

WEBVTT

NOTE duration:"00:48:05"

NOTE recognizability:0.872

NOTE language:en-us

NOTE Confidence: 0.901512288181818

00:00:00.000 --> 00:00:01.484 Thank you. Very much.

NOTE Confidence: 0.901512288181818

00:00:01.484 --> 00:00:04.750 Thanks so much for that Nice introduction.

NOTE Confidence: 0.901512288181818

00:00:04.750 --> 00:00:06.164 It's really an honor to be here.

NOTE Confidence: 0.901512288181818

00:00:06.170 --> 00:00:07.904 And I was just talking to

NOTE Confidence: 0.901512288181818

00:00:07.904 --> 00:00:09.430 some folks before the talk.

NOTE Confidence: 0.901512288181818

00:00:09.430 --> 00:00:10.755 I've known folks from Yale

NOTE Confidence: 0.901512288181818

00:00:10.755 --> 00:00:12.570 since I was a graduate student,

NOTE Confidence: 0.901512288181818

00:00:12.570 --> 00:00:13.790 and I've always admired them.

NOTE Confidence: 0.901512288181818

00:00:13.790 --> 00:00:16.550 So it's nice to be here giving my own talk.

NOTE Confidence: 0.901512288181818

00:00:16.550 --> 00:00:20.878 So I'm going to cover a lot today.

NOTE Confidence: 0.901512288181818

00:00:20.880 --> 00:00:22.175 I just to give you an outline

NOTE Confidence: 0.901512288181818

00:00:22.175 --> 00:00:23.640 of what I'd like to talk about.

NOTE Confidence: 0.901512288181818

00:00:23.640 --> 00:00:26.069 I'd like to talk about some background

NOTE Confidence: 0.901512288181818

00:00:26.069 --> 00:00:28.542 about cannabis and the brain and how
NOTE Confidence: 0.901512288181818

00:00:28.542 --> 00:00:30.588 the landscape of cannabis and cannabis
NOTE Confidence: 0.901512288181818

00:00:30.655 --> 00:00:33.399 itself is changing and just rapidly changing.
NOTE Confidence: 0.901512288181818

00:00:33.400 --> 00:00:35.920 The product types, the the the,
NOTE Confidence: 0.901512288181818

00:00:35.920 --> 00:00:37.040 the characteristics of people
NOTE Confidence: 0.901512288181818

00:00:37.040 --> 00:00:38.160 using it are are,
NOTE Confidence: 0.901512288181818

00:00:38.160 --> 00:00:39.114 are dramatically changing.
NOTE Confidence: 0.901512288181818

00:00:39.114 --> 00:00:41.735 Then I'd like to talk about some of
NOTE Confidence: 0.901512288181818

00:00:41.735 --> 00:00:44.108 my work on cannabis and cognition and
NOTE Confidence: 0.901512288181818

00:00:44.108 --> 00:00:45.682 adolescent adolescents and young adults
NOTE Confidence: 0.901512288181818

00:00:45.682 --> 00:00:48.128 and talk about a super cool clinical
NOTE Confidence: 0.901512288181818

00:00:48.128 --> 00:00:50.540 trial that we did with adolescence.
NOTE Confidence: 0.901512288181818

00:00:50.540 --> 00:00:52.106 Then I'd like to talk about.
NOTE Confidence: 0.901512288181818

00:00:52.110 --> 00:00:52.740 Umm.
NOTE Confidence: 0.901512288181818

00:00:52.740 --> 00:00:55.890 The medicinal aspects of cannabis,
NOTE Confidence: 0.901512288181818

00:00:55.890 --> 00:00:58.509 which a lot of my work focuses on now

NOTE Confidence: 0.901512288181818
00:00:58.509 --> 00:01:01.140 because it's just such a hot topic right
NOTE Confidence: 0.901512288181818
00:01:01.140 --> 00:01:03.667 now about whether cannabis is a medicine,
NOTE Confidence: 0.901512288181818
00:01:03.670 --> 00:01:05.846 how it can be conceptualized as a medicine,
NOTE Confidence: 0.901512288181818
00:01:05.850 --> 00:01:07.638 does it work as a medicine?
NOTE Confidence: 0.901512288181818
00:01:07.640 --> 00:01:08.858 And then finally,
NOTE Confidence: 0.901512288181818
00:01:08.858 --> 00:01:12.451 I want to talk about some of my
NOTE Confidence: 0.901512288181818
00:01:12.451 --> 00:01:15.067 acute THC administration paradigms
NOTE Confidence: 0.901512288181818
00:01:15.070 --> 00:01:17.056 where we're looking at the problem
NOTE Confidence: 0.901512288181818
00:01:17.056 --> 00:01:18.775 of cannabis impaired driving and
NOTE Confidence: 0.901512288181818
00:01:18.775 --> 00:01:20.480 whether we can detect cannabis
NOTE Confidence: 0.901512288181818
00:01:20.480 --> 00:01:21.844 impairment from brain imaging.
NOTE Confidence: 0.901512288181818
00:01:21.850 --> 00:01:23.800 So it's sort of a.
NOTE Confidence: 0.901512288181818
00:01:23.800 --> 00:01:26.660 A lot to cover, so I'll get right into it.
NOTE Confidence: 0.901512288181818
00:01:26.660 --> 00:01:28.772 So what is cannabis?
NOTE Confidence: 0.901512288181818
00:01:28.772 --> 00:01:32.276 So, so cannabis is simply a plant.
NOTE Confidence: 0.901512288181818

00:01:32.280 --> 00:01:34.720 It is a dry shredded mix of leaves,
NOTE Confidence: 0.901512288181818

00:01:34.720 --> 00:01:36.910 flower stems and seeds from the
NOTE Confidence: 0.901512288181818

00:01:36.910 --> 00:01:38.820 cannabis sativa or indica plant.
NOTE Confidence: 0.901512288181818

00:01:38.820 --> 00:01:40.458 These are common subspecies of the hemp
NOTE Confidence: 0.901512288181818

00:01:40.458 --> 00:01:42.418 plant which is common throughout the world.
NOTE Confidence: 0.901512288181818

00:01:42.420 --> 00:01:44.384 And cannabis contains over
NOTE Confidence: 0.901512288181818

00:01:44.384 --> 00:01:45.857 400 chemical compounds.
NOTE Confidence: 0.901512288181818

00:01:45.860 --> 00:01:48.121 So when we talk about cannabis and
NOTE Confidence: 0.901512288181818

00:01:48.121 --> 00:01:49.793 cannabis derived products and the
NOTE Confidence: 0.901512288181818

00:01:49.793 --> 00:01:51.085 landscape of cannabis products
NOTE Confidence: 0.901512288181818

00:01:51.085 --> 00:01:52.377 in the United States,
NOTE Confidence: 0.901512288181818

00:01:52.380 --> 00:01:54.508 I think it's important to keep in mind.
NOTE Confidence: 0.901512288181818

00:01:54.510 --> 00:01:57.886 Sort of that that this is all basically
NOTE Confidence: 0.901512288181818

00:01:57.886 --> 00:02:00.018 originating from this hemp plant.
NOTE Confidence: 0.901512288181818

00:02:00.020 --> 00:02:03.555 Cannabis is the most commonly used quote
NOTE Confidence: 0.901512288181818

00:02:03.555 --> 00:02:06.788 illicit drug in the United States.

NOTE Confidence: 0.901512288181818
00:02:06.790 --> 00:02:08.272 You have to put quotes around
NOTE Confidence: 0.901512288181818
00:02:08.272 --> 00:02:09.800 it because as we all know,
NOTE Confidence: 0.901512288181818
00:02:09.800 --> 00:02:11.870 the legality of cannabis is
NOTE Confidence: 0.901512288181818
00:02:11.870 --> 00:02:12.698 constantly changing.
NOTE Confidence: 0.901512288181818
00:02:12.700 --> 00:02:15.164 I think in the election this week
NOTE Confidence: 0.901512288181818
00:02:15.164 --> 00:02:17.660 two more states legalized cannabis,
NOTE Confidence: 0.901512288181818
00:02:17.660 --> 00:02:19.620 so I have this map.
NOTE Confidence: 0.901512288181818
00:02:19.620 --> 00:02:21.588 I have to update it about every 10
NOTE Confidence: 0.901512288181818
00:02:21.588 --> 00:02:23.435 minutes about sort of the legal
NOTE Confidence: 0.901512288181818
00:02:23.435 --> 00:02:25.060 landscape throughout the United States.
NOTE Confidence: 0.901512288181818
00:02:25.060 --> 00:02:26.656 But the point of this is that
NOTE Confidence: 0.901512288181818
00:02:26.656 --> 00:02:27.856 cannabis use is, is,
NOTE Confidence: 0.901512288181818
00:02:27.856 --> 00:02:30.436 is incredibly common over 100.
NOTE Confidence: 0.901512288181818
00:02:30.440 --> 00:02:33.740 Million Americans have tried cannabis.
NOTE Confidence: 0.901512288181818
00:02:33.740 --> 00:02:35.342 And millions more people use it
NOTE Confidence: 0.901512288181818

00:02:35.342 --> 00:02:37.059 for the first time every year.
NOTE Confidence: 0.901512288181818

00:02:37.060 --> 00:02:39.657 And this is this is increasing dramatically.
NOTE Confidence: 0.901512288181818

00:02:39.660 --> 00:02:41.692 And a lot of the reasons for its
NOTE Confidence: 0.901512288181818

00:02:41.692 --> 00:02:43.849 increase has to do with sort of
NOTE Confidence: 0.901512288181818

00:02:43.849 --> 00:02:45.434 societal tolerance of cannabis that's
NOTE Confidence: 0.901512288181818

00:02:45.492 --> 00:02:47.526 really increased in the past decade.
NOTE Confidence: 0.856852455

00:02:50.890 --> 00:02:55.458 OK. So how does cannabis affect the brain?
NOTE Confidence: 0.856852455

00:02:55.460 --> 00:02:57.560 So when cannabis is smoked,
NOTE Confidence: 0.856852455

00:02:57.560 --> 00:02:59.696 THC, which is the the main
NOTE Confidence: 0.856852455

00:02:59.696 --> 00:03:01.120 psychoactive compound in cannabis,
NOTE Confidence: 0.856852455

00:03:01.120 --> 00:03:03.899 passes from the lungs into the bloodstream.
NOTE Confidence: 0.856852455

00:03:03.900 --> 00:03:05.850 Bloodstream carries the chemical to the
NOTE Confidence: 0.856852455

00:03:05.850 --> 00:03:08.259 brain and other organs throughout the body.
NOTE Confidence: 0.856852455

00:03:08.260 --> 00:03:11.220 When cannabis is orally ingested,
NOTE Confidence: 0.856852455

00:03:11.220 --> 00:03:12.196 it's absorbed more slowly,
NOTE Confidence: 0.856852455

00:03:12.196 --> 00:03:14.478 so it takes more time to reach the brain.

NOTE Confidence: 0.856852455

00:03:14.480 --> 00:03:15.344 But basically,

NOTE Confidence: 0.856852455

00:03:15.344 --> 00:03:18.368 THC acts on molecular targets and brain

NOTE Confidence: 0.856852455

00:03:18.368 --> 00:03:20.960 cells called cannabinoid receptors.

NOTE Confidence: 0.856852455

00:03:20.960 --> 00:03:24.530 These are these are endogenous receptors

NOTE Confidence: 0.856852455

00:03:24.530 --> 00:03:27.942 that are ordinarily activated by natural

NOTE Confidence: 0.856852455

00:03:27.942 --> 00:03:31.246 chemicals that are very similar to THC.

NOTE Confidence: 0.856852455

00:03:31.250 --> 00:03:33.162 And the one I have here is called

NOTE Confidence: 0.856852455

00:03:33.162 --> 00:03:34.806 anandamide that are part of a

NOTE Confidence: 0.856852455

00:03:34.806 --> 00:03:36.196 neural communication network that is

NOTE Confidence: 0.856852455

00:03:36.196 --> 00:03:37.850 called the endocannabinoid system.

NOTE Confidence: 0.856852455

00:03:37.850 --> 00:03:39.788 And this is an incredibly important

NOTE Confidence: 0.856852455

00:03:39.788 --> 00:03:42.557 system in and plays a role in normal

NOTE Confidence: 0.856852455

00:03:42.557 --> 00:03:43.969 brain development and function.

NOTE Confidence: 0.856852455

00:03:43.970 --> 00:03:46.299 So what happens is that THC's

NOTE Confidence: 0.856852455

00:03:46.299 --> 00:03:48.144 chemical structure is quite similar

NOTE Confidence: 0.856852455

00:03:48.144 --> 00:03:50.217 to anandamide and that is how
NOTE Confidence: 0.856852455

00:03:50.217 --> 00:03:51.819 it is recognized by the brain.
NOTE Confidence: 0.856852455

00:03:51.820 --> 00:03:54.956 And it can alter normal brain communication.
NOTE Confidence: 0.856852455

00:03:54.960 --> 00:03:57.090 So the endocannabinoid system is
NOTE Confidence: 0.856852455

00:03:57.090 --> 00:03:59.867 often thought of as the neurons
NOTE Confidence: 0.856852455

00:03:59.867 --> 00:04:01.577 volume control system.
NOTE Confidence: 0.856852455

00:04:01.580 --> 00:04:03.230 It dials down activity when
NOTE Confidence: 0.856852455

00:04:03.230 --> 00:04:04.880 neuronal activity is too strong,
NOTE Confidence: 0.856852455

00:04:04.880 --> 00:04:06.795 and it regulates neurotransmitters that
NOTE Confidence: 0.856852455

00:04:06.795 --> 00:04:09.105 affect things like pleasure and mood
NOTE Confidence: 0.856852455

00:04:09.105 --> 00:04:11.139 and appetite and motivation and memory.
NOTE Confidence: 0.856852455

00:04:11.140 --> 00:04:14.564 So a wide variety of of functions are
NOTE Confidence: 0.856852455

00:04:14.564 --> 00:04:17.878 affected by the endocannabinoid system.
NOTE Confidence: 0.856852455

00:04:17.880 --> 00:04:19.950 The endocannabinoid system is also
NOTE Confidence: 0.856852455

00:04:19.950 --> 00:04:22.020 incredibly important in brain development.
NOTE Confidence: 0.856852455

00:04:22.020 --> 00:04:24.738 It guides neurons to grow in the right place.

NOTE Confidence: 0.856852455
00:04:24.740 --> 00:04:26.236 It controls neuronal activity.
NOTE Confidence: 0.856852455
00:04:26.236 --> 00:04:28.480 We say neurons that that fire
NOTE Confidence: 0.856852455
00:04:28.545 --> 00:04:29.979 together wire together.
NOTE Confidence: 0.856852455
00:04:29.980 --> 00:04:31.540 So it it plays a role in making
NOTE Confidence: 0.856852455
00:04:31.540 --> 00:04:33.257 sure these neurons reach the the
NOTE Confidence: 0.856852455
00:04:33.257 --> 00:04:34.533 correct targets and destinations.
NOTE Confidence: 0.856852455
00:04:34.540 --> 00:04:36.878 And it supports myelin growth on neurons.
NOTE Confidence: 0.856852455
00:04:36.880 --> 00:04:37.764 So again,
NOTE Confidence: 0.856852455
00:04:37.764 --> 00:04:39.532 it's an incredibly important
NOTE Confidence: 0.856852455
00:04:39.532 --> 00:04:41.300 system in the brain.
NOTE Confidence: 0.856852455
00:04:41.300 --> 00:04:43.478 So thinking about THC versus anandamide,
NOTE Confidence: 0.856852455
00:04:43.480 --> 00:04:45.256 they have a very similar chemical
NOTE Confidence: 0.856852455
00:04:45.256 --> 00:04:46.846 structure and both dial down
NOTE Confidence: 0.856852455
00:04:46.846 --> 00:04:48.258 neuronal activity and change.
NOTE Confidence: 0.856852455
00:04:48.260 --> 00:04:49.318 Neurotransmitter release.
NOTE Confidence: 0.856852455

00:04:49.318 --> 00:04:53.021 But THC has this much stronger and
NOTE Confidence: 0.856852455

00:04:53.021 --> 00:04:55.250 longer effect compared to an end of mind.
NOTE Confidence: 0.856852455

00:04:55.250 --> 00:04:57.147 And what it does is it interferes
NOTE Confidence: 0.856852455

00:04:57.147 --> 00:04:58.989 with an and amide functions.
NOTE Confidence: 0.856852455

00:04:58.990 --> 00:05:01.937 So you have this distribution of THC
NOTE Confidence: 0.856852455

00:05:01.937 --> 00:05:03.970 binding sites throughout the brain.
NOTE Confidence: 0.856852455

00:05:03.970 --> 00:05:05.070 Whoops.
NOTE Confidence: 0.856852455

00:05:05.070 --> 00:05:06.170 Sorry.
NOTE Confidence: 0.856852455

00:05:06.170 --> 00:05:08.670 And throughout the prefrontal cortex,
NOTE Confidence: 0.856852455

00:05:08.670 --> 00:05:10.570 throughout somatosensory cortex, cortex,
NOTE Confidence: 0.856852455

00:05:10.570 --> 00:05:12.872 the cerebellum, thalamus, hippocampus,
NOTE Confidence: 0.856852455

00:05:12.872 --> 00:05:15.576 basically throughout the brain.
NOTE Confidence: 0.856852455

00:05:15.580 --> 00:05:20.158 And because the the binding sites are
NOTE Confidence: 0.856852455

00:05:20.160 --> 00:05:23.020 very dispersed throughout the brain,
NOTE Confidence: 0.856852455

00:05:23.020 --> 00:05:24.980 the functions that it affects
NOTE Confidence: 0.856852455

00:05:24.980 --> 00:05:26.156 our quite dispersed.

