08.386 --> 00:42:10.588 of the psychedelic effects as well.

NOTE Confidence: 0.944124138461539

00:42:10.590 --> 00:42:12.510 And for our further studies,

NOTE Confidence: 0.944124138461539

00:42:12.510 --> 00:42:14.435 we wanted to choose a dose of

NOTE Confidence: 0.944124138461539

00:42:14.435 --> 00:42:16.346 five Methoxy DMT that was roughly

NOTE Confidence: 0.944124138461539

00:42:16.346 --> 00:42:18.392 equivalent to psilocybin in terms of

NOTE Confidence: 0.944124138461539

00:42:18.392 --> 00:42:20.710 the number of head twitches induced.

NOTE Confidence: 0.944124138461539

00:42:20.710 --> 00:42:22.280 So what's kind of a?

NOTE Confidence: 0.944124138461539

00:42:22.280 --> 00:42:24.730 A similar intensity psychedelic dose

NOTE Confidence: 0.944124138461539

00:42:24.730 --> 00:42:27.465 of this drug and we ended up choosing

NOTE Confidence: 0.944124138461539

00:42:27.465 --> 00:42:29.656 the 20 mig per kick dose based on

NOTE Confidence: 0.944124138461539

00:42:29.656 --> 00:42:31.680 the total number of hedgewatches.

NOTE Confidence: 0.94427896

00:42:34.680 --> 00:42:38.928 So there's kind of limited behavioral

NOTE Confidence: 0.94427896

00:42:38.928 --> 00:42:42.000 data that characterizes psychedelics

NOTE Confidence: 0.94427896

00:42:42.000 --> 00:42:45.006 in behaviors outside of the hedgewitch.

NOTE Confidence: 0.94427896

00:42:45.010 --> 00:42:47.050 And I think it's kind of important to

NOTE Confidence: 0.94427896

00:42:47.050 --> 00:42:49.489 study a wider range of behaviors because,

NOTE Confidence: 0.94427896

00:42:49.490 --> 00:42:51.140 you know, these can give us

NOTE Confidence: 0.94427896

00:42:51.140 --> 00:42:52.240 insights into the mechanisms

NOTE Confidence: 0.94427896

00:42:52.290 --> 00:42:54.010 underlying these psychedelic drugs.

NOTE Confidence: 0.94427896

00:42:54.010 --> 00:42:56.114 And I think it's also important as people

NOTE Confidence: 0.94427896

00:42:56.114 --> 00:42:58.250 are thinking about screening novel compounds,

NOTE Confidence: 0.94427896

00:42:58.250 --> 00:42:59.636 novel psychedelics potentially.

NOTE Confidence: 0.94427896

00:42:59.636 --> 00:43:02.408 Now people are interested in drugs

NOTE Confidence: 0.94427896

00:43:02.408 --> 00:43:05.054 that have sort of psychoplastogen

NOTE Confidence: 0.94427896

00:43:05.054 --> 00:43:07.170 effects without psychedelic effects.

NOTE Confidence: 0.94427896

00:43:07.170 --> 00:43:09.378 So I think having a battery of behavioral

NOTE Confidence: 0.94427896

00:43:09.378 --> 00:43:11.477 assays that help us understand how these

NOTE Confidence: 0.94427896

00:43:11.477 --> 00:43:14.254 drugs work is it's important and so.

NOTE Confidence: 0.94427896

00:43:14.254 --> 00:43:16.180 Along those lines,

NOTE Confidence: 0.94427896

00:43:16.180 --> 00:43:18.202 a post back in the lab who's

NOTE Confidence: 0.94427896

00:43:18.202 --> 00:43:19.294 now gone on to grad school,

NOTE Confidence: 0.94427896

00:43:19.300 --> 00:43:23.164 Ian Gregg conducted this study of

NOTE Confidence: 0.94427896

00:43:23.164 --> 00:43:25.096 social ultrasonic vocalizations.

NOTE Confidence: 0.94427896

00:43:25.100 --> 00:43:27.865 And this is a social behavior that's

NOTE Confidence: 0.94427896

00:43:27.865 --> 00:43:29.828 produced during mating by males

NOTE Confidence: 0.94427896

00:43:29.828 --> 00:43:31.940 when they're exposed to a female.

NOTE Confidence: 0.94427896

00:43:31.940 --> 00:43:33.352 The females produce these

NOTE Confidence: 0.94427896

00:43:33.352 --> 00:43:34.058 ultrasonic vocalizations,

NOTE Confidence: 0.94427896

00:43:34.060 --> 00:43:36.946 but to a much lesser extent.

NOTE Confidence: 0.94427896

00:43:36.950 --> 00:43:40.082 And he wanted to look at the changes in

NOTE Confidence: 0.94427896

00:43:40.082 --> 00:43:42.334 social USV's with classical psychedelics,

NOTE Confidence: 0.94427896

00:43:42.334 --> 00:43:45.190 so psilocybin and five methoxy DMT,

NOTE Confidence: 0.94427896

00:43:45.190 --> 00:43:46.750 as well as with ketamine,

NOTE Confidence: 0.94427896

00:43:46.750 --> 00:43:48.400 which has kind of similar effects

NOTE Confidence: 0.94427896

00:43:48.400 --> 00:43:48.950 on neuroplasticity.

NOTE Confidence: 0.94427896

00:43:48.950 --> 00:43:51.622 But I would expect the sort of acute

NOTE Confidence: 0.94427896

00:43:51.622 --> 00:43:53.311 psychoactive effects to be quite

NOTE Confidence: 0.94427896

00:43:53.311 --> 00:43:55.225 different from those other two drugs.

NOTE Confidence: 0.94427896

00:43:55.230 --> 00:43:58.194 And he essentially measures this over

NOTE Confidence: 0.94427896

00:43:58.194 --> 00:44:01.176 3 prerecording sessions and then a

NOTE Confidence: 0.94427896

00:44:01.176 --> 00:44:03.966 session that's immediately after the drug.

NOTE Confidence: 0.94427896

00:44:03.970 --> 00:44:04.568 And interestingly,

NOTE Confidence: 0.94427896

00:44:04.568 --> 00:44:06.960 what what was found was that all of

NOTE Confidence: 0.94427896

00:44:07.022 --> 00:44:09.128 these drugs suppressed social US fees,

NOTE Confidence: 0.94427896

00:44:09.130 --> 00:44:12.542 but to very different degrees and in

NOTE Confidence: 0.94427896

00:44:12.542 --> 00:44:16.010 particular 5 methoxy DMT almost entirely

NOTE Confidence: 0.94427896

00:44:16.010 --> 00:44:17.810 suppressed ultrasonic vocalizations

NOTE Confidence: 0.94427896

00:44:17.810 --> 00:44:20.210 produced during meeting behavior.

NOTE Confidence: 0.94427896

00:44:20.210 --> 00:44:21.485 Now thinking about the different

NOTE Confidence: 0.94427896

00:44:21.485 --> 00:44:22.250 interpretations of this,

NOTE Confidence: 0.94427896

00:44:22.250 --> 00:44:25.686 I think there are there are multiple options,

NOTE Confidence: 0.94427896

00:44:25.690 --> 00:44:28.245 but one possibility that we're toying with

NOTE Confidence: 0.94427896

00:44:28.245 --> 00:44:31.215 is that this is really representative of

NOTE Confidence: 0.94427896

00:44:31.215 --> 00:44:33.921 the intensity of the psychedelic effect.

NOTE Confidence: 0.94427896

00:44:33.930 --> 00:44:35.415 Which would track from what

NOTE Confidence: 0.94427896

00:44:35.415 --> 00:44:36.603 we know from humans,

NOTE Confidence: 0.94427896

00:44:36.610 --> 00:44:38.192 which is that even though this is

NOTE Confidence: 0.94427896

00:44:38.192 --> 00:44:39.730 a short acting psychedelic drug,

NOTE Confidence: 0.94427896

00:44:39.730 --> 00:44:42.058 the quality of the the psychedelic

NOTE Confidence: 0.94427896

00:44:42.058 --> 00:44:44.430 experience is very intense and

NOTE Confidence: 0.94427896

00:44:44.430 --> 00:44:46.890 indifferent from psilocybin.

NOTE Confidence: 0.94427896

00:44:46.890 --> 00:44:48.810 And I'm not going to go into this in detail,

NOTE Confidence: 0.94427896

00:44:48.810 --> 00:44:51.690 but essentially you can characterize

NOTE Confidence: 0.94427896

00:44:51.690 --> 00:44:55.490 different forms of ultrasonic vocalizations,

NOTE Confidence: 0.94427896

00:44:55.490 --> 00:44:58.190 different patterns and we found

NOTE Confidence: 0.94427896

00:44:58.190 --> 00:44:59.810 that these different.

NOTE Confidence: 0.94427896

00:44:59.810 --> 00:45:02.600 Novel antidepressants can modulate the

NOTE Confidence: 0.94427896

00:45:02.600 --> 00:45:04.832 pattern of ultrasonic vocalizations

NOTE Confidence: 0.94427896

00:45:04.832 --> 00:45:07.209 as well in particular ways.

NOTE Confidence: 0.94427896

00:45:07.210 --> 00:45:07.507 OK,

NOTE Confidence: 0.94427896

00:45:07.507 --> 00:45:09.289 so the biggest question we wanted

NOTE Confidence: 0.94427896

00:45:09.289 --> 00:45:11.665 to answer in the study was related

NOTE Confidence: 0.94427896

00:45:11.665 --> 00:45:13.445 to changes in neural plasticity.

NOTE Confidence: 0.94427896

00:45:13.450 --> 00:45:16.006 So the way we're able to do this is

NOTE Confidence: 0.94427896

00:45:16.010 --> 00:45:18.720 really this elegant approach that

NOTE Confidence: 0.94427896

00:45:18.720 --> 00:45:22.105 utilizes in vivo longitudinal 2 photon

NOTE Confidence: 0.94427896

00:45:22.105 --> 00:45:25.230 imaging of dendritic spines over time.

NOTE Confidence: 0.94427896

00:45:25.230 --> 00:45:27.334 And the way we do this is we

NOTE Confidence: 0.94427896

00:45:27.334 --> 00:45:29.554 insert a cranial window over an

NOTE Confidence: 0.94427896

00:45:29.554 --> 00:45:31.984 area of the medial frontal cortex,

NOTE Confidence: 0.94427896

00:45:31.990 --> 00:45:32.342 CG1M2,

NOTE Confidence: 0.94427896

00:45:32.342 --> 00:45:34.806 which again is that same region that

NOTE Confidence: 0.94427896

00:45:34.806 --> 00:45:36.390 they investigated with psilocybin

NOTE Confidence: 0.94427896

00:45:36.390 --> 00:45:38.850 that's been shown to be modulated

NOTE Confidence: 0.94427896

00:45:38.850 --> 00:45:39.670 with antidepressants.

