WEBVTT

- NOTE duration:"01:09:51.2640000"
- NOTE language:en-us
- NOTE Confidence: 0.85609347
- $00:00:00.000 \dashrightarrow 00:00:03.320$  For the annual Flynn Lecture an it's my
- NOTE Confidence: 0.85609347
- $00:00:03.320 \rightarrow 00:00:06.275$  pleasure to be able to introduce both
- NOTE Confidence: 0.85609347
- $00:00:06.275 \rightarrow 00:00:09.540$  the lecture and also our speaker today,
- NOTE Confidence: 0.85609347
- $00{:}00{:}09{.}540 \dashrightarrow 00{:}00{:}12.604$  so the Flint Lecture is in honor of
- NOTE Confidence: 0.85609347
- $00:00:12.604 \rightarrow 00:00:15.588$  a faculty member in our department.
- NOTE Confidence: 0.85609347
- 00:00:15.590 --> 00:00:16.954 Doctor John P. Flynn,
- NOTE Confidence: 0.85609347
- $00{:}00{:}16.954 \dashrightarrow 00{:}00{:}19.630$  who was a pioneer in the understanding
- NOTE Confidence: 0.85609347
- $00{:}00{:}19.630 \dashrightarrow 00{:}00{:}22.936$  how the brain contributes to behavior,
- NOTE Confidence: 0.85609347
- $00:00:22.940 \longrightarrow 00:00:25.971$  and it's hard to think now of
- NOTE Confidence: 0.85609347
- 00:00:25.971 -> 00:00:28.120 how revolutionary his work was,
- NOTE Confidence: 0.85609347
- $00:00:28.120 \longrightarrow 00:00:29.584$  but in particular.
- NOTE Confidence: 0.85609347
- 00:00:29.584 --> 00:00:33.600 I look back to this paper from 1964,
- NOTE Confidence: 0.85609347
- $00:00:33.600 \rightarrow 00:00:36.564$  which Full disclosure I was already
- NOTE Confidence: 0.85609347
- $00:00:36.564 \rightarrow 00:00:40.424$  born but just barely and what he and

 $00:00:40.424 \rightarrow 00:00:43.118$  his colleagues did was to stimulate

NOTE Confidence: 0.85609347

 $00{:}00{:}43.215 \dashrightarrow 00{:}00{:}46.545$  part of the cat brain and to find that

NOTE Confidence: 0.85609347

 $00{:}00{:}46.545 \dashrightarrow 00{:}00{:}51.204$  the cat would attack a rat or another.

NOTE Confidence: 0.85609347

 $00{:}00{:}51{.}210 \dashrightarrow 00{:}00{:}54{.}346$  Other rat sorry a cat would attacker at

NOTE Confidence: 0.85609347

 $00:00:54.346 \rightarrow 00:00:57.891$  yes and that this would be completely

NOTE Confidence: 0.85609347

 $00{:}00{:}57.891 \dashrightarrow 00{:}01{:}00.561$  independent of any other stimulus.

NOTE Confidence: 0.85609347

 $00:01:00.570 \rightarrow 00:01:03.846$  Any other thing happening in the environment?

NOTE Confidence: 0.85609347

 $00{:}01{:}03.850 \dashrightarrow 00{:}01{:}05.718$  Just this electrical stimulation

NOTE Confidence: 0.85609347

00:01:05.718 --> 00:01:07.586 could result in attack,

NOTE Confidence: 0.85609347

 $00:01:07.590 \dashrightarrow 00:01:10.824$  and it began to form our concept

NOTE Confidence: 0.85609347

 $00{:}01{:}10.824 \dashrightarrow 00{:}01{:}13.694$  that aggression had a brain basis

NOTE Confidence: 0.85609347

 $00{:}01{:}13.694 \dashrightarrow 00{:}01{:}16.478$  and this work is still inspiring.

NOTE Confidence: 0.85609347

00:01:16.480 --> 00:01:17.755 Today in 2011,

NOTE Confidence: 0.85609347

 $00{:}01{:}17.755 \dashrightarrow 00{:}01{:}20.305$  a paper in which the hypothalamus

NOTE Confidence: 0.85609347

 $00{:}01{:}20.305 \dashrightarrow 00{:}01{:}22.619$  was stimulated with light.

 $00:01:22.620 \rightarrow 00:01:25.115$  In using novel molecular genetic

NOTE Confidence: 0.85609347

 $00{:}01{:}25{.}115 \dashrightarrow 00{:}01{:}28{.}107$  tools was really based very much

NOTE Confidence: 0.85609347

00:01:28.107 - 00:01:30.949 on this 1964 paper and Alan Lewis,

NOTE Confidence: 0.85609347

 $00:01:30.950 \longrightarrow 00:01:34.359$  who was a resident in our department

NOTE Confidence: 0.85609347

 $00:01:34.359 \rightarrow 00:01:36.969$  and who worked in our lab,

NOTE Confidence: 0.85609347

 $00:01:36.970 \longrightarrow 00:01:39.748$  also followed up on this work

NOTE Confidence: 0.85609347

 $00:01:39.748 \longrightarrow 00:01:40.674$  using molecular,

NOTE Confidence: 0.85609347

 $00:01:40.680 \rightarrow 00:01:42.800$  genetic and pharmacological tools.

NOTE Confidence: 0.85609347

00:01:42.800 --> 00:01:45.980 Looking at Astro choline and its

NOTE Confidence: 0.85609347

 $00{:}01{:}46.061 \dashrightarrow 00{:}01{:}48.053$  receptors so seriously influential

NOTE Confidence: 0.85609347

 $00{:}01{:}48.053 \dashrightarrow 00{:}01{:}51.041$  from the time that this work

NOTE Confidence: 0.85609347

 $00:01:51.125 \longrightarrow 00:01:53.339$  was done to the present day.

NOTE Confidence: 0.85609347

 $00{:}01{:}53{.}340 \dashrightarrow 00{:}01{:}56{.}140$  I also want to note that we have

NOTE Confidence: 0.85609347

 $00:01:56.140 \dashrightarrow 00:01:58.489$ Doctor Flynn's daughter Sarah Flynn.

NOTE Confidence: 0.85609347

00:01:58.490 --> 00:02:00.716 Joining us today and it's always

NOTE Confidence: 0.85609347

00:02:00.716 --> 00:02:03.393 been one of the real pleasures of

- NOTE Confidence: 0.85609347
- $00:02:03.393 \longrightarrow 00:02:05.990$  this of this lecture for me to
- NOTE Confidence: 0.85609347
- 00:02:06.070 --> 00:02:08.390 meet Doctor Flynn's late life,
- NOTE Confidence: 0.85609347
- 00:02:08.390 --> 00:02:10.370 Holda and his daughter Sarah.
- NOTE Confidence: 0.85609347
- $00:02:10.370 \rightarrow 00:02:13.925$  I wish that we could be meeting in person,
- NOTE Confidence: 0.85609347
- $00:02:13.930 \longrightarrow 00:02:16.306$  but certainly in the coming years.
- NOTE Confidence: 0.85609347
- $00{:}02{:}16{.}310 \dashrightarrow 00{:}02{:}18{.}686$  As as we move beyond this
- NOTE Confidence: 0.85609347
- 00:02:18.686 --> 00:02:20.270 pandemic will move back,
- NOTE Confidence: 0.85609347
- $00:02:20.270 \longrightarrow 00:02:22.274$  hopefully to to having
- NOTE Confidence: 0.85609347
- $00:02:22.274 \longrightarrow 00:02:24.278$  this lecture in person.
- NOTE Confidence: 0.85609347
- $00{:}02{:}24.280 \dashrightarrow 00{:}02{:}27.298$  The winners of or the winners.
- NOTE Confidence: 0.85609347
- $00:02:27.300 \longrightarrow 00:02:30.499$  The presenters of this lecture have been
- NOTE Confidence: 0.85609347
- $00:02:30.499 \rightarrow 00:02:33.350$  luminaries and our current presenter,
- NOTE Confidence: 0.85609347
- $00:02:33.350 \longrightarrow 00:02:37.206$  Doctor Campti is is no less of a
- NOTE Confidence: 0.85609347
- $00:02:37.206 \longrightarrow 00:02:40.290$  luminary than any of our previous
- NOTE Confidence: 0.85609347
- 00:02:40.290 --> 00:02:43.940 presenters Ann Dr Ty did her work.
- NOTE Confidence: 0.85609347

 $00:02:43.940 \rightarrow 00:02:47.454$  Her undergraduate training at the at MIT,

NOTE Confidence: 0.85609347

 $00:02:47.460 \longrightarrow 00:02:51.219$  where she graduated with a major in

NOTE Confidence: 0.85609347

 $00:02:51.219 \dashrightarrow 00:02:54.599$  brain and cognitive sciences in 2003.

NOTE Confidence: 0.85609347

00:02:54.600 --> 00:02:57.967 After taking a year off to travel,

NOTE Confidence: 0.85609347

 $00{:}02{:}57{.}970 \dashrightarrow 00{:}03{:}00{.}693$ she joined Patricia Genics lab at UCSF

NOTE Confidence: 0.85609347

 $00{:}03{:}00{.}693 \dashrightarrow 00{:}03{:}03{.}740$  and began her work in electrophysiological NOTE Confidence: 0.85609347

00:03:03.740 --> 00:03:06.136 recording from brain areas.

NOTE Confidence: 0.85609347

 $00{:}03{:}06{.}140 \dashrightarrow 00{:}03{:}08{.}064$  Important for emotional behavior

NOTE Confidence: 0.85609347

 $00{:}03{:}08{.}064 \dashrightarrow 00{:}03{:}10{.}469$  and connecting those circuits too.

NOTE Confidence: 0.85609347

 $00{:}03{:}10.470 \dashrightarrow 00{:}03{:}11.928$  Important behavioral outputs.

NOTE Confidence: 0.85609347

 $00{:}03{:}11{.}928 \dashrightarrow 00{:}03{:}14{.}844$  She then moved to Carl Daesrath

NOTE Confidence: 0.85609347

00:03:14.844 --> 00:03:16.794 Laboratory at Stanford University

NOTE Confidence: 0.85609347

00:03:16.794 --> 00:03:18.646 as a postdoctoral fellow,

NOTE Confidence: 0.85609347

 $00:03:18.650 \longrightarrow 00:03:21.536$  where she began to use the

NOTE Confidence: 0.85609347

 $00:03:21.536 \dashrightarrow 00:03:22.979$  molecular genetic approaches.

NOTE Confidence: 0.85609347

 $00:03:22.980 \rightarrow 00:03:25.560$  The labeling approaches to identify

- NOTE Confidence: 0.85609347
- 00:03:25.560 -> 00:03:27.108 specific neuronal subtypes.
- NOTE Confidence: 0.85609347
- $00:03:27.110 \longrightarrow 00:03:29.228$  These stimulate stimula Tori approaches that
- NOTE Confidence: 0.85609347
- 00:03:29.228 --> 00:03:31.860 allowed her to isolate specific sub circuits,
- NOTE Confidence: 0.85609347
- $00{:}03{:}31{.}860 \dashrightarrow 00{:}03{:}33{.}680$  and these tools allowed her
- NOTE Confidence: 0.85609347
- $00:03:33.680 \longrightarrow 00:03:35.136$  to unleash your creativity.
- NOTE Confidence: 0.85609347
- $00{:}03{:}35{.}140 \dashrightarrow 00{:}03{:}37{.}464$  Ann became the basis of the work
- NOTE Confidence: 0.85609347
- $00:03:37.464 \longrightarrow 00:03:39.715$  that her lab members she and
- NOTE Confidence: 0.85609347
- 00:03:39.715 --> 00:03:42.073 her lab members have been doing.
- NOTE Confidence: 0.85609347
- 00:03:42.080 --> 00:03:43.202 To this day,
- NOTE Confidence: 0.85609347
- $00:03:43.202 \rightarrow 00:03:45.072$  she became an assistant professor
- NOTE Confidence: 0.85609347
- 00:03:45.072 --> 00:03:46.459 at MIT in 2012,
- NOTE Confidence: 0.84423935
- $00:03:46.460 \longrightarrow 00:03:47.920$  was rapidly promoted to
- NOTE Confidence: 0.84423935
- $00:03:47.920 \rightarrow 00:03:49.380$  associate professor with tenure,
- NOTE Confidence: 0.84423935
- $00:03:49.380 \longrightarrow 00:03:51.200$  and then moved her laboratory
- NOTE Confidence: 0.84423935
- $00:03:51.200 \longrightarrow 00:03:52.656$  to the Salk Institute,
- NOTE Confidence: 0.84423935

 $00:03:52.660 \rightarrow 00:03:55.876$  where she was promoted to professor.

NOTE Confidence: 0.84423935

 $00:03:55.880 \dashrightarrow 00:03:57.800$  Doctor Ty is currently professor

NOTE Confidence: 0.84423935

 $00:03:57.800 \longrightarrow 00:04:00.240$  and the Wiley Veiled Chair of

NOTE Confidence: 0.84423935

00:04:00.240 --> 00:04:02.515 Systems Neuroscience at the Salk

NOTE Confidence: 0.84423935

 $00{:}04{:}02{.}515 \dashrightarrow 00{:}04{:}04{.}335$  Institute for Biological Sciences.

NOTE Confidence: 0.84423935

 $00{:}04{:}04{.}340 \dashrightarrow 00{:}04{:}07{.}700$  She's also an adjunct faculty member at the

NOTE Confidence: 0.84423935

 $00{:}04{:}07.700 \dashrightarrow 00{:}04{:}10.688$  University of California at San Diego and,

NOTE Confidence: 0.84423935

 $00:04:10.690 \longrightarrow 00:04:11.854$  as I mentioned,

NOTE Confidence: 0.84423935

00:04:11.854 $\operatorname{-->}$ 00:04:14.182 her research broadly is focused on

NOTE Confidence: 0.84423935

 $00{:}04{:}14.182 \dashrightarrow 00{:}04{:}16.074$  understanding the neurobiological mechanisms

NOTE Confidence: 0.84423935

00:04:16.074 --> 00:04:18.469 underlying social and emotional processes

NOTE Confidence: 0.84423935

 $00:04:18.469 \rightarrow 00:04:21.678$  at the circuit level at the cellular level,

NOTE Confidence: 0.84423935

 $00:04:21.680 \longrightarrow 00:04:23.632$  at the synaptic level,

NOTE Confidence: 0.84423935

 $00{:}04{:}23.632 \dashrightarrow 00{:}04{:}25.584$  and particularly those relevant

NOTE Confidence: 0.84423935

 $00{:}04{:}25{.}584 \dashrightarrow 00{:}04{:}27{.}200$  to psychiatric illness.

NOTE Confidence: 0.84423935

 $00:04:27.200 \rightarrow 00:04:29.582$  Professor ties been recognized with a

- NOTE Confidence: 0.84423935
- $00{:}04{:}29.582 \dashrightarrow 00{:}04{:}31.640$  number of prestigious research awards.
- NOTE Confidence: 0.84423935

00:04:31.640 --> 00:04:32.412 In fact,

NOTE Confidence: 0.84423935

 $00{:}04{:}32{.}412 \dashrightarrow 00{:}04{:}36{.}004$  it's hard to find out an award that has

NOTE Confidence: 0.84423935

 $00:04:36.004 \rightarrow 00:04:39.712$  not really pulled out her work to to honor.

NOTE Confidence: 0.84423935

 $00{:}04{:}39{.}720 \dashrightarrow 00{:}04{:}41{.}745$  She received the NIH Director's

NOTE Confidence: 0.84423935

00:04:41.745 --> 00:04:42.960 New Innovator Award,

NOTE Confidence: 0.84423935

 $00:04:42.960 \rightarrow 00:04:44.980$  the presidential early Career award.

NOTE Confidence: 0.84423935

 $00:04:44.980 \longrightarrow 00:04:45.786$  For scientists,

NOTE Confidence: 0.84423935

 $00{:}04{:}45.786 \dashrightarrow 00{:}04{:}46.995$  scientists and engineering

NOTE Confidence: 0.84423935

 $00:04:46.995 \longrightarrow 00:04:48.607$  from the White House,

NOTE Confidence: 0.84423935

00:04:48.610 --> 00:04:50.222 the Society for Neuroscience

NOTE Confidence: 0.84423935

 $00{:}04{:}50{.}222 \dashrightarrow 00{:}04{:}51{.}834$  is Young Investigator award.

NOTE Confidence: 0.84423935

 $00{:}04{:}51{.}840 \dashrightarrow 00{:}04{:}54{.}190$  She was listed as technology

NOTE Confidence: 0.84423935

 $00{:}04{:}54{.}190 \dashrightarrow 00{:}04{:}56{.}540$  reviews Top 35 in among.

NOTE Confidence: 0.84423935

 $00:04:56.540 \rightarrow 00:04:59.634$  The reviews top 35 innovators under 35.

 $00:04:59.640 \longrightarrow 00:05:01.408$  She received the NIH

NOTE Confidence: 0.84423935

00:05:01.408 --> 00:05:02.734 Director's Pioneer Award,

NOTE Confidence: 0.84423935

 $00{:}05{:}02{.}740 \dashrightarrow 00{:}05{:}04{.}955$  and she's also been recognized

NOTE Confidence: 0.84423935

 $00:05:04.955 \longrightarrow 00:05:07.170$  with a number of awards.

NOTE Confidence: 0.84423935

 $00{:}05{:}07{.}170 \dashrightarrow 00{:}05{:}09{.}390$  From mentoring at the undergraduate,

NOTE Confidence: 0.84423935

 $00:05:09.390 \rightarrow 00:05:11.278$  graduate and postdoctoral level,

NOTE Confidence: 0.84423935

 $00:05:11.278 \dashrightarrow 00:05:15.080$  and this is a place where I know

NOTE Confidence: 0.84423935

 $00:05:15.080 \rightarrow 00:05:17.720$  that she really has made incredible

NOTE Confidence: 0.84423935

00:05:17.720 $\operatorname{-->}$ 00:05:20.680 efforts and I want to highlight her

NOTE Confidence: 0.84423935

 $00{:}05{:}20.680 \dashrightarrow 00{:}05{:}23.646$  trainees who have been at the forefront

NOTE Confidence: 0.84423935

00:05:23.646 --> 00:05:26.544 of the wiki project to recognize.

NOTE Confidence: 0.84423935

00:05:26.550 - 00:05:28.202 Scientists who are generally

NOTE Confidence: 0.84423935

00:05:28.202 --> 00:05:29.028 under represented,

NOTE Confidence: 0.84423935

 $00:05:29.030 \longrightarrow 00:05:31.210$  both women and members of

NOTE Confidence: 0.84423935

 $00{:}05{:}31{.}210$ --> $00{:}05{:}32{.}954$  underrepresented groups in Wikipedia

NOTE Confidence: 0.84423935

 $00:05:32.954 \rightarrow 00:05:35.236$  for the work that they've done,

- NOTE Confidence: 0.84423935
- $00:05:35.240 \longrightarrow 00:05:36.896$  and it's no short.
- NOTE Confidence: 0.84423935
- $00{:}05{:}36{.}896 \dashrightarrow 00{:}05{:}38{.}966$  Nothing short of a revolution.
- NOTE Confidence: 0.84423935
- $00{:}05{:}38{.}970 \dashrightarrow 00{:}05{:}41{.}616$  What she and her trainees have done
- NOTE Confidence: 0.84423935
- $00:05:41.616 \rightarrow 00:05:44.350$  to further the efforts of outreach,
- NOTE Confidence: 0.84423935
- $00{:}05{:}44.350 \dashrightarrow 00{:}05{:}47.490$  diversity and inclusion in science.
- NOTE Confidence: 0.84423935
- $00:05:47.490 \longrightarrow 00:05:49.800$  So without any further ado,
- NOTE Confidence: 0.84423935
- $00:05:49.800 \rightarrow 00:05:52.720$  I'm going to now.
- NOTE Confidence: 0.84423935
- $00:05:52.720 \longrightarrow 00:05:55.222$  Turn the podium over to doctor
- NOTE Confidence: 0.84423935
- $00{:}05{:}55{.}222 \dashrightarrow 00{:}05{:}56{.}056$  ties presentation.
- NOTE Confidence: 0.84423935
- $00:05:56.060 \longrightarrow 00:05:58.145$  She will be joining us
- NOTE Confidence: 0.84423935
- $00:05:58.145 \longrightarrow 00:06:00.230$  for questions at the end,
- NOTE Confidence: 0.84423935
- $00{:}06{:}00{.}230 \dashrightarrow 00{:}06{:}03{.}558$  so please do put them in the chat.
- NOTE Confidence: 0.84423935
- $00{:}06{:}03.560 \dashrightarrow 00{:}06{:}06{.}738$  I will moderate the chat as after
- NOTE Confidence: 0.84423935
- $00{:}06{:}06{.}738 \dashrightarrow 00{:}06{:}08{.}961$  the presentation is finished and
- NOTE Confidence: 0.84423935
- $00{:}06{:}08{.}961 \dashrightarrow 00{:}06{:}11{.}656$  I hope that you will all join
- NOTE Confidence: 0.84423935

00:06:11.656 --> 00:06:14.280 me in welcoming doctor Thai.

NOTE Confidence: 0.84423935

00:06:14.280 --> 00:06:18.160 And I will now. Share her presentation.

NOTE Confidence: 0.83259946

 $00:06:25.790 \rightarrow 00:06:28.382$  Hi, it's such a pleasure to be here

NOTE Confidence: 0.83259946

00:06:28.382 --> 00:06:30.770 for the Flynn lecture at Yale,

NOTE Confidence: 0.83259946

 $00{:}06{:}30{.}770 \dashrightarrow 00{:}06{:}32{.}842$  where I'm going to tell you about

NOTE Confidence: 0.83259946

 $00{:}06{:}32{.}842 \dashrightarrow 00{:}06{:}34{.}682$  the neural circuits of motivational

NOTE Confidence: 0.83259946

 $00:06:34.682 \rightarrow 00:06:36.470$  processing focusing on violence.

NOTE Confidence: 0.68969816

 $00:06:40.450 \rightarrow 00:06:44.626$  Some stimuli carry innate emotional valence.

NOTE Confidence: 0.68969816

 $00:06:44.630 \longrightarrow 00:06:47.480$  No training or learning is required

NOTE Confidence: 0.68969816

 $00:06:47.480 \rightarrow 00:06:50.059$  to have emotional responses to them.

NOTE Confidence: 0.68969816

00:06:50.060 --> 00:06:51.940 Other stimuli are initially neutral,

NOTE Confidence: 0.68969816

 $00:06:51.940 \rightarrow 00:06:53.810$  unless paired with an emotionally

NOTE Confidence: 0.68969816

00:06:53.810 --> 00:06:54.558 significant stimulus.

NOTE Confidence: 0.68969816

 $00:06:54.560 \rightarrow 00:06:57.560$  So to have an emotional response to this,

NOTE Confidence: 0.68969816

 $00:06:57.560 \rightarrow 00:07:01.344$  we need to learn the associations between the

NOTE Confidence: 0.68969816

 $00:07:01.344 \rightarrow 00:07:04.956$  Twin Towers and the horrific events of 911.

 $00{:}07{:}04.960 \dashrightarrow 00{:}07{:}08.434$  There's been quite a bit of controversy in my

NOTE Confidence: 0.68969816

 $00:07:08.434 \rightarrow 00:07:11.201$  field about whether emotion is experienced

NOTE Confidence: 0.68969816

 $00:07:11.201 \rightarrow 00:07:14.797$  by humans and by animals in the same way.

NOTE Confidence: 0.68969816

00:07:14.800 - 00:07:16.960 There is no way to ever really know

NOTE Confidence: 0.68969816

 $00:07:16.960 \longrightarrow 00:07:19.298$  how an animal experiences emotion.

NOTE Confidence: 0.68969816

 $00{:}07{:}19{.}300 \dashrightarrow 00{:}07{:}21{.}700$  There is no way to say whether it

NOTE Confidence: 0.68969816

 $00{:}07{:}21.700 \dashrightarrow 00{:}07{:}24.489$  is the same as a humans experience.

NOTE Confidence: 0.68969816

 $00:07:24.490 \longrightarrow 00:07:27.138$  There's also no way for me to ever

NOTE Confidence: 0.68969816

 $00:07:27.138 \rightarrow 00:07:29.428$  truly know whether my subjectively

NOTE Confidence: 0.68969816

 $00:07:29.428 \dashrightarrow 00:07:32.008$  experienced emotions are the same

NOTE Confidence: 0.68969816

 $00{:}07{:}32.008 \dashrightarrow 00{:}07{:}34.439$  or different as another humans.

NOTE Confidence: 0.68969816

 $00{:}07{:}34{.}440 \dashrightarrow 00{:}07{:}36{.}282$  So you know what I'm interested

NOTE Confidence: 0.68969816

 $00{:}07{:}36.282 \dashrightarrow 00{:}07{:}37.203$  in is emotion.

NOTE Confidence: 0.68969816

 $00:07:37.210 \dashrightarrow 00:07:39.366$  What I actually study is motivated behavior.

NOTE Confidence: 0.8249697

 $00:07:41.570 \longrightarrow 00:07:43.310$  I've always been interested in how

 $00:07:43.310 \longrightarrow 00:07:44.867$  we assign positive negative balance

NOTE Confidence: 0.8249697

 $00{:}07{:}44.867 \dashrightarrow 00{:}07{:}46.584$  to environmental cues. For example,

NOTE Confidence: 0.8249697

 $00{:}07{:}46.584 \dashrightarrow 00{:}07{:}49.930$  think of a track star and a war veteran.

NOTE Confidence: 0.8249697

 $00:07:49.930 \rightarrow 00:07:52.695$  They both had the same auditory stimulus,

NOTE Confidence: 0.8249697

 $00{:}07{:}52{.}700 \dashrightarrow 00{:}07{:}53{.}756$  bang a gunshot.

NOTE Confidence: 0.8249697

 $00{:}07{:}53.756 \dashrightarrow 00{:}07{:}56.740$  The track star might have a rush of

NOTE Confidence: 0.8249697

 $00{:}07{:}56.740 \dashrightarrow 00{:}07{:}58.940$  excitement while the war veteran

NOTE Confidence: 0.8249697

 $00:07:58.940 \rightarrow 00:08:01.810$  might have sensations of panic or fear,

NOTE Confidence: 0.8249697

 $00{:}08{:}01{.}810 \dashrightarrow 00{:}08{:}04{.}078$  someone presented with these stimuli many

NOTE Confidence: 0.8249697

 $00:08:04.078 \rightarrow 00:08:06.170$  times without consequences may habituate.

NOTE Confidence: 0.8249697

00:08:06.170 --> 00:08:07.355 An experienced neutral

NOTE Confidence: 0.8249697

 $00:08:07.355 \longrightarrow 00:08:08.935$  valence and low arousal.

NOTE Confidence: 0.8249697

 $00:08:08.940 \longrightarrow 00:08:11.306$  So why would the same sound produce

NOTE Confidence: 0.8249697

 $00{:}08{:}11.306 \dashrightarrow 00{:}08{:}13.690$  opposing reactions in different individuals?

NOTE Confidence: 0.8249697

00:08:13.690 - 00:08:15.638 Sure, they've had different

NOTE Confidence: 0.8249697

 $00:08:15.638 \rightarrow 00:08:17.586$  experiences in the past.

 $00:08:17.590 \rightarrow 00:08:19.613$  That have changed the way they experience

NOTE Confidence: 0.8249697

00:08:19.613 --> 00:08:21.084 their environment now, but how?

NOTE Confidence: 0.8249697

 $00:08:21.084 \longrightarrow 00:08:23.198$  How do our brains tell us if

NOTE Confidence: 0.8249697

 $00:08:23.198 \rightarrow 00:08:24.530$  something is good or bad?

NOTE Confidence: 0.8249697

 $00:08:24.530 \dashrightarrow 00:08:27.266$  What actually makes our brains different?

NOTE Confidence: 0.8249697

 $00{:}08{:}27{.}270 \dashrightarrow 00{:}08{:}29{.}881$  Solving this mystery would shed light on

NOTE Confidence: 0.8249697

 $00:08:29.881 \rightarrow 00:08:31.729$  the fundamental principles of survival,

NOTE Confidence: 0.8249697

 $00:08:31.730 \rightarrow 00:08:34.334$  as well as really help us understanding.

NOTE Confidence: 0.8249697

 $00{:}08{:}34{.}340 \dashrightarrow 00{:}08{:}37{.}106$  The key hallmark features of many

NOTE Confidence: 0.8249697

 $00:08:37.106 \longrightarrow 00:08:38.950$  different psychiatric disease states.

NOTE Confidence: 0.8249697

 $00:08:38.950 \longrightarrow 00:08:40.936$  So by plotting things here in

NOTE Confidence: 0.8249697

 $00{:}08{:}40{.}936 \dashrightarrow 00{:}08{:}43{.}123$  a simplified version of the two

NOTE Confidence: 0.8249697

 $00:08:43.123 \rightarrow 00:08:44.707$  dimensional theory of emotion,

NOTE Confidence: 0.8249697

 $00{:}08{:}44.710 \dashrightarrow 00{:}08{:}47.027$  where on one axis we have the

NOTE Confidence: 0.8249697

 $00:08:47.027 \longrightarrow 00:08:48.670$  intensity or the arousal,

 $00{:}08{:}48.670 \dashrightarrow 00{:}08{:}51.190$  and on the other axis we have

NOTE Confidence: 0.8249697

 $00{:}08{:}51{.}190 \dashrightarrow 00{:}08{:}52{.}270$  balance orthodontic value.

NOTE Confidence: 0.8249697

 $00:08:52.270 \longrightarrow 00:08:53.778$  This is the implication,

NOTE Confidence: 0.8249697

 $00:08:53.778 \dashrightarrow 00:08:57.149$  and this is we can also compare this.

NOTE Confidence: 0.8249697

 $00{:}08{:}57{.}150 \dashrightarrow 00{:}08{:}59{.}230$  Framework with another framework called

NOTE Confidence: 0.8249697

 $00:08:59.230 \dashrightarrow 00:09:02.217$  the two factor theory of emotion that

NOTE Confidence: 0.8249697

00:09:02.217 --> 00:09:04.307 suggests an order of operations.

NOTE Confidence: 0.8249697

 $00:09:04.310 \dashrightarrow 00:09:06.830$  And then she got back to theory of motion.

NOTE Confidence: 0.8249697

00:09:06.830 --> 00:09:08.462 We think about stimuli that coming

NOTE Confidence: 0.8249697

 $00:09:08.462 \rightarrow 00:09:10.739$  in and the first question we have to

NOTE Confidence: 0.8249697

 $00:09:10.739 \rightarrow 00:09:12.622$  ask ourselves is, is this stimulus important?

NOTE Confidence: 0.8249697

 $00{:}09{:}12.622 \dashrightarrow 00{:}09{:}14.535$  You can think of that as absolute

NOTE Confidence: 0.8249697

00:09:14.535 --> 00:09:16.070 value if it's not important,

NOTE Confidence: 0.8249697

 $00:09:16.070 \longrightarrow 00:09:16.910$  we ignore it.

NOTE Confidence: 0.8249697

00:09:16.910 --> 00:09:18.030 If it is important,

NOTE Confidence: 0.8249697

 $00:09:18.030 \dashrightarrow 00:09:19.920$  the next question we need to ask

- NOTE Confidence: 0.8249697
- $00:09:19.920 \longrightarrow 00:09:21.670$  ourselves is how is it important?

 $00:09:21.670 \dashrightarrow 00:09:23.910$  Is it something that is good or bad?

NOTE Confidence: 0.8249697

 $00{:}09{:}23{.}910 \dashrightarrow 00{:}09{:}27{.}366$  Do we want to avoid this Daniels or

NOTE Confidence: 0.8249697

00:09:27.366 --> 00:09:28.230 approach it?

