WEBVTT

NOTE duration:"01:03:15"

NOTE recognizability:0.853

NOTE language:en-us

NOTE Confidence: 0.843327943333333

00:00:00.000 --> 00:00:01.314 Good afternoon, everyone.

NOTE Confidence: 0.843327943333333

 $00{:}00{:}01{.}314 \dashrightarrow 00{:}00{:}03{.}942$ I think we'll make a start.

NOTE Confidence: 0.86612206

 $00{:}00{:}05{.}430 \dashrightarrow 00{:}00{:}06{.}078$ So it's great to

NOTE Confidence: 0.91326451

 $00:00:06.090 \rightarrow 00:00:07.630$ see you all here for grand rounds.

NOTE Confidence: 0.91326451

 $00{:}00{:}07{.}630 \dashrightarrow 00{:}00{:}09{.}275$ Welcome to grand rounds for those of

NOTE Confidence: 0.91326451

 $00:00:09.275 \rightarrow 00:00:11.109$ you who are celebrating last week.

NOTE Confidence: 0.91326451

 $00{:}00{:}11.110 \dashrightarrow 00{:}00{:}13.422$ I hope you enjoyed your Thanks giving and I

NOTE Confidence: 0.91326451

 $00{:}00{:}13.422 \dashrightarrow 00{:}00{:}15.922$ hope that every one had a restful and relaxing

NOTE Confidence: 0.91326451

 $00:00:15.922 \rightarrow 00:00:18.169$ few days towards the end of last week.

NOTE Confidence: 0.91326451

 $00{:}00{:}18.170 \dashrightarrow 00{:}00{:}20.760$ And just a reminder about next week,

NOTE Confidence: 0.91326451

 $00{:}00{:}20{.}760 \dashrightarrow 00{:}00{:}22{.}640$ we'll have compassionate care rounds

NOTE Confidence: 0.91326451

 $00{:}00{:}22.640 \dashrightarrow 00{:}00{:}25.430$ here in the Cohen and live on zoom.

NOTE Confidence: 0.91326451

 $00:00:25.430 \longrightarrow 00:00:26.381$ As a reminder,

 $00:00:26.381 \longrightarrow 00:00:27.966$ that session won't be recorded.

NOTE Confidence: 0.91326451

 $00{:}00{:}27{.}970 \dashrightarrow 00{:}00{:}30{.}658$ So please do join us either in person

NOTE Confidence: 0.91326451

 $00{:}00{:}30{.}658 \dashrightarrow 00{:}00{:}33{.}446$ or live on zoom, or we'll hear from NOTE Confidence: 0.91326451

 $00:00:33.446 \longrightarrow 00:00:35.600$ an expert panel on the complex.

NOTE Confidence: 0.91326451

 $00:00:35.600 \dashrightarrow 00:00:38.366$ Care needs of patients dealing with

NOTE Confidence: 0.91326451

 $00{:}00{:}38.366 \dashrightarrow 00{:}00{:}40.210$ suicidality and disordered eating.

NOTE Confidence: 0.91326451

 $00:00:40.210 \longrightarrow 00:00:42.688$ So please do join us for that.

NOTE Confidence: 0.91326451

 $00:00:42.690 \longrightarrow 00:00:44.196$ Now in the spirit of the

NOTE Confidence: 0.91326451

 $00{:}00{:}44.196 \dashrightarrow 00{:}00{:}45.650$ holiday that we just marked,

NOTE Confidence: 0.91326451

 $00{:}00{:}45.650 \dashrightarrow 00{:}00{:}47.904$ I am very thankful to we lcome to

NOTE Confidence: 0.91326451

 $00{:}00{:}47{.}904 \dashrightarrow 00{:}00{:}50{.}188$ have our speaker join us here today,

NOTE Confidence: 0.91326451

00:00:50.190 --> 00:00:51.168 Doctor Aaron Dunn.

NOTE Confidence: 0.91326451

 $00{:}00{:}51.168 \dashrightarrow 00{:}00{:}53.450$ And so Doctor Dunn is an associate

NOTE Confidence: 0.91326451

 $00:00:53.514 \rightarrow 00:00:55.210$ professor of psychiatry and

NOTE Confidence: 0.91326451

 $00{:}00{:}55{.}210 \dashrightarrow 00{:}00{:}56{.}906$ Pediatrics and Harvard Medical

NOTE Confidence: 0.91326451

 $00{:}00{:}56{.}906 \dashrightarrow 00{:}00{:}59{.}113$ School and also an assistant

- NOTE Confidence: 0.91326451
- 00:00:59.113 --> 00:01:01.263 investigator in Mass General Hospital.
- NOTE Confidence: 0.91326451
- $00:01:01.270 \longrightarrow 00:01:03.358$ And I think it's fair to say that Doctor
- NOTE Confidence: 0.91326451
- $00:01:03.358 \rightarrow 00:01:05.609$ Dunn has pioneered the application of life.
- NOTE Confidence: 0.91326451
- $00:01:05.610 \longrightarrow 00:01:06.654$ Of course,
- NOTE Confidence: 0.91326451
- $00:01:06.654 \rightarrow 00:01:09.264$ epidemiological methods to study the
- NOTE Confidence: 0.91326451
- $00:01:09.264 \rightarrow 00:01:11.350$ biological embedding of adversity
- NOTE Confidence: 0.91326451
- $00:01:11.350 \longrightarrow 00:01:13.996$ and the impact of adversity on
- NOTE Confidence: 0.91326451
- $00:01:13.996 \dashrightarrow 00:01:16.060$ adult mental health outcomes.
- NOTE Confidence: 0.91326451
- 00:01:16.060 --> 00:01:18.124 And now Doctor Dunn has received
- NOTE Confidence: 0.91326451
- $00:01:18.124 \longrightarrow 00:01:19.500$ substantial support from the
- NOTE Confidence: 0.91326451
- 00:01:19.558 --> 00:01:21.250 National Institutes of Health,
- NOTE Confidence: 0.91326451
- $00:01:21.250 \dashrightarrow 00:01:22.410$ including the National Institute
- NOTE Confidence: 0.91326451
- 00:01:22.410 --> 00:01:23.280 of Mental Health,
- NOTE Confidence: 0.91326451
- $00{:}01{:}23.280 \dashrightarrow 00{:}01{:}24.668$ and has published prolifically,
- NOTE Confidence: 0.91326451
- $00{:}01{:}24.668 \dashrightarrow 00{:}01{:}26.056$ as you'll have seen.
- NOTE Confidence: 0.91326451

 $00:01:26.060 \rightarrow 00:01:27.756$ And just as recently as two weeks ago,

NOTE Confidence: 0.91326451

 $00{:}01{:}27.760 \dashrightarrow 00{:}01{:}29.566$ I think you marked your 100th

NOTE Confidence: 0.91326451

 $00{:}01{:}29.566 \dashrightarrow 00{:}01{:}31.214$ publication and a nice systematic

NOTE Confidence: 0.91326451

 $00:01:31.214 \rightarrow 00:01:33.500$ review of the of sensitive periods,

NOTE Confidence: 0.91326451

 $00{:}01{:}33{.}500 \dashrightarrow 00{:}01{:}34{.}580$ the evidence for sensitive

NOTE Confidence: 0.91326451

 $00:01:34.580 \longrightarrow 00:01:35.930$ periods of exposure to child.

NOTE Confidence: 0.91326451

 $00{:}01{:}35{.}930 \dashrightarrow 00{:}01{:}37{.}235$ Our treatment and the prediction

NOTE Confidence: 0.91326451

 $00:01:37.235 \longrightarrow 00:01:38.279$ of adult health outcomes.

NOTE Confidence: 0.91326451

 $00{:}01{:}38{.}280 \dashrightarrow 00{:}01{:}40{.}176$ So hopefully we'll hear a little

NOTE Confidence: 0.91326451

 $00{:}01{:}40.176 \dashrightarrow 00{:}01{:}42.310$ bit about that today and a new

NOTE Confidence: 0.91326451

 $00{:}01{:}42.310 \dashrightarrow 00{:}01{:}43.918$ area in the Dunlap looking at

NOTE Confidence: 0.91326451

 $00{:}01{:}43.918 \dashrightarrow 00{:}01{:}46.109$ teeth as a potential biomarker of

NOTE Confidence: 0.91326451

00:01:46.109 --> 00:01:47.593 exposure to early adversity.

NOTE Confidence: 0.91326451

00:01:47.600 --> 00:01:47.944 Again,

NOTE Confidence: 0.91326451

 $00:01:47.944 \rightarrow 00:01:50.696$ very excited to hear more about that today.

NOTE Confidence: 0.91326451

00:01:50.700 --> 00:01:52.856 So please give a warm child study

- NOTE Confidence: 0.91326451
- $00:01:52.856 \dashrightarrow 00:01:54.570$ center welcome to Doctor Dunn.
- NOTE Confidence: 0.87195876625
- 00:01:59.480 --> 00:02:01.680 I'm impressed, Karen. You did
- NOTE Confidence: 0.87195876625
- $00:02:01.680 \dashrightarrow 00:02:03.930$ that all memorized. It's amazing.
- NOTE Confidence: 0.935726333636364
- $00{:}02{:}06.050 \dashrightarrow 00{:}02{:}07.442$ All right, so let me go
- NOTE Confidence: 0.935726333636364
- $00:02:07.442 \longrightarrow 00:02:08.820$ ahead and share my screen.
- NOTE Confidence: 0.8811313425
- 00:02:18.330 --> 00:02:21.546 OK. I think we're, I think we're good.
- NOTE Confidence: 0.8811313425
- $00:02:21.550 \rightarrow 00:02:22.930$ Well, thank you everyone for the
- NOTE Confidence: 0.8811313425
- $00:02:22.930 \longrightarrow 00:02:24.150$ opportunity to be here today.
- NOTE Confidence: 0.8811313425
- $00:02:24.150 \longrightarrow 00:02:25.620$ I'm really excited to share
- NOTE Confidence: 0.8811313425
- $00:02:25.620 \rightarrow 00:02:27.450$ with you more about my work.
- NOTE Confidence: 0.8811313425
- 00:02:27.450 --> 00:02:29.665 As Kieran said, around childhood
- NOTE Confidence: 0.8811313425
- $00{:}02{:}29.665 \dashrightarrow 00{:}02{:}31.437$ adversity and mental health,
- NOTE Confidence: 0.8811313425
- $00:02:31.440 \longrightarrow 00:02:33.320$ I'm going to tell you a little bit
- NOTE Confidence: 0.8811313425
- $00{:}02{:}33{.}320 \dashrightarrow 00{:}02{:}35{.}106$ more about opportunities I think there
- NOTE Confidence: 0.8811313425
- 00:02:35.106 --> 00:02:36.990 are to identify risk and promote
- NOTE Confidence: 0.8811313425

 $00:02:37.046 \dashrightarrow 00:02:38.670$ resilience across the lifespan.

NOTE Confidence: 0.8811313425

 $00{:}02{:}38{.}670 \dashrightarrow 00{:}02{:}39{.}726$ Can every one hear me?

NOTE Confidence: 0.8811313425

00:02:39.726 --> 00:02:41.472 OK, OK, perfect.

NOTE Confidence: 0.8811313425

 $00{:}02{:}41.472 \dashrightarrow 00{:}02{:}45.177$ So I have no disclosures.

NOTE Confidence: 0.8811313425

00:02:45.180 --> 00:02:47.500 So just to Orient us a little bit,

NOTE Confidence: 0.8811313425

 $00:02:47.500 \longrightarrow 00:02:49.980$ I want to say a little bit about

NOTE Confidence: 0.8811313425

 $00:02:49.980 \longrightarrow 00:02:50.600$ childhood adversity.

NOTE Confidence: 0.8811313425

00:02:50.600 --> 00:02:51.312 Childhood adversity,

NOTE Confidence: 0.8811313425

 $00{:}02{:}51{.}312 \dashrightarrow 00{:}02{:}54{.}585$ I think is so critical to study because it's

NOTE Confidence: 0.8811313425

 $00:02:54.585 \rightarrow 00:02:57.077$ one of the most impactful social determinants

NOTE Confidence: 0.8811313425

 $00{:}02{:}57{.}077 \dashrightarrow 00{:}02{:}59{.}879$ of mental health as well as physical health.

NOTE Confidence: 0.8811313425

 $00:02:59.880 \rightarrow 00:03:01.776$ When I think about childhood adversity,

NOTE Confidence: 0.8811313425

 $00:03:01.780 \longrightarrow 00:03:03.808$ I think about a range of

NOTE Confidence: 0.8811313425

 $00{:}03{:}03{.}808 \dashrightarrow 00{:}03{:}05{.}160$ different kinds of experiences.

NOTE Confidence: 0.8811313425

 $00:03:05.160 \rightarrow 00:03:07.330$ These could be events that happen within

NOTE Confidence: 0.8811313425

 $00:03:07.330 \longrightarrow 00:03:09.679$ the household or outside of the household.

- NOTE Confidence: 0.8811313425
- $00{:}03{:}09{.}680 \dashrightarrow 00{:}03{:}12{.}110$ They could be perpetrated by
- NOTE Confidence: 0.8811313425
- $00{:}03{:}12{.}110 \dashrightarrow 00{:}03{:}14{.}540$ loved ones or by strangers.
- NOTE Confidence: 0.8811313425
- $00:03:14.540 \longrightarrow 00:03:15.365$ They could be.
- NOTE Confidence: 0.8811313425
- 00:03:15.365 00:03:16.465 Friends that are acute,
- NOTE Confidence: 0.8811313425
- $00:03:16.470 \longrightarrow 00:03:17.874$ they could be chronic.
- NOTE Confidence: 0.8811313425
- $00{:}03{:}17.874 \dashrightarrow 00{:}03{:}20.609$ Some might meet the definition of a trauma,
- NOTE Confidence: 0.8811313425
- $00:03:20.610 \longrightarrow 00:03:21.837$ others might not.
- NOTE Confidence: 0.8811313425
- $00{:}03{:}21.837 \dashrightarrow 00{:}03{:}24.291$ What we know from large scale
- NOTE Confidence: 0.8811313425
- $00{:}03{:}24{.}291 \dashrightarrow 00{:}03{:}25{.}526$ epidemiological studies that
- NOTE Confidence: 0.8811313425
- $00:03:25.526 \longrightarrow 00:03:27.788$ have been done primarily in the
- NOTE Confidence: 0.8811313425
- 00:03:27.788 --> 00:03:30.037 United States is that we know
- NOTE Confidence: 0.8811313425
- $00{:}03{:}30{.}037 \dashrightarrow 00{:}03{:}31{.}465$ that adversities are common,
- NOTE Confidence: 0.8811313425
- $00{:}03{:}31{.}470 \dashrightarrow 00{:}03{:}33{.}108$ so we know that more than half
- NOTE Confidence: 0.8811313425
- $00{:}03{:}33{.}108 \dashrightarrow 00{:}03{:}35{.}235$ of all kids growing up in the US
- NOTE Confidence: 0.8811313425
- $00:03:35.235 \rightarrow 00:03:36.995$ will experience at least one type
- NOTE Confidence: 0.8811313425

00:03:36.995 - 00:03:38.665 of adversity in their lifespan.

NOTE Confidence: 0.8811313425

 $00:03:38.670 \dashrightarrow 00:03:41.463$ We also know that there are large

NOTE Confidence: 0.8811313425

 $00:03:41.463 \longrightarrow 00:03:43.131$ racial ethnic minority differences

NOTE Confidence: 0.8811313425

 $00:03:43.131 \rightarrow 00:03:45.875$ such that kids who grow up from.

NOTE Confidence: 0.8811313425

 $00{:}03{:}45{.}880 \dashrightarrow 00{:}03{:}49{.}240$ Racial and non white families are

NOTE Confidence: 0.8811313425

 $00:03:49.240 \rightarrow 00:03:51.480$ disproportionately affected by adversity,

NOTE Confidence: 0.8811313425

00:03:51.480 --> 00:03:52.118 and similarly,

NOTE Confidence: 0.8811313425

 $00:03:52.118 \longrightarrow 00:03:54.032$ we also know that girls are

NOTE Confidence: 0.8811313425

 $00{:}03{:}54{.}032 \dashrightarrow 00{:}03{:}55{.}955$ more likely to experience some

NOTE Confidence: 0.8811313425

 $00:03:55.955 \rightarrow 00:03:57.579$ adversities compared to boys.

NOTE Confidence: 0.8811313425

 $00:03:57.580 \longrightarrow 00:03:59.476$ The boys are also more likely

NOTE Confidence: 0.8811313425

 $00:03:59.476 \longrightarrow 00:04:01.267$ to experience some types of

NOTE Confidence: 0.8811313425

 $00:04:01.267 \longrightarrow 00:04:03.139$ interpersonal violence in particular.

NOTE Confidence: 0.8811313425

00:04:03.140 --> 00:04:06.040 Now I think this following

NOTE Confidence: 0.8811313425

 $00:04:06.040 \longrightarrow 00:04:08.360$ statistic is both sobering.

NOTE Confidence: 0.8811313425

 $00{:}04{:}08{.}360 \dashrightarrow 00{:}04{:}10{.}502$ These two sets of statistics are

- NOTE Confidence: 0.8811313425
- $00{:}04{:}10.502 \dashrightarrow 00{:}04{:}12.720$ both sobering but also optimistic.
- NOTE Confidence: 0.8811313425
- $00:04:12.720 \longrightarrow 00:04:15.058$ The first is that we know that
- NOTE Confidence: 0.8811313425
- $00:04:15.058 \rightarrow 00:04:17.055$ adversity is estimated to at least
- NOTE Confidence: 0.8811313425
- $00:04:17.055 \rightarrow 00:04:19.218$ double the risk of a mental disorder.
- NOTE Confidence: 0.8811313425
- $00:04:19.220 \longrightarrow 00:04:20.267$ Throughout the lifespan.
- NOTE Confidence: 0.8811313425
- $00:04:20.267 \longrightarrow 00:04:20.616$ Now,
- NOTE Confidence: 0.8811313425
- 00:04:20.616 --> 00:04:23.150 it might not surprise you to hear
- NOTE Confidence: 0.8811313425
- $00:04:23.150 \longrightarrow 00:04:25.045$ that childhood adversity is associated
- NOTE Confidence: 0.8811313425
- $00{:}04{:}25.045 \dashrightarrow 00{:}04{:}27.209$ with child onset or adolescent
- NOTE Confidence: 0.8811313425
- 00:04:27.209 --> 00:04:28.967 onset psychiatric disorders.
- NOTE Confidence: 0.8811313425
- $00:04:28.970 \longrightarrow 00:04:31.082$ But we also know that these
- NOTE Confidence: 0.8811313425
- $00{:}04{:}31.082 \dashrightarrow 00{:}04{:}32.490$ adversities are associated with
- NOTE Confidence: 0.8811313425
- $00{:}04{:}32.552 \dashrightarrow 00{:}04{:}34.252$ increased risk of disorders that
- NOTE Confidence: 0.8811313425
- $00{:}04{:}34.252 \dashrightarrow 00{:}04{:}36.790$ onset for the first time in a dulthood.
- NOTE Confidence: 0.8811313425
- $00:04:36.790 \longrightarrow 00:04:38.430$ And we also know,
- NOTE Confidence: 0.8811313425

 $00:04:38.430 \longrightarrow 00:04:40.070$ particularly from recent large

NOTE Confidence: 0.8811313425

00:04:40.070 --> 00:04:41.590 scale meta analysis,

NOTE Confidence: 0.8811313425

00:04:41.590 -> 00:04:43.642 that if these effects of adversity

NOTE Confidence: 0.8811313425

 $00:04:43.642 \longrightarrow 00:04:44.326$ are causal,

NOTE Confidence: 0.8811313425

00:04:44.330 --> 00:04:47.354 they'd explain about 30 to 40%

NOTE Confidence: 0.8811313425

 $00{:}04{:}47{.}354 \dashrightarrow 00{:}04{:}49{.}538$ of the total variability in risk

NOTE Confidence: 0.8811313425

00:04:49.538 --> 00:04:51.310 for mental health problems.

NOTE Confidence: 0.8811313425

 $00:04:51.310 \longrightarrow 00:04:52.462$ So to me,

NOTE Confidence: 0.8811313425

 $00{:}04{:}52{.}462 \dashrightarrow 00{:}04{:}54{.}766$ I hear that both optimistically sobering,

NOTE Confidence: 0.8811313425

00:04:54.770 --> 00:04:55.050 right?

NOTE Confidence: 0.8811313425

00:04:55.050 --> 00:04:56.730 It's a it's a scary statistic,

NOTE Confidence: 0.8811313425

 $00{:}04{:}56.730 \dashrightarrow 00{:}04{:}59.094$ but I think it also suggests

NOTE Confidence: 0.8811313425

 $00:04:59.094 \rightarrow 00:05:01.196$ opportunities for where our work

NOTE Confidence: 0.8811313425

 $00:05:01.196 \rightarrow 00:05:03.426$ can really have potential impact.

NOTE Confidence: 0.8811313425

 $00{:}05{:}03{.}430 \dashrightarrow 00{:}05{:}04{.}969$ A lot of the work that we do in

NOTE Confidence: 0.8811313425

 $00:05:04.969 \rightarrow 00:05:06.746$ my group is focused on depression,

NOTE Confidence: 0.8811313425

 $00:05:06.750 \longrightarrow 00:05:08.234$ which for those of you who may

NOTE Confidence: 0.8811313425

 $00:05:08.234 \rightarrow 00:05:08.870$ not be familiar,

NOTE Confidence: 0.8811313425

 $00:05:08.870 \longrightarrow 00:05:10.946$ is a major public health problem.

NOTE Confidence: 0.8811313425

 $00:05:10.950 \rightarrow 00:05:12.882$ So depression is a disorder that's

NOTE Confidence: 0.8811313425

 $00{:}05{:}12.882 \dashrightarrow 00{:}05{:}14.170$ common throughout the lifespan.

NOTE Confidence: 0.8811313425

 $00{:}05{:}14.170 \dashrightarrow 00{:}05{:}16.284$ About one out of every five people

NOTE Confidence: 0.8811313425

 $00:05:16.284 \longrightarrow 00:05:17.902$ will experience an episode of

NOTE Confidence: 0.8811313425

 $00:05:17.902 \rightarrow 00:05:20.163$ depression at some point in their lives.

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}20{.}170 \dashrightarrow 00{:}05{:}23{.}194$ We also know that depression is a disorder

NOTE Confidence: 0.9302913916666667

 $00:05:23.194 \rightarrow 00:05:24.810$ that disproportionately effects women.

NOTE Confidence: 0.9302913916666667

00:05:24.810 --> 00:05:27.072 So during childhood, boys and girls

NOTE Confidence: 0.930291391666667

 $00{:}05{:}27.072 \dashrightarrow 00{:}05{:}29.290$ experience similar levels of depression.

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}29{.}290 \dashrightarrow 00{:}05{:}31{.}030$ But something happens in a dolescence

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}31{.}030 \dashrightarrow 00{:}05{:}33{.}670$ where Girl Scout start to outnumber boys.

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}33.670 \dashrightarrow 00{:}05{:}36.430$ By a ratio of two to one, and that

 $00:05:36.430 \rightarrow 00:05:39.055$ disparity persists throughout the lifespan.

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}39{.}060 \dashrightarrow 00{:}05{:}41{.}052$ We also know that depression is

NOTE Confidence: 0.930291391666667

 $00{:}05{:}41.052 \dashrightarrow 00{:}05{:}43.152$ associated with a host of negative

NOTE Confidence: 0.9302913916666667

 $00:05:43.152 \rightarrow 00:05:45.637$ consequences in the short and long term.

NOTE Confidence: 0.9302913916666667

 $00:05:45.640 \longrightarrow 00:05:46.716$ We know it's recurrent,

NOTE Confidence: 0.9302913916666667

 $00:05:46.716 \dashrightarrow 00:05:48.920$ we know their side effects from medication.

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}48{.}920 \dashrightarrow 00{:}05{:}50{.}520$ We know that it affects

NOTE Confidence: 0.9302913916666667

 $00:05:50.520 \rightarrow 00:05:52.520$ people's ability to go to work,

NOTE Confidence: 0.930291391666667

 $00:05:52.520 \dashrightarrow 00:05:54.560$ to complete school, and so forth.

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}54{.}560 \dashrightarrow 00{:}05{:}56{.}751$ And I think in its most severe

NOTE Confidence: 0.9302913916666667

 $00{:}05{:}56{.}751 \dashrightarrow 00{:}05{:}58{.}719$ form is suicide and self harm.

NOTE Confidence: 0.9302913916666667

00:05:58.720 --> 00:06:01.318 So because depression is so common,

NOTE Confidence: 0.9302913916666667

 $00:06:01.320 \rightarrow 00:06:02.848$ and because it disproportionately

NOTE Confidence: 0.9302913916666667

 $00:06:02.848 \rightarrow 00:06:05.140$ affects large segments of the population.

NOTE Confidence: 0.9302913916666667

 $00:06:05.140 \dashrightarrow 00:06:07.888$ And is associated with so many

NOTE Confidence: 0.9302913916666667

00:06:07.888 - 00:06:08.804 negative consequences.

- NOTE Confidence: 0.930291391666667
- $00:06:08.810 \longrightarrow 00:06:09.111$ Hopefully,
- NOTE Confidence: 0.9302913916666667
- $00:06:09.111 \dashrightarrow 00:06:11.519$ it might not be a surprise to learn
- NOTE Confidence: 0.9302913916666667
- $00:06:11.519 \rightarrow 00:06:14.048$ that depression is currently the second
- NOTE Confidence: 0.9302913916666667
- $00:06:14.048 \rightarrow 00:06:16.208$ leading cause of disability worldwide.
- NOTE Confidence: 0.9302913916666667
- $00:06:16.210 \rightarrow 00:06:18.883$ So my group is really focused on trying to
- NOTE Confidence: 0.9302913916666667
- $00:06:18.883 \rightarrow 00:06:21.347$ identify ways that we can prevent depression.
- NOTE Confidence: 0.9302913916666667
- 00:06:21.350 --> 00:06:23.216 And I think that's really critical
- NOTE Confidence: 0.9302913916666667
- $00:06:23.216 \longrightarrow 00:06:24.825$ because it's a disorder that
- NOTE Confidence: 0.9302913916666667
- $00:06:24.825 \dashrightarrow 00:06:26.385$ strikes when people are young.
- NOTE Confidence: 0.9302913916666667
- 00:06:26.390 --> 00:06:27.782 And once it emerges,
- NOTE Confidence: 0.930291391666667
- $00:06:27.782 \longrightarrow 00:06:29.870$ it tends to be highly recurrent.
- NOTE Confidence: 0.930291391666667
- $00{:}06{:}29.870 \dashrightarrow 00{:}06{:}33.113$ So we know that between 20 to 40% of
- NOTE Confidence: 0.9302913916666667
- $00:06:33.113 \rightarrow 00:06:35.528$ people who experience depression will
- NOTE Confidence: 0.9302913916666667
- $00:06:35.528 \dashrightarrow 00:06:38.810$ have had their first onset by age 21.
- NOTE Confidence: 0.9302913916666667
- $00:06:38.810 \longrightarrow 00:06:40.497$ And we also know that about 3
- NOTE Confidence: 0.930291391666667

00:06:40.497 --> 00:06:42.382 out of every four people with

NOTE Confidence: 0.9302913916666667

 $00:06:42.382 \rightarrow 00:06:44.217$ depression will experience at least

NOTE Confidence: 0.9302913916666667

 $00:06:44.217 \longrightarrow 00:06:46.048$ one relapse in their lifespan.

NOTE Confidence: 0.9302913916666667

00:06:46.050 --> 00:06:47.996 So when I hear data like this,

NOTE Confidence: 0.9302913916666667

 $00{:}06{:}48.000 \dashrightarrow 00{:}06{:}50.790$ to me the the message is we need to

NOTE Confidence: 0.930291391666667

 $00:06:50.869 \rightarrow 00:06:53.809$ better understand what causes depression,

NOTE Confidence: 0.9302913916666667

 $00:06:53.810 \longrightarrow 00:06:54.770$ what's its etiology,

NOTE Confidence: 0.9302913916666667

 $00:06:54.770 \longrightarrow 00:06:56.370$ how does it come about,

NOTE Confidence: 0.930291391666667

 $00{:}06{:}56{.}370 \dashrightarrow 00{:}06{:}58{.}762$ so that we can use those insights to

NOTE Confidence: 0.9302913916666667

 $00:06:58.762 \dashrightarrow 00:07:00.595$ then identify targets to identify kids

NOTE Confidence: 0.9302913916666667

 $00{:}07{:}00.595 \dashrightarrow 00{:}07{:}03.039$ who might be at risk and prevent the

NOTE Confidence: 0.9302913916666667

 $00:07:03.039 \rightarrow 00:07:05.527$ onset of depression and do that as early

NOTE Confidence: 0.9302913916666667

 $00:07:05.530 \longrightarrow 00:07:08.490$ on as we possibly can in the lifespan.

NOTE Confidence: 0.9302913916666667

 $00:07:08.490 \longrightarrow 00:07:08.854$ So.

NOTE Confidence: 0.930291391666667

 $00:07:08.854 \rightarrow 00:07:10.310$ Committed to that goal.

NOTE Confidence: 0.9302913916666667

 $00:07:10.310 \dashrightarrow 00:07:12.816$ The current focus of my research group

- NOTE Confidence: 0.9302913916666667
- $00:07:12.816 \longrightarrow 00:07:15.072$ has been organized in these 44 domains.
- NOTE Confidence: 0.9302913916666667
- $00:07:15.072 \longrightarrow 00:07:17.214$ So we do work on The Who,
- NOTE Confidence: 0.9302913916666667
- $00{:}07{:}17.220 \dashrightarrow 00{:}07{:}19.405$ how and the when question
- NOTE Confidence: 0.9302913916666667
- $00:07:19.405 \longrightarrow 00:07:20.716$ around depression prevention.
- NOTE Confidence: 0.9302913916666667
- $00:07:20.720 \longrightarrow 00:07:22.676$ So with respect to The Who,
- NOTE Confidence: 0.930291391666667
- $00:07:22.680 \dashrightarrow 00:07:24.940$ a lot of what we do is focused on trying
- NOTE Confidence: 0.9302913916666667
- $00:07:24.999 \dashrightarrow 00:07:27.295$ to identify people at highest risk using
- NOTE Confidence: 0.930291391666667
- 00:07:27.295 --> 00:07:29.749 genetic and other markers of vulnerability.
- NOTE Confidence: 0.9302913916666667
- $00{:}07{:}29.750 \dashrightarrow 00{:}07{:}31.973$ So that's work that we do in in relationship
- NOTE Confidence: 0.9302913916666667
- $00:07:31.973 \rightarrow 00:07:34.177$ to the Psychiatric Genomics Consortium,
- NOTE Confidence: 0.9302913916666667
- $00:07:34.180 \longrightarrow 00:07:34.806$ for example.
- NOTE Confidence: 0.9302913916666667
- $00{:}07{:}34.806 \dashrightarrow 00{:}07{:}36.997$ We also do a lot of work,
- NOTE Confidence: 0.9302913916666667
- $00{:}07{:}37{.}000 \dashrightarrow 00{:}07{:}38{.}204$ and I'm going to tell you a
- NOTE Confidence: 0.9302913916666667
- $00{:}07{:}38{.}204 \dashrightarrow 00{:}07{:}39{.}220$ lot about this work today.
- NOTE Confidence: 0.9302913916666667
- $00:07:39.220 \dashrightarrow 00:07:41.360$ Around the biological embedding of
- NOTE Confidence: 0.9302913916666667

 $00:07:41.360 \dashrightarrow 00:07:43.500$ adversity and the mechanisms that

NOTE Confidence: 0.9302913916666667

00:07:43.566 --> 00:07:46.030 might explain how it is that these

NOTE Confidence: 0.930291391666667

 $00:07:46.030 \rightarrow 00:07:47.784$ stressors and traumas might get

NOTE Confidence: 0.9302913916666667

 $00:07:47.784 \rightarrow 00:07:49.982$ under our skin to shape our health,

NOTE Confidence: 0.930291391666667

 $00{:}07{:}49{.}990 \dashrightarrow 00{:}07{:}51{.}946$ the third area is really focused

NOTE Confidence: 0.930291391666667

 $00:07:51.946 \longrightarrow 00:07:52.924$ on sensitive periods.