NOTE Confidence: 0.856852455
00:05:26.160 --> 00:05:30.168 So THC will affect everything from
NOTE Confidence: 0.856852455
00:05:30.168 --> 00:05:33.362 motor control to memory to anxiety,
NOTE Confidence: 0.856852455
00:05:33.362 --> 00:05:35.726 emotion, fear and it has some.
NOTE Confidence: 0.856852455
00:05:35.730 --> 00:05:38.310 Really important implications for
NOTE Confidence: 0.856852455
00:05:38.310 --> 00:05:41.535 pain processing and other functions
NOTE Confidence: 0.856852455
00:05:41.540 --> 00:05:44.900 underlying these brain regions.
NOTE Confidence: 0.856852455
00:05:44.900 --> 00:05:47.758 So let's talk about cannabis, the product.
NOTE Confidence: 0.856852455
00:05:47.758 --> 00:05:49.953 So cannabis from basically the
NOTE Confidence: 0.856852455
00:05:49.953 --> 00:05:52.530 beginning of time, this is you know,
NOTE Confidence: 0.856852455
00:05:52.530 --> 00:05:54.420 pictures from the 1960 to 2000s,
NOTE Confidence: 0.856852455
00:05:54.420 --> 00:05:55.940 canvas was this plant that
NOTE Confidence: 0.856852455
00:05:55.940 --> 00:05:57.156 I talked about before.
NOTE Confidence: 0.856852455
00:05:57.160 --> 00:05:58.728 People would smoke it in a joint,
NOTE Confidence: 0.856852455
00:05:58.730 --> 00:06:00.960 people would sometimes vape it,
NOTE Confidence: 0.856852455
00:06:00.960 --> 00:06:03.354 but it's THC content was quite low.
NOTE Confidence: 0.856852455

00:06:03.360 --> 00:06:05.728 So 1 to 3% was was fairly common
NOTE Confidence: 0.856852455

00:06:05.728 --> 00:06:08.098 for the amount of THC in cannabis
NOTE Confidence: 0.856852455

00:06:08.098 --> 00:06:10.400 that was used on the street.
NOTE Confidence: 0.874935572380952

00:06:12.430 --> 00:06:14.649 What's happened lately and this is really
NOTE Confidence: 0.874935572380952

00:06:14.649 --> 00:06:17.066 been in the past decade is that THC
NOTE Confidence: 0.874935572380952

00:06:17.066 --> 00:06:19.310 potency has has gone up dramatically.
NOTE Confidence: 0.874935572380952

00:06:19.310 --> 00:06:21.086 This has happened in plant based
NOTE Confidence: 0.874935572380952

00:06:21.086 --> 00:06:22.914 THC and they're they've done some
NOTE Confidence: 0.874935572380952

00:06:22.914 --> 00:06:24.369 studies looking at police seizures
NOTE Confidence: 0.874935572380952

00:06:24.369 --> 00:06:26.866 of THC and they've of cannabis and
NOTE Confidence: 0.874935572380952

00:06:26.866 --> 00:06:28.430 they've measured THC concentration.
NOTE Confidence: 0.874935572380952

00:06:28.430 --> 00:06:30.691 So even the the plant based cannabis
NOTE Confidence: 0.874935572380952

00:06:30.691 --> 00:06:33.047 growers have worked to make it more potent.
NOTE Confidence: 0.874935572380952

00:06:33.050 --> 00:06:35.367 But now even in addition to that
NOTE Confidence: 0.874935572380952

00:06:35.367 --> 00:06:37.870 we have all these new products,
NOTE Confidence: 0.874935572380952

00:06:37.870 --> 00:06:39.635 these derivatives which contain up

NOTE Confidence: 0.874935572380952
00:06:39.635 --> 00:06:42.167 to 98% THC. So you have hash oil.
NOTE Confidence: 0.874935572380952
00:06:42.170 --> 00:06:43.784 Shatter, butter,
NOTE Confidence: 0.874935572380952
00:06:43.784 --> 00:06:49.433 wax and these are incredibly potent products.
NOTE Confidence: 0.874935572380952
00:06:49.440 --> 00:06:51.624 You have novel forms of THC delivery
NOTE Confidence: 0.874935572380952
00:06:51.624 --> 00:06:53.890 such as you can put THC oil in
NOTE Confidence: 0.874935572380952
00:06:53.890 --> 00:06:56.200 a jewel pod and this is use is
NOTE Confidence: 0.874935572380952
00:06:56.200 --> 00:06:57.500 very difficult to detect.
NOTE Confidence: 0.874935572380952
00:06:57.500 --> 00:06:59.509 So something that we have seen in
NOTE Confidence: 0.874935572380952
00:06:59.509 --> 00:07:00.839 our adolescent studies is that.
NOTE Confidence: 0.8026975806
00:07:02.910 --> 00:07:03.900 People's kids will use this
NOTE Confidence: 0.8026975806
00:07:03.900 --> 00:07:04.890 in school all day long.
NOTE Confidence: 0.8026975806
00:07:04.890 --> 00:07:06.770 They'll put this, this jewel pod under their
NOTE Confidence: 0.8026975806
00:07:06.770 --> 00:07:08.546 shirt and they can just use it all day.
NOTE Confidence: 0.8026975806
00:07:08.550 --> 00:07:09.696 So it wasn't like, you know,
NOTE Confidence: 0.8026975806
00:07:09.700 --> 00:07:10.828 when I was in high school,
NOTE Confidence: 0.8026975806

00:07:10.830 --> 00:07:12.230 of course kids used pot,
NOTE Confidence: 0.8026975806

00:07:12.230 --> 00:07:13.268 but you had to sneak out.
NOTE Confidence: 0.8026975806

00:07:13.270 --> 00:07:14.790 You had to sneak out to the corner
NOTE Confidence: 0.8026975806

00:07:14.790 --> 00:07:16.249 or the bathroom or something.
NOTE Confidence: 0.8026975806

00:07:16.250 --> 00:07:17.430 Now they can basically do
NOTE Confidence: 0.8026975806

00:07:17.430 --> 00:07:18.610 this in class all day.
NOTE Confidence: 0.8026975806

00:07:18.610 --> 00:07:20.087 And you have kids who are high.
NOTE Confidence: 0.8026975806

00:07:20.090 --> 00:07:21.926 There's no odor.
NOTE Confidence: 0.8026975806

00:07:21.926 --> 00:07:23.150 You can't,
NOTE Confidence: 0.8026975806

00:07:23.150 --> 00:07:25.990 there's no smoke that's emitted.
NOTE Confidence: 0.8026975806

00:07:25.990 --> 00:07:27.500 And oftentimes the kids don't
NOTE Confidence: 0.8026975806

00:07:27.500 --> 00:07:28.708 get the bloodshot eyes,
NOTE Confidence: 0.8026975806

00:07:28.710 --> 00:07:32.049 so you would just have no idea.
NOTE Confidence: 0.8026975806

00:07:32.050 --> 00:07:34.586 This is to say nothing of the new
NOTE Confidence: 0.8026975806

00:07:34.586 --> 00:07:37.506 market of edibles that is now prevalent.
NOTE Confidence: 0.8026975806

00:07:37.510 --> 00:07:38.938 There are edibles,

NOTE Confidence: 0.8026975806

00:07:38.938 --> 00:07:41.794 particularly in states with legal cannabis.

NOTE Confidence: 0.8026975806

00:07:41.800 --> 00:07:42.984 These shops are everywhere.

NOTE Confidence: 0.8026975806

00:07:42.984 --> 00:07:45.618 I was just in Portland last week and I was

NOTE Confidence: 0.8026975806

00:07:45.618 --> 00:07:47.789 trying to get a cup of coffee and all I,

NOTE Confidence: 0.8026975806

00:07:47.790 --> 00:07:48.260 you know,

NOTE Confidence: 0.8026975806

00:07:48.260 --> 00:07:49.670 I couldn't even find a coffee

NOTE Confidence: 0.8026975806

00:07:49.670 --> 00:07:51.509 shop shop because there were all

NOTE Confidence: 0.8026975806

00:07:51.509 --> 00:07:52.896 these recreational pot shops and

NOTE Confidence: 0.8026975806

00:07:52.896 --> 00:07:54.348 this was just in the windows.

NOTE Confidence: 0.8026975806

00:07:54.350 --> 00:07:56.670 Just every, every edible you could think of.

NOTE Confidence: 0.8026975806

00:07:56.670 --> 00:07:57.998 These products simply didn't

NOTE Confidence: 0.8026975806

00:07:57.998 --> 00:07:59.326 exist 10 years ago.

NOTE Confidence: 0.8026975806

00:07:59.330 --> 00:08:01.955 This is a product of of commercial.

NOTE Confidence: 0.8026975806

00:08:01.960 --> 00:08:04.018 Location of cannabis.

NOTE Confidence: 0.8026975806

00:08:04.020 --> 00:08:05.665 Now you know manufacturers are

NOTE Confidence: 0.8026975806

00:08:05.665 --> 00:08:08.140 working to to sort of create this
NOTE Confidence: 0.8026975806

00:08:08.140 --> 00:08:09.660 emerging commercial market of
NOTE Confidence: 0.8026975806

00:08:09.660 --> 00:08:12.292 products and a lot of them are
NOTE Confidence: 0.8026975806

00:08:12.292 --> 00:08:13.824 appealing to children because you
NOTE Confidence: 0.8026975806

00:08:13.824 --> 00:08:15.760 know a lot of adults don't eat pop
NOTE Confidence: 0.8026975806

00:08:15.815 --> 00:08:18.079 tarts and fruit loops and things like that,
NOTE Confidence: 0.8026975806

00:08:18.080 --> 00:08:19.724 but kids do and then instead
NOTE Confidence: 0.8026975806

00:08:19.724 --> 00:08:21.783 of your pop tarts you have pop
NOTE Confidence: 0.8026975806

00:08:21.783 --> 00:08:23.273 tarts and things like that.
NOTE Confidence: 0.8026975806

00:08:23.280 --> 00:08:26.072 So this we've seen increases in ER visits
NOTE Confidence: 0.8026975806

00:08:26.072 --> 00:08:29.198 of kids getting a hold of these products.
NOTE Confidence: 0.8026975806

00:08:29.200 --> 00:08:31.570 This is not uncommon and these
NOTE Confidence: 0.8026975806

00:08:31.570 --> 00:08:33.530 products again are are are.
NOTE Confidence: 0.8026975806

00:08:33.530 --> 00:08:35.588 Super potent, a lot of them.
NOTE Confidence: 0.8026975806

00:08:35.590 --> 00:08:37.276 You know, a cookie will be,
NOTE Confidence: 0.8026975806

00:08:37.280 --> 00:08:39.536 you know, 10 servings of THC.

NOTE Confidence: 0.8026975806

00:08:39.540 --> 00:08:40.856 But who eats 1/10 of a cookie?

NOTE Confidence: 0.8026975806

00:08:40.860 --> 00:08:42.300 Nobody eats 1/10 of a cookie.

NOTE Confidence: 0.8026975806

00:08:42.300 --> 00:08:44.502 So oftentimes people do have negative

NOTE Confidence: 0.8026975806

00:08:44.502 --> 00:08:46.369 side effects from these edibles

NOTE Confidence: 0.8026975806

00:08:46.369 --> 00:08:48.686 because they're just not used to it.

NOTE Confidence: 0.9409106825

00:08:51.420 --> 00:08:55.478 So we know that. That the brain is

NOTE Confidence: 0.9409106825

00:08:55.478 --> 00:08:56.549 developing throughout adolescence.

NOTE Confidence: 0.9409106825

00:08:56.550 --> 00:08:59.124 This is very well known and this is research

NOTE Confidence: 0.9409106825

00:08:59.124 --> 00:09:01.410 that that's now you know 30 years old.

NOTE Confidence: 0.9409106825

00:09:01.410 --> 00:09:03.740 We know that the brain has developmental

NOTE Confidence: 0.9409106825

00:09:03.740 --> 00:09:05.945 changes into the third decade of life

NOTE Confidence: 0.9409106825

00:09:05.945 --> 00:09:07.894 and we know that these changes take

NOTE Confidence: 0.9409106825

00:09:07.894 --> 00:09:10.142 place you know in multi domain changes

NOTE Confidence: 0.9409106825

00:09:10.142 --> 00:09:12.047 in connectivity and brain chemistry,

NOTE Confidence: 0.9409106825

00:09:12.050 --> 00:09:15.256 in in brain morphology and the prefrontal

NOTE Confidence: 0.9409106825

00:09:15.256 --> 00:09:18.436 cortex which is up here is the last
NOTE Confidence: 0.9409106825

00:09:18.436 --> 00:09:20.930 to develop and that's part of the
NOTE Confidence: 0.9409106825

00:09:20.930 --> 00:09:22.370 theories of adolescent development
NOTE Confidence: 0.9409106825

00:09:22.370 --> 00:09:24.477 is that this prefrontal cortex.
NOTE Confidence: 0.9409106825

00:09:24.480 --> 00:09:25.436 Develops later,
NOTE Confidence: 0.9409106825

00:09:25.436 --> 00:09:28.700 and that's why teenagers are often,
NOTE Confidence: 0.9409106825

00:09:28.700 --> 00:09:31.140 often make risky decisions,
NOTE Confidence: 0.9409106825

00:09:31.140 --> 00:09:33.090 more so than than adults do.
NOTE Confidence: 0.9409106825

00:09:33.090 --> 00:09:34.776 But the other thing about the
NOTE Confidence: 0.9409106825

00:09:34.776 --> 00:09:36.417 prefrontal cortex is it's densely
NOTE Confidence: 0.9409106825

00:09:36.417 --> 00:09:38.257 populated with cannabinoid receptors.
NOTE Confidence: 0.9409106825

00:09:38.260 --> 00:09:40.068 So these prefrontal regions
NOTE Confidence: 0.9409106825

00:09:40.068 --> 00:09:41.876 critically underlie higher order
NOTE Confidence: 0.9409106825

00:09:41.876 --> 00:09:43.240 cognitive decision making.
NOTE Confidence: 0.9409106825

00:09:43.240 --> 00:09:45.630 And they're also densely populated
NOTE Confidence: 0.9409106825

00:09:45.630 --> 00:09:47.064 with cannabinoid receptors.

NOTE Confidence: 0.9409106825

00:09:47.070 --> 00:09:50.622 And that means that adolescent cannabis

NOTE Confidence: 0.9409106825

00:09:50.622 --> 00:09:52.990 use is particularly detrimental.

NOTE Confidence: 0.9409106825

00:09:52.990 --> 00:09:54.646 So I'm going to there's been,

NOTE Confidence: 0.9409106825

00:09:54.650 --> 00:09:55.214 you know,

NOTE Confidence: 0.9409106825

00:09:55.214 --> 00:09:57.188 tons and tons of of studies showing

NOTE Confidence: 0.9409106825

00:09:57.188 --> 00:09:59.195 that animal studies and to human

NOTE Confidence: 0.9409106825

00:09:59.195 --> 00:10:00.527 studies showing that effects

NOTE Confidence: 0.9409106825

00:10:00.527 --> 00:10:02.412 of cannabis are just worse in

NOTE Confidence: 0.9409106825

00:10:02.412 --> 00:10:04.245 teenagers than they are in adults.

NOTE Confidence: 0.9409106825

00:10:04.245 --> 00:10:06.255 And there's a lot of controversy

NOTE Confidence: 0.9409106825

00:10:06.255 --> 00:10:07.680 in the cannabis field.

NOTE Confidence: 0.9409106825

00:10:07.680 --> 00:10:09.912 But I would say that that's one of the

NOTE Confidence: 0.9409106825

00:10:09.912 --> 00:10:12.249 least controversial statements I can make,

NOTE Confidence: 0.9409106825

00:10:12.250 --> 00:10:14.680 that that cannabis is worse

NOTE Confidence: 0.9409106825

00:10:14.680 --> 00:10:16.624 for kids than adults.

NOTE Confidence: 0.9409106825

00:10:16.630 --> 00:10:18.638 And this is just a study that I
NOTE Confidence: 0.9409106825

00:10:18.638 --> 00:10:20.903 did a few years ago now where
NOTE Confidence: 0.9409106825

00:10:20.903 --> 00:10:22.940 we brought people into the lab.
NOTE Confidence: 0.9409106825

00:10:22.940 --> 00:10:24.116 For all cannabis users.
NOTE Confidence: 0.9409106825

00:10:24.116 --> 00:10:26.935 And we gave them a memory task and it
NOTE Confidence: 0.9409106825

00:10:26.935 --> 00:10:29.245 was called the CVLT California verbal test.
NOTE Confidence: 0.9409106825

00:10:29.250 --> 00:10:31.600 And we let we read them a list of words
NOTE Confidence: 0.9409106825

00:10:31.660 --> 00:10:34.009 and they had to recall them back to us.
NOTE Confidence: 0.9409106825

00:10:34.010 --> 00:10:35.672 And this is just the number
NOTE Confidence: 0.9409106825

00:10:35.672 --> 00:10:36.503 of words recalled.
NOTE Confidence: 0.9409106825

00:10:36.510 --> 00:10:38.134 And then you read them the list again
NOTE Confidence: 0.9409106825

00:10:38.134 --> 00:10:39.855 and they read it back to you again and
NOTE Confidence: 0.9409106825

00:10:39.855 --> 00:10:41.550 then you do it again for five trials.
NOTE Confidence: 0.9409106825

00:10:41.550 --> 00:10:43.098 So what we did was everyone,
NOTE Confidence: 0.9409106825

00:10:43.100 --> 00:10:44.340 these were college students,
NOTE Confidence: 0.9409106825

00:10:44.340 --> 00:10:46.841 so they were all ages 21 to 25

NOTE Confidence: 0.9409106825
00:10:46.841 --> 00:10:48.850 and some of them had started using
NOTE Confidence: 0.9409106825
00:10:48.850 --> 00:10:50.429 cannabis before the age of 16.
NOTE Confidence: 0.9409106825
00:10:50.430 --> 00:10:52.128 Some of them had been using,
NOTE Confidence: 0.9409106825
00:10:52.130 --> 00:10:53.003 started using cannabis.
NOTE Confidence: 0.9409106825
00:10:53.003 --> 00:10:54.458 After the age of 18,
NOTE Confidence: 0.9409106825
00:10:54.460 --> 00:10:57.141 so we had these early onset users
NOTE Confidence: 0.9409106825
00:10:57.141 --> 00:10:59.513 and these later onset users and
NOTE Confidence: 0.9409106825
00:10:59.513 --> 00:11:01.418 what we found was that.
NOTE Confidence: 0.9409106825
00:11:01.420 --> 00:11:03.740 Learning improved in both groups,
NOTE Confidence: 0.9409106825
00:11:03.740 --> 00:11:04.836 all three groups actually.
NOTE Confidence: 0.9409106825
00:11:04.836 --> 00:11:06.480 We had a control group also.
NOTE Confidence: 0.9409106825
00:11:06.480 --> 00:11:08.440 So learning improved over time,
NOTE Confidence: 0.9409106825
00:11:08.440 --> 00:11:09.988 which you would expect.
NOTE Confidence: 0.9409106825
00:11:09.988 --> 00:11:11.923 The slopes were absolutely identical.
NOTE Confidence: 0.9409106825
00:11:11.930 --> 00:11:14.270 The rate of learning was identical
NOTE Confidence: 0.9409106825

00:11:14.270 --> 00:11:16.565 but these early onset users which
NOTE Confidence: 0.9409106825

00:11:16.565 --> 00:11:18.210 are shown in the red.
NOTE Confidence: 0.9409106825

00:11:18.210 --> 00:11:19.614 Had trouble with encoding.
NOTE Confidence: 0.9409106825

00:11:19.614 --> 00:11:21.720 They had trouble with initial learning,
NOTE Confidence: 0.9409106825

00:11:21.720 --> 00:11:23.600 they just didn't learn the
NOTE Confidence: 0.9409106825

00:11:23.600 --> 00:11:24.728 information as efficiently.
NOTE Confidence: 0.9409106825

00:11:24.730 --> 00:11:26.490 So these weren't even
NOTE Confidence: 0.9409106825

00:11:26.490 --> 00:11:27.810 really memory differences.
NOTE Confidence: 0.9409106825