NOTE Confidence: 0.8249697

 $00{:}09{:}28.230 \dashrightarrow 00{:}09{:}31.070$  And so this is what I want to focus on today.

NOTE Confidence: 0.8249697

 $00:09:31.070 \longrightarrow 00:09:32.790$  Where is the fork in the road and

NOTE Confidence: 0.8249697

 $00:09:32.790 \longrightarrow 00:09:34.749$  how do we determine what gets routed

NOTE Confidence: 0.8249697

 $00:09:34.749 \longrightarrow 00:09:36.224$  down one path or another?

NOTE Confidence: 0.8573632

 $00:09:39.350 \dashrightarrow 00:09:41.429$  So if we think why am I so obsessed

NOTE Confidence: 0.8573632

 $00:09:41.429 \longrightarrow 00:09:42.852$  with understanding the perturbations

NOTE Confidence: 0.8573632

 $00:09:42.852 \longrightarrow 00:09:45.108$  that could occur with you know

NOTE Confidence: 0.8573632

 $00:09:45.108 \longrightarrow 00:09:47.085$  of motivational valence, really?

NOTE Confidence: 0.8573632

 $00{:}09{:}47.085 \dashrightarrow 00{:}09{:}49.360$  Because I think this could be a

NOTE Confidence: 0.8573632

 $00{:}09{:}49{.}360 \dashrightarrow 00{:}09{:}51{.}606$  common thread between many different

NOTE Confidence: 0.8573632

 $00{:}09{:}51.606 \dashrightarrow 00{:}09{:}53.139$  psychiatric disease states.

00:09:53.140 - 00:09:55.534 For example, in the case of anxiety,

NOTE Confidence: 0.8573632

 $00{:}09{:}55{.}540 \dashrightarrow 00{:}09{:}57{.}738$  perhaps there is a shift to too

NOTE Confidence: 0.8573632

 $00{:}09{:}57{.}738 \dashrightarrow 00{:}09{:}59{.}709$  much motivation to avoid potential

NOTE Confidence: 0.8573632

 $00:09:59.709 \rightarrow 00:10:01.158$  negative consequences relative

NOTE Confidence: 0.8573632

 $00:10:01.158 \longrightarrow 00:10:03.573$  to motivation to seek rewards.

NOTE Confidence: 0.8573632

 $00{:}10{:}03.580 \dashrightarrow 00{:}10{:}05.746$  The converse can also be true.

NOTE Confidence: 0.8573632

 $00{:}10{:}05{.}750 \dashrightarrow 00{:}10{:}07{.}586$  Too much motivation to seek potential

NOTE Confidence: 0.8573632

 $00{:}10{:}07{.}586 \dashrightarrow 00{:}10{:}09{.}749$  rewards and not enough motivation to

NOTE Confidence: 0.8573632

00:10:09.749 --> 00:10:11.517 avoid potential negative consequences.

NOTE Confidence: 0.8573632

00:10:11.520 --> 00:10:13.364 And you know, admittedly,

NOTE Confidence: 0.8573632

 $00{:}10{:}13.364 \dashrightarrow 00{:}10{:}16.130$  this is a very simplified perspective.

NOTE Confidence: 0.8573632

 $00{:}10{:}16{.}130 \dashrightarrow 00{:}10{:}18{.}167$  And then in the case of depression,

NOTE Confidence: 0.8573632

 $00:10:18.170 \longrightarrow 00:10:20.420$  perhaps we just have reduced

NOTE Confidence: 0.8573632

00:10:20.420 --> 00:10:21.770 motivation over all.

NOTE Confidence: 0.8573632

 $00{:}10{:}21.770 \dashrightarrow 00{:}10{:}24.255$  So how do we implement this process?

NOTE Confidence: 0.8573632

 $00:10:24.260 \longrightarrow 00:10:27.100$  How does the brain carry out this very,

- NOTE Confidence: 0.8573632
- 00:10:27.100 --> 00:10:28.880 very simple process of asking

 $00:10:28.880 \longrightarrow 00:10:31.000$  if something is good or bad?

NOTE Confidence: 0.8573632

 $00{:}10{:}31.000 \dashrightarrow 00{:}10{:}33.443$  So there are a few different neural

NOTE Confidence: 0.8573632

 $00:10:33.443 \rightarrow 00:10:35.259$  circuit motifs that we've seen,

NOTE Confidence: 0.8573632

 $00:10:35.260 \longrightarrow 00:10:35.950$  you know,

NOTE Confidence: 0.8573632

 $00:10:35.950 \longrightarrow 00:10:38.020$  recur and appear over and over

NOTE Confidence: 0.8573632

 $00:10:38.020 \longrightarrow 00:10:40.667$  again as the field of circuit

NOTE Confidence: 0.8573632

 $00:10:40.667 \rightarrow 00:10:43.017$  neuroscience has developed and matured.

NOTE Confidence: 0.8573632

 $00:10:43.020 \longrightarrow 00:10:45.036$  And I'm not going to really talk

NOTE Confidence: 0.8573632

 $00:10:45.036 \rightarrow 00:10:46.823$  about the labeled lines model just

NOTE Confidence: 0.8573632

 $00{:}10{:}46.823 \dashrightarrow 00{:}10{:}48.839$  because it's sort of a straw man.

NOTE Confidence: 0.8573632

 $00{:}10{:}48.840 \dashrightarrow 00{:}10{:}50.616$  When we think about balance processing

NOTE Confidence: 0.8573632

 $00:10:50.616 \rightarrow 00:10:52.410$  because it doesn't really allow for

NOTE Confidence: 0.8573632

 $00{:}10{:}52{.}410 \dashrightarrow 00{:}10{:}54{.}078$  learning to happen reversals to occur.

NOTE Confidence: 0.8573632

00:10:54.080 --> 00:10:54.664 You know,

 $00:10:54.664 \rightarrow 00:10:56.124$  aside from just strengthening or

NOTE Confidence: 0.8573632

 $00:10:56.124 \rightarrow 00:10:57.614$  weakening the lines of information

NOTE Confidence: 0.8573632

 $00:10:57.614 \longrightarrow 00:10:59.024$  flow as they already exist,

NOTE Confidence: 0.8573632

 $00:10:59.030 \longrightarrow 00:11:00.194$  you know it doesn't.

NOTE Confidence: 0.8573632

00:11:00.194 --> 00:11:02.568 It doesn't explain how we can learn to

NOTE Confidence: 0.8573632

 $00{:}11{:}02.568 \dashrightarrow 00{:}11{:}04.848$  like a bitter taste like coffee or beer,

NOTE Confidence: 0.8573632

 $00:11:04.850 \longrightarrow 00:11:06.614$  or how we can adapt to changing

NOTE Confidence: 0.8573632

 $00{:}11{:}06{.}614 \dashrightarrow 00{:}11{:}08{.}050$  conditions in the environment.

NOTE Confidence: 0.78140694

 $00{:}11{:}10{.}300 \dashrightarrow 00{:}11{:}13{.}030$  So what we want other machines that NOTE Confidence: 0.78140694

 $00:11:13.030 \rightarrow 00:11:15.523$  we have explored include divergent has NOTE Confidence: 0.78140694

 $00{:}11{:}15{.}523$  -->  $00{:}11{:}18{.}720$  where a common scene is is coming on. NOTE Confidence: 0.78140694

00:11:18.720 --> 00:11:21.024 To posit that send information to

NOTE Confidence: 0.78140694

 $00{:}11{:}21.024 \dashrightarrow 00{:}11{:}22.560$  different downstream targets were

NOTE Confidence: 0.78140694

00:11:22.620 --> 00:11:24.340 different processes may occur,

NOTE Confidence: 0.78140694

 $00{:}11{:}24{.}340 \dashrightarrow 00{:}11{:}26{.}430$  and pretty Danbury and Anabella

NOTE Confidence: 0.78140694

 $00:11:26.430 \longrightarrow 00:11:29.149$  have worked on this in my lab.

- NOTE Confidence: 0.78140694
- $00:11:29.150 \rightarrow 00:11:31.150$  Will talk about that momentarily.

 $00{:}11{:}31{.}150 \dashrightarrow 00{:}11{:}33{.}970$  Another possible motif is that opposing

NOTE Confidence: 0.78140694

 $00:11:33.970 \longrightarrow 00:11:36.570$  components where the anatomical origin and

NOTE Confidence: 0.78140694

 $00:11:36.570 \rightarrow 00:11:39.162$  and target the point A&B are the same,

NOTE Confidence: 0.78140694

 $00{:}11{:}39{.}170 \dashrightarrow 00{:}11{:}40{.}334$  but the lines of.

NOTE Confidence: 0.78140694

00:11:40.334 --> 00:11:42.080 But the circuits that are are

NOTE Confidence: 0.78140694

 $00{:}11{:}42.149 \dashrightarrow 00{:}11{:}44.159$  sending messages from point A to

NOTE Confidence: 0.78140694

00:11:44.159 --> 00:11:46.370 point B are different functionally.

NOTE Confidence: 0.78140694

 $00:11:46.370 \longrightarrow 00:11:47.090$  For example,

NOTE Confidence: 0.78140694

 $00{:}11{:}47.090 \dashrightarrow 00{:}11{:}48.890$  if there glutamate and GABA

NOTE Confidence: 0.78140694

00:11:48.890 --> 00:11:50.858 going from point A to point B,

NOTE Confidence: 0.78140694

 $00{:}11{:}50.860 \dashrightarrow 00{:}11{:}53.446$  what really matters is is the

NOTE Confidence: 0.78140694

 $00{:}11{:}53.446 \dashrightarrow 00{:}11{:}55.170$  neurons integrate that information

NOTE Confidence: 0.78140694

 $00{:}11{:}55{.}245 \dashrightarrow 00{:}11{:}56{.}965$  of those opponent components to

NOTE Confidence: 0.78140694

 $00:11:56.965 \rightarrow 00:11:59.359$  sort of do a winner take all?

00:11:59.360 --> 00:12:01.580 And for that, my graduate student,

NOTE Confidence: 0.78140694

 $00:12:01.580 \longrightarrow 00:12:02.690$  former graduate student,

NOTE Confidence: 0.78140694

00:12:02.690 --> 00:12:04.910 Edward now who's now at Princeton,

NOTE Confidence: 0.78140694

 $00:12:04.910 \longrightarrow 00:12:07.130$  explored this in his thesis work,

NOTE Confidence: 0.78140694

 $00{:}12{:}07{.}130 \dashrightarrow 00{:}12{:}09{.}350$  and then the 4th would be

NOTE Confidence: 0.78140694

 $00:12:09.350 \longrightarrow 00:12:10.830$  that of Neuromodulatory gain.

NOTE Confidence: 0.78140694

 $00{:}12{:}10.830 \dashrightarrow 00{:}12{:}13.050$  And so we've looked at this

NOTE Confidence: 0.78140694

 $00:12:13.050 \longrightarrow 00:12:14.530$  in the prefrontal cortex,

NOTE Confidence: 0.78140694

00:12:14.530 --> 00:12:16.010 Caitlin Vanderweel and Cody

NOTE Confidence: 0.78140694

 $00{:}12{:}16.010$  -->  $00{:}12{:}18.230$  Siciliano have explored this in and NOTE Confidence: 0.78140694

00:12:18.289 --> 00:12:20.221 today I'm going to tell you about

NOTE Confidence: 0.78140694

 $00{:}12{:}20{.}221 \dashrightarrow 00{:}12{:}22{.}012$  a new venture of understanding

NOTE Confidence: 0.78140694

00:12:22.012 --> 00:12:23.820 how neuropeptides can influence

NOTE Confidence: 0.78140694

 $00{:}12{:}23.820 \dashrightarrow 00{:}12{:}26.078$  the divergent circuit motifs that

NOTE Confidence: 0.78140694

 $00{:}12{:}26.078$  -->  $00{:}12{:}28.766$  we already know about within the NOTE Confidence: 0.78140694

 $00:12:28.766 \rightarrow 00:12:31.338$  basil lateral and make the left.

- NOTE Confidence: 0.78140694
- 00:12:31.340 --> 00:12:33.265 For today I'm going to be focusing

 $00:12:33.265 \rightarrow 00:12:35.767$  on these two motifs and how they're

NOTE Confidence: 0.78140694

 $00:12:35.767 \rightarrow 00:12:37.379$  relevant for balance processing.

NOTE Confidence: 0.78140694

 $00:12:37.380 \rightarrow 00:12:40.926$  So the road map for today are just three.

NOTE Confidence: 0.78140694

 $00{:}12{:}40{.}930 \dashrightarrow 00{:}12{:}42{.}900$  Sort of big general questions.

NOTE Confidence: 0.78140694

 $00:12:42.900 \longrightarrow 00:12:45.126$  One is a little bit of review

NOTE Confidence: 0.78140694

 $00:12:45.126 \rightarrow 00:12:47.168$  where to circuits encoding positive

NOTE Confidence: 0.78140694

 $00:12:47.168 \rightarrow 00:12:49.200$  and negative bills diverge.

NOTE Confidence: 0.78140694

00:12:49.200 --> 00:12:51.958 There's many places where they could diverge,

NOTE Confidence: 0.78140694

 $00:12:51.960 \rightarrow 00:12:55.104$  but will will go through one case study.

NOTE Confidence: 0.78140694

 $00{:}12{:}55{.}110 \dashrightarrow 00{:}12{:}57{.}474$  What are the local interactions between

NOTE Confidence: 0.78140694

 $00{:}12{:}57{.}474 \dashrightarrow 00{:}12{:}59{.}050$  these functionally distinct circuits?

NOTE Confidence: 0.78140694

00:12:59.050 --> 00:13:01.264 Just form give rise to function

NOTE Confidence: 0.78140694

 $00:13:01.264 \longrightarrow 00:13:03.864$  and then third how can narrow

NOTE Confidence: 0.78140694

 $00:13:03.864 \longrightarrow 00:13:05.960$  modulation participate in the

- $00:13:05.960 \rightarrow 00:13:08.056$  process of valence assignment?
- NOTE Confidence: 0.78140694
- 00:13:08.060 --> 00:13:09.434 And then well.
- NOTE Confidence: 0.78140694
- 00:13:09.434 --> 00:13:10.350 Rabbit up,
- NOTE Confidence: 0.78140694
- $00{:}13{:}10.350 \dashrightarrow 00{:}13{:}13.647$  so the first hints of the Amygdala's
- NOTE Confidence: 0.78140694
- 00:13:13.647 --> 00:13:15.635 involvement in emotional processing
- NOTE Confidence: 0.78140694
- $00{:}13{:}15{.}635 \dashrightarrow 00{:}13{:}18{.}105$  came from temporal lobe activities NOTE Confidence: 0.78140694
- 00:13:18.105 00:13:21.089 in primates over a century ago.
- NOTE Confidence: 0.78140694
- 00:13:21.090 --> 00:13:22.900 Following Brown and cheaper work,
- NOTE Confidence: 0.78140694
- 00:13:22.900 --> 00:13:24.670 Kluver Bucy coined the term
- NOTE Confidence: 0.78140694
- $00:13:24.670 \rightarrow 00:13:26.861$  psychic blindness to refer to what
- NOTE Confidence: 0.78140694
- $00:13:26.861 \longrightarrow 00:13:28.985$  happens to these animals when they
- NOTE Confidence: 0.78140694
- 00:13:28.985 --> 00:13:30.860 lose their innate fear snakes,
- NOTE Confidence: 0.78140694
- 00:13:30.860 --> 00:13:31.175 or,
- NOTE Confidence: 0.78140694
- 00:13:31.175 --> 00:13:31.805 you know,
- NOTE Confidence: 0.78140694
- $00{:}13{:}31{.}805 \dashrightarrow 00{:}13{:}34{.}497$  sort of lose interest in food and treat
- NOTE Confidence: 0.78140694
- $00:13:34.497 \rightarrow 00:13:37.374$  sort of inanimate objects like light bulbs,

- NOTE Confidence: 0.78140694
- $00:13:37.380 \rightarrow 00:13:39.624$  similarly to what would have been

 $00:13:39.624 \rightarrow 00:13:41.513$  previously fearful rewarding stimuli or

NOTE Confidence: 0.78140694

 $00:13:41.513 \rightarrow 00:13:43.529$  Larry Weiss grants then identified these.

NOTE Confidence: 0.78140694

 $00:13:43.530 \rightarrow 00:13:45.766$  These phenotypes were actually

NOTE Confidence: 0.78140694

 $00:13:45.766 \longrightarrow 00:13:47.443$  specifically attributable to

NOTE Confidence: 0.78140694

 $00{:}13{:}47{.}443 \dashrightarrow 00{:}13{:}49{.}780$  selective amygdala lesions later on.

NOTE Confidence: 0.78140694

 $00{:}13{:}49{.}780 \dashrightarrow 00{:}13{:}51{.}424$  There's also the important

NOTE Confidence: 0.78140694

 $00:13:51.424 \rightarrow 00:13:53.480$  case study patient \*\* who,

NOTE Confidence: 0.78140694

 $00:13:53.480 \rightarrow 00:13:55.120$  following bilateral amygdala damage,

NOTE Confidence: 0.78140694

 $00:13:55.120 \longrightarrow 00:13:57.586$  lost fear to snakes and spiders.

NOTE Confidence: 0.78140694

 $00:13:57.590 \longrightarrow 00:13:59.234$  The ability to recognize

NOTE Confidence: 0.78140694

 $00:13:59.234 \longrightarrow 00:14:01.289$  emotion in other peoples faces,

NOTE Confidence: 0.78140694

 $00{:}14{:}01{.}290 \dashrightarrow 00{:}14{:}03{.}340$  and even lost the fear.

NOTE Confidence: 0.78140694

 $00{:}14{:}03{.}340 \dashrightarrow 00{:}14{:}05{.}400$  Fear responses to being mugged,

NOTE Confidence: 0.78140694

 $00:14:05.400 \rightarrow 00:14:07.044$  which actually happened several

 $00:14:07.044 \longrightarrow 00:14:09.254$  times in her life, however.

NOTE Confidence: 0.78140694

 $00{:}14{:}09{.}254 \dashrightarrow 00{:}14{:}12{.}638$  When she was at suffocation when

NOTE Confidence: 0.78140694

00:14:12.638 --> 00:14:14.330 she's experiencing suffocation,

NOTE Confidence: 0.78140694

 $00{:}14{:}14{.}330 \dashrightarrow 00{:}14{:}17{.}078$  she still could have the autonomic

NOTE Confidence: 0.78140694

 $00:14:17.078 \rightarrow 00:14:19.540$  responses increase in autonomic arousal,

NOTE Confidence: 0.78140694

 $00{:}14{:}19.540 \dashrightarrow 00{:}14{:}20.406$  heart rate,

NOTE Confidence: 0.78140694

 $00:14:20.406 \longrightarrow 00:14:21.272$  sweating, etc.

NOTE Confidence: 0.78140694

 $00:14:21.272 \rightarrow 00:14:23.437$  Suggesting the amygdala is important

NOTE Confidence: 0.78140694

 $00{:}14{:}23{.}437 \dashrightarrow 00{:}14{:}26{.}002$  for the assignment of environmental

NOTE Confidence: 0.78140694

00:14:26.002 --> 00:14:28.070 significance to sensory stimuli,

NOTE Confidence: 0.78140694

 $00:14:28.070 \rightarrow 00:14:30.630$  but not necessarily the production

NOTE Confidence: 0.78140694

 $00:14:30.630 \longrightarrow 00:14:33.190$  of the autonomic or arousal

NOTE Confidence: 0.81227297

 $00{:}14{:}33{.}276 \dashrightarrow 00{:}14{:}35{.}589$  and physiological responses.

NOTE Confidence: 0.81227297

 $00{:}14{:}35{.}590 \dashrightarrow 00{:}14{:}38{.}690$  So in my in my lab, we work in mice and

NOTE Confidence: 0.81227297

00:14:38.690 - 00:14:41.447 if you take a look at the mouse brain,

NOTE Confidence: 0.81227297

 $00:14:41.450 \rightarrow 00:14:43.494$  take a little section and look here,

 $00:14:43.500 \longrightarrow 00:14:45.844$  there are 13 sub nuclei of the amygdala,

NOTE Confidence: 0.81227297

 $00{:}14{:}45{.}850 \dashrightarrow 00{:}14{:}47{.}761$  actually, but I'll just be focusing on

NOTE Confidence: 0.81227297

 $00:14:47.761 \rightarrow 00:14:49.950$  two of them for simplicity of today.

NOTE Confidence: 0.7513969

 $00:14:54.490 \longrightarrow 00:14:56.035$  So where does circuits encoding

NOTE Confidence: 0.7513969

 $00{:}14{:}56.035 \dashrightarrow 00{:}14{:}57.580$  positive and negative balance diverge?

NOTE Confidence: 0.7513969

00:14:57.580 --> 00:14:59.314 Well, I've already sort of hinted

NOTE Confidence: 0.7513969

 $00:14:59.314 \rightarrow 00:15:01.598$  to you that the bill is important.

NOTE Confidence: 0.7513969

 $00:15:01.600 \longrightarrow 00:15:03.092$  Why you know what?

NOTE Confidence: 0.7513969

 $00:15:03.092 \rightarrow 00:15:04.957$  What else about the amygdala?

NOTE Confidence: 0.7513969

 $00:15:04.960 \longrightarrow 00:15:07.840$  Do you make alot is kind of this

NOTE Confidence: 0.7513969

 $00:15:07.840 \longrightarrow 00:15:10.338$  primitive analog of the cortical

NOTE Confidence: 0.7513969

00:15:10.338 --> 00:15:12.468 striatal circuit and some have

NOTE Confidence: 0.7513969

 $00:15:12.468 \dashrightarrow 00:15:15.099$  referred to it as the alligator brain.

NOTE Confidence: 0.7513969

00:15:15.100 --> 00:15:17.698 It's it's primitive brain within the

NOTE Confidence: 0.7513969

00:15:17.698 --> 00:15:20.083 brain because the amygdala days auto

00:15:20.083 --> 00:15:21.790 mgla is 90% glutamatergic neurons

NOTE Confidence: 0.7513969

 $00{:}15{:}21.790 \dashrightarrow 00{:}15{:}23.890$  and described the cortical cortical

NOTE Confidence: 0.7513969

00:15:23.890 --> 00:15:26.272 like in that it forms associations

NOTE Confidence: 0.7513969

 $00{:}15{:}26{.}272 \dashrightarrow 00{:}15{:}28{.}396$  is not a laminated structure like

NOTE Confidence: 0.7513969

 $00:15:28.396 \longrightarrow 00:15:30.310$  the cortical like the cortex,

NOTE Confidence: 0.7513969

 $00{:}15{:}30{.}310 \dashrightarrow 00{:}15{:}32{.}260$  but other than that there

NOTE Confidence: 0.7513969

 $00:15:32.260 \longrightarrow 00:15:33.430$  are some similarities.

NOTE Confidence: 0.7513969

 $00:15:33.430 \longrightarrow 00:15:35.058$  The central amygdala is

NOTE Confidence: 0.7513969

00:15:35.058 --> 00:15:36.279 striatal like because.

NOTE Confidence: 0.7513969

00:15:36.280 --> 00:15:38.275 It's 95% Gabaergic medium spiny

NOTE Confidence: 0.7513969

 $00{:}15{:}38{.}275 \dashrightarrow 00{:}15{:}40{.}270$  neurons in a similar manner.

NOTE Confidence: 0.7513969

 $00:15:40.270 \longrightarrow 00:15:43.286$  So there is a very rich body of

NOTE Confidence: 0.7513969

 $00:15:43.286 \longrightarrow 00:15:44.837$  literature suggesting that the

NOTE Confidence: 0.7513969

 $00{:}15{:}44.837 \dashrightarrow 00{:}15{:}47.371$  PLA is well positioned to be where

NOTE Confidence: 0.7513969

 $00{:}15{:}47{.}371 \dashrightarrow 00{:}15{:}49{.}448$  valence encoding neurons exist.

NOTE Confidence: 0.7513969

 $00:15:49.450 \longrightarrow 00:15:51.760$  So we know that neurons in the

- NOTE Confidence: 0.7513969
- 00:15:51.760 --> 00:15:53.787 PLA encode positive and negative
- NOTE Confidence: 0.7513969
- $00{:}15{:}53.787 \dashrightarrow 00{:}15{:}56.197$  balance that all modalities of
- NOTE Confidence: 0.7513969
- $00:15:56.197 \rightarrow 00:15:58.087$  sensory information converges in
- NOTE Confidence: 0.7513969
- 00:15:58.087 --> 00:16:00.677 the basal lateral make the love that
- NOTE Confidence: 0.7513969
- $00:16:00.677 \rightarrow 00:16:03.470$  learning induces synaptic plasticity.
- NOTE Confidence: 0.7513969
- $00{:}16{:}03.470 \dashrightarrow 00{:}16{:}06.235$  And just a brief didactic direction here,
- NOTE Confidence: 0.7513969
- $00{:}16{:}06{.}240 \dashrightarrow 00{:}16{:}08{.}370$  so so.
- NOTE Confidence: 0.7513969
- $00:16:08.370 \longrightarrow 00:16:10.240$  We believe plasticity occurs in
- NOTE Confidence: 0.7513969
- $00{:}16{:}10.240 \dashrightarrow 00{:}16{:}12.110$  synapses that were previously weak
- NOTE Confidence: 0.7513969
- $00:16:12.170 \longrightarrow 00:16:14.280$  synapses that might carry information
- NOTE Confidence: 0.7513969
- $00:16:14.280 \longrightarrow 00:16:15.968$  about the condition stimulus,
- NOTE Confidence: 0.7513969
- $00:16:15.970 \longrightarrow 00:16:17.970$  such as an auditory tone,
- NOTE Confidence: 0.7513969
- $00:16:17.970 \longrightarrow 00:16:20.370$  but once is paired with either
- NOTE Confidence: 0.7513969
- $00{:}16{:}20{.}370 \dashrightarrow 00{:}16{:}21{.}970$  a reward or punishment,
- NOTE Confidence: 0.7513969
- $00:16:21.970 \longrightarrow 00:16:23.173$  will be strengthened,
- NOTE Confidence: 0.7513969

00:16:23.173 --> 00:16:27.168 and so just to I'll come back to this later,

NOTE Confidence: 0.7513969

 $00:16:27.170 \longrightarrow 00:16:28.582$  but just very quickly.

NOTE Confidence: 0.7513969

00:16:28.582 --> 00:16:31.686 We are using ampata NMJ ratio as a

NOTE Confidence: 0.7513969

00:16:31.686 --> 00:16:33.966 proxy for glutamatergic synaptic strength,

NOTE Confidence: 0.7513969

00:16:33.970 --> 00:16:36.770 because after your garden variety LTP occurs,

NOTE Confidence: 0.7513969

 $00:16:36.770 \longrightarrow 00:16:38.394$  you will see an.

NOTE Confidence: 0.7513969

00:16:38.394 --> 00:16:40.018 Increase in Emperor Scepter

NOTE Confidence: 0.7513969

 $00:16:40.018 \longrightarrow 00:16:40.830$  mediated currents.

NOTE Confidence: 0.6712021

 $00{:}16{:}46{.}560 \dashrightarrow 00{:}16{:}50{.}322$  We have already seen that fear

NOTE Confidence: 0.6712021

 $00{:}16{:}50{.}322 \dashrightarrow 00{:}16{:}53{.}630$  conditioning increases Amp'd MD ratio

NOTE Confidence: 0.6712021

 $00:16:53.630 \rightarrow 00:16:57.085$  in putative flammable DLA synapses.

NOTE Confidence: 0.6712021

 $00:16:57.090 \rightarrow 00:16:59.060$  In this particular putative synapse

NOTE Confidence: 0.6712021

00:16:59.060 --> 00:17:02.512 I've also found when I was a graduate

NOTE Confidence: 0.6712021

 $00:17:02.512 \rightarrow 00:17:04.388$  student that reward conditioning

NOTE Confidence: 0.6712021

00:17:04.388 --> 00:17:06.888 also increased ampata MDA ratio in

NOTE Confidence: 0.6712021

 $00{:}17{:}06.888 \dashrightarrow 00{:}17{:}08.928$  putative clam Omega Listen apps is

- NOTE Confidence: 0.6712021
- $00:17:08.928 \rightarrow 00:17:11.300$  in the same computer the senses,

 $00{:}17{:}11{.}300 \dashrightarrow 00{:}17{:}15{.}284$  and so when I was a grad student.

NOTE Confidence: 0.6712021

 $00{:}17{:}15{.}290 \dashrightarrow 00{:}17{:}16{.}498$  I presented these data.

NOTE Confidence: 0.6712021

 $00:17:16.498 \rightarrow 00:17:18.651$  This is my first time meeting and

NOTE Confidence: 0.6712021

 $00:17:18.651 \rightarrow 00:17:20.604$  one of my colleagues came up to

NOTE Confidence: 0.6712021

00:17:20.604 --> 00:17:22.260 me afterwards and just, you know,

NOTE Confidence: 0.6712021

 $00{:}17{:}22.260 \dashrightarrow 00{:}17{:}24.733$  gave me gave me a lot of Flack about

NOTE Confidence: 0.6712021

 $00:17:24.733 \rightarrow 00:17:27.008$  you know how does this make sense?

NOTE Confidence: 0.6712021

 $00{:}17{:}27.010 \dashrightarrow 00{:}17{:}28.768$  How can the same mechanism underlying

NOTE Confidence: 0.6712021

00:17:28.768 --> 00:17:29.940 fear and reward conditioning?

NOTE Confidence: 0.89172715

 $00:17:32.960 \longrightarrow 00:17:35.858$  Well, there's a few different possibilities.

NOTE Confidence: 0.89172715

 $00{:}17{:}35{.}860 \dashrightarrow 00{:}17{:}38{.}660$  Maybe the amygdala just encode salients and

NOTE Confidence: 0.89172715

 $00{:}17{:}38.660 \dashrightarrow 00{:}17{:}42.289$  it it you know anything that's important,

NOTE Confidence: 0.89172715

 $00{:}17{:}42.290 \dashrightarrow 00{:}17{:}45.608$  good or bad, will induce plasticity.

NOTE Confidence: 0.89172715

 $00{:}17{:}45.610 \dashrightarrow 00{:}17{:}47.098$  Or maybe the amygdala is actually

 $00:17:47.098 \rightarrow 00:17:48.660$  the site of valence assignment,

NOTE Confidence: 0.89172715

 $00{:}17{:}48.660 \dashrightarrow 00{:}17{:}50.522$  but it occurs by a distinct projections

NOTE Confidence: 0.89172715

 $00{:}17{:}50{.}522 \dashrightarrow 00{:}17{:}52{.}485$  that we just didn't discriminate between NOTE Confidence: 0.89172715

 $00{:}17{:}52{.}485{\:}{-}{>}00{:}17{:}56{.}940$  when we were patching blindly. So dumb.

NOTE Confidence: 0.89172715

 $00{:}17{:}56{.}940 \dashrightarrow 00{:}17{:}59{.}831$  We know that the essential medial nucleus

NOTE Confidence: 0.89172715

 $00{:}17{:}59{.}831 \dashrightarrow 00{:}18{:}02{.}818$  is critical for the expression of fear.

NOTE Confidence: 0.89172715

 $00{:}18{:}02{.}820 \dashrightarrow 00{:}18{:}05{.}286$  We know that up genetically stimulating,

NOTE Confidence: 0.89172715

 $00{:}18{:}05{.}290 \dashrightarrow 00{:}18{:}07{.}494$  central medial nucleus neurons

NOTE Confidence: 0.89172715

 $00{:}18{:}07{.}494 \dashrightarrow 00{:}18{:}09{.}147$  evokes freezing responses.