NOTE Confidence: 0.9302913916666667

 $00:07:52.930 \longrightarrow 00:07:53.818$ Try to understand,

NOTE Confidence: 0.9302913916666667

 $00{:}07{:}53.818 \dashrightarrow 00{:}07{:}55.594$ are there ages in the course

NOTE Confidence: 0.930291391666667

 $00{:}07{:}55{.}594 \dashrightarrow 00{:}07{:}57{.}835$ of the lifespan when our life

NOTE Confidence: 0.9302913916666667

00:07:57.835 --> 00:07:58.966 experience matters more?

NOTE Confidence: 0.930291391666667

 $00:07:58.970 \dashrightarrow 00:08:00.650$ And could that differentially

NOTE Confidence: 0.9302913916666667

00:08:00.650 --> 00:08:02.330 predict risk for depression?

NOTE Confidence: 0.9302913916666667

 $00:08:02.330 \longrightarrow 00:08:03.329$ And then finally,

NOTE Confidence: 0.9302913916666667

 $00:08:03.329 \rightarrow 00:08:04.994$ I'm someone that really believes

NOTE Confidence: 0.930291391666667

 $00:08:04.994 \rightarrow 00:08:07.190$ in and committed to translation,

NOTE Confidence: 0.9302913916666667

00:08:07.190 --> 00:08:09.548 so I don't want to just do ivory tower.

NOTE Confidence: 0.930291391666667

00:08:09.550 --> 00:08:09.784 Client,

NOTE Confidence: 0.9302913916666667

 $00:08:09.784 \longrightarrow 00:08:10.486$ so to speak,

NOTE Confidence: 0.9302913916666667

 $00{:}08{:}10.486 \dashrightarrow 00{:}08{:}11.890$ I want to figure out how

NOTE Confidence: 0.860109156842105

 $00:08:11.951 \rightarrow 00:08:14.300$ to get our findings out to make a difference.

NOTE Confidence: 0.860109156842105

 $00:08:14.300 \longrightarrow 00:08:16.071$ So that's where we've also been doing

NOTE Confidence: 0.860109156842105

 $00:08:16.071 \rightarrow 00:08:18.617$ work to try to build novel infrastructure

NOTE Confidence: 0.860109156842105

 $00:08:18.617 \rightarrow 00:08:20.349$ for scientific knowledge translation.

NOTE Confidence: 0.860109156842105

00:08:20.350 --> 00:08:22.734 And I'm proud to partner with Josh Rothman,

NOTE Confidence: 0.860109156842105

00:08:22.740 --> 00:08:24.044 a colleague in psychiatry,

NOTE Confidence: 0.860109156842105

 $00{:}08{:}24.044 \dashrightarrow 00{:}08{:}26.000$ around a birth cohort work that

NOTE Confidence: 0.860109156842105

 $00:08:26.059 \rightarrow 00:08:27.884$ we're doing where we're deliberately

NOTE Confidence: 0.860109156842105

 $00{:}08{:}27{.}884 \dashrightarrow 00{:}08{:}30{.}057$ from the beginning trying to design

NOTE Confidence: 0.860109156842105

 $00{:}08{:}30{.}057 \dashrightarrow 00{:}08{:}32{.}059$ it to not just observe but also

NOTE Confidence: 0.860109156842105

 $00{:}08{:}32{.}059 \dashrightarrow 00{:}08{:}33{.}326$ intervene in those participants.

NOTE Confidence: 0.860109156842105

 $00{:}08{:}33{.}326 \dashrightarrow 00{:}08{:}37{.}611$ So what I want to do in this talk is tell you

 $00:08:37.611 \rightarrow 00:08:40.449$ more about two specific aspects of my labs.

NOTE Confidence: 0.860109156842105

 $00:08:40.450 \dashrightarrow 00:08:42.680$ Work related to childhood adversity.

NOTE Confidence: 0.860109156842105

 $00:08:42.680 \longrightarrow 00:08:44.255$ So the first is work that we've

NOTE Confidence: 0.860109156842105

00:08:44.255 --> 00:08:46.361 been doing to try to identify these

NOTE Confidence: 0.860109156842105

 $00{:}08{:}46{.}361 \dashrightarrow 00{:}08{:}47{.}737$ sensitive periods in development.

NOTE Confidence: 0.860109156842105

 $00{:}08{:}47.740 \dashrightarrow 00{:}08{:}49.714$ And then I'll also transition into

NOTE Confidence: 0.860109156842105

 $00:08:49.714 \rightarrow 00:08:51.825$ telling you more about what we're

NOTE Confidence: 0.860109156842105

 $00{:}08{:}51.825 \dashrightarrow 00{:}08{:}54.009$ doing to try to overcome measurement

NOTE Confidence: 0.860109156842105

 $00{:}08{:}54{.}009 \dashrightarrow 00{:}08{:}56{.}191$ challenges that exist in capturing

NOTE Confidence: 0.860109156842105

00:08:56.191 -> 00:08:57.580 childhood diversity exposure.

NOTE Confidence: 0.860109156842105

 $00:08:57.580 \longrightarrow 00:08:58.840$ And then at the end,

NOTE Confidence: 0.860109156842105

00:08:58.840 --> 00:08:59.868 I'm not a clinician,

NOTE Confidence: 0.860109156842105

 $00:08:59.868 \longrightarrow 00:09:01.871$ but I'll try to talk a little

NOTE Confidence: 0.860109156842105

 $00:09:01.871 \longrightarrow 00:09:04.271$ bit about some of the clinical

NOTE Confidence: 0.860109156842105

 $00{:}09{:}04{.}271 \dashrightarrow 00{:}09{:}05{.}827$ implications and applications I

NOTE Confidence: 0.860109156842105

 $00:09:05.827 \rightarrow 00:09:07.567$ think might exist for this work.

- NOTE Confidence: 0.860109156842105
- $00:09:07.570 \longrightarrow 00:09:09.635$ So let me just also clarify at
- NOTE Confidence: 0.860109156842105
- 00:09:09.635 --> 00:09:11.405 the beginning because one of the
- NOTE Confidence: 0.860109156842105
- 00:09:11.405 --> 00:09:12.785 questions you might have is,
- NOTE Confidence: 0.860109156842105
- 00:09:12.790 --> 00:09:14.454 you know, childhood adversity,
- NOTE Confidence: 0.860109156842105
- 00:09:14.454 --> 00:09:15.160 trauma, aces,
- NOTE Confidence: 0.860109156842105
- $00:09:15.160 \longrightarrow 00:09:17.770$ do all of these things mean the same thing?
- NOTE Confidence: 0.860109156842105
- $00:09:17.770 \longrightarrow 00:09:19.058$ So from my perspective,
- NOTE Confidence: 0.860109156842105
- 00:09:19.058 --> 00:09:21.499 I tend to use the language of
- NOTE Confidence: 0.860109156842105
- 00:09:21.499 --> 00:09:23.271 childhood adversity because I
- NOTE Confidence: 0.860109156842105
- 00:09:23.271 > 00:09:25.043 think it's more encompassing.
- NOTE Confidence: 0.860109156842105
- 00:09:25.050 --> 00:09:26.742 Childhood adversity is generally
- NOTE Confidence: 0.860109156842105
- $00{:}09{:}26.742 \dashrightarrow 00{:}09{:}28.857$ defined as circumstances or events
- NOTE Confidence: 0.860109156842105
- $00:09:28.857 \dashrightarrow 00:09:30.807$ that threaten children's physical
- NOTE Confidence: 0.860109156842105
- $00{:}09{:}30{.}807 \dashrightarrow 00{:}09{:}32{.}759$ and psychological well-being and
- NOTE Confidence: 0.860109156842105
- $00:09:32.759 \rightarrow 00:09:35.273$ their deviations from what you would
- NOTE Confidence: 0.860109156842105

 $00:09:35.273 \longrightarrow 00:09:36.923$ expect kids who are typically.

NOTE Confidence: 0.860109156842105

 $00:09:36.930 \dashrightarrow 00:09:38.103$ Developing should experience.

NOTE Confidence: 0.860109156842105

00:09:38.103 - > 00:09:41.527 I think of aces as being a set

NOTE Confidence: 0.860109156842105

 $00:09:41.527 \longrightarrow 00:09:43.676$ of 10 markers that have been most

NOTE Confidence: 0.860109156842105

 $00{:}09{:}43.676 \dashrightarrow 00{:}09{:}46.866$ well studied in the context of of

NOTE Confidence: 0.860109156842105

 $00:09:46.866 \rightarrow 00:09:48.738$ adverse childhood experiences studies,

NOTE Confidence: 0.860109156842105

 $00:09:48.740 \rightarrow 00:09:51.680$ and so those are sometimes overlapping

NOTE Confidence: 0.860109156842105

 $00:09:51.680 \rightarrow 00:09:53.660$ with the adversities that we study,

NOTE Confidence: 0.860109156842105

 $00{:}09{:}53.660 \dashrightarrow 00{:}09{:}55.724$ but tend to sometimes not include

NOTE Confidence: 0.860109156842105

 $00:09:55.724 \rightarrow 00:09:56.756$ all of them.

NOTE Confidence: 0.860109156842105

 $00{:}09{:}56.760 \dashrightarrow 00{:}09{:}58.650$ Some of the adversities we study

NOTE Confidence: 0.860109156842105

 $00:09:58.650 \longrightarrow 00:09:59.595$ could be stressors,

NOTE Confidence: 0.860109156842105

 $00:09:59.600 \dashrightarrow 00:10:01.856$ some could be traumas and toxic.

NOTE Confidence: 0.860109156842105

 $00:10:01.860 \rightarrow 00:10:04.070$ Stress to me really differentiates

NOTE Confidence: 0.860109156842105

 $00:10:04.070 \rightarrow 00:10:06.280$ the context surrounding the stressors

NOTE Confidence: 0.860109156842105

 $00:10:06.343 \longrightarrow 00:10:07.079$ and traumas.

- NOTE Confidence: 0.860109156842105
- $00:10:07.080 \longrightarrow 00:10:08.598$ The kids are going through and
- NOTE Confidence: 0.860109156842105
- 00:10:08.598 00:10:10.330 whether or not they have buffers,
- NOTE Confidence: 0.860109156842105
- $00:10:10.330 \rightarrow 00:10:11.970$ mainly those protective adults
- NOTE Confidence: 0.860109156842105
- $00{:}10{:}11{.}970 \dashrightarrow 00{:}10{:}14{.}430$ who can help buffer those effects
- NOTE Confidence: 0.860109156842105
- $00{:}10{:}14.496 \dashrightarrow 00{:}10{:}16.286$ of those stressors for them.
- NOTE Confidence: 0.860109156842105
- $00:10:16.290 \longrightarrow 00:10:17.925$ So hopefully that's clarifying in
- NOTE Confidence: 0.860109156842105
- 00:10:17.925 --> 00:10:20.254 terms of just getting a better feel
- NOTE Confidence: 0.860109156842105
- $00{:}10{:}20{.}254 \dashrightarrow 00{:}10{:}22{.}150$ for how I think about adversity.
- NOTE Confidence: 0.860109156842105
- $00:10:22.150 \rightarrow 00:10:24.537$ So in terms of talking about identifying
- NOTE Confidence: 0.860109156842105
- $00:10:24.537 \rightarrow 00:10:26.290$ sensitive periods in development.
- NOTE Confidence: 0.860109156842105
- $00:10:26.290 \longrightarrow 00:10:28.516$ So one of the big questions that
- NOTE Confidence: 0.860109156842105
- $00:10:28.516 \longrightarrow 00:10:30.687$ I think exists for the field is,
- NOTE Confidence: 0.860109156842105
- 00:10:30.690 --> 00:10:31.336 you know,
- NOTE Confidence: 0.860109156842105
- $00{:}10{:}31{.}336 \dashrightarrow 00{:}10{:}33{.}274$ how does the timing of adversity
- NOTE Confidence: 0.860109156842105
- $00:10:33.274 \rightarrow 00:10:35.543$ shape risk for depression or any
- NOTE Confidence: 0.860109156842105

 $00:10:35.543 \rightarrow 00:10:37.099$ other adverse health outcome?

NOTE Confidence: 0.860109156842105

 $00{:}10{:}37{.}100 \dashrightarrow 00{:}10{:}38{.}619$ And if you turn to the literature,

NOTE Confidence: 0.860109156842105

 $00:10:38.620 \longrightarrow 00:10:40.426$ you'll see that there's been a lot

NOTE Confidence: 0.860109156842105

 $00:10:40.426 \longrightarrow 00:10:41.748$ of different theories that have

NOTE Confidence: 0.860109156842105

 $00{:}10{:}41.748 \dashrightarrow 00{:}10{:}42.998$ been proposed on this topic.

NOTE Confidence: 0.860109156842105

00:10:43.000 - 00:10:45.816 So a basic model is an exposure model.

NOTE Confidence: 0.860109156842105

 $00:10:45.820 \rightarrow 00:10:48.022$ And this model simply states that

NOTE Confidence: 0.860109156842105

 $00:10:48.022 \longrightarrow 00:10:49.896$ people who've been exposed to

NOTE Confidence: 0.860109156842105

00:10:49.896 --> 00:10:51.948 adversity have an increased risk of

NOTE Confidence: 0.860109156842105

 $00{:}10{:}51{.}948 \dashrightarrow 00{:}10{:}53{.}761$ an adverse health outcome relative

NOTE Confidence: 0.860109156842105

00:10:53.761 -> 00:10:55.915 to people who are not exposed.

NOTE Confidence: 0.860109156842105

00:10:55.920 --> 00:10:57.828 There's also accumulation models,

NOTE Confidence: 0.860109156842105

 $00{:}10{:}57{.}828 \dashrightarrow 00{:}11{:}00{.}213$ and in its simplest presentation,

NOTE Confidence: 0.860109156842105

 $00:11:00.220 \longrightarrow 00:11:02.902$ I'm showing here a basic dose

NOTE Confidence: 0.860109156842105

 $00:11:02.902 \longrightarrow 00:11:03.796$ response relationship.

NOTE Confidence: 0.860109156842105

 $00:11:03.800 \longrightarrow 00:11:05.252$ So the more adversity,

- NOTE Confidence: 0.860109156842105
- $00{:}11{:}05{.}252 \dashrightarrow 00{:}11{:}07{.}430$ the more at risk you become.

NOTE Confidence: 0.886890448

 $00:11:07.430 \longrightarrow 00:11:08.990$ Now that could be exposure

NOTE Confidence: 0.886890448

 $00:11:08.990 \longrightarrow 00:11:10.550$ to the same type repeatedly,

NOTE Confidence: 0.886890448

 $00:11:10.550 \rightarrow 00:11:13.910$ or it could be different types of exposure.

NOTE Confidence: 0.886890448

00:11:13.910 --> 00:11:16.665 There's also recency models and

NOTE Confidence: 0.886890448

00:11:16.665 --> 00:11:18.544 recency models. Oops, sorry.

NOTE Confidence: 0.886890448

 $00:11:18.544 \rightarrow 00:11:20.866$ Recency models focus on the time

NOTE Confidence: 0.886890448

 $00:11:20.866 \longrightarrow 00:11:23.060$ since the onset of the event.

NOTE Confidence: 0.792361311666667

 $00{:}11{:}25{.}830 \dashrightarrow 00{:}11{:}30{.}268$ So a recency model says that your risk

NOTE Confidence: 0.792361311666667

 $00:11:30.268 \rightarrow 00:11:32.711$ of an adverse health outcome is greatest

NOTE Confidence: 0.792361311666667

 $00:11:32.711 \rightarrow 00:11:34.688$ shortly after you've been exposed,

NOTE Confidence: 0.7923613116666667

 $00{:}11{:}34.690 \dashrightarrow 00{:}11{:}37.525$ but then your risk decreases over time.

NOTE Confidence: 0.792361311666667

 $00{:}11{:}37{.}530 \dashrightarrow 00{:}11{:}39{.}118$ And then finally there's

NOTE Confidence: 0.792361311666667

 $00{:}11{:}39{.}118 \dashrightarrow 00{:}11{:}40{.}706$ a sensitive period model.

NOTE Confidence: 0.7923613116666667

 $00:11:40.710 \longrightarrow 00:11:42.822$ And a sensitive period model is

00:11:42.822 --> 00:11:44.331 really asking, are there specific

NOTE Confidence: 0.792361311666667

 $00:11:44.331 \longrightarrow 00:11:46.200$ age stages in the course of the

NOTE Confidence: 0.792361311666667

 $00:11:46.254 \rightarrow 00:11:48.229$ lifespan when our experience matters?

NOTE Confidence: 0.792361311666667

 $00:11:48.230 \rightarrow 00:11:51.990$ More so over the years on and very

NOTE Confidence: 0.792361311666667

00:11:51.990 --> 00:11:54.809 symbolically marking my 100th publication.

NOTE Confidence: 0.792361311666667

 $00{:}11{:}54{.}810 \dashrightarrow 00{:}11{:}56{.}162$ I love the symbolism.

NOTE Confidence: 0.7923613116666667

00:11:56.162 --> 00:11:57.816 Of that, we've spent, you know,

NOTE Confidence: 0.792361311666667

 $00:11:57.816 \rightarrow 00:12:00.070$ my group has spent a lot of time over

NOTE Confidence: 0.792361311666667

 $00{:}12{:}00{.}070 \dashrightarrow 00{:}12{:}02{.}175$ the last however many years to try to

NOTE Confidence: 0.792361311666667

 $00:12:02.175 \rightarrow 00:12:03.865$ disentangle which of these different

NOTE Confidence: 0.792361311666667

 $00{:}12{:}03.865 \dashrightarrow 00{:}12{:}06.000$ theories might best apply to our data.

NOTE Confidence: 0.7923613116666667

 $00{:}12{:}06.000 \dashrightarrow 00{:}12{:}08.191$ And the reason that we've been doing that

NOTE Confidence: 0.7923613116666667

 $00:12:08.191 \longrightarrow 00:12:10.347$ is because we think it has important

NOTE Confidence: 0.792361311666667

 $00:12:10.347 \rightarrow 00:12:11.928$ implications for how we intervene.

NOTE Confidence: 0.7923613116666667

 $00{:}12{:}11{.}930 \dashrightarrow 00{:}12{:}13{.}778$ So if the data we find are

NOTE Confidence: 0.792361311666667

 $00:12:13.778 \rightarrow 00:12:15.519$ consistent with an exposure model,

- NOTE Confidence: 0.792361311666667
- $00:12:15.520 \longrightarrow 00:12:17.040$ that suggests that we can
- NOTE Confidence: 0.792361311666667
- $00:12:17.040 \longrightarrow 00:12:18.256$ intervene at any time,
- NOTE Confidence: 0.792361311666667
- $00:12:18.260 \longrightarrow 00:12:19.972$ and it suggests that our goal is to
- NOTE Confidence: 0.7923613116666667
- $00:12:19.972 \longrightarrow 00:12:21.739$ try to partition the population,
- NOTE Confidence: 0.7923613116666667
- 00:12:21.740 --> 00:12:22.583 so to speak,
- NOTE Confidence: 0.792361311666667
- $00{:}12{:}22{.}583 \dashrightarrow 00{:}12{:}24{.}550$ in terms of people who've been exposed
- NOTE Confidence: 0.7923613116666667
- $00:12:24.612 \rightarrow 00:12:26.490$ in those who haven't been exposed.
- NOTE Confidence: 0.792361311666667
- $00:12:26.490 \longrightarrow 00:12:28.338$ If our data are consistent with
- NOTE Confidence: 0.7923613116666667
- 00:12:28.338 --> 00:12:29.262 an accumulation model,
- NOTE Confidence: 0.792361311666667
- $00:12:29.270 \longrightarrow 00:12:31.702$ then that points us to want to try
- NOTE Confidence: 0.792361311666667
- $00:12:31.702 \longrightarrow 00:12:34.223$ to intervene early before people are
- NOTE Confidence: 0.7923613116666667
- $00{:}12{:}34{.}223 \dashrightarrow 00{:}12{:}36{.}067$ accruing those adverse exposures.
- NOTE Confidence: 0.7923613116666667
- 00:12:36.070 --> 00:12:38.330 If it's a recency model,
- NOTE Confidence: 0.792361311666667
- $00{:}12{:}38{.}330 \dashrightarrow 00{:}12{:}40{.}395$ it suggests that we want to intervene
- NOTE Confidence: 0.7923613116666667
- 00:12:40.395 --> 00:12:40.690 quickly,
- NOTE Confidence: 0.7923613116666667

 $00:12:40.690 \rightarrow 00:12:42.909$ but it might also suggest that maybe

NOTE Confidence: 0.792361311666667

 $00{:}12{:}42{.}909 \dashrightarrow 00{:}12{:}44{.}490$ doing nothing would be OK too.

NOTE Confidence: 0.792361311666667

 $00{:}12{:}44.490 \dashrightarrow 00{:}12{:}46.680$ These symptoms might naturally resolve

NOTE Confidence: 0.792361311666667

00:12:46.680 --> 00:12:48.870 or risk would resolve overtime,

NOTE Confidence: 0.792361311666667

00:12:48.870 --> 00:12:50.310 and if it's a sensitive period,

NOTE Confidence: 0.792361311666667

 $00{:}12{:}50{.}310 \dashrightarrow 00{:}12{:}52{.}362$ model suggests that we want to

NOTE Confidence: 0.792361311666667

00:12:52.362 --> 00:12:54.250 intervene during or maybe shortly

NOTE Confidence: 0.792361311666667

 $00:12:54.250 \longrightarrow 00:12:56.505$ before those time periods of

NOTE Confidence: 0.792361311666667

00:12:56.505 --> 00:12:57.407 increased sensitivity.

NOTE Confidence: 0.792361311666667

 $00:12:57.410 \longrightarrow 00:12:59.384$ So we think about sensitive periods

NOTE Confidence: 0.792361311666667

 $00{:}12{:}59{.}384 \dashrightarrow 00{:}13{:}02{.}049$ as being both high risk periods or

NOTE Confidence: 0.7923613116666667

 $00:13:02.049 \rightarrow 00:13:04.184$ windows of vulnerability when adverse

NOTE Confidence: 0.7923613116666667

 $00:13:04.184 \rightarrow 00:13:06.140$ life experiences are more harmful.

NOTE Confidence: 0.792361311666667

 $00{:}13{:}06{.}140 \dashrightarrow 00{:}13{:}08{.}012$ But they could also be windows

NOTE Confidence: 0.7923613116666667

00:13:08.012 --> 00:13:08.636 of opportunity,

NOTE Confidence: 0.792361311666667

 $00:13:08.640 \rightarrow 00:13:10.506$ when enriching interventions

- NOTE Confidence: 0.792361311666667
- $00:13:10.506 \rightarrow 00:13:12.994$ could yield greater impact.
- NOTE Confidence: 0.792361311666667
- 00:13:13.000 --> 00:13:14.980 So we've been working over the
- NOTE Confidence: 0.792361311666667
- $00:13:14.980 \longrightarrow 00:13:17.413$ last several years to try to bring
- NOTE Confidence: 0.7923613116666667
- $00{:}13{:}17{.}413 \dashrightarrow 00{:}13{:}19{.}158$ more research evidence to this.
- NOTE Confidence: 0.7923613116666667
- $00{:}13{:}19{.}160 \dashrightarrow 00{:}13{:}22{.}144$ And my goal ultimately is to try to
- NOTE Confidence: 0.792361311666667
- $00:13:22.144 \rightarrow 00:13:23.678$ enable policymakers and clinicians
- NOTE Confidence: 0.7923613116666667
- $00:13:23.678 \rightarrow 00:13:25.814$ to have better data to act,
- NOTE Confidence: 0.792361311666667
- $00:13:25.820 \longrightarrow 00:13:27.605$ to know not just what to what
- NOTE Confidence: 0.7923613116666667
- $00:13:27.605 \longrightarrow 00:13:29.120$ to do to intervene,
- NOTE Confidence: 0.792361311666667
- $00:13:29.120 \longrightarrow 00:13:31.224$ but specifically when and to try to do
- NOTE Confidence: 0.792361311666667
- $00:13:31.224 \rightarrow 00:13:33.408$ that on a high resolution timescale.
- NOTE Confidence: 0.792361311666667
- $00:13:33.410 \longrightarrow 00:13:34.974$ So in other words,
- NOTE Confidence: 0.792361311666667
- $00{:}13{:}34{.}974 \dashrightarrow 00{:}13{:}37{.}320$ let's get more granular than just
- NOTE Confidence: 0.792361311666667
- $00{:}13{:}37{.}397 \dashrightarrow 00{:}13{:}39{.}875$ saying early or saying 1000 days.
- NOTE Confidence: 0.792361311666667
- $00:13:39.880 \longrightarrow 00:13:42.520$ The 1st 1000 days rather.
- NOTE Confidence: 0.792361311666667

 $00:13:42.520 \longrightarrow 00:13:45.175$ So I want to tell you a little bit

NOTE Confidence: 0.792361311666667

00:13:45.175 --> 00:13:47.600 more about the the first work that

NOTE Confidence: 0.792361311666667

 $00:13:47.600 \rightarrow 00:13:50.624$ we did this was back when I was a NOTE Confidence: 0.792361311666667

 $00{:}13{:}50{.}624 \dashrightarrow 00{:}13{:}52{.}740$ postdoc and was a data set called

NOTE Confidence: 0.792361311666667

 $00{:}13{:}52{.}740 \dashrightarrow 00{:}13{:}54{.}777$ AD Health that's now following it

NOTE Confidence: 0.792361311666667

00:13:54.777 --> 00:13:56.702 started studying kids when they

NOTE Confidence: 0.792361311666667

 $00:13:56.702 \longrightarrow 00:13:58.380$ were in middle school,

NOTE Confidence: 0.792361311666667

 $00:13:58.380 \rightarrow 00:14:00.480$ and they've now been following

NOTE Confidence: 0.792361311666667

 $00:14:00.480 \longrightarrow 00:14:01.740$ them through adulthood.

NOTE Confidence: 0.7923613116666667

 $00:14:01.740 \longrightarrow 00:14:03.574$ And the way that the data were

NOTE Confidence: 0.7923613116666667

00:14:03.574 --> 00:14:05.632 recorded in AD health gave us the

NOTE Confidence: 0.7923613116666667

 $00{:}14{:}05{.}632 \dashrightarrow 00{:}14{:}07{.}450$ chance to ask this question about

NOTE Confidence: 0.7923613116666667

 $00:14:07.509 \longrightarrow 00:14:08.977$ sensitive periods because people

NOTE Confidence: 0.792361311666667

00:14:08.977 --> 00:14:11.179 were asked were you exposed to

NOTE Confidence: 0.792361311666667

 $00:14:11.180 \rightarrow 00:14:13.130$ physical abuse and sexual abuse?

NOTE Confidence: 0.792361311666667

 $00:14:13.130 \longrightarrow 00:14:13.982$ And if so,

- NOTE Confidence: 0.792361311666667
- $00:14:13.982 \rightarrow 00:14:16.630$ how old were you when that first happened?
- NOTE Confidence: 0.792361311666667
- $00:14:16.630 \longrightarrow 00:14:16.924$ Now,
- NOTE Confidence: 0.792361311666667
- 00:14:16.924 --> 00:14:18.688 I know there's measurement challenges here,
- NOTE Confidence: 0.792361311666667
- $00:14:18.690 \rightarrow 00:14:20.450$ and I'm going to come back to that.
- NOTE Confidence: 0.859872807058824
- 00:14:20.450 --> 00:14:22.162 But just to give you a sort of
- NOTE Confidence: 0.859872807058824
- $00:14:22.162 \rightarrow 00:14:23.723$ intuition for how we've approached
- NOTE Confidence: 0.859872807058824
- $00{:}14{:}23.723 \dashrightarrow 00{:}14{:}25.167$ these sensitive period studies.
- NOTE Confidence: 0.859872807058824
- $00:14:25.170 \longrightarrow 00:14:27.725$ So we code people based on whether
- NOTE Confidence: 0.859872807058824
- 00:14:27.725 --> 00:14:29.862 they've been exposed to adversity
- NOTE Confidence: 0.859872807058824
- $00:14:29.862 \rightarrow 00:14:31.810$ during these different periods.
- NOTE Confidence: 0.859872807058824
- $00:14:31.810 \longrightarrow 00:14:34.154$ And what we end up finding is that
- NOTE Confidence: 0.859872807058824
- $00:14:34.154 \rightarrow 00:14:36.728$ compared to people who were never exposed,
- NOTE Confidence: 0.859872807058824
- $00:14:36.730 \longrightarrow 00:14:39.136$ kids who were exposed to physical
- NOTE Confidence: 0.859872807058824
- $00{:}14{:}39{.}136 \dashrightarrow 00{:}14{:}41{.}223$ abuse generally across the board
- NOTE Confidence: 0.859872807058824
- $00{:}14{:}41{.}223 \dashrightarrow 00{:}14{:}43{.}689$ have an increased risk of depression.
- NOTE Confidence: 0.859872807058824

00:14:43.690 --> 00:14:46.246 Compared to kids who are unexposed,

NOTE Confidence: 0.859872807058824

 $00{:}14{:}46{.}250 \dashrightarrow 00{:}14{:}47{.}916$ but when we start to compare kids

NOTE Confidence: 0.859872807058824

 $00:14:47.916 \rightarrow 00:14:49.987$ based on the timing of their exposure,

NOTE Confidence: 0.859872807058824

 $00:14:49.990 \rightarrow 00:14:52.307$ we do see some within group differences.

NOTE Confidence: 0.859872807058824

 $00{:}14{:}52{.}310 \dashrightarrow 00{:}14{:}54{.}078$ So here we see that kids who are

NOTE Confidence: 0.859872807058824

00:14:54.078 --> 00:14:55.749 exposed as preschoolers for the first

NOTE Confidence: 0.859872807058824

 $00:14:55.749 \rightarrow 00:14:57.884$ time have an increased risk of high

NOTE Confidence: 0.859872807058824

 $00:14:57.884 \rightarrow 00:14:59.479$ depressive symptoms compared to kids

NOTE Confidence: 0.859872807058824

 $00{:}14{:}59{.}479 \dashrightarrow 00{:}15{:}02{.}272$ who were exposed for the first time in

NOTE Confidence: 0.859872807058824

 $00:15:02.272 \rightarrow 00:15:04.730$ adolescence and similarly for sexual abuse.