NOTE Confidence: 0.94427896

00:45:39.670 --> 00:45:42.559 And we do this in a thy 1G FP

NOTE Confidence: 0.94427896

00:45:42.559 --> 00:45:44.801 mouse where there's a fluorescent

NOTE Confidence: 0.94427896

00:45:44.801 --> 00:45:47.507 reporter in layer 5 framinal neurons.

NOTE Confidence: 0.94427896

00:45:47.510 --> 00:45:49.712 These neurons are important in receiving

NOTE Confidence: 0.94427896

00:45:49.712 --> 00:45:51.590 inputs across different cortical layers.

NOTE Confidence: 0.94427896

00:45:51.590 --> 00:45:54.670 They're major output neuron from the cortex.

NOTE Confidence: 0.94427896

00:45:54.670 --> 00:45:55.995 That go to deeper brain

NOTE Confidence: 0.94427896

00:45:55.995 --> 00:45:57.320 structures and they they project

NOTE Confidence: 0.941312905263158

00:45:57.369 --> 00:45:59.304 to the other parts of the cortex as well.

NOTE Confidence: 0.941312905263158

00:45:59.310 --> 00:46:02.054 So these are very important neurons and they

NOTE Confidence: 0.941312905263158

00:46:02.054 --> 00:46:04.708 also highly express serotonin 2A receptors.

NOTE Confidence: 0.941312905263158

00:46:04.710 --> 00:46:07.006 So we think that it makes sense that

NOTE Confidence: 0.941312905263158

00:46:07.006 --> 00:46:09.431 these could be like a direct or

NOTE Confidence: 0.941312905263158

00:46:09.431 --> 00:46:11.221 immediate target of psychedelic effects.

NOTE Confidence: 0.941312905263158

00:46:11.230 --> 00:46:14.016 So we're actually able to image their

NOTE Confidence: 0.941312905263158

00:46:14.016 --> 00:46:16.441 apical dendrites in layer one as

NOTE Confidence: 0.941312905263158

00:46:16.441 --> 00:46:20.320 shown here and this is our timing of.

NOTE Confidence: 0.941312905263158

00:46:20.320 --> 00:46:22.045 Time scale of our experiments.

NOTE Confidence: 0.941312905263158

00:46:22.050 --> 00:46:24.012 So we take two baseline imaging

NOTE Confidence: 0.941312905263158

00:46:24.012 --> 00:46:25.930 sessions prior to drug delivery,

NOTE Confidence: 0.941312905263158

00:46:25.930 --> 00:46:28.261 which allows us to look at the

NOTE Confidence: 0.941312905263158

00:46:28.261 --> 00:46:29.849 spine dynamics prior to drug.

NOTE Confidence: 0.941312905263158

00:46:29.850 --> 00:46:31.470 These spines are dynamically being

NOTE Confidence: 0.941312905263158

00:46:31.470 --> 00:46:33.610 formed and eliminated all of the time.

NOTE Confidence: 0.941312905263158

00:46:33.610 --> 00:46:35.346 So it's important to sort of get

NOTE Confidence: 0.941312905263158

00:46:35.346 --> 00:46:37.250 a sense of the baseline there.

NOTE Confidence: 0.941312905263158

00:46:37.250 --> 00:46:38.965 And then we are able to image

NOTE Confidence: 0.941312905263158

00:46:38.965 --> 00:46:40.290 those exact same dendrites,

NOTE Confidence: 0.941312905263158

00:46:40.290 --> 00:46:42.270 the exact same spines every

NOTE Confidence: 0.941312905263158

00:46:42.270 --> 00:46:44.250 two days for seven days.

NOTE Confidence: 0.941312905263158

00:46:44.250 --> 00:46:46.410 And then we take a longer time point

NOTE Confidence: 0.941312905263158

00:46:46.410 --> 00:46:48.900 at over a month and I think we could

NOTE Confidence: 0.941312905263158

00:46:48.900 --> 00:46:50.350 actually carry these experiments out.

NOTE Confidence: 0.941312905263158

00:46:50.350 --> 00:46:52.228 At longer time points as well,

NOTE Confidence: 0.941312905263158

00:46:52.230 --> 00:46:54.630 something I'm curious about doing in

NOTE Confidence: 0.941312905263158

00:46:54.630 --> 00:46:56.918 the future and this is just an example

NOTE Confidence: 0.941312905263158

00:46:56.918 --> 00:46:58.550 of the beautiful images that we got.

NOTE Confidence: 0.93361721875

00:47:00.950 --> 00:47:03.966 So we did this in drugs treated with

NOTE Confidence: 0.93361721875

00:47:03.966 --> 00:47:06.394 five methoxy DMT versus vehicle and

NOTE Confidence: 0.93361721875

00:47:06.394 --> 00:47:08.453 we found surprisingly that treatment

NOTE Confidence: 0.93361721875

00:47:08.453 --> 00:47:11.400 with five methoxy DMT is again a

NOTE Confidence: 0.93361721875

00:47:11.473 --> 00:47:13.788 single dose increases dendritic spine

NOTE Confidence: 0.93361721875

00:47:13.788 --> 00:47:16.880 density at one day following injection.

NOTE Confidence: 0.93361721875

00:47:16.880 --> 00:47:18.172 And similar to psilocybin,

NOTE Confidence: 0.93361721875

00:47:18.172 --> 00:47:20.500 this response really persists for over a

NOTE Confidence: 0.93361721875

00:47:20.500 --> 00:47:22.160 month following that single injection.

NOTE Confidence: 0.93361721875

00:47:22.160 --> 00:47:24.480 So even though there was acute effects of

NOTE Confidence: 0.93361721875

00:47:24.480 --> 00:47:27.364 the drug are wearing off within 2030 minutes,

NOTE Confidence: 0.93361721875

00:47:27.364 --> 00:47:29.774 we're getting this really sustained

NOTE Confidence: 0.93361721875

00:47:29.774 --> 00:47:31.718 enhancement of neuroplasticity which

NOTE Confidence: 0.93361721875

00:47:31.718 --> 00:47:33.878 is pretty interesting and remarkable.

NOTE Confidence: 0.93361721875

00:47:33.880 --> 00:47:35.956 The other measure of synaptic strength

NOTE Confidence: 0.93361721875

00:47:35.956 --> 00:47:38.716 that we can look at is the size of

NOTE Confidence: 0.93361721875

00:47:38.716 --> 00:47:40.950 spine heads or the spine head with.

NOTE Confidence: 0.93361721875

00:47:40.950 --> 00:47:43.218 This is a measure that is enhanced

NOTE Confidence: 0.93361721875

00:47:43.218 --> 00:47:43.866 by psilocybin.

NOTE Confidence: 0.93361721875

00:47:43.870 --> 00:47:45.382 We found that this wasn't altered

NOTE Confidence: 0.93361721875

00:47:45.382 --> 00:47:46.390 with five methoxy DMT,

NOTE Confidence: 0.93361721875

00:47:46.390 --> 00:47:48.478 which is also kind of interesting

NOTE Confidence: 0.93361721875

00:47:48.478 --> 00:47:49.870 that there's potentially these

NOTE Confidence: 0.93361721875

00:47:49.930 --> 00:47:51.510 divergent effects on the way,

NOTE Confidence: 0.93361721875

00:47:51.510 --> 00:47:53.662 or at least different effects on the way

NOTE Confidence: 0.93361721875

00:47:53.662 --> 00:47:55.788 that these drugs affect neuroplasticity.

NOTE Confidence: 0.918554740909091

00:47:57.830 --> 00:48:00.070 Finally, spine density is a factor of the

NOTE Confidence: 0.918554740909091

00:48:00.070 --> 00:48:02.538 rate of formation of new spines and the

NOTE Confidence: 0.918554740909091

00:48:02.538 --> 00:48:04.749 rate of elimination of existing spines.

NOTE Confidence: 0.918554740909091

00:48:04.750 --> 00:48:07.452 So we wanted to understand what was

NOTE Confidence: 0.918554740909091

00:48:07.452 --> 00:48:09.820 underlying this change in spine density.

NOTE Confidence: 0.918554740909091

00:48:09.820 --> 00:48:13.340 And we found that with five methoxy DMT,

NOTE Confidence: 0.918554740909091

00:48:13.340 --> 00:48:14.995 the formation rate of new

NOTE Confidence: 0.918554740909091

00:48:14.995 --> 00:48:17.077 spines was increased at one and

NOTE Confidence: 0.918554740909091

00:48:17.077 --> 00:48:18.897 three days post drug injection,

NOTE Confidence: 0.918554740909091

00:48:18.900 --> 00:48:21.498 whereas the elimination rate was unchanged.

NOTE Confidence: 0.918554740909091

00:48:21.500 --> 00:48:22.685 So really what's happening with

NOTE Confidence: 0.918554740909091

00:48:22.685 --> 00:48:24.140 the drug is that we're getting

NOTE Confidence: 0.918554740909091

00:48:24.140 --> 00:48:25.460 a lot of new spines formed.

NOTE Confidence: 0.918554740909091

00:48:25.460 --> 00:48:27.556 We have an increase of about 15%,

NOTE Confidence: 0.918554740909091

00:48:27.556 --> 00:48:29.860 which is pretty significant

NOTE Confidence: 0.918554740909091

00:48:29.860 --> 00:48:33.184 and they seem to be persisting

NOTE Confidence: 0.918554740909091

00:48:33.184 --> 00:48:34.860 longterm and not being eliminated.

NOTE Confidence: 0.907491211666667

00:48:37.010 --> 00:48:40.475 So a summary of what I've shown so far

NOTE Confidence: 0.907491211666667

00:48:40.475 --> 00:48:42.803 is that this short acting psychedelic

NOTE Confidence: 0.907491211666667

00:48:42.803 --> 00:48:45.120 5 Methoxy DMT elicits a very brief

NOTE Confidence: 0.907491211666667

00:48:45.177 --> 00:48:47.112 head twitch response which mirrors

NOTE Confidence: 0.907491211666667

00:48:47.112 --> 00:48:49.047 its psychedelic effects in humans.