NOTE Confidence: 0.89172715

 $00{:}18{:}09{.}150 \dashrightarrow 00{:}18{:}12{.}027$  We also know that disconnecting the basal

NOTE Confidence: 0.89172715

 $00{:}18{:}12.027 \dashrightarrow 00{:}18{:}14.750$  lateral amygdala from the central medial

NOTE Confidence: 0.89172715

 $00{:}18{:}14.750 \dashrightarrow 00{:}18{:}17.115$  nucleus will abolished fear expression.

NOTE Confidence: 0.89172715

00:18:17.120 --> 00:18:18.119 But of course,

NOTE Confidence: 0.89172715

 $00{:}18{:}18{.}119 \dashrightarrow 00{:}18{:}20{.}450$  the central amygdala does many other things,

NOTE Confidence: 0.89172715

 $00{:}18{:}20{.}450 \dashrightarrow 00{:}18{:}22{.}790$  and there are a number of

NOTE Confidence: 0.89172715

 $00:18:22.790 \dashrightarrow 00:18:24.800$  fantastic studies that show this.

- NOTE Confidence: 0.89172715
- $00{:}18{:}24.800 \dashrightarrow 00{:}18{:}26.460$  So it's not this simple.
- NOTE Confidence: 0.89172715
- $00{:}18{:}26{.}460 \dashrightarrow 00{:}18{:}28{.}440$  Same thing for the nucleus incumbents.
- NOTE Confidence: 0.89172715
- $00{:}18{:}28{.}440 \dashrightarrow 00{:}18{:}30{.}880$  Of course we know that the nucleus income
- NOTE Confidence: 0.89172715
- $00:18:30.880 \rightarrow 00:18:33.080$  is important for diversity of functions,
- NOTE Confidence: 0.89172715
- $00:18:33.080 \rightarrow 00:18:36.321$  but it's best known for its importance
- NOTE Confidence: 0.89172715
- $00:18:36.321 \longrightarrow 00:18:38.620$  in reward related processes.
- NOTE Confidence: 0.89172715
- $00:18:38.620 \longrightarrow 00:18:40.315$  We know that Papa genetically
- NOTE Confidence: 0.89172715
- $00{:}18{:}40{.}315 \dashrightarrow 00{:}18{:}41{.}671$  stimulating VLA terminals and
- NOTE Confidence: 0.89172715
- 00:18:41.671 --> 00:18:43.264 nuclear comments supports self
- NOTE Confidence: 0.89172715
- $00:18:43.264 \rightarrow 00:18:44.856$  stimulation in place preference.
- NOTE Confidence: 0.788228
- 00:18:47.550 --> 00:18:49.435 When Praneeth Embery Annabelle or
- NOTE Confidence: 0.788228
- 00:18:49.435 --> 00:18:52.262 came to my lab, they came ready to
- NOTE Confidence: 0.788228
- 00:18:52.262 --> 00:18:54.230 tackle this question about what the
- NOTE Confidence: 0.788228
- 00:18:54.297 --> 00:18:56.422 circuit mechanism is for signing
- NOTE Confidence: 0.788228
- $00{:}18{:}56{.}422 \dashrightarrow 00{:}18{:}58{.}122$  positive and negative balance.
- NOTE Confidence: 0.788228

 $00:18:58.130 \longrightarrow 00:19:00.020$  So the hypothesis is simple,

NOTE Confidence: 0.788228

 $00{:}19{:}00{.}020 \dashrightarrow 00{:}19{:}01{.}910$  just that the specific downstream

NOTE Confidence: 0.788228

 $00:19:01.910 \longrightarrow 00:19:03.044$  projection neuron matters.

NOTE Confidence: 0.788228

 $00{:}19{:}03.050 \dashrightarrow 00{:}19{:}05.437$  So if you pair a tone with

NOTE Confidence: 0.788228

 $00:19:05.437 \longrightarrow 00:19:07.210$  foot shock for example,

NOTE Confidence: 0.788228

 $00:19:07.210 \longrightarrow 00:19:10.840$  you'll see a strengthening of synapses.

NOTE Confidence: 0.788228

00:19:10.840 --> 00:19:13.288 Coming on to see M projectors.

NOTE Confidence: 0.788228

 $00:19:13.290 \longrightarrow 00:19:16.190$  Whereas if we are.

NOTE Confidence: 0.788228

00:19:16.190 --> 00:19:17.960 I'm going to pair the tone

NOTE Confidence: 0.788228

 $00{:}19{:}17{.}960 \dashrightarrow 00{:}19{:}19{.}740$  with a reward like sucrose.

NOTE Confidence: 0.788228

 $00{:}19{:}19{.}740 \dashrightarrow 00{:}19{:}21{.}280$  We would see strengthening of

NOTE Confidence: 0.788228

 $00:19:21.280 \rightarrow 00:19:23.300$  synapses coming on to feeling neurons,

NOTE Confidence: 0.788228

00:19:23.300 --> 00:19:24.588 projecting the nucleus of

NOTE Confidence: 0.788228

00:19:24.588 --> 00:19:25.876 Commons so very simply,

NOTE Confidence: 0.788228

 $00{:}19{:}25.880 \dashrightarrow 00{:}19{:}28.134$  we just used retrogradely traveling for us.

NOTE Confidence: 0.788228

 $00{:}19{:}28{.}140 \dashrightarrow 00{:}19{:}30{.}240$  It feeds and check into them into

- NOTE Confidence: 0.788228
- $00:19:30.240 \longrightarrow 00:19:31.895$  either the nucleus of comments

 $00:19:31.895 \longrightarrow 00:19:33.625$  or the central medial nucleus,

NOTE Confidence: 0.788228

 $00:19:33.630 \longrightarrow 00:19:35.295$  then train animals and either

NOTE Confidence: 0.788228

 $00:19:35.295 \longrightarrow 00:19:36.960$  a fear conditioning task or

NOTE Confidence: 0.788228

00:19:37.019 --> 00:19:38.480 reward conditioning task.

NOTE Confidence: 0.788228

 $00{:}19{:}38{.}480 \dashrightarrow 00{:}19{:}39{.}952$  Simulated putative built Alanic

NOTE Confidence: 0.788228

 $00:19:39.952 \longrightarrow 00:19:41.792$  inputs to the amygdala and

NOTE Confidence: 0.788228

 $00{:}19{:}41.792 \dashrightarrow 00{:}19{:}43.618$  then recorded just as before.

NOTE Confidence: 0.788228

00:19:43.620 --> 00:19:46.734 Except now we just know where

NOTE Confidence: 0.788228

 $00:19:46.734 \rightarrow 00:19:49.650$  the targets are very simple.

NOTE Confidence: 0.788228

 $00{:}19{:}49.650 \dashrightarrow 00{:}19{:}52.762$  And what we found was that after fear

NOTE Confidence: 0.788228

 $00{:}19{:}52.762 \dashrightarrow 00{:}19{:}55.147$  conditioning we see a button increase

NOTE Confidence: 0.788228

 $00{:}19{:}55{.}147 \dashrightarrow 00{:}19{:}58{.}249$  in synaptic strength on to see M neurons,

NOTE Confidence: 0.788228

 $00{:}19{:}58{.}250 \dashrightarrow 00{:}20{:}00{.}542$  CN projectors excuse me and decrease

NOTE Confidence: 0.788228

 $00{:}20{:}00{.}542 \dashrightarrow 00{:}20{:}04{.}107$  in amber ratio on to PLA to see M

 $00:20:04.107 \rightarrow 00:20:05.679$  neurons after reward conditioning.

NOTE Confidence: 0.71817434

00:20:07.870 --> 00:20:08.938 Conversely, for being

NOTE Confidence: 0.71817434

00:20:08.938 --> 00:20:10.718 late to a Commons neurons,

NOTE Confidence: 0.71817434

 $00:20:10.720 \rightarrow 00:20:12.724$  we saw synaptic strengthening on to

NOTE Confidence: 0.71817434

 $00{:}20{:}12.724 \dashrightarrow 00{:}20{:}15.612$  them or some Excuse me Ltd a reduction

NOTE Confidence: 0.71817434

 $00{:}20{:}15.612 \dashrightarrow 00{:}20{:}17.838$  and Anthony ratio after fear conditioning,

NOTE Confidence: 0.71817434

 $00{:}20{:}17.840 \dashrightarrow 00{:}20{:}19.970$  but an increase in synaptic strength

NOTE Confidence: 0.71817434

 $00:20:19.970 \longrightarrow 00:20:21.035$  after reward conditioning.

NOTE Confidence: 0.71817434

 $00:20:21.040 \longrightarrow 00:20:24.148$  So just the opposite.

NOTE Confidence: 0.71817434

 $00:20:24.150 \longrightarrow 00:20:24.924$  And importantly,

NOTE Confidence: 0.71817434

 $00{:}20{:}24{.}924 \dashrightarrow 00{:}20{:}28{.}604$  what I want to point out is that even

NOTE Confidence: 0.71817434

 $00:20:28.604 \rightarrow 00:20:31.129$  conditions like food restriction can

NOTE Confidence: 0.71817434

 $00{:}20{:}31.129 \dashrightarrow 00{:}20{:}34.180$  change the basil amput empty ratio.

NOTE Confidence: 0.71817434

 $00:20:34.180 \longrightarrow 00:20:36.132$  So if the visa lottery legal is truly

NOTE Confidence: 0.71817434

 $00{:}20{:}36{.}132 \dashrightarrow 00{:}20{:}38{.}621$  the site at which we translate sensory

NOTE Confidence: 0.71817434

 $00:20:38.621 \rightarrow 00:20:40.177$  information into motivated behavior,

- NOTE Confidence: 0.71817434
- $00:20:40.180 \longrightarrow 00:20:42.516$  then be light inputs should be able to

 $00{:}20{:}42.516 \dashrightarrow 00{:}20{:}44.919$  drive motor behaviors in the naive animal.

NOTE Confidence: 0.8699819

 $00:20:47.810 \rightarrow 00:20:50.554$  OK, but is there a causal relationship

NOTE Confidence: 0.8699819

 $00:20:50.554 \rightarrow 00:20:52.910$  and we show that there is.

NOTE Confidence: 0.8699819

 $00{:}20{:}52{.}910 \dashrightarrow 00{:}20{:}54{.}870$  If we fail to stimulate

NOTE Confidence: 0.8699819

00:20:54.870 --> 00:20:56.046 village Commons animals,

NOTE Confidence: 0.8699819

 $00{:}20{:}56.050 \dashrightarrow 00{:}20{:}58.010$  we get intracranial self stimulation.

NOTE Confidence: 0.8699819

 $00{:}20{:}58.010 \dashrightarrow 00{:}21{:}01.142$  Just replicating work that gets tuber

NOTE Confidence: 0.8699819

 $00:21:01.142 \rightarrow 00:21:04.559$  and John Britton have already shown.

NOTE Confidence: 0.8699819

 $00:21:04.560 \longrightarrow 00:21:07.035$  And we also show that if we simulate dealing

NOTE Confidence: 0.8699819

 $00{:}21{:}07.035 \dashrightarrow 00{:}21{:}09.497$  arms protecting the central medial nucleus,

NOTE Confidence: 0.8699819

 $00{:}21{:}09{.}500 \dashrightarrow 00{:}21{:}11{.}300$  we actually get punishment

NOTE Confidence: 0.8699819

00:21:11.300 --> 00:21:12.650 avoidance place avoidance.

NOTE Confidence: 0.8699819

 $00{:}21{:}12.650 \dashrightarrow 00{:}21{:}15.980$  So OK, if it's true that if this whole

NOTE Confidence: 0.8699819

 $00{:}21{:}15{.}980 \dashrightarrow 00{:}21{:}18{.}510$  hypothesis is true and this is relying
00:21:18.510 --> 00:21:21.489 on an MDA receptor dependent mechanism,

NOTE Confidence: 0.8699819

 $00:21:21.490 \rightarrow 00:21:25.108$  what happens with with an MD or soldier LDP?

NOTE Confidence: 0.8699819

00:21:25.110 --> 00:21:26.642 I'm sure you know,

NOTE Confidence: 0.8699819

 $00:21:26.642 \rightarrow 00:21:29.940$  but if you don't know glutamate is released,

NOTE Confidence: 0.8699819

00:21:29.940 --> 00:21:32.346 it will bind to gloomy receptors,

NOTE Confidence: 0.8699819

 $00:21:32.350 \longrightarrow 00:21:33.553$  including an perceptors.

NOTE Confidence: 0.8699819

00:21:33.553 --> 00:21:34.756 An MDA receptors,

NOTE Confidence: 0.8699819

 $00{:}21{:}34.760 \dashrightarrow 00{:}21{:}37.539$  however NMD a receptors are have a

NOTE Confidence: 0.8699819

00:21:37.539 --> 00:21:40.450 magnesium blockade that sits in the poor

NOTE Confidence: 0.8699819

 $00:21:40.450 \rightarrow 00:21:42.916$  of energy receptors and the depolarization.

NOTE Confidence: 0.8699819

00:21:42.920 --> 00:21:44.368 Caused by glutamate binding

NOTE Confidence: 0.8699819

 $00:21:44.368 \rightarrow 00:21:45.454$  and amp receptors.

NOTE Confidence: 0.8699819

 $00:21:45.460 \longrightarrow 00:21:47.280$  Allows the influx of sodium.

NOTE Confidence: 0.8699819

 $00:21:47.280 \longrightarrow 00:21:48.892$  Then it becomes depolarized.

NOTE Confidence: 0.8699819

 $00{:}21{:}48.892 \dashrightarrow 00{:}21{:}51.310$  This allows the magnesium blockade to

NOTE Confidence: 0.8699819

 $00:21:51.373 \rightarrow 00:21:53.445$  come out of the NBA receptor poor,

- NOTE Confidence: 0.8699819
- $00:21:53.450 \rightarrow 00:21:56.140$  allowing calcium influx to occur.

00:21:56.140 --> 00:21:57.724 So if this is,

NOTE Confidence: 0.8699819

00:21:57.724 --> 00:21:58.516 you know,

NOTE Confidence: 0.8699819

 $00{:}21{:}58{.}520 \dashrightarrow 00{:}22{:}01{.}292$  this is all true that this is

NOTE Confidence: 0.8699819

 $00:22:01.292 \rightarrow 00:22:02.480$  how energy receptors.

NOTE Confidence: 0.8699819

 $00{:}22{:}02{.}480 \dashrightarrow 00{:}22{:}05{.}640$  This is how NBA receptor dependent LTP works.

NOTE Confidence: 0.8699819

 $00{:}22{:}05{.}640 \dashrightarrow 00{:}22{:}07{.}240$  Then hyperpolarizing the postsynaptic

NOTE Confidence: 0.8699819

 $00{:}22{:}07{.}240 \dashrightarrow 00{:}22{:}10.466$  neuron at a critical time point here would

NOTE Confidence: 0.8699819

 $00:22:10.466 \rightarrow 00:22:12.770$  then prevent learning because we couldn't,

NOTE Confidence: 0.8699819

 $00:22:12.770 \longrightarrow 00:22:16.124$  you wouldn't be able to remove

NOTE Confidence: 0.8699819

 $00{:}22{:}16{.}124 \dashrightarrow 00{:}22{:}18{.}360$  that that magnesium blockade.

NOTE Confidence: 0.8699819

 $00{:}22{:}18.360 \dashrightarrow 00{:}22{:}20.320$  So we did this experiment.

NOTE Confidence: 0.8699819

 $00{:}22{:}20{.}320 \dashrightarrow 00{:}22{:}23{.}158$  This is bilateral Weezer dual virus

NOTE Confidence: 0.8699819

 $00{:}22{:}23.158 \dashrightarrow 00{:}22{:}25.050$  approach to express halorhodops in

NOTE Confidence: 0.8699819

00:22:25.122 --> 00:22:27.216 in either Bealach na Si Productions

00:22:27.216 --> 00:22:29.361 or belay to see M Productions

NOTE Confidence: 0.8699819

 $00{:}22{:}29{.}361 \dashrightarrow 00{:}22{:}31{.}713$  and then train them again on a

NOTE Confidence: 0.8699819

 $00{:}22{:}31.713 \dashrightarrow 00{:}22{:}33.718$  fear or reward conditioning task.

NOTE Confidence: 0.8699819

 $00:22:33.718 \longrightarrow 00:22:35.803$  Photo inhibiting only when the

NOTE Confidence: 0.8699819

 $00{:}22{:}35{.}803 \dashrightarrow 00{:}22{:}38{.}144$  US the unconditioned stimulus was

NOTE Confidence: 0.8699819

 $00:22:38.144 \longrightarrow 00:22:40.928$  presented either for shock or sucrose.

NOTE Confidence: 0.8699819

 $00:22:40.930 \longrightarrow 00:22:43.558$  And what we found.

NOTE Confidence: 0.8699819

 $00:22:43.560 \longrightarrow 00:22:45.896$  I've sort of what I said for the

NOTE Confidence: 0.8699819

 $00{:}22{:}45.896 \dashrightarrow 00{:}22{:}47.599$  fear conditioning and that when we

NOTE Confidence: 0.8699819

 $00:22:47.599 \rightarrow 00:22:49.710$  photo inhibited be late to a comment,

NOTE Confidence: 0.8699819

 $00:22:49.710 \longrightarrow 00:22:50.254$  something happened.

NOTE Confidence: 0.8699819

 $00{:}22{:}50{.}254 \dashrightarrow 00{:}22{:}51{.}614$  But if we silenced Beladice

NOTE Confidence: 0.8699819

 $00:22:51.614 \rightarrow 00:22:52.940$  central medial nucleus projections,

NOTE Confidence: 0.8699819

 $00:22:52.940 \rightarrow 00:22:54.984$  we saw an impairment in fear conditioning.

NOTE Confidence: 0.7586047

 $00:22:57.280 \rightarrow 00:22:59.446$  When we looked at reward conditioning,

NOTE Confidence: 0.7586047

 $00:22:59.450 \longrightarrow 00:23:00.530$  however, something sort

- NOTE Confidence: 0.7586047
- $00:23:00.530 \longrightarrow 00:23:01.610$  of unexpected happened.

00:23:01.610 --> 00:23:03.415 It was surprising because we

NOTE Confidence: 0.7586047

00:23:03.415 --> 00:23:05.220 actually didn't see an impairment

NOTE Confidence: 0.7586047

 $00:23:05.282 \longrightarrow 00:23:07.027$  to belay and astie inhibition,

NOTE Confidence: 0.7586047

00:23:07.030 --> 00:23:08.830 as I would have expected,

NOTE Confidence: 0.7586047

 $00{:}23{:}08{.}830 \dashrightarrow 00{:}23{:}10{.}820$  we actually saw in enhancement

NOTE Confidence: 0.7586047

 $00{:}23{:}10.820 \dashrightarrow 00{:}23{:}13.720$  when feeling to see an innovation.

NOTE Confidence: 0.7586047

00:23:13.720 --> 00:23:16.457 OK, so that was a little confusing,

NOTE Confidence: 0.7586047

 $00{:}23{:}16{.}460 \dashrightarrow 00{:}23{:}18{.}410$  but it'll make sense later.

NOTE Confidence: 0.7586047

 $00:23:18.410 \longrightarrow 00:23:20.566$  So so just an interim summary is

NOTE Confidence: 0.7586047

 $00{:}23{:}20.566 \dashrightarrow 00{:}23{:}22.961$  that I've told you that opposite

NOTE Confidence: 0.7586047

00:23:22.961 --> 00:23:24.825 synaptic changes map onto

NOTE Confidence: 0.7586047

 $00:23:24.825 \rightarrow 00:23:26.620$  production following either fear,

NOTE Confidence: 0.7586047

 $00{:}23{:}26.620 \dashrightarrow 00{:}23{:}28.692$  conditioning or reward conditioning.

NOTE Confidence: 0.7586047

00:23:28.692 --> 00:23:30.992 If we just, you know,

 $00{:}23{:}30{.}992 \dashrightarrow 00{:}23{:}32{.}847$  circumvent all of this upstream

NOTE Confidence: 0.7586047

00:23:32.847 --> 00:23:34.832 plasticity and just cut right

NOTE Confidence: 0.7586047

 $00{:}23{:}34{.}832 \dashrightarrow 00{:}23{:}36{.}842$  to the chase and manipulate

NOTE Confidence: 0.7586047

00:23:36.842 --> 00:23:38.048 these projector populations,

NOTE Confidence: 0.7586047

 $00{:}23{:}38.050 \dashrightarrow 00{:}23{:}40.250$  activation of projections will

NOTE Confidence: 0.7586047

 $00:23:40.250 \rightarrow 00:23:43.000$  either cause avoidance or approach.

NOTE Confidence: 0.7586047

00:23:43.000 -> 00:23:45.260 If we then bilaterally inhibit

NOTE Confidence: 0.7586047

 $00:23:45.260 \longrightarrow 00:23:47.068$  either of these productions,

NOTE Confidence: 0.7586047

 $00{:}23{:}47.070 \dashrightarrow 00{:}23{:}50.442$  will see that inhibition of central

NOTE Confidence: 0.7586047

 $00{:}23{:}50{.}442 \dashrightarrow 00{:}23{:}52{.}690$  medial projectors impairs fear

NOTE Confidence: 0.7586047

 $00{:}23{:}52{.}782 \dashrightarrow 00{:}23{:}55{.}507$  but enhances reward learning OK?

NOTE Confidence: 0.7586047

 $00:23:55.510 \longrightarrow 00:23:57.568$  But is it really that simple?

NOTE Confidence: 0.7586047

00:23:57.570 -> 00:23:59.978 And of course the answer is no.

NOTE Confidence: 0.7586047

 $00:23:59.980 \longrightarrow 00:24:01.700$  There's a lot of heterogeneity.

NOTE Confidence: 0.7586047

00:24:01.700 --> 00:24:03.016 It's it's, you know,

NOTE Confidence: 0.7586047

 $00:24:03.016 \longrightarrow 00:24:04.661$  all these neurons that are

- NOTE Confidence: 0.7586047
- 00:24:04.661 --> 00:24:05.490 anatomically defined,
- NOTE Confidence: 0.7586047
- $00:24:05.490 \rightarrow 00:24:07.548$  have a lot of functional heterogeneity.
- NOTE Confidence: 0.7586047
- $00{:}24{:}07{.}550 \dashrightarrow 00{:}24{:}09{.}832$  We do address this that even though
- NOTE Confidence: 0.7586047
- $00:24:09.832 \rightarrow 00:24:12.293$  it's really exciting that we can target
- NOTE Confidence: 0.7586047
- $00:24:12.293 \rightarrow 00:24:14.423$  things more specifically than ever before,
- NOTE Confidence: 0.7586047
- $00:24:14.430 \longrightarrow 00:24:15.802$  we're still possibly only
- NOTE Confidence: 0.7586047
- $00:24:15.802 \rightarrow 00:24:17.174$  observing a majority vote.
- NOTE Confidence: 0.7586047
- $00:24:17.180 \longrightarrow 00:24:18.227$  There you know,
- NOTE Confidence: 0.7586047
- 00:24:18.227 --> 00:24:19.972 just because an offer genetic
- NOTE Confidence: 0.7586047
- $00:24:19.972 \longrightarrow 00:24:21.728$  manipulation can produce only one
- NOTE Confidence: 0.7586047
- 00:24:21.728 --> 00:24:23.720 measurable behavior in a given task,
- NOTE Confidence: 0.7586047
- $00:24:23.720 \longrightarrow 00:24:25.868$  this does not in any way
- NOTE Confidence: 0.7586047
- $00{:}24{:}25.868 \dashrightarrow 00{:}24{:}26.942$  suggest functional homogeneity.
- NOTE Confidence: 0.7586047
- $00{:}24{:}26{.}950 \dashrightarrow 00{:}24{:}29{.}645$  Of neurons anymore than having you know,
- NOTE Confidence: 0.7586047
- $00:24:29.650 \rightarrow 00:24:32.890$  one president of the country suggest
- NOTE Confidence: 0.7586047

- $00:24:32.890 \longrightarrow 00:24:36.288$  that everyone agrees who it should be.
- NOTE Confidence: 0.7586047
- $00{:}24{:}36{.}290 \dashrightarrow 00{:}24{:}37{.}286$  So Eve Marder,
- NOTE Confidence: 0.7586047
- 00:24:37.286 --> 00:24:38.614 once said very wisely,
- NOTE Confidence: 0.7586047
- 00:24:38.620 --> 00:24:40.285 you know very artistic I
- NOTE Confidence: 0.7586047
- $00{:}24{:}40{.}285 \dashrightarrow 00{:}24{:}41{.}950$  love I love this club,
- NOTE Confidence: 0.7586047
- $00{:}24{:}41{.}950 \dashrightarrow 00{:}24{:}44{.}947$  that optic tools tell us what neurons can do,
- NOTE Confidence: 0.7586047
- $00:24:44.950 \longrightarrow 00:24:46.610$  not what neurons do do.
- NOTE Confidence: 0.7586047
- $00:24:46.610 \longrightarrow 00:24:48.332$  So it's very important we need to
- NOTE Confidence: 0.7586047
- $00{:}24{:}48.332 \dashrightarrow 00{:}24{:}50.476$  be able to explore the endogenous
- NOTE Confidence: 0.7586047
- $00:24:50.476 \rightarrow 00:24:52.268$  functional properties of neurons.
- NOTE Confidence: 0.7586047
- $00:24:52.270 \longrightarrow 00:24:53.494$  Really understand them.
- NOTE Confidence: 0.7586047
- $00{:}24{:}53{.}494 \dashrightarrow 00{:}24{:}55{.}942$  So the minimal the absolute minimal
- NOTE Confidence: 0.7586047
- 00:24:55.942 --> 00:24:57.658 criteria for violence in coding
- NOTE Confidence: 0.7586047
- $00:24:57.658 \rightarrow 00:24:59.770$  a single cells is that number 10,
- NOTE Confidence: 0.7586047
- $00{:}24{:}59{.}770 \dashrightarrow 00{:}25{:}02{.}010$  and I should say before I get
- NOTE Confidence: 0.7586047
- $00:25:02.010 \longrightarrow 00:25:03.940$  into this set on one axis,

- NOTE Confidence: 0.7586047
- $00:25:03.940 \rightarrow 00:25:06.817$  there's the response to rewarding CS is.

 $00:25:06.820 \longrightarrow 00:25:08.064$  On the other access,

NOTE Confidence: 0.7586047

 $00:25:08.064 \rightarrow 00:25:09.619$  there's a response to aversive

NOTE Confidence: 0.7586047

 $00{:}25{:}09{.}619 \dashrightarrow 00{:}25{:}11{.}028$  CS is in either case,

NOTE Confidence: 0.7586047

 $00{:}25{:}11.030 \dashrightarrow 00{:}25{:}13.438$  and in both cases we can either have

NOTE Confidence: 0.7586047

 $00{:}25{:}13.438 \dashrightarrow 00{:}25{:}16.160$  innovation, no response or an excitation.

NOTE Confidence: 0.7586047

00:25:16.160 --> 00:25:18.700 Uhm?

NOTE Confidence: 0.7586047

 $00:25:18.700 \longrightarrow 00:25:19.876$  So the so,

NOTE Confidence: 0.7586047

 $00:25:19.876 \rightarrow 00:25:21.836$  given these combinations of responses.

NOTE Confidence: 0.7586047

 $00:25:21.840 \longrightarrow 00:25:24.540$  Of course, if.

NOTE Confidence: 0.7586047

 $00{:}25{:}24{.}540 \dashrightarrow 00{:}25{:}25{.}030$  Just.

NOTE Confidence: 0.78889453

 $00{:}25{:}27.560 \dashrightarrow 00{:}25{:}29.264$  They conclude that it fails in

NOTE Confidence: 0.78889453

 $00{:}25{:}29{.}264 \dashrightarrow 00{:}25{:}31{.}908$  coding a little bit harder is to say

NOTE Confidence: 0.78889453

 $00{:}25{:}31{.}908 \dashrightarrow 00{:}25{:}33{.}356$  that it's differential responding.

NOTE Confidence: 0.78889453

 $00:25:33.360 \longrightarrow 00:25:35.292$  You want to say if it's

 $00:25:35.292 \rightarrow 00:25:36.580$  responding in a similar,

NOTE Confidence: 0.78889453

 $00{:}25{:}36{.}580 \dashrightarrow 00{:}25{:}37{.}960$  in distinguishable manner to to

NOTE Confidence: 0.78889453

 $00{:}25{:}37{.}960 \dashrightarrow 00{:}25{:}39{.}685$  both positive and negative stimuli

NOTE Confidence: 0.78889453

 $00{:}25{:}39.685 \dashrightarrow 00{:}25{:}41.409$  that it is not encoding balance.

NOTE Confidence: 0.78889453

 $00:25:41.410 \longrightarrow 00:25:42.794$  This is pretty important.

NOTE Confidence: 0.78889453

 $00{:}25{:}42{.}794 \dashrightarrow 00{:}25{:}44{.}870$  Oftentimes studies will only show or

NOTE Confidence: 0.78889453

 $00{:}25{:}44{.}928 \dashrightarrow 00{:}25{:}46{.}804$  response to one or the other within

NOTE Confidence: 0.78889453

00:25:46.804 --> 00:25:49.024 a given cell an you really need

NOTE Confidence: 0.78889453

 $00{:}25{:}49{.}024 \dashrightarrow 00{:}25{:}50{.}724$  responses to both without seeing

NOTE Confidence: 0.78889453

 $00{:}25{:}50{.}724 \dashrightarrow 00{:}25{:}53{.}110$  responses to both in the same cell

NOTE Confidence: 0.78889453

00:25:53.110 --> 00:25:55.075 you you can't differentiate between

NOTE Confidence: 0.78889453

 $00{:}25{:}55{.}075 \dashrightarrow 00{:}25{:}57{.}745$  salience responses and balance responses.

NOTE Confidence: 0.78889453

 $00{:}25{:}57{.}750 \dashrightarrow 00{:}25{:}59{.}885$  And then finally it needs to be

NOTE Confidence: 0.78889453

 $00{:}25{:}59.885 \dashrightarrow 00{:}26{:}01{.}370$  independent of sensory features.

NOTE Confidence: 0.78889453

 $00{:}26{:}01{.}370 \dashrightarrow 00{:}26{:}04{.}238$  It's not just tracking the modality

NOTE Confidence: 0.78889453

 $00:26:04.238 \longrightarrow 00:26:06.605$  or the specific frequency of

- NOTE Confidence: 0.78889453
- $00:26:06.605 \longrightarrow 00:26:08.109$  the tone or whatever.

00:26:08.110 -> 00:26:10.528 OK, so this just underscores the

NOTE Confidence: 0.78889453

00:26:10.528 --> 00:26:12.900 importance of seller resolution recordings.

NOTE Confidence: 0.78889453

 $00:26:12.900 \longrightarrow 00:26:15.510$  So on a baler performed this

NOTE Confidence: 0.78889453

 $00{:}26{:}15{.}510 \dashrightarrow 00{:}26{:}18{.}119$  and it had fixed task an.

NOTE Confidence: 0.78889453

 $00:26:18.120 \longrightarrow 00:26:19.878$  In this task,

NOTE Confidence: 0.78889453

00:26:19.878 --> 00:26:22.808 one tone predicts sucrose delivery.

NOTE Confidence: 0.78889453

 $00:26:22.810 \longrightarrow 00:26:25.465$  As you can see here and then in another,

NOTE Confidence: 0.78889453

 $00:26:25.470 \longrightarrow 00:26:27.240$  another town predicts quiet time delivery,

NOTE Confidence: 0.78889453

 $00:26:27.240 \longrightarrow 00:26:29.010$  which is a no go trial.