00:11:27.810 --> 00:11:29.350 So this is trial 5,
NOTE Confidence: 0.9409106825

00:11:29.350 --> 00:11:31.186 and then there's a delay and they call they.
NOTE Confidence: 0.9409106825

00:11:31.190 --> 00:11:32.330 They basically you do something
NOTE Confidence: 0.9409106825

00:11:32.330 --> 00:11:33.917 else with them and then you ask
NOTE Confidence: 0.9409106825

00:11:33.917 --> 00:11:35.129 them to recall the words again.
NOTE Confidence: 0.9409106825

00:11:35.130 --> 00:11:37.363 And what we found is that they
NOTE Confidence: 0.9409106825

00:11:37.363 --> 00:11:38.658 remembered everything they learned
NOTE Confidence: 0.9409106825

00:11:38.658 --> 00:11:40.338 the same as the controls of

NOTE Confidence: 0.9409106825
00:11:40.338 --> 00:11:41.178 the late onset
NOTE Confidence: 0.845291932857143
00:11:41.234 --> 00:11:42.346 users, but they just never
NOTE Confidence: 0.845291932857143
00:11:42.346 --> 00:11:43.510 learned it in the 1st place.
NOTE Confidence: 0.845291932857143
00:11:43.510 --> 00:11:45.382 And that was really the first
NOTE Confidence: 0.845291932857143
00:11:45.382 --> 00:11:47.018 demonstration that I know of
NOTE Confidence: 0.845291932857143
00:11:47.018 --> 00:11:48.628 of really parsing the learning.
NOTE Confidence: 0.845291932857143
00:11:48.630 --> 00:11:50.965 Process and understanding that it
NOTE Confidence: 0.845291932857143
00:11:50.965 --> 00:11:53.749 was the initial encoding that was
NOTE Confidence: 0.845291932857143
00:11:53.749 --> 00:11:55.428 really affected by the cannabis
NOTE Confidence: 0.845291932857143
00:11:55.428 --> 00:11:56.736 and this was cross-sectional.
NOTE Confidence: 0.845291932857143
00:11:56.740 --> 00:11:58.625 So there's caveats to this
NOTE Confidence: 0.845291932857143
00:11:58.625 --> 00:11:59.756 study showing that.
NOTE Confidence: 0.845291932857143
00:11:59.760 --> 00:12:01.524 You know, you can say that
NOTE Confidence: 0.845291932857143
00:12:01.524 --> 00:12:03.132 maybe these people had poorer
NOTE Confidence: 0.845291932857143
00:12:03.132 --> 00:12:04.620 memory being begin with,
NOTE Confidence: 0.845291932857143

00:12:04.620 --> 00:12:07.287 but I thought this was a powerful
NOTE Confidence: 0.845291932857143

00:12:07.287 --> 00:12:09.859 illustration that that the age of onset is,
NOTE Confidence: 0.845291932857143

00:12:09.860 --> 00:12:12.278 is quite important and this is
NOTE Confidence: 0.845291932857143

00:12:12.278 --> 00:12:13.890 specific to encoding strategies.
NOTE Confidence: 0.884290705

00:12:16.110 --> 00:12:18.422 We find that this is even worse in
NOTE Confidence: 0.884290705

00:12:18.422 --> 00:12:20.115 people with psychiatric diagnosis and
NOTE Confidence: 0.884290705

00:12:20.115 --> 00:12:22.925 this has also been shown a few times
NOTE Confidence: 0.884290705

00:12:22.925 --> 00:12:25.463 and this was a study where we looked at
NOTE Confidence: 0.884290705

00:12:25.470 --> 00:12:28.530 people with depression and cannabis use.
NOTE Confidence: 0.884290705

00:12:28.530 --> 00:12:30.441 So again this is the same test
NOTE Confidence: 0.884290705

00:12:30.441 --> 00:12:32.930 and this is total number of words
NOTE Confidence: 0.884290705

00:12:32.930 --> 00:12:34.526 recalled across all trials.
NOTE Confidence: 0.884290705

00:12:34.530 --> 00:12:36.510 So you see the control participants
NOTE Confidence: 0.884290705

00:12:36.510 --> 00:12:39.544 did the best and then the cannabis
NOTE Confidence: 0.884290705

00:12:39.544 --> 00:12:42.099 users had a significant decrease.
NOTE Confidence: 0.884290705

00:12:42.100 --> 00:12:44.245 The the participants with depression

NOTE Confidence: 0.884290705

00:12:44.245 --> 00:12:47.509 had even more of a decrease and

NOTE Confidence: 0.884290705

00:12:47.509 --> 00:12:49.589 they participants with both

NOTE Confidence: 0.884290705

00:12:49.590 --> 00:12:52.500 depression and cannabis use showed

NOTE Confidence: 0.884290705

00:12:52.500 --> 00:12:55.410 the worst decrements in learning.

NOTE Confidence: 0.884290705

00:12:55.410 --> 00:12:58.330 And if you look at the memory component,

NOTE Confidence: 0.884290705

00:12:58.330 --> 00:12:59.530 so this is the learning component,

NOTE Confidence: 0.884290705

00:12:59.530 --> 00:13:01.330 this is the memory component component,

NOTE Confidence: 0.884290705

00:13:01.330 --> 00:13:03.517 the free recall after delay and you can do

NOTE Confidence: 0.884290705

00:13:03.517 --> 00:13:05.625 this with a short delay or a long delay,

NOTE Confidence: 0.884290705

00:13:05.630 --> 00:13:06.970 then you really see this.

NOTE Confidence: 0.884290705

00:13:06.970 --> 00:13:10.210 You really see this additive effect of of

NOTE Confidence: 0.884290705

00:13:10.210 --> 00:13:12.909 depression and cannabis use we also saw.

NOTE Confidence: 0.884290705

00:13:12.910 --> 00:13:14.542 To break brain imaging on all

NOTE Confidence: 0.884290705

00:13:14.542 --> 00:13:16.666 these people and we also saw not

NOTE Confidence: 0.884290705

00:13:16.666 --> 00:13:18.296 only did their performance suffer,

NOTE Confidence: 0.884290705

00:13:18.300 --> 00:13:20.016 but they had reduced cortical thickness

NOTE Confidence: 0.884290705

00:13:20.016 --> 00:13:21.930 in the middle middle temporal gyrus,

NOTE Confidence: 0.884290705

00:13:21.930 --> 00:13:23.538 which is also important in memory

NOTE Confidence: 0.884290705

00:13:23.538 --> 00:13:24.342 in this group.

NOTE Confidence: 0.8903780225

00:13:27.630 --> 00:13:29.454 So something that comes up quite

NOTE Confidence: 0.8903780225

00:13:29.454 --> 00:13:31.578 often is the question of whether

NOTE Confidence: 0.8903780225

00:13:31.578 --> 00:13:33.270 cognitive deficits are reversible.

NOTE Confidence: 0.8903780225

00:13:33.270 --> 00:13:36.470 So we we've shown that that you know,

NOTE Confidence: 0.8903780225

00:13:36.470 --> 00:13:38.455 when when people are acutely

NOTE Confidence: 0.8903780225

00:13:38.455 --> 00:13:39.646 intoxicated from cannabis,

NOTE Confidence: 0.8903780225

00:13:39.650 --> 00:13:41.182 they have memory weaknesses.

NOTE Confidence: 0.8903780225

00:13:41.182 --> 00:13:43.097 And we've shown that chronic

NOTE Confidence: 0.8903780225

00:13:43.097 --> 00:13:44.950 users have memory weaknesses.

NOTE Confidence: 0.8903780225

00:13:44.950 --> 00:13:46.318 But these are all people who

NOTE Confidence: 0.8903780225

00:13:46.318 --> 00:13:47.230 are still using cannabis.

NOTE Confidence: 0.8903780225

00:13:47.230 --> 00:13:49.379 What happens if people stop using cannabis?

NOTE Confidence: 0.882383856

00:13:51.570 --> 00:13:53.550 So we did a trial, and this was led

NOTE Confidence: 0.882383856

00:13:53.550 --> 00:13:54.825 by my colleague Randy Schuster.

NOTE Confidence: 0.8720725635

00:13:57.320 --> 00:13:59.840 Where we use something called contingency

NOTE Confidence: 0.8720725635

00:13:59.840 --> 00:14:02.639 management to pay kids to stop using

NOTE Confidence: 0.8720725635

00:14:02.639 --> 00:14:05.075 cannabis for a specific period of time.

NOTE Confidence: 0.8720725635

00:14:05.080 --> 00:14:07.130 Contingency management is is widely

NOTE Confidence: 0.8720725635

00:14:07.130 --> 00:14:09.660 used in the substance use field.

NOTE Confidence: 0.8720725635

00:14:09.660 --> 00:14:11.984 And basically it's it's what it's it

NOTE Confidence: 0.8720725635

00:14:11.984 --> 00:14:14.588 sounds like you pay people for negative

NOTE Confidence: 0.8720725635

00:14:14.588 --> 00:14:16.892 drug screens and you have escalating

NOTE Confidence: 0.8720725635

00:14:16.956 --> 00:14:19.164 payments over time so that they're

NOTE Confidence: 0.8720725635

00:14:19.164 --> 00:14:21.960 invested in in stopping use, you know,

NOTE Confidence: 0.8720725635

00:14:21.960 --> 00:14:23.598 for longer periods of time because

NOTE Confidence: 0.8720725635

00:14:23.598 --> 00:14:25.479 they keep making more and more money.

NOTE Confidence: 0.8720725635

00:14:25.480 --> 00:14:27.432 The reason why we we we chose to

NOTE Confidence: 0.8720725635

00:14:27.432 --> 00:14:28.784 do this contingency management
NOTE Confidence: 0.8720725635

00:14:28.784 --> 00:14:31.166 study is that you cannot randomize
NOTE Confidence: 0.8720725635

00:14:31.166 --> 00:14:33.496 kids to use or not use cannabis.
NOTE Confidence: 0.8720725635

00:14:33.500 --> 00:14:34.252 That's unethical,
NOTE Confidence: 0.8720725635

00:14:34.252 --> 00:14:36.508 but it was not considered unethical
NOTE Confidence: 0.8720725635

00:14:36.508 --> 00:14:38.767 to pay some kids for stopping.
NOTE Confidence: 0.8720725635

00:14:38.770 --> 00:14:40.098 So what we did was we did this,
NOTE Confidence: 0.8720725635

00:14:40.100 --> 00:14:41.464 this randomized trial where
NOTE Confidence: 0.8720725635

00:14:41.464 --> 00:14:43.510 we paid some kids to stop.
NOTE Confidence: 0.8720725635

00:14:43.510 --> 00:14:45.158 Other kids, we did not pay to stop.
NOTE Confidence: 0.8720725635

00:14:45.160 --> 00:14:46.930 They were called a monitoring condition.
NOTE Confidence: 0.8720725635

00:14:46.930 --> 00:14:48.218 We said you can stop if you'd like,
NOTE Confidence: 0.8720725635

00:14:48.220 --> 00:14:49.880 but we're not going to pay you to do so.
NOTE Confidence: 0.8720725635

00:14:49.880 --> 00:14:52.330 And you can imagine how many stopped.
NOTE Confidence: 0.8720725635

00:14:52.330 --> 00:14:55.882 And we looked at changes in
NOTE Confidence: 0.8720725635

00:14:55.882 --> 00:14:57.658 cognition with abstinence.

NOTE Confidence: 0.8720725635

00:14:57.660 --> 00:14:59.135 So these were high school

NOTE Confidence: 0.8720725635

00:14:59.135 --> 00:15:00.020 and college students.

NOTE Confidence: 0.8720725635

00:15:00.020 --> 00:15:01.778 They used cannabis weekly or more.

NOTE Confidence: 0.8720725635

00:15:01.780 --> 00:15:03.480 They were not seeking treatment.

NOTE Confidence: 0.8720725635

00:15:03.480 --> 00:15:07.030 And as I mentioned after baseline,

NOTE Confidence: 0.8720725635

00:15:07.030 --> 00:15:09.165 the kids who are abstained to cannabis

NOTE Confidence: 0.8720725635

00:15:09.165 --> 00:15:11.070 were asked to stop using cannabis for

NOTE Confidence: 0.8720725635

00:15:11.070 --> 00:15:12.995 a month and there was urine samples

NOTE Confidence: 0.8720725635

00:15:12.995 --> 00:15:14.948 to verify this and those assigned to

NOTE Confidence: 0.8720725635

00:15:14.950 --> 00:15:17.668 monitoring were not asked to change

NOTE Confidence: 0.8720725635

00:15:17.668 --> 00:15:19.850 their patterns of cannabis use.

NOTE Confidence: 0.8720725635

00:15:19.850 --> 00:15:21.776 And we we assess cognition with

NOTE Confidence: 0.8720725635

00:15:21.776 --> 00:15:23.801 the cantab battery and and and

NOTE Confidence: 0.8720725635

00:15:23.801 --> 00:15:25.835 the two domains we were interested

NOTE Confidence: 0.8720725635

00:15:25.835 --> 00:15:27.229 were attention and memory.

NOTE Confidence: 0.8720725635

00:15:27.230 --> 00:15:30.174 So we had a series of of cognitive
NOTE Confidence: 0.8720725635

00:15:30.174 --> 00:15:32.887 tasks in each of these domains.
NOTE Confidence: 0.8720725635

00:15:32.890 --> 00:15:33.315 OK.
NOTE Confidence: 0.8720725635

00:15:33.315 --> 00:15:33.740 So.
NOTE Confidence: 0.8720725635

00:15:33.740 --> 00:15:36.715 The first thing we found was that
NOTE Confidence: 0.8720725635

00:15:36.715 --> 00:15:39.369 kids will abstain for money.
NOTE Confidence: 0.8720725635

00:15:39.370 --> 00:15:41.370 So this study worked beautifully.
NOTE Confidence: 0.8720725635

00:15:41.370 --> 00:15:44.010 So this is the group that was randomized
NOTE Confidence: 0.8720725635

00:15:44.010 --> 00:15:47.410 to CM and this is their carboxy THC levels.
NOTE Confidence: 0.8720725635

00:15:47.410 --> 00:15:49.978 And you could see they just plummeted and
NOTE Confidence: 0.8720725635

00:15:49.978 --> 00:15:52.147 stayed really low throughout the study.
NOTE Confidence: 0.8720725635

00:15:52.150 --> 00:15:53.572 I think we had something like
NOTE Confidence: 0.8720725635

00:15:53.572 --> 00:15:54.594 a 90% abstinence rate.
NOTE Confidence: 0.8720725635

00:15:54.594 --> 00:15:56.498 And then this was the group that
NOTE Confidence: 0.8720725635

00:15:56.498 --> 00:15:57.955 continued to use and of course there
NOTE Confidence: 0.8720725635

00:15:57.955 --> 00:15:59.625 was a lot more variation in their

NOTE Confidence: 0.8720725635
00:15:59.625 --> 00:16:01.714 carboxyl levels because we had, you know,
NOTE Confidence: 0.8720725635
00:16:01.714 --> 00:16:03.324 kids with different use patterns,
NOTE Confidence: 0.8720725635
00:16:03.330 --> 00:16:06.936 but the randomization worked quite well.
NOTE Confidence: 0.8720725635
00:16:06.940 --> 00:16:08.560 And this is what we found.
NOTE Confidence: 0.8720725635
00:16:08.560 --> 00:16:12.375 So for attention, they improved over time.
NOTE Confidence: 0.8720725635
00:16:12.380 --> 00:16:14.380 They're given the same tests
NOTE Confidence: 0.8720725635
00:16:14.380 --> 00:16:15.076 throughout four weeks.
NOTE Confidence: 0.8720725635
00:16:15.076 --> 00:16:16.236 So as you can imagine,
NOTE Confidence: 0.8720725635
00:16:16.240 --> 00:16:18.720 there's learning that occurs.
NOTE Confidence: 0.8720725635
00:16:18.720 --> 00:16:19.599 So attention,
NOTE Confidence: 0.8720725635
00:16:19.599 --> 00:16:21.412 you saw no difference between the kids
NOTE Confidence: 0.8720725635
00:16:21.412 --> 00:16:23.118 who stopped and the kids who continued.
NOTE Confidence: 0.8720725635
00:16:23.120 --> 00:16:24.616 But something really interesting
NOTE Confidence: 0.8720725635
00:16:24.616 --> 00:16:25.738 happened with memory.
NOTE Confidence: 0.8720725635
00:16:25.740 --> 00:16:28.060 So the kids, this is a monitoring group.
NOTE Confidence: 0.8720725635

00:16:28.060 --> 00:16:29.740 This is the kids who didn't
NOTE Confidence: 0.8720725635

00:16:29.740 --> 00:16:30.860 change their cannabis use.
NOTE Confidence: 0.8720725635

00:16:30.860 --> 00:16:32.472 They just didn't improve
NOTE Confidence: 0.8720725635

00:16:32.472 --> 00:16:34.890 from week zero to week four.
NOTE Confidence: 0.8720725635

00:16:34.890 --> 00:16:36.466 We're giving them the same test four times.
NOTE Confidence: 0.8720725635

00:16:36.470 --> 00:16:38.110 They showed no improvement.
NOTE Confidence: 0.8720725635

00:16:38.110 --> 00:16:40.570 The kids who were abstinent showed
NOTE Confidence: 0.8720725635

00:16:40.644 --> 00:16:42.829 dramatic improvement in week one,
NOTE Confidence: 0.8720725635

00:16:42.830 --> 00:16:45.350 and then they sort of.
NOTE Confidence: 0.8720725635

00:16:45.350 --> 00:16:46.571 Stayed the same.
NOTE Confidence: 0.8720725635

00:16:46.571 --> 00:16:49.420 So a week of abstinence was enough
NOTE Confidence: 0.8623915655

00:16:49.500 --> 00:16:51.775 to really improve the amount
NOTE Confidence: 0.8623915655

00:16:51.775 --> 00:16:54.050 that they that they learned,
NOTE Confidence: 0.8623915655

00:16:54.050 --> 00:16:55.360 which was quite interesting because
NOTE Confidence: 0.8623915655

00:16:55.360 --> 00:16:57.096 you think about kids who, you know,
NOTE Confidence: 0.8623915655

00:16:57.096 --> 00:16:58.587 smoke pot on the weekends and then

NOTE Confidence: 0.8623915655

00:16:58.587 --> 00:17:00.045 they go to school on the weekdays

NOTE Confidence: 0.8623915655

00:17:00.045 --> 00:17:01.628 and there are not learning as well,

NOTE Confidence: 0.8623915655

00:17:01.630 --> 00:17:03.970 is what this study indicates.

NOTE Confidence: 0.8623915655

00:17:03.970 --> 00:17:06.105 So what we found in this study

NOTE Confidence: 0.8623915655

00:17:06.105 --> 00:17:08.202 is that memory improved among

NOTE Confidence: 0.8623915655

00:17:08.202 --> 00:17:09.870 adolescents who abstained,

NOTE Confidence: 0.8623915655

00:17:09.870 --> 00:17:12.070 but not among those who continue to use.