NOTE Confidence: 0.859872807058824

 $00{:}15{:}04.730 \dashrightarrow 00{:}15{:}06.615$ We find generally across the

NOTE Confidence: 0.859872807058824

00:15:06.615 --> 00:15:08.123 board this increased risk,

NOTE Confidence: 0.859872807058824

 $00:15:08.130 \longrightarrow 00:15:10.140$ but here too these potential

NOTE Confidence: 0.859872807058824

 $00{:}15{:}10{.}140 \dashrightarrow 00{:}15{:}12{.}150$ sensitive periods this was shifted

NOTE Confidence: 0.859872807058824

 $00:15:12.222 \rightarrow 00:15:14.455$ to be latency or school age period.

NOTE Confidence: 0.859872807058824

 $00:15:14.460 \longrightarrow 00:15:17.320$ Relative to preschool or relative

- NOTE Confidence: 0.859872807058824
- $00:15:17.320 \longrightarrow 00:15:19.608$ to the prepubertal period?
- NOTE Confidence: 0.859872807058824
- $00{:}15{:}19.610 \dashrightarrow 00{:}15{:}21.775$ Over the years we've searched
- NOTE Confidence: 0.859872807058824
- 00:15:21.775 00:15:23.507 broadly for sensitive periods,
- NOTE Confidence: 0.859872807058824
- $00:15:23.510 \longrightarrow 00:15:25.094$ trying to see the level where
- NOTE Confidence: 0.859872807058824
- $00{:}15{:}25{.}094 \dashrightarrow 00{:}15{:}25{.}886$ they might operate.
- NOTE Confidence: 0.859872807058824
- $00:15:25.890 \longrightarrow 00:15:27.661$ So the earliest work that we did
- NOTE Confidence: 0.859872807058824
- 00:15:27.661 --> 00:15:29.170 was looking at childhood adversity
- NOTE Confidence: 0.859872807058824
- $00:15:29.170 \longrightarrow 00:15:30.895$ in relation to depression and
- NOTE Confidence: 0.859872807058824
- $00{:}15{:}30.895 \dashrightarrow 00{:}15{:}32.850$ other forms of psychopathology.
- NOTE Confidence: 0.859872807058824
- $00:15:32.850 \longrightarrow 00:15:34.070$ But then we started,
- NOTE Confidence: 0.859872807058824
- $00:15:34.070 \longrightarrow 00:15:35.900$ this is really based on my
- NOTE Confidence: 0.859872807058824
- $00:15:35.967 \longrightarrow 00:15:37.329$ interest in genetics,
- NOTE Confidence: 0.859872807058824
- $00{:}15{:}37{.}330 \dashrightarrow 00{:}15{:}39{.}470$ starting to think about these
- NOTE Confidence: 0.859872807058824
- $00{:}15{:}39{.}470 \dashrightarrow 00{:}15{:}40{.}326$ intermediate phenotypes.
- NOTE Confidence: 0.859872807058824
- $00:15:40.330 \longrightarrow 00:15:41.790$ So in other words,
- NOTE Confidence: 0.859872807058824

 $00{:}15{:}41.790 \dashrightarrow 00{:}15{:}44.418$ are there these measures that we can

NOTE Confidence: 0.859872807058824

 $00:15:44.418 \rightarrow 00:15:47.282$ get that are maybe more proximal to risk

NOTE Confidence: 0.859872807058824

 $00:15:47.282 \rightarrow 00:15:49.868$ based on their timing of occurrence?

NOTE Confidence: 0.859872807058824

 $00:15:49.870 \longrightarrow 00:15:50.992$ In other words,

NOTE Confidence: 0.859872807058824

 $00{:}15{:}50{.}992 \dashrightarrow 00{:}15{:}52{.}862$ these measures that are may be

NOTE Confidence: 0.859872807058824

 $00{:}15{:}52{.}862 \dashrightarrow 00{:}15{:}55{.}069$ capturing more of the biology of

NOTE Confidence: 0.859872807058824

 $00{:}15{:}55{.}069 \dashrightarrow 00{:}15{:}56{.}814$ the the short-term effects of

NOTE Confidence: 0.859872807058824

 $00:15:56.814 \rightarrow 00:15:58.660$ exposure to childhood adversity.

NOTE Confidence: 0.859872807058824

 $00:15:58.660 \rightarrow 00:16:00.496$ And maybe these are the level,

NOTE Confidence: 0.859872807058824

 $00:16:00.500 \rightarrow 00:16:02.788$ this is the level where we might see

NOTE Confidence: 0.859872807058824

 $00{:}16{:}02.788 \dashrightarrow 00{:}16{:}05.237$ more signal and might be more readily

NOTE Confidence: 0.859872807058824

 $00:16:05.237 \rightarrow 00:16:07.052$ able to identify sensitive periods.

NOTE Confidence: 0.859872807058824

 $00:16:07.060 \longrightarrow 00:16:09.391$ So we've looked at a number of

NOTE Confidence: 0.859872807058824

00:16:09.391 --> 00:16:10.390 different intermediate phenotypes

NOTE Confidence: 0.859872807058824

 $00:16:10.446 \rightarrow 00:16:12.266$ and I'll tell you more about those.

NOTE Confidence: 0.859872807058824

00:16:12.270 --> 00:16:14.148 You know everything from how kids

- NOTE Confidence: 0.859872807058824
- $00:16:14.148 \longrightarrow 00:16:15.906$ cope with stress to executive
- NOTE Confidence: 0.859872807058824
- 00:16:15.906 --> 00:16:17.658 function and more recently,
- NOTE Confidence: 0.859872807058824
- 00:16:17.660 --> 00:16:20.860 molecular targets.
- NOTE Confidence: 0.859872807058824
- 00:16:20.860 --> 00:16:21.838 Throughout this work,
- NOTE Confidence: 0.859872807058824
- $00{:}16{:}21.838 \dashrightarrow 00{:}16{:}24.120$ we've also been focused on trying to
- NOTE Confidence: 0.859872807058824
- $00:16:24.185 \rightarrow 00:16:26.435$ develop and apply better analytic tools,
- NOTE Confidence: 0.859872807058824
- 00:16:26.440 --> 00:16:27.952 particularly to analyze longitudinal
- NOTE Confidence: 0.859872807058824
- $00{:}16{:}27{.}952 \dashrightarrow 00{:}16{:}30{.}220$ data where you have these repeated
- NOTE Confidence: 0.859872807058824
- $00{:}16{:}30{.}277 \dashrightarrow 00{:}16{:}32{.}287$ measures of adversity and where
- NOTE Confidence: 0.859872807058824
- $00:16:32.287 \rightarrow 00:16:33.895$ sometimes they're highly correlated.
- NOTE Confidence: 0.859872807058824
- $00:16:33.900 \longrightarrow 00:16:36.007$ So this is an approach that we've
- NOTE Confidence: 0.859872807058824
- 00:16:36.007 --> 00:16:37.990 been working on with my colleague
- NOTE Confidence: 0.859872807058824
- $00{:}16{:}37{.}990 \dashrightarrow 00{:}16{:}40{.}018$ Andrew Smith out of the University
- NOTE Confidence: 0.859872807058824
- $00:16:40.018 \rightarrow 00:16:42.017$ of West of England in the UK.
- NOTE Confidence: 0.859872807058824
- $00:16:42.020 \longrightarrow 00:16:43.805$ So it's called the structured
- NOTE Confidence: 0.859872807058824

00:16:43.805 --> 00:16:45.233 life course modeling approach,

NOTE Confidence: 0.859872807058824

 $00{:}16{:}45{.}240 \dashrightarrow 00{:}16{:}48{.}198$ or the slick comma and slick

NOTE Confidence: 0.859872807058824

 $00:16:48.198 \longrightarrow 00:16:50.170$ comma is incredibly cool.

NOTE Confidence: 0.859872807058824

 $00:16:50.170 \longrightarrow 00:16:52.942$ It works really well when you

NOTE Confidence: 0.859872807058824

 $00{:}16{:}52{.}942 \dashrightarrow 00{:}16{:}54{.}790$ have repeated measures data.

NOTE Confidence: 0.859872807058824

 $00{:}16{:}54{.}790 \dashrightarrow 00{:}16{:}57{.}517$ It can work when you have measures that are

NOTE Confidence: 0.859872807058824

 $00:16:57.517 \rightarrow 00:16:59.688$ measured close in time or more distally,

NOTE Confidence: 0.859872807058824

 $00:16:59.690 \longrightarrow 00:17:00.264$ in time.

NOTE Confidence: 0.859872807058824

 $00{:}17{:}00{.}264 \dashrightarrow 00{:}17{:}02{.}560$ What I also really like about it is

NOTE Confidence: 0.859872807058824

 $00{:}17{:}02.633 \dashrightarrow 00{:}17{:}05.089$ that it forces you to have ideas up

NOTE Confidence: 0.859872807058824

 $00{:}17{:}05{.}089 \dashrightarrow 00{:}17{:}07{.}669$ front about what you think you might see.

NOTE Confidence: 0.859872807058824

 $00{:}17{:}07.670 \dashrightarrow 00{:}17{:}10.190$ So it's not just a a fishing expedition,

NOTE Confidence: 0.859872807058824

 $00{:}17{:}10{.}190 \dashrightarrow 00{:}17{:}12{.}234$ but you have to have some idea

NOTE Confidence: 0.859872807058824

 $00{:}17{:}12.234 \dashrightarrow 00{:}17{:}14.350$ about what you think might be the

NOTE Confidence: 0.859872807058824

 $00:17:14.350 \longrightarrow 00:17:16.971$ theory at play so that you can then

NOTE Confidence: 0.859872807058824

 $00:17:16.971 \rightarrow 00:17:18.966$ encode your theories into testable

NOTE Confidence: 0.791182593333333

 $00:17:18.970 \longrightarrow 00:17:21.310$ hypotheses. And So what the what?

NOTE Confidence: 0.791182593333333

 $00:17:21.310 \longrightarrow 00:17:23.518$ The way that it works is that it

NOTE Confidence: 0.791182593333333

 $00:17:23.518 \rightarrow 00:17:25.098$ essentially allows you to identify

NOTE Confidence: 0.791182593333333

 $00{:}17{:}25.098 \dashrightarrow 00{:}17{:}26.718$ from the combination of theories

NOTE Confidence: 0.791182593333333

 $00{:}17{:}26.718 \dashrightarrow 00{:}17{:}28.619$ that you've identified beforehand,

NOTE Confidence: 0.791182593333333

 $00{:}17{:}28.620 \dashrightarrow 00{:}17{:}30.840$ which set explain the most amount

NOTE Confidence: 0.791182593333333

 $00:17:30.840 \longrightarrow 00:17:32.940$ of variation in your outcome.

NOTE Confidence: 0.791182593333333

 $00{:}17{:}32{.}940 \dashrightarrow 00{:}17{:}35{.}047$ So it basically works in three stages.

NOTE Confidence: 0.791182593333333

 $00{:}17{:}35{.}050 \dashrightarrow 00{:}17{:}37{.}174$ So the first thing you do is you take

NOTE Confidence: 0.791182593333333

 $00{:}17{:}37{.}174 \dashrightarrow 00{:}17{:}39{.}090$ all of your theoretical models and

NOTE Confidence: 0.791182593333333

 $00{:}17{:}39.090 \dashrightarrow 00{:}17{:}41.399$ then you encode them into a variable.

NOTE Confidence: 0.791182593333333

00:17:41.400 --> 00:17:43.068 So, for example, if you're going

NOTE Confidence: 0.791182593333333

 $00{:}17{:}43.068 \dashrightarrow 00{:}17{:}44.939$ to test a sensitive period model,

NOTE Confidence: 0.791182593333333

00:17:44.940 --> 00:17:47.915 you code people based on being exposed

NOTE Confidence: 0.791182593333333

 $00{:}17{:}47{.}915 \dashrightarrow 00{:}17{:}50{.}970$ during that time period versus outside.

00:17:50.970 --> 00:17:52.140 An accumulation model,

NOTE Confidence: 0.791182593333333

00:17:52.140 --> 00:17:54.090 you're coding the number of

NOTE Confidence: 0.791182593333333

 $00:17:54.090 \rightarrow 00:17:56.087$ exposures and so on and so forth.

NOTE Confidence: 0.791182593333333

 $00:17:56.090 \rightarrow 00:17:58.410$ And these aren't the only life course models,

NOTE Confidence: 0.791182593333333

 $00{:}17{:}58{.}410 \dashrightarrow 00{:}17{:}59{.}509$ I should say, that you could test.

NOTE Confidence: 0.791182593333333

 $00{:}17{:}59{.}510$ --> $00{:}18{:}01{.}687$ But there's other kinds of models too,

NOTE Confidence: 0.791182593333333

 $00{:}18{:}01.690 \dashrightarrow 00{:}18{:}02.710$ like mobility models.

NOTE Confidence: 0.791182593333333

 $00:18:02.710 \longrightarrow 00:18:05.090$ So where a kid might have social

NOTE Confidence: 0.791182593333333

 $00{:}18{:}05{.}161 \dashrightarrow 00{:}18{:}07{.}275$ support and then they don't at the

NOTE Confidence: 0.791182593333333

 $00{:}18{:}07{.}275 \dashrightarrow 00{:}18{:}09{.}827$ next time and then it comes back again.

NOTE Confidence: 0.791182593333333

 $00:18:09.830 \longrightarrow 00:18:11.765$ And So what you end up doing is you

NOTE Confidence: 0.791182593333333

 $00{:}18{:}11.765 \dashrightarrow 00{:}18{:}13.678$ take all of these variables and then

NOTE Confidence: 0.791182593333333

 $00:18:13.678 \rightarrow 00:18:15.849$ you bring them into a regression model.

NOTE Confidence: 0.791182593333333

 $00:18:15.850 \longrightarrow 00:18:17.509$ And the way the regression model is

NOTE Confidence: 0.791182593333333

 $00:18:17.509 \rightarrow 00:18:19.351$ working is it's in a very sequential

NOTE Confidence: 0.791182593333333

 $00:18:19.351 \rightarrow 00:18:20.696$ fashion where you're trying to.
- NOTE Confidence: 0.791182593333333
- $00:18:20.700 \rightarrow 00:18:22.800$ Identify the amount of variation
- NOTE Confidence: 0.791182593333333
- 00:18:22.800 00:18:25.404 in your outcome or R-squared that
- NOTE Confidence: 0.791182593333333
- $00:18:25.404 \rightarrow 00:18:27.569$ is explained by the greatest
- NOTE Confidence: 0.791182593333333
- $00:18:27.569 \longrightarrow 00:18:29.301$ combination of variables and.
- NOTE Confidence: 0.791182593333333
- $00:18:29.310 \rightarrow 00:18:31.582$ So what you can see in this example
- NOTE Confidence: 0.791182593333333
- $00{:}18{:}31{.}582 \dashrightarrow 00{:}18{:}33{.}683$ is where the model keeps fitting
- NOTE Confidence: 0.791182593333333
- $00:18:33.683 \rightarrow 00:18:35.885$ until it gets to this combination
- NOTE Confidence: 0.791182593333333
- $00{:}18{:}35{.}959 \dashrightarrow 00{:}18{:}38{.}024$ of both accumulation and exposure
- NOTE Confidence: 0.791182593333333
- $00{:}18{:}38{.}024 \dashrightarrow 00{:}18{:}40{.}089$ during that third time period.
- NOTE Confidence: 0.791182593333333
- $00{:}18{:}40.090 \dashrightarrow 00{:}18{:}42.061$ And So what you're able to also do is
- NOTE Confidence: 0.791182593333333
- $00:18:42.061 \rightarrow 00:18:43.950$ you can look at these elbow plots,
- NOTE Confidence: 0.791182593333333
- $00:18:43.950 \rightarrow 00:18:46.020$ which is what I'm showing here in the middle,
- NOTE Confidence: 0.791182593333333
- $00:18:46.020 \longrightarrow 00:18:49.122$ but then you can also evaluate
- NOTE Confidence: 0.791182593333333
- $00:18:49.122 \longrightarrow 00:18:50.894$ fit quantitatively using post
- NOTE Confidence: 0.791182593333333
- $00:18:50.894 \rightarrow 00:18:51.628$ selective inference.
- NOTE Confidence: 0.791182593333333

 $00:18:51.628 \longrightarrow 00:18:54.196$ And so we've used the slick law

NOTE Confidence: 0.791182593333333

 $00{:}18{:}54{.}196 \dashrightarrow 00{:}18{:}56{.}324$ over the years and and also other

NOTE Confidence: 0.791182593333333

00:18:56.324 --> 00:18:58.059 analysis to look at you know,

NOTE Confidence: 0.791182593333333

00:18:58.060 -> 00:18:58.670 psychopathologies,

NOTE Confidence: 0.791182593333333

00:18:58.670 --> 00:18:59.890 suicide risk,

NOTE Confidence: 0.791182593333333

 $00{:}18{:}59{.}890 \dashrightarrow 00{:}19{:}03{.}550$ sleep and and other more intermediate

NOTE Confidence: 0.791182593333333

00:19:03.550 -> 00:19:04.160 phenotypes.

NOTE Confidence: 0.791182593333333

 $00{:}19{:}04.160 \dashrightarrow 00{:}19{:}06.320$ I want to tell you more about the

NOTE Confidence: 0.791182593333333

 $00{:}19{:}06{.}320 \dashrightarrow 00{:}19{:}08{.}306$ work that we've been doing where

NOTE Confidence: 0.791182593333333

 $00:19:08.306 \longrightarrow 00:19:10.308$ we've been engaged in the most

NOTE Confidence: 0.791182593333333

 $00{:}19{:}10{.}308 \dashrightarrow 00{:}19{:}12{.}804$ work so far and that's related to

NOTE Confidence: 0.791182593333333

 $00:19:12.804 \rightarrow 00:19:14.640$ DNA methylation and epigenetics.

NOTE Confidence: 0.791182593333333

 $00{:}19{:}14.640 \dashrightarrow 00{:}19{:}17.328$ So these are chemical tags that are

NOTE Confidence: 0.791182593333333

 $00{:}19{:}17{.}328 \dashrightarrow 00{:}19{:}19{.}380$ essentially added to your genome.

NOTE Confidence: 0.791182593333333

 $00:19:19.380 \longrightarrow 00:19:22.754$ They don't change how your DNA sequence.

NOTE Confidence: 0.791182593333333

 $00:19:22.760 \longrightarrow 00:19:24.590$ Is is shaped, but they change.

 $00:19:24.590 \rightarrow 00:19:26.870$ They have the potential to change

NOTE Confidence: 0.791182593333333

 $00:19:26.870 \longrightarrow 00:19:28.390$ how your genes function.

NOTE Confidence: 0.791182593333333

 $00:19:28.390 \rightarrow 00:19:30.718$ So they're one pathway through which

NOTE Confidence: 0.791182593333333

 $00:19:30.718 \rightarrow 00:19:32.862$ adversity might end up affecting

NOTE Confidence: 0.791182593333333

 $00:19:32.862 \rightarrow 00:19:35.964$ depression and other adverse health outcomes.

NOTE Confidence: 0.791182593333333

 $00{:}19{:}35{.}970 \dashrightarrow 00{:}19{:}38{.}450$ So one of the main studies that we've

NOTE Confidence: 0.791182593333333

 $00:19:38.450 \rightarrow 00:19:41.265$ been using for this is a study called alpac,

NOTE Confidence: 0.791182593333333

 $00:19:41.270 \longrightarrow 00:19:42.754$ where the Avon Longitudinal

NOTE Confidence: 0.791182593333333

00:19:42.754 --> 00:19:44.609 Study of Parents and Children,

NOTE Confidence: 0.791182593333333

 $00:19:44.610 \longrightarrow 00:19:45.996$ which for any of you who might

NOTE Confidence: 0.791182593333333

 $00:19:45.996 \longrightarrow 00:19:47.049$ be shopping a data set,

NOTE Confidence: 0.791182593333333

 $00{:}19{:}47.050 \dashrightarrow 00{:}19{:}49.626$ is a wonderful data set they have.

NOTE Confidence: 0.791182593333333

 $00{:}19{:}49{.}630 \dashrightarrow 00{:}19{:}51{.}598$ It's a birth cohort and the kids are,

NOTE Confidence: 0.791182593333333

 $00{:}19{:}51.600 \dashrightarrow 00{:}19{:}52.866$ the kids are now in their.

NOTE Confidence: 0.791182593333333

 $00{:}19{:}52.870 \dashrightarrow 00{:}19{:}56.758$ 30 So there's you know 30 years of data.

 $00:19:56.760 \longrightarrow 00:19:59.420$ They also collected as part of the

NOTE Confidence: 0.791182593333333

 $00{:}19{:}59{.}420 \dashrightarrow 00{:}20{:}02{.}030$ sub sample about 1000 mother child

NOTE Confidence: 0.791182593333333

 $00:20:02.030 \dashrightarrow 00:20:04.355$ pairs with DNA methylation data.

NOTE Confidence: 0.791182593333333

 $00:20:04.360 \longrightarrow 00:20:06.292$ And so that was what we ended

NOTE Confidence: 0.791182593333333

 $00:20:06.292 \longrightarrow 00:20:07.120$ up analyzing here.

NOTE Confidence: 0.791182593333333

 $00{:}20{:}07{.}120 \dashrightarrow 00{:}20{:}09{.}040$ So we had repeated measures of

NOTE Confidence: 0.791182593333333

 $00:20:09.040 \longrightarrow 00:20:10.320$ exposure to different types

NOTE Confidence: 0.8950420525

 $00:20:10.381 \rightarrow 00:20:12.612$ of adversity, things that were happening

NOTE Confidence: 0.8950420525

 $00{:}20{:}12.612 \dashrightarrow 00{:}20{:}15.289$ within the household up through markers of

NOTE Confidence: 0.8950420525

 $00{:}20{:}15{.}289 \dashrightarrow 00{:}20{:}17{.}353$ neighborhood disadvantage and we coded those

NOTE Confidence: 0.8950420525

 $00{:}20{:}17.353 \dashrightarrow 00{:}20{:}20{.}051$ based on the timing of occurrence and then

NOTE Confidence: 0.8950420525

 $00:20:20.051 \rightarrow 00:20:22.804$ we looked at these markers of adversity.

NOTE Confidence: 0.8950420525

00:20:22.804 --> 00:20:25.664 In relation to DNA methylation,

NOTE Confidence: 0.8950420525

 $00{:}20{:}25{.}670 \dashrightarrow 00{:}20{:}29{.}667$ a type of epigenetic modification at about

NOTE Confidence: 0.8950420525

 $00:20:29.670 \rightarrow 00:20:32.868$ 500,000 different sites across the epigenome.

NOTE Confidence: 0.8950420525

 $00:20:32.870 \rightarrow 00:20:35.246$ And so we applied the slickman and we asked,

 $00{:}20{:}35{.}250 \dashrightarrow 00{:}20{:}37{.}452$ you know, what's the best theoretical

NOTE Confidence: 0.8950420525

 $00:20:37.452 \rightarrow 00:20:39.670$ model that might explain the variation

NOTE Confidence: 0.8950420525

 $00:20:39.670 \rightarrow 00:20:42.064$ that we see in these epigenetic marks?

NOTE Confidence: 0.8950420525

00:20:42.070 --> 00:20:44.382 Is it accumulation, recency,

NOTE Confidence: 0.8950420525

 $00:20:44.382 \rightarrow 00:20:47.850$ sensitive period or maybe a combination?

NOTE Confidence: 0.8950420525

 $00{:}20{:}47.850 \dashrightarrow 00{:}20{:}49.635$ And what we did was we ended

NOTE Confidence: 0.8950420525

 $00:20:49.635 \longrightarrow 00:20:50.750$ up analyzing the data.

NOTE Confidence: 0.8950420525

00:20:50.750 -> 00:20:53.886 So on the X axis here is chromosome,

NOTE Confidence: 0.8950420525

 $00{:}20{:}53{.}890 \dashrightarrow 00{:}20{:}55{.}759$ on the Y axis is the negative

NOTE Confidence: 0.8950420525

 $00:20:55.759 \rightarrow 00:20:57.170 \log of the P value.$

NOTE Confidence: 0.8950420525

 $00{:}20{:}57{.}170 \dashrightarrow 00{:}21{:}00{.}205$ So it's basically the test

NOTE Confidence: 0.8950420525

 $00{:}21{:}00{.}205 \dashrightarrow 00{:}21{:}02{.}026$ of statistical significance.

NOTE Confidence: 0.8950420525

 $00{:}21{:}02{.}030 \dashrightarrow 00{:}21{:}03{.}590$ This is a Manhattan plot.

NOTE Confidence: 0.8950420525

00:21:03.590 --> 00:21:05.318 So ideally it looks like Manhattan

NOTE Confidence: 0.8950420525

 $00{:}21{:}05{.}318 \dashrightarrow 00{:}21{:}07{.}239$ where you see these sky scraper like

 $00:21:07.239 \dashrightarrow 00:21:09.029$ effects emerging from the data.

NOTE Confidence: 0.8950420525

00:21:09.030 --> 00:21:10.470 You don't want a Dutch plot,

NOTE Confidence: 0.8950420525

00:21:10.470 --> 00:21:12.622 you don't want it to look flat because

NOTE Confidence: 0.8950420525

 $00:21:12.622 \rightarrow 00:21:14.862$ these are basically regions where you're

NOTE Confidence: 0.8950420525

 $00:21:14.862 \longrightarrow 00:21:16.917$ seeing you know interesting signal.

NOTE Confidence: 0.8950420525

00:21:16.920 --> 00:21:21.470 So and then because we test literally

NOTE Confidence: 0.8950420525

00:21:21.470 --> 00:21:22.718 500,000 different associations,

NOTE Confidence: 0.8950420525

 $00:21:22.718 \longrightarrow 00:21:24.798$ we correct for that testing.

NOTE Confidence: 0.8950420525

00:21:24.800 --> 00:21:26.350 So anything that's considered to

NOTE Confidence: 0.8950420525

 $00{:}21{:}26.350 \dashrightarrow 00{:}21{:}28.503$ be above that line is considered

NOTE Confidence: 0.8950420525

 $00{:}21{:}28{.}503 \dashrightarrow 00{:}21{:}30{.}138$ epigenome wide significant.

NOTE Confidence: 0.8950420525

00:21:30.140 --> 00:21:32.908 And so we ended up finding 46 loci

NOTE Confidence: 0.8950420525

 $00:21:32.908 \rightarrow 00:21:34.940$ that were distributed throughout

NOTE Confidence: 0.8950420525

 $00{:}21{:}34{.}940 \dashrightarrow 00{:}21{:}38{.}085$ the epigenome as being potentially

NOTE Confidence: 0.8950420525

 $00:21:38.085 \longrightarrow 00:21:39.972$ impacted by adversity.

NOTE Confidence: 0.8950420525

 $00:21:39.980 \rightarrow 00:21:42.964$ And when we dug deeper into these results,

- NOTE Confidence: 0.8950420525
- $00:21:42.970 \longrightarrow 00:21:45.040$ what we ended up finding that
- NOTE Confidence: 0.8950420525
- $00:21:45.040 \longrightarrow 00:21:47.160$ more than half of the loci.
- NOTE Confidence: 0.8950420525
- 00:21:47.160 --> 00:21:48.720 We identified were influenced
- NOTE Confidence: 0.8950420525
- $00:21:48.720 \rightarrow 00:21:50.280$ by exposure to adversity,
- NOTE Confidence: 0.8950420525
- $00:21:50.280 \rightarrow 00:21:52.968$ specifically between ages three to five.
- NOTE Confidence: 0.8950420525
- $00{:}21{:}52{.}970 \dashrightarrow 00{:}21{:}54{.}930$ I actually didn't expect that we'd find
- NOTE Confidence: 0.8950420525
- $00:21:54.930 \rightarrow 00:21:56.848$ such strong evidence for sensitive periods.
- NOTE Confidence: 0.8950420525
- $00{:}21{:}56.850 \dashrightarrow 00{:}21{:}58.750$ I was thinking accumulation might
- NOTE Confidence: 0.8950420525
- $00:21:58.750 \longrightarrow 00:22:01.000$ be as important, but it wasn't.
- NOTE Confidence: 0.8950420525
- $00:22:01.000 \rightarrow 00:22:03.590$ Here we actually didn't identify any loci.
- NOTE Confidence: 0.8950420525
- $00{:}22{:}03.590 \dashrightarrow 00{:}22{:}05.515$ What's also interesting is that
- NOTE Confidence: 0.8950420525
- $00{:}22{:}05{.}515 \dashrightarrow 00{:}22{:}07{.}055$ these DNA differences weren't
- NOTE Confidence: 0.8950420525
- $00:22:07.055 \longrightarrow 00:22:08.428$ actually present at birth.
- NOTE Confidence: 0.8950420525
- $00:22:08.430 \longrightarrow 00:22:10.362$ So we looked at whether they happened
- NOTE Confidence: 0.8950420525
- $00:22:10.362 \longrightarrow 00:22:12.108$ in cord blood and they didn't.
- NOTE Confidence: 0.8950420525

00:22:12.110 --> 00:22:13.880 And we've been now working.

NOTE Confidence: 0.8950420525

 $00{:}22{:}13.880 \dashrightarrow 00{:}22{:}15.651$ We're probably about a month off or

NOTE Confidence: 0.8950420525

 $00:22:15.651 \rightarrow 00:22:17.339$ so from wrapping up efforts around.

NOTE Confidence: 0.8950420525

00:22:17.340 --> 00:22:19.510 A meta analysis that we've been doing

NOTE Confidence: 0.8950420525

 $00{:}22{:}19.510 \dashrightarrow 00{:}22{:}22.117$ to try to replicate and extend these

NOTE Confidence: 0.8950420525

 $00:22:22.117 \rightarrow 00:22:24.529$ findings and other datasets to see

NOTE Confidence: 0.8950420525

 $00{:}22{:}24.603 \dashrightarrow 00{:}22{:}27.027$ if they hold and by and large spoiler

NOTE Confidence: 0.8950420525

 $00:22:27.027 \rightarrow 00:22:29.338$ alert is I think most of the data,

NOTE Confidence: 0.8950420525

 $00{:}22{:}29{.}340 \dashrightarrow 00{:}22{:}31{.}979$ most of the evidence we are seeing

NOTE Confidence: 0.8950420525

 $00{:}22{:}31{.}979 \dashrightarrow 00{:}22{:}34{.}153$ is for sensitive periods relative

NOTE Confidence: 0.8950420525

 $00{:}22{:}34{.}153 \dashrightarrow 00{:}22{:}36{.}077$ to these other models.