NOTE Confidence: 0.7276678

 $00:26:32.140 \longrightarrow 00:26:35.080$  So we did a match modality,

NOTE Confidence: 0.7276678

 $00{:}26{:}35{.}080 \dashrightarrow 00{:}26{:}38{.}265$  build task where both the CSS and

NOTE Confidence: 0.7276678

 $00{:}26{:}38.265 \dashrightarrow 00{:}26{:}42.428$  both US is were of the same modality.

NOTE Confidence: 0.7276678

 $00{:}26{:}42{.}430 \dashrightarrow 00{:}26{:}46{.}366$  Auditory stimuli and gusta Tori outcomes.

NOTE Confidence: 0.7276678

00:26:46.370 --> 00:26:47.486 And generally speaking,

00:26:47.486 --> 00:26:49.718 for the non specific PLA recordings,

NOTE Confidence: 0.7276678

00:26:49.720 --> 00:26:51.970 we just reproduced publications that already

NOTE Confidence: 0.7276678

00:26:51.970 --> 00:26:54.550 existed from Dan Saltzman and Trajanic slabs,

NOTE Confidence: 0.7276678

 $00:26:54.550 \longrightarrow 00:26:56.410$  but we didn't, you know,

NOTE Confidence: 0.7276678

 $00:26:56.410 \longrightarrow 00:26:58.270$  go through all this trouble.

NOTE Confidence: 0.7276678

 $00:26:58.270 \longrightarrow 00:27:00.130$  We did record 1600 neurons,

NOTE Confidence: 0.7276678

 $00{:}27{:}00{.}130 \dashrightarrow 00{:}27{:}01{.}246$  just we producers,

NOTE Confidence: 0.7276678

00:27:01.246 --> 00:27:02.734 although it's always nice,

NOTE Confidence: 0.7276678

 $00{:}27{:}02.740 \dashrightarrow 00{:}27{:}05.434$  we wanted to know what neurons

NOTE Confidence: 0.7276678

 $00:27:05.434 \longrightarrow 00:27:07.640$  of Goan production target did.

NOTE Confidence: 0.7276678

 $00:27:07.640 \longrightarrow 00:27:09.902$  And so we used an approach

NOTE Confidence: 0.7276678

 $00:27:09.902 \longrightarrow 00:27:11.780$  developed in Tony Zeiders lab,

NOTE Confidence: 0.7276678

 $00{:}27{:}11.780 \dashrightarrow 00{:}27{:}13.965$  which he termed Photostimulation assisted

NOTE Confidence: 0.7276678

00:27:13.965 --> 00:27:15.713 identification of neuronal populations

NOTE Confidence: 0.7276678

 $00:27:15.713 \longrightarrow 00:27:18.009$  which many people would refer to as

NOTE Confidence: 0.7276678

 $00:27:18.009 \rightarrow 00:27:19.670$  photo identification or photo tagging.

- NOTE Confidence: 0.7276678
- $00{:}27{:}19.670 \dashrightarrow 00{:}27{:}21.550$  And basically the idea is

 $00:27:21.550 \longrightarrow 00:27:23.054$  you've got an electrode.

NOTE Confidence: 0.7276678

00:27:23.060 --> 00:27:24.940 You've got an optical fiber,

NOTE Confidence: 0.7276678

 $00:27:24.940 \longrightarrow 00:27:27.060$  and you've got some specific

NOTE Confidence: 0.7276678

 $00:27:27.060 \longrightarrow 00:27:29.739$  cell population that you have are

NOTE Confidence: 0.7276678

 $00:27:29.739 \rightarrow 00:27:32.119$  expressing opposition and so first.

NOTE Confidence: 0.7276678

00:27:32.120 --> 00:27:34.556 You know it's near on a spikes.

NOTE Confidence: 0.7276678

 $00:27:34.560 \rightarrow 00:27:37.360$  We can record that if neuron B spikes,

NOTE Confidence: 0.7276678

 $00{:}27{:}37{.}360 \dashrightarrow 00{:}27{:}39{.}496$  we can record that too and we just

NOTE Confidence: 0.7276678

 $00{:}27{:}39{.}496 \dashrightarrow 00{:}27{:}41{.}877$  want to record all the endogenous

NOTE Confidence: 0.7276678

00:27:41.877 --> 00:27:43.657 naturally occurring activity during

NOTE Confidence: 0.7276678

 $00{:}27{:}43.657 \dashrightarrow 00{:}27{:}46.076$  the task after the task is over,

NOTE Confidence: 0.7276678

 $00{:}27{:}46.080 \dashrightarrow 00{:}27{:}48.024$  we can shine light and get

NOTE Confidence: 0.7276678

 $00:27:48.024 \longrightarrow 00:27:49.920$  spikes out of the neuron.

NOTE Confidence: 0.7276678

 $00:27:49.920 \longrightarrow 00:27:53.100$  That is expressing option.

 $00{:}27{:}53.100 \dashrightarrow 00{:}27{:}55.028$  Then we can look at that and determine

NOTE Confidence: 0.7276678

 $00{:}27{:}55{.}028 \dashrightarrow 00{:}27{:}56{.}808$  whether there was a photoresponse or not.

NOTE Confidence: 0.7276678

 $00:27:56.810 \longrightarrow 00:27:57.592$  Importantly, very,

NOTE Confidence: 0.7276678

 $00:27:57.592 \rightarrow 00:27:58.374$  very importantly,

NOTE Confidence: 0.7276678

 $00:27:58.374 \rightarrow 00:28:01.400$  we need to control for recurrent excitation,

NOTE Confidence: 0.7276678

00:28:01.400 --> 00:28:04.088 particularly if you're doing photo tagging

NOTE Confidence: 0.7276678

00:28:04.088 --> 00:28:07.649 in any place known to have it like cortex,

NOTE Confidence: 0.7276678

00:28:07.650 --> 00:28:09.810 hippocampus, amygdala.

NOTE Confidence: 0.7276678

 $00:28:09.810 \longrightarrow 00:28:10.946$  What does this mean?

NOTE Confidence: 0.7276678

00:28:10.946 --> 00:28:11.230 Well,

NOTE Confidence: 0.7276678

00:28:11.230 --> 00:28:12.838 it's just referring to this compound

NOTE Confidence: 0.7276678

 $00{:}28{:}12.838 \dashrightarrow 00{:}28{:}15.129$  that can occur if you have secret to

NOTE Confidence: 0.7276678

 $00:28:15.129 \rightarrow 00:28:16.881$  expressing ones that are protected from,

NOTE Confidence: 0.7276678

00:28:16.890 --> 00:28:18.300 for example, BL A2 incumbents.

NOTE Confidence: 0.7276678

 $00:28:18.300 \longrightarrow 00:28:19.432$  Let's say that's great.

NOTE Confidence: 0.7276678

 $00:28:19.432 \rightarrow 00:28:21.130$  Where were expressing in those cells?

- NOTE Confidence: 0.7276678
- $00:28:21.130 \rightarrow 00:28:23.104$  We can verify that anatomically post hoc,
- NOTE Confidence: 0.7276678
- $00:28:23.110 \longrightarrow 00:28:25.462$  and it's easy in vivo to tell the
- NOTE Confidence: 0.7276678
- $00:28:25.462 \rightarrow 00:28:27.419$  difference between a teacher to expressing
- NOTE Confidence: 0.7276678
- $00:28:27.419 \rightarrow 00:28:29.387$  cell and a non expressing neighbor
- NOTE Confidence: 0.7276678
- $00:28:29.444 \longrightarrow 00:28:31.644$  that is not responsive to light at all.
- NOTE Confidence: 0.7276678
- 00:28:31.650 --> 00:28:32.133 However,
- NOTE Confidence: 0.7276678
- $00:28:32.133 \rightarrow 00:28:35.514$  there may also be non expressing neighbors
- NOTE Confidence: 0.7276678
- $00{:}28{:}35{.}514 \dashrightarrow 00{:}28{:}37{.}725$  that receive recurrent excitation
- NOTE Confidence: 0.7276678
- $00:28:37.725 \rightarrow 00:28:40.635$  from the opsin expressing neuron.
- NOTE Confidence: 0.7276678
- $00:28:40.640 \rightarrow 00:28:42.360$  And so when we pass,
- NOTE Confidence: 0.7276678
- $00:28:42.360 \longrightarrow 00:28:43.560$  we can validate this.
- NOTE Confidence: 0.7276678
- 00:28:43.560 --> 00:28:46.140 That doesn't help us in vivo necessarily,
- NOTE Confidence: 0.7276678
- $00:28:46.140 \longrightarrow 00:28:46.828$  you'd think.
- NOTE Confidence: 0.7276678
- 00:28:46.828 --> 00:28:49.580 But let's look at this and we can.
- NOTE Confidence: 0.7276678
- $00:28:49.580 \longrightarrow 00:28:50.450$  We can patch.
- NOTE Confidence: 0.7276678

 $00:28:50.450 \longrightarrow 00:28:52.190$  We can look at different light

NOTE Confidence: 0.7276678

 $00{:}28{:}52{.}190 \dashrightarrow 00{:}28{:}54{.}158$  powers and determine a distribution

NOTE Confidence: 0.7276678

 $00:28:54.158 \longrightarrow 00:28:55.778$  of photo response latency's,

NOTE Confidence: 0.7276678

 $00:28:55.780 \longrightarrow 00:28:57.490$  because if it is through

NOTE Confidence: 0.7276678

 $00:28:57.490 \longrightarrow 00:28:58.174$  recurrent excitation,

NOTE Confidence: 0.7276678

 $00:28:58.180 \longrightarrow 00:29:00.848$  there's this added synapse.

NOTE Confidence: 0.7276678

 $00{:}29{:}00{.}850 \dashrightarrow 00{:}29{:}03{.}010$  So sometimes the response to non

NOTE Confidence: 0.7276678

 $00:29:03.010 \rightarrow 00:29:04.908$  expressing neighbors that are receiving

NOTE Confidence: 0.7276678

 $00{:}29{:}04{.}908 \dashrightarrow 00{:}29{:}07{.}278$  input which you can determine and

NOTE Confidence: 0.7276678

00:29:07.278 --> 00:29:08.989 know about unequivocally ex vivo,

NOTE Confidence: 0.7276678

 $00:29:08.990 \longrightarrow 00:29:10.598$  you get the distribution.

NOTE Confidence: 0.7276678

 $00:29:10.598 \rightarrow 00:29:12.206$  This distribution is completely

NOTE Confidence: 0.7276678

 $00:29:12.206 \rightarrow 00:29:13.995$  non overlapping with those cells

NOTE Confidence: 0.7276678

 $00{:}29{:}13{.}995 \dashrightarrow 00{:}29{:}15{.}843$  are actually trying to record from

NOTE Confidence: 0.7276678

 $00{:}29{:}15.843 \dashrightarrow 00{:}29{:}17.867$  this feature to expressing neurons.

NOTE Confidence: 0.7276678

 $00:29:17.870 \longrightarrow 00:29:20.966$  That's great. That's often the case.

- NOTE Confidence: 0.7276678
- $00:29:20.970 \longrightarrow 00:29:21.582$  Sometimes, though,

 $00:29:21.582 \rightarrow 00:29:23.724$  the case is that there's some partial

NOTE Confidence: 0.7276678

 $00:29:23.724 \longrightarrow 00:29:25.130$  overlap where you for wrestle with

NOTE Confidence: 0.7276678

 $00:29:25.130 \longrightarrow 00:29:26.950$  once a pot with a false positive,

NOTE Confidence: 0.7276678

 $00:29:26.950 \longrightarrow 00:29:27.962$  once a false negative,

NOTE Confidence: 0.7276678

 $00{:}29{:}27{.}962 \dashrightarrow 00{:}29{:}29{.}227$  and then some cases there's

NOTE Confidence: 0.7276678

 $00:29:29.227 \longrightarrow 00:29:30.490$  so much overlap issues.

NOTE Confidence: 0.7276678

 $00:29:30.490 \longrightarrow 00:29:31.216$  Different approach,

NOTE Confidence: 0.7276678

 $00:29:31.216 \rightarrow 00:29:33.394$  like maybe you know genetically incredible

NOTE Confidence: 0.7276678

 $00:29:33.394 \rightarrow 00:29:34.749$  calcium indicators or something.

NOTE Confidence: 0.7276678

 $00:29:34.750 \longrightarrow 00:29:35.754$  So we did this.

NOTE Confidence: 0.7276678

 $00{:}29{:}35{.}754 \dashrightarrow 00{:}29{:}36{.}758$  I'm going to skip.

NOTE Confidence: 0.7276678

 $00{:}29{:}36{.}760 \dashrightarrow 00{:}29{:}38{.}284$  I'm going to skip to the

NOTE Confidence: 0.7276678

 $00:29:38.284 \longrightarrow 00:29:39.300$  punchline of this story

NOTE Confidence: 0.81243426

00:29:39.355 --> 00:29:40.520 to tell you about new,

 $00:29:40.520 \longrightarrow 00:29:41.651$  unpublished data, but.

NOTE Confidence: 0.81243426

 $00{:}29{:}41.651 \dashrightarrow 00{:}29{:}43.536$  We use multiple different types

NOTE Confidence: 0.81243426

 $00{:}29{:}43.536 \dashrightarrow 00{:}29{:}45.599$  of analysis and found that in

NOTE Confidence: 0.81243426

 $00:29:45.599 \rightarrow 00:29:47.154$  general it's true that village,

NOTE Confidence: 0.81243426

00:29:47.160 --> 00:29:49.128 an AC predominantly encodes positive balance.

NOTE Confidence: 0.81243426

 $00:29:49.130 \longrightarrow 00:29:50.765$  Be latest central amygdala predominantly

NOTE Confidence: 0.81243426

 $00{:}29{:}50.765 \dashrightarrow 00{:}29{:}52.718$  encodes negative balance, and we've

NOTE Confidence: 0.81243426

 $00:29:52.718 \rightarrow 00:29:56.590$  shown this in a bunch of different ways.

NOTE Confidence: 0.81243426

 $00{:}29{:}56{.}590 \dashrightarrow 00{:}29{:}58{.}090$  So it is heterogeneous genius.

NOTE Confidence: 0.81243426

 $00:29:58.090 \rightarrow 00:29:59.878$  There is a lot of heterogeneity,

NOTE Confidence: 0.81243426

 $00{:}29{:}59{.}880 \dashrightarrow 00{:}30{:}01{.}668$  but the general trend is history.

NOTE Confidence: 0.81243426

 $00:30:01.670 \longrightarrow 00:30:03.686$  So what about the local interactions between

NOTE Confidence: 0.81243426

 $00:30:03.686 \rightarrow 00:30:04.960$  these functionally distinct circuits?

NOTE Confidence: 0.81243426

 $00:30:04.960 \longrightarrow 00:30:06.968$  Why do we have them all like salt

NOTE Confidence: 0.81243426

 $00{:}30{:}06{.}968 \dashrightarrow 00{:}30{:}08{.}586$  and pepper mingled together in

NOTE Confidence: 0.81243426

 $00:30:08.586 \longrightarrow 00:30:10.336$  the basal lateral make alone?

- NOTE Confidence: 0.73263353
- $00:30:12.800 \rightarrow 00:30:15.960$  What is the microcircuit architecture,

 $00:30:15.960 \longrightarrow 00:30:19.648$  so to speak well?

NOTE Confidence: 0.73263353

 $00{:}30{:}19.650 \dashrightarrow 00{:}30{:}22.386$  If I have here in green reward encoding you

NOTE Confidence: 0.73263353

 $00:30:22.386 \rightarrow 00:30:25.048$  know principle drones or production runs,

NOTE Confidence: 0.73263353

 $00:30:25.050 \rightarrow 00:30:29.334$  fear encoding principles and then of course.

NOTE Confidence: 0.73263353

 $00{:}30{:}29{.}340 \dashrightarrow 00{:}30{:}31{.}645$  Some interneurons that are that

NOTE Confidence: 0.73263353

00:30:31.645 --> 00:30:33.028 are Gabaergic interneurons,

NOTE Confidence: 0.73263353

 $00{:}30{:}33{.}030 \dashrightarrow 00{:}30{:}36{.}257$  you might have one motif where there's

NOTE Confidence: 0.73263353

00:30:36.257 --> 00:30:38.100 mutual inhibition, where reward

NOTE Confidence: 0.73263353

 $00{:}30{:}38{.}100 \dashrightarrow 00{:}30{:}40{.}400$  encoding neurons can silence fear,

NOTE Confidence: 0.73263353

00:30:40.400 --> 00:30:43.400 encoding neurons, and vice versa.

NOTE Confidence: 0.73263353

00:30:43.400 --> 00:30:45.563 You might actually also have a uni

NOTE Confidence: 0.73263353

 $00{:}30{:}45{.}563 \dashrightarrow 00{:}30{:}47{.}110$  directional or asymmetric inhibition,

NOTE Confidence: 0.73263353

 $00{:}30{:}47.110 \dashrightarrow 00{:}30{:}48.790$  where fear encoding neurons would

NOTE Confidence: 0.73263353

00:30:48.790 --> 00:30:50.134 silence reward encoding runs,

- $00{:}30{:}50{.}140 \dashrightarrow 00{:}30{:}51{.}484$  but not vice versa.
- NOTE Confidence: 0.73263353
- $00:30:51.484 \rightarrow 00:30:54.176$  And honestly, when I first drew this picture,
- NOTE Confidence: 0.73263353
- $00{:}30{:}54{.}180 \dashrightarrow 00{:}30{:}56{.}500$  I just drew it 'cause I thought like
- NOTE Confidence: 0.73263353
- $00:30:56.500 \rightarrow 00:30:58.229$  technically it's another possibility.
- NOTE Confidence: 0.73263353
- 00:30:58.230 --> 00:31:00.534 I didn't actually think it was
- NOTE Confidence: 0.73263353
- $00:31:00.534 \longrightarrow 00:31:02.740$  going to be the answer.
- NOTE Confidence: 0.73263353
- $00:31:02.740 \longrightarrow 00:31:03.984$  And then of course,
- NOTE Confidence: 0.73263353
- $00:31:03.984 \rightarrow 00:31:05.228$  like the third possibility,
- NOTE Confidence: 0.73263353
- $00{:}31{:}05{.}230 \dashrightarrow 00{:}31{:}07{.}420$  being that there's a neutral
- NOTE Confidence: 0.73263353
- $00:31:07.420 \rightarrow 00:31:08.296$  excitatory response.
- NOTE Confidence: 0.73263353
- 00:31:08.300 --> 00:31:10.220 Felt thanks to Klong Hoon Chung.
- NOTE Confidence: 0.73263353
- 00:31:10.220 --> 00:31:12.443 We were able to look at this and you
- NOTE Confidence: 0.73263353
- $00:31:12.443 \rightarrow 00:31:14.494$  can see here some bling NEC ability
- NOTE Confidence: 0.73263353
- $00{:}31{:}14.494 \dashrightarrow 00{:}31{:}17.016$  to see an cells within the lateral
- NOTE Confidence: 0.73263353
- $00:31:17.016 \rightarrow 00:31:19.176$  nebula intermingled so much together,
- NOTE Confidence: 0.73263353
- $00:31:19.180 \rightarrow 00:31:22.477$  but also you know there's a gradient.

- NOTE Confidence: 0.73263353
- $00:31:22.480 \longrightarrow 00:31:24.920$  So indeed there are gradients.

 $00{:}31{:}24{.}920 \dashrightarrow 00{:}31{:}27{.}188$  We can quantify them,

NOTE Confidence: 0.73263353

 $00:31:27.188 \longrightarrow 00:31:29.456$  and they are intermingled.

NOTE Confidence: 0.73263353

 $00:31:29.460 \rightarrow 00:31:31.574$  So this sort of underscores the need

NOTE Confidence: 0.73263353

 $00:31:31.574 \rightarrow 00:31:33.974$  to think about the relationship between

NOTE Confidence: 0.73263353

 $00:31:33.974 \rightarrow 00:31:36.349$  these different populations of neurons,

NOTE Confidence: 0.73263353

 $00:31:36.350 \rightarrow 00:31:39.797$  so I'll just show you one little tidbit here.

NOTE Confidence: 0.73263353

 $00{:}31{:}39{.}800 \dashrightarrow 00{:}31{:}42{.}348$  But when we looked at the latest

NOTE Confidence: 0.73263353

 $00{:}31{:}42{.}348 \dashrightarrow 00{:}31{:}43{.}914$  central amygdala neurons that

NOTE Confidence: 0.73263353

 $00:31:43.914 \longrightarrow 00:31:45.546$  were photo identified here,

NOTE Confidence: 0.73263353

 $00:31:45.550 \longrightarrow 00:31:46.974$  we've got 33 units.

NOTE Confidence: 0.73263353

 $00{:}31{:}46{.}974 \dashrightarrow 00{:}31{:}49{.}110$  We can also see neurons that

NOTE Confidence: 0.73263353

00:31:49.192 --> 00:31:50.530 are photo excited,

NOTE Confidence: 0.73263353

00:31:50.530 - 00:31:52.440 meaning they have slower latency,

NOTE Confidence: 0.73263353

 $00:31:52.440 \rightarrow 00:31:55.470$  excitation, and response to light.

00:31:55.470 --> 00:31:57.636 Order on that were photo inhibited,

NOTE Confidence: 0.73263353

 $00:31:57.640 \rightarrow 00:31:59.908$  meaning they were silenced by the activation

NOTE Confidence: 0.73263353

 $00{:}31{:}59{.}908 \dashrightarrow 00{:}32{:}02{.}329$  of the late Essential Omega neurons.

NOTE Confidence: 0.73263353

 $00:32:02.330 \longrightarrow 00:32:04.857$  So if you look at these numbers,

NOTE Confidence: 0.73263353

 $00{:}32{:}04.860 \dashrightarrow 00{:}32{:}07.556$  you can see that the the amount

NOTE Confidence: 0.73263353

 $00:32:07.556 \longrightarrow 00:32:09.549$  of neurons that it's silent.

NOTE Confidence: 0.73263353

00:32:09.550 --> 00:32:11.518 These bileta CN neurons or silencing

NOTE Confidence: 0.73263353

00:32:11.518 - > 00:32:13.520 is greater than them themselves,

NOTE Confidence: 0.73263353

 $00:32:13.520 \longrightarrow 00:32:16.608$  and so there's this huge ability for them

NOTE Confidence: 0.73263353

 $00:32:16.608 \rightarrow 00:32:19.719$  to suppress the responses of other neurons.

NOTE Confidence: 0.73263353

 $00:32:19.720 \longrightarrow 00:32:21.360$  So.

NOTE Confidence: 0.73263353

00:32:21.360 --> 00:32:22.080 You know,

NOTE Confidence: 0.73263353

00:32:22.080 --> 00:32:23.160 perhaps it's true,

NOTE Confidence: 0.73263353

 $00:32:23.160 \longrightarrow 00:32:25.288$  like if we compare these numbers that

NOTE Confidence: 0.73263353

 $00{:}32{:}25{.}288 \dashrightarrow 00{:}32{:}27{.}739$  I just showed you for the normalizing

NOTE Confidence: 0.73263353

 $00:32:27.739 \longrightarrow 00:32:29.953$  to the neurons that actually expressed

 $00:32:30.022 \rightarrow 00:32:31.987$  channel rhodopsin and then looking at

NOTE Confidence: 0.73263353

00:32:31.987 --> 00:32:34.320 the proportion of neurons are excited

NOTE Confidence: 0.73263353

 $00:32:34.320 \rightarrow 00:32:36.120$  or inhibited by those projectors.

NOTE Confidence: 0.73263353

 $00:32:36.120 \longrightarrow 00:32:38.598$  You can see that the latest Central

NOTE Confidence: 0.73263353

 $00{:}32{:}38{.}598 \dashrightarrow 00{:}32{:}40{.}441$  McDonald's inhibit far more neurons

NOTE Confidence: 0.73263353

 $00{:}32{:}40{.}441 \dashrightarrow 00{:}32{:}42{.}954$  than do either of the other productions.

NOTE Confidence: 0.73263353

 $00:32:42.960 \longrightarrow 00:32:45.480$  So maybe when it comes down to

NOTE Confidence: 0.73263353

00:32:45.480 --> 00:32:47.896 a majority vote, so so to speak,

NOTE Confidence: 0.73263353

 $00{:}32{:}47.896 \dashrightarrow 00{:}32{:}49.900$  at the Bellator CN population is

NOTE Confidence: 0.73263353

 $00:32:49.973 \dashrightarrow 00:32:52.478$  more influential than local network.

NOTE Confidence: 0.73263353

 $00:32:52.480 \rightarrow 00:32:54.846$  And maybe their votes count more similar,

NOTE Confidence: 0.73263353

00:32:54.850 --> 00:32:55.492 you know,

NOTE Confidence: 0.73263353

 $00:32:55.492 \longrightarrow 00:32:57.418$  so that might be like something

NOTE Confidence: 0.73263353

 $00{:}32{:}57{.}418 \dashrightarrow 00{:}32{:}59{.}239$  that we want to consider.

NOTE Confidence: 0.73263353

 $00:32:59.240 \longrightarrow 00:33:00.925$  It's not necessarily that all

- $00:33:00.925 \longrightarrow 00:33:01.936$  votes are equal,
- NOTE Confidence: 0.73263353
- $00{:}33{:}01{.}940 \dashrightarrow 00{:}33{:}03{.}968$  not necessarily just a majority vote.
- NOTE Confidence: 0.73263353
- $00{:}33{:}03{.}970 \dashrightarrow 00{:}33{:}05{.}764$  Some neurons are positioned to be
- NOTE Confidence: 0.73263353
- $00:33:05.764 \rightarrow 00:33:07.436$  able to exert greater influence
- NOTE Confidence: 0.73263353
- $00:33:07.436 \rightarrow 00:33:10.401$  over their neighbors, like be late,
- NOTE Confidence: 0.73263353
- 00:33:10.401 --> 00:33:12.669 essential in Glen Rose.
- NOTE Confidence: 0.73263353
- 00:33:12.670 --> 00:33:15.934 Now, why won't the brain work this way?
- NOTE Confidence: 0.73263353
- $00:33:15.940 \dashrightarrow 00:33:18.439$  If we record from this is published
- NOTE Confidence: 0.73263353
- $00{:}33{:}18{.}439 \dashrightarrow 00{:}33{:}20{.}849$  in in Gwendolyn Calhouns preprint.
- NOTE Confidence: 0.73263353
- $00{:}33{:}20.850 \dashrightarrow 00{:}33{:}23.678$  But when we record from from NEC
- NOTE Confidence: 0.73263353
- 00:33:23.678 --> 00:33:25.350 Projectors and green Eyes,
- NOTE Confidence: 0.73263353
- $00{:}33{:}25{.}350 \dashrightarrow 00{:}33{:}27{.}612$  just abbreviated it end and patch
- NOTE Confidence: 0.73263353
- 00:33:27.612 --> 00:33:30.504 a record from from any project and
- NOTE Confidence: 0.73263353
- $00{:}33{:}30{.}504 \dashrightarrow 00{:}33{:}33{.}114$  stimulate CN protectors or vice versa.
- NOTE Confidence: 0.7511034
- 00:33:33.120 --> 00:33:34.752 You know, recording stimulate
- NOTE Confidence: 0.7511034
- $00:33:34.752 \rightarrow 00:33:36.792$  from the opposite pairing you.

- NOTE Confidence: 0.7511034
- 00:33:36.800 00:33:39.386 We actually see that they have

00:33:39.386 --> 00:33:41.110 different asymmetric impact on

NOTE Confidence: 0.7511034

 $00:33:41.187 \dashrightarrow 00:33:43.307$  each other when you stimulate.

NOTE Confidence: 0.7511034

00:33:43.310 --> 00:33:46.280 Uhm? A common projectors recording

NOTE Confidence: 0.7511034

 $00:33:46.280 \longrightarrow 00:33:48.656$  from central appraisal of

NOTE Confidence: 0.7511034

00:33:48.656 --> 00:33:51.350 projectors you actually facilitate.

NOTE Confidence: 0.7511034

 $00:33:51.350 \dashrightarrow 00:33:52.985$  Excitation, whereas in the other

NOTE Confidence: 0.7511034

 $00:33:52.985 \rightarrow 00:33:55.284$  direction you suppress it, so why would?

NOTE Confidence: 0.7511034

 $00:33:55.284 \rightarrow 00:33:57.580$  Why would the brain work this way?

NOTE Confidence: 0.7511034

 $00{:}33{:}57{.}580 \dashrightarrow 00{:}34{:}00{.}204$  I did not expect to see an asymmetric

NOTE Confidence: 0.7511034

 $00{:}34{:}00{.}204 \dashrightarrow 00{:}34{:}00{.}860$  unidirectional relationship,

NOTE Confidence: 0.7511034

 $00{:}34{:}00{.}860$  -->  $00{:}34{:}03{.}226$  but may be that makes sense because you NOTE Confidence: 0.7511034

00:34:03.226 --> 00:34:06.110 know you can mate or eat or drink later.

NOTE Confidence: 0.7511034

 $00{:}34{:}06{.}110 \dashrightarrow 00{:}34{:}08{.}336$  You need to escape from that predator

NOTE Confidence: 0.7511034

 $00:34:08.336 \rightarrow 00:34:10.698$  right now that is the most immediate,

 $00:34:10.700 \longrightarrow 00:34:12.340 \text{ most urgent demand or threat}$ 

NOTE Confidence: 0.7511034

 $00{:}34{:}12{.}340 \dashrightarrow 00{:}34{:}13{.}324$  on your survival.

NOTE Confidence: 0.7511034

 $00:34:13.330 \longrightarrow 00:34:15.286$  So you have to address that.

NOTE Confidence: 0.8124424

 $00{:}34{:}17.850 \dashrightarrow 00{:}34{:}19.362$  Further, maybe it makes sense 'cause

NOTE Confidence: 0.8124424

 $00:34:19.362 \rightarrow 00:34:21.149$  reward seeking is just inherently risky.

NOTE Confidence: 0.8124424

 $00:34{:}21.150$  -->  $00{:}34{:}23.697$  If I'm a mouse that lives in in my

NOTE Confidence: 0.8124424

 $00{:}34{:}23.697 \dashrightarrow 00{:}34{:}25.768$  borough and I need to, I need to.

NOTE Confidence: 0.8124424

 $00:34:25.768 \rightarrow 00:34:28.030$  I want to forage for food or water.

NOTE Confidence: 0.8124424

00:34:28.030 --> 00:34:29.986 Then you know, providing a skip

NOTE Confidence: 0.8124424

 $00{:}34{:}29{.}986 \dashrightarrow 00{:}34{:}32{.}540$  could be a good insurance policy.

NOTE Confidence: 0.8124424

 $00:34:32.540 \longrightarrow 00:34:34.280$  OK, so that's some speculation

NOTE Confidence: 0.8124424

 $00{:}34{:}34{.}280 \dashrightarrow 00{:}34{:}36{.}374$  and just contacts, but how does

NOTE Confidence: 0.8124424

 $00{:}34{:}36{.}374 \dashrightarrow 00{:}34{:}38{.}462$  neuromodulation play a role in here?

NOTE Confidence: 0.8124424

 $00{:}34{:}38{.}470 \dashrightarrow 00{:}34{:}40{.}920$  So this is the third final questions.

NOTE Confidence: 0.8124424

 $00{:}34{:}40{.}920 \dashrightarrow 00{:}34{:}44{.}637$  Main big question or focus on today.

NOTE Confidence: 0.8124424

 $00:34:44.640 \dashrightarrow 00:34:46.992$  And for that meeting that I want to

- NOTE Confidence: 0.8124424
- $00:34:46.992 \rightarrow 00:34:48.840$  actually show you the the questions

 $00:34:48.840 \longrightarrow 00:34:51.240$  that that make me lose sleep at night.