NOTE Confidence: 0.907491211666667

00:48:49.050 --> 00:48:51.130 In terms of the duration,

NOTE Confidence: 0.907491211666667

00:48:51.130 --> 00:48:54.460 5 Methoxy DMT substantially suppresses

NOTE Confidence: 0.907491211666667

00:48:54.460 --> 00:48:57.114 social USB's which potentially could

NOTE Confidence: 0.907491211666667

00:48:57.114 --> 00:48:59.594 could represent the intensity of

NOTE Confidence: 0.907491211666667

00:48:59.594 --> 00:49:02.088 this acute psychedelic effects.

NOTE Confidence: 0.907491211666667

00:49:02.090 --> 00:49:04.022 And a single dose of the short

NOTE Confidence: 0.907491211666667

00:49:04.022 --> 00:49:06.500 acting drug can produce long lasting

NOTE Confidence: 0.907491211666667

00:49:06.500 --> 00:49:08.090 enhancements in neuroplasticity.

NOTE Confidence: 0.907491211666667

00:49:08.090 --> 00:49:10.274 And just to touch on a couple of

NOTE Confidence: 0.907491211666667

00:49:10.274 --> 00:49:12.001 the things that we're actively

NOTE Confidence: 0.907491211666667

00:49:12.001 --> 00:49:13.489 working on right now.

NOTE Confidence: 0.907491211666667

00:49:13.490 --> 00:49:15.250 So as Alex said, we're,

NOTE Confidence: 0.907491211666667

00:49:15.250 --> 00:49:18.310 I'm pretty interested in combining sort

NOTE Confidence: 0.907491211666667

00:49:18.310 --> 00:49:22.130 of systems neuroscience tools with more

NOTE Confidence: 0.907491211666667

00:49:22.130 --> 00:49:24.718 molecular neuroscience tools as well.

NOTE Confidence: 0.907491211666667

00:49:24.718 --> 00:49:27.094 My background is more in molecular

NOTE Confidence: 0.907491211666667

00:49:27.094 --> 00:49:29.369 and behavioral neuroscience.

NOTE Confidence: 0.907491211666667

00:49:29.370 --> 00:49:30.980 And the questions I'm interested

NOTE Confidence: 0.907491211666667

00:49:30.980 --> 00:49:32.810 in addressing are related to #1.

NOTE Confidence: 0.907491211666667

00:49:32.810 --> 00:49:34.685 What's responsible for the acute

NOTE Confidence: 0.907491211666667

00:49:34.685 --> 00:49:37.370 effects of this drug on plasticity?

NOTE Confidence: 0.907491211666667

00:49:37.370 --> 00:49:39.122 And maybe more importantly,

NOTE Confidence: 0.907491211666667

00:49:39.122 --> 00:49:41.750 why are there such enduring effects

NOTE Confidence: 0.907491211666667

00:49:41.823 --> 00:49:44.048 of this drug on neuroplasticity?

NOTE Confidence: 0.907491211666667

00:49:44.050 --> 00:49:45.370 So trying to understand, you know,

NOTE Confidence: 0.907491211666667

00:49:45.370 --> 00:49:48.079 what is it about these centritic spines

NOTE Confidence: 0.907491211666667

00:49:48.079 --> 00:49:50.686 that's causing them to last so long term?

NOTE Confidence: 0.907491211666667

00:49:50.690 --> 00:49:51.850 And if people have questions,

NOTE Confidence: 0.907491211666667

00:49:51.850 --> 00:49:54.482 I can talk more about the the

NOTE Confidence: 0.907491211666667

00:49:54.482 --> 00:49:56.468 specifics of these, you know, finally.

NOTE Confidence: 0.907491211666667

00:49:56.468 --> 00:49:57.898 What are the behavioral consequences

NOTE Confidence: 0.907491211666667

00:49:57.898 --> 00:49:58.880 of these changes?

NOTE Confidence: 0.907491211666667

00:49:58.880 --> 00:50:00.536 I think it's overly simplistic to

NOTE Confidence: 0.907491211666667

00:50:00.536 --> 00:50:02.530 say that plasticity is all good and

NOTE Confidence: 0.907491211666667

00:50:02.530 --> 00:50:03.920 all therapeutic in every region.

NOTE Confidence: 0.907491211666667

00:50:03.920 --> 00:50:06.440 So really understanding, you know,

NOTE Confidence: 0.907491211666667

00:50:06.440 --> 00:50:06.751 #1,

NOTE Confidence: 0.907491211666667

00:50:06.751 --> 00:50:09.239 is this change specific to this brain region?

NOTE Confidence: 0.907491211666667

00:50:09.240 --> 00:50:11.958 And if so,

NOTE Confidence: 0.907491211666667

00:50:11.960 --> 00:50:14.680 what are the behavioral consequences?

NOTE Confidence: 0.907491211666667

00:50:14.680 --> 00:50:16.300 If it's happening brain wide

NOTE Confidence: 0.907491211666667

00:50:16.300 --> 00:50:17.920 that would also be interesting.

NOTE Confidence: 0.907491211666667

00:50:17.920 --> 00:50:20.044 I think there's there's a lot

NOTE Confidence: 0.907491211666667

00:50:20.044 --> 00:50:21.460 of open questions there.

NOTE Confidence: 0.907491211666667

00:50:21.460 --> 00:50:22.504 And then finally,

NOTE Confidence: 0.907491211666667

00:50:22.504 --> 00:50:24.940 we're also interested in looking at other

NOTE Confidence: 0.907491211666667

00:50:25.005 --> 00:50:27.130 classes of psychedelics and looking

NOTE Confidence: 0.907491211666667

00:50:27.130 --> 00:50:29.255 at their effects on neuroplasticity.

NOTE Confidence: 0.907491211666667

00:50:29.260 --> 00:50:31.588 I will mention that we've now

NOTE Confidence: 0.907491211666667

00:50:31.588 --> 00:50:34.032 completed a study with MDMA looking

NOTE Confidence: 0.907491211666667

00:50:34.032 --> 00:50:36.460 at neuroplasticity over time and

NOTE Confidence: 0.907491211666667

00:50:36.460 --> 00:50:41.310 we've actually found that MDMA looks.

NOTE Confidence: 0.907491211666667

00:50:41.310 --> 00:50:42.626 Pretty interesting as well.

NOTE Confidence: 0.907491211666667

00:50:42.626 --> 00:50:44.600 It induces very robust increases in

NOTE Confidence: 0.907491211666667

00:50:44.654 --> 00:50:46.429 neuroplasticity in the short term,

NOTE Confidence: 0.907491211666667

00:50:46.430 --> 00:50:48.728 but the dynamics of the changes

NOTE Confidence: 0.907491211666667

00:50:48.728 --> 00:50:51.524 over time are different from the

NOTE Confidence: 0.907491211666667

00:50:51.524 --> 00:50:54.550 serotonergic psychedelics Okay.

NOTE Confidence: 0.907491211666667

00:50:54.550 --> 00:50:57.181 And just a thank you again to

NOTE Confidence: 0.907491211666667

00:50:57.181 --> 00:50:59.767 the Westman Award Committee to my

NOTE Confidence: 0.907491211666667

00:50:59.767 --> 00:51:01.905 plethora of amazing mentors that

NOTE Confidence: 0.907491211666667

00:51:01.905 --> 00:51:03.825 I've had here at Yale.

NOTE Confidence: 0.907491211666667

00:51:03.830 --> 00:51:06.116 Alex, Al Marina,

NOTE Confidence: 0.907491211666667

00:51:06.116 --> 00:51:06.878 Chris.

NOTE Confidence: 0.907491211666667

00:51:06.880 --> 00:51:08.812 And I'm only mentioning people in

NOTE Confidence: 0.907491211666667

00:51:08.812 --> 00:51:10.962 the Quan lab who directly contributed

NOTE Confidence: 0.907491211666667

00:51:10.962 --> 00:51:13.356 to this study because their group

NOTE Confidence: 0.907491211666667

00:51:13.356 --> 00:51:15.972 is ever expanding and then as well

NOTE Confidence: 0.907491211666667

00:51:15.972 --> 00:51:18.130 to to the K lab in particular,

NOTE Confidence: 0.907491211666667

00:51:18.130 --> 00:51:20.545 Patrick is a post grad working with

NOTE Confidence: 0.907491211666667

00:51:20.545 --> 00:51:23.700 me who really did the the majority

NOTE Confidence: 0.907491211666667

00:51:23.700 --> 00:51:26.145 of the MDMA spine work and we're

NOTE Confidence: 0.907491211666667

00:51:26.145 --> 00:51:28.540 going to be sad to to lose him

NOTE Confidence: 0.907491211666667

00:51:28.540 --> 00:51:30.040 to grad school next year.

NOTE Confidence: 0.907491211666667

00:51:30.040 --> 00:51:31.839 So I'm happy to take any questions.

NOTE Confidence: 0.907491211666667

00:51:31.840 --> 00:51:32.200 Thank you.

NOTE Confidence: 0.935679327272727

00:51:48.370 --> 00:51:49.440 glad that nobody has to

NOTE Confidence: 0.935679327272727

00:51:49.440 --> 00:51:50.810 lick the toads to do this.

NOTE Confidence: 0.935679327272727

00:51:50.810 --> 00:51:53.916 this. is great, great, talk.

NOTE Confidence: 0.935679327272727

00:51:53.916 --> 00:51:57.130 I'm wondering if this finding that you

NOTE Confidence: 0.935679327272727

00:51:57.130 --> 00:51:58.810 have because it was so substantial,

NOTE Confidence: 0.935679327272727

00:51:58.810 --> 00:52:00.960 the increase in spine creation

NOTE Confidence: 0.935679327272727

00:52:00.960 --> 00:52:03.700 on that 24 hour time point.

NOTE Confidence: 0.935679327272727

00:52:03.700 --> 00:52:06.052 Whether there are PET imaging possibilities

NOTE Confidence: 0.935679327272727

00:52:06.052 --> 00:52:08.420 in humans that could be parallel.

NOTE Confidence: 0.935679327272727

00:52:08.420 --> 00:52:11.410 I know the SV2 PET leg and mainly looks at

NOTE Confidence: 0.935679327272727

00:52:11.483 --> 00:52:14.160 presynaptic markers of synapse structure.