NOTE Confidence: 0.8950420525

 $00:22:36.080 \longrightarrow 00:22:38.915$ One thing I also want to say too is,

NOTE Confidence: 0.8950420525

 $00:22:38.920 \longrightarrow 00:22:39.280$ you know,

NOTE Confidence: 0.8950420525

 $00:22:39.280 \rightarrow 00:22:40.720$ one of the questions that I think is,

NOTE Confidence: 0.8950420525

 $00:22:40.720 \longrightarrow 00:22:43.138$ is really fair is these methods

NOTE Confidence: 0.8950420525

00:22:43.138 --> 00:22:44.870 seem really complicated, you know,

- NOTE Confidence: 0.8950420525
- $00:22:44.870 \longrightarrow 00:22:46.690$ is is the juice worth the squeeze
- NOTE Confidence: 0.8950420525
- $00:22:46.690 \longrightarrow 00:22:47.519$ so to speak?
- NOTE Confidence: 0.8950420525
- 00:22:47.520 --> 00:22:49.480 Do you actually get more if you,
- NOTE Confidence: 0.8950420525
- 00:22:49.480 --> 00:22:50.044 you know,
- NOTE Confidence: 0.8950420525
- 00:22:50.044 --> 00:22:51.736 if you get all these repeated
- NOTE Confidence: 0.8950420525
- $00:22:51.736 \longrightarrow 00:22:54.221$ measures and you model it with this
- NOTE Confidence: 0.8950420525
- $00:22:54.221 \rightarrow 00:22:55.340$ sophisticated modeling approach,
- NOTE Confidence: 0.8950420525
- $00:22:55.340 \longrightarrow 00:22:56.552$ the answer is yes.
- NOTE Confidence: 0.8950420525
- $00:22:56.552 \rightarrow 00:22:58.770$ So we are able to identify with
- NOTE Confidence: 0.8950420525
- $00{:}22{:}58{.}770 \dashrightarrow 00{:}23{:}01{.}038$ the slick ma more signal that we
- NOTE Confidence: 0.8950420525
- $00:23:01.038 \longrightarrow 00:23:03.254$ would have missed had we just
- NOTE Confidence: 0.8950420525
- $00{:}23{:}03{.}254 \dashrightarrow 00{:}23{:}05{.}129$ coded people as exposed versus.
- NOTE Confidence: 0.8950420525
- $00{:}23{:}05{.}130 \dashrightarrow 00{:}23{:}05{.}547$ Unexposed.
- NOTE Confidence: 0.8950420525
- $00{:}23{:}05{.}547 \dashrightarrow 00{:}23{:}08{.}049$ So I think hopefully you hear
- NOTE Confidence: 0.8950420525
- $00:23:08.049 \longrightarrow 00:23:10.218$ a message here of you know
- NOTE Confidence: 0.8950420525

 $00:23:10.218 \longrightarrow 00:23:12.178$ it is worth it to do this

NOTE Confidence: 0.872977993103448

 $00:23:12.260 \rightarrow 00:23:15.188$ more repeated measures data collection and

NOTE Confidence: 0.872977993103448

 $00:23:15.188 \longrightarrow 00:23:18.049$ use these these more complicated methods.

NOTE Confidence: 0.831294540833333

 $00:23:20.060 \rightarrow 00:23:21.590$ We've also been working and this

NOTE Confidence: 0.831294540833333

 $00:23:21.590 \longrightarrow 00:23:23.320$ is work led by Alex Lucier,

NOTE Confidence: 0.831294540833333

 $00{:}23{:}23{.}320 \dashrightarrow 00{:}23{:}26.086$ a postdoc in my group, because we have

NOTE Confidence: 0.831294540833333

 $00:23:26.086 \rightarrow 00:23:28.696$ longitudinal methylation data in alpac.

NOTE Confidence: 0.831294540833333

 $00:23:28.700 \rightarrow 00:23:31.796$ So not just looking at methylation at age 7,

NOTE Confidence: 0.831294540833333

 $00:23:31.800 \longrightarrow 00:23:34.452$ but he's also been expanding it

NOTE Confidence: 0.831294540833333

 $00:23:34.452 \rightarrow 00:23:37.059$ to methylation at age 15 to 17.

NOTE Confidence: 0.831294540833333

 $00{:}23{:}37.060 \dashrightarrow 00{:}23{:}39.112$ So we can understand these patterns

NOTE Confidence: 0.831294540833333

 $00{:}23{:}39{.}112 \dashrightarrow 00{:}23{:}41{.}239$ of stability and change across time.

NOTE Confidence: 0.831294540833333

 $00{:}23{:}41{.}240 \dashrightarrow 00{:}23{:}43{.}305$ And these, these data are really interesting

NOTE Confidence: 0.831294540833333

 $00:23:43.305 \rightarrow 00:23:45.643$ and I'm just going to present a a little

NOTE Confidence: 0.831294540833333

 $00:23:45.643 \rightarrow 00:23:47.558$ bit of what we've been finding here.

NOTE Confidence: 0.831294540833333

 $00:23:47.560 \rightarrow 00:23:49.440$ So what I'm showing here.

 $00:23:49.440 \rightarrow 00:23:53.148$ Are the 46 low side that I showed before,

NOTE Confidence: 0.831294540833333

 $00:23:53.150 \longrightarrow 00:23:55.250$ so these were the top low side

NOTE Confidence: 0.831294540833333

 $00:23:55.250 \longrightarrow 00:23:56.770$ that we identified at age 7.

NOTE Confidence: 0.831294540833333

 $00:23:56.770 \longrightarrow 00:23:59.434$ Now we're looking at them at age 15 and

NOTE Confidence: 0.831294540833333

 $00{:}23{:}59{.}434 \dashrightarrow 00{:}24{:}02{.}181$ saying do we still see them being you

NOTE Confidence: 0.831294540833333

 $00:24:02.181 \rightarrow 00:24:03.925$ know largely important and generally

NOTE Confidence: 0.831294540833333

 $00{:}24{:}03{.}925 \dashrightarrow 00{:}24{:}06{.}549$ what we find is that the direction of

NOTE Confidence: 0.831294540833333

 $00:24:06.550 \rightarrow 00:24:11.323$ change or the the pattern of direction

NOTE Confidence: 0.831294540833333

 $00:24:11.323 \rightarrow 00:24:13.561$ of association is generally the same

NOTE Confidence: 0.831294540833333

 $00:24:13.561 \rightarrow 00:24:16.250$ but the results are attenuating slightly.

NOTE Confidence: 0.831294540833333

 $00:24:16.250 \rightarrow 00:24:18.690$ So had we run an epigenome Wide Association

NOTE Confidence: 0.831294540833333

 $00{:}24{:}18.690 \dashrightarrow 00{:}24{:}21.177$ study we wouldn't have identified these.

NOTE Confidence: 0.831294540833333

 $00:24:21.180 \longrightarrow 00:24:24.780$ Game low Sci at age 15.

NOTE Confidence: 0.831294540833333

 $00{:}24{:}24{.}780 \dashrightarrow 00{:}24{:}26{.}980$ What we're finding actually now

NOTE Confidence: 0.831294540833333

 $00:24:26.980 \longrightarrow 00:24:30.679$ is a new set of loci at age 15,

 $00:24:30.680 \longrightarrow 00:24:33.686$ so 41 in total and interesting.

NOTE Confidence: 0.831294540833333

 $00{:}24{:}33.690 \dashrightarrow 00{:}24{:}35.660$ These are also underscoring the

NOTE Confidence: 0.831294540833333

00:24:35.660 --> 00:24:37.630 importance of this early childhood

NOTE Confidence: 0.831294540833333

 $00:24:37.690 \rightarrow 00:24:39.657$ of this age three to five period.

NOTE Confidence: 0.831294540833333

 $00:24:39.660 \longrightarrow 00:24:41.500$ So we didn't see them before at 7,

NOTE Confidence: 0.831294540833333

 $00{:}24{:}41{.}500 \dashrightarrow 00{:}24{:}43{.}376$ but now we're starting to see them.

NOTE Confidence: 0.831294540833333

 $00:24:43.380 \rightarrow 00:24:46.372$ So sort of interesting to think about maybe

NOTE Confidence: 0.831294540833333

 $00:24:46.372 \longrightarrow 00:24:48.840$ potential sleeper effects or latency effects.

NOTE Confidence: 0.831294540833333

 $00:24:48.840 \longrightarrow 00:24:50.140$ We don't really know what's

NOTE Confidence: 0.831294540833333

 $00:24:50.140 \longrightarrow 00:24:51.180$ necessarily going on here,

NOTE Confidence: 0.831294540833333

 $00:24:51.180 \longrightarrow 00:24:52.625$ but we're we're starting to

NOTE Confidence: 0.831294540833333

 $00:24:52.625 \longrightarrow 00:24:54.360$ try to unpack this and ask,

NOTE Confidence: 0.831294540833333

 $00:24:54.360 \rightarrow 00:24:56.340$ you know what might be giving rise to these?

NOTE Confidence: 0.831294540833333

 $00:24:56.340 \longrightarrow 00:24:57.496$ These patterns.

NOTE Confidence: 0.831294540833333

 $00:24:57.496 \longrightarrow 00:24:59.230$ We've also looked,

NOTE Confidence: 0.831294540833333

00:24:59.230 --> 00:24:59.744 you know,

- NOTE Confidence: 0.831294540833333
- $00:24:59.744 \longrightarrow 00:25:01.543$ at these data and we can find
- NOTE Confidence: 0.831294540833333
- $00{:}25{:}01{.}543 \dashrightarrow 00{:}25{:}04{.}041$ so far at least six different
- NOTE Confidence: 0.831294540833333
- $00:25:04.041 \rightarrow 00:25:05.781$ patterns of adversity associated
- NOTE Confidence: 0.831294540833333
- $00:25:05.781 \rightarrow 00:25:07.749$ methylation differences across time.
- NOTE Confidence: 0.831294540833333
- $00{:}25{:}07.750 \dashrightarrow 00{:}25{:}09.534$ And these patterns essentially
- NOTE Confidence: 0.831294540833333
- $00:25:09.534 \rightarrow 00:25:11.318$ reflect differences that emerge
- NOTE Confidence: 0.831294540833333
- $00:25:11.318 \rightarrow 00:25:13.530$ early versus later in development,
- NOTE Confidence: 0.831294540833333
- $00:25:13.530 \longrightarrow 00:25:15.340$ those that happen among people
- NOTE Confidence: 0.831294540833333
- $00:25:15.340 \longrightarrow 00:25:17.150$ who are exposed to adversity.
- NOTE Confidence: 0.831294540833333
- $00:25:17.150 \rightarrow 00:25:19.034$ But what's interesting here is we
- NOTE Confidence: 0.831294540833333
- $00:25:19.034 \rightarrow 00:25:20.676$ see differences based on whether
- NOTE Confidence: 0.831294540833333
- $00:25:20.676 \rightarrow 00:25:22.326$ you were exposed during the
- NOTE Confidence: 0.831294540833333
- $00:25:22.326 \rightarrow 00:25:24.322$ sensitive period we think might be
- NOTE Confidence: 0.831294540833333
- $00{:}25{:}24{.}322 \dashrightarrow 00{:}25{:}25{.}867$ impactful versus outside of it.
- NOTE Confidence: 0.831294540833333
- $00:25:25.870 \longrightarrow 00:25:27.475$ And there's some cases where
- NOTE Confidence: 0.831294540833333

 $00:25:27.475 \longrightarrow 00:25:28.759$ people who were exposed.

NOTE Confidence: 0.831294540833333

 $00{:}25{:}28.760 \dashrightarrow 00{:}25{:}30.860$ During the sensitive period,

NOTE Confidence: 0.831294540833333

 $00:25:30.860 \rightarrow 00:25:34.010$ look like people who were unexposed.

NOTE Confidence: 0.831294540833333

 $00:25:34.010 \longrightarrow 00:25:36.380$ And then we're also seeing

NOTE Confidence: 0.831294540833333

 $00{:}25{:}36{.}380 \dashrightarrow 00{:}25{:}38{.}750$ differences in in age differences

NOTE Confidence: 0.831294540833333

 $00{:}25{:}38.835 \dashrightarrow 00{:}25{:}41.050$ based on age and assessment.

NOTE Confidence: 0.831294540833333

00:25:41.050 --> 00:25:42.786 And I think this is really interesting

NOTE Confidence: 0.831294540833333

 $00:25:42.786 \longrightarrow 00:25:44.314$ in terms of thinking about again

NOTE Confidence: 0.831294540833333

 $00:25:44.314 \longrightarrow 00:25:46.343$ a kind of is the juice worth the

NOTE Confidence: 0.831294540833333

 $00:25:46.343 \rightarrow 00:25:47.708$ squeeze question of you know,

NOTE Confidence: 0.831294540833333

 $00:25:47.710 \longrightarrow 00:25:49.894$ is it worth us getting these repeated

NOTE Confidence: 0.831294540833333

 $00:25:49.894 \rightarrow 00:25:51.844$ measures of methylation and I think

NOTE Confidence: 0.831294540833333

 $00{:}25{:}51{.}844 \dashrightarrow 00{:}25{:}53{.}820$ at least from what we're seeing it is.

NOTE Confidence: 0.88670415

00:25:57.280 --> 00:26:02.080 So. Umm. You might also be wondering,

NOTE Confidence: 0.88670415

 $00:26:02.080 \rightarrow 00:26:03.848$ OK, this is interesting,

NOTE Confidence: 0.88670415

 $00:26:03.848 \rightarrow 00:26:05.174$ adversaries predicting methylation,

- NOTE Confidence: 0.88670415
- $00:26:05.180 \longrightarrow 00:26:06.491$ but what's actually
- NOTE Confidence: 0.88670415
- 00:26:06.491 --> 00:26:08.676 happening in terms of health?
- NOTE Confidence: 0.88670415
- $00{:}26{:}08.680 \dashrightarrow 00{:}26{:}10.360$ And Alex, who's a postdoc,
- NOTE Confidence: 0.88670415
- 00:26:10.360 --> 00:26:11.698 as I mentioned, and Brooke Smith,
- NOTE Confidence: 0.88670415
- 00:26:11.700 --> 00:26:13.636 who was a data analyst in my group,
- NOTE Confidence: 0.88670415
- $00{:}26{:}13.640 \dashrightarrow 00{:}26{:}16.196$ have been doing a mediation analysis,
- NOTE Confidence: 0.88670415
- $00:26:16.200 \rightarrow 00:26:18.180$ mediation analysis to essentially
- NOTE Confidence: 0.88670415
- $00:26:18.180 \rightarrow 00:26:21.150$ ask is adversity leading to changes
- NOTE Confidence: 0.88670415
- 00:26:21.222 --> 00:26:23.442 in these DNA methylation signatures
- NOTE Confidence: 0.88670415
- $00{:}26{:}23.442 \dashrightarrow 00{:}26{:}26.460$ that then predict risk for depression
- NOTE Confidence: 0.88670415
- $00:26:26.460 \longrightarrow 00:26:28.536$ and what we're looking at here.
- NOTE Confidence: 0.88670415
- $00{:}26{:}28{.}540 \dashrightarrow 00{:}26{:}30{.}100$ So we could basically calculate
- NOTE Confidence: 0.88670415
- $00{:}26{:}30{.}100 \dashrightarrow 00{:}26{:}31{.}660$ all of these different paths.
- NOTE Confidence: 0.88670415
- $00{:}26{:}31.660 \dashrightarrow 00{:}26{:}34.072$ Using regression and what we're looking
- NOTE Confidence: 0.88670415
- $00:26:34.072 \rightarrow 00:26:37.412$ for is to try to identify, you know,
- NOTE Confidence: 0.88670415

 $00{:}26{:}37{.}412 \dashrightarrow 00{:}26{:}40{.}009$ how much of the association is explained

NOTE Confidence: 0.88670415

 $00{:}26{:}40.009 \dashrightarrow 00{:}26{:}42.488$ by these methylation signatures.

NOTE Confidence: 0.88670415

 $00{:}26{:}42{.}490 \dashrightarrow 00{:}26{:}45{.}343$ And So what we found overall is so far NOTE Confidence: 0.88670415

 $00{:}26{:}45{.}343 \dashrightarrow 00{:}26{:}48{.}834$ 70 total mediators that were identified

NOTE Confidence: 0.88670415

 $00:26:48.834 \rightarrow 00:26:51.310$ across these different adversities,

NOTE Confidence: 0.88670415

00:26:51.310 --> 00:26:55.059 corresponding to 667 unique CPG

NOTE Confidence: 0.88670415

00:26:55.059 --> 00:26:58.174 sites that that each explained

NOTE Confidence: 0.88670415

 $00:26:58.174 \longrightarrow 00:27:02.030$ between 10 and 71% of the variation.

NOTE Confidence: 0.88670415

00:27:02.030 --> 00:27:04.190 In risk for depression.

NOTE Confidence: 0.88670415

 $00{:}27{:}04.190 \dashrightarrow 00{:}27{:}06.446$ So you can see that there's differences in,

NOTE Confidence: 0.88670415

 $00{:}27{:}06.450 \dashrightarrow 00{:}27{:}07.144$ you know,

NOTE Confidence: 0.88670415

 $00{:}27{:}07{.}144 \dashrightarrow 00{:}27{:}09{.}226$ how much is being explained across

NOTE Confidence: 0.88670415

 $00{:}27{:}09{.}226 \dashrightarrow 00{:}27{:}11{.}199$ these different types of adversities.

NOTE Confidence: 0.88670415

00:27:11.200 --> 00:27:13.848 And then what I think is maybe really

NOTE Confidence: 0.88670415

 $00:27:13.848 \rightarrow 00:27:15.803$ interesting is that the epigenetic

NOTE Confidence: 0.88670415

 $00:27:15.803 \rightarrow 00:27:18.659$ adaptation that we're seeing is not uniform.

 $00:27:18.660 \rightarrow 00:27:21.916$ So when we plot the direction of these

NOTE Confidence: 0.88670415

 $00{:}27{:}21.916 \dashrightarrow 00{:}27{:}23.966$ different associations and whether

NOTE Confidence: 0.88670415

 $00{:}27{:}23.966 \dashrightarrow 00{:}27{:}26.290$ adversities associated with increased

NOTE Confidence: 0.88670415

 $00:27:26.290 \rightarrow 00:27:28.614$ methylation or decreased methylation,

NOTE Confidence: 0.88670415

 $00:27:28.620 \longrightarrow 00:27:31.176$ we're seeing a lot of variation.

NOTE Confidence: 0.88670415

 $00{:}27{:}31.180 \dashrightarrow 00{:}27{:}33.424$ So what this is essentially showing

NOTE Confidence: 0.88670415

 $00:27:33.424 \rightarrow 00:27:36.511$ is that most of what we're finding

NOTE Confidence: 0.88670415

 $00:27:36.511 \rightarrow 00:27:39.041$ are effects where methylation changes

NOTE Confidence: 0.88670415

 $00{:}27{:}39{.}041 \dashrightarrow 00{:}27{:}41{.}519$ are actually protective against.

NOTE Confidence: 0.88670415

 $00:27:41.520 \longrightarrow 00:27:43.290$ Depression.

NOTE Confidence: 0.88670415

 $00{:}27{:}43.290 \dashrightarrow 00{:}27{:}46.050$ So adversity is associated with a

NOTE Confidence: 0.88670415

 $00{:}27{:}46.050 \dashrightarrow 00{:}27{:}47.890$ methylation change that protects

NOTE Confidence: 0.88670415

 $00{:}27{:}47.960 \dashrightarrow 00{:}27{:}50.328$ people from developing depression.

NOTE Confidence: 0.88670415

 $00{:}27{:}50{.}330 \dashrightarrow 00{:}27{:}52{.}310$ We've also been finding that some

NOTE Confidence: 0.88670415

 $00{:}27{:}52{.}310 \dashrightarrow 00{:}27{:}54{.}323$ sites that we've identified are linked

 $00{:}27{:}54{.}323 \dashrightarrow 00{:}27{:}56{.}237$ to cortical development and other

NOTE Confidence: 0.88670415

 $00{:}27{:}56{.}237 \dashrightarrow 00{:}27{:}58{.}184$ aspects of brain development and we've

NOTE Confidence: 0.88670415

 $00{:}27{:}58.184 \dashrightarrow 00{:}28{:}00.561$ been able to replicate some of the

NOTE Confidence: 0.88670415

 $00:28:00.561 \rightarrow 00:28:03.016$ LOCI and some independent cohorts.

NOTE Confidence: 0.88670415

 $00{:}28{:}03{.}020 \dashrightarrow 00{:}28{:}05{.}043$ And I think this is another area

NOTE Confidence: 0.88670415

00:28:05.043 --> 00:28:07.108 that's just ripe for investigation

NOTE Confidence: 0.88670415

 $00{:}28{:}07{.}108 \dashrightarrow 00{:}28{:}08{.}809$ because it's counterintuitive.

NOTE Confidence: 0.88670415

 $00:28:08.810 \longrightarrow 00:28:10.833$ I think most of us would expect

NOTE Confidence: 0.88670415

 $00{:}28{:}10.833 \dashrightarrow 00{:}28{:}12.588$ that these things are, you know,

NOTE Confidence: 0.88670415

 $00:28:12.588 \longrightarrow 00:28:13.176$ more deleterious.

NOTE Confidence: 0.88670415

 $00:28:13.176 \longrightarrow 00:28:14.940$ But it might be that we're,

NOTE Confidence: 0.88670415

 $00:28:14.940 \rightarrow 00:28:17.299$ our bodies are trying to reach homeostasis.

NOTE Confidence: 0.88670415

 $00:28:17.300 \longrightarrow 00:28:19.806$ And so we're some of the damage

NOTE Confidence: 0.88670415

 $00:28:19.806 \longrightarrow 00:28:21.776$ that's done is protective and

NOTE Confidence: 0.88670415

 $00{:}28{:}21.776 \dashrightarrow 00{:}28{:}24.224$ some of it is also harmful.

NOTE Confidence: 0.88670415

00:28:24.230 --> 00:28:25.868 I also want to just kind of

 $00:28:25.868 \rightarrow 00:28:27.636$ zoom out and sort of share with

NOTE Confidence: 0.88670415

 $00{:}28{:}27.636 \dashrightarrow 00{:}28{:}29.561$ you the last set of work around

NOTE Confidence: 0.88670415

 $00:28:29.561 \rightarrow 00:28:31.667$ sensitive periods in terms of this,

NOTE Confidence: 0.88670415

 $00:28:31.670 \rightarrow 00:28:33.890$ this review paper that John Schaefer,

NOTE Confidence: 0.88670415

 $00{:}28{:}33{.}890 \dashrightarrow 00{:}28{:}36{.}542$ who's a a postdoc collaborator of

NOTE Confidence: 0.88670415

 $00{:}28{:}36{.}542 \dashrightarrow 00{:}28{:}39{.}436$ mine and I worked on around the

NOTE Confidence: 0.88670415

 $00:28:39.436 \longrightarrow 00:28:41.168$ question of sensitive periods.

NOTE Confidence: 0.88670415

 $00:28:41.170 \longrightarrow 00:28:44.194$ So I've been really surprised that the

NOTE Confidence: 0.88670415

 $00{:}28{:}44{.}194{\:}-{>}00{:}28{:}47{.}178$ data we've been seeing for methylation

NOTE Confidence: 0.88670415

 $00{:}28{:}47.178 \dashrightarrow 00{:}28{:}50.394$ has been so consistent for sensitive

NOTE Confidence: 0.88670415

 $00{:}28{:}50{.}394 \dashrightarrow 00{:}28{:}52{.}225$ periods and we wanted to know you know,

NOTE Confidence: 0.88670415

 $00{:}28{:}52{.}230 \dashrightarrow 00{:}28{:}53{.}570$ does this really extend to.

NOTE Confidence: 0.88670415

 $00:28:53.570 \longrightarrow 00:28:54.406$ Other domains.

NOTE Confidence: 0.88670415

 $00:28:54.406 \rightarrow 00:28:57.332$ So we ended up publishing this review.

NOTE Confidence: 0.88670415

 $00{:}28{:}57{.}340 \dashrightarrow 00{:}28{:}59{.}428$ It just came out a couple weeks ago

 $00:28:59.428 \rightarrow 00:29:01.719$ looking at a range of different outcomes.

NOTE Confidence: 0.88670415

00:29:01.720 --> 00:29:03.302 So psychopathology,

NOTE Confidence: 0.88670415

00:29:03.302 --> 00:29:04.884 neuroimaging, epigenetics,

NOTE Confidence: 0.88670415

 $00:29:04.884 \rightarrow 00:29:07.257$ psychophysiology and behavior.

NOTE Confidence: 0.88670415

 $00:29:07.260 \longrightarrow 00:29:08.780$ It's defined by our doc,

NOTE Confidence: 0.88670415

 $00{:}29{:}08.780 \dashrightarrow 00{:}29{:}11.120$ the research domain criteria.

NOTE Confidence: 0.88670415

 $00{:}29{:}11{.}120 \dashrightarrow 00{:}29{:}15{.}376$ So we found 118 unique cross-sectional

NOTE Confidence: 0.88670415

00:29:15.376 --> 00:29:17.040 observational studies.

NOTE Confidence: 0.88670415

 $00{:}29{:}17.040 \dashrightarrow 00{:}29{:}18.865$ Most of these studies focused

NOTE Confidence: 0.88670415

00:29:18.865 - 00:29:20.690 on psychopathology as at least

NOTE Confidence: 0.88670415

 $00:29:20.759 \longrightarrow 00:29:22.099$ one of their outcomes,

NOTE Confidence: 0.88670415

 $00:29:22.100 \longrightarrow 00:29:25.480$ so depressive symptoms or diagnosis

NOTE Confidence: 0.88670415

 $00{:}29{:}25{.}480 \dashrightarrow 00{:}29{:}29{.}584$ or other PTSD or so on and so forth.

NOTE Confidence: 0.728458122307692

 $00:29:29.590 \longrightarrow 00:29:31.372$ Other ones we're looking at are

NOTE Confidence: 0.728458122307692

 $00{:}29{:}31{.}372 \dashrightarrow 00{:}29{:}33{.}439$ other R DOC domains and a handful.

NOTE Confidence: 0.728458122307692

 $00:29:33.440 \longrightarrow 00:29:36.807$ We're also looking at more neural indices.

 $00{:}29{:}36{.}810 \dashrightarrow 00{:}29{:}39{.}466$ What we ended up finding was that most

NOTE Confidence: 0.728458122307692

 $00:29:39.466 \rightarrow 00:29:41.989$ studies did report a timing difference.

NOTE Confidence: 0.728458122307692

 $00:29:41.990 \longrightarrow 00:29:44.559$ In other words, they reported that kids

NOTE Confidence: 0.728458122307692

 $00{:}29{:}44.559 \dashrightarrow 00{:}29{:}46.630$ exposed to maltreatment in one time

NOTE Confidence: 0.728458122307692

 $00:29:46.630 \longrightarrow 00:29:48.448$ period had an increased risk relative

NOTE Confidence: 0.728458122307692

 $00{:}29{:}48{.}448{\:}-{:}>00{:}29{:}50{.}905$ to kids exposed at another time period.

NOTE Confidence: 0.728458122307692

00:29:50.910 --> 00:29:52.974 But when we dug deeper into

NOTE Confidence: 0.728458122307692

 $00:29:52.974 \longrightarrow 00:29:54.006$ these timing effects,

NOTE Confidence: 0.728458122307692

 $00:29:54.010 \longrightarrow 00:29:56.722$ we essentially didn't find any consistent

NOTE Confidence: 0.728458122307692

00:29:56.722 --> 00:29:59.750 evidence for peak periods of vulnerability.

NOTE Confidence: 0.728458122307692

 $00:29:59.750 \rightarrow 00:30:03.751$ So it's not as though we saw three to five or

NOTE Confidence: 0.728458122307692

 $00:30:03.751 \longrightarrow 00:30:07.297$ 6 to 8 is this time period of vulnerability.

NOTE Confidence: 0.728458122307692

 $00:30:07.300 \dashrightarrow 00:30:09.220$ This was also very surprising.

NOTE Confidence: 0.728458122307692

 $00{:}30{:}09{.}220 \dashrightarrow 00{:}30{:}12{.}328$ So we didn't see that these

NOTE Confidence: 0.728458122307692

00:30:12.328 --> 00:30:14.296 biological markers, you know,

 $00:30:14.296 \longrightarrow 00:30:17.537$ the neural indices or other indicators were

NOTE Confidence: 0.728458122307692

 $00{:}30{:}17{.}537 \dashrightarrow 00{:}30{:}21{.}095$ any better able than the symptom measures

NOTE Confidence: 0.728458122307692

 $00:30:21.100 \rightarrow 00:30:23.900$ to identify potential sensitive periods.

NOTE Confidence: 0.728458122307692

 $00:30:23.900 \longrightarrow 00:30:25.635$ We also didn't see any

NOTE Confidence: 0.728458122307692

 $00:30:25.635 \rightarrow 00:30:27.370$ differences based on study rigor.

NOTE Confidence: 0.728458122307692

 $00{:}30{:}27{.}370 \dashrightarrow 00{:}30{.}30{.}018$ So if you had a study where you

NOTE Confidence: 0.728458122307692

 $00:30:30.018 \rightarrow 00:30:32.020$ compared your models to accumulation

NOTE Confidence: 0.728458122307692

 $00:30:32.020 \rightarrow 00:30:34.960$ models or you were a larger study,

NOTE Confidence: 0.728458122307692

 $00:30:34.960 \rightarrow 00:30:37.016$ we didn't see any differences based on that.

NOTE Confidence: 0.728458122307692

 $00:30:37.020 \rightarrow 00:30:40.615$ Neither we did interestingly share find

NOTE Confidence: 0.728458122307692

 $00{:}30{:}40.615 \dashrightarrow 00{:}30{:}43.650$ that there were similarities in terms of

NOTE Confidence: 0.728458122307692

 $00{:}30{:}43.650 \dashrightarrow 00{:}30{:}45.706$ internalizing and externalizing symptoms.

NOTE Confidence: 0.728458122307692

00:30:45.710 --> 00:30:48.510 They did share peak periods of vulnerability,

NOTE Confidence: 0.728458122307692

 $00{:}30{:}48{.}510 \dashrightarrow 00{:}30{:}51{.}107$ but specific types of maltreatment did not.

NOTE Confidence: 0.728458122307692

 $00{:}30{:}51{.}110 \dashrightarrow 00{:}30{:}54{.}122$ So this may be speaks to maltreatment

NOTE Confidence: 0.728458122307692

 $00:30:54.122 \rightarrow 00:30:56.713$ types having potential different impacts

 $00:30:56.713 \rightarrow 00:30:59.258$ with respect to sensitive periods.

NOTE Confidence: 0.728458122307692

 $00:30:59.260 \rightarrow 00:31:02.092$ Studies were also split with respect

NOTE Confidence: 0.728458122307692

 $00{:}31{:}02.092 \dashrightarrow 00{:}31{:}05.080$ with respect to sex differences.

NOTE Confidence: 0.728458122307692

 $00:31:05.080 \rightarrow 00:31:08.518$ We also generally saw a huge risk of bias.