NOTE Confidence: 0.8124424

 $00:34:51.240 \longrightarrow 00:34:52.920$  So it's great that we found that

NOTE Confidence: 0.8124424

00:34:52.920 --> 00:34:54.360 you know after fear conditioning

NOTE Confidence: 0.8124424

 $00{:}34{:}54{.}360 \dashrightarrow 00{:}34{:}56{.}020$  we see strengthening of synapses

NOTE Confidence: 0.8124424

00:34:56.020 --> 00:34:57.839 going down one path afterward,

NOTE Confidence: 0.8124424

 $00:34:57.840 \rightarrow 00:34:59.640$  conditioning with the strengthening of steps,

NOTE Confidence: 0.8124424

 $00:34:59.640 \longrightarrow 00:35:02.350$  going down another path, but.

NOTE Confidence: 0.8124424

00:35:02.350 - 00:35:05.017 When this is happening in real life,

NOTE Confidence: 0.8124424

 $00:35:05.020 \rightarrow 00:35:08.450$  you know animals are capable of 1

NOTE Confidence: 0.8124424

 $00:35:08.450 \longrightarrow 00:35:10.762$  trial learning. How is this possible?

NOTE Confidence: 0.8124424

 $00{:}35{:}10.762 \dashrightarrow 00{:}35{:}11.428$  You know?

NOTE Confidence: 0.8124424

 $00{:}35{:}11{.}430 \dashrightarrow 00{:}35{:}13{.}418$  So I think the timescales how do

NOTE Confidence: 0.8124424

 $00{:}35{:}13.418$  -->  $00{:}35{:}15.176$  the synapses know which postsynaptic

NOTE Confidence: 0.8124424

 $00:35:15.176 \longrightarrow 00:35:16.439$  neurons are which,

 $00:35:16.440 \rightarrow 00:35:18.450$  and what you're supposed to do,

NOTE Confidence: 0.8124424

 $00:35:18.450 \longrightarrow 00:35:20.543$  so you know if you think about

NOTE Confidence: 0.8124424

 $00:35:20.543 \dashrightarrow 00:35:22.120$  spike timing dependent plasticity,

NOTE Confidence: 0.8124424

 $00:35:22.120 \longrightarrow 00:35:24.240$  you know shifting things from

NOTE Confidence: 0.8124424

 $00{:}35{:}24{.}240 \dashrightarrow 00{:}35{:}26{.}360$  just 50 or 100 milliseconds.

NOTE Confidence: 0.8124424

 $00{:}35{:}26{.}360 \dashrightarrow 00{:}35{:}27{.}744$  Can dramatically impact whether

NOTE Confidence: 0.8124424

 $00{:}35{:}27.744 \dashrightarrow 00{:}35{:}29.128$  it's LTP or Ltd.

NOTE Confidence: 0.8124424

 $00:35:29.130 \longrightarrow 00:35:30.860$  If we record in vivo,

NOTE Confidence: 0.8124424

 $00{:}35{:}30{.}860 \dashrightarrow 00{:}35{:}33{.}148$  you can see that after the onset of

NOTE Confidence: 0.8124424

 $00:35:33.148 \dashrightarrow 00:35:35.707$  the Q this the the auditory tone

NOTE Confidence: 0.8124424

00:35:35.707 --> 00:35:38.120 just 100 or 200 milliseconds later,

NOTE Confidence: 0.8124424

 $00{:}35{:}38{.}120 \dashrightarrow 00{:}35{:}39{.}850$  we're back down to baseline.

NOTE Confidence: 0.8124424

 $00{:}35{:}39{.}850 \dashrightarrow 00{:}35{:}40{.}879$  We don't have.

NOTE Confidence: 0.8124424

 $00:35:40.879 \rightarrow 00:35:43.280$  You know the neurons are no longer

NOTE Confidence: 0.8124424

 $00{:}35{:}43{.}350 \dashrightarrow 00{:}35{:}46{.}078$  active even as the Q continues to play.

NOTE Confidence: 0.8124424

 $00{:}35{:}46{.}080 \dashrightarrow 00{:}35{:}48{.}222$  And then let's think about the

- NOTE Confidence: 0.8124424
- $00:35:48.222 \rightarrow 00:35:50.391$  most common paradigms used in the

00:35:50.391 - > 00:35:51.743 field where condition stimulus

NOTE Confidence: 0.8124424

00:35:51.743 --> 00:35:54.039 will play for 10 or 20 seconds,

NOTE Confidence: 0.8124424

 $00:35:54.040 \longrightarrow 00:35:56.265$  the beeline neurons that are

NOTE Confidence: 0.8124424

 $00:35:56.265 \longrightarrow 00:35:58.045$  critical for the plasticity.

NOTE Confidence: 0.8124424

 $00{:}35{:}58.050 \dashrightarrow 00{:}35{:}59.952$  Please tell a very transient activation

NOTE Confidence: 0.8124424

 $00:35:59.952 \rightarrow 00:36:02.608$  at the onset of the condition stimulus,

NOTE Confidence: 0.8124424

 $00{:}36{:}02.610 \dashrightarrow 00{:}36{:}05.458$  then then go back down to baseline and

NOTE Confidence: 0.8124424

 $00:36:05.458 \longrightarrow 00:36:08.229$  you know could be 10 or 20 seconds.

NOTE Confidence: 0.8124424

 $00:36:08.230 \rightarrow 00:36:09.980$  The unconditioned stimulus is presented.

NOTE Confidence: 0.8124424

 $00:36:09.980 \longrightarrow 00:36:12.086$  So how does the brain solve

NOTE Confidence: 0.8124424

 $00{:}36{:}12.086 \dashrightarrow 00{:}36{:}13.490$  the valence assignment problem?

NOTE Confidence: 0.8124424

 $00{:}36{:}13.490 \dashrightarrow 00{:}36{:}15.695$  How does the brain attach these things

NOTE Confidence: 0.8124424

 $00{:}36{:}15.695 \dashrightarrow 00{:}36{:}18.407$  that are so desperate in time together?

NOTE Confidence: 0.8124424

 $00:36:18.410 \dashrightarrow 00:36:21.569$  So first there's the question of how do they? NOTE Confidence: 0.8124424

 $00:36:21.570 \longrightarrow 00:36:23.670$  How does the brain know which

NOTE Confidence: 0.8124424

00:36:23.670 --> 00:36:25.430 synapses route information to wear?

NOTE Confidence: 0.8124424

 $00{:}36{:}25{.}430 \dashrightarrow 00{:}36{:}28{.}294$  So there's a few different options here so.

NOTE Confidence: 0.8124424

00:36:28.300 --> 00:36:29.488 In terms of knowing,

NOTE Confidence: 0.8124424

 $00{:}36{:}29{.}488 \dashrightarrow 00{:}36{:}30{.}973$  knowing who's who in terms

NOTE Confidence: 0.8124424

 $00{:}36{:}30{.}973 \dashrightarrow 00{:}36{:}32{.}758$  of the postsynaptic neuron,

NOTE Confidence: 0.8124424

 $00{:}36{:}32.760 \dashrightarrow 00{:}36{:}35.736$  we wanted to explore this and so we

NOTE Confidence: 0.8124424

00:36:35.736 --> 00:36:38.310 sequenced violate any simulated CM neurons.

NOTE Confidence: 0.8124424

 $00:36:38.310 \dashrightarrow 00:36:40.716$  And look for surface receptor specifically.

NOTE Confidence: 0.8124424

00:36:40.720 --> 00:36:41.093 Indeed,

NOTE Confidence: 0.8124424

 $00{:}36{:}41.093 \dashrightarrow 00{:}36{:}43.704$  one service provider that we identified as

NOTE Confidence: 0.8124424

 $00:36:43.704 \rightarrow 00:36:45.950$  interesting is the Neurotensin receptor,

NOTE Confidence: 0.8124424

 $00{:}36{:}45{.}950 \dashrightarrow 00{:}36{:}48{.}982$  one which we see to be enriched have

NOTE Confidence: 0.8124424

 $00:36:48.982 \rightarrow 00:36:51.170$  enriched expression and Sian projectors.

NOTE Confidence: 0.8124424

 $00{:}36{:}51{.}170 \dashrightarrow 00{:}36{:}54{.}455$  Now why am I going to focus in on

NOTE Confidence: 0.8124424

00:36:54.455 --> 00:36:57.790 the nearest ends in one receptor?

 $00:36:57.790 \longrightarrow 00:36:58.144$  Well,

NOTE Confidence: 0.8124424

 $00{:}36{:}58{.}144 \dashrightarrow 00{:}37{:}00{.}976$  we know that there is a one receptor

NOTE Confidence: 0.8124424

00:37:00.976 --> 00:37:03.829 controls a G protein coupled receptor GP CR.

NOTE Confidence: 0.8124424

 $00:37:03.830 \longrightarrow 00:37:05.828$  The function of this receptor has

NOTE Confidence: 0.8124424

 $00{:}37{:}05{.}828 \dashrightarrow 00{:}37{:}09{.}086$  been linked to both LDP in the PLA and

NOTE Confidence: 0.8124424

 $00{:}37{:}09{.}086$  -->  $00{:}37{:}10{.}570$  also contextual fear conditioning.

NOTE Confidence: 0.8124424

 $00:37:10.570 \dashrightarrow 00:37:13.330$  And the thing that really got me was

NOTE Confidence: 0.8124424

 $00:37:13.330 \rightarrow 00:37:16.997$  done by Kimberly Kempadoo and she found that.

NOTE Confidence: 0.7342665

00:37:17.000 --> 00:37:19.280 Different concentrations of narrow tense,

NOTE Confidence: 0.7342665

 $00:37:19.280 \longrightarrow 00:37:22.458$  and this is a different cell population,

NOTE Confidence: 0.7342665

 $00{:}37{:}22.460 \dashrightarrow 00{:}37{:}24.180$  but different concentrations are

NOTE Confidence: 0.7342665

 $00{:}37{:}24.180 \dashrightarrow 00{:}37{:}26.330$  intense and could actually either

NOTE Confidence: 0.7342665

00:37:26.330 --> 00:37:28.050 facilitate glutamatergic transmission

NOTE Confidence: 0.7342665

 $00{:}37{:}28.050 \dashrightarrow 00{:}37{:}30.510$  or suppress gluta matergic transmission.

NOTE Confidence: 0.7342665

00:37:30.510 - 00:37:34.808 So if this is possible, you know then?

00:37:34.808 -> 00:37:37.724 We hypothesize that but the same

NOTE Confidence: 0.7342665

 $00{:}37{:}37{.}724$  -->  $00{:}37{:}40.680$  concentration of their attention could then,

NOTE Confidence: 0.7342665

 $00{:}37{:}40.680 \dashrightarrow 00{:}37{:}42.960$  you know, drive effects differently on

NOTE Confidence: 0.7342665

 $00{:}37{:}42.960 \dashrightarrow 00{:}37{:}45.005$  these projector populations that have

NOTE Confidence: 0.7342665

 $00:37:45.005 \rightarrow 00:37:46.889$  different receptor expression profiles.

NOTE Confidence: 0.7342665

 $00{:}37{:}46.890 \dashrightarrow 00{:}37{:}48.855$  OK, so if different concentrations

NOTE Confidence: 0.7342665

00:37:48.855 - 00:37:51.440 are neurons at the same profile,

NOTE Confidence: 0.7342665

 $00{:}37{:}51{.}440 \dashrightarrow 00{:}37{:}53{.}510$  can can make glutamatergic transmission

NOTE Confidence: 0.7342665

 $00{:}37{:}53.510 \dashrightarrow 00{:}37{:}55.580$  either be facilitated or suppressed,

NOTE Confidence: 0.7342665

 $00{:}37{:}55{.}580 \dashrightarrow 00{:}37{:}57{.}854$  then may be one concentration of their

NOTE Confidence: 0.7342665

 $00{:}37{:}57{.}854 \dashrightarrow 00{:}38{:}00{.}196$  attention can shift the balance from

NOTE Confidence: 0.7342665

 $00{:}38{:}00{.}196 \dashrightarrow 00{:}38{:}02{.}849$  one population to another if they have

NOTE Confidence: 0.7342665

 $00:38:02.849 \dashrightarrow 00:38:05.099$  different receptor expression profiles.

NOTE Confidence: 0.7793689

 $00:38:07.530 \longrightarrow 00:38:09.918$  So first we want to explore

NOTE Confidence: 0.7793689

 $00{:}38{:}09{.}918 \dashrightarrow 00{:}38{:}11{.}510$  this an we performed.

NOTE Confidence: 0.7793689

 $00:38:11.510 \rightarrow 00:38:14.205$  We did some pharmacological manipulations

- NOTE Confidence: 0.7793689
- $00:38:14.205 \rightarrow 00:38:16.900$  where we administered the audience

00:38:16.976 --> 00:38:19.148 or want agonist in today's letter

NOTE Confidence: 0.7793689

00:38:19.148 --> 00:38:22.367 will make the lab and we actually saw

NOTE Confidence: 0.7793689

 $00:38:22.367 \rightarrow 00:38:24.492$  an enhancement of reward learning.

NOTE Confidence: 0.7793689

 $00{:}38{:}24{.}500 \dashrightarrow 00{:}38{:}26{.}840$  We saw a nonsignificant trend towards

NOTE Confidence: 0.7793689

 $00{:}38{:}26{.}840 \dashrightarrow 00{:}38{:}29{.}330$  an impairment of fear conditioning.

NOTE Confidence: 0.7793689

00:38:29.330 --> 00:38:31.640 OK, so that's potentially, you know,

NOTE Confidence: 0.7793689

 $00:38:31.640 \longrightarrow 00:38:33.180$  suggested that narrative could

NOTE Confidence: 0.7793689

 $00{:}38{:}33{.}180 \dashrightarrow 00{:}38{:}35{.}490$  play a role in balance processing,

NOTE Confidence: 0.7793689

 $00{:}38{:}35{.}490 \dashrightarrow 00{:}38{:}38{.}017$  and we also see that indeed there

NOTE Confidence: 0.7793689

 $00:38:38.017 \dashrightarrow 00:38:39.915$  are different effects you know

NOTE Confidence: 0.7793689

 $00{:}38{:}39{.}915 \dashrightarrow 00{:}38{:}41{.}785$  match for credit concentration of

NOTE Confidence: 0.7793689

00:38:41.785 --> 00:38:43.959 Billy and Acnb licien neurons.

NOTE Confidence: 0.7793689

 $00{:}38{:}43{.}960 \dashrightarrow 00{:}38{:}46{.}860$  We do indeed see different

NOTE Confidence: 0.7793689

00:38:46.860 - 00:38:48.600 dose response curves.

 $00{:}38{:}48{.}600 \dashrightarrow 00{:}38{:}51{.}162$  These differences at a given concentration

NOTE Confidence: 0.7793689

 $00{:}38{:}51{.}162 \dashrightarrow 00{:}38{:}54{.}268$  of tendon, animal or near attention,

NOTE Confidence: 0.7793689

 $00{:}38{:}54{.}268 \dashrightarrow 00{:}38{:}59{.}298$  we can see an increase of billet and AC.

NOTE Confidence: 0.7793689

 $00{:}38{:}59{.}300 \dashrightarrow 00{:}39{:}01{.}502$  Amplitudes EPS evoked from Billy the

NOTE Confidence: 0.7793689

00:39:01.502 --> 00:39:04.070 NACS neurons, and a suppression of EPS,

NOTE Confidence: 0.7793689

 $00{:}39{:}04.070 \dashrightarrow 00{:}39{:}07.006$  sees a bug from the legacy M neurons,

NOTE Confidence: 0.7793689

 $00{:}39{:}07{.}010 \dashrightarrow 00{:}39{:}10{.}069$  and this is blocked by the NPS

NOTE Confidence: 0.7793689

 $00:39:10.069 \rightarrow 00:39:11.380$  are one antagonist.

NOTE Confidence: 0.7793689

 $00:39:11.380 \longrightarrow 00:39:14.140$  OK, great, but where do we get near?

NOTE Confidence: 0.7793689

 $00:39:14.140 \longrightarrow 00:39:15.520$  It ends in front.

NOTE Confidence: 0.7793689

 $00:39:15.520 \longrightarrow 00:39:17.245$  Where does it come from?

NOTE Confidence: 0.7793689

 $00{:}39{:}17.250 \dashrightarrow 00{:}39{:}19.994$  So we we trace upstream and looked for

NOTE Confidence: 0.7793689

 $00:39:19.994 \rightarrow 00:39:21.451$  colocalization of Tracer suggesting

NOTE Confidence: 0.7793689

00:39:21.451 --> 00:39:23.936 that you were protecting the leg as

NOTE Confidence: 0.7793689

 $00{:}39{:}23{.}936 \dashrightarrow 00{:}39{:}25{.}974$  well as expression of neural tension

NOTE Confidence: 0.7793689

00:39:25.974 --> 00:39:29.979 in the New York Times and cream mask.

 $00{:}39{:}29{.}980 \dashrightarrow 00{:}39{:}32{.}725$  And so we found that the PDT was a

NOTE Confidence: 0.7793689

 $00{:}39{:}32{.}725 \dashrightarrow 00{:}39{:}35{.}119$  prime target and photo stimulating

NOTE Confidence: 0.7793689

 $00{:}39{:}35{.}119$  -->  $00{:}39{:}38{.}137$  PDT to be lay neurons produces valence

NOTE Confidence: 0.7793689

 $00:39:38.217 \rightarrow 00:39:40.807$  specific effects that we actually.

NOTE Confidence: 0.7793689

 $00:39:40.810 \longrightarrow 00:39:44.698$  If we stimulate this PT input to be alive,

NOTE Confidence: 0.7793689

 $00:39:44.700 \dashrightarrow 00:39:46.844$  which includes neurotensin neurons,

NOTE Confidence: 0.7793689

 $00:39:46.844 \rightarrow 00:39:50.631$  we see a facilitation of reward learning

NOTE Confidence: 0.7793689

 $00:39:50.631 \rightarrow 00:39:53.577$  and an impairment of fear looming.

NOTE Confidence: 0.7793689

 $00:39:53.580 \longrightarrow 00:39:55.897$  Next to this huge body of work

NOTE Confidence: 0.7793689

 $00{:}39{:}55{.}897 \dashrightarrow 00{:}39{:}58{.}327$  that I'm about to tell you about to

NOTE Confidence: 0.7793689

 $00{:}39{:}58{.}327 \dashrightarrow 00{:}40{:}00{.}746$  get into is a by Hailee a postdoc

NOTE Confidence: 0.7793689

 $00{:}40{:}00{.}746 \dashrightarrow 00{:}40{:}02{.}708$  in my lab here at salt.

NOTE Confidence: 0.7793689

 $00:40:02.710 \longrightarrow 00:40:03.340$  And what,

NOTE Confidence: 0.7793689

 $00{:}40{:}03{.}340 \dashrightarrow 00{:}40{:}06{.}448$  how found was that the PDT to bill a

NOTE Confidence: 0.7793689

00:40:06.448 --> 00:40:09.023 nuro 10 synergic projection contributes

00:40:09.023 --> 00:40:11.083 heavily to Billy computations,

NOTE Confidence: 0.7793689

 $00{:}40{:}11.090 \dashrightarrow 00{:}40{:}14.177$  and so he said to look at this and

NOTE Confidence: 0.7793689

 $00{:}40{:}14.177 \dashrightarrow 00{:}40{:}16.443$  interrogate the contribution of Neuro

NOTE Confidence: 0.7793689

00:40:16.443 --> 00:40:19.890 10 synergic input from this specific pathway,

NOTE Confidence: 0.7793689

 $00:40:19.890 \longrightarrow 00:40:21.506$  we first Chris Byrd.

NOTE Confidence: 0.7793689

 $00{:}40{:}21.506 \dashrightarrow 00{:}40{:}23.930$  We used CRISPR to knock down

NOTE Confidence: 0.7793689

 $00{:}40{:}24.022 \dashrightarrow 00{:}40{:}26.167$  that near attend and Gene.

NOTE Confidence: 0.7793689

 $00{:}40{:}26.170 \dashrightarrow 00{:}40{:}29.482$  And so the PDT input would either have

NOTE Confidence: 0.7793689

 $00{:}40{:}29{.}482 \dashrightarrow 00{:}40{:}32.756$  knocked down or control of your attention.

NOTE Confidence: 0.7793689

 $00{:}40{:}32.760 \dashrightarrow 00{:}40{:}35.712$  Then we wanted to be able to perform

NOTE Confidence: 0.7793689

 $00{:}40{:}35.712 \dashrightarrow 00{:}40{:}38.529$  recordings in the basil lateral amygdala,

NOTE Confidence: 0.7793689

 $00{:}40{:}38{.}530 \dashrightarrow 00{:}40{:}40{.}522$  in both control an crisper animals

NOTE Confidence: 0.7793689

 $00:40:40.522 \longrightarrow 00:40:43.038$  and be able to photo identify

NOTE Confidence: 0.7793689

 $00:40:43.038 \longrightarrow 00:40:44.706$  the different populations.

NOTE Confidence: 0.7793689

 $00{:}40{:}44{.}710 \dashrightarrow 00{:}40{:}47{.}806$  So first I'm just showing you that the

NOTE Confidence: 0.7793689

 $00{:}40{:}47.806 \dashrightarrow 00{:}40{:}50.210$  crisper works we can inactivate the

 $00:40:50.210 \longrightarrow 00:40:53.360$  near 10s and gene and preserve glutamate.

NOTE Confidence: 0.5319372

 $00:40:55.460 \rightarrow 00:40:57.480$  Narrative the neurons coberly's glutamate.

NOTE Confidence: 0.73834090000001

 $00:40:59.610 \rightarrow 00:41:02.130$  And we found that the crisper animals

NOTE Confidence: 0.73834090000001

 $00:41:02.130 \longrightarrow 00:41:04.282$  will be knocked down the narrow

NOTE Confidence: 0.73834090000001

 $00{:}41{:}04{.}282 \dashrightarrow 00{:}41{:}06{.}613$  Tenzin gene within the PD gbla we

NOTE Confidence: 0.73834090000001

00:41:06.683 --> 00:41:09.197 see an impairment of reward learning,

NOTE Confidence: 0.73834090000001

 $00:41:09.200 \longrightarrow 00:41:11.050$  and this also promotes fear.

NOTE Confidence: 0.73834090000001

 $00:41:11.050 \rightarrow 00:41:13.969$  Learning this is again suggesting this role

NOTE Confidence: 0.73834090000001

 $00{:}41{:}13.969 \dashrightarrow 00{:}41{:}16.828$  for near Tencent in Valence processing.

NOTE Confidence: 0.73834090000001

00:41:16.830 --> 00:41:19.926 OK, but how is this role actually like?

NOTE Confidence: 0.73834090000001

 $00:41:19.930 \longrightarrow 00:41:21.860$  What does this look like?

NOTE Confidence: 0.738340900000001

 $00:41:21.860 \longrightarrow 00:41:23.015$  What? How does?

NOTE Confidence: 0.73834090000001

 $00{:}41{:}23.015 \dashrightarrow 00{:}41{:}24.940$  How do the computations that

NOTE Confidence: 0.73834090000001

 $00:41:24.940 \longrightarrow 00:41:27.278$  are being performed in the PLA?

NOTE Confidence: 0.73834090000001

 $00{:}41{:}27.280 \dashrightarrow 00{:}41{:}29.245$  How are the computations being
$00:41:29.245 \rightarrow 00:41:31.210$  modified when you know there's

NOTE Confidence: 0.73834090000001

 $00:41:31.280 \longrightarrow 00:41:32.700$  more attention or not?

NOTE Confidence: 0.766144792857143

 $00{:}41{:}34{.}850 \dashrightarrow 00{:}41{:}38{.}130$  And so dumb. How recorded from hundreds of

NOTE Confidence: 0.766144792857143

 $00:41:38.130 \rightarrow 00:41:41.038$  neurons from the basal lateral amygdala,

NOTE Confidence: 0.766144792857143

 $00{:}41{:}41{.}040 \dashrightarrow 00{:}41{:}44{.}048$  in a task where animals had to just

NOTE Confidence: 0.766144792857143

 $00{:}41{:}44.048 \dashrightarrow 00{:}41{:}46.030$  differentiate between a reward and

NOTE Confidence: 0.766144792857143

 $00{:}41{:}46.030 \dashrightarrow 00{:}41{:}48.726$  shock predictive cues, as well as a

NOTE Confidence: 0.766144792857143

 $00:41:48.726 \rightarrow 00:41:51.030$  neutral Q that didn't predict anything,

NOTE Confidence: 0.766144792857143

 $00:41:51.030 \rightarrow 00:41:52.945$  and we perform functional agglomerative

NOTE Confidence: 0.766144792857143

 $00:41:52.945 \longrightarrow 00:41:55.250$  clustering, and we can see that

NOTE Confidence: 0.766144792857143

 $00:41:55.250 \rightarrow 00:41:57.170$  across different types of clusters.

NOTE Confidence: 0.766144792857143

00:41:57.170 --> 00:41:59.858 Here, Gray is controlled and blue is

NOTE Confidence: 0.766144792857143

00:41:59.858 --> 00:42:03.355 crisper and across the board. But you know,

NOTE Confidence: 0.766144792857143

 $00:42:03.355 \rightarrow 00:42:05.980$  there's a diversity of responses.

NOTE Confidence: 0.766144792857143

 $00{:}42{:}05{.}980 \dashrightarrow 00{:}42{:}08{.}290$  But what you can see across the

NOTE Confidence: 0.766144792857143

 $00{:}42{:}08{.}290 \dashrightarrow 00{:}42{:}10{.}582$  board in each of these clusters

- NOTE Confidence: 0.766144792857143
- $00{:}42{:}10.582 \dashrightarrow 00{:}42{:}13.030$  is that the response is blunted.
- NOTE Confidence: 0.766144792857143
- $00:42:13.030 \longrightarrow 00:42:14.885$  When we Chris Brown your
- NOTE Confidence: 0.766144792857143
- 00:42:14.885 --> 00:42:16.369 attention on both directions,
- NOTE Confidence: 0.766144792857143
- $00:42:16.370 \longrightarrow 00:42:18.220$  both for excitations an ambitions,
- NOTE Confidence: 0.766144792857143
- $00{:}42{:}18{.}220 \dashrightarrow 00{:}42{:}20{.}075$  the absolute value of the
- NOTE Confidence: 0.766144792857143
- 00:42:20.075 --> 00:42:21.559 amplitude of the response,
- NOTE Confidence: 0.766144792857143
- $00:42:21.560 \longrightarrow 00:42:23.465$  the change in physical activity
- NOTE Confidence: 0.766144792857143
- $00:42:23.465 \longrightarrow 00:42:25.370$  in either direction to reward
- NOTE Confidence: 0.766144792857143
- 00:42:25.440 --> 00:42:27.130 or Punish Inc uses reduced,
- NOTE Confidence: 0.766144792857143
- $00:42:27.130 \longrightarrow 00:42:29.190$  so every all the valence
- NOTE Confidence: 0.766144792857143
- $00:42:29.190 \longrightarrow 00:42:31.250$  processing just looks blunted by
- NOTE Confidence: 0.766144792857143
- $00{:}42{:}31{.}324 \dashrightarrow 00{:}42{:}33{.}709$  the knockdown of their attention.
- NOTE Confidence: 0.766144792857143
- 00:42:33.710 --> 00:42:37.060 OK, So what about specifically
- NOTE Confidence: 0.766144792857143
- $00:42:37.060 \longrightarrow 00:42:39.740$  to BLAN AC projectors?
- NOTE Confidence: 0.766144792857143
- $00:42:39.740 \longrightarrow 00:42:43.708$  We see that indeed.
- NOTE Confidence: 0.766144792857143

 $00:42:43.710 \rightarrow 00:42:46.356$  Control animals we replicate this general

NOTE Confidence: 0.766144792857143

 $00{:}42{:}46{.}356 \dashrightarrow 00{:}42{:}49{.}370$  effect of having a reward you know,

NOTE Confidence: 0.766144792857143

 $00:42:49.370 \rightarrow 00:42:51.560$  a positive balance biased encoding

NOTE Confidence: 0.766144792857143

 $00:42:51.560 \rightarrow 00:42:54.590$  property which drops sort of to neutral.

NOTE Confidence: 0.766144792857143

 $00{:}42{:}54{.}590 \dashrightarrow 00{:}42{:}57{.}306$  When we Chris Brown are tense and

NOTE Confidence: 0.766144792857143

 $00{:}42{:}57{.}306$  -->  $00{:}42{:}59{.}370$  same thing central projectors.

NOTE Confidence: 0.766144792857143

 $00:42:59.370 \longrightarrow 00:43:01.455$  We reproduced our initial response

NOTE Confidence: 0.766144792857143

 $00:43:01.455 \rightarrow 00:43:04.065$  of having a negative balance biased

NOTE Confidence: 0.766144792857143

 $00{:}43{:}04.065 \dashrightarrow 00{:}43{:}06.330$  response of this whole population,

NOTE Confidence: 0.766144792857143

 $00{:}43{:}06{.}330 \dashrightarrow 00{:}43{:}08{.}670$  which again is sort of neutralized

NOTE Confidence: 0.766144792857143

 $00{:}43{:}08.670 \dashrightarrow 00{:}43{:}10.829$  or attenuated with the knockdown

NOTE Confidence: 0.766144792857143

 $00:43:10.829 \longrightarrow 00:43:12.419$  of crisper injustice.

NOTE Confidence: 0.766144792857143

 $00:43:12.420 \longrightarrow 00:43:15.276$  Pacific PDT to be late input.

NOTE Confidence: 0.766144792857143

 $00:43:15.280 \longrightarrow 00:43:16.726$  Neurotensin everywhere else

NOTE Confidence: 0.766144792857143

 $00:43:16.726 \longrightarrow 00:43:19.136$  in the brain is intact.

NOTE Confidence: 0.766144792857143

00:43:19.140 --> 00:43:19.473 OK,

 $00:43:19.473 \rightarrow 00:43:22.137$  so this is just showing the opposite effects

NOTE Confidence: 0.766144792857143

 $00{:}43{:}22.137 \dashrightarrow 00{:}43{:}24.890$  of the different projector populations.

NOTE Confidence: 0.766144792857143

 $00:43:24.890 \rightarrow 00:43:28.250$  And then what I want to show you here is,

NOTE Confidence: 0.766144792857143

 $00:43:28.250 \longrightarrow 00:43:29.590$  this is what normally

NOTE Confidence: 0.766144792857143

 $00:43:29.590 \longrightarrow 00:43:31.265$  happens for each trial type.

NOTE Confidence: 0.766144792857143

 $00:43:31.270 \longrightarrow 00:43:32.614$  We've got sucrose neutral,

NOTE Confidence: 0.766144792857143

 $00:43:32.614 \longrightarrow 00:43:33.958$  an shock condition stimuli,

NOTE Confidence: 0.766144792857143

 $00:43:33.960 \rightarrow 00:43:36.305$  and each trajectory begins here in time.

NOTE Confidence: 0.766144792857143

 $00{:}43{:}36{.}310 \dashrightarrow 00{:}43{:}38{.}558$  Then the Q will be on set and

NOTE Confidence: 0.766144792857143

 $00:43:38.558 \longrightarrow 00:43:40.678$  then the response will occur.

NOTE Confidence: 0.766144792857143

 $00:43:40.680 \rightarrow 00:43:43.025$  And what am I showing you here?

NOTE Confidence: 0.766144792857143

 $00:43:43.030 \rightarrow 00:43:45.242$  This is looking at the neural ensemble

NOTE Confidence: 0.766144792857143

 $00{:}43{:}45{.}242 \dashrightarrow 00{:}43{:}47{.}399$  as visualized as a neural trajectory.