NOTE Confidence: 0.8623915655

00:17:12.070 --> 00:17:13.450 We didn't see this for attention.

NOTE Confidence: 0.8623915655

00:17:13.450 --> 00:17:14.965 So this really seems specific

NOTE Confidence: 0.8623915655

00:17:14.965 --> 00:17:16.177 to learning and memory.

NOTE Confidence: 0.8623915655

00:17:16.180 --> 00:17:17.760 Um, this finding is consistent

NOTE Confidence: 0.8623915655

00:17:17.760 --> 00:17:19.835 with other studies that show that

NOTE Confidence: 0.8623915655

00:17:19.835 --> 00:17:21.155 neurocognitive dysfunction persists

NOTE Confidence: 0.8623915655

00:17:21.155 --> 00:17:23.355 after several days of abstinence.

NOTE Confidence: 0.8623915655

00:17:23.360 --> 00:17:25.565 And the improvement occurred within

NOTE Confidence: 0.8623915655

00:17:25.565 --> 00:17:27.770 one week of continuous abstinence,
NOTE Confidence: 0.8623915655

00:17:27.770 --> 00:17:28.882 which was super interesting.
NOTE Confidence: 0.8623915655

00:17:28.882 --> 00:17:30.979 So we thought that this study provides
NOTE Confidence: 0.8623915655

00:17:30.979 --> 00:17:32.874 evidence that adolescents and young
NOTE Confidence: 0.8623915655

00:17:32.874 --> 00:17:34.716 adults may experience improvements in
NOTE Confidence: 0.8623915655

00:17:34.716 --> 00:17:36.106 their ability to learn information
NOTE Confidence: 0.8623915655

00:17:36.106 --> 00:17:37.650 when they stop using cannabis,
NOTE Confidence: 0.8623915655

00:17:37.650 --> 00:17:40.660 which has a lot of implications for,
NOTE Confidence: 0.8623915655

00:17:40.660 --> 00:17:41.442 you know,
NOTE Confidence: 0.8623915655

00:17:41.442 --> 00:17:43.397 for for adolescent cannabis use,
NOTE Confidence: 0.8623915655

00:17:43.400 --> 00:17:45.440 which we know is increasing steadily,
NOTE Confidence: 0.8623915655

00:17:45.440 --> 00:17:46.392 particularly among 12th graders.
NOTE Confidence: 0.8623915655

00:17:46.392 --> 00:17:48.657 And I think I'm going to show you that data.
NOTE Confidence: 0.938180981538462

00:17:51.390 --> 00:17:53.546 So now I'd like to change gears
NOTE Confidence: 0.938180981538462

00:17:53.546 --> 00:17:55.788 and talk a little bit about.
NOTE Confidence: 0.938180981538462

00:17:55.790 --> 00:17:57.842 Cannabis is a medicine.

NOTE Confidence: 0.938180981538462
00:17:57.842 --> 00:18:00.920 So is cannabis and medicine right?
NOTE Confidence: 0.938180981538462
00:18:00.920 --> 00:18:02.540 Is there anything to this?
NOTE Confidence: 0.938180981538462
00:18:02.540 --> 00:18:06.113 So my answer to this is it's not simple.
NOTE Confidence: 0.938180981538462
00:18:06.120 --> 00:18:09.906 So cannabis is a medicine for some
NOTE Confidence: 0.938180981538462
00:18:09.906 --> 00:18:12.144 and there have been components of
NOTE Confidence: 0.938180981538462
00:18:12.144 --> 00:18:14.831 cannabis that have been FDA approved
NOTE Confidence: 0.938180981538462
00:18:14.831 --> 00:18:16.699 for different medicinal purposes.
NOTE Confidence: 0.938180981538462
00:18:16.700 --> 00:18:17.786 So Epidiolex is,
NOTE Confidence: 0.938180981538462
00:18:17.786 --> 00:18:20.320 is a CBD medication that's FDA approved
NOTE Confidence: 0.938180981538462
00:18:20.391 --> 00:18:22.761 for children and adults with epilepsy
NOTE Confidence: 0.938180981538462
00:18:22.761 --> 00:18:25.442 and we're studying that in one of our
NOTE Confidence: 0.938180981538462
00:18:25.442 --> 00:18:28.380 trials now journal is a synthetic THC.
NOTE Confidence: 0.938180981538462
00:18:28.380 --> 00:18:29.628 That's approved for AIDS
NOTE Confidence: 0.938180981538462
00:18:29.628 --> 00:18:31.188 patients with severe weight loss.
NOTE Confidence: 0.938180981538462
00:18:31.190 --> 00:18:33.890 But the thing to keep in mind is for
NOTE Confidence: 0.938180981538462

00:18:33.890 --> 00:18:36.161 all other indications other than
NOTE Confidence: 0.938180981538462

00:18:36.161 --> 00:18:38.999 the epilepsy for Epidiolex and the
NOTE Confidence: 0.938180981538462

00:18:39.076 --> 00:18:41.626 severe weight loss for dronabinol,
NOTE Confidence: 0.938180981538462

00:18:41.630 --> 00:18:44.480 there are too few studies and
NOTE Confidence: 0.938180981538462

00:18:44.480 --> 00:18:47.619 poor data quality to really know.
NOTE Confidence: 0.938180981538462

00:18:47.620 --> 00:18:49.170 And I think effective regulation
NOTE Confidence: 0.938180981538462

00:18:49.170 --> 00:18:50.720 using a public health framework
NOTE Confidence: 0.938180981538462

00:18:50.771 --> 00:18:52.367 is really key to mitigating risk.
NOTE Confidence: 0.938180981538462

00:18:52.370 --> 00:18:53.880 And people ask me sometimes,
NOTE Confidence: 0.938180981538462

00:18:53.880 --> 00:18:55.889 well are you for or against legalization?
NOTE Confidence: 0.938180981538462

00:18:55.890 --> 00:18:57.986 And I say, well it's not that simple.
NOTE Confidence: 0.938180981538462

00:18:57.990 --> 00:18:58.524 It's it's.
NOTE Confidence: 0.938180981538462

00:18:58.524 --> 00:19:00.393 You know, it's it's how are you?
NOTE Confidence: 0.938180981538462

00:19:00.400 --> 00:19:02.572 How are you legalizing?
NOTE Confidence: 0.938180981538462

00:19:02.572 --> 00:19:04.140 I think, you know,
NOTE Confidence: 0.938180981538462

00:19:04.140 --> 00:19:05.580 at the Center for Addiction Medicine,

NOTE Confidence: 0.938180981538462
00:19:05.580 --> 00:19:07.414 we we believe in treatment, not punishment.
NOTE Confidence: 0.938180981538462
00:19:07.414 --> 00:19:09.256 Nobody needs to go to jail,
NOTE Confidence: 0.938180981538462
00:19:09.260 --> 00:19:12.540 but there is a way to regulate safely,
NOTE Confidence: 0.938180981538462
00:19:12.540 --> 00:19:14.804 and I'm going to talk about that a
NOTE Confidence: 0.938180981538462
00:19:14.804 --> 00:19:16.948 little bit in the next few minutes.
NOTE Confidence: 0.938180981538462
00:19:16.950 --> 00:19:19.410 So medical cannabis products from
NOTE Confidence: 0.938180981538462
00:19:19.410 --> 00:19:21.870 dispensaries are not FDA approved.
NOTE Confidence: 0.938180981538462
00:19:21.870 --> 00:19:23.690 And FDA approval is important.
NOTE Confidence: 0.938180981538462
00:19:23.690 --> 00:19:25.844 It assures that medicines are effective
NOTE Confidence: 0.938180981538462
00:19:25.844 --> 00:19:27.810 and safe and properly labeled.
NOTE Confidence: 0.938180981538462
00:19:27.810 --> 00:19:29.502 The FDA can't really evaluate medical
NOTE Confidence: 0.938180981538462
00:19:29.502 --> 00:19:31.650 cannabis as a drug since it's a plant,
NOTE Confidence: 0.938180981538462
00:19:31.650 --> 00:19:33.520 it's not a standardized medical
NOTE Confidence: 0.938180981538462
00:19:33.520 --> 00:19:35.390 formulation and it's quite different
NOTE Confidence: 0.938180981538462
00:19:35.445 --> 00:19:36.930 depending on how it's bred,
NOTE Confidence: 0.938180981538462

00:19:36.930 --> 00:19:38.750 the conditions that it's grown
NOTE Confidence: 0.938180981538462

00:19:38.750 --> 00:19:40.570 and a million other variables.
NOTE Confidence: 0.938180981538462

00:19:40.570 --> 00:19:42.370 So when we say medical cannabis,
NOTE Confidence: 0.938180981538462

00:19:42.370 --> 00:19:44.428 we're not talking about one drug,
NOTE Confidence: 0.938180981538462

00:19:44.430 --> 00:19:46.976 we're talking about you know, this, this.
NOTE Confidence: 0.938180981538462

00:19:46.976 --> 00:19:51.074 Wide variety of of dispensary products.
NOTE Confidence: 0.938180981538462

00:19:51.080 --> 00:19:51.422 Umm.
NOTE Confidence: 0.938180981538462

00:19:51.422 --> 00:19:53.132 Commercial cannabis that you buy
NOTE Confidence: 0.938180981538462

00:19:53.132 --> 00:19:55.282 at dispensaries just has not been
NOTE Confidence: 0.938180981538462

00:19:55.282 --> 00:19:56.718 tested to medicinal standards.
NOTE Confidence: 0.938180981538462

00:19:56.720 --> 00:19:57.910 I don't think that's a
NOTE Confidence: 0.938180981538462

00:19:57.910 --> 00:19:58.386 controversial statement,
NOTE Confidence: 0.938180981538462

00:19:58.390 --> 00:20:00.749 I think everyone would agree with that.
NOTE Confidence: 0.938180981538462

00:20:00.750 --> 00:20:03.466 The gold standard in medicine are these
NOTE Confidence: 0.938180981538462

00:20:03.470 --> 00:20:04.926 double-blind placebo-controlled trials and
NOTE Confidence: 0.938180981538462

00:20:04.926 --> 00:20:07.110 few exist for these cannabis products.

NOTE Confidence: 0.938180981538462

00:20:07.110 --> 00:20:09.590 And clinical trials unfortunately

NOTE Confidence: 0.938180981538462

00:20:09.590 --> 00:20:12.070 have been quite mixed,

NOTE Confidence: 0.938180981538462

00:20:12.070 --> 00:20:14.085 particularly for chronic pain which

NOTE Confidence: 0.938180981538462

00:20:14.085 --> 00:20:16.590 is the indication that people use

NOTE Confidence: 0.938180981538462

00:20:16.590 --> 00:20:18.710 medical cannabis for most frequently.

NOTE Confidence: 0.938180981538462

00:20:18.710 --> 00:20:20.894 There have been a lot of systematic

NOTE Confidence: 0.938180981538462

00:20:20.894 --> 00:20:22.430 reviews and meta analysis.

NOTE Confidence: 0.938180981538462

00:20:22.430 --> 00:20:25.678 And and the the evidence just isn't strong.

NOTE Confidence: 0.938180981538462

00:20:25.680 --> 00:20:26.840 Some find small effects,

NOTE Confidence: 0.938180981538462

00:20:26.840 --> 00:20:28.000 some find no effect,

NOTE Confidence: 0.938180981538462

00:20:28.000 --> 00:20:29.225 so it's really up in the air.

NOTE Confidence: 0.914982644

00:20:31.280 --> 00:20:33.548 So I'd like to talk to you about a

NOTE Confidence: 0.914982644

00:20:33.548 --> 00:20:35.159 clinical trial that we conducted

NOTE Confidence: 0.914982644

00:20:35.159 --> 00:20:37.097 in my lab of medical marijuana.

NOTE Confidence: 0.914982644

00:20:37.100 --> 00:20:40.140 And this was, this was my first R1.

NOTE Confidence: 0.914982644

00:20:40.140 --> 00:20:41.826 It was an RCT of medical
NOTE Confidence: 0.914982644

00:20:41.826 --> 00:20:42.669 marijuana card holders.
NOTE Confidence: 0.914982644

00:20:42.670 --> 00:20:44.550 And what we did was we wanted to
NOTE Confidence: 0.914982644

00:20:44.550 --> 00:20:46.042 test the products that people
NOTE Confidence: 0.914982644

00:20:46.042 --> 00:20:47.956 were using in the real world.
NOTE Confidence: 0.914982644

00:20:47.960 --> 00:20:50.837 So we randomized people to either an
NOTE Confidence: 0.914982644

00:20:50.837 --> 00:20:53.568 active study group and and we told them
NOTE Confidence: 0.914982644

00:20:53.568 --> 00:20:56.857 to go out and get a medical cannabis card.
NOTE Confidence: 0.914982644

00:20:56.860 --> 00:20:59.436 We didn't provide the cards for them,
NOTE Confidence: 0.914982644

00:20:59.440 --> 00:21:01.060 but we said go out and get a card.
NOTE Confidence: 0.914982644

00:21:01.060 --> 00:21:03.055 Here are some resources and the other
NOTE Confidence: 0.914982644

00:21:03.055 --> 00:21:04.971 group agreed to be in a weightless
NOTE Confidence: 0.914982644

00:21:04.971 --> 00:21:06.866 control and we said will you wait
NOTE Confidence: 0.914982644

00:21:06.866 --> 00:21:08.798 three months before getting a medical
NOTE Confidence: 0.914982644

00:21:08.798 --> 00:21:11.410 cannabis card and they had to agree to
NOTE Confidence: 0.914982644

00:21:11.410 --> 00:21:13.432 wait before randomization and then we

NOTE Confidence: 0.914982644

00:21:13.432 --> 00:21:15.623 would randomize them to the two groups.

NOTE Confidence: 0.914982644

00:21:15.630 --> 00:21:17.398 So we had a baseline of two week

NOTE Confidence: 0.914982644

00:21:17.398 --> 00:21:19.513 or one month and a three month

NOTE Confidence: 0.914982644

00:21:19.513 --> 00:21:21.128 visit during the randomized phase

NOTE Confidence: 0.914982644

00:21:21.188 --> 00:21:23.024 and then after the three months

NOTE Confidence: 0.914982644

00:21:23.024 --> 00:21:24.814 they could do whatever they want.

NOTE Confidence: 0.914982644

00:21:24.814 --> 00:21:26.506 Because I didn't think about 12

NOTE Confidence: 0.914982644

00:21:26.506 --> 00:21:28.128 month wave was controls feasible

NOTE Confidence: 0.914982644

00:21:28.128 --> 00:21:30.120 even though we were interested in,

NOTE Confidence: 0.914982644

00:21:30.120 --> 00:21:32.076 you know the the.

NOTE Confidence: 0.914982644

00:21:32.076 --> 00:21:34.521 The development of of cannabis

NOTE Confidence: 0.914982644

00:21:34.521 --> 00:21:37.288 use over a year and everybody was

NOTE Confidence: 0.914982644

00:21:37.288 --> 00:21:39.976 followed up at 6 and 12 months.

NOTE Confidence: 0.914982644

00:21:39.980 --> 00:21:41.600 So the patients were between

NOTE Confidence: 0.914982644

00:21:41.600 --> 00:21:43.220 18 and 55 years old.

NOTE Confidence: 0.914982644

00:21:43.220 --> 00:21:44.180 They were seeking medical
NOTE Confidence: 0.914982644

00:21:44.180 --> 00:21:45.140 marijuana cards for pain,
NOTE Confidence: 0.914982644

00:21:45.140 --> 00:21:47.918 insomnia or or depression and anxiety.
NOTE Confidence: 0.914982644

00:21:47.920 --> 00:21:49.523 The reason we chose those conditions was
NOTE Confidence: 0.914982644

00:21:49.523 --> 00:21:51.114 those are the most common conditions
NOTE Confidence: 0.914982644

00:21:51.114 --> 00:21:52.836 that people seek medical cannabis for,
NOTE Confidence: 0.914982644

00:21:52.840 --> 00:21:55.680 and they're often comorbid.
NOTE Confidence: 0.914982644

00:21:55.680 --> 00:21:57.012 And we also did brain imaging
NOTE Confidence: 0.914982644

00:21:57.012 --> 00:21:58.409 at baseline and at 12 months.
NOTE Confidence: 0.823801525

00:22:01.980 --> 00:22:03.624 So the interesting thing about this
NOTE Confidence: 0.823801525

00:22:03.624 --> 00:22:05.346 trial is our exclusion criteria was
NOTE Confidence: 0.823801525

00:22:05.346 --> 00:22:07.074 daily cannabis use because we didn't
NOTE Confidence: 0.823801525

00:22:07.074 --> 00:22:08.790 want people who were using already.
NOTE Confidence: 0.823801525

00:22:08.790 --> 00:22:10.260 We wanted people were interested
NOTE Confidence: 0.823801525

00:22:10.260 --> 00:22:12.095 in using and cannabis use disorder
NOTE Confidence: 0.823801525

00:22:12.095 --> 00:22:13.655 or at screening or baseline.

NOTE Confidence: 0.823801525

00:22:13.660 --> 00:22:15.570 Also things like current psychosis

NOTE Confidence: 0.823801525

00:22:15.570 --> 00:22:17.480 and other substance use disorders.

NOTE Confidence: 0.823801525

00:22:17.480 --> 00:22:19.120 The patients were responsible for

NOTE Confidence: 0.823801525

00:22:19.120 --> 00:22:21.756 arranging for and paying for the cost of

NOTE Confidence: 0.823801525

00:22:21.756 --> 00:22:23.628 obtaining their cards and their products.

NOTE Confidence: 0.823801525

00:22:23.630 --> 00:22:24.720 We didn't provide the products,

NOTE Confidence: 0.823801525

00:22:24.720 --> 00:22:25.956 we didn't pay for the products,

NOTE Confidence: 0.823801525

00:22:25.960 --> 00:22:28.480 but we paid them for their

NOTE Confidence: 0.823801525

00:22:28.480 --> 00:22:29.740 for their participation.

NOTE Confidence: 0.823801525

00:22:29.740 --> 00:22:30.829 Our outcome measures.

NOTE Confidence: 0.791848332666667

00:22:32.900 --> 00:22:34.520 Where cannabis use disorder and then

NOTE Confidence: 0.791848332666667

00:22:34.520 --> 00:22:36.570 the changes in the symptoms that they

NOTE Confidence: 0.791848332666667

00:22:36.570 --> 00:22:38.520 were seeking the medical marijuana for.

NOTE Confidence: 0.791848332666667

00:22:38.520 --> 00:22:40.490 So depression, anxiety, pain and sleep.

NOTE Confidence: 0.824673566

00:22:42.960 --> 00:22:44.540 This is our concert diagram.