NOTE Confidence: 0.728458122307692

 $00{:}31{:}08{.}520 \dashrightarrow 00{:}31{:}10{.}767$ Most of these studies were under powered

NOTE Confidence: 0.728458122307692

 $00{:}31{:}10.767 \dashrightarrow 00{:}31{:}13.912$ and so as a result we ended up providing

NOTE Confidence: 0.728458122307692

 $00{:}31{:}13{.}912 \dashrightarrow 00{:}31{:}16{.}353$ a set of recommendations at the end

NOTE Confidence: 0.728458122307692

 $00:31:16.353 \rightarrow 00:31:18.600$ that we hope will guide future studies,

NOTE Confidence: 0.728458122307692

00:31:18.600 --> 00:31:20.052 including but not limited

NOTE Confidence: 0.728458122307692

00:31:20.052 --> 00:31:21.867 to issues of of measurement,

NOTE Confidence: 0.728458122307692

00:31:21.870 --> 00:31:24.035 which I'm going to turn to next.

NOTE Confidence: 0.728458122307692

 $00:31:24.035 \dashrightarrow 00:31:27.835$ So in terms of the issue of measurement,

NOTE Confidence: 0.728458122307692

 $00{:}31{:}27{.}840 \dashrightarrow 00{:}31{:}30{.}342$ so this is something I've been

NOTE Confidence: 0.728458122307692

 $00:31:30.342 \longrightarrow 00:31:32.699$ frustrated about for for a while.

NOTE Confidence: 0.728458122307692

 $00{:}31{:}32.700 \dashrightarrow 00{:}31{:}34.956$ So we know that current measures

00:31:34.956 --> 00:31:36.460 of childhood adversity have

NOTE Confidence: 0.728458122307692

 $00:31:36.531 \rightarrow 00:31:38.539$ some pretty serious limitations.

NOTE Confidence: 0.728458122307692

 $00{:}31{:}38{.}540 \dashrightarrow 00{:}31{:}41{.}240$ So what we most often do in in research

NOTE Confidence: 0.728458122307692

 $00:31:41.240 \longrightarrow 00:31:43.341$ studies is we ask people and this

NOTE Confidence: 0.728458122307692

 $00{:}31{:}43{.}341 \dashrightarrow 00{:}31{:}45{.}390$ is also in clinical practice too.

NOTE Confidence: 0.728458122307692

 $00:31:45.390 \longrightarrow 00:31:46.774$ We ask people retrospectively.

NOTE Confidence: 0.728458122307692

 $00:31:46.774 \dashrightarrow 00:31:49.970$ So when you're an adult or maybe an an

NOTE Confidence: 0.728458122307692

 $00:31:49.970 \rightarrow 00:31:52.357$ adolescent, we ask you how old you know,

NOTE Confidence: 0.728458122307692

 $00{:}31{:}52{.}360 \dashrightarrow 00{:}31{:}54{.}195$ did you experience these adverse

NOTE Confidence: 0.728458122307692

 $00{:}31{:}54{.}195 \dashrightarrow 00{:}31{:}55{.}296$ events and so.

NOTE Confidence: 0.728458122307692

 $00:31:55.300 \longrightarrow 00:31:56.585$ You might imagine that there's

NOTE Confidence: 0.728458122307692

 $00:31:56.585 \longrightarrow 00:31:58.160$ a lot of potential bias here.

NOTE Confidence: 0.728458122307692

00:31:58.160 --> 00:31:59.201 So, you know,

NOTE Confidence: 0.728458122307692

00:31:59.201 --> 00:32:00.936 it's subjects to people's memory.

NOTE Confidence: 0.728458122307692

 $00:32:00.940 \longrightarrow 00:32:03.175$ It's subject to whether they're

NOTE Confidence: 0.728458122307692

 $00:32:03.175 \longrightarrow 00:32:04.963$ comfortable disclosing what are

- NOTE Confidence: 0.728458122307692
- $00:32:04.963 \rightarrow 00:32:06.678$ oftentimes very painful events.
- NOTE Confidence: 0.728458122307692
- 00:32:06.680 --> 00:32:08.884 So it's no surprise that, you know,
- NOTE Confidence: 0.728458122307692
- $00:32:08.884 \longrightarrow 00:32:10.816$ there might be bias in these
- NOTE Confidence: 0.728458122307692
- 00:32:10.816 --> 00:32:11.460 retrospective measures.
- NOTE Confidence: 0.728458122307692
- $00:32:11.460 \longrightarrow 00:32:13.056$ The other thing that we can also
- NOTE Confidence: 0.728458122307692
- 00:32:13.056 --> 00:32:14.580 do is go prospectively.
- NOTE Confidence: 0.728458122307692
- $00:32:14.580 \longrightarrow 00:32:16.940$ So we can ask parents,
- NOTE Confidence: 0.728458122307692
- $00:32:16.940 \longrightarrow 00:32:17.824$ oftentimes moms,
- NOTE Confidence: 0.728458122307692
- $00:32:17.824 \longrightarrow 00:32:20.034$ whether their child is exposed
- NOTE Confidence: 0.728458122307692
- $00:32:20.034 \rightarrow 00:32:22.119$ to certain kinds of events.
- NOTE Confidence: 0.728458122307692
- $00:32:22.120 \longrightarrow 00:32:24.418$ But this is another area where
- NOTE Confidence: 0.728458122307692
- $00:32:24.418 \longrightarrow 00:32:25.567$ there's potential problems.
- NOTE Confidence: 0.728458122307692
- $00:32:25.570 \longrightarrow 00:32:28.363$ So moms might not want to talk
- NOTE Confidence: 0.728458122307692
- $00{:}32{:}28{.}363 \dashrightarrow 00{:}32{:}30{.}420$ about painful events or events,
- NOTE Confidence: 0.728458122307692
- $00{:}32{:}30{.}420 \dashrightarrow 00{:}32{:}32{.}840$ particularly when she's the perpetrator
- NOTE Confidence: 0.728458122307692

 $00:32:32.840 \longrightarrow 00:32:35.260$ of those sources of adversity.

NOTE Confidence: 0.728458122307692

 $00:32:35.260 \longrightarrow 00:32:35.880$ For adolescence,

NOTE Confidence: 0.728458122307692

 $00:32:35.880 \longrightarrow 00:32:37.430$ there might be some adversities

NOTE Confidence: 0.728458122307692

 $00:32:37.430 \longrightarrow 00:32:38.920$ that parents don't know about,

NOTE Confidence: 0.728458122307692

 $00:32:38.920 \dashrightarrow 00:32:40.952$ and I think This is why it's maybe

NOTE Confidence: 0.728458122307692

 $00{:}32{:}40{.}952 \dashrightarrow 00{:}32{:}42{.}854$ there's no surprise that when you

NOTE Confidence: 0.728458122307692

 $00:32:42.854 \rightarrow 00:32:44.852$ ask both children and their parents,

NOTE Confidence: 0.918896138333333

00:32:44.860 --> 00:32:46.834 you see very low levels of

NOTE Confidence: 0.918896138333333

 $00:32:46.834 \rightarrow 00:32:48.720$ agreement between the two of them.

NOTE Confidence: 0.918896138333333

 $00:32:48.720 \longrightarrow 00:32:50.105$ Another source of data would

NOTE Confidence: 0.918896138333333

00:32:50.105 - 00:32:51.213 be the official reports,

NOTE Confidence: 0.918896138333333

 $00:32:51.220 \rightarrow 00:32:52.876$ like health and Social service records,

NOTE Confidence: 0.918896138333333

 $00{:}32{:}52{.}880 \dashrightarrow 00{:}32{:}55{.}190$ but we know that those are also

NOTE Confidence: 0.918896138333333

 $00:32:55.190 \dashrightarrow 00:32:56.790$ dramatic undercounts of people's.

NOTE Confidence: 0.918896138333333

 $00:32:56.790 \rightarrow 00:32:59.706$ Exposure to adversity and they probably

NOTE Confidence: 0.918896138333333

 $00:32:59.706 \rightarrow 00:33:03.218$ only get about 30% of all true cases.

 $00:33:03.218 \longrightarrow 00:33:05.476$ So, so sort of borne from these

NOTE Confidence: 0.918896138333333

 $00:33:05.476 \rightarrow 00:33:07.174$ frustrations and a very serendipitous

NOTE Confidence: 0.918896138333333

 $00{:}33{:}07{.}174 \dashrightarrow 00{:}33{:}09{.}514$ conversation I had with a colleague

NOTE Confidence: 0.918896138333333

 $00{:}33{:}09{.}514 \dashrightarrow 00{:}33{:}11{.}757$ that I started thinking about baby

NOTE Confidence: 0.918896138333333

 $00{:}33{:}11.757 \dashrightarrow 00{:}33{:}14.102$ teeth and this idea that maybe baby

NOTE Confidence: 0.918896138333333

00:33:14.110 --> 00:33:16.636 teeth could serve as fossilized records

NOTE Confidence: 0.918896138333333

 $00:33:16.636 \rightarrow 00:33:19.210$ of people's early life experiences.

NOTE Confidence: 0.918896138333333

 $00:33:19.210 \longrightarrow 00:33:21.570$ So we published this paper.

NOTE Confidence: 0.918896138333333

00:33:21.570 --> 00:33:24.030 Back in 2020 in biological psychiatry,

NOTE Confidence: 0.918896138333333

 $00:33:24.030 \dashrightarrow 00:33:25.675$ where we outline this hypothesis

NOTE Confidence: 0.918896138333333

 $00{:}33{:}25.675 \dashrightarrow 00{:}33{:}28.335$ and so we said we basically put

NOTE Confidence: 0.918896138333333

 $00:33:28.335 \rightarrow 00:33:30.690$ forward this teeth conceptual model,

NOTE Confidence: 0.918896138333333

 $00{:}33{:}30.690 \dashrightarrow 00{:}33{:}33.735$ this idea that teeth are as encoding

NOTE Confidence: 0.918896138333333

 $00{:}33{:}33{.}735 \dashrightarrow 00{:}33{:}35{.}610$ experiences to transform health.

NOTE Confidence: 0.918896138333333

00:33:35.610 --> 00:33:37.213 And So what we said is that

00:33:37.213 - 00:33:38.470 you have this exposure,

NOTE Confidence: 0.918896138333333

 $00:33:38.470 \longrightarrow 00:33:40.878$ so a psychosocial stressor,

NOTE Confidence: 0.918896138333333

 $00:33:40.878 \rightarrow 00:33:43.888$ it disrupts some biological process.

NOTE Confidence: 0.918896138333333

 $00:33:43.890 \longrightarrow 00:33:46.641$ It leaves behind an imprint of that

NOTE Confidence: 0.918896138333333

 $00:33:46.641 \rightarrow 00:33:48.290$ biological process somewhere and

NOTE Confidence: 0.918896138333333

 $00:33:48.290 \dashrightarrow 00:33:50.290$ that that predicts health outcomes.

NOTE Confidence: 0.918896138333333

 $00:33:50.290 \longrightarrow 00:33:51.568$ And So what we were saying.

NOTE Confidence: 0.918896138333333

 $00:33:51.570 \longrightarrow 00:33:53.358$ That essentially primary tooth

NOTE Confidence: 0.918896138333333

00:33:53.358 --> 00:33:56.040 development might be altered as a

NOTE Confidence: 0.918896138333333

 $00{:}33{:}56{.}112 \dashrightarrow 00{:}33{:}58{.}674$ result of this adversity and that could

NOTE Confidence: 0.918896138333333

 $00{:}33{:}58.674 \dashrightarrow 00{:}34{:}01.050$ then therefore be captured in baby

NOTE Confidence: 0.918896138333333

 $00:34:01.119 \rightarrow 00:34:03.669$ teeth that started forming prenatally.

NOTE Confidence: 0.918896138333333

 $00:34:03.670 \longrightarrow 00:34:05.574$ So let me tell you a little

NOTE Confidence: 0.918896138333333

 $00{:}34{:}05{.}574 \dashrightarrow 00{:}34{:}06{.}850$ bit more about teeth.

NOTE Confidence: 0.918896138333333

 $00{:}34{:}06{.}850 \dashrightarrow 00{:}34{:}09{.}066$ I could talk an entire talk about teeth

NOTE Confidence: 0.918896138333333

 $00:34:09.066 \rightarrow 00:34:11.090$ because they're like absolutely fascinating,

- NOTE Confidence: 0.918896138333333
- $00:34:11.090 \rightarrow 00:34:12.326$ but in the interest of time,
- NOTE Confidence: 0.918896138333333
- $00:34:12.330 \longrightarrow 00:34:13.306$ I won't do that.
- NOTE Confidence: 0.918896138333333
- 00:34:13.306 --> 00:34:13.550 But,
- NOTE Confidence: 0.918896138333333
- $00:34:13.550 \rightarrow 00:34:15.718$ but just to give you a little bit more of a
- NOTE Confidence: 0.918896138333333
- $00:34:15.718 \dashrightarrow 00:34:17.563$ flavor for teeth and in how cool they are.
- NOTE Confidence: 0.918896138333333
- 00:34:17.570 --> 00:34:17.849 So,
- NOTE Confidence: 0.918896138333333
- $00:34:17.849 \rightarrow 00:34:20.830$ so most of us are born with 20 primary teeth.
- NOTE Confidence: 0.918896138333333
- $00:34:20.830 \longrightarrow 00:34:21.958$ These are our baby.
- NOTE Confidence: 0.918896138333333
- 00:34:21.958 --> 00:34:23.086 Death or milk teeth,
- NOTE Confidence: 0.918896138333333
- $00:34:23.090 \rightarrow 00:34:25.070$ they start forming during about the
- NOTE Confidence: 0.918896138333333
- 00:34:25.070 00:34:27.355 second trimester of life and then they
- NOTE Confidence: 0.918896138333333
- $00{:}34{:}27{.}355 \dashrightarrow 00{:}34{:}29{.}167$ continue forming over the first few
- NOTE Confidence: 0.918896138333333
- $00:34:29.167 \rightarrow 00:34:31.567$ years of life and then around age 5 or six,
- NOTE Confidence: 0.918896138333333
- $00{:}34{:}31{.}570 \dashrightarrow 00{:}34{:}32{.}362$ they fall out.
- NOTE Confidence: 0.918896138333333
- $00:34:32.362 \longrightarrow 00:34:33.946$ They're the only part of our
- NOTE Confidence: 0.918896138333333

 $00:34:33.946 \rightarrow 00:34:35.438$ body that actually falls out

NOTE Confidence: 0.918896138333333

 $00:34:35.438 \longrightarrow 00:34:37.190$ as part of a healthy process.

NOTE Confidence: 0.918896138333333

 $00:34:37.190 \longrightarrow 00:34:38.882$ And then they're replaced

NOTE Confidence: 0.918896138333333

 $00:34:38.882 \rightarrow 00:34:40.574$ by 32 permanent teeth.

NOTE Confidence: 0.918896138333333

 $00{:}34{:}40{.}580 \dashrightarrow 00{:}34{:}42{.}840$ And those form postnatally up

NOTE Confidence: 0.918896138333333

 $00{:}34{:}42.840 \dashrightarrow 00{:}34{:}44.648$ through about mid adolescence.

NOTE Confidence: 0.918896138333333

 $00{:}34{:}44.650 \dashrightarrow 00{:}34{:}47.415$ And so teeth are also a mazing because

NOTE Confidence: 0.918896138333333

 $00:34:47.415 \longrightarrow 00:34:50.245$ they record the timing of their

NOTE Confidence: 0.918896138333333

 $00:34:50.245 \rightarrow 00:34:52.100$ incremental growth, so the outside.

NOTE Confidence: 0.918896138333333

 $00:34:52.100 \longrightarrow 00:34:53.990$ Part of our tooth is called the

NOTE Confidence: 0.918896138333333

 $00{:}34{:}54.055 \dashrightarrow 00{:}34{:}56.059$ Crown and that's comprised of the

NOTE Confidence: 0.918896138333333

 $00:34:56.059 \rightarrow 00:34:57.746$ enamel that we hopefully brush

NOTE Confidence: 0.918896138333333

 $00:34:57.746 \longrightarrow 00:34:59.504$ twice a day in our underlying

NOTE Confidence: 0.918896138333333

 $00:34:59.504 \rightarrow 00:35:01.814$ dentin and then the pulp and root.

NOTE Confidence: 0.918896138333333

 $00:35:01.814 \longrightarrow 00:35:03.950$ And the way that teeth develop

NOTE Confidence: 0.918896138333333

 $00:35:04.031 \rightarrow 00:35:06.211$ is really very much reminiscent

- NOTE Confidence: 0.918896138333333
- 00:35:06.211 --> 00:35:08.391 of a circadian like process.
- NOTE Confidence: 0.918896138333333
- $00{:}35{:}08{.}400 \dashrightarrow 00{:}35{:}10{.}248$ So there are cells called a meloblasts
- NOTE Confidence: 0.918896138333333
- $00{:}35{:}10.248 \dashrightarrow 00{:}35{:}12.483$ and those are the cells that form
- NOTE Confidence: 0.918896138333333
- $00:35:12.483 \rightarrow 00:35:14.053$ enamel and they're basically acting
- NOTE Confidence: 0.918896138333333
- $00:35:14.053 \longrightarrow 00:35:16.169$ in a in a circadian like process
- NOTE Confidence: 0.918896138333333
- $00:35:16.169 \rightarrow 00:35:18.348$ to lay down this matrix of enamel.
- NOTE Confidence: 0.918896138333333
- $00:35:18.348 \longrightarrow 00:35:22.059$ And as every sort of passage of time goes on,
- NOTE Confidence: 0.918896138333333
- $00:35:22.060 \longrightarrow 00:35:22.954$ it leaves.
- NOTE Confidence: 0.918896138333333
- 00:35:22.954 --> 00:35:25.636 Behind an imprint of that recording.
- NOTE Confidence: 0.918896138333333
- $00:35:25.640 \longrightarrow 00:35:27.768$ So this is similar to the way that
- NOTE Confidence: 0.918896138333333
- $00:35:27.768 \rightarrow 00:35:29.688$ tree rings develop and that every
- NOTE Confidence: 0.918896138333333
- $00:35:29.688 \dashrightarrow 00:35:31.343$ year of the trees development
- NOTE Confidence: 0.918896138333333
- $00:35:31.343 \longrightarrow 00:35:33.159$ you see a new ring recorded.
- NOTE Confidence: 0.918896138333333
- $00:35:33.160 \dashrightarrow 00:35:35.855$ Well, our teeth have very similar lines.
- NOTE Confidence: 0.918896138333333
- $00:35:35.860 \longrightarrow 00:35:37.732$ There are sets of lines that
- NOTE Confidence: 0.918896138333333

 $00:35:37.732 \longrightarrow 00:35:38.980$ correspond to about weekly

NOTE Confidence: 0.831379243636364

 $00:35:39.039 \rightarrow 00:35:41.975$ development, and then lines that also

NOTE Confidence: 0.831379243636364

 $00:35:41.975 \rightarrow 00:35:44.230$ correspond to about daily development.

NOTE Confidence: 0.831379243636364

 $00:35:44.230 \rightarrow 00:35:46.309$ What's also unique is that this recording

NOTE Confidence: 0.831379243636364

 $00:35:46.309 \rightarrow 00:35:48.410$ of development is found across evolution,

NOTE Confidence: 0.831379243636364

 $00:35:48.410 \rightarrow 00:35:51.105$ so we see similar tree similar rings

NOTE Confidence: 0.831379243636364

 $00:35:51.105 \rightarrow 00:35:54.149$ within the teeth across different species.

NOTE Confidence: 0.831379243636364

 $00{:}35{:}54{.}150 \dashrightarrow 00{:}35{:}56{.}467$ And teeth also record insults or disruptions

NOTE Confidence: 0.831379243636364

 $00{:}35{:}56{.}467 \dashrightarrow 00{:}35{:}58{.}470$ that happen during their development.

NOTE Confidence: 0.831379243636364

 $00{:}35{:}58{.}470 \dashrightarrow 00{:}36{:}00{.}603$ So in this way we can think about teeth

NOTE Confidence: 0.831379243636364

 $00:36:00.603 \rightarrow 00:36:03.236$ just telling us not just whether a stressor

NOTE Confidence: 0.831379243636364

 $00:36:03.236 \rightarrow 00:36:05.428$ occurred in development but potentially when.

NOTE Confidence: 0.831379243636364

 $00{:}36{:}05{.}430 \dashrightarrow 00{:}36{:}07{.}846$ And this can happen on both a low

NOTE Confidence: 0.831379243636364

 $00:36:07.846 \dashrightarrow 00:36:09.818$ resolution time scale where you can

NOTE Confidence: 0.831379243636364

 $00:36:09.818 \rightarrow 00:36:12.232$ see for example these white marks or

NOTE Confidence: 0.831379243636364

00:36:12.232 --> 00:36:14.172 these enamel hypoplasia or concentrated

- NOTE Confidence: 0.831379243636364
- $00:36:14.172 \longrightarrow 00:36:16.098$ to those two central incisors.
- NOTE Confidence: 0.831379243636364
- $00:36:16.098 \rightarrow 00:36:18.306$ So that maybe speaks to something
- NOTE Confidence: 0.831379243636364
- $00:36:18.306 \rightarrow 00:36:20.631$ that was happening as those particular
- NOTE Confidence: 0.831379243636364
- $00:36:20.631 \rightarrow 00:36:21.789$ teeth were forming,
- NOTE Confidence: 0.831379243636364
- $00:36:21.790 \rightarrow 00:36:23.702$ but then you can get even more granular
- NOTE Confidence: 0.831379243636364
- $00:36:23.702 \rightarrow 00:36:25.629$ and look really at a high resolution.
- NOTE Confidence: 0.831379243636364
- $00:36:25.630 \longrightarrow 00:36:27.667$ Time scale and leverage what we know
- NOTE Confidence: 0.831379243636364
- $00:36:27.667 \rightarrow 00:36:29.759$ about those tree ring like structures.
- NOTE Confidence: 0.831379243636364
- 00:36:29.760 --> 00:36:30.996 So you could take a tooth,
- NOTE Confidence: 0.831379243636364
- 00:36:31.000 --> 00:36:32.360 cut it in half,
- NOTE Confidence: 0.831379243636364
- $00:36:32.360 \longrightarrow 00:36:34.400$ take thin sections of the tooth,
- NOTE Confidence: 0.831379243636364
- $00{:}36{:}34{.}400 \dashrightarrow 00{:}36{:}35{.}620$ put it on a slide,
- NOTE Confidence: 0.831379243636364
- $00:36:35.620 \longrightarrow 00:36:37.786$ put it under a microscope and
- NOTE Confidence: 0.831379243636364
- $00{:}36{:}37.786 \dashrightarrow 00{:}36{:}39.795$ look at the incremental formation
- NOTE Confidence: 0.831379243636364
- $00:36:39.795 \longrightarrow 00:36:41.759$ of that tooth development.
- NOTE Confidence: 0.831379243636364

 $00:36:41.760 \dashrightarrow 00:36:44.082$ And one of the lines that you can look

NOTE Confidence: 0.831379243636364

 $00{:}36{:}44.082 \dashrightarrow 00{:}36{:}46.956$ at among others is this neonatal line.

NOTE Confidence: 0.831379243636364

 $00:36:46.960 \longrightarrow 00:36:49.298$ So this is a line that actually

NOTE Confidence: 0.831379243636364

 $00:36:49.298 \rightarrow 00:36:51.158$ differentiates the time of our birth.

NOTE Confidence: 0.831379243636364

 $00{:}36{:}51{.}160 \dashrightarrow 00{:}36{:}53{.}040$ So it differentiates prenatal enamel

NOTE Confidence: 0.831379243636364

 $00:36:53.040 \rightarrow 00:36:55.639$ from post Natal enamel and it's often.

NOTE Confidence: 0.831379243636364

 $00:36:55.640 \dashrightarrow 00:36:57.698$ Is in studies of archaeology and

NOTE Confidence: 0.831379243636364

 $00:36:57.698 \rightarrow 00:37:00.583$ anthropology as as a way of differentiating

NOTE Confidence: 0.831379243636364

 $00{:}37{:}00{.}583 \dashrightarrow 00{:}37{:}02{.}507$ those different time periods.

NOTE Confidence: 0.831379243636364

 $00{:}37{:}02{.}510 \dashrightarrow 00{:}37{:}03{.}610$ But then there's also other

NOTE Confidence: 0.831379243636364

 $00:37:03.610 \longrightarrow 00:37:04.890$ lines that you can look at,

NOTE Confidence: 0.831379243636364

 $00:37:04.890 \rightarrow 00:37:06.400$ and these are generally referred

NOTE Confidence: 0.831379243636364

 $00:37:06.400 \longrightarrow 00:37:07.608$ to as stress lines.

NOTE Confidence: 0.831379243636364

00:37:07.610 -> 00:37:09.270 Whether they happen prenatally,

NOTE Confidence: 0.831379243636364

 $00:37:09.270 \rightarrow 00:37:10.930$ anthropologists don't really know.

NOTE Confidence: 0.831379243636364

 $00:37:10.930 \longrightarrow 00:37:12.232$ So this is part of what

- NOTE Confidence: 0.831379243636364
- 00:37:12.232 --> 00:37:13.855 we're trying to look at, Umm.
- NOTE Confidence: 0.831379243636364
- 00:37:13.855 --> 00:37:16.630 And also these lines occur,
- NOTE Confidence: 0.831379243636364
- $00:37:16.630 \dashrightarrow 00:37:18.534$ as I said, at different time scales.
- NOTE Confidence: 0.831379243636364
- $00{:}37{:}18.540 \dashrightarrow 00{:}37{:}18.950$ So.
- NOTE Confidence: 0.831379243636364
- $00:37:18.950 \longrightarrow 00:37:22.230$ So you can get pretty granular with teeth.
- NOTE Confidence: 0.831379243636364
- $00{:}37{:}22.230 \dashrightarrow 00{:}37{:}24.442$ Most of the work that's been done
- NOTE Confidence: 0.831379243636364
- $00{:}37{:}24{.}442 \dashrightarrow 00{:}37{:}27{.}070$ so far around teeth as markers of
- NOTE Confidence: 0.831379243636364
- 00:37:27.070 --> 00:37:29.085 stress really focus on Physiology,
- NOTE Confidence: 0.831379243636364
- 00:37:29.090 -> 00:37:30.566 physiological stressors,
- NOTE Confidence: 0.831379243636364
- $00:37:30.566 \longrightarrow 00:37:32.780$ so disease, malnutrition.
- NOTE Confidence: 0.831379243636364
- $00:37:32.780 \longrightarrow 00:37:34.868$ The process of our birth and the recording
- NOTE Confidence: 0.831379243636364
- $00{:}37{:}34.868 \dashrightarrow 00{:}37{:}37.578$ of that neonatal line and most of this
- NOTE Confidence: 0.831379243636364
- 00:37:37.578 --> 00:37:38.998 happens in archaeological populations
- NOTE Confidence: 0.831379243636364
- $00{:}37{:}39{.}058 \dashrightarrow 00{:}37{:}40{.}668$ and there is a little bit that's
- NOTE Confidence: 0.831379243636364
- $00{:}37{:}40.668 \dashrightarrow 00{:}37{:}44.390$ going on in more modern populations.
- NOTE Confidence: 0.831379243636364

 $00:37:44.390 \longrightarrow 00:37:46.010$ But what I think is interesting

NOTE Confidence: 0.831379243636364

 $00{:}37{:}46.010 \dashrightarrow 00{:}37{:}47.902$ is that there are primate studies

NOTE Confidence: 0.831379243636364

 $00:37:47.902 \longrightarrow 00:37:50.152$ that have shown that teeth might

NOTE Confidence: 0.831379243636364

 $00:37:50.152 \rightarrow 00:37:51.350$ record psychosocial stress.

NOTE Confidence: 0.831379243636364

00:37:51.350 --> 00:37:53.870 So Simona Lemmers is a postdoc in my group.

NOTE Confidence: 0.831379243636364

 $00:37:53.870 \dashrightarrow 00:37:55.518$ She's a biological anthropologist.

NOTE Confidence: 0.831379243636364

 $00{:}37{:}55{.}518 \dashrightarrow 00{:}37{:}58{.}462$ She's been doing some of this work

NOTE Confidence: 0.831379243636364

 $00:37:58.462 \longrightarrow 00:38:00.457$ and essentially shows that different

NOTE Confidence: 0.831379243636364

 $00{:}38{:}00{.}457 \dashrightarrow 00{:}38{:}03{.}029$ kinds of events that happen within.

NOTE Confidence: 0.831379243636364

 $00:38:03.030 \longrightarrow 00:38:04.170$ For her study,

NOTE Confidence: 0.831379243636364

 $00{:}38{:}04{.}170 \dashrightarrow 00{:}38{:}05{.}310$ it was mandrills.

NOTE Confidence: 0.831379243636364

 $00{:}38{:}05{.}310 \dashrightarrow 00{:}38{:}08{.}454$ So you can see these stress lines appearing

NOTE Confidence: 0.831379243636364

 $00:38:08.454 \rightarrow 00:38:11.310$ shortly after the occurrence of a stressor.

NOTE Confidence: 0.831379243636364

 $00:38:11.310 \longrightarrow 00:38:12.612$ So, for example,

NOTE Confidence: 0.831379243636364

 $00:38:12.612 \rightarrow 00:38:14.348$ you separate the offspring.