NOTE Confidence: 0.766144792857143

 $00{:}43{:}47{.}400 \dashrightarrow 00{:}43{:}49{.}980$  So what does that mean?

NOTE Confidence: 0.766144792857143

 $00:43:49.980 \longrightarrow 00:43:50.571$  How do you?

 $00:43:50.571 \rightarrow 00:43:52.480$  How do we think about an ensemble of neurons?

NOTE Confidence: 0.766144792857143

00:43:52.480 --> 00:43:54.136 So if you if you had 100 neurons,

NOTE Confidence: 0.766144792857143

00:43:54.140 --> 00:43:56.080 I mean here we have.

NOTE Confidence: 0.766144792857143

 $00:43:56.080 \longrightarrow 00:43:57.252$  Sam called 700 rounds,

NOTE Confidence: 0.766144792857143

 $00{:}43{:}57{.}252 \dashrightarrow 00{:}43{:}59{.}931$  but if you have 100 rounds and you want

NOTE Confidence: 0.766144792857143

 $00{:}43{:}59{.}931 \dashrightarrow 00{:}44{:}02{.}360$  to see what the whole population is doing,

NOTE Confidence: 0.766144792857143

 $00{:}44{:}02{.}360 \dashrightarrow 00{:}44{:}04{.}397$  you could plot that in 100 dimensional

NOTE Confidence: 0.766144792857143

 $00:44:04.397 \longrightarrow 00:44:06.872$  space and then just look at each neuron

NOTE Confidence: 0.766144792857143

 $00{:}44{:}06.872 \dashrightarrow 00{:}44{:}08.754$  as representing a dimension and then

NOTE Confidence: 0.766144792857143

 $00:44:08.754 \longrightarrow 00:44:10.756$  just look at the trajectory of that

NOTE Confidence: 0.766144792857143

 $00{:}44{:}10.756 \dashrightarrow 00{:}44{:}12.990$  ensemble in activity space across time.

NOTE Confidence: 0.766144792857143

00:44:12.990 --> 00:44:14.650 It's an aerial trajectory.

NOTE Confidence: 0.766144792857143

 $00:44:14.650 \rightarrow 00:44:17.254$  It's hard to plot 100 dimensional space,

NOTE Confidence: 0.766144792857143

 $00{:}44{:}17{.}260 \dashrightarrow 00{:}44{:}20{.}329$  so of course what we can do is perform

NOTE Confidence: 0.766144792857143

 $00:44:20.329 \rightarrow 00:44:21.734$  dimensionality reduction principle

NOTE Confidence: 0.766144792857143

 $00:44:21.734 \rightarrow 00:44:24.214$  components analysis and then reduce

- NOTE Confidence: 0.766144792857143
- $00{:}44{:}24{.}214 \dashrightarrow 00{:}44{:}26{.}824$  reduce the dimensions down to those
- NOTE Confidence: 0.766144792857143
- $00{:}44{:}26.824 \dashrightarrow 00{:}44{:}28.930$  that can offer the most covariance.
- NOTE Confidence: 0.766144792857143
- $00:44:28.930 \longrightarrow 00:44:31.018$  So that's what we're doing here.
- NOTE Confidence: 0.766144792857143
- $00:44:31.020 \rightarrow 00:44:32.424$  Principal component one principal
- NOTE Confidence: 0.766144792857143
- $00{:}44{:}32{.}424 \dashrightarrow 00{:}44{:}34{.}179$  component to it that you
- NOTE Confidence: 0.766144792857143
- $00{:}44{:}34{.}179 \dashrightarrow 00{:}44{:}35{.}594$  components that offer contributed
- NOTE Confidence: 0.766144792857143
- $00:44:35.594 \longrightarrow 00:44:37.279$  most covariance here and then.
- NOTE Confidence: 0.766144792857143
- $00:44:37.280 \rightarrow 00:44:39.786$  You can see that the sucrose trajectory's
- NOTE Confidence: 0.766144792857143
- $00{:}44{:}39.786 \dashrightarrow 00{:}44{:}42.560$  once the the tone comes on you can
- NOTE Confidence: 0.766144792857143
- $00{:}44{:}42.560 \dashrightarrow 00{:}44{:}44.590$  see the animals are showing this.
- NOTE Confidence: 0.766144792857143
- $00:44:44.590 \rightarrow 00:44:47.610$  This divergent of the trajectory's.
- NOTE Confidence: 0.766144792857143
- $00:44:47.610 \longrightarrow 00:44:49.210$  These are the control animals,
- NOTE Confidence: 0.8035762
- $00:44:49.210 \rightarrow 00:44:51.754$  though. What happens when you put Chris Rock,
- NOTE Confidence: 0.8035762
- 00:44:51.760 --> 00:44:53.040 Chris Brown? You say?
- NOTE Confidence: 0.8035762
- $00:44:53.040 \rightarrow 00:44:55.333$  Well actually it's this little blob right
- NOTE Confidence: 0.8035762

 $00:44:55.333 \rightarrow 00:44:57.496$  here that you can't even see anything.

NOTE Confidence: 0.8035762

00:44:57.500 --> 00:44:59.621 It's so small, so I'm going to

NOTE Confidence: 0.8035762

 $00:44:59.621 \longrightarrow 00:45:01.650$  blow it up in this inset,

NOTE Confidence: 0.8035762

 $00{:}45{:}01{.}650 \dashrightarrow 00{:}45{:}03{.}883$  but here the arbitrary units were on

NOTE Confidence: 0.8035762

 $00{:}45{:}03.883 \dashrightarrow 00{:}45{:}05.821$  a different scale. It's so small.

NOTE Confidence: 0.8035762

 $00:45:05.821 \rightarrow 00:45:07.783$  So basically all of these trajectories

NOTE Confidence: 0.8035762

 $00:45:07.783 \rightarrow 00:45:10.260$  shrivel up into into nothing, so when when,

NOTE Confidence: 0.8035762

 $00:45:10.260 \rightarrow 00:45:11.540$  when trajectory length shrink,

NOTE Confidence: 0.8035762

00:45:11.540 --> 00:45:13.130 that suggests that the ensemble

NOTE Confidence: 0.8035762

 $00:45:13.130 \longrightarrow 00:45:14.402$  is either less dynamic,

NOTE Confidence: 0.8035762

 $00:45:14.410 \rightarrow 00:45:16.936$  changing less or changing less quickly.

NOTE Confidence: 0.8035762

 $00:45:16.940 \longrightarrow 00:45:19.856$  So. The dynamics of the of

NOTE Confidence: 0.8035762

 $00{:}45{:}19.856 \dashrightarrow 00{:}45{:}21.800$  amygdala neurons are blunted

NOTE Confidence: 0.8035762

 $00{:}45{:}21.891 \dashrightarrow 00{:}45{:}24.717$  when we knocked down or Tencent.

NOTE Confidence: 0.80430764

00:45:26.880 --> 00:45:29.877 OK, so Chris bring out the New York Times

NOTE Confidence: 0.80430764

 $00:45:29.877 \rightarrow 00:45:32.955$  and Gene in specifically the PDT tibial.

- NOTE Confidence: 0.80430764
- $00:45:32.960 \rightarrow 00:45:34.860$  A population reduces decoding accuracy

 $00{:}45{:}34.860 \dashrightarrow 00{:}45{:}36.760$  of behavior from feeling relativity,

NOTE Confidence: 0.80430764

 $00:45:36.760 \longrightarrow 00:45:37.900$  so control animals.

NOTE Confidence: 0.80430764

00:45:37.900 --> 00:45:41.369 Once the Q comes on, it's very clear

NOTE Confidence: 0.80430764

 $00:45:41.369 \rightarrow 00:45:45.030$  like what what trial type it was.

NOTE Confidence: 0.80430764

 $00:45:45.030 \rightarrow 00:45:47.396$  However, if we do this with crisper

NOTE Confidence: 0.80430764

00:45:47.396 --> 00:45:49.344 animals and this is, you know,

NOTE Confidence: 0.80430764

 $00:45:49.344 \rightarrow 00:45:51.004$  training with controls testing controls,

NOTE Confidence: 0.80430764

00:45:51.010 --> 00:45:52.334 you know different different

NOTE Confidence: 0.80430764

 $00{:}45{:}52{.}334 \dashrightarrow 00{:}45{:}53{.}989$  training and testing of course.

NOTE Confidence: 0.80430764

 $00:45:53.990 \longrightarrow 00:45:55.650$  But from the same group.

NOTE Confidence: 0.7999176

 $00{:}45{:}58.080 \dashrightarrow 00{:}46{:}01.056$  If we train and test on crisper animals,

NOTE Confidence: 0.7999176

 $00:46:01.060 \rightarrow 00:46:02.930$  they perform significantly less well,

NOTE Confidence: 0.7999176

 $00{:}46{:}02{.}930 \dashrightarrow 00{:}46{:}05{.}906$  but still are able to code above chance.

NOTE Confidence: 0.7999176

 $00:46:05.910 \longrightarrow 00:46:08.208$  Importantly, if we train the decoder

 $00{:}46{:}08{.}208 \dashrightarrow 00{:}46{:}10{.}939$  with data from the control and then

NOTE Confidence: 0.7999176

 $00:46:10.939 \rightarrow 00:46:13.571$  test on crisper or train with CRISPER

NOTE Confidence: 0.7999176

 $00{:}46{:}13.643 \dashrightarrow 00{:}46{:}16.355$  data and then test on the control data, NOTE Confidence: 0.7999176

 $00:46:16.360 \longrightarrow 00:46:18.632$  we get chance essentially.

NOTE Confidence: 0.7999176

 $00{:}46{:}18.632 \dashrightarrow 00{:}46{:}21.472$  Suggesting that crisper and control

NOTE Confidence: 0.7999176

 $00{:}46{:}21.472 \dashrightarrow 00{:}46{:}24.640$  animals are using different coding rules NOTE Confidence: 0.7999176

 $00{:}46{:}24{.}640 \dashrightarrow 00{:}46{:}27{.}748$  to determine what's going on. OK Anna.

NOTE Confidence: 0.7999176

 $00{:}46{:}27.748 \dashrightarrow 00{:}46{:}30.904$  Nice ball in my lab who has has done a

NOTE Confidence: 0.7999176

 $00:46:30.904 \rightarrow 00:46:33.431$  lot of work on another project relating NOTE Confidence: 0.7999176

 $00{:}46{:}33{.}431 \dashrightarrow 00{:}46{:}36{.}395$  to a real time Alpha tracker which I

NOTE Confidence: 0.7999176

00:46:36.395 --> 00:46:39.200 don't have time to talk about right now.

NOTE Confidence: 0.7999176

00:46:39.200 --> 00:46:40.732 Explored this for analyzing,

NOTE Confidence: 0.7999176

 $00:46:40.732 \longrightarrow 00:46:42.647$  analyzing BLTS with more regularity

NOTE Confidence: 0.7999176

 $00{:}46{:}42.647 \dashrightarrow 00{:}46{:}44.697$  here and so this is pretty simple.

NOTE Confidence: 0.7999176

 $00:46:44.700 \longrightarrow 00:46:46.425$  We're looking at reward trials

NOTE Confidence: 0.7999176

 $00{:}46{:}46{.}425 \dashrightarrow 00{:}46{:}47{.}460$  and shock trials.

- NOTE Confidence: 0.7999176
- $00:46:47.460 \longrightarrow 00:46:48.832$  Should be simple, right?

00:46:48.832 --> 00:46:50.204 Just punishment and reward,

NOTE Confidence: 0.7999176

 $00:46:50.210 \rightarrow 00:46:51.992$  but yet, even with the responses

NOTE Confidence: 0.7999176

 $00:46:51.992 \rightarrow 00:46:54.339$  that we get from punishment reward,

NOTE Confidence: 0.7999176

 $00{:}46{:}54{.}340 \dashrightarrow 00{:}46{:}55{.}736$  there are different responses.

NOTE Confidence: 0.7999176

 $00{:}46{:}55{.}736$  -->  $00{:}46{:}57{.}830$  For example in with shock conditioning.

NOTE Confidence: 0.7999176

 $00{:}46{:}57{.}830 \dashrightarrow 00{:}46{:}59{.}979$  You could either get freezing a passive,

NOTE Confidence: 0.7999176

 $00:46:59.980 \longrightarrow 00:47:01.204$  you know coping state,

NOTE Confidence: 0.7999176

 $00:47:01.204 \longrightarrow 00:47:02.734$  or you can get darting,

NOTE Confidence: 0.7999176

 $00:47:02.740 \longrightarrow 00:47:05.248$  which might be thought of as

NOTE Confidence: 0.7999176

 $00{:}47{:}05{.}248 \dashrightarrow 00{:}47{:}06{.}920$  a more active state.

NOTE Confidence: 0.7999176

 $00{:}47{:}06{.}920 \dashrightarrow 00{:}47{:}07{.}276$  Similarly,

NOTE Confidence: 0.7999176

 $00{:}47{:}07{.}276 \dashrightarrow 00{:}47{:}09{.}412$  this is true for reward trials

NOTE Confidence: 0.7999176

00:47:09.412 --> 00:47:10.790 could be hanging out,

NOTE Confidence: 0.7999176

 $00:47:10.790 \longrightarrow 00:47:12.902$  or you can come and actively

- $00:47:12.902 \longrightarrow 00:47:13.958$  approach the port.
- NOTE Confidence: 0.8637464
- $00:47:16.120 \longrightarrow 00:47:19.416$  So what we found here is that the
- NOTE Confidence: 0.8637464
- $00:47:19.416 \longrightarrow 00:47:21.570$  neural responses to the rewards,
- NOTE Confidence: 0.8637464
- $00{:}47{:}21.570 \dashrightarrow 00{:}47{:}24.330$  yes, or the shocks, yes.
- NOTE Confidence: 0.8637464
- $00:47:24.330 \longrightarrow 00:47:29.270$  For each type each behavioral.
- NOTE Confidence: 0.8637464
- 00:47:29.270 --> 00:47:31.587 Type of response is is blunted overall,
- NOTE Confidence: 0.8637464
- $00:47:31.590 \longrightarrow 00:47:33.250$  but specific to each type,
- NOTE Confidence: 0.8637464
- $00:47:33.250 \longrightarrow 00:47:34.910$  and if we quantify this,
- NOTE Confidence: 0.8637464
- $00{:}47{:}34{.}910 \dashrightarrow 00{:}47{:}37{.}022$  what you can see.
- NOTE Confidence: 0.8637464
- $00{:}47{:}37{.}022 \dashrightarrow 00{:}47{:}40{.}945$  Is that there's a greater impact of
- NOTE Confidence: 0.8637464
- 00:47:40.945 --> 00:47:44.165 Christopher ING out near attention
- NOTE Confidence: 0.8637464
- $00{:}47{:}44.165 \dashrightarrow 00{:}47{:}48.153$  in these low motivation States and
- NOTE Confidence: 0.8637464
- $00{:}47{:}48.153 \dashrightarrow 00{:}47{:}51.398$  or active avoidance states here.
- NOTE Confidence: 0.8637464
- $00:47:51.400 \longrightarrow 00:47:53.848$  OK, so back to the outline.
- NOTE Confidence: 0.8637464
- $00:47:53.850 \rightarrow 00:47:56.220$  Where does circuits you know encoding
- NOTE Confidence: 0.8637464
- $00:47:56.220 \rightarrow 00:47:58.340$  positive and negative balance diverge?

- NOTE Confidence: 0.8637464
- $00{:}47{:}58{.}340 \dashrightarrow 00{:}48{:}00{.}380$  The basil lateral make list

 $00:48:00.380 \longrightarrow 00:48:02.420$  one of these prime targets,

NOTE Confidence: 0.8637464

 $00:48:02.420 \longrightarrow 00:48:06.083$  but now you know what criteria to look for.

NOTE Confidence: 0.8637464

 $00:48:06.090 \rightarrow 00:48:08.130$  What are the local interactions?

NOTE Confidence: 0.8637464

 $00:48:08.130 \longrightarrow 00:48:10.752$  There are absolutely lots of microcircuit

NOTE Confidence: 0.8637464

 $00:48:10.752 \longrightarrow 00:48:12.873$  interactions of inhibition and or

NOTE Confidence: 0.8637464

 $00:48:12.873 \longrightarrow 00:48:15.001$  facilitation locally at the level of the

NOTE Confidence: 0.8637464

 $00:48:15.001 \rightarrow 00:48:17.918$  lay of these functionally distinct circuits.

NOTE Confidence: 0.8637464

 $00:48:17.920 \longrightarrow 00:48:20.235$  And now we're beginning to

NOTE Confidence: 0.8637464

 $00{:}48{:}20{.}235 \dashrightarrow 00{:}48{:}22{.}087$  explore how narrow modulation.

NOTE Confidence: 0.8637464

00:48:22.090 --> 00:48:24.904 Can play a role in balance assignment

NOTE Confidence: 0.8637464

 $00{:}48{:}24{.}904 \dashrightarrow 00{:}48{:}27{.}839$  specially in these sort of initial trials,

NOTE Confidence: 0.8637464

 $00{:}48{:}27.840 \dashrightarrow 00{:}48{:}30.372$  and so I don't really think

NOTE Confidence: 0.8637464

 $00:48:30.372 \longrightarrow 00:48:32.060$  neuromodulatory systems or neuropeptides

NOTE Confidence: 0.8637464

 $00{:}48{:}32{.}123 \dashrightarrow 00{:}48{:}34{.}415$  will contribute within trial per say,

 $00:48:34.420 \longrightarrow 00:48:37.748$  but between trials, certainly.

NOTE Confidence: 0.8637464

 $00:48:37.750 \longrightarrow 00:48:40.396$  OK, so where are we now?

NOTE Confidence: 0.8637464

 $00:48:40.400 \longrightarrow 00:48:40.840$  What?

NOTE Confidence: 0.8637464

 $00:48:40.840 \longrightarrow 00:48:43.040$  What can we take away?

NOTE Confidence: 0.8637464

 $00{:}48{:}43.040 \dashrightarrow 00{:}48{:}45.686$  What's the take away message from a,

NOTE Confidence: 0.8637464

 $00:48:45.690 \rightarrow 00:48:47.890$  you know the rapeutic standpoint here.

NOTE Confidence: 0.8637464

00:48:47.890 --> 00:48:49.778 Well, just that identifying

NOTE Confidence: 0.8637464

 $00:48:49.778 \rightarrow 00:48:51.666$  differentially expressed genes and

NOTE Confidence: 0.8637464

 $00{:}48{:}51.666$  -->  $00{:}48{:}53.047$  functionally characterized functionally

NOTE Confidence: 0.8637464

00:48:53.047 --> 00:48:54.957 distinct circuits can be leveraged

NOTE Confidence: 0.8637464

 $00{:}48{:}54{.}957 \dashrightarrow 00{:}48{:}57{.}599$  for selective control of neuronal population.

NOTE Confidence: 0.8637464

00:48:57.600 - 00:49:01.120 So instead of a shooting in the dark,

NOTE Confidence: 0.8637464

 $00{:}49{:}01{.}120 \dashrightarrow 00{:}49{:}02{.}884$  like trial and error

NOTE Confidence: 0.8637464

00:49:02.884 --> 00:49:04.648 strategy for drug discovery,

NOTE Confidence: 0.8637464

 $00:49:04.650 \longrightarrow 00:49:07.807$  why don't we use a circuit based?

NOTE Confidence: 0.8637464

00:49:07.810 --> 00:49:09.781 Just drug discovery.

- NOTE Confidence: 0.8637464
- $00:49:09.781 \rightarrow 00:49:13.723$  Find small molecule targets on circuit

 $00{:}49{:}13.723 \dashrightarrow 00{:}49{:}16.359$  components with known function.

NOTE Confidence: 0.8637464

 $00{:}49{:}16{.}360 \dashrightarrow 00{:}49{:}19{.}736$  So again, this is just bringing things back.

NOTE Confidence: 0.8637464

 $00:49:19.740 \longrightarrow 00:49:21.436$  We've in the amygdala,

NOTE Confidence: 0.8637464

00:49:21.436 --> 00:49:22.934 Howley, Praneeth, Ambrian,

NOTE Confidence: 0.8637464

 $00{:}49{:}22{.}934 \dashrightarrow 00{:}49{:}26{.}156$  Jake Olson are contributing to understanding

NOTE Confidence: 0.8637464

 $00{:}49{:}26.156 \dashrightarrow 00{:}49{:}29.100$  the role of Neuromodulatory gang.

NOTE Confidence: 0.8637464

 $00:49:29.100 \longrightarrow 00:49:29.554$  OK,

NOTE Confidence: 0.8637464

 $00{:}49{:}29{.}554 \dashrightarrow 00{:}49{:}33{.}640$  so why should you even care about all this?

NOTE Confidence: 0.8637464

 $00:49:33.640 \rightarrow 00:49:36.818$  How does this ultimately matter for people?

NOTE Confidence: 0.8637464

 $00:49:36.820 \longrightarrow 00:49:37.319$  Well,

NOTE Confidence: 0.8637464

 $00{:}49{:}37{.}319 \dashrightarrow 00{:}49{:}40{.}313$  despite the prevalence of anxiety disorders

NOTE Confidence: 0.8637464

 $00{:}49{:}40{.}313 \dashrightarrow 00{:}49{:}43{.}179$  and other mental health disorders.

NOTE Confidence: 0.8637464

00:49:43.180 --> 00:49:44.770 Current treatments are not effective

NOTE Confidence: 0.8637464

 $00{:}49{:}44.770 \dashrightarrow 00{:}49{:}46.360$  for the entire patient population,

 $00:49:46.360 \longrightarrow 00:49:49.314$  or at least have a lot of

NOTE Confidence: 0.8637464

 $00{:}49{:}49{.}314 \dashrightarrow 00{:}49{:}50{.}580$  undesirable side effects.

NOTE Confidence: 0.8637464

 $00:49:50.580 \longrightarrow 00:49:53.600$  So how do we get to where we are now?

NOTE Confidence: 0.8637464

00:49:53.600 - 00:49:55.378 From you know where we are now

NOTE Confidence: 0.8637464

 $00{:}49{:}55{.}378$  -->  $00{:}49{:}57{.}335$  with with these sort of no no

NOTE Confidence: 0.8637464

 $00{:}49{:}57{.}335 \dashrightarrow 00{:}49{:}58{.}750$  treatment is perfect that works.

NOTE Confidence: 0.8637464

 $00{:}49{:}58{.}750 \dashrightarrow 00{:}50{:}00{.}991$  There's no such thing as a team that works

NOTE Confidence: 0.8637464

 $00:50:00.991 \rightarrow 00:50:03.357$  for everyone that is free of side effects.

NOTE Confidence: 0.8637464

 $00{:}50{:}03{.}360 \dashrightarrow 00{:}50{:}05{.}208$  How do we get from that to something

NOTE Confidence: 0.8637464

 $00{:}50{:}05{.}208 \dashrightarrow 00{:}50{:}06{.}945$  where that is possible with every

NOTE Confidence: 0.8637464

 $00{:}50{:}06{.}945 \dashrightarrow 00{:}50{:}08{.}775$  single individual will find a treatment

NOTE Confidence: 0.8637464

 $00{:}50{:}08.829 \dashrightarrow 00{:}50{:}10.425$  that is effective for them that

NOTE Confidence: 0.8637464

 $00:50:10.425 \longrightarrow 00:50:12.320$  lasts and doesn't have side effects?

NOTE Confidence: 0.8637464

 $00{:}50{:}12.320 \dashrightarrow 00{:}50{:}13.150$  Sounds like.

NOTE Confidence: 0.8637464

00:50:13.150 --> 00:50:14.776 You know, far away,

NOTE Confidence: 0.8637464

 $00:50:14.776 \rightarrow 00:50:16.766$  how do we get there?

- NOTE Confidence: 0.8637464
- 00:50:16.770 --> 00:50:17.168 Well,
- NOTE Confidence: 0.8637464
- $00{:}50{:}17{.}168 \dashrightarrow 00{:}50{:}19{.}954$  we have to change our current approach,
- NOTE Confidence: 0.8637464
- $00:50:19.960 \rightarrow 00:50:21.684$  which currently involves testing
- NOTE Confidence: 0.8637464
- $00:50:21.684 \rightarrow 00:50:23.408$  drugs that act nonspecifically
- NOTE Confidence: 0.8637464
- $00{:}50{:}23{.}408 \dashrightarrow 00{:}50{:}25{.}548$  throughout the entire brain and body,
- NOTE Confidence: 0.8637464
- $00{:}50{:}25{.}550 \dashrightarrow 00{:}50{:}28{.}189$  and doing so in a sort of
- NOTE Confidence: 0.8637464
- $00:50:28.189 \longrightarrow 00:50:30.339$  again trial and error way.
- NOTE Confidence: 0.8637464
- $00:50:30.340 \rightarrow 00:50:32.566$  I think another huge problem with
- NOTE Confidence: 0.8637464
- $00:50:32.566 \rightarrow 00:50:35.129$  the way that we're tackling this.
- NOTE Confidence: 0.8637464
- $00:50:35.130 \longrightarrow 00:50:36.722$  This challenge is poor
- NOTE Confidence: 0.8637464
- 00:50:36.722 --> 00:50:37.518 disease classification,
- NOTE Confidence: 0.8637464
- $00:50:37.520 \rightarrow 00:50:39.515$  poor understanding of what actually
- NOTE Confidence: 0.8637464
- $00:50:39.515 \longrightarrow 00:50:41.510$  gives rise to the disease,
- NOTE Confidence: 0.8637464
- $00{:}50{:}41{.}510 \dashrightarrow 00{:}50{:}44{.}178$  comorbidity that we see.
- NOTE Confidence: 0.8637464
- $00{:}50{:}44.180 \dashrightarrow 00{:}50{:}46.035$  We currently rely on symptom
- NOTE Confidence: 0.8637464

 $00:50:46.035 \rightarrow 00:50:47.519$  based categorical definitions of

NOTE Confidence: 0.8637464

00:50:47.519 --> 00:50:49.148 mental illness and this is just

NOTE Confidence: 0.8637464

 $00{:}50{:}49{.}148 \dashrightarrow 00{:}50{:}50{.}348$  a barrier to a true

NOTE Confidence: 0.794893600000001

00:50:50.405 --> 00:50:52.041 biological understanding of psychiatric

NOTE Confidence: 0.79489360000001

 $00{:}50{:}52{.}041 \dashrightarrow 00{:}50{:}54{.}495$  diseases as researchers are sort of

NOTE Confidence: 0.79489360000001

 $00{:}50{:}54{.}500 \dashrightarrow 00{:}50{:}56{.}220$  discouraged from exploring comorbid

NOTE Confidence: 0.79489360000001

 $00{:}50{:}56{.}220 \dashrightarrow 00{:}50{:}58{.}800$  Lee Express symptoms when they may

NOTE Confidence: 0.794893600000001

 $00:50:58.864 \rightarrow 00:51:00.814$  in fact be meaningful clues that

NOTE Confidence: 0.794893600000001

 $00{:}51{:}00{.}814 \dashrightarrow 00{:}51{:}02{.}654$  guide us to distinct ideologies

NOTE Confidence: 0.79489360000001

 $00{:}51{:}02{.}654 \dashrightarrow 00{:}51{:}05{.}009$  that call for different treatments.

NOTE Confidence: 0.794893600000001

 $00{:}51{:}05{.}010 \dashrightarrow 00{:}51{:}08{.}216$  All these issues route back to the

NOTE Confidence: 0.79489360000001

 $00:51:08.216 \rightarrow 00:51:10.025$  inadequate understanding that we

NOTE Confidence: 0.794893600000001

 $00:51:10.025 \longrightarrow 00:51:12.173$  currently have of how the brain

NOTE Confidence: 0.794893600000001

 $00:51:12.173 \longrightarrow 00:51:14.180$  even gives rise to behavior.

NOTE Confidence: 0.794893600000001

 $00:51:14.180 \rightarrow 00:51:16.050$  Super BASIC, but fortunately we

NOTE Confidence: 0.794893600000001

00:51:16.050 - 00:51:18.436 now have the ability to identify

- NOTE Confidence: 0.79489360000001
- 00:51:18.436 --> 00:51:20.676 specific neuronal or synaptic targets
- NOTE Confidence: 0.79489360000001
- $00:51:20.676 \longrightarrow 00:51:23.360$  and test their role in behavior.
- NOTE Confidence: 0.794893600000001
- $00{:}51{:}23.360 \dashrightarrow 00{:}51{:}25.028$  That's what modern neuroscience
- NOTE Confidence: 0.794893600000001
- $00:51:25.028 \rightarrow 00:51:26.279$  technologies will allow,
- NOTE Confidence: 0.79489360000001
- $00:51:26.280 \longrightarrow 00:51:28.460$  and perhaps high rates of
- NOTE Confidence: 0.79489360000001
- $00:51:28.460 \longrightarrow 00:51:30.640$  comorbidity can be explained by
- NOTE Confidence: 0.79489360000001
- $00:51:30.723 \rightarrow 00:51:33.479$  common neural circuit perturbations.
- NOTE Confidence: 0.79489360000001
- $00{:}51{:}33{.}480 \dashrightarrow 00{:}51{:}35{.}670$  And then to translate our basic
- NOTE Confidence: 0.794893600000001
- $00:51:35.670 \longrightarrow 00:51:38.278$  insights into a better type of the rapy,
- NOTE Confidence: 0.79489360000001
- $00:51:38.280 \rightarrow 00:51:40.492$  we will need to apply the knowledge
- NOTE Confidence: 0.794893600000001
- $00:51:40.492 \rightarrow 00:51:41.916$  we gained informed the rapeutic
- NOTE Confidence: 0.79489360000001
- $00{:}51{:}41{.}916 \dashrightarrow 00{:}51{:}43{.}576$  development and take advantage
- NOTE Confidence: 0.794893600000001
- 00:51:43.576 --> 00:51:45.651 of we know about plasticity,
- NOTE Confidence: 0.794893600000001
- $00{:}51{:}45{.}660 \dashrightarrow 00{:}51{:}47{.}330$  resilience and the new adaptations
- NOTE Confidence: 0.794893600000001
- $00:51:47.330 \longrightarrow 00:51:49.000$  that occur with stress and
- NOTE Confidence: 0.794893600000001

 $00:51:49.055 \dashrightarrow 00:51:51.461$  basically focus on a neural circuit

NOTE Confidence: 0.79489360000001

 $00:51:51.461 \longrightarrow 00:51:52.664$  based therapeutic development.

NOTE Confidence: 0.79489360000001

00:51:52.670 --> 00:51:54.142 It may be pharmacological,

NOTE Confidence: 0.794893600000001

 $00:51:54.142 \longrightarrow 00:51:55.614$  it may not be.

NOTE Confidence: 0.88645333

00:51:58.130 --> 00:52:00.302 OK, so regardless of if you're

NOTE Confidence: 0.88645333

 $00:52:00.302 \longrightarrow 00:52:02.170$  listening to this talk with,

NOTE Confidence: 0.88645333

 $00:52:02.170 \longrightarrow 00:52:03.634$  you know translation here

NOTE Confidence: 0.88645333

 $00:52:03.634 \longrightarrow 00:52:05.098$  or basic science here.

NOTE Confidence: 0.88645333

 $00{:}52{:}05{.}100 \dashrightarrow 00{:}52{:}08{.}306$  I guess I would say from a

NOTE Confidence: 0.88645333

 $00:52:08.306 \dashrightarrow 00:52:09.680$  basic science perspective.