NOTE Confidence: 0.935679327272727

00:52:14.160 --> 00:52:16.525 Is there something that you can

NOTE Confidence: 0.935679327272727

00:52:16.525 --> 00:52:18.821 look at that's more presynaptic just

NOTE Confidence: 0.935679327272727

00:52:18.821 --> 00:52:20.856 to parallel that postsynaptic that

NOTE Confidence: 0.935679327272727

00:52:20.856 --> 00:52:22.980 might actually translate to a human

NOTE Confidence: 0.935679327272727

00:52:22.980 --> 00:52:26.858 imaging study pretty quickly, Yeah,

NOTE Confidence: 0.935679327272727

00:52:26.858 --> 00:52:29.246 that that translational aspect is is

NOTE Confidence: 0.935679327272727

00:52:29.246 --> 00:52:31.937 very interesting to me as well, yeah.

NOTE Confidence: 0.935679327272727

00:52:31.937 --> 00:52:35.894 I think that you know certainly with

NOTE Confidence: 0.935679327272727

00:52:35.894 --> 00:52:38.149 kind of more classical immunohisto

NOTE Confidence: 0.935679327272727

00:52:38.149 --> 00:52:40.049 chemistry looking at pre synaptic

NOTE Confidence: 0.935679327272727

00:52:40.049 --> 00:52:42.650 markers that could be like a kind of

NOTE Confidence: 0.935679327272727

00:52:42.650 --> 00:52:46.250 quicker way of getting at that question.

NOTE Confidence: 0.935679327272727

00:52:46.250 --> 00:52:48.772 You know we could just take for example

NOTE Confidence: 0.935679327272727

00:52:48.772 --> 00:52:50.700 a shorter time point and just see if

NOTE Confidence: 0.935679327272727

00:52:50.752 --> 00:52:52.649 the changes in pre synaptic marker is

NOTE Confidence: 0.935679327272727

00:52:52.649 --> 00:52:54.368 parallel the the increases in the.

NOTE Confidence: 0.938423890909091

00:52:57.050 --> 00:52:58.928 Starting point, I know a lot

NOTE Confidence: 0.938423890909091

00:52:58.928 --> 00:53:00.856 of people are looking at SV2A

NOTE Confidence: 0.938423890909091

00:53:00.856 --> 00:53:03.286 with the psychedelics as well.

NOTE Confidence: 0.938423890909091

00:53:03.290 --> 00:53:05.910 So, so I think yeah,

NOTE Confidence: 0.938423890909091

00:53:05.910 --> 00:53:08.346 I think that that's definitely a

NOTE Confidence: 0.938423890909091

00:53:08.346 --> 00:53:10.698 nice pairing that we could do with

NOTE Confidence: 0.938423890909091

00:53:10.698 --> 00:53:12.602 wonderful studies and just to follow

NOTE Confidence: 0.938423890909091

00:53:12.602 --> 00:53:16.640 up on that are people who are taking.

NOTE Confidence: 0.938423890909091

00:53:16.640 --> 00:53:20.078 5 Methoxy DMT that the drug

NOTE Confidence: 0.938423890909091

00:53:20.080 --> 00:53:21.280 do they get very quiet?

NOTE Confidence: 0.938423890909091

00:53:21.280 --> 00:53:24.024 I mean do they they have a very

NOTE Confidence: 0.938423890909091

00:53:24.024 --> 00:53:25.127 internal psychedelic experience

NOTE Confidence: 0.938423890909091

00:53:25.127 --> 00:53:27.570 that would parallel the the loss of

NOTE Confidence: 0.938423890909091

00:53:27.570 --> 00:53:30.720 of sub vocalizations of subsonic,

NOTE Confidence: 0.938423890909091

00:53:30.720 --> 00:53:33.418 ultrasonic Yeah that's that's

NOTE Confidence: 0.938423890909091

00:53:33.418 --> 00:53:34.276 an interesting question.

NOTE Confidence: 0.938423890909091

00:53:34.280 --> 00:53:36.947 I I think that from from what

NOTE Confidence: 0.938423890909091

00:53:36.947 --> 00:53:38.600 I've read about this,

NOTE Confidence: 0.938423890909091

00:53:38.600 --> 00:53:40.700 it seems that they do have a

NOTE Confidence: 0.938423890909091

00:53:40.700 --> 00:53:41.600 pretty internal experience.

NOTE Confidence: 0.938423890909091

00:53:41.600 --> 00:53:43.210 It's.

NOTE Confidence: 0.938423890909091

00:53:43.210 --> 00:53:43.832 You know,

NOTE Confidence: 0.938423890909091

00:53:43.832 --> 00:53:46.009 almost to the point of like ego

NOTE Confidence: 0.938423890909091

00:53:46.009 --> 00:53:47.773 dissolution for some it's it's a

NOTE Confidence: 0.938423890909091

00:53:47.773 --> 00:53:49.144 very intense psychedelic experience.

NOTE Confidence: 0.938423890909091

00:53:49.144 --> 00:53:51.586 So I would imagine that they

NOTE Confidence: 0.938423890909091

00:53:51.586 --> 00:53:53.688 they probably are not really

NOTE Confidence: 0.938423890909091

00:53:53.688 --> 00:53:55.316 interacting with their environment

NOTE Confidence: 0.938423890909091

00:53:55.316 --> 00:53:56.850 in a substantial way.

NOTE Confidence: 0.938423890909091

00:53:56.850 --> 00:53:56.970 Yeah,

NOTE Confidence: 0.93622824

00:54:00.250 --> 00:54:01.330 I had a brief question

NOTE Confidence: 0.939479492307692

00:54:05.650 --> 00:54:08.261 I wanted to ask about the plot

NOTE Confidence: 0.939479492307692

00:54:08.261 --> 00:54:10.120 with the different doses of

NOTE Confidence: 0.939479492307692

00:54:10.120 --> 00:54:12.590 five MEODMT and the psilocybin.

NOTE Confidence: 0.939479492307692

00:54:12.590 --> 00:54:14.388 So just looking at that pot,

NOTE Confidence: 0.939479492307692

00:54:14.390 --> 00:54:15.913 I I wouldn't necessarily pull

NOTE Confidence: 0.939479492307692

00:54:15.913 --> 00:54:17.528 out the differences that people

NOTE Confidence: 0.939479492307692

00:54:17.528 --> 00:54:19.630 talk about with DMT lasting much,

NOTE Confidence: 0.939479492307692

00:54:19.630 --> 00:54:22.542 much shorter than psilocybin

NOTE Confidence: 0.939479492307692

00:54:22.542 --> 00:54:24.490 because all the curves seem to

NOTE Confidence: 0.939479492307692

00:54:24.490 --> 00:54:26.442 come back to baseline in about

NOTE Confidence: 0.939479492307692

00:54:26.442 --> 00:54:28.830 an hour or a little less.

NOTE Confidence: 0.939479492307692

00:54:28.830 --> 00:54:32.950 What do you think are the differences there?

NOTE Confidence: 0.939479492307692

00:54:32.950 --> 00:54:34.668 Like if is it,

NOTE Confidence: 0.939479492307692

00:54:34.668 --> 00:54:36.024 is it a dosing difference between

NOTE Confidence: 0.939479492307692

00:54:36.024 --> 00:54:37.400 what people usually take and

NOTE Confidence: 0.939479492307692

00:54:37.400 --> 00:54:38.910 what's been giving given to the

NOTE Confidence: 0.939479492307692

00:54:38.910 --> 00:54:40.626 mice or is it something else?

NOTE Confidence: 0.9301902

00:54:42.890 --> 00:54:46.665 Yeah. So, well I think that the

NOTE Confidence: 0.9301902

00:54:46.665 --> 00:54:48.160 dose is definitely an important

NOTE Confidence: 0.9301902

00:54:48.221 --> 00:54:49.685 point to to touch on here.

NOTE Confidence: 0.9301902

00:54:49.690 --> 00:54:51.610 You know I I see,

NOTE Confidence: 0.9301902

00:54:51.610 --> 00:54:52.882 I think the other point you're

NOTE Confidence: 0.9301902

00:54:52.882 --> 00:54:54.330 making is about the the duration.

NOTE Confidence: 0.9301902

00:54:54.330 --> 00:54:56.694 Does the duration with this assay

NOTE Confidence: 0.9301902

00:54:56.694 --> 00:54:59.228 really fully reflects the duration of

NOTE Confidence: 0.9301902

00:54:59.228 --> 00:55:01.766 the human psychedelic effect And and I

NOTE Confidence: 0.9301902

00:55:01.766 --> 00:55:03.530 think that that that's a fair point.

NOTE Confidence: 0.9301902

00:55:03.530 --> 00:55:05.530 I think it's not a one to one.

NOTE Confidence: 0.9301902

00:55:05.530 --> 00:55:07.455 You know certainly in humans

NOTE Confidence: 0.9301902

00:55:07.455 --> 00:55:09.380 the the effects of psilocybin

NOTE Confidence: 0.9301902

00:55:09.450 --> 00:55:11.310 are going lasting for hours.

NOTE Confidence: 0.9301902

00:55:11.310 --> 00:55:12.668 You know in terms of the dosing,

NOTE Confidence: 0.9301902

00:55:12.670 --> 00:55:15.226 I think that's a really relevant

NOTE Confidence: 0.9301902

00:55:15.226 --> 00:55:17.683 question to address because the the

NOTE Confidence: 0.9301902

00:55:17.683 --> 00:55:19.638 clinical studies with five methoxy

NOTE Confidence: 0.9301902

00:55:19.638 --> 00:55:24.282 DMT that we have used doses of like

NOTE Confidence: 0.9301902

00:55:24.282 --> 00:55:26.674 6/12/18 milligrams and typically

NOTE Confidence: 0.9301902

00:55:26.674 --> 00:55:28.846 whereas the doses that we're using

NOTE Confidence: 0.9301902

00:55:28.846 --> 00:55:31.546 here like the 20 mig per kig dose

NOTE Confidence: 0.9301902

00:55:31.546 --> 00:55:33.182 would roughly be equivalent to

NOTE Confidence: 0.9301902

00:55:33.182 --> 00:55:34.946 like 90 milligrams in a human.

NOTE Confidence: 0.9301902

00:55:34.950 --> 00:55:37.158 So this is a really quite a high

NOTE Confidence: 0.9301902

00:55:37.158 --> 00:55:38.940 dose if you look at it that way.

NOTE Confidence: 0.9301902

00:55:38.940 --> 00:55:41.156 So I think that that is also a

NOTE Confidence: 0.9301902

00:55:41.156 --> 00:55:42.490 pretty important question going

NOTE Confidence: 0.9301902

00:55:42.490 --> 00:55:44.644 forward is can we achieve similar

NOTE Confidence: 0.9301902

00:55:44.644 --> 00:55:46.738 effects with doses that are more

NOTE Confidence: 0.9301902

00:55:46.738 --> 00:55:48.373 relevant to the human studies?