NOTE Confidence: 0.824673566

00:22:44.540 --> 00:22:45.961 So the the the reason I'm showing
NOTE Confidence: 0.824673566

00:22:45.961 --> 00:22:47.618 this the most interesting thing here,
NOTE Confidence: 0.824673566

00:22:47.620 --> 00:22:49.468 we randomized 2 to one to the
NOTE Confidence: 0.824673566

00:22:49.468 --> 00:22:51.359 cannabis card or the control group,
NOTE Confidence: 0.824673566

00:22:51.360 --> 00:22:53.740 because this is the group
NOTE Confidence: 0.824673566

00:22:53.740 --> 00:22:56.120 we really cared about more.
NOTE Confidence: 0.824673566

00:22:56.120 --> 00:22:58.248 And about 50 of them didn't even end
NOTE Confidence: 0.824673566

00:22:58.248 --> 00:23:00.258 up getting a medical marijuana card.
NOTE Confidence: 0.824673566

00:23:00.260 --> 00:23:01.436 So they were interested in the study.
NOTE Confidence: 0.824673566

00:23:01.440 --> 00:23:03.072 They passed the screen, they got
NOTE Confidence: 0.824673566

00:23:03.072 --> 00:23:04.760 randomized and they changed their minds.
NOTE Confidence: 0.824673566

00:23:04.760 --> 00:23:06.452 And a lot of that had to do with
NOTE Confidence: 0.824673566

00:23:06.452 --> 00:23:08.220 the process for getting the card.
NOTE Confidence: 0.824673566

00:23:08.220 --> 00:23:10.548 A lot of the cannabis doctors
NOTE Confidence: 0.824673566

00:23:10.548 --> 00:23:11.654 were really sketchy.
NOTE Confidence: 0.824673566

00:23:11.654 --> 00:23:14.510 We can talk about that in the Q&A.

NOTE Confidence: 0.824673566

00:23:14.510 --> 00:23:16.360 I can, I can write a book on some of

NOTE Confidence: 0.824673566

00:23:16.419 --> 00:23:18.462 the stories I heard and a lot of people

NOTE Confidence: 0.824673566

00:23:18.462 --> 00:23:20.337 were quite turned off to the system.

NOTE Confidence: 0.824673566

00:23:20.340 --> 00:23:22.496 But in the end we had 100,

NOTE Confidence: 0.824673566

00:23:22.500 --> 00:23:25.500 we had about 100 in the medical cannabis

NOTE Confidence: 0.824673566

00:23:25.500 --> 00:23:28.450 group and about 75 in the wait list

NOTE Confidence: 0.824673566

00:23:28.450 --> 00:23:30.990 control group that we could compare.

NOTE Confidence: 0.824673566

00:23:30.990 --> 00:23:33.048 We also did an analysis of

NOTE Confidence: 0.824673566

00:23:33.048 --> 00:23:34.501 their urine because, again,

NOTE Confidence: 0.824673566

00:23:34.501 --> 00:23:36.606 we're not giving the cannabis.

NOTE Confidence: 0.824673566

00:23:36.610 --> 00:23:37.708 We don't know what's in it.

NOTE Confidence: 0.824673566

00:23:37.710 --> 00:23:39.933 So we sent off their Urnes to a lab

NOTE Confidence: 0.824673566

00:23:39.933 --> 00:23:42.039 in Colorado and we got measures

NOTE Confidence: 0.824673566

00:23:42.039 --> 00:23:44.602 of THC and the metabolites of THC

NOTE Confidence: 0.824673566

00:23:44.602 --> 00:23:46.367 and CBD and other cannabinoids,

NOTE Confidence: 0.824673566

00:23:46.370 --> 00:23:49.230 which was kind of Nice.
NOTE Confidence: 0.824673566

00:23:49.230 --> 00:23:49.592 OK.
NOTE Confidence: 0.824673566

00:23:49.592 --> 00:23:52.126 So the first thing we found was
NOTE Confidence: 0.824673566

00:23:52.126 --> 00:23:54.660 that the randomization worked.
NOTE Confidence: 0.824673566

00:23:54.660 --> 00:23:58.165 The group that got the card increased
NOTE Confidence: 0.824673566

00:23:58.165 --> 00:24:00.475 their use basically right away to
NOTE Confidence: 0.824673566

00:24:00.475 --> 00:24:02.958 about three to four days per week.
NOTE Confidence: 0.824673566

00:24:02.960 --> 00:24:04.680 We had some daily users,
NOTE Confidence: 0.824673566

00:24:04.680 --> 00:24:06.157 we had some people who used less,
NOTE Confidence: 0.824673566

00:24:06.160 --> 00:24:08.260 and the delayed acquisition group was
NOTE Confidence: 0.824673566

00:24:08.260 --> 00:24:10.570 basically from less than once a week to,
NOTE Confidence: 0.824673566

00:24:10.570 --> 00:24:11.220 you know,
NOTE Confidence: 0.824673566

00:24:11.220 --> 00:24:13.495 less than once or twice a month.
NOTE Confidence: 0.824673566

00:24:13.500 --> 00:24:16.284 We did not tell them they
NOTE Confidence: 0.824673566

00:24:16.284 --> 00:24:17.676 couldn't use cannabis,
NOTE Confidence: 0.824673566

00:24:17.680 --> 00:24:20.263 but we said please don't get a card because.

NOTE Confidence: 0.824673566

00:24:20.270 --> 00:24:22.882 A lot of these people were were very

NOTE Confidence: 0.824673566

00:24:22.882 --> 00:24:24.574 light cannabis users in the beginning

NOTE Confidence: 0.824673566

00:24:24.574 --> 00:24:27.134 of the study and then we didn't want

NOTE Confidence: 0.824673566

00:24:27.134 --> 00:24:28.458 to introduce another intervention.

NOTE Confidence: 0.824673566

00:24:28.460 --> 00:24:28.836 We thought,

NOTE Confidence: 0.824673566

00:24:28.836 --> 00:24:30.868 oh should we do CM and pay them not to use.

NOTE Confidence: 0.824673566

00:24:30.870 --> 00:24:32.160 But it got too complicated.

NOTE Confidence: 0.824673566

00:24:32.160 --> 00:24:34.960 But as you can see there is a

NOTE Confidence: 0.824673566

00:24:34.960 --> 00:24:37.058 nice separation and use patterns.

NOTE Confidence: 0.824673566

00:24:37.060 --> 00:24:37.431 OK,

NOTE Confidence: 0.824673566

00:24:37.431 --> 00:24:39.657 so the biggest finding from this

NOTE Confidence: 0.824673566

00:24:39.657 --> 00:24:41.800 trial was that people in the

NOTE Confidence: 0.824673566

00:24:41.800 --> 00:24:43.980 medical marijuana card group

NOTE Confidence: 0.824673566

00:24:43.980 --> 00:24:46.160 developed cannabis use disorder.

NOTE Confidence: 0.824673566

00:24:46.160 --> 00:24:47.204 So again,

NOTE Confidence: 0.824673566

00:24:47.204 --> 00:24:49.292 cannabis use disorder was
NOTE Confidence: 0.824673566

00:24:49.292 --> 00:24:50.858 exclusionary at baseline.
NOTE Confidence: 0.824673566

00:24:50.860 --> 00:24:54.480 And what we saw was that in the 12 weeks,
NOTE Confidence: 0.824673566

00:24:54.480 --> 00:24:56.945 there was almost 20% of
NOTE Confidence: 0.824673566

00:24:56.945 --> 00:24:58.917 people who developed CVD,
NOTE Confidence: 0.824673566

00:24:58.920 --> 00:25:00.392 particularly in the depression
NOTE Confidence: 0.824673566

00:25:00.392 --> 00:25:01.496 and Anxiety group,
NOTE Confidence: 0.824673566

00:25:01.500 --> 00:25:02.796 in the pain and insomnia group,
NOTE Confidence: 0.824673566

00:25:02.800 --> 00:25:03.958 very little CD,
NOTE Confidence: 0.824673566

00:25:03.958 --> 00:25:05.888 not any different than the
NOTE Confidence: 0.824673566

00:25:05.888 --> 00:25:07.110 weightless control group.
NOTE Confidence: 0.824673566

00:25:07.110 --> 00:25:08.150 Um, but the pain,
NOTE Confidence: 0.824673566

00:25:08.150 --> 00:25:09.190 the Depression anxiety group.
NOTE Confidence: 0.824673566

00:25:09.190 --> 00:25:11.230 We saw this increase in
NOTE Confidence: 0.824673566

00:25:11.230 --> 00:25:12.862 cannabis use disorder symptoms.
NOTE Confidence: 0.824673566

00:25:12.870 --> 00:25:14.769 Now I will say most of it was mild.

NOTE Confidence: 0.824673566

00:25:14.770 --> 00:25:16.190 Most of it was was.

NOTE Confidence: 0.824673566

00:25:16.190 --> 00:25:18.440 I mean you need two or more symptoms of

NOTE Confidence: 0.824673566

00:25:18.440 --> 00:25:20.909 of cannabis use disorder for diagnosis.

NOTE Confidence: 0.824673566

00:25:20.910 --> 00:25:22.330 And people have asked me,

NOTE Confidence: 0.824673566

00:25:22.330 --> 00:25:22.644 well,

NOTE Confidence: 0.824673566

00:25:22.644 --> 00:25:23.272 you know,

NOTE Confidence: 0.824673566

00:25:23.272 --> 00:25:25.470 are these appropriate this is UD scale

NOTE Confidence: 0.824673566

00:25:25.536 --> 00:25:27.806 appropriate for medical cannabis users.

NOTE Confidence: 0.824673566

00:25:27.810 --> 00:25:29.150 And I think there's there

NOTE Confidence: 0.824673566

00:25:29.150 --> 00:25:30.490 there are things that we

NOTE Confidence: 0.813783775555556

00:25:30.550 --> 00:25:32.260 could do better in assessing

NOTE Confidence: 0.813783775555556

00:25:32.260 --> 00:25:33.286 cannabis use disorder.

NOTE Confidence: 0.813783775555556

00:25:33.290 --> 00:25:36.756 But people were developing tolerance.

NOTE Confidence: 0.813783775555556

00:25:36.756 --> 00:25:39.192 They were using despite negative consequences

NOTE Confidence: 0.813783775555556

00:25:39.192 --> 00:25:41.599 they were using in risky situations,

NOTE Confidence: 0.813783775555556

00:25:41.600 --> 00:25:42.675 which I'll talk about a
NOTE Confidence: 0.813783775555556

00:25:42.675 --> 00:25:44.200 little bit in a few minutes.
NOTE Confidence: 0.813783775555556

00:25:44.200 --> 00:25:48.099 So we definitely did see people were
NOTE Confidence: 0.813783775555556

00:25:48.099 --> 00:25:50.210 developing some problematic use.
NOTE Confidence: 0.813783775555556

00:25:50.210 --> 00:25:51.449 What about symptoms?
NOTE Confidence: 0.813783775555556

00:25:51.449 --> 00:25:54.823 So we found no effect of medical cannabis
NOTE Confidence: 0.813783775555556

00:25:54.823 --> 00:25:58.468 compared to the way it was control on pain,
NOTE Confidence: 0.813783775555556

00:25:58.470 --> 00:26:00.650 on depression or anxiety.
NOTE Confidence: 0.813783775555556

00:26:00.650 --> 00:26:02.830 There was just nothing.
NOTE Confidence: 0.813783775555556

00:26:02.830 --> 00:26:05.090 We found worsening OCD symptoms,
NOTE Confidence: 0.813783775555556

00:26:05.090 --> 00:26:06.902 which I just told you in
NOTE Confidence: 0.813783775555556

00:26:06.902 --> 00:26:08.110 the medical cannabis group,
NOTE Confidence: 0.813783775555556

00:26:08.110 --> 00:26:10.686 and we saw improvement in insomnia symptoms.
NOTE Confidence: 0.813783775555556

00:26:10.690 --> 00:26:12.545 So it helped people sleep better and
NOTE Confidence: 0.813783775555556

00:26:12.545 --> 00:26:14.650 that was a pretty robust finding,
NOTE Confidence: 0.813783775555556

00:26:14.650 --> 00:26:15.846 a large effect size,

NOTE Confidence: 0.813783775555556

00:26:15.846 --> 00:26:18.195 but no effect on pain or depression

NOTE Confidence: 0.813783775555556

00:26:18.195 --> 00:26:19.972 or anxiety, which was.

NOTE Confidence: 0.813783775555556

00:26:19.972 --> 00:26:21.977 Um, surprising to some people?

NOTE Confidence: 0.875729874285714

00:26:24.000 --> 00:26:25.659 We also saw no effect on cognition.

NOTE Confidence: 0.875729874285714

00:26:25.660 --> 00:26:28.194 So we did this nice cognitive battery

NOTE Confidence: 0.875729874285714

00:26:28.194 --> 00:26:30.356 throughout the trial and we saw

NOTE Confidence: 0.875729874285714

00:26:30.356 --> 00:26:32.378 that cognition didn't change in the

NOTE Confidence: 0.875729874285714

00:26:32.378 --> 00:26:34.304 medical marijuana group group versus

NOTE Confidence: 0.875729874285714

00:26:34.304 --> 00:26:36.590 the way it was controlled group.

NOTE Confidence: 0.875729874285714

00:26:36.590 --> 00:26:38.950 And we also saw no significant brain changes.

NOTE Confidence: 0.875729874285714

00:26:38.950 --> 00:26:41.490 So this was an end back task that we did.

NOTE Confidence: 0.875729874285714

00:26:41.490 --> 00:26:43.514 This was a 2 back versus 0 back

NOTE Confidence: 0.875729874285714

00:26:43.514 --> 00:26:45.427 condition at baseline and this is at

NOTE Confidence: 0.875729874285714

00:26:45.427 --> 00:26:47.699 one year in the Medical cannabis group.

NOTE Confidence: 0.875729874285714

00:26:47.700 --> 00:26:49.188 And there were no significant differences,

NOTE Confidence: 0.875729874285714

00:26:49.190 --> 00:26:51.080 which is really good news and not
NOTE Confidence: 0.875729874285714

00:26:51.080 --> 00:26:52.754 surprising because a lot of the
NOTE Confidence: 0.875729874285714

00:26:52.754 --> 00:26:54.374 brain changes that we've seen with
NOTE Confidence: 0.875729874285714

00:26:54.374 --> 00:26:55.950 cannabis have been in adolescence.
NOTE Confidence: 0.875729874285714

00:26:55.950 --> 00:26:58.890 So these were generally older adults
NOTE Confidence: 0.875729874285714

00:26:58.890 --> 00:27:02.730 and these were generally people who
NOTE Confidence: 0.875729874285714

00:27:02.730 --> 00:27:04.682 weren't using heavily somewhere,
NOTE Confidence: 0.875729874285714

00:27:04.682 --> 00:27:07.270 but we didn't, we didn't see changes
NOTE Confidence: 0.875729874285714

00:27:07.270 --> 00:27:08.670 in cognition or the brain.
NOTE Confidence: 0.875729874285714

00:27:08.670 --> 00:27:12.639 After one year of use in in these patients.
NOTE Confidence: 0.875729874285714

00:27:12.640 --> 00:27:14.850 We also looked at patterns
NOTE Confidence: 0.875729874285714

00:27:14.850 --> 00:27:16.618 of use post randomization,
NOTE Confidence: 0.875729874285714

00:27:16.620 --> 00:27:18.454 so this is month 4 to 12.
NOTE Confidence: 0.875729874285714

00:27:18.460 --> 00:27:20.546 And we did a trajectory analysis where
NOTE Confidence: 0.875729874285714

00:27:20.546 --> 00:27:22.796 we looked at sort of their naturalistic
NOTE Confidence: 0.875729874285714

00:27:22.796 --> 00:27:25.141 patterns of use and we found that

NOTE Confidence: 0.875729874285714

00:27:25.141 --> 00:27:26.896 most people were pretty stable.

NOTE Confidence: 0.875729874285714

00:27:26.900 --> 00:27:31.296 So this is our low use category,

NOTE Confidence: 0.875729874285714

00:27:31.300 --> 00:27:33.166 this is our moderate use category,

NOTE Confidence: 0.875729874285714

00:27:33.170 --> 00:27:34.520 this is our high use category.

NOTE Confidence: 0.875729874285714

00:27:34.520 --> 00:27:35.925 And most of the participants

NOTE Confidence: 0.875729874285714

00:27:35.925 --> 00:27:37.740 were in one of these three.

NOTE Confidence: 0.875729874285714

00:27:37.740 --> 00:27:40.052 And then we had two smaller groups that

NOTE Confidence: 0.875729874285714

00:27:40.052 --> 00:27:42.509 either went from low to high or high to low.

NOTE Confidence: 0.875729874285714

00:27:42.510 --> 00:27:44.970 But most people were pretty stable.

NOTE Confidence: 0.875729874285714

00:27:44.970 --> 00:27:47.640 Which is important to know.

NOTE Confidence: 0.875729874285714

00:27:47.640 --> 00:27:51.130 But what we found was that, and I'm sorry,

NOTE Confidence: 0.875729874285714

00:27:51.130 --> 00:27:53.556 these categories are not very descriptive,

NOTE Confidence: 0.875729874285714

00:27:53.556 --> 00:27:56.940 but this is our low stable use category and

NOTE Confidence: 0.875729874285714

00:27:57.015 --> 00:27:59.832 this is CD diagnosis and it was quite low.

NOTE Confidence: 0.875729874285714

00:27:59.840 --> 00:28:02.000 And as the patterns emerge

NOTE Confidence: 0.875729874285714

00:28:02.000 --> 00:28:04.160 emerged for more cannabis use,
NOTE Confidence: 0.875729874285714

00:28:04.160 --> 00:28:07.220 you had greater CD likelihood,
NOTE Confidence: 0.875729874285714

00:28:07.220 --> 00:28:08.340 which is not surprising,
NOTE Confidence: 0.875729874285714

00:28:08.340 --> 00:28:09.740 but it was an interesting
NOTE Confidence: 0.875729874285714

00:28:09.740 --> 00:28:11.320 proof of concept that you know,
NOTE Confidence: 0.875729874285714

00:28:11.320 --> 00:28:14.064 medical cannabis users can
NOTE Confidence: 0.875729874285714

00:28:14.064 --> 00:28:16.196 develop CD people thought,
NOTE Confidence: 0.875729874285714

00:28:16.196 --> 00:28:17.330 you know, well,
NOTE Confidence: 0.875729874285714

00:28:17.330 --> 00:28:18.716 they're not using to get high.
NOTE Confidence: 0.875729874285714

00:28:18.720 --> 00:28:20.120 They're using because you know,
NOTE Confidence: 0.875729874285714

00:28:20.120 --> 00:28:20.666 they have pain.
NOTE Confidence: 0.875729874285714

00:28:20.666 --> 00:28:21.940 They're not going to develop CD and
NOTE Confidence: 0.875729874285714

00:28:21.977 --> 00:28:23.117 we've shown that some people do.
NOTE Confidence: 0.923444754117647

00:28:25.200 --> 00:28:26.604 Also, I'm just going to read
NOTE Confidence: 0.923444754117647

00:28:26.604 --> 00:28:28.168 this to you because this was
NOTE Confidence: 0.923444754117647

00:28:28.168 --> 00:28:29.598 something that really struck me.