NOTE Confidence: 0.88645333

 $00{:}52{:}09{.}680 \dashrightarrow 00{:}52{:}11{.}335$  If we can't understand simple

NOTE Confidence: 0.88645333

 $00:52:11.335 \rightarrow 00:52:13.590$  circuits like those in the amygdala,

NOTE Confidence: 0.88645333

 $00:52:13.590 \longrightarrow 00:52:15.122$  and simple questions like,

NOTE Confidence: 0.88645333

 $00:52:15.122 \rightarrow 00:52:18.559$  how do we tell if something is good or bad?

NOTE Confidence: 0.88645333

 $00{:}52{:}18{.}560 \dashrightarrow 00{:}52{:}21{.}032$  How are we going to understand more complex

NOTE Confidence: 0.88645333

 $00:52:21.032 \rightarrow 00:52:23.305$  circuits and more complex questions and

- NOTE Confidence: 0.88645333
- $00:52:23.305 \rightarrow 00:52:25.300$  then from a translational perspective,

 $00{:}52{:}25{.}300 \dashrightarrow 00{:}52{:}27{.}430$  the amygdala has been so well

NOTE Confidence: 0.88645333

 $00{:}52{:}27{.}430 \dashrightarrow 00{:}52{:}28{.}495$  conserved across evolution,

NOTE Confidence: 0.88645333

 $00:52:28.500 \rightarrow 00:52:29.388$  and you know,

NOTE Confidence: 0.88645333

 $00{:}52{:}29{.}388 \dashrightarrow 00{:}52{:}31{.}460$  a lot of these circuits are still

NOTE Confidence: 0.88645333

 $00:52:31.531 \longrightarrow 00:52:33.516$  consistent in species that have

NOTE Confidence: 0.88645333

 $00:52:33.516 \rightarrow 00:52:35.950$  scarcely changed for 70 million years.

NOTE Confidence: 0.88645333

 $00:52:35.950 \rightarrow 00:52:39.145$  This this gives this lens a lot of hope,

NOTE Confidence: 0.88645333

 $00:52:39.150 \longrightarrow 00:52:39.746$  that the.

NOTE Confidence: 0.88645333

 $00{:}52{:}39{.}746 \dashrightarrow 00{:}52{:}42{.}130$  The changes that we see in in mice

NOTE Confidence: 0.88645333

00:52:42.204 --> 00:52:44.580 will also have relevance to humans,

NOTE Confidence: 0.88645333

 $00{:}52{:}44{.}580 \dashrightarrow 00{:}52{:}46{.}612$  given the common homology.

NOTE Confidence: 0.88645333

 $00{:}52{:}46.612 \dashrightarrow 00{:}52{:}49.250$  OK, so with that I will thank

NOTE Confidence: 0.88645333

 $00{:}52{:}49{.}250 \dashrightarrow 00{:}52{:}51{.}703$  all the members of my laboratory

NOTE Confidence: 0.88645333

 $00:52:51.703 \longrightarrow 00:52:54.068$  and you for your attention.

- $00:52:54.070 \rightarrow 00:52:54.890$  My collaborators,
- NOTE Confidence: 0.88645333
- $00{:}52{:}54{.}890 \dashrightarrow 00{:}52{:}56{.}120$  my funding sources,
- NOTE Confidence: 0.88645333
- $00:52:56.120 \rightarrow 00:52:59.382$  and thanks for listening and I believe
- NOTE Confidence: 0.88645333
- $00:52:59.382 \longrightarrow 00:53:03.210$  I will take some questions right now.
- NOTE Confidence: 0.88645333
- $00:53:03.210 \longrightarrow 00:53:03.780$  Thanks.
- NOTE Confidence: 0.8451138
- $00:53:09.420 \longrightarrow 00:53:11.604$  Thank you very much everyone
- NOTE Confidence: 0.8451138
- $00:53:11.604 \rightarrow 00:53:14.220$  for joining us for the talk.
- NOTE Confidence: 0.8451138
- 00:53:14.220 --> 00:53:17.265 Thank you Kate for a great talk.
- NOTE Confidence: 0.8451138
- 00:53:17.270 --> 00:53:21.450 I believe that we are going to have to wait
- NOTE Confidence: 0.8451138
- $00{:}53{:}21{.}556$  -->  $00{:}53{:}25{.}543$  a few moments for Doctor Tide to join us.
- NOTE Confidence: 0.8451138
- $00:53:25.550 \dashrightarrow 00:53:29.474$  She is in California and is on a delay.
- NOTE Confidence: 0.8451138
- $00{:}53{:}29{.}480 \dashrightarrow 00{:}53{:}32{.}819$  I do see that there is one message in
- NOTE Confidence: 0.8451138
- $00{:}53{:}32{.}819 \dashrightarrow 00{:}53{:}36{.}188$  the chat from Doctor Clayton Barnes.
- NOTE Confidence: 0.8451138
- 00:53:36.190 --> 00:53:38.087 But if you have any other questions,
- NOTE Confidence: 0.8451138
- $00{:}53{:}38{.}090 \dashrightarrow 00{:}53{:}39{.}734$  please add them in.
- NOTE Confidence: 0.8451138
- 00:53:39.734 --> 00:53:41.730 And Trisha, if you can,

- NOTE Confidence: 0.8451138
- 00:53:41.730 00:53:44.820 let me know when Doctor Ty joins us.

 $00:53:44.820 \longrightarrow 00:53:47.190$  We will switch to the question

NOTE Confidence: 0.8451138

 $00:53:47.190 \longrightarrow 00:53:49.466$  and answer portion of the talk.

NOTE Confidence: 0.8451138

 $00:53:49.466 \longrightarrow 00:53:51.788$  And there are a couple of

NOTE Confidence: 0.8451138

 $00:53:51.788 \longrightarrow 00:53:54.110$  questions for you in the chat.

NOTE Confidence: 0.8451138

00:53:54.110 --> 00:53:57.756 If I can read them out to you, I will.

NOTE Confidence: 0.8451138

 $00{:}53{:}57{.}756 \dashrightarrow 00{:}54{:}00{.}399$  I will start out by has the KAYTIE has

NOTE Confidence: 0.8451138

 $00{:}54{:}00{.}399 \dashrightarrow 00{:}54{:}02{.}703$  that I lab thought about developing

NOTE Confidence: 0.8451138

 $00{:}54{:}02{.}703 \dashrightarrow 00{:}54{:}05{.}395$  a dynamical systems model of the

NOTE Confidence: 0.8451138

 $00:54:05.395 \rightarrow 00:54:06.862$  interactions between projection

NOTE Confidence: 0.8451138

 $00{:}54{:}06.862 \dashrightarrow 00{:}54{:}09.200$  specific subpopulations in the VLA.

NOTE Confidence: 0.7905622

 $00{:}54{:}11{.}990 \dashrightarrow 00{:}54{:}14{.}380$  And you're muted.

NOTE Confidence: 0.7905622

 $00{:}54{:}14{.}380 \dashrightarrow 00{:}54{:}15{.}444$  Thank you, great question.

NOTE Confidence: 0.7905622

 $00{:}54{:}15{.}444 \dashrightarrow 00{:}54{:}17{.}040$  I think we've approached looking at

NOTE Confidence: 0.7905622

00:54:17.083 --> 00:54:18.967 predicted dynamical models in other systems.

00:54:18.970 - 00:54:21.218 We have not yet begun to build one

NOTE Confidence: 0.7905622

 $00:54:21.218 \rightarrow 00:54:23.274$  in the DLA, but we absolutely should.

NOTE Confidence: 0.7905622

00:54:23.274 --> 00:54:24.704 I think you're absolutely right.

NOTE Confidence: 0.7905622

 $00{:}54{:}24{.}710 \dashrightarrow 00{:}54{:}26{.}432$  Like you know there are these

NOTE Confidence: 0.7905622

 $00{:}54{:}26{.}432 \dashrightarrow 00{:}54{:}27{.}293$  projections that exist.

NOTE Confidence: 0.7905622

 $00:54:27.300 \rightarrow 00:54:29.295$  There are neurons that have hard wiring,

NOTE Confidence: 0.7905622

 $00:54:29.300 \longrightarrow 00:54:31.404$  but you can think of that as the

NOTE Confidence: 0.7905622

 $00{:}54{:}31{.}404 \dashrightarrow 00{:}54{:}33{.}223$  roads that exist and we want

NOTE Confidence: 0.7905622

 $00{:}54{:}33{.}223 \dashrightarrow 00{:}54{:}34{.}753$  to think about the traffic.

NOTE Confidence: 0.7905622

 $00{:}54{:}34{.}760 \dashrightarrow 00{:}54{:}37{.}630$  So coming to that is something we want to do.

NOTE Confidence: 0.7905622

 $00{:}54{:}37{.}630 \dashrightarrow 00{:}54{:}40{.}158$  We started to do that in the prefrontal

NOTE Confidence: 0.7905622

 $00{:}54{:}40{.}158 \dashrightarrow 00{:}54{:}42{.}410$  cortex and you know we're able to

NOTE Confidence: 0.7905622

 $00{:}54{:}42{.}410 \dashrightarrow 00{:}54{:}44{.}470$  predict a lot of different people.

NOTE Confidence: 0.7905622

 $00{:}54{:}44{.}470 \dashrightarrow 00{:}54{:}46{.}518$  Cortex VLA data is a little bit different.

NOTE Confidence: 0.7905622

 $00:54:46.520 \dashrightarrow 00:54:49.960$  Not to say that we couldn't do it, but.

NOTE Confidence: 0.7905622

00:54:49.960 - 00:54:51.320 We haven't done it yet,

- NOTE Confidence: 0.7905622
- $00:54:51.320 \rightarrow 00:54:52.400$  but we we absolutely
- NOTE Confidence: 0.847146100555556
- 00:54:52.400 --> 00:54:53.675 should. Thanks Kate,
- NOTE Confidence: 0.847146100555556
- $00{:}54{:}53.675 \dashrightarrow 00{:}54{:}56.225$  the next question is about the
- NOTE Confidence: 0.847146100555556
- $00:54:56.225 \rightarrow 00:54:58.885$  recruitment of the central amygdala
- NOTE Confidence: 0.847146100555556
- 00:54:58.885 --> 00:55:01.045 projections during rewarding conditions.
- NOTE Confidence: 0.847146100555556
- $00:55:01.050 \longrightarrow 00:55:04.210$  It looks like it might be a check
- NOTE Confidence: 0.847146100555556
- $00:55:04.210 \longrightarrow 00:55:06.929$  on reward behaviors are there?
- NOTE Confidence: 0.847146100555556
- $00:55:06.930 \longrightarrow 00:55:08.975$  Is there evidence of deficits
- NOTE Confidence: 0.847146100555556
- $00{:}55{:}08{.}975 \dashrightarrow 00{:}55{:}10{.}611$  in central amygdala projections
- NOTE Confidence: 0.847146100555556
- 00:55:10.611 --> 00:55:12.809 in unchecked reward behaviors,
- NOTE Confidence: 0.847146100555556
- $00:55:12.810 \longrightarrow 00:55:14.160$  like an addiction?
- NOTE Confidence: 0.821512054
- $00:55:15.440 \rightarrow 00:55:18.200$  Well, interesting. Interesting, you know.
- NOTE Confidence: 0.821512054
- $00:55:18.200 \rightarrow 00:55:20.544$  So first the projections to Central
- NOTE Confidence: 0.821512054
- $00:55:20.544 \rightarrow 00:55:22.584$  central itself is super complicated
- NOTE Confidence: 0.821512054
- $00{:}55{:}22{.}584$  -->  $00{:}55{:}25{.}317$  and I think of it as a ministrator.
- NOTE Confidence: 0.821512054

 $00:55:25.320 \rightarrow 00:55:27.195$  There's so many different mirror

NOTE Confidence: 0.821512054

00:55:27.195 --> 00:55:28.320 peptidergic neurons there,

NOTE Confidence: 0.821512054

 $00{:}55{:}28{.}320 \dashrightarrow 00{:}55{:}30{.}791$  and we found a lot of different

NOTE Confidence: 0.821512054

 $00:55:30.791 \rightarrow 00:55:33.199$  roles from central amygdala that are,

NOTE Confidence: 0.821512054

 $00:55:33.200 \rightarrow 00:55:35.762$  you know, widely varying from, you know,

NOTE Confidence: 0.821512054

 $00{:}55{:}35{.}762 \dashrightarrow 00{:}55{:}37{.}492$  aversive behavior to social behavior

NOTE Confidence: 0.821512054

 $00{:}55{:}37{.}492 \dashrightarrow 00{:}55{:}40{.}860$  and other other components, but.

NOTE Confidence: 0.821512054

00:55:40.860 - 00:55:42.765 Or the specific projection from

NOTE Confidence: 0.821512054

 $00{:}55{:}42.765 \dashrightarrow 00{:}55{:}45.170$  the PLA to the central limit,

NOTE Confidence: 0.821512054

 $00:55:45.170 \rightarrow 00:55:47.914$  which is predominantly coding for a version,

NOTE Confidence: 0.821512054

 $00{:}55{:}47{.}920 \dashrightarrow 00{:}55{:}50{.}266$  but it's not exclusively doing so.

NOTE Confidence: 0.821512054

 $00:55:50.270 \longrightarrow 00:55:52.230$  We haven't seen that in.

NOTE Confidence: 0.821512054

 $00{:}55{:}52{.}230 \dashrightarrow 00{:}55{:}54{.}190$  We haven't looked in addiction

NOTE Confidence: 0.821512054

 $00:55:54.190 \longrightarrow 00:55:56.150$  to see if it is,

NOTE Confidence: 0.821512054

 $00:55:56.150 \longrightarrow 00:55:58.430$  it is specifically modified in terms

NOTE Confidence: 0.821512054

 $00:55:58.430 \longrightarrow 00:56:00.849$  of firing rates we have looked.

- NOTE Confidence: 0.7812509
- $00:56:04.910 \longrightarrow 00:56:07.045$  Look and actually this is something I

 $00{:}56{:}07.045 \dashrightarrow 00{:}56{:}09.357$  didn't talk about in this particular talk.

NOTE Confidence: 0.7812509

00:56:09.360 --> 00:56:10.632 It's pretty new data,

NOTE Confidence: 0.7812509

 $00:56:10.632 \rightarrow 00:56:11.904$  but with social isolation,

NOTE Confidence: 0.7812509

 $00:56:11.910 \rightarrow 00:56:14.238$  a stress in this can potentiate the minerals

NOTE Confidence: 0.7812509

 $00:56:14.238 \rightarrow 00:56:16.038$  and correlate's with increased drinking.

NOTE Confidence: 0.7812509

 $00:56:16.040 \longrightarrow 00:56:17.870$  So when we stimulate the light

NOTE Confidence: 0.7812509

00:56:17.870 - 00:56:19.540 inputs to the prefrontal cortex,

NOTE Confidence: 0.7812509

 $00{:}56{:}19{.}540 \dashrightarrow 00{:}56{:}21{.}964$  we now find that this this is sufficient

NOTE Confidence: 0.7812509

 $00:56:21.964 \rightarrow 00:56:23.869$  to drive alcohol drinking as opposed

NOTE Confidence: 0.7812509

 $00:56:23.869 \longrightarrow 00:56:26.220$  to water in a 2 bottle choice.

NOTE Confidence: 0.7812509

 $00{:}56{:}26{.}220 \dashrightarrow 00{:}56{:}27{.}810$  So that's something, but it's,

NOTE Confidence: 0.7812509

 $00{:}56{:}27.810 \dashrightarrow 00{:}56{:}29.335$  you know, still super preliminary

NOTE Confidence: 0.7812509

 $00{:}56{:}29{.}335 \dashrightarrow 00{:}56{:}30{.}860$  and thinking about this particular

NOTE Confidence: 0.7812509

 $00{:}56{:}30{.}912 \dashrightarrow 00{:}56{:}32{.}260$  projection from DLA decentral,

- $00:56:32.260 \longrightarrow 00:56:34.920$  we haven't studied that one.
- NOTE Confidence: 0.7812509
- $00{:}56{:}34{.}920 \dashrightarrow 00{:}56{:}37{.}656$  In in the in the context of addiction,
- NOTE Confidence: 0.7812509
- 00:56:37.660 00:56:39.706 it is sort of this projection.
- NOTE Confidence: 0.7812509
- $00:56:39.710 \rightarrow 00:56:43.038$  These neurons have the capacity to sort of.
- NOTE Confidence: 0.7812509
- $00:56:43.040 \longrightarrow 00:56:44.910$  Ubiquitously inhibit
- NOTE Confidence: 0.7881507
- $00:56:48.500 \rightarrow 00:56:50.030$  birthday very broadly, and had,
- NOTE Confidence: 0.7881507
- 00:56:50.030 --> 00:56:52.158 of course also recruit another local network,
- NOTE Confidence: 0.7881507
- $00{:}56{:}52.160 \dashrightarrow 00{:}56{:}53.760$  but the local feedforward inhibition
- NOTE Confidence: 0.7881507
- $00{:}56{:}53.760 \dashrightarrow 00{:}56{:}55.688$  coming from the latest central England
- NOTE Confidence: 0.7881507
- $00:56:55.688 \rightarrow 00:56:57.655$  is is much more potent than other
- NOTE Confidence: 0.7881507
- $00:56:57.655 \rightarrow 00:56:59.179$  other productions that we've studied.
- NOTE Confidence: 0.7881507
- $00:56:59.180 \longrightarrow 00:57:01.000$  So I guess I don't know the
- NOTE Confidence: 0.7881507
- 00:57:01.000 00:57:02.839 answer to that question either.
- NOTE Confidence: 0.7881507
- $00:57:02.840 \longrightarrow 00:57:04.060$  That's a great question.
- NOTE Confidence: 0.7881507
- $00:57:04.060 \dashrightarrow 00:57:05.890$  We haven't done that specific experiment.
- NOTE Confidence: 0.8657458
- $00:57:06.990 \longrightarrow 00:57:10.174$  Next question is sort of related to that.

- NOTE Confidence: 0.8657458
- 00:57:10.180 --> 00:57:13.180 Do you see individual differences among.

 $00:57:13.180 \longrightarrow 00:57:14.760$  Subjects in the balance

NOTE Confidence: 0.8657458

00:57:14.760 -> 00:57:16.340 between the two circuits.

NOTE Confidence: 0.8657458

 $00:57:16.340 \rightarrow 00:57:18.940$  Have you been able to match that in

NOTE Confidence: 0.8657458

 $00:57:18.940 \longrightarrow 00:57:21.869$  any way to susceptible ability versus

NOTE Confidence: 0.856353

 $00:57:21.870 \rightarrow 00:57:23.450$  resilience for stress disorders?

NOTE Confidence: 0.856353

 $00:57:23.450 \longrightarrow 00:57:25.030$  That's a great question.

NOTE Confidence: 0.856353

 $00{:}57{:}25{.}030 \dashrightarrow 00{:}57{:}27{.}400$  That's great, but so we definitely

NOTE Confidence: 0.856353

 $00{:}57{:}27{.}400 \dashrightarrow 00{:}57{:}28{.}980$  do see individual variability.

NOTE Confidence: 0.856353

 $00{:}57{:}28{.}980 \dashrightarrow 00{:}57{:}31{.}265$  We have not systematically correlated

NOTE Confidence: 0.856353

 $00{:}57{:}31{.}265 \dashrightarrow 00{:}57{:}33{.}093$  that with pre-existing behavioral.

NOTE Confidence: 0.856353

 $00{:}57{:}33.100 \dashrightarrow 00{:}57{:}35.266$  Features, but we should do that.

NOTE Confidence: 0.856353

 $00:57:35.270 \longrightarrow 00:57:37.075$  That's a very good expansion

NOTE Confidence: 0.856353

 $00{:}57{:}37{.}075 \dashrightarrow 00{:}57{:}39{.}600$  that's I love that idea. The next

NOTE Confidence: 0.8713635

 $00:57:39.600 \rightarrow 00:57:41.124$  question is more clinical,

 $00{:}57{:}41{.}124 \dashrightarrow 00{:}57{:}44{.}206$  so I will actually ask John Crystal to

NOTE Confidence: 0.8713635

 $00{:}57{:}44.206 \dashrightarrow 00{:}57{:}47.086$  jump in and help or ask other clinicians

NOTE Confidence: 0.8713635

 $00:57:47.160 \longrightarrow 00:57:49.344$  in the audience to help with K.

NOTE Confidence: 0.8713635

 $00:57:49.350 \longrightarrow 00:57:51.150$  You may have some ideas.

NOTE Confidence: 0.8713635

 $00{:}57{:}51{.}150 \dashrightarrow 00{:}57{:}53{.}250$  So the question is help me translate

NOTE Confidence: 0.8713635

 $00{:}57{:}53.250 \dashrightarrow 00{:}57{:}55.499$  this into clinical practice of patient

NOTE Confidence: 0.8713635

 $00:57:55.499 \rightarrow 00:57:57.649$  presents with generalized anxiety disorder.

NOTE Confidence: 0.8713635

 $00{:}57{:}57{.}650 \dashrightarrow 00{:}57{:}59{.}842$  How do you know whether the treatment of

NOTE Confidence: 0.8713635

 $00{:}57{:}59{.}842 \dashrightarrow 00{:}58{:}01{.}979$  choice is pharmacology psychoanalysis,

NOTE Confidence: 0.8713635

 $00:58:01.980 \rightarrow 00:58:03.492$  cognitive therapy, behavioral therapy?

NOTE Confidence: 0.8713635

 $00:58:03.492 \longrightarrow 00:58:04.248$  Learning theory,

NOTE Confidence: 0.8713635

 $00:58:04.250 \rightarrow 00:58:07.170$  or a combination of all of these approaches,

NOTE Confidence: 0.8713635

 $00{:}58{:}07{.}170 \dashrightarrow 00{:}58{:}09{.}830$  with the theories that you put forward

NOTE Confidence: 0.8713635

 $00{:}58{:}09{.}830 \dashrightarrow 00{:}58{:}12{.}941$  around looking at a circuit analysis help to

NOTE Confidence: 0.8713635

 $00:58:12.941 \rightarrow 00:58:15.927$  make those kinds of decisions I know not now,

NOTE Confidence: 0.8713635

 $00:58:15.930 \longrightarrow 00:58:17.760$  but perhaps in the future,

- NOTE Confidence: 0.8713635
- $00{:}58{:}17.760 \dashrightarrow 00{:}58{:}19.944$  and I will recruit John to

00:58:19.944 --> 00:58:22.498 help back you up on this one.

NOTE Confidence: 0.8713635

00:58:22.500 --> 00:58:23.595 Yeah, it's John.

NOTE Confidence: 0.8713635

 $00:58:23.595 \rightarrow 00:58:25.785$  Do you want to start her?

NOTE Confidence: 0.8713635

00:58:25.790 --> 00:58:26.150 I

NOTE Confidence: 0.8536046

 $00{:}58{:}26.150 \dashrightarrow 00{:}58{:}29.070$  have go ahead, go ahead once you start.

NOTE Confidence: 0.8536046

 $00:58:29.070 \rightarrow 00:58:31.990$  I mean it's so some of this work.

NOTE Confidence: 0.8536046

 $00:58:31.990 \rightarrow 00:58:34.636$  I'm actually referring to colleagues work so.

NOTE Confidence: 0.8536046

 $00{:}58{:}34{.}640 \dashrightarrow 00{:}58{:}37{.}310$  I'm thinking of Amy Atkin, for example.

NOTE Confidence: 0.8536046

 $00{:}58{:}37{.}310 \dashrightarrow 00{:}58{:}39{.}900$  We've had a lot of interesting conversy

NOTE Confidence: 0.8536046

 $00:58:39.900 \rightarrow 00:58:42.336$  thinking about different types of anxiety,

NOTE Confidence: 0.8536046

00:58:42.340 --> 00:58:44.758 different types of you know psychiatric

NOTE Confidence: 0.8536046

 $00{:}58{:}44.758 \dashrightarrow 00{:}58{:}47.117$  conditions where you're you're put into

NOTE Confidence: 0.8536046

 $00{:}58{:}47.117 \dashrightarrow 00{:}58{:}49.658$  buckets with some symptoms, but that's not. NOTE Confidence: 0.7798303

 $00:58:53.440 \rightarrow 00:58:55.210$  Basically, with the biological perturbations,

 $00:58:55.210 \rightarrow 00:58:56.662$  so using resting state,

NOTE Confidence: 0.7798303

 $00:58:56.662 \rightarrow 00:58:59.588$  fMRI is is something that a meeting has

NOTE Confidence: 0.7798303

 $00{:}58{:}59{.}588 \dashrightarrow 00{:}59{:}02{.}268$  been able to do to sort of predict,

NOTE Confidence: 0.7798303

 $00:59:02.270 \rightarrow 00:59:03.845$  you know what treatment strategy

NOTE Confidence: 0.7798303

 $00{:}59{:}03.845 \dashrightarrow 00{:}59{:}05.420$  would be most successful with

NOTE Confidence: 0.7798303

 $00:59:05.476 \longrightarrow 00:59:06.850$  this particular individual.

NOTE Confidence: 0.7798303

00:59:06.850 --> 00:59:08.968 I'm a big proponent of individual

NOTE Confidence: 0.7798303

 $00:59:08.968 \longrightarrow 00:59:09.674$  individualized medicine.

NOTE Confidence: 0.7798303

00:59:09.680 --> 00:59:11.088 I understand us residency.

NOTE Confidence: 0.7798303

 $00:59:11.088 \rightarrow 00:59:13.232$  fMRI might not be, you know.

NOTE Confidence: 0.7798303

 $00:59:13.232 \longrightarrow 00:59:14.696$  We need something that

NOTE Confidence: 0.7798303

 $00:59:14.696 \rightarrow 00:59:16.160$  could be more affordable,

NOTE Confidence: 0.7798303

 $00:59:16.160 \rightarrow 00:59:17.714$  more easily applicable to a broader

NOTE Confidence: 0.7798303

 $00{:}59{:}17.714 \dashrightarrow 00{:}59{:}19.379$  population that can be rapidly used,

NOTE Confidence: 0.7798303

 $00{:}59{:}19{.}380 \dashrightarrow 00{:}59{:}20{.}988$  so I understand that's sort of,

NOTE Confidence: 0.7798303

00:59:20.990 --> 00:59:22.598 you know, a proof of principle,

- NOTE Confidence: 0.7798303
- $00:59:22.600 \rightarrow 00:59:24.100$  maybe not the immediate thing that

 $00{:}59{:}24.100 \dashrightarrow 00{:}59{:}25.809$  we would put right into practice,

NOTE Confidence: 0.7798303

 $00{:}59{:}25{.}810 \dashrightarrow 00{:}59{:}27{.}658$  but that's sort of what I would

NOTE Confidence: 0.7798303

00:59:27.658 --> 00:59:29.993 love to see happen in the future

NOTE Confidence: 0.7798303

 $00{:}59{:}29{.}993 \dashrightarrow 00{:}59{:}31{.}469$  of mental health treatment.

NOTE Confidence: 0.7798303

 $00:59:31.470 \longrightarrow 00:59:33.318$  Go ahead, John.

NOTE Confidence: 0.7798303

00:59:33.320 --> 00:59:36.750 Well first K, What an amazing awesome,

NOTE Confidence: 0.7798303

00:59:36.750 --> 00:59:38.220 fantastic, wonderful, stupendous,

NOTE Confidence: 0.7798303

 $00{:}59{:}38{.}220 \dashrightarrow 00{:}59{:}39{.}200$  exceptional presentation.

NOTE Confidence: 0.7798303

00:59:39.200 --> 00:59:41.650 It was just so enlightening.

NOTE Confidence: 0.7798303

 $00{:}59{:}41.650 \dashrightarrow 00{:}59{:}45.080$  And and and such a great example

NOTE Confidence: 0.7798303

 $00{:}59{:}45{.}080 \dashrightarrow 00{:}59{:}49{.}929$  of the way you approach this work.

NOTE Confidence: 0.7798303

00:59:49.930 --> 00:59:52.328 And and because it was so fantastic,

NOTE Confidence: 0.7798303

 $00{:}59{:}52{.}330 \dashrightarrow 00{:}59{:}54{.}871$  it's about 10 years of head of

NOTE Confidence: 0.7798303

 $00{:}59{:}54{.}871 \dashrightarrow 00{:}59{:}57{.}259$  anything that we're able to to do

 $00:59:57.259 \rightarrow 00:59:59.530$  in the clinic while you were away.

NOTE Confidence: 0.7798303

 $00:59:59.530 \longrightarrow 01:00:00.906$  The thought of we,

NOTE Confidence: 0.7798303

 $01:00:00.906 \rightarrow 01:00:03.650$  we got into a little discussion about how,

NOTE Confidence: 0.7798303

 $01{:}00{:}03.650 \dashrightarrow 01{:}00{:}05.711$  how could we even think about

NOTE Confidence: 0.7798303

 $01:00:05.711 \longrightarrow 01:00:07.416$  developing biomarkers of new retention

NOTE Confidence: 0.7798303

 $01{:}00{:}07{.}416 \dashrightarrow 01{:}00{:}09{.}140$  signaling in the human brain,

NOTE Confidence: 0.7798303

 $01:00:09.140 \longrightarrow 01:00:11.044$  and which would be kind of the

NOTE Confidence: 0.7798303

 $01{:}00{:}11.044 \dashrightarrow 01{:}00{:}13.337$  first step in guiding a precision

NOTE Confidence: 0.7798303

01:00:13.337 --> 01:00:14.277 medicine approach.

NOTE Confidence: 0.7798303

 $01:00:14.280 \longrightarrow 01:00:17.045$  But we're all in with you on

NOTE Confidence: 0.7798303

 $01:00:17.045 \longrightarrow 01:00:18.830$  on the idea that.

NOTE Confidence: 0.7798303

 $01:00:18.830 \longrightarrow 01:00:22.190$  That if we we treat illnesses,

NOTE Confidence: 0.7798303

 $01:00:22.190 \longrightarrow 01:00:24.836$  we treat pathology in other areas

NOTE Confidence: 0.7798303

 $01{:}00{:}24.836 \dashrightarrow 01{:}00{:}27.994$  of medicine and we treat people in

NOTE Confidence: 0.7798303

 $01{:}00{:}27{.}994 \dashrightarrow 01{:}00{:}31{.}508$  in psychiatry and we need to be able

NOTE Confidence: 0.7798303

 $01:00:31.508 \rightarrow 01:00:33.698$  to incorporate an understanding of

- NOTE Confidence: 0.7798303
- $01:00:33.698 \rightarrow 01:00:35.961$  the pathology that people actually

01:00:35.961 -> 01:00:39.066 have if we want to get better

NOTE Confidence: 0.7798303

 $01:00:39.066 \rightarrow 01:00:40.839$  and more specific treatments.

NOTE Confidence: 0.7798303

 $01:00:40.840 \longrightarrow 01:00:43.060$  So that's that's clearly a

NOTE Confidence: 0.7798303

 $01:00:43.060 \longrightarrow 01:00:45.280$  critical step in the pathway.

NOTE Confidence: 0.7798303

 $01:00:45.280 \longrightarrow 01:00:47.495$  So what a wonderful lecture

NOTE Confidence: 0.7798303

 $01:00:47.495 \rightarrow 01:00:48.824$  really appreciate it.

NOTE Confidence: 0.7798303

 $01:00:48.830 \longrightarrow 01:00:49.436$  Thank you.

NOTE Confidence: 0.7798303

01:00:49.436 --> 01:00:49.739 Yeah,

NOTE Confidence: 0.7798303

01:00:49.739 --> 01:00:52.284 I mean I this also didn't make it

NOTE Confidence: 0.7798303

 $01:00:52.284 \dashrightarrow 01:00:54.438$  into the seminar because it's still.

NOTE Confidence: 0.8208675

 $01{:}00{:}58{.}550 \dashrightarrow 01{:}01{:}00{.}818$  Have collected so recently but we are.