NOTE Confidence: 0.9301902

00:55:48.380 --> 00:55:48.580 Great.

NOTE Confidence: 0.9301902

00:55:48.580 --> 00:55:48.980 Thank you.

NOTE Confidence: 0.9301902

00:55:48.980 --> 00:55:49.180 Thank

NOTE Confidence: 0.8736241

00:56:07.220 --> 00:56:07.820 you, Sarah.

NOTE Confidence: 0.91606288

00:56:11.900 --> 00:56:12.444 Oh, perfect.

NOTE Confidence: 0.91606288

00:56:12.444 --> 00:56:16.264 Oh, that would be what are we

NOTE Confidence: 0.91606288

00:56:16.264 --> 00:56:18.620 looking for here for a video?

NOTE Confidence: 0.91606288

00:56:18.620 --> 00:56:20.900 OK, it's not in the PowerPoint.

NOTE Confidence: 0.91606288

00:56:20.900 --> 00:56:22.584 It's a separate form.

NOTE Confidence: 0.91606288

00:56:22.584 --> 00:56:25.765 I think it is our next speaker.

NOTE Confidence: 0.91606288

00:56:25.765 --> 00:56:27.070 It's right here.

NOTE Confidence: 0.91606288

00:56:27.070 --> 00:56:28.458 Our next speaker right here, Yep,

NOTE Confidence: 0.91606288

00:56:28.458 --> 00:56:30.306 our next speaker is Jay Lee,

NOTE Confidence: 0.91606288

00:56:30.310 --> 00:56:33.157 who was the 2nd year resident and

NOTE Confidence: 0.91606288

00:56:33.157 --> 00:56:35.119 he has done some really innovative

NOTE Confidence: 0.91606288

00:56:35.119 --> 00:56:36.974 work in Uganda bringing some

NOTE Confidence: 0.91606288

00:56:36.974 --> 00:56:38.984 work there to help alleviate

NOTE Confidence: 0.91606288

00:56:38.984 --> 00:56:40.618 stigma and psychiatric treatment.

NOTE Confidence: 0.91606288

00:56:40.618 --> 00:56:43.186 We will be introduced by Dr.

NOTE Confidence: 0.91606288

00:56:43.190 --> 00:56:44.070 Robert Rosenpeck.

NOTE Confidence: 0.9452853

00:56:51.690 --> 00:56:54.868 So I should mention for the historical

NOTE Confidence: 0.9452853

00:56:54.868 --> 00:56:57.956 record that 50 years ago Jeff Lesman,

NOTE Confidence: 0.9452853

00:56:57.956 --> 00:57:00.960 the son of Seymour Lesman and I.

NOTE Confidence: 0.9452853

00:57:00.960 --> 00:57:03.710 Began our careers at Yale,

NOTE Confidence: 0.9452853

00:57:03.710 --> 00:57:05.902 walking down the Carters of the VA

NOTE Confidence: 0.9452853

00:57:05.902 --> 00:57:08.790 to do what every resident must do.

NOTE Confidence: 0.9452853

00:57:08.790 --> 00:57:09.790 Get fingerprinted.

NOTE Confidence: 0.936899065

00:57:13.110 --> 00:57:15.030 So, Jeff, if you're out there,

NOTE Confidence: 0.936899065

00:57:15.030 --> 00:57:16.068 here's the longevity.

NOTE Confidence: 0.940253531666667

00:57:18.550 --> 00:57:21.586 Jay Lee is a remarkable person.

NOTE Confidence: 0.940253531666667

00:57:21.590 --> 00:57:22.198 The ordinary.

NOTE Confidence: 0.940253531666667

00:57:22.198 --> 00:57:25.770 So we we shift now to global mental health.

NOTE Confidence: 0.940253531666667

00:57:25.770 --> 00:57:29.698 Jay Lee was born in Korea.

NOTE Confidence: 0.940253531666667

00:57:29.700 --> 00:57:30.980 Came to the United States,

NOTE Confidence: 0.940253531666667

00:57:30.980 --> 00:57:33.393 was in a military family and traveled,

NOTE Confidence: 0.940253531666667

00:57:33.393 --> 00:57:36.940 lived in many places around the country.

NOTE Confidence: 0.940253531666667

00:57:36.940 --> 00:57:41.444 And what he developed as a kind of a

NOTE Confidence: 0.940253531666667

00:57:41.444 --> 00:57:44.424 modus Vivendi was a way of fitting into

NOTE Confidence: 0.940253531666667

00:57:44.424 --> 00:57:46.580 places where he shouldn't have fit in.

NOTE Confidence: 0.940253531666667

00:57:46.580 --> 00:57:49.700 And it wasn't enough to do this in

NOTE Confidence: 0.940253531666667

00:57:49.700 --> 00:57:53.260 the US and in the American South.

NOTE Confidence: 0.940253531666667

00:57:53.260 --> 00:57:54.420 He had to go further.

NOTE Confidence: 0.940253531666667

00:57:54.420 --> 00:57:56.256 And so he worked in China.

NOTE Confidence: 0.940253531666667

00:57:56.260 --> 00:57:57.340 Now he didn't go to China

NOTE Confidence: 0.933544666666667

00:57:57.340 --> 00:57:58.060 as a tourist.

NOTE Confidence: 0.91141744

00:57:58.060 --> 00:57:59.260 This is in college.

NOTE Confidence: 0.590716674

00:57:59.690 --> 00:58:01.034 Medical school Over the

NOTE Confidence: 0.590716674

00:58:01.034 --> 00:58:03.210 years he went and lived

NOTE Confidence: 0.94780115

00:58:03.210 --> 00:58:04.450 there and was involved.

NOTE Confidence: 0.9402536

00:58:05.530 --> 00:58:06.568 China was mild,

NOTE Confidence: 0.933065457142857

00:58:06.730 --> 00:58:08.890 so he was looking for a place where

NOTE Confidence: 0.933065457142857

00:58:08.890 --> 00:58:10.648 he could have a new experience

NOTE Confidence: 0.9402536

00:58:11.370 --> 00:58:13.146 and he chose Africa,

NOTE Confidence: 0.9402536

00:58:13.146 --> 00:58:15.366 spent some time in Ghana,

NOTE Confidence: 0.9402536

00:58:15.370 --> 00:58:17.250 then ended up in Uganda.

NOTE Confidence: 0.9402536

00:58:17.250 --> 00:58:19.210 He's an incredible networker,

NOTE Confidence: 0.9402536

00:58:19.210 --> 00:58:23.395 connected with people and created Empower

NOTE Confidence: 0.9402536

00:58:23.395 --> 00:58:26.930 Health in a rural area in Uganda,

NOTE Confidence: 0.9402536

00:58:26.930 --> 00:58:29.108 now most researchers.

NOTE Confidence: 0.9402536

00:58:29.108 --> 00:58:31.160 Service researchers find a

NOTE Confidence: 0.9402536

00:58:31.160 --> 00:58:33.380 health system and study it.

NOTE Confidence: 0.9402536

00:58:33.380 --> 00:58:35.400 Jay, with his incredible talents,

NOTE Confidence: 0.9402536

00:58:35.400 --> 00:58:37.965 created a health system and

NOTE Confidence: 0.9402536

00:58:37.965 --> 00:58:40.920 now is beginning to study it.

NOTE Confidence: 0.9402536

00:58:40.920 --> 00:58:44.408 He started a program in which

NOTE Confidence: 0.9402536

00:58:44.408 --> 00:58:47.060 thirty students from both

NOTE Confidence: 0.9402536

00:58:47.060 --> 00:58:50.288 Uganda and the US are paying to

NOTE Confidence: 0.9402536

00:58:50.288 --> 00:58:53.700 go spend their time with him.

NOTE Confidence: 0.9402536

00:58:53.700 --> 00:58:56.165 They are doing research and

NOTE Confidence: 0.9402536

00:58:56.165 --> 00:58:57.442 learning clinical work.

NOTE Confidence: 0.9402536

00:58:57.442 --> 00:58:59.397 Many of these are undergraduates

NOTE Confidence: 0.9402536

00:58:59.397 --> 00:59:00.179 and graduates.

NOTE Confidence: 0.9402536

00:59:00.180 --> 00:59:00.860 So he's

NOTE Confidence: 0.953671343333333

00:59:00.900 --> 00:59:03.420 a social entrepreneur of incredible

NOTE Confidence: 0.945285193333333

00:59:03.420 --> 00:59:08.120 talent and this is the beginning of what

NOTE Confidence: 0.945285193333333

00:59:08.120 --> 00:59:10.562 will be a research career which will

NOTE Confidence: 0.945285193333333

00:59:10.562 --> 00:59:12.940 be layered on top of that. Thank you.

NOTE Confidence: 0.921661518181818

00:59:17.500 --> 00:59:18.427 Greetings from Uganda.

NOTE Confidence: 0.921661518181818

00:59:18.427 --> 00:59:21.040 I apologize that I cannot join in person,

NOTE Confidence: 0.921661518181818

00:59:21.040 --> 00:59:23.063 but it's such an honor to be

NOTE Confidence: 0.921661518181818

00:59:23.063 --> 00:59:24.360 recognized for this award.

NOTE Confidence: 0.921661518181818

00:59:24.360 --> 00:59:26.128 My name is Jay, I'm a second year

NOTE Confidence: 0.921661518181818

00:59:26.128 --> 00:59:27.619 resident in the program and today

NOTE Confidence: 0.921661518181818

00:59:27.619 --> 00:59:29.510 I'm going to be talking about a

NOTE Confidence: 0.921661518181818

00:59:29.510 --> 00:59:31.200 novel intervention that we conducted

NOTE Confidence: 0.921661518181818

00:59:31.200 --> 00:59:33.508 to destigmatize mental illness in a

NOTE Confidence: 0.921661518181818

00:59:33.508 --> 00:59:36.826 rural area of a low income country.

NOTE Confidence: 0.921661518181818

00:59:36.830 --> 00:59:39.038 So I wanted to give you a little

NOTE Confidence: 0.921661518181818

00:59:39.038 --> 00:59:41.147 bit of context of this work.