NOTE Confidence: 0.923444754117647
00:28:29.600 --> 00:28:31.850 This is what a patient said.
NOTE Confidence: 0.923444754117647
00:28:31.850 --> 00:28:33.760 I was taking what I thought was CBD oil and
NOTE Confidence: 0.923444754117647
00:28:33.812 --> 00:28:35.724 apparently it wasn't what I thought it was.
NOTE Confidence: 0.923444754117647
00:28:35.730 --> 00:28:37.452 I started feeling the effects when I
NOTE Confidence: 0.923444754117647
00:28:37.452 --> 00:28:39.046 was driving, which was really scary.
NOTE Confidence: 0.923444754117647
00:28:39.046 --> 00:28:41.210 I got home as quickly as I could.
NOTE Confidence: 0.923444754117647
00:28:41.210 --> 00:28:43.253 I felt so high I didn't know where I
NOTE Confidence: 0.923444754117647
00:28:43.253 --> 00:28:45.338 was and could have focused and the only
NOTE Confidence: 0.923444754117647
00:28:45.338 --> 00:28:47.818 way I got home was the noises from GPS.
NOTE Confidence: 0.923444754117647
00:28:47.820 --> 00:28:49.152 I was paranoid that I might
NOTE Confidence: 0.923444754117647
00:28:49.152 --> 00:28:50.570 have hit someone or something,
NOTE Confidence: 0.923444754117647
00:28:50.570 --> 00:28:53.150 but I checked my car and there was no damage.
NOTE Confidence: 0.923444754117647
00:28:53.150 --> 00:28:55.094 So I call this the downside
NOTE Confidence: 0.923444754117647
00:28:55.094 --> 00:28:56.562 of poor regulation. So.
NOTE Confidence: 0.923444754117647
00:28:56.562 --> 00:29:00.006 These products are not very well regulated.
NOTE Confidence: 0.923444754117647

00:29:00.010 --> 00:29:02.116 So this person was not an
NOTE Confidence: 0.923444754117647

00:29:02.116 --> 00:29:03.254 experienced cannabis user.
NOTE Confidence: 0.923444754117647

00:29:03.254 --> 00:29:05.606 They thought they were taking CBD
NOTE Confidence: 0.923444754117647

00:29:05.606 --> 00:29:07.530 and obviously it had THC in it.
NOTE Confidence: 0.923444754117647

00:29:07.530 --> 00:29:09.732 They took it before going somewhere
NOTE Confidence: 0.923444754117647

00:29:09.732 --> 00:29:12.049 and it they they could have,
NOTE Confidence: 0.923444754117647

00:29:12.050 --> 00:29:13.725 they could have really injured
NOTE Confidence: 0.923444754117647

00:29:13.725 --> 00:29:15.065 themselves or somebody else.
NOTE Confidence: 0.923444754117647

00:29:15.070 --> 00:29:16.274 So I think it's,
NOTE Confidence: 0.923444754117647

00:29:16.274 --> 00:29:18.080 it's just going forward and thinking
NOTE Confidence: 0.923444754117647

00:29:18.142 --> 00:29:20.088 about how we deal with this new
NOTE Confidence: 0.923444754117647

00:29:20.088 --> 00:29:22.010 system of medical cannabis products.
NOTE Confidence: 0.923444754117647

00:29:22.010 --> 00:29:24.243 I think you know education and proper
NOTE Confidence: 0.923444754117647

00:29:24.243 --> 00:29:26.499 labeling is just critically important.
NOTE Confidence: 0.841291174166667

00:29:29.080 --> 00:29:30.872 So from this trial, what we found
NOTE Confidence: 0.841291174166667

00:29:30.872 --> 00:29:32.712 was that medical marijuana cards were

NOTE Confidence: 0.841291174166667

00:29:32.712 --> 00:29:34.402 associated with developing CD symptoms

NOTE Confidence: 0.841291174166667

00:29:34.402 --> 00:29:36.777 and no significant improvement in pain,

NOTE Confidence: 0.841291174166667

00:29:36.780 --> 00:29:37.926 anxiety or depression.

NOTE Confidence: 0.841291174166667

00:29:37.926 --> 00:29:40.218 So you think about risk reward.

NOTE Confidence: 0.841291174166667

00:29:40.220 --> 00:29:43.323 And people talk to me a lot about, well,

NOTE Confidence: 0.841291174166667

00:29:43.323 --> 00:29:44.838 isn't cannabis better than opioids?

NOTE Confidence: 0.841291174166667

00:29:44.840 --> 00:29:46.890 Well, yes, of course nobody's

NOTE Confidence: 0.841291174166667

00:29:46.890 --> 00:29:48.120 dying from cannabis.

NOTE Confidence: 0.841291174166667

00:29:48.120 --> 00:29:50.040 People are dying from from opioids,

NOTE Confidence: 0.841291174166667

00:29:50.040 --> 00:29:50.852 from overdoses.

NOTE Confidence: 0.841291174166667

00:29:50.852 --> 00:29:55.199 But even though it has to have a benefit too.

NOTE Confidence: 0.841291174166667

00:29:55.200 --> 00:29:57.324 So what we found here is that it really

NOTE Confidence: 0.841291174166667

00:29:57.324 --> 00:29:59.106 didn't have any benefit on pain and.

NOTE Confidence: 0.841291174166667

00:29:59.110 --> 00:30:00.881 And and you know the effect of

NOTE Confidence: 0.841291174166667

00:30:00.881 --> 00:30:02.427 cannabis on opioid reduction is a

NOTE Confidence: 0.841291174166667

00:30:02.427 --> 00:30:04.128 really hot topic right now and I
NOTE Confidence: 0.841291174166667

00:30:04.183 --> 00:30:05.887 have another grant to assess that
NOTE Confidence: 0.841291174166667

00:30:05.887 --> 00:30:08.809 and it really remains to be seen.
NOTE Confidence: 0.841291174166667

00:30:08.810 --> 00:30:10.434 We did see that the medical marijuana
NOTE Confidence: 0.841291174166667

00:30:10.434 --> 00:30:11.730 cards were associated with improved,
NOTE Confidence: 0.841291174166667

00:30:11.730 --> 00:30:15.069 improved sleep quality in the short term.
NOTE Confidence: 0.841291174166667

00:30:15.070 --> 00:30:16.694 And the nice thing about this trial,
NOTE Confidence: 0.841291174166667

00:30:16.700 --> 00:30:18.434 the reassuring thing was that there
NOTE Confidence: 0.841291174166667

00:30:18.434 --> 00:30:20.017 were no adverse events related
NOTE Confidence: 0.841291174166667

00:30:20.017 --> 00:30:21.139 to psychotic symptoms.
NOTE Confidence: 0.841291174166667

00:30:21.140 --> 00:30:22.036 Mania, hypomania,
NOTE Confidence: 0.841291174166667

00:30:22.036 --> 00:30:23.828 suicidal ideation didn't differ
NOTE Confidence: 0.841291174166667

00:30:23.828 --> 00:30:25.172 between the groups.
NOTE Confidence: 0.841291174166667

00:30:25.180 --> 00:30:27.560 So that was all reassuring.
NOTE Confidence: 0.841291174166667

00:30:27.560 --> 00:30:30.344 And I think the results warrant
NOTE Confidence: 0.841291174166667

00:30:30.344 --> 00:30:32.200 further investigation of benefits

NOTE Confidence: 0.841291174166667
00:30:32.281 --> 00:30:34.855 of cannabis for insomnia and also
NOTE Confidence: 0.841291174166667
00:30:34.855 --> 00:30:36.930 understanding the risk for CVD.
NOTE Confidence: 0.942168571111111
00:30:40.410 --> 00:30:44.325 OK. So in the last 10 or 15 minutes,
NOTE Confidence: 0.942168571111111
00:30:44.330 --> 00:30:46.192 I want to talk to you about
NOTE Confidence: 0.942168571111111
00:30:46.192 --> 00:30:47.810 something a little bit separate,
NOTE Confidence: 0.942168571111111
00:30:47.810 --> 00:30:49.412 but I think we'll be interesting
NOTE Confidence: 0.942168571111111
00:30:49.412 --> 00:30:51.153 to some people here who are
NOTE Confidence: 0.942168571111111
00:30:51.153 --> 00:30:52.385 working on similar projects,
NOTE Confidence: 0.942168571111111
00:30:52.390 --> 00:30:55.075 looking at THC impairment using
NOTE Confidence: 0.942168571111111
00:30:55.075 --> 00:30:56.686 functional brain imaging.
NOTE Confidence: 0.942168571111111
00:30:56.690 --> 00:30:58.580 I know there's some people here,
NOTE Confidence: 0.942168571111111
00:30:58.580 --> 00:31:00.911 Godfrey Pearlson and and Cyril Disa who
NOTE Confidence: 0.942168571111111
00:31:00.911 --> 00:31:03.270 are doing work very similar to this,
NOTE Confidence: 0.942168571111111
00:31:03.270 --> 00:31:05.912 so I wanted to include this so.
NOTE Confidence: 0.942168571111111
00:31:05.912 --> 00:31:09.044 Driving while high is not good.
NOTE Confidence: 0.942168571111111

00:31:09.050 --> 00:31:11.288 Despite what anyone will tell you,
NOTE Confidence: 0.9421685711111111

00:31:11.290 --> 00:31:13.626 cannabis does not make you a better driver.
NOTE Confidence: 0.9421685711111111

00:31:13.630 --> 00:31:15.730 I have heard this in talks,
NOTE Confidence: 0.9421685711111111

00:31:15.730 --> 00:31:16.950 it is just not true.
NOTE Confidence: 0.9421685711111111

00:31:16.950 --> 00:31:19.330 But the true rate crash risk of
NOTE Confidence: 0.9421685711111111

00:31:19.330 --> 00:31:21.730 THC is actually quite challenging.
NOTE Confidence: 0.9421685711111111

00:31:21.730 --> 00:31:24.155 We know that cannabis impairs
NOTE Confidence: 0.9421685711111111

00:31:24.155 --> 00:31:25.866 psychomotor skills, divided attention,
NOTE Confidence: 0.9421685711111111

00:31:25.866 --> 00:31:27.706 lane tracking, things like that.
NOTE Confidence: 0.9421685711111111

00:31:27.710 --> 00:31:29.550 But the epidemiological literature
NOTE Confidence: 0.9421685711111111

00:31:29.550 --> 00:31:31.850 is really quite divided and
NOTE Confidence: 0.9421685711111111

00:31:31.850 --> 00:31:33.869 knits this crash risk study.
NOTE Confidence: 0.9421685711111111

00:31:33.870 --> 00:31:35.405 They found the unadjusted odds
NOTE Confidence: 0.9421685711111111

00:31:35.405 --> 00:31:36.633 ratio for THC in.
NOTE Confidence: 0.9421685711111111

00:31:36.640 --> 00:31:38.232 In crashes was 1.25,
NOTE Confidence: 0.9421685711111111

00:31:38.232 --> 00:31:40.254 which is a 25% increase.

NOTE Confidence: 0.9421685711111111
00:31:40.254 --> 00:31:42.314 But when they adjusted this
NOTE Confidence: 0.9421685711111111
00:31:42.314 --> 00:31:43.550 for other demographics,
NOTE Confidence: 0.9421685711111111
00:31:43.550 --> 00:31:44.930 they did not find an effect.
NOTE Confidence: 0.9421685711111111
00:31:44.930 --> 00:31:47.822 And a lot of the epidemiological
NOTE Confidence: 0.9421685711111111
00:31:47.822 --> 00:31:49.750 research is similarly mixed.
NOTE Confidence: 0.9421685711111111
00:31:49.750 --> 00:31:53.394 I would like to argue that part of the
NOTE Confidence: 0.9421685711111111
00:31:53.394 --> 00:31:55.106 reason why the the literature is mixed is
NOTE Confidence: 0.9421685711111111
00:31:55.106 --> 00:31:56.802 we're not getting people at the right time,
NOTE Confidence: 0.9421685711111111
00:31:56.810 --> 00:31:59.230 we're we're measuring carboxy THC,
NOTE Confidence: 0.9421685711111111
00:31:59.230 --> 00:32:00.643 which I'm going to talk about in a minute,
NOTE Confidence: 0.9421685711111111
00:32:00.650 --> 00:32:02.810 sticks around for quite some time.
NOTE Confidence: 0.9421685711111111
00:32:02.810 --> 00:32:05.666 So if you measure somebody in an
NOTE Confidence: 0.9421685711111111
00:32:05.666 --> 00:32:08.638 accident and you look at carboxy THC.
NOTE Confidence: 0.9421685711111111
00:32:08.640 --> 00:32:09.362 You know,
NOTE Confidence: 0.9421685711111111
00:32:09.362 --> 00:32:09.723 they're,
NOTE Confidence: 0.9421685711111111

00:32:09.723 --> 00:32:11.889 they're that doesn't mean they were
NOTE Confidence: 0.9421685711111111

00:32:11.889 --> 00:32:14.030 high when they when they crashed.
NOTE Confidence: 0.9421685711111111

00:32:14.030 --> 00:32:18.326 So US state THC driving impairment laws are,
NOTE Confidence: 0.9421685711111111

00:32:18.330 --> 00:32:20.864 excuse the pun all over the map.
NOTE Confidence: 0.9421685711111111

00:32:20.870 --> 00:32:22.916 So some states have 0 tolerance,
NOTE Confidence: 0.9421685711111111

00:32:22.920 --> 00:32:25.391 so if you have any THC you're
NOTE Confidence: 0.9421685711111111

00:32:25.391 --> 00:32:27.529 considered to be THC impaired.
NOTE Confidence: 0.9421685711111111

00:32:27.530 --> 00:32:29.945 Some states have THC per se laws,
NOTE Confidence: 0.9421685711111111

00:32:29.950 --> 00:32:31.426 which it just means a specific
NOTE Confidence: 0.9421685711111111

00:32:31.426 --> 00:32:33.023 amount and it's usually two to
NOTE Confidence: 0.9421685711111111

00:32:33.023 --> 00:32:34.147 five nanograms per milliliter,
NOTE Confidence: 0.9421685711111111

00:32:34.150 --> 00:32:35.774 which I don't think makes much sense
NOTE Confidence: 0.9421685711111111

00:32:35.774 --> 00:32:37.586 and I'll talk about that in a minute.
NOTE Confidence: 0.9421685711111111

00:32:37.590 --> 00:32:39.690 And most states don't have anything,
NOTE Confidence: 0.9421685711111111

00:32:39.690 --> 00:32:40.335 although Gray states,
NOTE Confidence: 0.9421685711111111

00:32:40.335 --> 00:32:42.130 they don't have any laws on the books.

NOTE Confidence: 0.9421685711111111
00:32:42.130 --> 00:32:43.850 It's sort of up to the the cop.
NOTE Confidence: 0.9421685711111111
00:32:43.850 --> 00:32:45.710 To determine whether they're
NOTE Confidence: 0.9421685711111111
00:32:45.710 --> 00:32:47.105 impaired from THC.
NOTE Confidence: 0.9421685711111111
00:32:47.110 --> 00:32:50.729 And this is a really challenging problem.
NOTE Confidence: 0.9421685711111111
00:32:50.730 --> 00:32:52.788 The model for alcohol is breath
NOTE Confidence: 0.9421685711111111
00:32:52.788 --> 00:32:53.817 alcohol concentration that
NOTE Confidence: 0.9421685711111111
00:32:53.817 --> 00:32:55.608 you blow into a breathalyzer.
NOTE Confidence: 0.9421685711111111
00:32:55.610 --> 00:32:57.608 We've decided as a society that
NOTE Confidence: 0.9421685711111111
00:32:57.610 --> 00:32:59.470 .08 BAC is the legal limit.
NOTE Confidence: 0.9421685711111111
00:32:59.470 --> 00:33:02.920 We decided that based on,
NOTE Confidence: 0.9421685711111111
00:33:02.920 --> 00:33:03.608 you know,
NOTE Confidence: 0.9421685711111111
00:33:03.608 --> 00:33:04.984 an exponentially rising curve
NOTE Confidence: 0.9421685711111111
00:33:04.984 --> 00:33:06.730 of BAC and crash risk.
NOTE Confidence: 0.9421685711111111
00:33:06.730 --> 00:33:08.686 This does not exist for cannabis.
NOTE Confidence: 0.9421685711111111
00:33:08.690 --> 00:33:10.268 We don't have this nice curve,
NOTE Confidence: 0.9421685711111111

00:33:10.270 --> 00:33:11.908 and a lot of it is because
NOTE Confidence: 0.9421685711111111

00:33:11.908 --> 00:33:13.602 cannabis is unique in its
NOTE Confidence: 0.9421685711111111

00:33:13.602 --> 00:33:15.006 pharmacokinetics and pharmacodynamics.
NOTE Confidence: 0.9421685711111111

00:33:15.010 --> 00:33:17.938 It's not as easy as alcohol.
NOTE Confidence: 0.9421685711111111

00:33:17.940 --> 00:33:20.964 THC peaks in about 10 minutes
NOTE Confidence: 0.9421685711111111

00:33:20.964 --> 00:33:22.980 post smoking or vaping,
NOTE Confidence: 0.9421685711111111

00:33:22.980 --> 00:33:25.600 as you can see here it in
NOTE Confidence: 0.9421685711111111

00:33:25.600 --> 00:33:26.760 breath and in blood.
NOTE Confidence: 0.9421685711111111

00:33:26.760 --> 00:33:28.410 Your THC levels are quite
NOTE Confidence: 0.9421685711111111

00:33:28.410 --> 00:33:30.060 high right after you use,
NOTE Confidence: 0.9421685711111111

00:33:30.060 --> 00:33:33.966 and they return to baseline quite quickly.
NOTE Confidence: 0.9421685711111111

00:33:33.970 --> 00:33:35.080 And carboxy THC,
NOTE Confidence: 0.9421685711111111

00:33:35.080 --> 00:33:37.670 which is what THC is metabolized into
NOTE Confidence: 0.9421685711111111

00:33:37.744 --> 00:33:39.790 and this is probably what if you,
NOTE Confidence: 0.9421685711111111

00:33:39.790 --> 00:33:41.110 if you're given a drug test or a
NOTE Confidence: 0.838675413846154

00:33:41.155 --> 00:33:41.938 clinical drug test,

NOTE Confidence: 0.838675413846154
00:33:41.940 --> 00:33:44.892 that this is what these tests detect sticks
NOTE Confidence: 0.838675413846154
00:33:44.892 --> 00:33:47.545 around for a very long period of time.
NOTE Confidence: 0.838675413846154
00:33:47.550 --> 00:33:50.118 So this is detection window of
NOTE Confidence: 0.838675413846154
00:33:50.118 --> 00:33:52.470 marijuana drug tests in breath,
NOTE Confidence: 0.838675413846154
00:33:52.470 --> 00:33:56.216 in saliva, this is urine. It can.
NOTE Confidence: 0.838675413846154
00:33:56.216 --> 00:33:58.617 You can test positive for a month.
NOTE Confidence: 0.838675413846154
00:33:58.620 --> 00:34:00.606 If you're a heavy cannabis user
NOTE Confidence: 0.838675413846154
00:34:00.606 --> 00:34:03.451 and you stop so so carboxy THC is
NOTE Confidence: 0.838675413846154
00:34:03.451 --> 00:34:05.156 not water soluble, lipid soluble.
NOTE Confidence: 0.838675413846154
00:34:05.156 --> 00:34:06.696 It's stored in fat cells,
NOTE Confidence: 0.838675413846154
00:34:06.700 --> 00:34:08.860 it stays in the system for a long
NOTE Confidence: 0.838675413846154
00:34:08.860 --> 00:34:11.255 time and therefore it's not a very
NOTE Confidence: 0.838675413846154
00:34:11.255 --> 00:34:13.364 good test of impairment. And then?
NOTE Confidence: 0.838675413846154
00:34:13.364 --> 00:34:15.723 So we have THC is too quick,
NOTE Confidence: 0.838675413846154
00:34:15.730 --> 00:34:17.450 carboxy THC is too long.
NOTE Confidence: 0.838675413846154

00:34:17.450 --> 00:34:19.050 Well, how long are people
NOTE Confidence: 0.838675413846154

00:34:19.050 --> 00:34:20.010 actually reporting impairment?
NOTE Confidence: 0.838675413846154

00:34:20.010 --> 00:34:22.550 And this also varies dramatically.
NOTE Confidence: 0.838675413846154

00:34:22.550 --> 00:34:25.118 So this was a smoking study and you
NOTE Confidence: 0.838675413846154

00:34:25.118 --> 00:34:27.857 can see in after an hour about 50%.
NOTE Confidence: 0.838675413846154

00:34:27.860 --> 00:34:32.528 We're still impaired after three hours.
NOTE Confidence: 0.838675413846154

00:34:32.530 --> 00:34:35.290 10% were still impaired.
NOTE Confidence: 0.838675413846154

00:34:35.290 --> 00:34:37.246 So there's just and it also
NOTE Confidence: 0.838675413846154

00:34:37.246 --> 00:34:38.900 depends how much you use.
NOTE Confidence: 0.838675413846154

00:34:38.900 --> 00:34:41.700 So impairment can last for for four hours,
NOTE Confidence: 0.838675413846154

00:34:41.700 --> 00:34:42.828 particularly for oral THC,
NOTE Confidence: 0.838675413846154

00:34:42.828 --> 00:34:45.279 which I'm going to talk about in this study,
NOTE Confidence: 0.838675413846154

00:34:45.280 --> 00:34:47.212 impairment lasts for a
NOTE Confidence: 0.838675413846154

00:34:47.212 --> 00:34:49.627 very long period of time.
NOTE Confidence: 0.838675413846154

00:34:49.630 --> 00:34:51.230 The other thing we know is that people
NOTE Confidence: 0.838675413846154

00:34:51.230 --> 00:34:53.016 have poor insight to their own impairment.