NOTE Confidence: 0.831379243636364

 $00{:}38{:}14.350 \dashrightarrow 00{:}38{:}18.048$ From the mother and you'll see that the
- NOTE Confidence: 0.831379243636364
- $00:38:18.048 \rightarrow 00:38:20.946$ baby tooth will show evidence of that
- NOTE Confidence: 0.831379243636364
- $00{:}38{:}20{.}946 \dashrightarrow 00{:}38{:}24{.}076$ calendar timed event appearing in the tooth.
- NOTE Confidence: 0.831379243636364
- $00{:}38{:}24.080 \dashrightarrow 00{:}38{:}27.120$ So it sort of suggests that may be there
- NOTE Confidence: 0.831379243636364
- $00{:}38{:}27{.}120 \dashrightarrow 00{:}38{:}29{.}841$ is something going on about teeth
- NOTE Confidence: 0.831379243636364
- $00:38:29.841 \dashrightarrow 00:38:32.196$ recording these early life stressors.
- NOTE Confidence: 0.831379243636364
- 00:38:32.200 --> 00:38:35.080 So now going from, OK,
- NOTE Confidence: 0.831379243636364
- 00:38:35.080 00:38:36.676 so maybe early life stress can
- NOTE Confidence: 0.831379243636364
- $00:38:36.676 \longrightarrow 00:38:37.740$ get recorded in teeth.
- NOTE Confidence: 0.831379243636364
- 00:38:37.740 --> 00:38:38.002 Well,
- NOTE Confidence: 0.831379243636364
- $00:38:38.002 \longrightarrow 00:38:39.574$ what about teeth as a marker
- NOTE Confidence: 0.831379243636364
- $00:38:39.574 \longrightarrow 00:38:40.360$ of mental health?
- NOTE Confidence: 0.890789982
- $00{:}38{:}40{.}360 \dashrightarrow 00{:}38{:}43{.}204$ Well, there's been work mostly in
- NOTE Confidence: 0.890789982
- 00:38:43.204 --> 00:38:45.481 environmental health showing that pesticides,
- NOTE Confidence: 0.890789982
- $00:38:45.481 \dashrightarrow 00:38:48.148$ things that you can ingest or inhale,
- NOTE Confidence: 0.890789982
- $00:38:48.150 \longrightarrow 00:38:49.540$ those can appear in teeth.
- NOTE Confidence: 0.890789982

- $00:38:49.540 \longrightarrow 00:38:51.175$ And those are also indicative
- NOTE Confidence: 0.890789982
- 00:38:51.175 --> 00:38:52.483 of mental health risks.
- NOTE Confidence: 0.890789982
- $00:38:52.490 \longrightarrow 00:38:54.113$ So for example,
- NOTE Confidence: 0.890789982
- $00:38:54.113 \rightarrow 00:38:57.359$ studies have focused on heavy metals
- NOTE Confidence: 0.890789982
- $00:38:57.359 \rightarrow 00:39:00.535$ and lead like lead and other things,
- NOTE Confidence: 0.890789982
- 00:39:00.535 > 00:39:02.390 and showing risk for a range of.
- NOTE Confidence: 0.890789982
- 00:39:02.390 --> 00:39:03.923 Different psychiatric disorders,
- NOTE Confidence: 0.890789982
- 00:39:03.923 --> 00:39:05.456 autism spectrum disorder,
- NOTE Confidence: 0.890789982
- $00{:}39{:}05{.}460 \dashrightarrow 00{:}39{:}08{.}448$ schizophrenia and the like.
- NOTE Confidence: 0.890789982
- $00:39:08.450 \longrightarrow 00:39:10.262$ But there really hasn't been a
- NOTE Confidence: 0.890789982
- $00:39:10.262 \rightarrow 00:39:12.022$ lot that's been done specifically
- NOTE Confidence: 0.890789982
- 00:39:12.022 --> 00:39:14.186 in child psychiatry, I think,
- NOTE Confidence: 0.890789982
- $00:39:14.186 \dashrightarrow 00:39:15.926$ and in depression in particular.
- NOTE Confidence: 0.890789982
- $00{:}39{:}15{.}930 \dashrightarrow 00{:}39{:}18{.}306$ And I think this is where teeth Perot
- NOTE Confidence: 0.890789982
- $00:39:18.306 \rightarrow 00:39:20.786$ may provide this enormous and unique
- NOTE Confidence: 0.890789982
- $00:39:20.786 \rightarrow 00:39:22.606$ opportunity for primary prevention.

 $00:39:22.610 \rightarrow 00:39:24.714$ So if you think back to the beginning

NOTE Confidence: 0.890789982

 $00:39:24.714 \longrightarrow 00:39:27.082$ of the talk where I shared that 20 to

NOTE Confidence: 0.890789982

 $00:39:27.082 \longrightarrow 00:39:29.531 40\%$ of people will have had a first

NOTE Confidence: 0.890789982

 $00:39:29.531 \longrightarrow 00:39:31.389$ onset of depression before age 21.

NOTE Confidence: 0.890789982

00:39:31.390 --> 00:39:33.366 And you think about what I just shared

NOTE Confidence: 0.890789982

 $00{:}39{:}33{.}366 \dashrightarrow 00{:}39{:}35{.}941$ in terms of the timing of tooth formation

NOTE Confidence: 0.890789982

 $00:39:35.941 \rightarrow 00:39:37.289$ happening early in development,

NOTE Confidence: 0.890789982

 $00:39:37.290 \rightarrow 00:39:38.838$ you can think about every time.

NOTE Confidence: 0.890789982

 $00{:}39{:}38{.}840 \dashrightarrow 00{:}39{:}41{.}227$ Point when teeth are lost as a

NOTE Confidence: 0.890789982

 $00:39:41.227 \longrightarrow 00:39:42.940$ potential opportunity to intervene.

NOTE Confidence: 0.890789982

 $00:39:42.940 \longrightarrow 00:39:44.848$ So the first time happens when

NOTE Confidence: 0.890789982

 $00{:}39{:}44{.}848 \dashrightarrow 00{:}39{:}46{.}120$ teeth are naturally exfoliated,

NOTE Confidence: 0.890789982

 $00:39:46.120 \longrightarrow 00:39:48.157$ they fall out of your mouth around

NOTE Confidence: 0.890789982

00:39:48.157 --> 00:39:50.280 school age, you know, 5 or 6.

NOTE Confidence: 0.890789982

 $00:39:50.280 \rightarrow 00:39:52.555$ Instead of throwing those in the garbage,

 $00:39:52.560 \rightarrow 00:39:54.891$ what if they were potentially used to

NOTE Confidence: 0.890789982

 $00:39:54.891 \rightarrow 00:39:57.090$ help guide primary prevention efforts?

NOTE Confidence: 0.890789982

00:39:57.090 --> 00:39:57.690 Similarly,

NOTE Confidence: 0.890789982

 $00:39:57.690 \longrightarrow 00:40:00.090$ second opportunity comes for

NOTE Confidence: 0.890789982

00:40:00.090 --> 00:40:01.290 orthodontic work.

NOTE Confidence: 0.890789982

 $00:40:01.290 \longrightarrow 00:40:04.091$ So in the US about 20% of kids will

NOTE Confidence: 0.890789982

 $00{:}40{:}04{.}091 \dashrightarrow 00{:}40{:}05{.}933$ have at least one tooth extracted

NOTE Confidence: 0.890789982

 $00{:}40{:}05{.}933 \dashrightarrow 00{:}40{:}07{.}996$ to make room for those braces.

NOTE Confidence: 0.890789982

00:40:08.000 --> 00:40:09.776 Here too is another opportunity and

NOTE Confidence: 0.890789982

 $00{:}40{:}09{.}776 \dashrightarrow 00{:}40{:}12{.}248$ also at a time where we start to

NOTE Confidence: 0.890789982

00:40:12.248 --> 00:40:14.090 see upkicks in risk for depression

NOTE Confidence: 0.890789982

 $00:40:14.158 \rightarrow 00:40:16.228$ and other forms of psychopathology.

NOTE Confidence: 0.890789982

 $00{:}40{:}16{.}230 \dashrightarrow 00{:}40{:}18{.}204$ And then the last time comes with

NOTE Confidence: 0.890789982

 $00{:}40{:}18.204 \dashrightarrow 00{:}40{:}19.530$ wisdom tooth removal surgery.

NOTE Confidence: 0.890789982

 $00:40:19.530 \longrightarrow 00:40:22.694$ So this also happens in that transition

NOTE Confidence: 0.890789982

 $00:40:22.694 \rightarrow 00:40:25.129$ to from adolescence to adulthood,

- NOTE Confidence: 0.890789982
- $00:40:25.130 \longrightarrow 00:40:26.516$ kids are starting to live outside

 $00:40:26.516 \longrightarrow 00:40:27.209$ of the home.

NOTE Confidence: 0.890789982

 $00:40:27.210 \longrightarrow 00:40:29.121$ For the first time we start to

NOTE Confidence: 0.890789982

 $00:40:29.121 \longrightarrow 00:40:30.970$ see psychosis and other major

NOTE Confidence: 0.890789982

00:40:30.970 --> 00:40:31.938 psychiatric disorders.

NOTE Confidence: 0.890789982

 $00{:}40{:}31{.}940 \dashrightarrow 00{:}40{:}33{.}991$ So here imagine again if we might

NOTE Confidence: 0.890789982

 $00:40:33.991 \longrightarrow 00:40:36.672$ be able to use these as potential

NOTE Confidence: 0.890789982

 $00:40:36.672 \rightarrow 00:40:38.837$ biomarkers in combination with other

NOTE Confidence: 0.890789982

 $00{:}40{:}38.837 \dashrightarrow 00{:}40{:}41.338$ tools to help identify kids at risk.

NOTE Confidence: 0.890789982

 $00:40:41.340 \longrightarrow 00:40:44.292$ So so seeing all of these this

NOTE Confidence: 0.890789982

 $00{:}40{:}44{.}292 \dashrightarrow 00{:}40{:}46{.}284$ under you know under studied area

NOTE Confidence: 0.890789982

00:40:46.284 --> 00:40:48.363 and seeing the potential I decided

NOTE Confidence: 0.890789982

 $00{:}40{:}48{.}363 \dashrightarrow 00{:}40{:}50{.}391$ several years ago that I wanted

NOTE Confidence: 0.890789982

 $00{:}40{:}50{.}391 \dashrightarrow 00{:}40{:}52{.}400$ to become the science tooth fairy

NOTE Confidence: 0.890789982

 $00:40:52.400 \rightarrow 00:40:54.920$ and and try to study baby teeth.

 $00{:}40{:}54{.}920 \dashrightarrow 00{:}40{:}57{.}990$ So this is a the cover of a children's.

NOTE Confidence: 0.890789982

 $00{:}40{:}57{.}990 \dashrightarrow 00{:}40{:}59{.}302$ Look, we actually wrote,

NOTE Confidence: 0.890789982

 $00:40:59.302 \rightarrow 00:41:01.919$ so when kids are recruited into our study,

NOTE Confidence: 0.890789982

 $00:41:01.920 \rightarrow 00:41:04.053$ we use this book as a way of talking

NOTE Confidence: 0.890789982

 $00:41:04.053 \rightarrow 00:41:06.296$ with kids and family about why they

NOTE Confidence: 0.890789982

 $00{:}41{:}06{.}296 \dashrightarrow 00{:}41{:}07{.}999$ should donate their teeth to us.

NOTE Confidence: 0.890789982

00:41:08.000 --> 00:41:09.120 I have copies of the book too,

NOTE Confidence: 0.890789982

 $00:41:09.120 \longrightarrow 00:41:11.840$ if anyone's interested in it.

NOTE Confidence: 0.890789982

00:41:11.840 --> 00:41:13.268 I'll just share a very high level,

NOTE Confidence: 0.890789982

 $00:41:13.270 \rightarrow 00:41:15.110$ a couple of ideas part in the pond,

NOTE Confidence: 0.890789982

 $00{:}41{:}15{.}110 \dashrightarrow 00{:}41{:}17{.}072$ but I just have to. I love puns.

NOTE Confidence: 0.890789982

00:41:17.072 --> 00:41:19.270 Well, we've been sinking our teeth into,

NOTE Confidence: 0.890789982

 $00{:}41{:}19{.}270 \dashrightarrow 00{:}41{:}21{.}286$ in terms of this teeth conceptual model.

NOTE Confidence: 0.890789982

00:41:21.290 --> 00:41:24.170 So Simona Lemmers, Mona lawyer,

NOTE Confidence: 0.890789982

 $00{:}41{:}24{.}170 \dashrightarrow 00{:}41{:}26{.}466$ 2 postdocs in my lab and Ryan Lisanne,

NOTE Confidence: 0.890789982

 $00:41:26.470 \longrightarrow 00:41:29.480$ who's a pediatric dental resident

- NOTE Confidence: 0.890789982
- $00:41:29.480 \longrightarrow 00:41:30.684$ at Children's.
- NOTE Confidence: 0.890789982
- $00:41:30.690 \longrightarrow 00:41:32.472$ So we've been doing work on
- NOTE Confidence: 0.890789982
- $00:41:32.472 \longrightarrow 00:41:33.363$ the empirical side,
- NOTE Confidence: 0.882297653157895
- 00:41:33.370 --> 00:41:35.645 you know, can we see evidence of
- NOTE Confidence: 0.882297653157895
- $00{:}41{:}35.645 \dashrightarrow 00{:}41{:}37.993$ markers in in teeth being predicted
- NOTE Confidence: 0.882297653157895
- $00:41:37.993 \longrightarrow 00:41:40.585$ by exposure to early life stress?
- NOTE Confidence: 0.882297653157895
- $00:41:40.590 \longrightarrow 00:41:41.970$ We published a paper.
- NOTE Confidence: 0.882297653157895
- $00{:}41{:}41{.}970 \dashrightarrow 00{:}41{:}44{.}538$ Last year showing that markers of Mom
- NOTE Confidence: 0.882297653157895
- $00{:}41{:}44{.}538 \dashrightarrow 00{:}41{:}46{.}673$ depression and social support were
- NOTE Confidence: 0.882297653157895
- $00{:}41{:}46.673 \dashrightarrow 00{:}41{:}48.791$ associated with that neonatal line
- NOTE Confidence: 0.882297653157895
- $00{:}41{:}48.791 \dashrightarrow 00{:}41{:}50.837$ and in the direction we expected.
- NOTE Confidence: 0.882297653157895
- $00{:}41{:}50{.}840 \dashrightarrow 00{:}41{:}53{.}648$ So more stressful births in the
- NOTE Confidence: 0.882297653157895
- $00:41:53.648 \rightarrow 00:41:55.520$ form of higher psychopathology,
- NOTE Confidence: 0.882297653157895
- 00:41:55.520 --> 00:41:57.380 wider neonatal line,
- NOTE Confidence: 0.882297653157895
- $00:41:57.380 \rightarrow 00:41:59.860$ conversely more social support,
- NOTE Confidence: 0.882297653157895

00:41:59.860 --> 00:42:02.398 narrower neonatal line.

NOTE Confidence: 0.882297653157895

 $00:42:02.400 \longrightarrow 00:42:04.800$ And that was also pack.

NOTE Confidence: 0.882297653157895

 $00:42:04.800 \longrightarrow 00:42:06.420$ We also started a study,

NOTE Confidence: 0.882297653157895

 $00:42:06.420 \longrightarrow 00:42:07.730$ we just finished recruitment for

NOTE Confidence: 0.882297653157895

 $00{:}42{:}07{.}730 \dashrightarrow 00{:}42{:}09{.}357$ it in the spring called strong

NOTE Confidence: 0.882297653157895

 $00{:}42{:}09{.}357 \dashrightarrow 00{:}42{:}10.712$ the stories teeth record of

NOTE Confidence: 0.882297653157895

 $00:42:10.712 \longrightarrow 00:42:12.080$ newborn growth where we have.

NOTE Confidence: 0.882297653157895

 $00:42:12.080 \longrightarrow 00:42:13.440$ In recruiting the moms,

NOTE Confidence: 0.882297653157895

 $00:42:13.440 \rightarrow 00:42:15.140$ recruiting the offspring of women

NOTE Confidence: 0.882297653157895

 $00{:}42{:}15{.}140 \dashrightarrow 00{:}42{:}17{.}044$ who are pregnant or raising a

NOTE Confidence: 0.882297653157895

 $00:42:17.044 \longrightarrow 00:42:18.549$ newborn during the timing of

NOTE Confidence: 0.882297653157895

 $00{:}42{:}18.608 \dashrightarrow 00{:}42{:}20.168$ the Boston Marathon bombing.

NOTE Confidence: 0.882297653157895

 $00{:}42{:}20.170 \dashrightarrow 00{:}42{:}22.429$ So the idea here is we have a calendar

NOTE Confidence: 0.882297653157895

 $00{:}42{:}22{.}429 \dashrightarrow 00{:}42{:}24{.}289$ dated major stressful life event.

NOTE Confidence: 0.882297653157895

 $00{:}42{:}24{.}290 \dashrightarrow 00{:}42{:}27{.}008$ Can we see evidence of that

NOTE Confidence: 0.882297653157895

 $00:42:27.008 \longrightarrow 00:42:28.820$ recorded in kids teeth?

 $00{:}42{:}28.820 \dashrightarrow 00{:}42{:}30.676$ We've also been doing work to then link

NOTE Confidence: 0.882297653157895

 $00:42:30.676 \longrightarrow 00:42:32.768$ what we see in teeth with mental health.

NOTE Confidence: 0.882297653157895

00:42:32.770 --> 00:42:34.960 So we published a paper showing

NOTE Confidence: 0.882297653157895

 $00:42:34.960 \longrightarrow 00:42:36.870$ that markers derived from micro

NOTE Confidence: 0.882297653157895

 $00{:}42{:}36.870 \dashrightarrow 00{:}42{:}39.138$ CT of enamel volume and thickness

NOTE Confidence: 0.882297653157895

 $00:42:39.138 \longrightarrow 00:42:40.876$ predicted levels of psychopathology

NOTE Confidence: 0.882297653157895

 $00{:}42{:}40.876 \dashrightarrow 00{:}42{:}43.546$ symptoms in kindergarten age kids.

NOTE Confidence: 0.882297653157895

 $00{:}42{:}43.550 \dashrightarrow 00{:}42{:}45.818$ And then we also have some work

NOTE Confidence: 0.882297653157895

 $00:42:45.818 \longrightarrow 00:42:47.915$ looking at kind of the timing

NOTE Confidence: 0.882297653157895

 $00{:}42{:}47{.}915 \dashrightarrow 00{:}42{:}50{.}027$ and pacing of these growth marks

NOTE Confidence: 0.882297653157895

 $00:42:50.030 \rightarrow 00:42:52.530$ predicting weight gain in adolescence.

NOTE Confidence: 0.882297653157895

 $00{:}42{:}52{.}530 \dashrightarrow 00{:}42{:}53{.}754$ And then the last thing that

NOTE Confidence: 0.882297653157895

 $00:42:53.754 \longrightarrow 00:42:55.134$ we've been working on are more

NOTE Confidence: 0.882297653157895

 $00{:}42{:}55{.}134 \dashrightarrow 00{:}42{:}56{.}170$ feasibility kinds of studies.

NOTE Confidence: 0.882297653157895

 $00:42:56.170 \longrightarrow 00:42:58.230$ So teeth are new biomarkers,

 $00:42:58.230 \longrightarrow 00:42:59.070$ you know we need to.

NOTE Confidence: 0.882297653157895

00:42:59.070 --> 00:42:59.554 You know,

NOTE Confidence: 0.882297653157895

 $00{:}42{:}59{.}554 \dashrightarrow 00{:}43{:}00{.}522$ it's scientists and clinicians

NOTE Confidence: 0.882297653157895

 $00:43:00.522 \longrightarrow 00:43:02.090$ how we should be talking about

NOTE Confidence: 0.882297653157895

 $00:43:02.090 \rightarrow 00:43:03.460$ them with parents and families,

NOTE Confidence: 0.882297653157895

 $00{:}43{:}03{.}460 \dashrightarrow 00{:}43{:}04{.}728$ particularly help us understand

NOTE Confidence: 0.882297653157895

 $00:43:04.728 \longrightarrow 00:43:06.313$ how we can use them.

NOTE Confidence: 0.882297653157895

 $00:43:06.320 \longrightarrow 00:43:08.120$ So we've also been doing studies

NOTE Confidence: 0.882297653157895

 $00:43:08.120 \longrightarrow 00:43:09.320$ to try to understand.

NOTE Confidence: 0.882297653157895

 $00:43:09.320 \longrightarrow 00:43:12.056$ What do people think about teeth?

NOTE Confidence: 0.882297653157895

 $00{:}43{:}12.060 \dashrightarrow 00{:}43{:}13.986$ I I laugh when I get emails about them.

NOTE Confidence: 0.882297653157895

00:43:13.990 --> 00:43:15.766 Sometimes Mom will say, you know,

NOTE Confidence: 0.882297653157895

00:43:15.770 --> 00:43:18.858 dear Doctor Dunn, I've read about your study.

NOTE Confidence: 0.882297653157895

 $00:43:18.860 \longrightarrow 00:43:20.468$ I saved my child's baby teeth.

NOTE Confidence: 0.882297653157895

 $00:43:20.470 \dashrightarrow 00:43:22.550$ And then it's either one of two things.

NOTE Confidence: 0.882297653157895

 $00:43:22.550 \rightarrow 00:43:24.790$ I'm so glad I saved them or you.

- NOTE Confidence: 0.882297653157895
- 00:43:24.790 --> 00:43:25.525 Isn't that gross?
- NOTE Confidence: 0.882297653157895
- $00:43:25.525 \rightarrow 00:43:27.240$ I don't know why I saved them.
- NOTE Confidence: 0.882297653157895
- $00:43:27.240 \longrightarrow 00:43:28.744$ Something along those lines.
- NOTE Confidence: 0.882297653157895
- $00{:}43{:}28.744 \dashrightarrow 00{:}43{:}29.120$ So.
- NOTE Confidence: 0.882297653157895
- $00{:}43{:}29{.}120 \dashrightarrow 00{:}43{:}30{.}541$ I think there's a lot that we
- NOTE Confidence: 0.882297653157895
- $00:43:30.541 \rightarrow 00:43:31.390$ can potentially learn here,
- NOTE Confidence: 0.882297653157895
- $00{:}43{:}31{.}390 \dashrightarrow 00{:}43{:}33{.}455$ and I think that will be important
- NOTE Confidence: 0.882297653157895
- $00:43:33.455 \longrightarrow 00:43:35.112$ for building a solid foundation
- NOTE Confidence: 0.882297653157895
- $00:43:35.112 \longrightarrow 00:43:36.877$ for this work to unfold.
- NOTE Confidence: 0.882297653157895
- 00:43:36.880 --> 00:43:39.310 So let me just wrap up by saying a
- NOTE Confidence: 0.882297653157895
- $00:43:39.310 \longrightarrow 00:43:41.367$ little bit more on the translational
- NOTE Confidence: 0.882297653157895
- $00{:}43{:}41{.}367 \dashrightarrow 00{:}43{:}44{.}239$ side in terms of where I see this
- NOTE Confidence: 0.882297653157895
- 00:43:44.239 --> 00:43:46.417 work potentially going in terms of
- NOTE Confidence: 0.882297653157895
- $00{:}43{:}46{.}417 \dashrightarrow 00{:}43{:}48{.}214$ promoting resilience and trying
- NOTE Confidence: 0.882297653157895
- $00:43:48.214 \longrightarrow 00:43:50.126$ to reduce health disparities.
- NOTE Confidence: 0.882297653157895

 $00:43:50.130 \rightarrow 00:43:51.964$ You know we talked very early on

NOTE Confidence: 0.882297653157895

 $00:43:51.964 \longrightarrow 00:43:54.015$ in the pandemic about us living

NOTE Confidence: 0.882297653157895

 $00:43:54.015 \rightarrow 00:43:55.218$ through unprecedented times.

NOTE Confidence: 0.882297653157895

 $00:43:55.220 \rightarrow 00:43:56.180$ I don't feel like we,

NOTE Confidence: 0.882297653157895

 $00:43:56.180 \longrightarrow 00:43:57.416$ you hear that as much now,

NOTE Confidence: 0.882297653157895

 $00:43:57.420 \rightarrow 00:43:59.740$ but I still think we very much are.

NOTE Confidence: 0.882297653157895

00:43:59.740 --> 00:44:00.631 So you know,

NOTE Confidence: 0.882297653157895

00:44:00.631 - 00:44:02.413 we have all these stressors that

NOTE Confidence: 0.882297653157895

 $00{:}44{:}02{.}413 \dashrightarrow 00{:}44{:}04{.}537$ people experience before the pandemic,

NOTE Confidence: 0.882297653157895

 $00:44:04.540 \rightarrow 00:44:07.095$ you know add on these additional stressors.

NOTE Confidence: 0.882297653157895

 $00{:}44{:}07.100 \dashrightarrow 00{:}44{:}08.725$ That people are experiencing as

NOTE Confidence: 0.882297653157895

 $00{:}44{:}08.725 \dashrightarrow 00{:}44{:}10.350$ a result of the pandemic.

NOTE Confidence: 0.882297653157895

00:44:10.350 --> 00:44:12.310 But I also think simultaneously

NOTE Confidence: 0.882297653157895

 $00{:}44{:}12.310 \dashrightarrow 00{:}44{:}14.677$ we're seeing these shifts that are

NOTE Confidence: 0.882297653157895

 $00{:}44{:}14.677 \dashrightarrow 00{:}44{:}17.022$ happening largely as a result of the

NOTE Confidence: 0.882297653157895

00:44:17.022 --> 00:44:19.150 civil rights movement around racial

- NOTE Confidence: 0.882297653157895
- $00:44:19.150 \rightarrow 00:44:20.998$ equality and some institutional
- NOTE Confidence: 0.882297653157895
- $00:44:20.998 \longrightarrow 00:44:22.384$ practices that are
- NOTE Confidence: 0.932483985
- $00:44:22.390 \longrightarrow 00:44:27.198$ starting to shift where.
- NOTE Confidence: 0.932483985
- 00:44:27.200 --> 00:44:29.280 Oh, OK. Thank you.
- NOTE Confidence: 0.932483985
- $00:44:29.280 \longrightarrow 00:44:31.156$ Umm, where we're seeing some
- NOTE Confidence: 0.932483985
- 00:44:31.156 --> 00:44:32.512 movement to potentially better
- NOTE Confidence: 0.932483985
- $00:44:32.512 \longrightarrow 00:44:34.000$ address some of these areas.
- NOTE Confidence: 0.932483985
- $00{:}44{:}34{.}000 \dashrightarrow 00{:}44{:}36{.}328$ And I think where we are as scientists
- NOTE Confidence: 0.932483985
- $00{:}44{:}36{.}328 \dashrightarrow 00{:}44{:}38{.}340$ and also as clinicians is that,
- NOTE Confidence: 0.932483985
- 00:44:38.340 -> 00:44:39.996 you know, we have the chance to really,
- NOTE Confidence: 0.932483985
- $00{:}44{:}40.000 \dashrightarrow 00{:}44{:}43.056$ I think, develop a deeper and more meaningful
- NOTE Confidence: 0.932483985
- $00:44:43.056 \rightarrow 00:44:45.200$ research agenda to try to understand,
- NOTE Confidence: 0.932483985
- 00:44:45.200 --> 00:44:47.610 you know, opportunities to identify
- NOTE Confidence: 0.932483985
- $00{:}44{:}47.610 \dashrightarrow 00{:}44{:}50.642$ ways to promote health and reduce
- NOTE Confidence: 0.932483985
- $00{:}44{:}50{.}642 \dashrightarrow 00{:}44{:}53{.}362$ risk and build some interventions
- NOTE Confidence: 0.932483985

 $00:44:53.362 \longrightarrow 00:44:55.538$ to really promote resilience.

NOTE Confidence: 0.932483985

 $00{:}44{:}55{.}540 \dashrightarrow 00{:}44{:}57{.}250$ I think there's at least two.

NOTE Confidence: 0.932483985

 $00:44:57.250 \longrightarrow 00:44:58.438$ Main starting points for

NOTE Confidence: 0.932483985

 $00:44:58.438 \longrightarrow 00:45:00.660$ where we can go in this front,

NOTE Confidence: 0.932483985

 $00{:}45{:}00{.}660 \dashrightarrow 00{:}45{:}02{.}980$ I think one is we spend a ton

NOTE Confidence: 0.932483985

 $00:45:02.980 \longrightarrow 00:45:05.220$ of time focusing on the bad.

NOTE Confidence: 0.932483985

 $00:45:05.220 \rightarrow 00:45:08.360$ We do a lot of work and adversity and trauma,

NOTE Confidence: 0.932483985

00:45:08.360 --> 00:45:08.800 you know,

NOTE Confidence: 0.932483985

 $00{:}45{:}08.800 \dashrightarrow 00{:}45{:}10.120$ and I think the resilience world,

NOTE Confidence: 0.932483985

 $00:45:10.120 \longrightarrow 00:45:11.112$ there's definitely been a

NOTE Confidence: 0.932483985

 $00{:}45{:}11.112 \dashrightarrow 00{:}45{:}12.600$ lot of work in this area,

NOTE Confidence: 0.932483985

 $00:45:12.600 \longrightarrow 00:45:14.856$ but I don't think that the

NOTE Confidence: 0.932483985

 $00:45:14.856 \rightarrow 00:45:16.360$ resilience work has necessarily

NOTE Confidence: 0.932483985

 $00:45:16.433 \longrightarrow 00:45:18.455$ been as integrated in areas of

NOTE Confidence: 0.932483985

 $00{:}45{:}18{.}455 \dashrightarrow 00{:}45{:}20{.}459$ biology where I think it could.

NOTE Confidence: 0.932483985

 $00:45:20.460 \longrightarrow 00:45:22.422$ So I was sharing with some of you that

 $00:45:22.422 \rightarrow 00:45:24.364$ we just had a grant that hopefully

NOTE Confidence: 0.932483985

 $00:45:24.364 \rightarrow 00:45:26.419$ will get funded that will allow us

NOTE Confidence: 0.932483985

 $00:45:26.419 \rightarrow 00:45:28.195$ to look at the biological embedding.

NOTE Confidence: 0.932483985

00:45:28.200 --> 00:45:29.070 Of protective factors.

NOTE Confidence: 0.932483985

 $00{:}45{:}29{.}070 \dashrightarrow 00{:}45{:}31{.}100$ And I think this is something that

NOTE Confidence: 0.932483985

 $00{:}45{:}31{.}152 \dashrightarrow 00{:}45{:}33{.}114$ we need to bring in as part of our

NOTE Confidence: 0.932483985

 $00{:}45{:}33.114 \dashrightarrow 00{:}45{:}35.006$ research model so that we're not just

NOTE Confidence: 0.932483985

 $00{:}45{:}35{.}006 \dashrightarrow 00{:}45{:}37{.}004$ studying risk because we know that

NOTE Confidence: 0.932483985

 $00{:}45{:}37.004 \dashrightarrow 00{:}45{:}39.289$ risk alone doesn't predict outcomes,

NOTE Confidence: 0.932483985

 $00{:}45{:}39{.}290 \dashrightarrow 00{:}45{:}41{.}118$ but it's a constellation

NOTE Confidence: 0.932483985

 $00:45:41.118 \longrightarrow 00:45:42.489$ of different factors.

NOTE Confidence: 0.932483985

 $00{:}45{:}42{.}490 \dashrightarrow 00{:}45{:}44{.}570$ I think the other thing too is that

NOTE Confidence: 0.932483985

 $00{:}45{:}44{.}570 \dashrightarrow 00{:}45{:}46{.}930$ we also need to do more to develop

NOTE Confidence: 0.932483985

 $00{:}45{:}46{.}930 \dashrightarrow 00{:}45{:}48{.}708$ and implement tools to measure

NOTE Confidence: 0.932483985

 $00{:}45{:}48.708 \dashrightarrow 00{:}45{:}50.812$ childhood adversity and differentiate

 $00:45:50.812 \rightarrow 00:45:52.916$ exposure from the biological

NOTE Confidence: 0.932483985

 $00{:}45{:}52{.}916$ --> $00{:}45{:}54{.}368$ consequences of that exposure.

NOTE Confidence: 0.932483985

 $00:45:54.368 \rightarrow 00:45:56.872$ And I think this is really, really hard,

NOTE Confidence: 0.932483985

 $00:45:56.872 \rightarrow 00:45:58.858$ but I'm hoping maybe we're baby.

NOTE Confidence: 0.932483985

 $00{:}45{:}58.860 \dashrightarrow 00{:}46{:}00.729$ Keith and and some of our epigenetic

NOTE Confidence: 0.932483985

 $00{:}46{:}00{.}729$ --> $00{:}46{:}03{.}359$ work can go and I think this is really NOTE Confidence: 0.932483985

 $00:46:03.359 \rightarrow 00:46:05.131$ critical because you might find that

NOTE Confidence: 0.932483985

 $00:46:05.131 \rightarrow 00:46:07.000$ some kid has the exposure but seems

NOTE Confidence: 0.932483985

 $00{:}46{:}07{.}000 \dashrightarrow 00{:}46{:}09{.}118$ to be doing OK you know there's

NOTE Confidence: 0.932483985

 $00{:}46{:}09{.}118 \dashrightarrow 00{:}46{:}11{.}030$ individual differences in this adversities,

NOTE Confidence: 0.932483985

00:46:11.030 --> 00:46:11.814 not deterministic.