NOTE Confidence: 0.921661518181818

00:59:41.150 --> 00:59:43.579 So I've worked in rural Uganda on

NOTE Confidence: 0.921661518181818

00:59:43.579 --> 00:59:45.550 various health related interventions,

NOTE Confidence: 0.921661518181818

00:59:45.550 --> 00:59:47.902 specifically the Basuga region in the

NOTE Confidence: 0.921661518181818

00:59:47.902 --> 00:59:52.110 eastern region of Uganda since 2015.

NOTE Confidence: 0.921661518181818

00:59:52.110 --> 00:59:53.950 And in 2018, you know,

NOTE Confidence: 0.921661518181818

00:59:53.950 --> 00:59:55.890 I started A51C3 organization

NOTE Confidence: 0.921661518181818

00:59:55.890 --> 00:59:57.830 called Empowered Through Help.

NOTE Confidence: 0.921661518181818

00:59:57.830 --> 00:59:59.990 And currently, we provide healthcare,

NOTE Confidence: 0.921661518181818

00:59:59.990 --> 01:00:01.875 General Healthcare to a catchment

NOTE Confidence: 0.921661518181818

01:00:01.875 --> 01:00:03.383 area of 70,000 people,

NOTE Confidence: 0.921661518181818

01:00:03.390 --> 01:00:05.215 mental healthcare to a catchment

NOTE Confidence: 0.921661518181818

01:00:05.215 --> 01:00:07.722 area of 400,000 people and we

NOTE Confidence: 0.921661518181818

01:00:07.722 --> 01:00:09.051 conduct experiential fellowships

NOTE Confidence: 0.921661518181818

01:00:09.051 --> 01:00:11.321 for pre doctoral Ugandan and

NOTE Confidence: 0.921661518181818

01:00:11.321 --> 01:00:13.069 American students this summer.

NOTE Confidence: 0.921661518181818

01:00:13.070 --> 01:00:16.154 We have approximately 55 students in

NOTE Confidence: 0.921661518181818

01:00:16.154 --> 01:00:18.614 total and they work collaboratively

NOTE Confidence: 0.921661518181818

01:00:18.614 --> 01:00:21.044 on global mental health projects.

NOTE Confidence: 0.921661518181818

01:00:21.050 --> 01:00:23.990 And in 2021, we started providing

NOTE Confidence: 0.921661518181818

01:00:23.990 --> 01:00:25.786 mental healthcare you know,

NOTE Confidence: 0.921661518181818

01:00:25.786 --> 01:00:28.642 to people out of our Health Center

NOTE Confidence: 0.921661518181818

01:00:28.650 --> 01:00:30.449 and this is a very rural area.

NOTE Confidence: 0.921661518181818

01:00:30.450 --> 01:00:31.890 You know, there was no,

NOTE Confidence: 0.921661518181818

01:00:31.890 --> 01:00:32.676 you know,

NOTE Confidence: 0.921661518181818

01:00:32.676 --> 01:00:34.641 evidence based on mental healthcare

NOTE Confidence: 0.921661518181818

01:00:34.641 --> 01:00:36.489 system available in this area.

NOTE Confidence: 0.921661518181818

01:00:36.490 --> 01:00:38.938 So we realized that you know in order

NOTE Confidence: 0.921661518181818

01:00:38.938 --> 01:00:41.248 to increase mental healthcare seeking,

NOTE Confidence: 0.921661518181818

01:00:41.250 --> 01:00:44.813 we need to do some educational programs

NOTE Confidence: 0.921661518181818

01:00:44.813 --> 01:00:47.593 and some sensitization programs to to

NOTE Confidence: 0.921661518181818

01:00:47.593 --> 01:00:49.697 let people know that you know we have.

NOTE Confidence: 0.921661518181818

01:00:49.700 --> 01:00:51.420 Medications that that can work,

NOTE Confidence: 0.921661518181818

01:00:51.420 --> 01:00:54.348 that can help for things like

NOTE Confidence: 0.921661518181818

01:00:54.348 --> 01:00:55.812 psychosis and mania.

NOTE Confidence: 0.921661518181818

01:00:55.820 --> 01:00:57.076 So I looked at,

NOTE Confidence: 0.921661518181818

01:00:57.076 --> 01:00:58.646 you know what other interventions

NOTE Confidence: 0.921661518181818

01:00:58.646 --> 01:01:00.543 have been done to encourage

NOTE Confidence: 0.921661518181818

01:01:00.543 --> 01:01:02.059 healthcare seeking for mental

NOTE Confidence: 0.921661518181818

01:01:02.059 --> 01:01:04.099 illnesses in low income countries.

NOTE Confidence: 0.921661518181818

01:01:04.100 --> 01:01:06.697 And frankly I didn't find very much

NOTE Confidence: 0.921661518181818

01:01:06.700 --> 01:01:08.828 but the but the condition that has

NOTE Confidence: 0.921661518181818

01:01:08.828 --> 01:01:10.778 had better funding and global health

NOTE Confidence: 0.921661518181818

01:01:10.780 --> 01:01:13.265 that's got many parallels in my opinion

NOTE Confidence: 0.921661518181818

01:01:13.265 --> 01:01:15.460 to chronic mental illnesses like

NOTE Confidence: 0.921661518181818

01:01:15.460 --> 01:01:18.220 schizophrenia and bipolar disorder is HIV,

NOTE Confidence: 0.921661518181818

01:01:18.220 --> 01:01:18.603 AIDS.

NOTE Confidence: 0.921661518181818

01:01:18.603 --> 01:01:21.284 They're similar in that they're both chronic,

NOTE Confidence: 0.921661518181818

01:01:21.290 --> 01:01:22.754 they're both heavily stigmatized.

NOTE Confidence: 0.921661518181818

01:01:22.754 --> 01:01:24.950 So I looked at what interventions

NOTE Confidence: 0.921661518181818

01:01:25.013 --> 01:01:26.927 have been conducted before for HIV,

NOTE Confidence: 0.921661518181818

01:01:26.930 --> 01:01:28.928 AIDS and there was some really

NOTE Confidence: 0.921661518181818

01:01:28.928 --> 01:01:30.656 good evidence for creative based

NOTE Confidence: 0.921661518181818

01:01:30.656 --> 01:01:32.008 interventions and among these

NOTE Confidence: 0.921661518181818

01:01:32.008 --> 01:01:34.290 the other had the most evidence.

NOTE Confidence: 0.921661518181818

01:01:34.290 --> 01:01:36.300 So we subsequently developed and

NOTE Confidence: 0.921661518181818

01:01:36.300 --> 01:01:37.908 conducted the first evaluation

NOTE Confidence: 0.921661518181818

01:01:37.908 --> 01:01:39.935 of a creative based intervention

NOTE Confidence: 0.921661518181818

01:01:39.935 --> 01:01:41.885 to reduce mental illness stigma

NOTE Confidence: 0.921661518181818

01:01:41.885 --> 01:01:44.492 in a low income country aimed at

NOTE Confidence: 0.921661518181818

01:01:44.492 --> 01:01:45.569 the general population.

NOTE Confidence: 0.91994499375

01:01:47.680 --> 01:01:49.880 So here are the methods that we utilize.

NOTE Confidence: 0.91994499375

01:01:49.880 --> 01:01:52.072 So the first step was to find the

NOTE Confidence: 0.91994499375

01:01:52.072 --> 01:01:53.749 current beliefs and attitudes for

NOTE Confidence: 0.91994499375

01:01:53.749 --> 01:01:55.879 severe mental illness in the population

NOTE Confidence: 0.91994499375

01:01:55.880 --> 01:01:58.315 and utilizing that information we

NOTE Confidence: 0.91994499375

01:01:58.315 --> 01:02:00.750 developed the criteria for intervention

NOTE Confidence: 0.91994499375

01:02:00.823 --> 01:02:02.958 which is the other intervention.

NOTE Confidence: 0.91994499375

01:02:02.960 --> 01:02:05.474 And then we evaluated the effectiveness

NOTE Confidence: 0.91994499375

01:02:05.474 --> 01:02:07.543 of the intervention using a

NOTE Confidence: 0.91994499375

01:02:07.543 --> 01:02:09.475 single arm pre post study design.

NOTE Confidence: 0.93220288

01:02:11.610 --> 01:02:12.930 So to start off with,

NOTE Confidence: 0.93220288

01:02:12.930 --> 01:02:15.240 we conducted 4 focus groups with

NOTE Confidence: 0.93220288

01:02:15.240 --> 01:02:17.414 community members from from the area

NOTE Confidence: 0.93220288

01:02:17.414 --> 01:02:20.018 that we are that we are working and we

NOTE Confidence: 0.93220288

01:02:20.018 --> 01:02:21.538 utilize this information to develop

NOTE Confidence: 0.93220288

01:02:21.538 --> 01:02:23.409 a criteria for the intervention.

NOTE Confidence: 0.93220288

01:02:23.410 --> 01:02:26.040 So our aim was to not. Change beliefs,

NOTE Confidence: 0.93220288

01:02:26.040 --> 01:02:28.260 but to work within existing beliefs,

NOTE Confidence: 0.93220288

01:02:28.260 --> 01:02:30.540 to add the belief that medications

NOTE Confidence: 0.93220288

01:02:30.540 --> 01:02:33.180 can be helpful for conditions such

NOTE Confidence: 0.93220288

01:02:33.180 --> 01:02:36.940 as like such as psychosis, Amania,

NOTE Confidence: 0.93220288

01:02:36.940 --> 01:02:40.480 and to incorporate those new beliefs

NOTE Confidence: 0.93220288

01:02:40.480 --> 01:02:43.076 within the existing belief and

NOTE Confidence: 0.93220288

01:02:43.076 --> 01:02:44.420 then the theatrical intervention.

NOTE Confidence: 0.93220288

01:02:44.420 --> 01:02:47.528 So from the focus groups we developed

NOTE Confidence: 0.93220288

01:02:47.528 --> 01:02:49.870 the criteria of you know what we want

NOTE Confidence: 0.93220288

01:02:49.870 --> 01:02:51.938 to see in the seen that the others get.

NOTE Confidence: 0.93220288

01:02:51.940 --> 01:02:54.070 So outside of that was up

NOTE Confidence: 0.93220288

01:02:54.070 --> 01:02:55.135 to the participants,

NOTE Confidence: 0.93220288

01:02:55.140 --> 01:02:57.625 up to the audience or up to

NOTE Confidence: 0.93220288

01:02:57.625 --> 01:02:59.818 the community to come up with,

NOTE Confidence: 0.93220288

01:02:59.820 --> 01:03:00.534 you know,

NOTE Confidence: 0.93220288

01:03:00.534 --> 01:03:03.033 useful the other skits that they found

NOTE Confidence: 0.93220288

01:03:03.033 --> 01:03:05.524 was entertaining and that they found

NOTE Confidence: 0.93220288

01:03:05.524 --> 01:03:08.058 was that that they found was helpful.