NOTE Confidence: 0.8208675

 $01:01:00.820 \longrightarrow 01:01:02.435$  We've now started using the

NOTE Confidence: 0.8208675

01:01:02.435 --> 01:01:03.727 tensor from you lonely.

NOTE Confidence: 0.8208675

 $01{:}01{:}03.730 \dashrightarrow 01{:}01{:}05.350$  You along these lab created.

 $01{:}01{:}05{.}350 \dashrightarrow 01{:}01{:}07{.}744$  You know all of his tools work so well

NOTE Confidence: 0.8208675

 $01{:}01{:}07{.}744 \dashrightarrow 01{:}01{:}10{.}128$  and he created a new retention sensor

NOTE Confidence: 0.8208675

01:01:10.128 --> 01:01:12.650 and so obviously you know I'm not

NOTE Confidence: 0.8208675

 $01:01:12.650 \rightarrow 01:01:14.774$  necessarily a proponent of, you know.

NOTE Confidence: 0.8208675

01:01:14.774 --> 01:01:17.133 I think there's a lot of safety

NOTE Confidence: 0.8208675

 $01{:}01{:}17{.}133 \dashrightarrow 01{:}01{:}19{.}609$  testing that needs to be put in place.

NOTE Confidence: 0.8208675

01:01:19.610 --> 01:01:21.978 You know long term effects of of using

NOTE Confidence: 0.8208675

 $01:01:21.978 \longrightarrow 01:01:24.149$  viral or genetic tools in humans,

NOTE Confidence: 0.8208675

 $01{:}01{:}24.150 \dashrightarrow 01{:}01{:}25.835$  even though there's systemic administration NOTE Confidence: 0.8208675

NOTE Confidence. 0.8208075

01:01:25.835 --> 01:01:27.520 potentially possible long term effects.

NOTE Confidence: 0.8208675

 $01{:}01{:}27.520$  -->  $01{:}01{:}29.984$  I'm just having a transgene and creating NOTE Confidence: 0.8208675

 $01:01:29.984 \rightarrow 01:01:32.288$  proteins needs to be something that is

NOTE Confidence: 0.8208675

 $01{:}01{:}32.288 \dashrightarrow 01{:}01{:}34.620$  dealt with a great amount of caution,

NOTE Confidence: 0.8208675

 $01{:}01{:}34.620 \dashrightarrow 01{:}01{:}36.979$  so I will make that big disclaimer.

NOTE Confidence: 0.8208675

01:01:36.980 --> 01:01:38.332 Circle it underline highlight.

NOTE Confidence: 0.8208675

01:01:38.332 --> 01:01:39.478 However, you know,

- NOTE Confidence: 0.8208675
- 01:01:39.478 --> 01:01:41.902 potentially you could see you know
- NOTE Confidence: 0.8208675
- 01:01:41.902 --> 01:01:44.591 this isn't this is one way that you
- NOTE Confidence: 0.8208675
- $01{:}01{:}44{.}591 \dashrightarrow 01{:}01{:}47{.}336$  could be able to to sort of say what
- NOTE Confidence: 0.8208675
- $01{:}01{:}47.336 \dashrightarrow 01{:}01{:}49.575$  is going on in terms of the dynamics
- NOTE Confidence: 0.8208675
- 01:01:49.575 --> 01:01:51.948 and so it offers some some window into
- NOTE Confidence: 0.8208675
- $01{:}01{:}51{.}948$  -->  $01{:}01{:}53{.}550$  potentially using neurotransmitters.
- NOTE Confidence: 0.8208675
- $01{:}01{:}53{.}550 \dashrightarrow 01{:}01{:}55{.}115$  Biomarker even this really needs
- NOTE Confidence: 0.8208675
- $01:01:55.115 \rightarrow 01:01:57.260$  to be stressed out and approved.
- NOTE Confidence: 0.7894718
- $01{:}02{:}01{.}050 \dashrightarrow 01{:}02{:}03.642$  Away from that, but that's sort of my long
- NOTE Confidence: 0.7894718
- 01:02:03.642 --> 01:02:05.950 term forward looking view. Thanks John.
- NOTE Confidence: 0.84375924
- $01{:}02{:}06.620 \dashrightarrow 01{:}02{:}08.940$  I want to apologize that I haven't been
- NOTE Confidence: 0.84375924
- $01{:}02{:}08{.}940 \dashrightarrow 01{:}02{:}11{.}236$  reading out the names of the questioners,
- NOTE Confidence: 0.84375924
- $01:02:11.240 \rightarrow 01:02:13.970$  so I will try to start reading out the names NOTE Confidence: 0.84375924
- $01{:}02{:}14.041$  -->  $01{:}02{:}16.777$  of the questioners as I asked the questions. NOTE Confidence: 0.84375924
- $01{:}02{:}16.780 \dashrightarrow 01{:}02{:}19.244$  I also want to sort of echo Johns
- NOTE Confidence: 0.84375924
$01:02:19.244 \rightarrow 01:02:20.476$  phenomenal work. Phenomenal talk.

NOTE Confidence: 0.84375924

 $01{:}02{:}20.476 \dashrightarrow 01{:}02{:}22.940$  Thank you so much for being with us.

NOTE Confidence: 0.84375924

01:02:22.940 --> 01:02:25.092 Kay Ann. I want to introduce you again NOTE Confidence: 0.84375924

01:02:25.092 --> 01:02:27.254 to Doctor Flynn's daughter, Sarah Flynn,

NOTE Confidence: 0.84375924

 $01:02:27.254 \longrightarrow 01:02:29.403$  who's been able to join us today,

NOTE Confidence: 0.84375924

 $01{:}02{:}29{.}410$  -->  $01{:}02{:}31{.}914$  and it's really been a pleasure to have NOTE Confidence: 0.84375924

 $01:02:31.914 \rightarrow 01:02:33.717$  a representative of the Flynn family.

NOTE Confidence: 0.84375924

01:02:33.720 --> 01:02:38.348 Hi Sarah. Icera it's an honor.

NOTE Confidence: 0.84375924

 $01{:}02{:}38.350 \dashrightarrow 01{:}02{:}41.406$  So the next question is from Doctor Tech,

NOTE Confidence: 0.84375924

 $01:02:41.410 \longrightarrow 01:02:43.040$  both the function and structure

NOTE Confidence: 0.84375924

 $01:02:43.040 \rightarrow 01:02:45.223$  of amygdala seem to be impaired

NOTE Confidence: 0.84375924

 $01{:}02{:}45{.}223 \dashrightarrow 01{:}02{:}47{.}159$  in subjects with schizophrenia.

NOTE Confidence: 0.84375924

 $01:02:47.160 \longrightarrow 01:02:48.412$  Have you ever used,

NOTE Confidence: 0.84375924

 $01{:}02{:}48{.}412 \dashrightarrow 01{:}02{:}51{.}448$  or do you plan to use any models

NOTE Confidence: 0.84375924

 $01:02:51.448 \longrightarrow 01:02:52.520$  of schizophrenia,

NOTE Confidence: 0.84375924

 $01{:}02{:}52{.}520 \dashrightarrow 01{:}02{:}55{.}070$  and in this preclinical work such

- NOTE Confidence: 0.84375924
- $01:02:55.070 \rightarrow 01:02:56.345$  as phencyclidine administration

 $01{:}02{:}56{.}345 \dashrightarrow 01{:}02{:}58{.}648$  or some other way of getting it,

NOTE Confidence: 0.84375924

 $01:02:58.650 \longrightarrow 01:02:59.799$  that that link?

NOTE Confidence: 0.84009415

 $01:03:01.710 \longrightarrow 01:03:05.060$  I have not. I guess the short answer is no.

NOTE Confidence: 0.84009415

 $01{:}03{:}05{.}060 \dashrightarrow 01{:}03{:}06{.}740$  I have not done that,

NOTE Confidence: 0.84009415

 $01{:}03{:}06{.}740 \dashrightarrow 01{:}03{:}09{.}252$  but I think when I think about schizophrenia

NOTE Confidence: 0.84009415

 $01:03:09.252 \rightarrow 01:03:11.430$  and what what is really happening,

NOTE Confidence: 0.84009415

 $01:03:11.430 \longrightarrow 01:03:13.509$  I guess the the way that I've

NOTE Confidence: 0.84009415

 $01{:}03{:}13.509 \dashrightarrow 01{:}03{:}16.360$  thought about the most is sort of a

NOTE Confidence: 0.84009415

01:03:16.360 --> 01:03:17.938 computational framework, you know,

NOTE Confidence: 0.84009415

01:03:17.938 --> 01:03:20.392 kind of drawing from like roles

NOTE Confidence: 0.84009415

 $01{:}03{:}20{.}392 \dashrightarrow 01{:}03{:}22{.}220$  and and oppression.

NOTE Confidence: 0.84009415

01:03:22.220 --> 01:03:23.336 With Patricia Coleman,

NOTE Confidence: 0.84009415

 $01:03:23.336 \rightarrow 01:03:25.940$  rookies excuse me and thinking about just

NOTE Confidence: 0.84009415

01:03:26.004 --> 01:03:28.097 how do you modulate signal to noise?

- $01:03:28.100 \rightarrow 01:03:31.346$  How do neuromodulators are near peptides?
- NOTE Confidence: 0.84009415
- $01:03:31.350 \longrightarrow 01:03:31.675$  Influence.

01:03:31.675 -> 01:03:33.625 You know where you draw the

NOTE Confidence: 0.84009415

01:03:33.625 --> 01:03:35.280 line for spike threshold,

NOTE Confidence: 0.84009415

 $01{:}03{:}35{.}280 \dashrightarrow 01{:}03{:}36{.}678$  so you know there's always going

NOTE Confidence: 0.84009415

 $01:03:36.678 \longrightarrow 01:03:38.139$  to be some noise of inputs.

NOTE Confidence: 0.84009415

01:03:38.140 --> 01:03:39.556 There's going to be some signal,

NOTE Confidence: 0.84009415

 $01:03:39.560 \rightarrow 01:03:42.386$  and one way that I think about this is.

NOTE Confidence: 0.84009415

01:03:42.390 --> 01:03:43.398 Pattern completion there's

NOTE Confidence: 0.84009415

 $01:03:43.398 \rightarrow 01:03:45.414$  always going to be some noise,

NOTE Confidence: 0.84009415

 $01{:}03{:}45{.}420 \dashrightarrow 01{:}03{:}47{.}448$  and when there's more noise and.

NOTE Confidence: 0.34992766

01:03:50.100 --> 01:03:53.456 No. You know membrane potentials are closer,

NOTE Confidence: 0.34992766

 $01:03:53.460 \longrightarrow 01:03:53.996$  despite thresholds.

NOTE Confidence: 0.34992766

01:03:53.996 --> 01:03:55.604 Then you might just get spiking

NOTE Confidence: 0.34992766

 $01{:}03{:}55{.}604 \dashrightarrow 01{:}03{:}56{.}969$  and therefore pattern completion,

NOTE Confidence: 0.34992766

 $01:03:56.970 \longrightarrow 01:03:58.425$  and that's what the brain's

- NOTE Confidence: 0.34992766
- $01:03:58.425 \longrightarrow 01:03:59.589$  really good at doing.

 $01:03:59.590 \rightarrow 01:04:01.348$  This is not just limited Nicola.

NOTE Confidence: 0.34992766

01:04:01.350 --> 01:04:02.810 I'm thinking of amygdala, hippocampus,

NOTE Confidence: 0.34992766

 $01:04:02.810 \rightarrow 01:04:04.556$  prefrontal cortex as a connected circuit,

NOTE Confidence: 0.34992766

 $01{:}04{:}04{.}560 \dashrightarrow 01{:}04{:}06{.}268$  but this is something this is sort

NOTE Confidence: 0.34992766

 $01{:}04{:}06.268 \dashrightarrow 01{:}04{:}08.323$  of the way I've been thinking about

NOTE Confidence: 0.34992766

01:04:08.323 --> 01:04:09.898 how schizophrenia can can come

NOTE Confidence: 0.34992766

 $01:04:09.898 \longrightarrow 01:04:12.097$  to be in the context of dopamine

NOTE Confidence: 0.34992766

 $01:04:12.097 \longrightarrow 01:04:13.720$  and other neuropeptides as well.

NOTE Confidence: 0.34992766

 $01{:}04{:}13.720 \dashrightarrow 01{:}04{:}16.920$  But the signal to noise concept is really.

NOTE Confidence: 0.34992766

01:04:16.920 --> 01:04:18.136 Gotten into the infected,

NOTE Confidence: 0.34992766

01:04:18.136 $\operatorname{-->}$ 01:04:20.320 my brain and an I've been thinking

NOTE Confidence: 0.34992766

 $01:04:20.320 \longrightarrow 01:04:22.108$  about a lot in that terms.

NOTE Confidence: 0.34992766

01:04:22.110 $\operatorname{-->}$ 01:04:24.112 It makes a lot of intuitive sense

NOTE Confidence: 0.34992766

 $01{:}04{:}24{.}112 \dashrightarrow 01{:}04{:}26{.}378$  to me how you could get there.

 $01:04:26.380 \longrightarrow 01:04:28.270$  So just just how hallucination is

NOTE Confidence: 0.34992766

 $01{:}04{:}28{.}270 \dashrightarrow 01{:}04{:}29{.}730$  constructed is fascinating to me,

NOTE Confidence: 0.34992766

 $01{:}04{:}29{.}730 \dashrightarrow 01{:}04{:}31{.}560$  but we haven't done those experiments.

NOTE Confidence: 0.80241287

 $01{:}04{:}32.720 \dashrightarrow 01{:}04{:}35.793$  Yeah, that that's an active area of

NOTE Confidence: 0.80241287

 $01{:}04{:}35{.}793 \dashrightarrow 01{:}04{:}38{.}609$  investigation in the in the department.

NOTE Confidence: 0.80241287

01:04:38.610 --> 01:04:41.928 Jane Taylor and Phil Corlette are working NOTE Confidence: 0.80241287

 $01{:}04{:}41{.}928 \dashrightarrow 01{:}04{:}45{.}898$  on models that really do sort of address

NOTE Confidence: 0.80241287

 $01{:}04{:}45.898 \dashrightarrow 01{:}04{:}48.700$  some of those behavioral aspects of.

NOTE Confidence: 0.80241287

 $01:04:48.700 \rightarrow 01:04:50.428$  Not necessarily pattern completion,

NOTE Confidence: 0.80241287

01:04:50.428 --> 01:04:53.407 but I I like that idea of

NOTE Confidence: 0.80241287

 $01:04:53.407 \rightarrow 01:04:54.957$  signal to noise a lot.

NOTE Confidence: 0.80241287

01:04:54.960 --> 01:04:57.306 So John Crystal asks in humans

NOTE Confidence: 0.80241287

 $01:04:57.306 \rightarrow 01:04:58.870$  emotions are quite differentiated.

NOTE Confidence: 0.80241287

01:04:58.870 --> 01:05:00.820 So for example fear is

NOTE Confidence: 0.80241287

 $01:05:00.820 \longrightarrow 01:05:01.990$  different from discussed,

NOTE Confidence: 0.80241287

 $01{:}05{:}01{.}990 \dashrightarrow 01{:}05{:}04{.}461$  which of course we do have discussed

- NOTE Confidence: 0.80241287
- $01{:}05{:}04{.}461 \dashrightarrow 01{:}05{:}07{.}699$  circuits in the brain stem of mice that

 $01{:}05{:}07.699 \dashrightarrow 01{:}05{:}09.804$  are differentiated from fear circuits.

NOTE Confidence: 0.80241287

 $01:05:09.810 \longrightarrow 01:05:11.298$  There different from frustration,

NOTE Confidence: 0.80241287

 $01:05:11.298 \rightarrow 01:05:13.530$  which of course we can distinguish

NOTE Confidence: 0.80241287

 $01:05:13.586 \longrightarrow 01:05:14.900$  behaviourally in humans.

NOTE Confidence: 0.80241287

 $01:05:14.900 \rightarrow 01:05:16.920$  This higher level differentiation of

NOTE Confidence: 0.80241287

 $01{:}05{:}16.920 \dashrightarrow 01{:}05{:}19.410$  emotional states seems to involve insula.

NOTE Confidence: 0.80241287

 $01:05:19.410 \longrightarrow 01:05:20.892$  And have you thought about how

NOTE Confidence: 0.80241287

 $01{:}05{:}20{.}892 \dashrightarrow 01{:}05{:}22{.}389$  the insula might fit in with

NOTE Confidence: 0.80241287

 $01:05:22.389 \rightarrow 01:05:23.769$  the story that you told today?

NOTE Confidence: 0.79308337

 $01:05:24.660 \dashrightarrow 01:05:25.904$  That's an excellent question.

NOTE Confidence: 0.79308337

 $01:05:25.904 \rightarrow 01:05:28.459$  I am not presently working on the insulin,

NOTE Confidence: 0.79308337

 $01{:}05{:}28.460 \dashrightarrow 01{:}05{:}31.277$  but my first postdoc from the lab on a

NOTE Confidence: 0.79308337

 $01:05:31.277 \rightarrow 01:05:34.167$  Baylor who now has her own lab in Bordeaux,

NOTE Confidence: 0.79308337

 $01{:}05{:}34{.}170 \dashrightarrow 01{:}05{:}36{.}072$  has focused a lot on the

01:05:36.072 --> 01:05:37.340 insula and amygdala circuitry,

NOTE Confidence: 0.79308337

01:05:37.340 --> 01:05:39.820 so I guess I would encourage you to

NOTE Confidence: 0.79308337

 $01{:}05{:}39{.}820 \dashrightarrow 01{:}05{:}41{.}900$  check out her work, but absolutely,

NOTE Confidence: 0.79308337

 $01:05:41.900 \longrightarrow 01:05:44.180$  it's in its intricately involved in

NOTE Confidence: 0.79308337

 $01{:}05{:}44{.}180 \dashrightarrow 01{:}05{:}45{.}691$  reciprocally connected with a lot

NOTE Confidence: 0.79308337

 $01:05:45.691 \rightarrow 01:05:47.482$  of the different sort of, you know,

NOTE Confidence: 0.79308337

 $01:05:47.482 \rightarrow 01:05:49.384$  the emotional triad circuitry, I think.

NOTE Confidence: 0.79308337

 $01{:}05{:}49{.}384 \dashrightarrow 01{:}05{:}51{.}920$  Also Nadine Gogol's work in the insula is.

NOTE Confidence: 0.8155253

 $01{:}05{:}55{.}620 \dashrightarrow 01{:}05{:}58{.}836$  But I haven't done that, but there is

NOTE Confidence: 0.8155253

 $01{:}05{:}58{.}836 \dashrightarrow 01{:}06{:}01{.}650$  beautiful work being done by a number

NOTE Confidence: 0.8155253

 $01:06:01.650 \longrightarrow 01:06:03.660$  of rising stars in the

NOTE Confidence: 0.8155253

 $01{:}06{:}03.660 \dashrightarrow 01{:}06{:}06.066$  field. And Mark Anderman also has

NOTE Confidence: 0.8155253

 $01{:}06{:}06{.}070 \dashrightarrow 01{:}06{:}08{.}457$  some market as well. Yes, absolutely.

NOTE Confidence: 0.8155253

01:06:08.457 --> 01:06:11.096 So another question from the chat all care

NOTE Confidence: 0.8155253

 $01:06:11.096 \rightarrow 01:06:13.120$  asks or says behavioral activation

NOTE Confidence: 0.8155253

 $01{:}06{:}13.120 \dashrightarrow 01{:}06{:}15.532$  is 1 the rapeutic form of activation

- NOTE Confidence: 0.8155253
- $01:06:15.532 \rightarrow 01:06:17.652$  of positive valence neurons using

01:06:17.652 $\operatorname{-->}$ 01:06:20.136 psychotherapy which is used to treat

NOTE Confidence: 0.8155253

 $01:06:20.140 \longrightarrow 01:06:22.150$  negative balance disorders like depression.

NOTE Confidence: 0.8155253

01:06:22.150 --> 01:06:24.160 And he asks, you might,

NOTE Confidence: 0.8155253

 $01:06:24.160 \longrightarrow 01:06:27.114$  if you think this might rely on

NOTE Confidence: 0.8155253

 $01{:}06{:}27{.}114 \dashrightarrow 01{:}06{:}29{.}079$  the competition between the BLA.

NOTE Confidence: 0.8155253

 $01:06:29.080 \longrightarrow 01:06:30.650$  Nucleus incumbents in the BL.

NOTE Confidence: 0.8155253

01:06:30.650 --> 01:06:33.154 A central amygdala circuits and I would add.

NOTE Confidence: 0.8155253

 $01{:}06{:}33.160 \dashrightarrow 01{:}06{:}35.360$  If so, how might you measure that in

NOTE Confidence: 0.8155253

 $01:06:35.360 \rightarrow 01:06:37.559$  a person who is undergoing therapy?

NOTE Confidence: 0.8155253

 $01:06:37.560 \rightarrow 01:06:38.190$  Oh, oh,

NOTE Confidence: 0.794027

 $01{:}06{:}38{.}190 \dashrightarrow 01{:}06{:}40{.}068$  the second part of your question.

NOTE Confidence: 0.794027

01:06:40.070 --> 01:06:42.860 I'm going to come back to that that in a

NOTE Confidence: 0.794027

 $01{:}06{:}42.930 \dashrightarrow 01{:}06{:}45.714$  moment I think this is a great question.

NOTE Confidence: 0.794027

 $01{:}06{:}45.720 \dashrightarrow 01{:}06{:}47.808$  It it actually brings us back to Harkins

- $01:06:47.808 \rightarrow 01:06:50.295$  back to a few questions ago regarding
- NOTE Confidence: 0.794027
- 01:06:50.295 --> 01:06:53.040 clinical treatment, and I think.
- NOTE Confidence: 0.794027
- $01:06:53.040 \longrightarrow 01:06:58.440$  The reality is. That that.
- NOTE Confidence: 0.794027
- $01{:}06{:}58{.}440 \dashrightarrow 01{:}06{:}59{.}905$  I've been told that pharmacological
- NOTE Confidence: 0.794027
- 01:06:59.905 --> 01:07:01.660 treatment, in my opinion not specific,
- NOTE Confidence: 0.794027
- $01{:}07{:}01{.}660 \dashrightarrow 01{:}07{:}03{.}418$  and so this is. It's not.
- NOTE Confidence: 0.794027
- $01{:}07{:}03.420 \dashrightarrow 01{:}07{:}05.298$  It's never going to be maximally
- NOTE Confidence: 0.794027
- $01{:}07{:}05{.}298 \dashrightarrow 01{:}07{:}07{.}229$  effective in my opinion on its own.
- NOTE Confidence: 0.794027
- 01:07:07.230 $\operatorname{-->}$ 01:07:08.630 I think pharma<br/>cological treatments are
- NOTE Confidence: 0.794027
- $01{:}07{:}08.630 \dashrightarrow 01{:}07{:}10.987$  always going to be better in combination with
- NOTE Confidence: 0.794027
- $01:07:10.987 \longrightarrow 01:07:12.799$  some form of cognitive behavioral therapy,
- NOTE Confidence: 0.794027
- $01:07:12.800 \longrightarrow 01:07:14.468$  and I'm using that a very
- NOTE Confidence: 0.794027
- $01{:}07{:}14.468 \dashrightarrow 01{:}07{:}16.020$  very broad term and again,
- NOTE Confidence: 0.794027
- $01{:}07{:}16.020 \dashrightarrow 01{:}07{:}18.050$  of course I'm not a medical professional
- NOTE Confidence: 0.794027
- $01:07:18.050 \rightarrow 01:07:20.118$  and not qualified to give medical advice,
- NOTE Confidence: 0.794027
- $01:07:20.120 \longrightarrow 01:07:21.872$  but my perception and my understanding

- NOTE Confidence: 0.794027
- $01:07:21.872 \rightarrow 01:07:23.961$  of the circuitry would suggest this dual

 $01{:}07{:}23.961 \dashrightarrow 01{:}07{:}25.689$  approach would be what is necessary.

NOTE Confidence: 0.794027

01:07:25.690 - 01:07:27.754 I do think it's very likely that there's

NOTE Confidence: 0.794027

 $01:07:27.754 \rightarrow 01:07:30.018$  going to be competition between circuits.

NOTE Confidence: 0.794027

 $01:07:30.020 \rightarrow 01:07:32.715$  There's going to be interaction because both.

NOTE Confidence: 0.794027

01:07:32.720 --> 01:07:34.091 BLANECNBLICE central amygdala

NOTE Confidence: 0.794027

 $01:07:34.091 \rightarrow 01:07:36.376$  neurons are not only rip,

NOTE Confidence: 0.794027

 $01:07:36.380 \longrightarrow 01:07:38.208$  typically connected model synaptically

NOTE Confidence: 0.794027

 $01{:}07{:}38{.}208 \dashrightarrow 01{:}07{:}39{.}579$  with excitatory connections,

NOTE Confidence: 0.794027

 $01{:}07{:}39.580 \dashrightarrow 01{:}07{:}42.110$  but also through feedforward connections

NOTE Confidence: 0.794027

 $01{:}07{:}42.110 \dashrightarrow 01{:}07{:}45.086$  and that dual connectivity allows a

NOTE Confidence: 0.794027

 $01{:}07{:}45.086 \dashrightarrow 01{:}07{:}47.342$  lot of opportunity for regulation of

NOTE Confidence: 0.794027

 $01{:}07{:}47{.}342 \dashrightarrow 01{:}07{:}49{.}974$  the net strength of connections between

NOTE Confidence: 0.794027

 $01{:}07{:}49.974 \dashrightarrow 01{:}07{:}52.364$  those two populations of neurons,

NOTE Confidence: 0.794027

 $01:07:52.370 \longrightarrow 01:07:56.474$  and so we do see a lot of plus.

01:08:00.360 --> 01:08:03.136 I did not object into that study today,

NOTE Confidence: 0.8349331

 $01{:}08{:}03{.}140 \dashrightarrow 01{:}08{:}05{.}908$  but but we have seen that and simple

NOTE Confidence: 0.8349331

01:08:05.908 --> 01:08:06.964 manipulations, food deprivation,

NOTE Confidence: 0.8349331

 $01:08:06.964 \rightarrow 01:08:08.724$  social isolation of these things

NOTE Confidence: 0.8349331

01:08:08.724 --> 01:08:11.180 will change the balance of, you know,

NOTE Confidence: 0.8349331

01:08:11.180 --> 01:08:13.460 the the plasticity between these two

NOTE Confidence: 0.8349331

 $01:08:13.460 \rightarrow 01:08:15.840$  populations of neurons in their ability to

NOTE Confidence: 0.8349331

 $01:08:15.840 \rightarrow 01:08:18.136$  affect each other in a very qualitative

NOTE Confidence: 0.8349331

01:08:18.136 --> 01:08:21.177 way where you know it can become from a NOTE Confidence: 0.8349331

 $01:08:21.177 \rightarrow 01:08:23.259$  suppression to a facilitation based on,

NOTE Confidence: 0.8349331

 $01:08:23.260 \longrightarrow 01:08:24.692$  for example, food deprivation.

NOTE Confidence: 0.8349331

 $01:08:24.692 \rightarrow 01:08:27.080$  And so this is something this is.

NOTE Confidence: 0.8349331

 $01:08:27.080 \longrightarrow 01:08:28.830$  Gwendolyn calhouns.

NOTE Confidence: 0.8349331

01:08:28.830 --> 01:08:30.125 A study that's that's been

NOTE Confidence: 0.8349331

 $01:08:30.125 \longrightarrow 01:08:31.420$  bar by archive for a while.

NOTE Confidence: 0.8349331

01:08:31.420 --> 01:08:32.974 But yeah, I think I think that's

- NOTE Confidence: 0.8349331
- 01:08:32.974 --> 01:08:34.590 kind of how I would imagine

 $01{:}08{:}34{.}590 \dashrightarrow 01{:}08{:}36{.}075$  this circuitry playing into it,

NOTE Confidence: 0.8349331

 $01:08:36.080 \longrightarrow 01:08:38.144$  but it's going to be broader than that.

NOTE Confidence: 0.8349331

01:08:38.150 --> 01:08:39.138 Of course, you know,

NOTE Confidence: 0.8349331

01:08:39.138 --> 01:08:41.693 I don't think this is the end all and be

NOTE Confidence: 0.8349331

 $01:08:41.693 \dashrightarrow 01:08:43.590$  all of Dylan's processing by any means.

NOTE Confidence: 0.8349331

 $01:08:43.590 \longrightarrow 01:08:45.150$  I don't mean to imply that.

NOTE Confidence: 0.821403

 $01{:}08{:}49{.}270 \dashrightarrow 01{:}08{:}51{.}146$  And a representative of how the brain

NOTE Confidence: 0.821403

 $01{:}08{:}51{.}146 \dashrightarrow 01{:}08{:}52{.}382$  will apply biological implementational

NOTE Confidence: 0.821403

 $01{:}08{:}52{.}382 \dashrightarrow 01{:}08{:}54{.}277$  strategies to solve this problem.

NOTE Confidence: 0.821403

 $01:08:54.280 \longrightarrow 01:08:56.310$  And I think we'll see that motif

NOTE Confidence: 0.821403

01:08:56.310 --> 01:08:58.539 appear again and again in different in

NOTE Confidence: 0.821403

 $01{:}08{:}58{.}539 \dashrightarrow 01{:}09{:}00{.}850$  different circuits as well as the glow.

NOTE Confidence: 0.7463192

 $01{:}09{:}04{.}910 \dashrightarrow 01{:}09{:}05{.}530$  Therefore.

NOTE Confidence: 0.861282

 $01{:}09{:}06{.}950 \dashrightarrow 01{:}09{:}09{.}134$  That's all the questions from the chat,

 $01:09:09.140 \longrightarrow 01:09:10.705$  except for some comments to

NOTE Confidence: 0.861282

01:09:10.705 --> 01:09:11.644 say brilliant presentation.

NOTE Confidence: 0.861282

01:09:11.650 --> 01:09:13.195 Does any<br/>one else have any

NOTE Confidence: 0.861282

 $01{:}09{:}13.195 \dashrightarrow 01{:}09{:}15.090$  questions they'd like to ask live?

NOTE Confidence: 0.843655

 $01:09:19.050 \rightarrow 01:09:22.034$  Well, if not thank you so much Kay,

NOTE Confidence: 0.843655

01:09:22.040 --> 01:09:24.984 for being with us with a 3 hour

NOTE Confidence: 0.843655

 $01{:}09{:}24{.}984 \dashrightarrow 01{:}09{:}27{.}215$  difference in time early early on

NOTE Confidence: 0.843655

01:09:27.215 --> 01:09:30.179 the West Coast it was a pleasure to

NOTE Confidence: 0.843655

 $01{:}09{:}30{.}179$  -->  $01{:}09{:}33{.}251$  be able to hear about your work and NOTE Confidence: 0.843655

 $01{:}09{:}33{.}260 \dashrightarrow 01{:}09{:}35{.}912$  particularly to have our audience that NOTE Confidence: 0.843655

01:09:35.912 --> 01:09:38.047 involves everything from a molecule

NOTE Confidence: 0.843655

 $01:09:38.047 \longrightarrow 01:09:40.738$  to a patient to to be able to stab.

NOTE Confidence: 0.843655

 $01:09:40.740 \dashrightarrow 01:09:42.990$  Your synthesis has been really helpful,

NOTE Confidence: 0.843655

 $01:09:42.990 \longrightarrow 01:09:45.204$  so thanks so much everyone in

NOTE Confidence: 0.843655

 $01{:}09{:}45{.}204 \dashrightarrow 01{:}09{:}47{.}469$  Marina for hosting and having me.

NOTE Confidence: 0.38562948

 $01:09:49.500 \longrightarrow 01:09:51.264$  Wonderful God care.