NOTE Confidence: 0.932483985

 $00{:}46{:}11.814 \dashrightarrow 00{:}46{:}14.558$ So I think being able to disentangle

NOTE Confidence: 0.932483985

 $00{:}46{:}14.558 \dashrightarrow 00{:}46{:}17.015$ these is going to be really critical.

NOTE Confidence: 0.932483985

 $00:46:17.020 \longrightarrow 00:46:19.588$ In terms of the applications and

NOTE Confidence: 0.932483985

 $00:46:19.588 \rightarrow 00:46:21.300$ implications of the epigenetics

NOTE Confidence: 0.932483985

00:46:21.366 --> 00:46:23.636 and exfoliated primary teeth work,

- NOTE Confidence: 0.932483985
- 00:46:23.640 --> 00:46:25.130 you know, I'm an epidemiologist,
- NOTE Confidence: 0.932483985
- $00:46:25.130 \longrightarrow 00:46:27.167$ so I don't always have the the
- NOTE Confidence: 0.932483985
- $00:46:27.167 \longrightarrow 00:46:29.568$ the fortune of being able to talk
- NOTE Confidence: 0.932483985
- $00:46:29.568 \longrightarrow 00:46:31.024$ with parents and families.
- NOTE Confidence: 0.932483985
- 00:46:31.030 --> 00:46:32.262 But when I do,
- NOTE Confidence: 0.932483985
- $00{:}46{:}32.262 \dashrightarrow 00{:}46{:}34.749$ I'm always struck by the questions they ask.
- NOTE Confidence: 0.932483985
- $00:46:34.750 \rightarrow 00:46:36.880$ And they always ask two things.
- NOTE Confidence: 0.932483985
- 00:46:36.880 00:46:38.448 The first thing is they want answers.
- NOTE Confidence: 0.932483985
- $00{:}46{:}38{.}450 \dashrightarrow 00{:}46{:}40{.}658$ They want to know why did my loved
- NOTE Confidence: 0.932483985
- $00:46:40.658 \rightarrow 00:46:42.590$ one develop a mental health issue?
- NOTE Confidence: 0.932483985
- 00:46:42.590 --> 00:46:44.542 They want to know if you know their
- NOTE Confidence: 0.932483985
- $00:46:44.542 \rightarrow 00:46:46.129$ child being exposed at this age,
- NOTE Confidence: 0.932483985
- $00:46:46.130 \longrightarrow 00:46:47.090$ you know, caused this,
- NOTE Confidence: 0.932483985
- $00:46:47.090 \longrightarrow 00:46:48.530$ and then they also want hope.
- NOTE Confidence: 0.932483985
- 00:46:48.530 00:46:50.490 They want to know what can be done
- NOTE Confidence: 0.932483985

 $00:46:50.490 \longrightarrow 00:46:51.979$ to prevent some mental health

NOTE Confidence: 0.932483985

 $00{:}46{:}51{.}979 \dashrightarrow 00{:}46{:}53{.}863$ issue and someone else they love.

NOTE Confidence: 0.932483985

00:46:53.870 --> 00:46:55.388 And so I think, you know,

NOTE Confidence: 0.932483985

 $00:46:55.390 \rightarrow 00:46:56.730$ what if baby teeth,

NOTE Confidence: 0.932483985

 $00{:}46{:}56{.}730 \dashrightarrow 00{:}46{:}58{.}405$ when paired with existing tools

NOTE Confidence: 0.932483985

00:46:58.405 --> 00:47:00.408 and insights like family history

NOTE Confidence: 0.932483985

 $00:47:00.408 \rightarrow 00:47:02.408$ and genetic and other markers,

NOTE Confidence: 0.932483985

 $00:47:02.410 \longrightarrow 00:47:04.375$ could provide answers to some

NOTE Confidence: 0.932483985

 $00{:}47{:}04{.}375 \dashrightarrow 00{:}47{:}05{.}947$ of these burning questions.

NOTE Confidence: 0.932483985

00:47:05.950 --> 00:47:06.952 And you know,

NOTE Confidence: 0.932483985

 $00:47:06.952 \rightarrow 00:47:08.622$ they these things are something

NOTE Confidence: 0.932483985

 $00:47:08.622 \longrightarrow 00:47:09.290$ that naturally

NOTE Confidence: 0.8570116992

 $00:47:09.354 \rightarrow 00:47:11.910$ fall out of our mouth and most times they're

NOTE Confidence: 0.8570116992

 $00:47:11.910 \longrightarrow 00:47:13.926$ either stored or they're thrown away.

NOTE Confidence: 0.8570116992

 $00:47:13.930 \longrightarrow 00:47:16.275$ But what if instead, these really hidden

NOTE Confidence: 0.8570116992

00:47:16.275 --> 00:47:18.641 in plain sight objects could be used

 $00:47:18.641 \longrightarrow 00:47:20.973$ to give new insights that could help

NOTE Confidence: 0.8570116992

00:47:20.973 --> 00:47:23.269 identify people that might be at risk,

NOTE Confidence: 0.8570116992

 $00{:}47{:}23.270 \dashrightarrow 00{:}47{:}26.918$ and use the data from that to target

NOTE Confidence: 0.8570116992

 $00:47:26.918 \rightarrow 00:47:30.470$ towards specific strategies for prevention?

NOTE Confidence: 0.8570116992

00:47:30.470 --> 00:47:32.900 And I think this is where maybe one day

NOTE Confidence: 0.8570116992

 $00{:}47{:}32{.}900 \dashrightarrow 00{:}47{:}35{.}658$ we might be able to add methylation

NOTE Confidence: 0.8570116992

 $00:47:35.658 \rightarrow 00:47:37.719$ signatures or these epigenetic signatures

NOTE Confidence: 0.8570116992

 $00:47:37.719 \rightarrow 00:47:40.687$ and teeth as part of our screening tools.

NOTE Confidence: 0.8570116992

 $00:47:40.690 \rightarrow 00:47:43.074$ So, you know, imagine a world where somewhere

NOTE Confidence: 0.8570116992

 $00:47:43.074 \rightarrow 00:47:45.390$ in the future a child loses a tooth,

NOTE Confidence: 0.8570116992

 $00:47:45.390 \longrightarrow 00:47:47.106$ whether it falls out,

NOTE Confidence: 0.8570116992

00:47:47.106 --> 00:47:48.822 it's lost for orthodontia

NOTE Confidence: 0.8570116992

 $00:47:48.822 \rightarrow 00:47:50.810$ or wisdom tooth surgery.

NOTE Confidence: 0.8570116992

 $00{:}47{:}50{.}810 \dashrightarrow 00{:}47{:}54{.}302$ And that tooth is taken to a health care

NOTE Confidence: 0.8570116992

 $00{:}47{:}54.302 \dashrightarrow 00{:}47{:}56.514$ provider who sends it off then to

 $00:47:56.514 \longrightarrow 00:47:58.509$ a specialized lab and that that

NOTE Confidence: 0.8570116992

 $00:47:58.509 \longrightarrow 00:48:00.720$ lab is then able to combine.

NOTE Confidence: 0.8570116992

00:48:00.720 --> 00:48:02.890 Data from other omic markers,

NOTE Confidence: 0.8570116992

 $00:48:02.890 \rightarrow 00:48:05.100$ genetic markers and epigenetic markers

NOTE Confidence: 0.8570116992

 $00{:}48{:}05{.}100 \dashrightarrow 00{:}48{:}07{.}760$ and survey data about early life

NOTE Confidence: 0.8570116992

 $00{:}48{:}07.760 \dashrightarrow 00{:}48{:}10.046$ stress and other stressors and more

NOTE Confidence: 0.8570116992

 $00:48:10.046 \longrightarrow 00:48:12.737$ about the family context and pair that

NOTE Confidence: 0.8570116992

 $00:48:12.737 \longrightarrow 00:48:15.232$ with family history data and that you

NOTE Confidence: 0.8570116992

 $00{:}48{:}15{.}232 \dashrightarrow 00{:}48{:}17{.}206$ could then use that to then identify

NOTE Confidence: 0.8570116992

 $00{:}48{:}17.206 \dashrightarrow 00{:}48{:}19.781$ people who might be at highest risk and

NOTE Confidence: 0.8570116992

 $00{:}48{:}19.781 \dashrightarrow 00{:}48{:}21.750$ connect them with preventative treatments.

NOTE Confidence: 0.8570116992

 $00:48:21.750 \longrightarrow 00:48:22.982$ I think there's a lot we have

NOTE Confidence: 0.8570116992

 $00:48:22.982 \longrightarrow 00:48:24.070$ to do on this space,

NOTE Confidence: 0.8570116992

00:48:24.070 --> 00:48:25.876 but I think it's really promising when

NOTE Confidence: 0.8570116992

00:48:25.876 - 00:48:27.729 we think about what we know already,

NOTE Confidence: 0.8570116992

 $00:48:27.730 \rightarrow 00:48:29.668$ we know that exercise is protective,

- NOTE Confidence: 0.8570116992
- $00:48:29.670 \longrightarrow 00:48:30.890$ we know that social support.

 $00:48:30.890 \longrightarrow 00:48:31.164$ Protective.

NOTE Confidence: 0.8570116992

 $00:48:31.164 \longrightarrow 00:48:33.630$ So can we get that data in the hands

NOTE Confidence: 0.8570116992

 $00{:}48{:}33.694 \dashrightarrow 00{:}48{:}35.494$ of people and create interventions

NOTE Confidence: 0.8570116992

 $00:48:35.494 \rightarrow 00:48:37.609$ that really leverage that so that

NOTE Confidence: 0.8570116992

 $00:48:37.609 \rightarrow 00:48:39.127$ we can try to reduce risk?

NOTE Confidence: 0.8570116992

 $00{:}48{:}39{.}130 \dashrightarrow 00{:}48{:}40{.}817$ And it might also be someday too

NOTE Confidence: 0.8570116992

 $00{:}48{:}40{.}817 \dashrightarrow 00{:}48{:}42{.}652$ that we're able to shift these

NOTE Confidence: 0.8570116992

 $00:48:42.652 \longrightarrow 00:48:43.708$ methylation signatures too.

NOTE Confidence: 0.8570116992

 $00{:}48{:}43.710 \dashrightarrow 00{:}48{:}45.486$ So we see something turning on

NOTE Confidence: 0.8570116992

 $00:48:45.486 \longrightarrow 00:48:46.670$ that might be deleterious,

NOTE Confidence: 0.8570116992

00:48:46.670 --> 00:48:48.918 maybe there's an intervention,

NOTE Confidence: 0.8570116992

 $00:48:48.918 \longrightarrow 00:48:50.604$ biological or not,

NOTE Confidence: 0.8570116992

 $00{:}48{:}50{.}610 \dashrightarrow 00{:}48{:}53{.}190$ that can also produce those shifts.

NOTE Confidence: 0.8570116992

 $00:48:53.190 \longrightarrow 00:48:54.828$ And then in just my last slide,

 $00:48:54.830 \longrightarrow 00:48:57.827$ I'll also say too that I think one thing

NOTE Confidence: 0.8570116992

00:48:57.827 -> 00:49:00.676 that we also want to be mindful of IS,

NOTE Confidence: 0.8570116992

 $00:49:00.680 \longrightarrow 00:49:01.032$ is.

NOTE Confidence: 0.8570116992

 $00:49:01.032 \rightarrow 00:49:03.496$ This idea of of screening and I

NOTE Confidence: 0.8570116992

 $00{:}49{:}03{.}496 \dashrightarrow 00{:}49{:}05{.}856$ think there's a lot of interest

NOTE Confidence: 0.8570116992

 $00:49:05.856 \longrightarrow 00:49:07.436$ in people doing screening.

NOTE Confidence: 0.8570116992

 $00{:}49{:}07{.}440 \dashrightarrow 00{:}49{:}10{.}040$ I think we have to be careful around

NOTE Confidence: 0.8570116992

 $00:49:10.040 \rightarrow 00:49:12.356$ screening though and we published this,

NOTE Confidence: 0.8570116992

 $00{:}49{:}12.360 \dashrightarrow 00{:}49{:}14.960$ this commentary a couple months

NOTE Confidence: 0.8570116992

 $00{:}49{:}14.960 \dashrightarrow 00{:}49{:}16.936$ ago where we tried to just put a

NOTE Confidence: 0.8570116992

00:49:16.936 --> 00:49:18.495 little bit of context around this

NOTE Confidence: 0.8570116992

 $00{:}49{:}18{.}495 \dashrightarrow 00{:}49{:}20{.}253$ area of screening because I think

NOTE Confidence: 0.8570116992

 $00{:}49{:}20.253 \dashrightarrow 00{:}49{:}22.146$ we're at this tipping point where

NOTE Confidence: 0.8570116992

 $00:49:22.146 \longrightarrow 00:49:23.076$ there's the potential,

NOTE Confidence: 0.8570116992

 $00:49:23.080 \rightarrow 00:49:25.228$ the real potential for screening for

NOTE Confidence: 0.8570116992

 $00:49:25.228 \rightarrow 00:49:27.036$ childhood adversity to do potential

- NOTE Confidence: 0.8570116992
- $00:49:27.036 \longrightarrow 00:49:28.914$ more harm than it does good.

 $00:49:28.920 \longrightarrow 00:49:30.424$ So in this commentary.

NOTE Confidence: 0.8570116992

 $00:49:30.424 \rightarrow 00:49:32.304$ We just described some recommendations

NOTE Confidence: 0.8570116992

 $00:49:32.304 \longrightarrow 00:49:34.335$ that folks should consider when

NOTE Confidence: 0.8570116992

 $00:49:34.335 \rightarrow 00:49:36.330$ deploying these kinds of screenings.

NOTE Confidence: 0.8570116992

00:49:36.330 --> 00:49:37.227 And you know,

NOTE Confidence: 0.8570116992

 $00{:}49{:}37{.}227 \dashrightarrow 00{:}49{:}39{.}021$ being very clear about what things

NOTE Confidence: 0.8570116992

 $00:49:39.021 \rightarrow 00:49:40.577$ measure and and deploying screening

NOTE Confidence: 0.8570116992

 $00{:}49{:}40{.}577 \dashrightarrow 00{:}49{:}43{.}141$ at the right time and making sure that

NOTE Confidence: 0.8570116992

 $00{:}49{:}43{.}141 \dashrightarrow 00{:}49{:}45{.}265$ there are appropriate interventions to use.

NOTE Confidence: 0.8570116992

 $00{:}49{:}45{.}270 \dashrightarrow 00{:}49{:}47{.}052$ And also just creating systems that

NOTE Confidence: 0.8570116992

 $00{:}49{:}47.052 \dashrightarrow 00{:}49{:}48.613$ are nimble and adaptable knowing

NOTE Confidence: 0.8570116992

 $00{:}49{:}48.613 \dashrightarrow 00{:}49{:}50.515$ that the science of adversity and

NOTE Confidence: 0.8570116992

 $00{:}49{:}50{.}515 \dashrightarrow 00{:}49{:}52{.}006$ resilience is changing and therefore

NOTE Confidence: 0.8570116992

 $00{:}49{:}52.006 \dashrightarrow 00{:}49{:}53.707$ we want to be able to leverage

 $00:49:53.707 \longrightarrow 00:49:55.975$ that best evidence in support of

NOTE Confidence: 0.8570116992

 $00:49:55.975 \longrightarrow 00:49:57.190$ of future interventions.

NOTE Confidence: 0.8570116992

 $00:49:57.190 \rightarrow 00:50:01.150$ So with that, just to thank everyone who's.

NOTE Confidence: 0.851094551

00:50:01.150 --> 00:50:04.738 And part of my career journey

NOTE Confidence: 0.851094551

 $00{:}50{:}04.738 \dashrightarrow 00{:}50{:}07.130$ and my collaboration team.

NOTE Confidence: 0.851094551

 $00:50:07.130 \longrightarrow 00:50:08.702$ Immigration is good because

NOTE Confidence: 0.851094551

 $00:50:08.702 \dashrightarrow 00:50:10.667$ science is a global enterprise.

NOTE Confidence: 0.851094551

 $00{:}50{:}10.670 \dashrightarrow 00{:}50{:}13.900$ And thank my outstanding lab

NOTE Confidence: 0.851094551

 $00{:}50{:}13.900 \dashrightarrow 00{:}50{:}15.840$ members and sources of funding and

NOTE Confidence: 0.851094551

 $00{:}50{:}15{.}840 \dashrightarrow 00{:}50{:}17{.}521$ I'm happy to take any questions

NOTE Confidence: 0.851094551

 $00:50:17.521 \rightarrow 00:50:19.080$ you might have. Thank you.

NOTE Confidence: 0.78020521

 $00{:}50{:}25{.}780 \dashrightarrow 00{:}50{:}27{.}850$ Wonderful. Thank you so much Doctor

NOTE Confidence: 0.78020521

 $00{:}50{:}27.850 \dashrightarrow 00{:}50{:}30.720$ Dunn and fantastic mix of topics there.

NOTE Confidence: 0.78020521

 $00:50:30.720 \longrightarrow 00:50:31.668$ And I know that we've already

NOTE Confidence: 0.78020521

 $00{:}50{:}31.668 \dashrightarrow 00{:}50{:}32.620$ got some questions on the chat.

NOTE Confidence: 0.78020521

 $00:50:32.620 \rightarrow 00:50:33.425$ Are there any questions in

 $00:50:33.425 \longrightarrow 00:50:34.560$ the room to get us started?

NOTE Confidence: 0.820819014433333

 $00{:}50{:}41.830 \dashrightarrow 00{:}50{:}43.622$ And so one question that we had in

NOTE Confidence: 0.820819014433333

 $00:50:43.622 \rightarrow 00:50:45.256$ the chat and actually from Doctor

NOTE Confidence: 0.820819014433333

 $00:50:45.256 \rightarrow 00:50:47.329$ Martin was can you talk about the

NOTE Confidence: 0.820819014433333

 $00:50:47.329 \rightarrow 00:50:48.974$ parallels between telomere length and

NOTE Confidence: 0.820819014433333

 $00{:}50{:}48{.}974 \dashrightarrow 00{:}50{:}51{.}122$ some of those markers that you're

NOTE Confidence: 0.820819014433333

 $00:50:51.122 \rightarrow 00:50:57.530$ observing in teeth? Oh, there is.

NOTE Confidence: 0.834738841666667

 $00:50:57.530 \rightarrow 00:51:00.122$ I thought you were maybe going to ask

NOTE Confidence: 0.8347388416666667

00:51:00.122 --> 00:51:02.046 about parallels between Umm Tillman

NOTE Confidence: 0.834738841666667

 $00:51:02.046 \rightarrow 00:51:04.726$ or length and epigenetic aging.

NOTE Confidence: 0.834738841666667

00:51:04.730 - 00:51:08.584 We don't. What are you? So. Umm.

NOTE Confidence: 0.834738841666667

 $00{:}51{:}08{.}584 \dashrightarrow 00{:}51{:}11{.}680$ So I think that this is an area

NOTE Confidence: 0.8347388416666667

 $00{:}51{:}11.782 \dashrightarrow 00{:}51{:}14.631$ where I don't know that I've seen

NOTE Confidence: 0.8347388416666667

 $00:51:14.631 \longrightarrow 00:51:18.078$ a lot of very good comparisons.

NOTE Confidence: 0.834738841666667

 $00:51:18.080 \longrightarrow 00:51:19.480$ There's the epigenetic clocks

- $00:51:19.480 \longrightarrow 00:51:21.230$ that people tend to use.
- NOTE Confidence: 0.834738841666667
- 00:51:21.230 --> 00:51:23.210 There's now, there's now about
- NOTE Confidence: 0.834738841666667
- $00:51:23.210 \longrightarrow 00:51:25.660 1/2$ a dozen dozen of them.
- NOTE Confidence: 0.834738841666667
- 00:51:25.660 --> 00:51:27.700 Some of them are correlating with each other,
- NOTE Confidence: 0.834738841666667
- $00:51:27.700 \longrightarrow 00:51:28.724$ some of them aren't.
- NOTE Confidence: 0.8347388416666667
- $00:51:28.724 \rightarrow 00:51:30.719$ It depends on what tissue type you get,
- NOTE Confidence: 0.8347388416666667
- $00:51:30.720 \longrightarrow 00:51:32.750$ whether you have buckle cells
- NOTE Confidence: 0.834738841666667
- $00:51:32.750 \longrightarrow 00:51:34.374$ or saliva or blood.
- NOTE Confidence: 0.8347388416666667
- $00:51:34.380 \longrightarrow 00:51:36.531$ So I think part of what we as a
- NOTE Confidence: 0.834738841666667
- $00:51:36.531 \rightarrow 00:51:38.854$ field have to grapple with is trying
- NOTE Confidence: 0.834738841666667
- $00{:}51{:}38{.}854 \dashrightarrow 00{:}51{:}41{.}565$ to build studies that allow us to
- NOTE Confidence: 0.8347388416666667
- $00:51:41.565 \rightarrow 00:51:43.297$ better understand similarities and
- NOTE Confidence: 0.8347388416666667
- $00{:}51{:}43.297 \dashrightarrow 00{:}51{:}45.689$ differences in these markers and then
- NOTE Confidence: 0.8347388416666667
- $00:51:45.689 \rightarrow 00:51:48.480$ also piece together that with the context of.
- NOTE Confidence: 0.8347388416666667
- 00:51:48.480 --> 00:51:50.350 Development because as I shared,
- NOTE Confidence: 0.834738841666667
- $00:51:50.350 \rightarrow 00:51:52.240$ a lot of these markers also vary,

- NOTE Confidence: 0.834738841666667
- 00:51:52.240 --> 00:51:52.946 you know,
- NOTE Confidence: 0.8347388416666667
- $00:51:52.946 \longrightarrow 00:51:55.064$ over over the course of lifespan,
- NOTE Confidence: 0.8347388416666667
- $00:51:55.070 \rightarrow 00:51:56.111$ telomeres and teeth,
- NOTE Confidence: 0.834738841666667
- 00:51:56.111 --> 00:51:58.540 I haven't thought about it and we
- NOTE Confidence: 0.8347388416666667
- $00:51:58.604 \rightarrow 00:52:01.110$ haven't done anything on that just yet.
- NOTE Confidence: 0.834738841666667
- $00:52:01.110 \longrightarrow 00:52:03.210$ I think teeth are really understudied
- NOTE Confidence: 0.8347388416666667
- $00{:}52{:}03{.}210 \dashrightarrow 00{:}52{:}05{.}461$ and an area where there's a lot
- NOTE Confidence: 0.834738841666667
- $00:52:05.461 \longrightarrow 00:52:07.288$ of a lot that we can learn.
- NOTE Confidence: 0.8347388416666667
- $00:52:07.290 \rightarrow 00:52:10.314$ I don't know if there maybe there's
- NOTE Confidence: 0.834738841666667
- $00:52:10.314 \longrightarrow 00:52:12.673$ something in that circadian process
- NOTE Confidence: 0.834738841666667
- $00:52:12.673 \rightarrow 00:52:16.096$ that can be indicative of of aging
- NOTE Confidence: 0.834738841666667
- 00:52:16.096 --> 00:52:17.917 related processes or something,
- NOTE Confidence: 0.8347388416666667
- 00:52:17.917 --> 00:52:19.519 but I have we haven't gotten.
- NOTE Confidence: 0.8347388416666667
- $00{:}52{:}19{.}520 \dashrightarrow 00{:}52{:}21{.}662$ To that yet, but but it's a great question,
- NOTE Confidence: 0.834738841666667
- $00:52:21.670 \longrightarrow 00:52:22.678$ something to think about.
- NOTE Confidence: 0.892573172857143

 $00:52:30.260 \rightarrow 00:52:33.046$ I just had a quick question about.

NOTE Confidence: 0.892573172857143

 $00:52:33.050 \rightarrow 00:52:35.745$ The you brought up measure difficulties with

NOTE Confidence: 0.892573172857143

 $00:52:35.745 \rightarrow 00:52:37.798$ measurement and bringing it back to age,

NOTE Confidence: 0.892573172857143

00:52:37.800 --> 00:52:39.686 and age being kind of just

NOTE Confidence: 0.892573172857143

 $00:52:39.686 \longrightarrow 00:52:41.198$ a proxy for development,

NOTE Confidence: 0.892573172857143

 $00{:}52{:}41{.}200 \dashrightarrow 00{:}52{:}43{.}465$ and then you're interested in

NOTE Confidence: 0.892573172857143

 $00:52:43.465 \rightarrow 00:52:46.700$ looking for sensitive periods.

NOTE Confidence: 0.892573172857143

 $00{:}52{:}46.700 \dashrightarrow 00{:}52{:}49.760$ I noticed in across the development

NOTE Confidence: 0.892573172857143

 $00:52:49.760 \rightarrow 00:52:53.770$ age was bent in and I think routinely

NOTE Confidence: 0.892573172857143

 $00{:}52{:}53{.}770 \dashrightarrow 00{:}52{:}56{.}544$ about two year increments and I'm

NOTE Confidence: 0.892573172857143

 $00:52:56.544 \rightarrow 00:52:59.088$ wondering if that is was informed

NOTE Confidence: 0.892573172857143

 $00:52:59.088 \longrightarrow 00:53:01.775$ by by research or because that

NOTE Confidence: 0.892573172857143

00:53:01.775 - 00:53:04.439 really can either hinder or help.

NOTE Confidence: 0.892573172857143

 $00:53:04.440 \rightarrow 00:53:07.938$ Finding these sort of sensitive periods,

NOTE Confidence: 0.892573172857143

 $00:53:07.940 \longrightarrow 00:53:09.190$ if something falls in between

NOTE Confidence: 0.892573172857143

 $00:53:09.190 \rightarrow 00:53:11.169$ one of those bins or so I just

 $00:53:11.169 \rightarrow 00:53:12.519$ wondering if you could speak to

NOTE Confidence: 0.892573172857143

 $00:53:12.519 \longrightarrow 00:53:13.950$ how those are are gathered.

NOTE Confidence: 0.824961088076923

00:53:14.700 --> 00:53:16.866 I love your question and doing

NOTE Confidence: 0.824961088076923

 $00:53:16.866 \rightarrow 00:53:18.996$ sensitive period work in relying on

NOTE Confidence: 0.824961088076923

 $00:53:18.996 \rightarrow 00:53:21.460$ age I think as your questions may be

NOTE Confidence: 0.824961088076923

 $00{:}53{:}21{.}534 \dashrightarrow 00{:}53{:}23{.}898$ saying is just an imperfect measure.

NOTE Confidence: 0.824961088076923

 $00:53:23.900 \longrightarrow 00:53:29.124$ So we we tend to use the most.

NOTE Confidence: 0.824961088076923

 $00{:}53{:}29{.}130 \dashrightarrow 00{:}53{:}32{.}554$ The narrowest age we can and then we

NOTE Confidence: 0.824961088076923

 $00{:}53{:}32{.}554 \dashrightarrow 00{:}53{:}35{.}519$ afterwards Bennett into developmental stages.

NOTE Confidence: 0.824961088076923

 $00:53:35.520 \rightarrow 00:53:38.056$ So in other words we try to leverage.

NOTE Confidence: 0.824961088076923

 $00:53:38.060 \rightarrow 00:53:41.399$ So we have differences based on month of age.

NOTE Confidence: 0.824961088076923

 $00{:}53{:}41{.}400 \dashrightarrow 00{:}53{:}43{.}542$ So we have eight months and you know 17

NOTE Confidence: 0.824961088076923

 $00{:}53{:}43{.}542 \dashrightarrow 00{:}53{:}45{.}324$ months or whatever and then we'll group

NOTE Confidence: 0.824961088076923

 $00{:}53{:}45{.}324 \dashrightarrow 00{:}53{:}47{.}679$ after we do the analysis into just a

NOTE Confidence: 0.824961088076923

 $00{:}53{:}47.679 \dashrightarrow 00{:}53{:}49.635$ developmental stage and the thinking there

 $00:53:49.640 \rightarrow 00:53:51.616$ is that's just sort of how we think,

NOTE Confidence: 0.824961088076923

 $00{:}53{:}51{.}620 \dashrightarrow 00{:}53{:}54{.}300$ we think of you know based on school

NOTE Confidence: 0.824961088076923

 $00:53:54.300 \longrightarrow 00:53:56.989$ age and non school age or preschool

NOTE Confidence: 0.824961088076923

 $00:53:56.989 \rightarrow 00:53:59.240$ period or what have you so.

NOTE Confidence: 0.824961088076923

 $00:53:59.240 \longrightarrow 00:54:01.452$ It's really just meant to try to

NOTE Confidence: 0.824961088076923

 $00:54:01.452 \longrightarrow 00:54:03.050$ help better translate that work.

NOTE Confidence: 0.824961088076923

 $00:54:03.050 \longrightarrow 00:54:04.735$ I think really to understand

NOTE Confidence: 0.824961088076923

00:54:04.735 --> 00:54:05.409 sensitive periods,

NOTE Confidence: 0.824961088076923

 $00:54:05.410 \longrightarrow 00:54:07.944$ we need to have measures of plasticity.

NOTE Confidence: 0.824961088076923

00:54:07.950 --> 00:54:09.870 And in order to have measures of plasticity,

NOTE Confidence: 0.824961088076923

 $00{:}54{:}09{.}870 \dashrightarrow 00{:}54{:}11{.}856$ we need to know what plasticity

NOTE Confidence: 0.824961088076923

 $00{:}54{:}11.856 \dashrightarrow 00{:}54{:}14.030$ actually is and how what we mean

NOTE Confidence: 0.824961088076923

 $00:54:14.030 \longrightarrow 00:54:15.850$ by it and how we define it.

NOTE Confidence: 0.824961088076923

 $00{:}54{:}15.850 \dashrightarrow 00{:}54{:}17.642$ So I have a postdoc in my group

NOTE Confidence: 0.824961088076923

 $00{:}54{:}17.642 \dashrightarrow 00{:}54{:}18.910$ that's actually working on that.

NOTE Confidence: 0.824961088076923

 $00:54:18.910 \rightarrow 00:54:21.250$ That's just saying can we get all on the

 $00:54:21.250 \rightarrow 00:54:23.769$ same page about what we mean by plasticity.

NOTE Confidence: 0.824961088076923

 $00{:}54{:}23.770 \dashrightarrow 00{:}54{:}25.870$ So the plan is to write a paper on that

NOTE Confidence: 0.824961088076923

 $00:54:25.930 \longrightarrow 00:54:28.090$ and then to follow that with a paper on,

NOTE Confidence: 0.824961088076923

 $00:54:28.090 \rightarrow 00:54:30.010$ OK, now that we're hopefully maybe.

NOTE Confidence: 0.824961088076923

 $00:54:30.010 \rightarrow 00:54:32.236$ More on the same page about plasticity.

NOTE Confidence: 0.824961088076923

 $00{:}54{:}32{.}240 \dashrightarrow 00{:}54{:}34{.}784$ Can we then start to think

NOTE Confidence: 0.824961088076923

 $00:54:34.784 \rightarrow 00:54:36.480$ about markers of plasticity?