NOTE Confidence: 0.93220288

01:03:08.060 --> 01:03:10.370 So we had a competition for

NOTE Confidence: 0.93220288

01:03:10.370 --> 01:03:12.484 the best the other skit.

NOTE Confidence: 0.93220288

01:03:12.484 --> 01:03:14.724 So four different teams competed

NOTE Confidence: 0.93220288

01:03:14.724 --> 01:03:18.232 and and the winner was a group that

NOTE Confidence: 0.93220288

01:03:18.232 --> 01:03:20.645 portrayed A relatable story of an

NOTE Confidence: 0.93220288

01:03:20.645 --> 01:03:22.233 individual with mental illness.

NOTE Confidence: 0.93220288

01:03:22.240 --> 01:03:24.800 So if he had what looks like psychosis,

NOTE Confidence: 0.93220288

01:03:24.800 --> 01:03:27.040 so at first he took him to

NOTE Confidence: 0.93220288

01:03:27.040 --> 01:03:28.820 traditional healer, He was still sick.

NOTE Confidence: 0.93220288

01:03:28.820 --> 01:03:30.530 After that they took him to

NOTE Confidence: 0.93220288

01:03:30.599 --> 01:03:32.399 religious leader for prayers.

NOTE Confidence: 0.93220288

01:03:32.400 --> 01:03:33.516 He was still sick after that.

NOTE Confidence: 0.93220288

01:03:33.520 --> 01:03:35.128 And then he got some medication

NOTE Confidence: 0.93220288

01:03:35.128 --> 01:03:37.451 and then he got better and he got

NOTE Confidence: 0.93220288

01:03:37.451 --> 01:03:39.583 functional enough so that he could hold

NOTE Confidence: 0.93220288

01:03:39.583 --> 01:03:41.919 down the job as a motorcycle taxi driver,

NOTE Confidence: 0.93220288

01:03:41.920 --> 01:03:43.695 which is a wellregarded profession

NOTE Confidence: 0.93220288

01:03:43.695 --> 01:03:45.115 in the village setting.

NOTE Confidence: 0.94780115

01:03:47.960 --> 01:03:49.660 And to evaluate the

NOTE Confidence: 0.94780115

01:03:49.660 --> 01:03:51.360 effectiveness of this program,

NOTE Confidence: 0.94780115

01:03:51.360 --> 01:03:55.165 we utilize the 61 item questionnaire as

NOTE Confidence: 0.94780115

01:03:55.165 --> 01:03:58.315 measuring demographics as well as stigma.

NOTE Confidence: 0.94780115

01:03:58.320 --> 01:03:59.875 So the Sigma questionnaire in

NOTE Confidence: 0.94780115

01:03:59.875 --> 01:04:01.775 particular was taken by from a

NOTE Confidence: 0.94780115

01:04:01.775 --> 01:04:03.479 study that Doctor Rosenhack and Dr.

NOTE Confidence: 0.94780115

01:04:03.480 --> 01:04:05.140 Iannacho conducted in Nigeria

NOTE Confidence: 0.94780115

01:04:05.140 --> 01:04:06.800 a few years ago.

NOTE Confidence: 0.94780115

01:04:06.800 --> 01:04:09.000 And we also divided that

NOTE Confidence: 0.94780115

01:04:09.000 --> 01:04:10.760 up into two categories,

NOTE Confidence: 0.94780115

01:04:10.760 --> 01:04:12.615 broad acceptance scale and the

NOTE Confidence: 0.94780115

01:04:12.615 --> 01:04:13.728 Personal Acceptance Scale.

NOTE Confidence: 0.94780115

01:04:13.730 --> 01:04:15.878 And so in general,

NOTE Confidence: 0.94780115

01:04:15.878 --> 01:04:18.026 broad acceptance scale reflected

NOTE Confidence: 0.94780115

01:04:18.026 --> 01:04:20.959 structural stigma and personal acceptance

NOTE Confidence: 0.94780115

01:04:20.959 --> 01:04:23.924 scale reflected public public stigma.

NOTE Confidence: 0.94780115

01:04:23.930 --> 01:04:25.218 So this is kind of like the

NOTE Confidence: 0.94780115

01:04:25.218 --> 01:04:26.490 flow chart of the evaluation.

NOTE Confidence: 0.94780115

01:04:26.490 --> 01:04:28.570 So initially we selected 101

NOTE Confidence: 0.94780115

01:04:28.570 --> 01:04:30.650 participants randomly to get the

NOTE Confidence: 0.94780115

01:04:30.724 --> 01:04:33.250 initial questionnaire and of the 100,

NOTE Confidence: 0.94780115

01:04:33.250 --> 01:04:36.110 one 77 watch the intervention.

NOTE Confidence: 0.94780115

01:04:36.110 --> 01:04:39.372 And 57 of the 77 were administered

NOTE Confidence: 0.94780115

01:04:39.372 --> 01:04:41.842 A questionnaire one week later and

NOTE Confidence: 0.94780115

01:04:41.842 --> 01:04:44.660 46 of the 57 were administered A

NOTE Confidence: 0.94780115

01:04:44.660 --> 01:04:46.850 questionnaire one year later to

NOTE Confidence: 0.94780115

01:04:46.850 --> 01:04:49.230 evaluate the long term effect.

NOTE Confidence: 0.94780115

01:04:49.230 --> 01:04:52.983 So the results, so as you can see here,

NOTE Confidence: 0.94780115

01:04:52.990 --> 01:04:54.962 the broad acceptance scale,

NOTE Confidence: 0.94780115

01:04:54.962 --> 01:04:57.150 so people begin accepting those

NOTE Confidence: 0.94780115

01:04:57.150 --> 01:04:58.350 with mental illness.

NOTE Confidence: 0.94780115

01:04:58.350 --> 01:05:00.505 We're having more accepting beliefs

NOTE Confidence: 0.94780115

01:05:00.505 --> 01:05:02.660 towards those with mental illness

NOTE Confidence: 0.94780115

01:05:02.730 --> 01:05:04.920 quite significantly as you can see.

NOTE Confidence: 0.94780115

01:05:04.920 --> 01:05:06.970 And also for the Personal

NOTE Confidence: 0.94780115

01:05:06.970 --> 01:05:08.200 Acceptance Scale too.

NOTE Confidence: 0.94780115

01:05:08.200 --> 01:05:10.558 And these are some effect sizes.

NOTE Confidence: 0.94780115

01:05:10.560 --> 01:05:11.704 As you can see,

NOTE Confidence: 0.94780115

01:05:11.704 --> 01:05:13.420 the coins D reflects almost like

NOTE Confidence: 0.94780115

01:05:13.489 --> 01:05:15.379 a difference in one standard

NOTE Confidence: 0.94780115

01:05:15.379 --> 01:05:17.200 deviation for both broad and

NOTE Confidence: 0.94780115

01:05:17.200 --> 01:05:18.280 Personal Acceptance Scale.

NOTE Confidence: 0.94780115

01:05:18.280 --> 01:05:21.480 And it also shows that that that change

NOTE Confidence: 0.94780115

01:05:21.480 --> 01:05:23.440 has persisted not over like one week,

NOTE Confidence: 0.94780115

01:05:23.440 --> 01:05:26.158 but over the course of one year as well.

NOTE Confidence: 0.938386512

01:05:29.690 --> 01:05:31.370 So some significant findings of this

NOTE Confidence: 0.938386512

01:05:31.370 --> 01:05:33.492 study is that this was the first

NOTE Confidence: 0.938386512

01:05:33.492 --> 01:05:34.756 study that evaluated effectiveness

NOTE Confidence: 0.938386512

01:05:34.756 --> 01:05:36.437 of a creative based intervention

NOTE Confidence: 0.938386512

01:05:36.437 --> 01:05:38.142 for reducing mental illness stigma

NOTE Confidence: 0.938386512

01:05:38.142 --> 01:05:42.569 in low income countries and it was

NOTE Confidence: 0.938386512

01:05:42.569 --> 01:05:45.434 very notable the persistent and

NOTE Confidence: 0.938386512

01:05:45.434 --> 01:05:47.810 significant and large effect sizes

NOTE Confidence: 0.938386512

01:05:47.810 --> 01:05:50.060 throughout the personal and broad

NOTE Confidence: 0.938386512

01:05:50.060 --> 01:05:52.327 acceptance scale at both time points.

NOTE Confidence: 0.938386512

01:05:52.330 --> 01:05:54.395 And you know, it's notable that this

NOTE Confidence: 0.938386512

01:05:54.395 --> 01:05:56.536 was much greater than most comfortable

NOTE Confidence: 0.938386512

01:05:56.536 --> 01:05:58.421 interventions that have been conducted

NOTE Confidence: 0.938386512

01:05:58.421 --> 01:06:00.167 in high income countries that showed

NOTE Confidence: 0.938386512

01:06:00.167 --> 01:06:02.090 more of a modest effect size.

NOTE Confidence: 0.938386512

01:06:02.090 --> 01:06:03.600 And a possible explanation could

NOTE Confidence: 0.938386512

01:06:03.600 --> 01:06:05.500 be that in high income countries

NOTE Confidence: 0.938386512

01:06:05.500 --> 01:06:07.810 there's just so much media to consume,

NOTE Confidence: 0.938386512

01:06:07.810 --> 01:06:09.770 whereas in the area that we work,

NOTE Confidence: 0.938386512

01:06:09.770 --> 01:06:12.521 there's one TV for the village that's

NOTE Confidence: 0.938386512

01:06:12.521 --> 01:06:15.445 a communal TV that people utilize to

NOTE Confidence: 0.938386512

01:06:15.445 --> 01:06:18.410 watch Uganda play soccer or you know,

NOTE Confidence: 0.938386512

01:06:18.410 --> 01:06:21.830 have seen major presidential addresses.

NOTE Confidence: 0.938386512

01:06:21.830 --> 01:06:24.894 But there's not a lot of media that's

NOTE Confidence: 0.938386512

01:06:24.894 --> 01:06:26.821 available which could help explain

NOTE Confidence: 0.938386512

01:06:26.821 --> 01:06:29.790 the a very large effect size as well.