NOTE Confidence: 0.838675413846154
00:34:53.020 --> 00:34:55.684 This was a super cool paper that just
NOTE Confidence: 0.838675413846154
00:34:55.684 --> 00:34:58.825 came out where they did this driving task
NOTE Confidence: 0.838675413846154
00:34:58.825 --> 00:35:01.508 and people pre smoking did very well.
NOTE Confidence: 0.838675413846154
00:35:01.510 --> 00:35:02.353 After they smoked,
NOTE Confidence: 0.838675413846154
00:35:02.353 --> 00:35:04.039 30 minutes later they did a
NOTE Confidence: 0.838675413846154
00:35:04.039 --> 00:35:06.129 lot worse and they knew this
NOTE Confidence: 0.838675413846154
00:35:06.129 --> 00:35:07.529 was their perceived impairment.
NOTE Confidence: 0.838675413846154
00:35:07.530 --> 00:35:09.007 They knew they weren't doing very well.
NOTE Confidence: 0.838675413846154
00:35:09.010 --> 00:35:10.486 This is how impaired are you,
NOTE Confidence: 0.838675413846154
00:35:10.490 --> 00:35:12.818 but that in an hour and 30 minutes
NOTE Confidence: 0.838675413846154
00:35:12.818 --> 00:35:13.930 something interesting happened.
NOTE Confidence: 0.838675413846154
00:35:13.930 --> 00:35:16.050 So there's still quite impaired,
NOTE Confidence: 0.838675413846154
00:35:16.050 --> 00:35:17.220 not as impaired at 30 minutes,
NOTE Confidence: 0.838675413846154
00:35:17.220 --> 00:35:18.670 but they're still quite impaired.
NOTE Confidence: 0.838675413846154
00:35:18.670 --> 00:35:21.606 But now sorry, I'm I did that backwards.
NOTE Confidence: 0.838675413846154

00:35:21.610 --> 00:35:23.710 This is their composite Dr score.
NOTE Confidence: 0.838675413846154

00:35:23.710 --> 00:35:26.027 So there's still quite impaired from driving,
NOTE Confidence: 0.838675413846154

00:35:26.030 --> 00:35:27.730 but they're perceived impairment
NOTE Confidence: 0.838675413846154

00:35:27.730 --> 00:35:29.005 is quite low.
NOTE Confidence: 0.838675413846154

00:35:29.010 --> 00:35:30.450 So you have this gap where
NOTE Confidence: 0.838675413846154

00:35:30.450 --> 00:35:31.410 people are still impaired,
NOTE Confidence: 0.838675413846154

00:35:31.410 --> 00:35:32.508 but they don't think they are.
NOTE Confidence: 0.838675413846154

00:35:32.510 --> 00:35:35.390 So that's not good for when
NOTE Confidence: 0.838675413846154

00:35:35.390 --> 00:35:37.960 you're deciding to drive a car.
NOTE Confidence: 0.838675413846154

00:35:37.960 --> 00:35:39.964 Dozens of studies have now shown
NOTE Confidence: 0.838675413846154

00:35:39.964 --> 00:35:41.773 that there's no association between
NOTE Confidence: 0.838675413846154

00:35:41.773 --> 00:35:43.818 THC biomarkers and impairment there.
NOTE Confidence: 0.838675413846154

00:35:43.820 --> 00:35:46.277 It's just really hard to detect THC
NOTE Confidence: 0.838675413846154

00:35:46.277 --> 00:35:48.958 impairment using a blood or a breath level.
NOTE Confidence: 0.838675413846154

00:35:48.960 --> 00:35:49.948 These are three papers.
NOTE Confidence: 0.838675413846154

00:35:49.948 --> 00:35:50.936 There are dozens more.

NOTE Confidence: 0.869731797241379
00:35:53.090 --> 00:35:55.331 So our idea was, is there a test that
NOTE Confidence: 0.869731797241379
00:35:55.331 --> 00:35:57.399 can go to the source of impairment
NOTE Confidence: 0.869731797241379
00:35:57.399 --> 00:35:59.522 so when you break a bone you
NOTE Confidence: 0.869731797241379
00:35:59.522 --> 00:36:01.304 take an X-ray if you're impaired,
NOTE Confidence: 0.869731797241379
00:36:01.310 --> 00:36:03.515 the affected organ is actually the brain.
NOTE Confidence: 0.869731797241379
00:36:03.520 --> 00:36:05.473 These other methods all look for body
NOTE Confidence: 0.869731797241379
00:36:05.473 --> 00:36:07.179 fluids which replicates the alcohol model,
NOTE Confidence: 0.869731797241379
00:36:07.180 --> 00:36:09.736 but as I mentioned that doesn't work for THC.
NOTE Confidence: 0.869731797241379
00:36:09.740 --> 00:36:11.900 So we wanted to use F near as
NOTE Confidence: 0.869731797241379
00:36:11.900 --> 00:36:13.820 functional near infrared spectroscopy.
NOTE Confidence: 0.869731797241379
00:36:13.820 --> 00:36:16.018 Not many people haven't heard of Fnirs,
NOTE Confidence: 0.869731797241379
00:36:16.020 --> 00:36:18.036 it's not as popular as F MRI,
NOTE Confidence: 0.869731797241379
00:36:18.040 --> 00:36:20.704 but it it's an optical imaging
NOTE Confidence: 0.869731797241379
00:36:20.704 --> 00:36:22.480 technique that's non invasive.
NOTE Confidence: 0.869731797241379
00:36:22.480 --> 00:36:24.860 It'll it'll allows measurement of
NOTE Confidence: 0.869731797241379

00:36:24.860 --> 00:36:27.240 brain tissue concentration changes or
NOTE Confidence: 0.869731797241379

00:36:27.309 --> 00:36:28.770 HBO following neuronal activation.
NOTE Confidence: 0.869731797241379

00:36:28.770 --> 00:36:31.710 It uses light to measure brain activity.
NOTE Confidence: 0.869731797241379

00:36:31.710 --> 00:36:33.210 Same principles of F MRI.
NOTE Confidence: 0.869731797241379

00:36:33.210 --> 00:36:36.010 F MRI uses magnets, FNIRS uses light.
NOTE Confidence: 0.869731797241379

00:36:36.010 --> 00:36:37.641 And the cool thing about F nears
NOTE Confidence: 0.869731797241379

00:36:37.641 --> 00:36:38.870 is it's non invasive.
NOTE Confidence: 0.869731797241379

00:36:38.870 --> 00:36:40.454 It's safe, it's inexpensive,
NOTE Confidence: 0.869731797241379

00:36:40.454 --> 00:36:41.968 it's portable, it's wireless,
NOTE Confidence: 0.869731797241379

00:36:41.968 --> 00:36:44.481 it can be used in natural environments
NOTE Confidence: 0.869731797241379

00:36:44.481 --> 00:36:46.548 without restraints without sedation.
NOTE Confidence: 0.869731797241379

00:36:46.550 --> 00:36:48.827 F MRI will never be useful on the roadside,
NOTE Confidence: 0.869731797241379

00:36:48.830 --> 00:36:50.458 obviously for obvious reasons,
NOTE Confidence: 0.869731797241379

00:36:50.458 --> 00:36:52.493 but you can imagine that.
NOTE Confidence: 0.869731797241379

00:36:52.500 --> 00:36:54.330 If news is a good indicator
NOTE Confidence: 0.869731797241379

00:36:54.330 --> 00:36:55.920 of impairment that you know,

NOTE Confidence: 0.869731797241379

00:36:55.920 --> 00:36:57.940 someday it might be useful,

NOTE Confidence: 0.869731797241379

00:36:57.940 --> 00:37:00.268 like the breathalyzer.

NOTE Confidence: 0.869731797241379

00:37:00.270 --> 00:37:02.490 And just if anyone's curious

NOTE Confidence: 0.869731797241379

00:37:02.490 --> 00:37:04.710 about how F nears works,

NOTE Confidence: 0.869731797241379

00:37:04.710 --> 00:37:06.900 basically brain activation could be inferred

NOTE Confidence: 0.869731797241379

00:37:06.900 --> 00:37:09.110 by this oxygenated hemoglobin concentration.

NOTE Confidence: 0.869731797241379

00:37:09.110 --> 00:37:11.156 So you have your neuronal activation,

NOTE Confidence: 0.869731797241379

00:37:11.160 --> 00:37:12.795 metabolic demand, increased blood flow

NOTE Confidence: 0.869731797241379

00:37:12.795 --> 00:37:15.130 and then you have this increase in,

NOTE Confidence: 0.869731797241379

00:37:15.130 --> 00:37:15.533 in,

NOTE Confidence: 0.869731797241379

00:37:15.533 --> 00:37:15.936 in,

NOTE Confidence: 0.869731797241379

00:37:15.936 --> 00:37:18.354 in oxyhemoglobin and wash out of

NOTE Confidence: 0.869731797241379

00:37:18.354 --> 00:37:20.306 D deoxyhemoglobin and you can

NOTE Confidence: 0.869731797241379

00:37:20.306 --> 00:37:21.734 measure that with light.

NOTE Confidence: 0.849457122

00:37:23.870 --> 00:37:26.320 This is the first breathalyzer.

NOTE Confidence: 0.849457122

00:37:26.320 --> 00:37:28.364 It took up a whole desktop and
NOTE Confidence: 0.849457122

00:37:28.364 --> 00:37:30.359 now it's smaller than your iPhone.
NOTE Confidence: 0.849457122

00:37:30.360 --> 00:37:32.176 And I think a similar thing is happening
NOTE Confidence: 0.849457122

00:37:32.176 --> 00:37:33.815 with Fnirs where these things are big
NOTE Confidence: 0.849457122

00:37:33.815 --> 00:37:35.580 and bulky and have wires sticking out,
NOTE Confidence: 0.849457122

00:37:35.580 --> 00:37:38.436 but I think they are just becoming smaller
NOTE Confidence: 0.849457122

00:37:38.436 --> 00:37:40.738 and smaller and more user friendly.
NOTE Confidence: 0.849457122

00:37:40.740 --> 00:37:43.989 So. For our study,
NOTE Confidence: 0.849457122

00:37:43.989 --> 00:37:46.834 what we did was we had 169 participants
NOTE Confidence: 0.849457122

00:37:46.834 --> 00:37:48.948 who were weekly or more cannabis users.
NOTE Confidence: 0.849457122

00:37:48.950 --> 00:37:50.868 They had two visits a week apart.
NOTE Confidence: 0.849457122

00:37:50.870 --> 00:37:52.260 They got placebo one day
NOTE Confidence: 0.849457122

00:37:52.260 --> 00:37:53.650 and THC and other day.
NOTE Confidence: 0.849457122

00:37:53.650 --> 00:37:55.883 And we did Fnirs recording during an
NOTE Confidence: 0.849457122

00:37:55.883 --> 00:37:57.987 in back task before they received
NOTE Confidence: 0.849457122

00:37:57.987 --> 00:38:00.493 THC or placebo at 100 minutes when

NOTE Confidence: 0.849457122

00:38:00.567 --> 00:38:02.601 peak effects were expected and at

NOTE Confidence: 0.849457122

00:38:02.601 --> 00:38:05.032 200 minutes and we got actual cops to

NOTE Confidence: 0.849457122

00:38:05.032 --> 00:38:07.520 come in and do and do assessments.

NOTE Confidence: 0.849457122

00:38:07.520 --> 00:38:09.992 They're called Dre drug drug recognition

NOTE Confidence: 0.849457122

00:38:09.992 --> 00:38:11.650 experts. We didn't train CRC's.

NOTE Confidence: 0.849457122

00:38:11.650 --> 00:38:12.982 To do this, we wanted,

NOTE Confidence: 0.849457122

00:38:12.982 --> 00:38:14.590 we wanted the real cops to come in.

NOTE Confidence: 0.849457122

00:38:14.590 --> 00:38:15.955 We told them don't worry your uniforms,

NOTE Confidence: 0.849457122

00:38:15.960 --> 00:38:17.358 we don't want to scare people,

NOTE Confidence: 0.849457122

00:38:17.360 --> 00:38:21.408 but they did their whole field sobriety test.

NOTE Confidence: 0.849457122

00:38:21.410 --> 00:38:23.174 And we did something in this

NOTE Confidence: 0.849457122

00:38:23.174 --> 00:38:24.350 study that was controversial,

NOTE Confidence: 0.849457122

00:38:24.350 --> 00:38:26.936 but we thought it was necessary

NOTE Confidence: 0.849457122

00:38:26.936 --> 00:38:29.030 is we did individualize dosing

NOTE Confidence: 0.849457122

00:38:29.030 --> 00:38:31.105 of THC to achieve impairment.

NOTE Confidence: 0.849457122

00:38:31.110 --> 00:38:33.385 So how much THC does it take
NOTE Confidence: 0.849457122

00:38:33.385 --> 00:38:35.110 to get somebody impaired?
NOTE Confidence: 0.849457122

00:38:35.110 --> 00:38:36.262 We have no idea.
NOTE Confidence: 0.849457122

00:38:36.262 --> 00:38:37.414 We have no idea.
NOTE Confidence: 0.849457122

00:38:37.420 --> 00:38:40.776 So what we did was we took a a very
NOTE Confidence: 0.849457122

00:38:40.776 --> 00:38:42.591 detailed medical history of their
NOTE Confidence: 0.849457122

00:38:42.591 --> 00:38:44.997 cannabis use and we looked at age
NOTE Confidence: 0.849457122

00:38:44.997 --> 00:38:46.869 and gender and tolerance and BMI
NOTE Confidence: 0.849457122

00:38:46.937 --> 00:38:48.817 and their patterns of cannabis
NOTE Confidence: 0.849457122

00:38:48.817 --> 00:38:50.697 use and determined the dose.
NOTE Confidence: 0.849457122

00:38:50.700 --> 00:38:52.416 That we thought would achieve impairment
NOTE Confidence: 0.849457122

00:38:52.416 --> 00:38:54.249 and that was different for everybody.
NOTE Confidence: 0.849457122

00:38:54.250 --> 00:38:55.966 So some people we gave them
NOTE Confidence: 0.849457122

00:38:55.966 --> 00:38:57.110 10 milligrams of THC,
NOTE Confidence: 0.849457122

00:38:57.110 --> 00:38:58.658 some people we gave up to
NOTE Confidence: 0.849457122

00:38:58.658 --> 00:38:59.690 80 milligrams of THC,

NOTE Confidence: 0.849457122

00:38:59.690 --> 00:39:02.000 some people who we gave 80 milligrams

NOTE Confidence: 0.849457122

00:39:02.000 --> 00:39:04.230 of THC didn't even get impaired.

NOTE Confidence: 0.849457122

00:39:04.230 --> 00:39:05.486 Dosing is really difficult.

NOTE Confidence: 0.849457122

00:39:05.486 --> 00:39:07.370 We couldn't figure out a dose

NOTE Confidence: 0.849457122

00:39:07.433 --> 00:39:09.457 for everybody and particularly

NOTE Confidence: 0.849457122

00:39:09.457 --> 00:39:10.469 after commercialization,

NOTE Confidence: 0.849457122

00:39:10.470 --> 00:39:11.826 people are using these, you know,

NOTE Confidence: 0.849457122

00:39:11.830 --> 00:39:14.848 high potency products.

NOTE Confidence: 0.849457122

00:39:14.850 --> 00:39:16.398 So we estimate that a little

NOTE Confidence: 0.849457122

00:39:16.398 --> 00:39:17.430 over half got impaired,

NOTE Confidence: 0.849457122

00:39:17.430 --> 00:39:18.888 even though we tried our darn

NOTE Confidence: 0.849457122

00:39:18.888 --> 00:39:20.320 hardest to get everybody impaired.

NOTE Confidence: 0.8750336

00:39:22.720 --> 00:39:24.519 How? How do we know who's impaired?