NOTE Confidence: 0.824961088076923

00:54:36.480 --> 00:54:38.013 Because we're a lot of us are

NOTE Confidence: 0.824961088076923

00:54:38.013 --> 00:54:39.200 really interested in plasticity.

NOTE Confidence: 0.824961088076923

 $00:54:39.200 \rightarrow 00:54:41.290$ But plasticity means something really

NOTE Confidence: 0.824961088076923

 $00:54:41.290 \rightarrow 00:54:43.380$ different to a neuroscientist who

NOTE Confidence: 0.824961088076923

 $00:54:43.441 \rightarrow 00:54:45.937$ thinks about it at a synaptic level and

NOTE Confidence: 0.824961088076923

 $00{:}54{:}45{.}937 \dashrightarrow 00{:}54{:}48{.}267$ someone who's thinking about it in the

NOTE Confidence: 0.824961088076923

 $00:54:48.267 \rightarrow 00:54:50.674$ context of like stroke recovery for example,

NOTE Confidence: 0.824961088076923

 $00{:}54{:}50{.}674 \dashrightarrow 00{:}54{:}52{.}182$ and and rehabilitation and

 $00:54:52.182 \rightarrow 00:54:53.690$ those kinds of outcomes.

NOTE Confidence: 0.824961088076923

 $00{:}54{:}53{.}690 \dashrightarrow 00{:}54{:}55{.}796$ So I think this is another,

NOTE Confidence: 0.824961088076923

 $00:54:55.800 \rightarrow 00:54:57.606$ I think this is a Holy Grail

NOTE Confidence: 0.824961088076923

 $00:54:57.606 \rightarrow 00:54:59.239$ for our field is to really,

NOTE Confidence: 0.824961088076923

 $00{:}54{:}59{.}240 \dashrightarrow 00{:}55{:}01{.}046$ I think if we nail the sensitive.

NOTE Confidence: 0.824961088076923

 $00:55:01.050 \rightarrow 00:55:02.772$ Period question and we did that through

NOTE Confidence: 0.824961088076923

 $00:55:02.772 \longrightarrow 00:55:04.536$ plasticity and had a good markers of that.

NOTE Confidence: 0.824961088076923

 $00:55:04.540 \longrightarrow 00:55:05.878$ I think that would be pretty,

NOTE Confidence: 0.824961088076923

 $00{:}55{:}05{.}880 \dashrightarrow 00{:}55{:}07{.}340$ pretty amazing.

NOTE Confidence: 0.824961088076923

 $00:55:07.340 \longrightarrow 00:55:07.760$ Thank you.

NOTE Confidence: 0.76753051875

 $00{:}55{:}12.070 \dashrightarrow 00{:}55{:}15.726$ Aye, thank you for such an amazing talk,

NOTE Confidence: 0.76753051875

 $00:55:15.730 \longrightarrow 00:55:19.360$ so I'm very curious about.

NOTE Confidence: 0.76753051875

 $00:55:19.360 \dashrightarrow 00:55:22.144$ The effects that you observe on

NOTE Confidence: 0.76753051875

 $00{:}55{:}22.144 \dashrightarrow 00{:}55{:}25.175$ the protective effects of the DNA

NOTE Confidence: 0.76753051875

 $00:55:25.175 \rightarrow 00:55:27.905$ methylation changes that specific loci.

NOTE Confidence: 0.76753051875

 $00{:}55{:}27{.}910 \dashrightarrow 00{:}55{:}29{.}848$ Could you elaborate a little bit

 $00:55:29.848 \rightarrow 00:55:32.280$ more how they were defined and also?

NOTE Confidence: 0.76753051875

 $00{:}55{:}32{.}280 \dashrightarrow 00{:}55{:}36{.}180$ Will that be dependent depending on?

NOTE Confidence: 0.76753051875

 $00:55:36.180 \rightarrow 00:55:38.592$ That it occurred during the sensitive

NOTE Confidence: 0.76753051875

 $00:55:38.592 \rightarrow 00:55:41.882$ periods and that you like look at that

NOTE Confidence: 0.76753051875

 $00:55:41.882 \rightarrow 00:55:43.887$ during that specific time whereas.

NOTE Confidence: 0.76753051875

 $00{:}55{:}43.890 \dashrightarrow 00{:}55{:}46.314$ You know, compared to auto hold for example.

NOTE Confidence: 0.76753051875

00:55:46.320 - 00:55:49.567 How would that compare? Um, like?

NOTE Confidence: 0.76753051875

 $00:55:49.567 \rightarrow 00:55:52.766$ I will argue that maybe adulthood we

NOTE Confidence: 0.76753051875

 $00{:}55{:}52{.}766 \dashrightarrow 00{:}55{:}55{.}849$ will observe more deleterious effects.

NOTE Confidence: 0.76753051875

00:55:55.850 --> 00:55:59.090 But you know, I wonder about.

NOTE Confidence: 0.76753051875

 $00{:}55{:}59{.}090 \dashrightarrow 00{:}56{:}00{.}434$ Your thoughts on that and I

NOTE Confidence: 0.76753051875

 $00:56:00.434 \longrightarrow 00:56:01.330$ have a second question,

NOTE Confidence: 0.76753051875

 $00:56:01.330 \longrightarrow 00:56:02.569$ but if you want to answer that,

NOTE Confidence: 0.76753051875

 $00{:}56{:}02{.}570 \dashrightarrow 00{:}56{:}04{.}676$ thank you for just asking one at a time.

NOTE Confidence: 0.76753051875

 $00{:}56{:}04{.}680 \dashrightarrow 00{:}56{:}07{.}110$ That's that's great.

- $00{:}56{:}07{.}110 \dashrightarrow 00{:}56{:}07{.}794$ I think so.
- NOTE Confidence: 0.76753051875
- 00:56:07.794 --> 00:56:09.749 I think there's a lot to still unpack
- NOTE Confidence: 0.76753051875
- $00{:}56{:}09{.}749 \dashrightarrow 00{:}56{:}11{.}842$ in this mediation work and there's not
- NOTE Confidence: 0.76753051875
- $00{:}56{:}11.842 \dashrightarrow 00{:}56{:}13.859$ been from what we've seen any other
- NOTE Confidence: 0.76753051875
- $00:56:13.859 \dashrightarrow 00:56:17.460$ work that's been done in this space.
- NOTE Confidence: 0.76753051875
- $00{:}56{:}17{.}460 \dashrightarrow 00{:}56{:}18{.}948$ And it took a lot for us to
- NOTE Confidence: 0.76753051875
- 00:56:18.948 --> 00:56:20.139 just figure out the methods,
- NOTE Confidence: 0.76753051875
- 00:56:20.140 --> 00:56:20.772 you know,
- NOTE Confidence: 0.76753051875
- $00{:}56{:}20.772 \dashrightarrow 00{:}56{:}22.036$ because you're bringing these
- NOTE Confidence: 0.76753051875
- $00{:}56{:}22.036 \dashrightarrow 00{:}56{:}23.628$ methods that have been developed
- NOTE Confidence: 0.76753051875
- $00:56:23.628 \dashrightarrow 00:56:25.553$ typically for what we call like a
- NOTE Confidence: 0.76753051875
- $00{:}56{:}25{.}553 \dashrightarrow 00{:}56{:}27{.}237$ small data setting and then you're
- NOTE Confidence: 0.76753051875
- 00:56:27.237 00:56:29.271 applying it to data where you have,
- NOTE Confidence: 0.76753051875
- 00:56:29.271 --> 00:56:31.326 you know, as you know,
- NOTE Confidence: 0.76753051875
- $00:56:31.330 \longrightarrow 00:56:33.700$ 500,000 different associations that you can,
- NOTE Confidence: 0.76753051875
- $00:56:33.700 \rightarrow 00:56:34.423$ you know, study.

- NOTE Confidence: 0.76753051875
- $00:56:34.423 \longrightarrow 00:56:36.540$ So a lot of the time we spent,

00:56:36.540 --> 00:56:37.166 you know,

NOTE Confidence: 0.76753051875

 $00{:}56{:}37.166 \dashrightarrow 00{:}56{:}40.208$ was was built in on that and then we

NOTE Confidence: 0.76753051875

 $00:56:40.208 \rightarrow 00:56:42.498$ carried forward our sensitive period

NOTE Confidence: 0.76753051875

 $00{:}56{:}42.498 \dashrightarrow 00{:}56{:}45.024$ work to try to bring in more of this

NOTE Confidence: 0.76753051875

 $00:56:45.024 \rightarrow 00:56:46.196$ information about these different

NOTE Confidence: 0.76753051875

 $00:56:46.196 \longrightarrow 00:56:47.978$ life course models to try to.

NOTE Confidence: 0.76753051875

 $00:56:47.980 \rightarrow 00:56:50.570$ Understand, you know these effects.

NOTE Confidence: 0.76753051875

 $00{:}56{:}50{.}570 \dashrightarrow 00{:}56{:}51{.}386$ I don't.

NOTE Confidence: 0.76753051875

 $00:56:51.386 \rightarrow 00:56:54.650$ I was not expecting to see such variation.

NOTE Confidence: 0.76753051875

 $00{:}56{:}54{.}650 \dashrightarrow 00{:}56{:}56{.}547$ I think the next set of questions

NOTE Confidence: 0.76753051875

00:56:56.547 -> 00:56:58.864 that will be really key is, you know,

NOTE Confidence: 0.76753051875

 $00:56:58.864 \rightarrow 00:57:01.013$ we just looked at depression at one

NOTE Confidence: 0.76753051875

 $00{:}57{:}01{.}013 \dashrightarrow 00{:}57{:}03{.}068$ point in time in late adolescence.

NOTE Confidence: 0.76753051875

 $00{:}57{:}03{.}070 \dashrightarrow 00{:}57{:}05{.}401$ We can look at later markers of

 $00:57:05.401 \dashrightarrow 00:57:07.628$ depression to see if this persists.

NOTE Confidence: 0.76753051875

00:57:07.630 --> 00:57:09.610 And I think, you know,

NOTE Confidence: 0.76753051875

 $00{:}57{:}09{.}610 \dashrightarrow 00{:}57{:}11{.}779$ I come from the camp of let's see it

NOTE Confidence: 0.76753051875

 $00:57:11.779 \rightarrow 00:57:14.205$ once and if we see something interesting,

NOTE Confidence: 0.76753051875

 $00:57:14.210 \longrightarrow 00:57:16.296$ let's try to see it again in

NOTE Confidence: 0.76753051875

 $00{:}57{:}16.296 \dashrightarrow 00{:}57{:}17.990$ another data set and try to.

NOTE Confidence: 0.76753051875

 $00:57:17.990 \longrightarrow 00:57:18.690$ Replicate it.

NOTE Confidence: 0.76753051875

 $00:57:18.690 \rightarrow 00:57:21.920$ And then that's where let's if we do that,

NOTE Confidence: 0.76753051875

 $00{:}57{:}21{.}920 \dashrightarrow 00{:}57{:}24{.}195$ then let's start digging in on biology.

NOTE Confidence: 0.76753051875

00:57:24.200 --> 00:57:25.856 Let's get into cell culture models,

NOTE Confidence: 0.76753051875

 $00:57:25.860 \longrightarrow 00:57:27.960$ let's get into animal models.

NOTE Confidence: 0.76753051875

00:57:27.960 --> 00:57:29.196 Let's, you know,

NOTE Confidence: 0.76753051875

 $00:57:29.196 \dashrightarrow 00:57:32.420$ really try to probe this to see if this is,

NOTE Confidence: 0.76753051875

 $00:57:32.420 \longrightarrow 00:57:34.898$ you know, real and what might be

NOTE Confidence: 0.76753051875

 $00{:}57{:}34.898 \dashrightarrow 00{:}57{:}37.410$ some of the the consequences.

NOTE Confidence: 0.76753051875

 $00:57:37.410 \longrightarrow 00:57:37.972$ Thank you.
NOTE Confidence: 0.76753051875

 $00{:}57{:}37{.}972 \dashrightarrow 00{:}57{:}40{.}220$ And then make my second question is sort

NOTE Confidence: 0.76753051875

 $00{:}57{:}40.281 \dashrightarrow 00{:}57{:}42.598$ of a follow-up of their previous question,

NOTE Confidence: 0.76753051875

 $00:57:42.600 \longrightarrow 00:57:43.976$ how these sensitive fears

NOTE Confidence: 0.76753051875

 $00:57:43.976 \longrightarrow 00:57:45.696$ are defined in terms of?

NOTE Confidence: 0.820937503076923

 $00{:}57{:}48.200 \dashrightarrow 00{:}57{:}52.632$ The age or and following up on on

NOTE Confidence: 0.820937503076923

 $00{:}57{:}52.632 \dashrightarrow 00{:}57{:}56.235$ the definition of of that in terms of

NOTE Confidence: 0.820937503076923

 $00{:}57{:}56{.}235 \dashrightarrow 00{:}57{:}58{.}260$ like have you considered biological

NOTE Confidence: 0.820937503076923

 $00:57:58.260 \rightarrow 00:58:01.403$ age like not only tell me your land

NOTE Confidence: 0.820937503076923

 $00{:}58{:}01{.}403 \dashrightarrow 00{:}58{:}03{.}795$ but also epigenetic aging and I

NOTE Confidence: 0.820937503076923

 $00:58:03.795 \rightarrow 00:58:06.225$ always wonder what does that mean

NOTE Confidence: 0.820937503076923

 $00{:}58{:}06{.}225 \dashrightarrow 00{:}58{:}08{.}712$ during childhood because we often see

NOTE Confidence: 0.820937503076923

00:58:08.712 --> 00:58:11.220 accelerated at beginning of aging in

NOTE Confidence: 0.820937503076923

00:58:11.301 --> 00:58:13.466 adults being associated with trauma

NOTE Confidence: 0.820937503076923

 $00{:}58{:}13.466 \dashrightarrow 00{:}58{:}16.590$ but that what does that really mean.

NOTE Confidence: 0.820937503076923

 $00:58:16.590 \rightarrow 00:58:20.286$ In childhood and if these could be?

NOTE Confidence: 0.820937503076923

 $00:58:20.290 \longrightarrow 00:58:23.164$ A marker for biological aging to

NOTE Confidence: 0.820937503076923

 $00{:}58{:}23.164 \dashrightarrow 00{:}58{:}25.080$ define better sensitive periods.

NOTE Confidence: 0.820937503076923

 $00:58:25.080 \longrightarrow 00:58:27.150$ Yeah, that's a great question.

NOTE Confidence: 0.820937503076923

 $00:58:27.150 \rightarrow 00:58:28.390$ So believe it or not,

NOTE Confidence: 0.820937503076923

 $00:58:28.390 \longrightarrow 00:58:30.098$ I think it's counterintuitive in a way

NOTE Confidence: 0.820937503076923

 $00:58:30.098 \rightarrow 00:58:32.206$ for us to think about kids as aging,

NOTE Confidence: 0.820937503076923

 $00:58:32.210 \longrightarrow 00:58:33.410$ but they are.

NOTE Confidence: 0.820937503076923

 $00:58:33.410 \longrightarrow 00:58:36.220$ And we, we did a study actually in

NOTE Confidence: 0.820937503076923

 $00{:}58{:}36{.}220 \dashrightarrow 00{:}58{:}38{.}417$ alspach where we showed that some

NOTE Confidence: 0.820937503076923

00:58:38.417 - 00:58:40.787 early life markers of stress were

NOTE Confidence: 0.820937503076923

 $00{:}58{:}40.787 \dashrightarrow 00{:}58{:}42.572$ associated with accelerated aging at

NOTE Confidence: 0.820937503076923

 $00:58:42.572 \longrightarrow 00:58:45.152$ age 7 by as much as seven months.

NOTE Confidence: 0.820937503076923

 $00{:}58{:}45{.}152 \dashrightarrow 00{:}58{:}48{.}106$ So a 7 year old could look,

NOTE Confidence: 0.820937503076923

00:58:48.110 --> 00:58:50.438 you know, Cellularly older than us.

NOTE Confidence: 0.820937503076923

 $00{:}58{:}50{.}440 \dashrightarrow 00{:}58{:}53{.}120$ 7 year old by they would look 7 point you

NOTE Confidence: 0.820937503076923

 $00:58:53.190 \rightarrow 00:58:56.070$ know seven years with seven months added on.

NOTE Confidence: 0.820937503076923

00:58:56.070 - 00:58:59.912 So I think for us we wanted to

NOTE Confidence: 0.820937503076923

 $00{:}58{:}59{.}912 \dashrightarrow 00{:}59{:}02{.}399$ have in order to do the sensitive

NOTE Confidence: 0.820937503076923

 $00:59:02.399 \longrightarrow 00:59:05.090$ period work you need to either have.

NOTE Confidence: 0.820937503076923

 $00:59:05.090 \rightarrow 00:59:07.742$ You ideally have repeated measures so

NOTE Confidence: 0.820937503076923

 $00:59:07.742 \rightarrow 00:59:11.558$ that you can get these markers of timing,

NOTE Confidence: 0.820937503076923

 $00:59:11.560 \longrightarrow 00:59:13.880$ not that you're relying on

NOTE Confidence: 0.820937503076923

00:59:13.880 - 00:59:14.808 retrospective reports.

NOTE Confidence: 0.820937503076923

 $00{:}59{:}14.810 \dashrightarrow 00{:}59{:}17.006$ So we there's not a lot of data sets

NOTE Confidence: 0.820937503076923

 $00{:}59{:}17.006 \dashrightarrow 00{:}59{:}19.210$ that have that repeated methylation data

NOTE Confidence: 0.820937503076923

 $00{:}59{:}19{.}210 \dashrightarrow 00{:}59{:}22{.}130$ where you could derive those repeated scores.

NOTE Confidence: 0.820937503076923

 $00:59:22.130 \longrightarrow 00:59:24.695$ But we just got a grant last year where

NOTE Confidence: 0.820937503076923

 $00{:}59{:}24.695 \dashrightarrow 00{:}59{:}27.033$ we're doing work in a South African

NOTE Confidence: 0.820937503076923

 $00:59:27.033 \rightarrow 00:59:29.308$ cohort and where we're going to have,

NOTE Confidence: 0.820937503076923

 $00{:}59{:}29{.}310 \dashrightarrow 00{:}59{:}31{.}962$ we're going to be driving epigenetic

NOTE Confidence: 0.820937503076923

 $00{:}59{:}31{.}962 \dashrightarrow 00{:}59{:}34{.}398$ signatures at 1/3 and five and I think

NOTE Confidence: 0.820937503076923

 $00:59:34.398 \longrightarrow 00:59:36.060$ that would be a. Great opportunity.

NOTE Confidence: 0.820937503076923

 $00{:}59{:}36{.}060 \dashrightarrow 00{:}59{:}37{.}635$ I'm glad you said this.

NOTE Confidence: 0.820937503076923

 $00:59:37.640 \dashrightarrow 00:59:39.684$ I think this is something we should

NOTE Confidence: 0.820937503076923

 $00:59:39.684 \longrightarrow 00:59:41.820$ look into there and see if if how

NOTE Confidence: 0.820937503076923

 $00{:}59{:}41{.}820 \dashrightarrow 00{:}59{:}43{.}448$ similar or different it is relative

NOTE Confidence: 0.820937503076923

 $00:59:43.448 \longrightarrow 00:59:45.266$ to findings you get for age.

NOTE Confidence: 0.883827367142857

00:59:46.170 --> 00:59:47.549 So I know we're almost at time,

NOTE Confidence: 0.883827367142857

 $00{:}59{:}47{.}550 \dashrightarrow 00{:}59{:}48{.}906$ but I didn't realize Doctor Lombroso

NOTE Confidence: 0.883827367142857

00:59:48.906 --> 00:59:50.610 that your hand was up actually was

NOTE Confidence: 0.883827367142857

 $00:59:50.610 \rightarrow 00:59:51.870$ fading into the background there.

NOTE Confidence: 0.883827367142857

 $00{:}59{:}51{.}870 \dashrightarrow 00{:}59{:}55{.}846$ So Paul, please, please ask your question.

NOTE Confidence: 0.883827367142857

 $00:59:55.850 \longrightarrow 00:59:57.732$ So can you hear me?

NOTE Confidence: 0.883827367142857

 $00{:}59{:}57{.}732 \dashrightarrow 00{:}59{:}59{.}135$ Yes. Yes. OK great.

NOTE Confidence: 0.883827367142857

 $00{:}59{:}59{.}135 \dashrightarrow 01{:}00{:}02{.}282$ I I that was a fantastic talk and

NOTE Confidence: 0.883827367142857

 $01{:}00{:}02.282 \dashrightarrow 01{:}00{:}04.817$ then specifically because it was

NOTE Confidence: 0.883827367142857

 $01{:}00{:}04{.}817 \dashrightarrow 01{:}00{:}07{.}348$ introducing such a for me anyway a

- NOTE Confidence: 0.883827367142857
- $01:00:07.348 \rightarrow 01:00:10.336$ novel area couple of questions that
- NOTE Confidence: 0.883827367142857
- 01:00:10.336 01:00:12.560 I try to get my head around this.
- NOTE Confidence: 0.883827367142857
- $01{:}00{:}12.560 \dashrightarrow 01{:}00{:}15.470$ If a child has early onset
- NOTE Confidence: 0.883827367142857
- $01:00:15.470 \longrightarrow 01:00:20.280$ depression or childhood psychosis
- NOTE Confidence: 0.883827367142857
- $01{:}00{:}20.280 \dashrightarrow 01{:}00{:}23.939$ or early childhood onset diabetes,
- NOTE Confidence: 0.883827367142857
- $01{:}00{:}23.940 \dashrightarrow 01{:}00{:}25.695$ are you saying that that there will be a
- NOTE Confidence: 0.883827367142857
- $01{:}00{:}25.695 \dashrightarrow 01{:}00{:}29.788$ marker for for in the teeth of this event.
- NOTE Confidence: 0.883827367142857
- $01:00:29.790 \longrightarrow 01:00:33.378$ And are the epigenetic.
- NOTE Confidence: 0.883827367142857
- $01:00:33.380 \longrightarrow 01:00:35.460$ Findings,
- NOTE Confidence: 0.883827367142857
- $01:00:35.460 \longrightarrow 01:00:37.722$ I would imagine they're all different
- NOTE Confidence: 0.883827367142857
- $01:00:37.722 \rightarrow 01:00:40.560$ in these three very distinct disorders.
- NOTE Confidence: 0.883827367142857
- $01:00:40.560 \longrightarrow 01:00:42.438$ Just to help me understand,
- NOTE Confidence: 0.883827367142857
- $01:00:42.438 \rightarrow 01:00:44.668$ you probably already mentioned this, but
- NOTE Confidence: 0.771631115
- $01{:}00{:}45{.}380 \dashrightarrow 01{:}00{:}46{.}658$ no, I think it's a good,
- NOTE Confidence: 0.771631115
- $01{:}00{:}46.660 \dashrightarrow 01{:}00{:}47.860$ I think it's a good question.
- NOTE Confidence: 0.771631115

01:00:47.860 --> 01:00:48.780 Pardon me, I don't know.

NOTE Confidence: 0.771631115

01:00:48.780 --> 01:00:51.084 I think I'm going to look

NOTE Confidence: 0.771631115

 $01:00:51.084 \rightarrow 01:00:53.100$ here even though you're here.

NOTE Confidence: 0.771631115

01:00:53.100 --> 01:00:55.908 Trying to answer you, but Umm,

NOTE Confidence: 0.771631115

 $01{:}00{:}55{.}910 \dashrightarrow 01{:}00{:}58{.}318$ so in terms of what we've seen so

NOTE Confidence: 0.771631115

 $01{:}00{:}58{.}318$ --> $01{:}01{:}00{.}870$ far with teeth and psychopathology. NOTE Confidence: 0.771631115

 $01{:}01{:}00.870 \dashrightarrow 01{:}01{:}03.504$ So we are correlating marker that's

NOTE Confidence: 0.771631115

01:01:03.504 --> 01:01:06.283 derived from micro CT imaging about

NOTE Confidence: 0.771631115

 $01{:}01{:}06{.}283 \dashrightarrow 01{:}01{:}09{.}103$ how thick the enamel basically marker NOTE Confidence: 0.771631115

 $01:01:09.103 \rightarrow 01:01:12.205$ of enamel volume is and seeing that NOTE Confidence: 0.771631115

01:01:12.205 --> 01:01:14.787 kids who have thinner volume have

NOTE Confidence: 0.771631115

 $01:01:14.787 \rightarrow 01:01:16.278$ higher psychopathology symptoms.

NOTE Confidence: 0.771631115

 $01{:}01{:}16.278 \dashrightarrow 01{:}01{:}18.763$ I think that's just correlational.

NOTE Confidence: 0.771631115

 $01:01:18.770 \rightarrow 01:01:21.724$ Who knows whether this is actually causal.

NOTE Confidence: 0.771631115

 $01{:}01{:}21.730 \dashrightarrow 01{:}01{:}23.719$ I think we need more studies to try to.

NOTE Confidence: 0.771631115

 $01:01:23.720 \longrightarrow 01:01:24.710$ Impact that.

- NOTE Confidence: 0.771631115
- $01:01:24.710 \longrightarrow 01:01:28.175$ I think teeth might be a marker.
- NOTE Confidence: 0.771631115
- $01{:}01{:}28.180 \dashrightarrow 01{:}01{:}30.476$ So I think of teeth as the marker
- NOTE Confidence: 0.771631115
- $01:01:30.476 \longrightarrow 01:01:32.926$ of early life stress and then
- NOTE Confidence: 0.771631115
- $01{:}01{:}32.926 \dashrightarrow 01{:}01{:}34.279$ potentially those biological
- NOTE Confidence: 0.771631115
- 01:01:34.279 $\operatorname{-->}$ 01:01:36.964 markers of early life stress can
- NOTE Confidence: 0.771631115
- $01:01:36.964 \rightarrow 01:01:39.059$ be informative for mental health.
- NOTE Confidence: 0.771631115
- 01:01:39.060 --> 01:01:41.628 I don't know that teeth necessarily
- NOTE Confidence: 0.771631115
- $01:01:41.628 \rightarrow 01:01:44.333$ independent of early life stress would
- NOTE Confidence: 0.771631115
- $01:01:44.333 \rightarrow 01:01:46.638$ be informative for mental health.
- NOTE Confidence: 0.771631115
- 01:01:46.640 --> 01:01:47.017 However,
- NOTE Confidence: 0.771631115
- $01:01:47.017 \rightarrow 01:01:49.656$ I think there is maybe a kind
- NOTE Confidence: 0.771631115
- 01:01:49.656 --> 01:01:52.076 of tooth brain access where
- NOTE Confidence: 0.771631115
- $01{:}01{:}52.076 \dashrightarrow 01{:}01{:}54.184$ teeth might be informative.
- NOTE Confidence: 0.771631115
- $01{:}01{:}54{.}190 \dashrightarrow 01{:}01{:}56{.}590$ For characterizing and understanding
- NOTE Confidence: 0.771631115
- $01{:}01{:}56{.}590 \dashrightarrow 01{:}02{:}00{.}190$ processes of brain development that might
- NOTE Confidence: 0.771631115

 $01:02:00.267 \rightarrow 01:02:02.957$ be harder to interrogate otherwise.

NOTE Confidence: 0.771631115

 $01:02:02.960 \longrightarrow 01:02:06.119$ So that's sort of my thought on on that.

NOTE Confidence: 0.771631115

 $01:02:06.120 \longrightarrow 01:02:08.680$ And then whether the epigenetic

NOTE Confidence: 0.771631115

 $01:02:08.680 \rightarrow 01:02:11.240$ signatures are similar across disorders,

NOTE Confidence: 0.771631115

 $01:02:11.240 \rightarrow 01:02:15.038$ we've not really looked at that,

NOTE Confidence: 0.771631115

01:02:15.040 --> 01:02:16.900 but I think it's something that

NOTE Confidence: 0.771631115

01:02:16.900 $\operatorname{-->}$ 01:02:19.039 that you know the work that has

NOTE Confidence: 0.771631115

 $01:02:19.039 \rightarrow 01:02:20.985$ been done is more so where you

NOTE Confidence: 0.771631115

01:02:21.053 --> 01:02:23.221 group kids into internalizing

NOTE Confidence: 0.771631115

 $01:02:23.221 \rightarrow 01:02:24.847$ versus externalizing symptoms.

NOTE Confidence: 0.771631115

 $01{:}02{:}24.850 \dashrightarrow 01{:}02{:}27.545$ Part of the challenge is that you

NOTE Confidence: 0.771631115

01:02:27.545 --> 01:02:29.758 really just need incredibly large

NOTE Confidence: 0.771631115

01:02:29.758 --> 01:02:33.160 sample sizes in order to find potential

NOTE Confidence: 0.771631115

01:02:33.160 --> 01:02:36.375 signal when you bring epigenetic work

NOTE Confidence: 0.771631115

 $01{:}02{:}36{.}375 \dashrightarrow 01{:}02{:}39{.}382$ to psychiatric disorders on the order of, NOTE Confidence: 0.771631115

 $01:02:39.382 \longrightarrow 01:02:42.210$ you know, thousands, 10s of thousands.

- NOTE Confidence: 0.771631115
- 01:02:42.210 --> 01:02:44.330 To give you context,
- NOTE Confidence: 0.771631115
- 01:02:44.330 --> 01:02:47.130 you may or may not know about
- NOTE Confidence: 0.771631115
- $01{:}02{:}47.130 \dashrightarrow 01{:}02{:}48.330$ genetic association studies.
- NOTE Confidence: 0.771631115
- $01{:}02{:}48.330 \dashrightarrow 01{:}02{:}50.556$ Those are starting to see results.
- NOTE Confidence: 0.771631115
- 01:02:50.560 --> 01:02:52.668 After 500,000, you know,
- NOTE Confidence: 0.771631115
- $01:02:52.668 \rightarrow 01:02:54.249$ a million participants,
- NOTE Confidence: 0.771631115
- $01{:}02{:}54{.}250 \dashrightarrow 01{:}02{:}54{.}603$ so.
- NOTE Confidence: 0.771631115
- 01:02:54.603 --> 01:02:57.074 I think we're seeing more with epigenetic
- NOTE Confidence: 0.771631115
- $01:02:57.074 \rightarrow 01:02:59.637$ work starting to emerge with less than that,
- NOTE Confidence: 0.771631115
- $01:02:59.640 \rightarrow 01:03:01.740$ but it's still the scale is very,
- NOTE Confidence: 0.771631115
- $01:03:01.740 \longrightarrow 01:03:03.520$ very large because these effects
- NOTE Confidence: 0.771631115
- $01:03:03.520 \longrightarrow 01:03:04.944$ are are pretty small.
- NOTE Confidence: 0.837287913181818
- $01:03:08.650 \longrightarrow 01:03:10.312$ Great. Well, thank you all for
- NOTE Confidence: 0.837287913181818
- $01{:}03{:}10{.}312 \dashrightarrow 01{:}03{:}11{.}703$ this rich discussion and please
- NOTE Confidence: 0.837287913181818
- 01:03:11.703 --> 01:03:13.320 join me again in thanking Dr Dunn
- NOTE Confidence: 0.837287913181818

01:03:13.320 --> 01:03:14.999 for a wonderful presentation.