NOTE Confidence: 0.938386512

01:06:29.790 --> 01:06:31.782 The strength of the study was

NOTE Confidence: 0.938386512

01:06:31.782 --> 01:06:33.110 this community based approach.

NOTE Confidence: 0.938386512

01:06:33.110 --> 01:06:34.163 So you know,

NOTE Confidence: 0.938386512

01:06:34.163 --> 01:06:36.269 we didn't design the intervention ourselves.

NOTE Confidence: 0.938386512

01:06:36.270 --> 01:06:38.630 We just gave a criteria of what the

NOTE Confidence: 0.938386512

01:06:38.630 --> 01:06:40.333 intervention should include and it was

NOTE Confidence: 0.938386512

01:06:40.333 --> 01:06:42.315 up to the community to develop something

NOTE Confidence: 0.938386512

01:06:42.315 --> 01:06:44.385 that was relatable to the audience.

NOTE Confidence: 0.938386512

01:06:44.390 --> 01:06:46.630 And so you know that was certainly a

NOTE Confidence: 0.938386512

01:06:46.630 --> 01:06:48.904 strength and could have like also contributed

NOTE Confidence: 0.938386512

01:06:48.904 --> 01:06:51.079 to the strong effect size as well.

NOTE Confidence: 0.938386512

01:06:51.080 --> 01:06:52.844 And a weakness of the study was

NOTE Confidence: 0.938386512

01:06:52.844 --> 01:06:54.559 that there is no control group

NOTE Confidence: 0.938386512

01:06:54.560 --> 01:06:55.800 just by the study design.

NOTE Confidence: 0.938386512

01:06:55.800 --> 01:06:59.392 This is a single arm pre post design,

NOTE Confidence: 0.938386512

01:06:59.392 --> 01:07:02.152 so social desirability bias could

NOTE Confidence: 0.938386512

01:07:02.152 --> 01:07:05.364 certainly factor in to factor in

NOTE Confidence: 0.938386512

01:07:05.364 --> 01:07:07.874 to biasing the results here.

NOTE Confidence: 0.938386512

01:07:07.880 --> 01:07:09.435 And another possibility is that

NOTE Confidence: 0.938386512

01:07:09.435 --> 01:07:10.679 attrition could be nonrandom,

NOTE Confidence: 0.938386512

01:07:10.680 --> 01:07:12.755 although there is no statistically

NOTE Confidence: 0.938386512

01:07:12.755 --> 01:07:14.415 significant differences in demographics

NOTE Confidence: 0.938386512

01:07:14.415 --> 01:07:16.505 as well as initial stigma level

NOTE Confidence: 0.938386512

01:07:16.505 --> 01:07:17.474 between the groups.

NOTE Confidence: 0.94629164

01:07:19.520 --> 01:07:21.360 And here are some references

NOTE Confidence: 0.94629164

01:07:21.360 --> 01:07:24.560 and acknowledgments.

NOTE Confidence: 0.94629164

01:07:24.560 --> 01:07:26.408 Appreciation goes out to the entire

NOTE Confidence: 0.94629164

01:07:26.408 --> 01:07:27.640 Empowered Through Health team,

NOTE Confidence: 0.94629164

01:07:27.640 --> 01:07:29.090 as well as from the

NOTE Confidence: 0.94629164

01:07:29.090 --> 01:07:29.960 community Health workers,

NOTE Confidence: 0.94629164

01:07:29.960 --> 01:07:32.880 my many mentors and friends.

NOTE Confidence: 0.94629164

01:07:32.880 --> 01:07:33.318 Thank you. So

NOTE Confidence: 0.935940714285714

01:07:42.070 --> 01:07:44.268 Jay is in Uganda at this moment.

NOTE Confidence: 0.935940714285714

01:07:44.270 --> 01:07:45.705 I think he might be on Zoom,

NOTE Confidence: 0.935940714285714

01:07:45.710 --> 01:07:47.390 though. Are you on Zoom?

NOTE Confidence: 0.935940714285714

01:07:47.390 --> 01:07:50.814 Jay? I'm here. You're here.

NOTE Confidence: 0.935940714285714

01:07:50.814 --> 01:07:52.979 Oh, wonderful. Okay wonderful.

NOTE Confidence: 0.94528525

01:07:58.500 --> 01:08:00.260 Any questions for Jay?

NOTE Confidence: 0.941259873

01:08:08.100 --> 01:08:09.708 I'm just curious of what a

NOTE Confidence: 0.941259873

01:08:09.708 --> 01:08:10.780 placebo would look like.

NOTE Confidence: 0.941259873

01:08:10.780 --> 01:08:13.271 Would it just be a a presentation

NOTE Confidence: 0.941259873

01:08:13.271 --> 01:08:16.697 that was not on the topic?

NOTE Confidence: 0.941259873

01:08:16.700 --> 01:08:18.338 How, how would that be designed?

NOTE Confidence: 0.93220288

01:08:20.090 --> 01:08:22.370 Yeah. So first of all,

NOTE Confidence: 0.93220288

01:08:22.370 --> 01:08:24.064 I think like the first part of

NOTE Confidence: 0.93220288

01:08:24.064 --> 01:08:25.210 my presentation where I think,

NOTE Confidence: 0.93220288

01:08:25.210 --> 01:08:26.410 you know, like the Lustman Committee

NOTE Confidence: 0.93220288

01:08:26.410 --> 01:08:29.455 and Lustman family as well as,

NOTE Confidence: 0.93220288

01:08:29.455 --> 01:08:31.330 as well as even acknowledging

NOTE Confidence: 0.93220288

01:08:31.330 --> 01:08:33.090 the honor I was cut out.

NOTE Confidence: 0.93220288

01:08:33.090 --> 01:08:34.592 So I'd like to do that.

NOTE Confidence: 0.93220288

01:08:34.592 --> 01:08:35.929 And I'd also like to thank Doctor

NOTE Confidence: 0.93220288

01:08:35.930 --> 01:08:36.848 Rose and that for his very

NOTE Confidence: 0.93220288

01:08:36.850 --> 01:08:38.738 generous introduction as well.

NOTE Confidence: 0.93220288

01:08:38.738 --> 01:08:42.150 So we're doing a follow up study.

NOTE Confidence: 0.93220288

01:08:42.150 --> 01:08:44.990 This is going to be like a cluster

NOTE Confidence: 0.93220288

01:08:44.990 --> 01:08:47.319 randomized control trial of a radio

NOTE Confidence: 0.93220288

01:08:47.319 --> 01:08:48.990 intervention to measure you know

NOTE Confidence: 0.93220288

01:08:48.990 --> 01:08:50.270 the difference between stickman.

NOTE Confidence: 0.93220288

01:08:50.270 --> 01:08:52.685 What we're doing there is a control

NOTE Confidence: 0.93220288

01:08:52.685 --> 01:08:54.905 group is listening to programs that

NOTE Confidence: 0.93220288

01:08:54.905 --> 01:08:57.206 are not related to mental illness,

NOTE Confidence: 0.93220288

01:08:57.206 --> 01:08:59.498 but they're they're they're you know,

NOTE Confidence: 0.93220288

01:08:59.498 --> 01:09:02.203 listening to some random programs and

NOTE Confidence: 0.93220288

01:09:02.203 --> 01:09:05.086 you know we're serving pre and post.

NOTE Confidence: 0.93220288

01:09:05.086 --> 01:09:08.744 And the idea is that the idea is

NOTE Confidence: 0.93220288

01:09:08.744 --> 01:09:10.263 that that could be a control group.

NOTE Confidence: 0.798143828571429

01:09:22.350 --> 01:09:24.462 So I see a question on the chat

NOTE Confidence: 0.798143828571429

01:09:24.462 --> 01:09:26.409 about major depress of this order.

NOTE Confidence: 0.798143828571429

01:09:26.410 --> 01:09:28.696 In the community that we work

NOTE Confidence: 0.798143828571429

01:09:28.696 --> 01:09:30.490 major depressive disorder is not

NOTE Confidence: 0.798143828571429

01:09:30.490 --> 01:09:33.450 really regarded as mental illness.

NOTE Confidence: 0.798143828571429

01:09:33.450 --> 01:09:35.410 You know generally when people think

NOTE Confidence: 0.798143828571429

01:09:35.410 --> 01:09:37.222 of mental illness or you know they

NOTE Confidence: 0.798143828571429

01:09:37.222 --> 01:09:39.559 call it disease disease of the skull.

NOTE Confidence: 0.798143828571429

01:09:39.559 --> 01:09:41.680 Do you think of four things once

NOTE Confidence: 0.798143828571429

01:09:41.749 --> 01:09:43.930 bipolar disorder, schizophrenia,

NOTE Confidence: 0.798143828571429

01:09:43.930 --> 01:09:47.130 very severe alcohol use disorder

NOTE Confidence: 0.798143828571429

01:09:47.130 --> 01:09:48.410 and epilepsy.

NOTE Confidence: 0.798143828571429

01:09:48.410 --> 01:09:49.930 So those four are considered

NOTE Confidence: 0.798143828571429

01:09:49.930 --> 01:09:51.450 to be like mental illnesses.

NOTE Confidence: 0.798143828571429

01:09:51.450 --> 01:09:53.862 So you know that that could be like the

NOTE Confidence: 0.798143828571429

01:09:53.862 --> 01:09:56.407 topic for a future studies but you know at.

NOTE Confidence: 0.798143828571429

01:09:56.410 --> 01:09:57.898 1st we need to know more about like

NOTE Confidence: 0.798143828571429

01:09:57.898 --> 01:09:59.227 the local conceptions of depression

NOTE Confidence: 0.798143828571429

01:09:59.227 --> 01:10:01.650 and how to and how to address that.

NOTE Confidence: 0.798143828571429

01:10:01.650 --> 01:10:02.661 And we're doing,

NOTE Confidence: 0.798143828571429

01:10:02.661 --> 01:10:04.683 we're partly doing that this summer,

NOTE Confidence: 0.798143828571429

01:10:04.690 --> 01:10:05.060 You know,

NOTE Confidence: 0.798143828571429

01:10:05.060 --> 01:10:06.170 like we're not doing an intervention,

NOTE Confidence: 0.798143828571429

01:10:06.170 --> 01:10:07.190 but we're, you know,

NOTE Confidence: 0.798143828571429

01:10:07.190 --> 01:10:09.310 studying it more in terms of like

NOTE Confidence: 0.798143828571429

01:10:09.310 --> 01:10:10.685 the local attitudes and beliefs.