NOTE Confidence: 0.8750336

00:39:24.520 --> 00:39:25.584 So we're like, oh,

NOTE Confidence: 0.8750336

00:39:25.584 --> 00:39:27.702 we'll let the cops tell us, you know,

NOTE Confidence: 0.8750336

00:39:27.702 --> 00:39:29.790 this is what they do for a living.
NOTE Confidence: 0.8750336

00:39:29.790 --> 00:39:31.435 We found that the cops weren't very
NOTE Confidence: 0.8750336

00:39:31.435 --> 00:39:32.970 good at telling us were impaired.
NOTE Confidence: 0.8750336

00:39:32.970 --> 00:39:34.962 About 20% of those who received
NOTE Confidence: 0.8750336

00:39:34.962 --> 00:39:36.910 placebo were judged as impaired,
NOTE Confidence: 0.8750336

00:39:36.910 --> 00:39:38.720 which was kind of disturbing.
NOTE Confidence: 0.8750336

00:39:38.720 --> 00:39:42.444 And then the DRE's were really inconsistent.
NOTE Confidence: 0.8750336

00:39:42.450 --> 00:39:43.685 One of them was fantastic
NOTE Confidence: 0.8750336

00:39:43.685 --> 00:39:45.606 and had a 92% accuracy.
NOTE Confidence: 0.8750336

00:39:45.606 --> 00:39:47.370 One was 5050.
NOTE Confidence: 0.8750336

00:39:47.370 --> 00:39:49.561 So we didn't want to use the DRES
NOTE Confidence: 0.8750336

00:39:49.561 --> 00:39:52.147 as our ground truth of impairment.
NOTE Confidence: 0.8750336

00:39:52.150 --> 00:39:55.390 So what we did was we had this sort of,
NOTE Confidence: 0.8750336

00:39:55.390 --> 00:39:58.254 I don't know this this cumbersome but very
NOTE Confidence: 0.8750336

00:39:58.254 --> 00:40:00.097 thorough assessment of impairment where
NOTE Confidence: 0.8750336

00:40:00.097 --> 00:40:02.538 we had a clinical assessment, we, we,

NOTE Confidence: 0.8750336

00:40:02.538 --> 00:40:05.210 we decided this was me and my colleague,

NOTE Confidence: 0.8750336

00:40:05.210 --> 00:40:07.430 we looked at all the indications

NOTE Confidence: 0.8750336

00:40:07.430 --> 00:40:08.910 during the study visit,

NOTE Confidence: 0.8750336

00:40:08.910 --> 00:40:11.297 how they were acting, you know the

NOTE Confidence: 0.8750336

00:40:11.297 --> 00:40:13.588 blinded study nurse her her assessment,

NOTE Confidence: 0.8750336

00:40:13.590 --> 00:40:14.856 if they said they were high,

NOTE Confidence: 0.8750336

00:40:14.860 --> 00:40:17.300 if they said they felt the drug effect.

NOTE Confidence: 0.8750336

00:40:17.300 --> 00:40:19.057 And then we had a computer based

NOTE Confidence: 0.8750336

00:40:19.057 --> 00:40:20.764 algorithm of of heart rate change

NOTE Confidence: 0.8750336

00:40:20.764 --> 00:40:22.552 and self reported high and both

NOTE Confidence: 0.8750336

00:40:22.552 --> 00:40:24.239 methods needed agreement for us

NOTE Confidence: 0.8750336

00:40:24.239 --> 00:40:25.899 to consider that person impaired.

NOTE Confidence: 0.8750336

00:40:25.900 --> 00:40:27.482 So the clinical consensus we have to

NOTE Confidence: 0.8750336

00:40:27.482 --> 00:40:28.770 say yeah, I think they were impaired,

NOTE Confidence: 0.8750336

00:40:28.770 --> 00:40:30.610 it was like a chart review and then

NOTE Confidence: 0.8750336

00:40:30.610 --> 00:40:32.316 the computer algorithm had to say yes,
NOTE Confidence: 0.8750336

00:40:32.320 --> 00:40:35.190 this was indicative of impairment.
NOTE Confidence: 0.8750336

00:40:35.190 --> 00:40:38.944 And this is just an example of our
NOTE Confidence: 0.8750336

00:40:38.944 --> 00:40:41.583 time course and this is a person
NOTE Confidence: 0.8750336

00:40:41.583 --> 00:40:44.258 self reported high and this is a
NOTE Confidence: 0.8750336

00:40:44.258 --> 00:40:45.890 person's heart rate change in red.
NOTE Confidence: 0.8750336

00:40:45.890 --> 00:40:48.002 And you can see this person had a
NOTE Confidence: 0.8750336

00:40:48.002 --> 00:40:49.308 dramatic increase in heart rate.
NOTE Confidence: 0.8750336

00:40:49.310 --> 00:40:52.138 This is on the THC day, on the placebo day.
NOTE Confidence: 0.8750336

00:40:52.138 --> 00:40:53.950 We didn't see anything on this person.
NOTE Confidence: 0.8750336

00:40:53.950 --> 00:40:55.434 And then this is an example of
NOTE Confidence: 0.8750336

00:40:55.434 --> 00:40:56.990 somebody who we just did not give
NOTE Confidence: 0.8750336

00:40:56.990 --> 00:40:58.070 them a high enough dose.
NOTE Confidence: 0.8750336

00:40:58.070 --> 00:40:59.606 They had very minimal,
NOTE Confidence: 0.8750336

00:40:59.606 --> 00:40:59.990 minimal,
NOTE Confidence: 0.8750336

00:40:59.990 --> 00:41:01.675 minimal heart rate change and

NOTE Confidence: 0.8750336

00:41:01.675 --> 00:41:03.722 they reported zeros all day and

NOTE Confidence: 0.8750336

00:41:03.722 --> 00:41:05.498 they both got 30 milligrams of.

NOTE Confidence: 0.8750336

00:41:05.500 --> 00:41:08.566 HC. So that's just an example.

NOTE Confidence: 0.8750336

00:41:08.570 --> 00:41:11.790 And then what we found was that

NOTE Confidence: 0.8750336

00:41:11.790 --> 00:41:13.818 subjective and physiological responses

NOTE Confidence: 0.8750336

00:41:13.818 --> 00:41:16.353 clearly distinguish the two groups.

NOTE Confidence: 0.8750336

00:41:16.360 --> 00:41:18.766 So this is the impaired group,

NOTE Confidence: 0.8750336

00:41:18.770 --> 00:41:20.948 this is their self reported high,

NOTE Confidence: 0.8750336

00:41:20.950 --> 00:41:22.498 this is the non impaired group.

NOTE Confidence: 0.8750336

00:41:22.500 --> 00:41:24.476 So they got a little impaired but not

NOTE Confidence: 0.8750336

00:41:24.476 --> 00:41:26.209 dramatically and this is our placebo group,

NOTE Confidence: 0.8750336

00:41:26.210 --> 00:41:27.074 this is heart rate.

NOTE Confidence: 0.8750336

00:41:27.074 --> 00:41:28.709 This is you know the the heart

NOTE Confidence: 0.8750336

00:41:28.709 --> 00:41:30.395 rate change or the impaired group,

NOTE Confidence: 0.8750336

00:41:30.400 --> 00:41:33.193 the heart rate change of the unimpaired

NOTE Confidence: 0.8750336

00:41:33.193 --> 00:41:35.966 group and placebo and this shading is
NOTE Confidence: 0.8750336

00:41:35.966 --> 00:41:39.469 this was our pre pre dose effner scan,
NOTE Confidence: 0.8750336

00:41:39.470 --> 00:41:41.150 this was our post dose EFFNER
NOTE Confidence: 0.8750336

00:41:41.150 --> 00:41:43.229 scan and that was the second one.
NOTE Confidence: 0.8750336

00:41:43.230 --> 00:41:45.518 So we did get sort of at the
NOTE Confidence: 0.8750336

00:41:45.518 --> 00:41:47.849 peak of using the ether scan.
NOTE Confidence: 0.8750336

00:41:47.850 --> 00:41:48.846 So that was nice.
NOTE Confidence: 0.8750336

00:41:48.846 --> 00:41:50.671 Now the important thing for me to
NOTE Confidence: 0.8750336

00:41:50.671 --> 00:41:52.315 point out here no dose difference.
NOTE Confidence: 0.8750336

00:41:52.320 --> 00:41:54.406 So the the people who got high,
NOTE Confidence: 0.8750336

00:41:54.410 --> 00:41:56.506 the people who did not get clearly high,
NOTE Confidence: 0.8750336

00:41:56.510 --> 00:41:58.780 there was no significant dose
NOTE Confidence: 0.8750336

00:41:58.780 --> 00:42:01.480 in difference in dose in THC.
NOTE Confidence: 0.8750336

00:42:01.480 --> 00:42:01.796 OK.
NOTE Confidence: 0.8750336

00:42:01.796 --> 00:42:03.376 So question is do impaired
NOTE Confidence: 0.8750336

00:42:03.376 --> 00:42:04.640 and non impaired groups

NOTE Confidence: 0.808531492142857

00:42:04.700 --> 00:42:06.340 differ on effner's measures.

NOTE Confidence: 0.808531492142857

00:42:06.340 --> 00:42:10.160 So again this is our end back task,

NOTE Confidence: 0.808531492142857

00:42:10.160 --> 00:42:11.696 this is our, our prefrontal probe.

NOTE Confidence: 0.808531492142857

00:42:11.700 --> 00:42:14.616 We looked at these different ROI.

NOTE Confidence: 0.808531492142857

00:42:14.620 --> 00:42:16.474 And what we found was that

NOTE Confidence: 0.808531492142857

00:42:16.474 --> 00:42:17.710 there was increased activation

NOTE Confidence: 0.808531492142857

00:42:17.770 --> 00:42:19.182 throughout the prefrontal cortex

NOTE Confidence: 0.808531492142857

00:42:19.182 --> 00:42:21.300 only in those who were impaired.

NOTE Confidence: 0.808531492142857

00:42:21.300 --> 00:42:26.360 So this is the scan at baseline is in blue,

NOTE Confidence: 0.808531492142857

00:42:26.360 --> 00:42:28.316 the scan after the drug is

NOTE Confidence: 0.808531492142857

00:42:28.316 --> 00:42:29.620 administered is in red.

NOTE Confidence: 0.808531492142857

00:42:29.620 --> 00:42:31.522 And we had significant differences in

NOTE Confidence: 0.808531492142857

00:42:31.522 --> 00:42:34.258 every ROI in the people who are impaired,

NOTE Confidence: 0.808531492142857

00:42:34.260 --> 00:42:35.420 people who are not impaired.

NOTE Confidence: 0.808531492142857

00:42:35.420 --> 00:42:37.155 We didn't see any significant

NOTE Confidence: 0.808531492142857

00:42:37.155 --> 00:42:38.890 differences and we didn't see
NOTE Confidence: 0.808531492142857

00:42:38.958 --> 00:42:40.550 any differences on placebo.
NOTE Confidence: 0.808531492142857

00:42:40.550 --> 00:42:42.000 And again, no dose difference.
NOTE Confidence: 0.81592794625

00:42:45.020 --> 00:42:47.561 So, you know, looking at this group
NOTE Confidence: 0.81592794625

00:42:47.561 --> 00:42:48.846 difference, this is super interesting.
NOTE Confidence: 0.81592794625

00:42:48.846 --> 00:42:50.648 You could get a good publication out of it,
NOTE Confidence: 0.81592794625

00:42:50.650 --> 00:42:51.980 but it's not very useful.
NOTE Confidence: 0.81592794625

00:42:51.980 --> 00:42:53.190 So group level impairment data
NOTE Confidence: 0.81592794625

00:42:53.190 --> 00:42:54.980 is not useful in the real world.
NOTE Confidence: 0.81592794625

00:42:54.980 --> 00:42:57.236 And psychiatry has really struggled with
NOTE Confidence: 0.81592794625

00:42:57.236 --> 00:42:59.903 the ability to diagnose an individual with
NOTE Confidence: 0.81592794625

00:42:59.903 --> 00:43:02.458 a condition based on functional brain data.
NOTE Confidence: 0.81592794625

00:43:02.460 --> 00:43:04.070 So could we do this with impairment?
NOTE Confidence: 0.81592794625

00:43:04.070 --> 00:43:05.576 Maybe impairment is such a global
NOTE Confidence: 0.81592794625

00:43:05.576 --> 00:43:06.860 change that it would work.
NOTE Confidence: 0.81592794625

00:43:06.860 --> 00:43:08.464 So we, we basically,

NOTE Confidence: 0.81592794625

00:43:08.464 --> 00:43:10.870 we broke this etnier signal into

NOTE Confidence: 0.81592794625

00:43:10.951 --> 00:43:13.828 features and gave them to our machine.

NOTE Confidence: 0.81592794625

00:43:13.830 --> 00:43:16.080 Morning colleagues and said could you

NOTE Confidence: 0.81592794625

00:43:16.080 --> 00:43:18.340 use a machine learning algorithm to

NOTE Confidence: 0.81592794625

00:43:18.340 --> 00:43:20.404 determine who was impaired and who

NOTE Confidence: 0.81592794625

00:43:20.404 --> 00:43:22.786 was not based on fnirs data alone?

NOTE Confidence: 0.8715183075

00:43:26.100 --> 00:43:29.355 And yes, So what this graph shows

NOTE Confidence: 0.8715183075

00:43:29.355 --> 00:43:32.500 is our machine learning results.

NOTE Confidence: 0.8715183075

00:43:32.500 --> 00:43:35.620 And in the blue we have the Dre,

NOTE Confidence: 0.8715183075

00:43:35.620 --> 00:43:36.820 so this is the cop.

NOTE Confidence: 0.8715183075

00:43:36.820 --> 00:43:39.400 So the cop was about 72% accurate

NOTE Confidence: 0.8715183075

00:43:39.400 --> 00:43:42.220 in judging people who are impaired.

NOTE Confidence: 0.8715183075

00:43:42.220 --> 00:43:43.370 The positive predictive value of

NOTE Confidence: 0.8715183075

00:43:43.370 --> 00:43:44.940 of those who are called impaired,

NOTE Confidence: 0.8715183075

00:43:44.940 --> 00:43:46.360 how many were really impaired

NOTE Confidence: 0.8715183075

00:43:46.360 --> 00:43:47.780 using our ground truth method
NOTE Confidence: 0.8715183075

00:43:47.828 --> 00:43:49.316 and then a false positive rate.
NOTE Confidence: 0.8715183075

00:43:49.320 --> 00:43:51.246 So what we found with Fnirs
NOTE Confidence: 0.8715183075

00:43:51.246 --> 00:43:53.739 is we were a little better.
NOTE Confidence: 0.8715183075

00:43:53.740 --> 00:43:54.910 From the cop about equal,
NOTE Confidence: 0.8715183075

00:43:54.910 --> 00:43:56.428 a little better than the cop,
NOTE Confidence: 0.8715183075

00:43:56.430 --> 00:43:57.910 much better in positive predictive
NOTE Confidence: 0.8715183075

00:43:57.910 --> 00:43:59.728 value and we had half of
NOTE Confidence: 0.8715183075

00:43:59.728 --> 00:44:00.868 the false positive rate.
NOTE Confidence: 0.8715183075

00:44:00.870 --> 00:44:02.130 So that was kind of exciting.
NOTE Confidence: 0.6250602

00:44:04.550 --> 00:44:07.846 Umm. Something that came up is, you know,
NOTE Confidence: 0.6250602

00:44:07.846 --> 00:44:09.302 you're giving people an end back task.
NOTE Confidence: 0.6250602

00:44:09.310 --> 00:44:10.190 How realistic is that?
NOTE Confidence: 0.6250602

00:44:10.190 --> 00:44:11.108 And we thought, well,
NOTE Confidence: 0.6250602

00:44:11.108 --> 00:44:13.430 what if it was just a resting state scan.
NOTE Confidence: 0.6250602

00:44:13.430 --> 00:44:16.027 So we looked at resting state connectivity,

NOTE Confidence: 0.6250602

00:44:16.030 --> 00:44:17.782 which is a measure of how regions of

NOTE Confidence: 0.6250602

00:44:17.782 --> 00:44:19.398 the brain interact with each other

NOTE Confidence: 0.6250602

00:44:19.398 --> 00:44:21.084 without need for a cognitive task.

NOTE Confidence: 0.6250602

00:44:21.090 --> 00:44:22.778 And basically with that,

NOTE Confidence: 0.6250602

00:44:22.778 --> 00:44:24.044 with functional connectivity,

NOTE Confidence: 0.6250602

00:44:24.050 --> 00:44:25.850 you're looking for patterns of

NOTE Confidence: 0.6250602

00:44:25.850 --> 00:44:27.650 temporally correlated but face but

NOTE Confidence: 0.6250602

00:44:27.713 --> 00:44:29.597 spatially distinct brain activity.

NOTE Confidence: 0.6250602

00:44:29.600 --> 00:44:33.288 And again what we found is that the

NOTE Confidence: 0.6250602

00:44:33.288 --> 00:44:36.550 people who are impaired after THC,

NOTE Confidence: 0.6250602

00:44:36.550 --> 00:44:39.125 they had this reduction in

NOTE Confidence: 0.6250602

00:44:39.125 --> 00:44:40.155 functional connectivity.

NOTE Confidence: 0.6250602

00:44:40.160 --> 00:44:41.456 The people who are not impaired,

NOTE Confidence: 0.6250602

00:44:41.460 --> 00:44:43.685 you see no difference between

NOTE Confidence: 0.6250602

00:44:43.685 --> 00:44:45.910 pre and post Drug Administration.

NOTE Confidence: 0.6250602

00:44:45.910 --> 00:44:47.938 Another way of looking at that
NOTE Confidence: 0.6250602

00:44:47.938 --> 00:44:49.290 is placebo and THC.
NOTE Confidence: 0.6250602

00:44:49.290 --> 00:44:53.070 So on placebo and THC,
NOTE Confidence: 0.6250602

00:44:53.070 --> 00:44:54.568 if you were not impaired from THC,
NOTE Confidence: 0.6250602

00:44:54.570 --> 00:44:56.070 there was no significant
NOTE Confidence: 0.6250602

00:44:56.070 --> 00:44:57.570 difference in brain connectivity.
NOTE Confidence: 0.6250602

00:44:57.570 --> 00:44:58.928 But for the people who are impaired,
NOTE Confidence: 0.6250602

00:44:58.930 --> 00:45:01.055 they had this dramatic decrease
NOTE Confidence: 0.6250602

00:45:01.055 --> 00:45:02.330 in brain connectivity.
NOTE Confidence: 0.6250602

00:45:02.330 --> 00:45:04.130 The groups are matched with placebo,
NOTE Confidence: 0.6250602

00:45:04.130 --> 00:45:05.370 which indicates to us that
NOTE Confidence: 0.6250602

00:45:05.370 --> 00:45:06.610 we're measuring the state level
NOTE Confidence: 0.6250602

00:45:06.662 --> 00:45:07.817 and not trade level effect,
NOTE Confidence: 0.6250602

00:45:07.820 --> 00:45:08.609 which was exciting.
NOTE Confidence: 0.930154107142857

00:45:11.210 --> 00:45:12.314 And then finally,
NOTE Confidence: 0.930154107142857

00:45:12.314 --> 00:45:14.340 as part of this, the study,

NOTE Confidence: 0.930154107142857
00:45:14.340 --> 00:45:15.990 we gave some people some alcohol,
NOTE Confidence: 0.930154107142857
00:45:15.990 --> 00:45:17.908 a subset of participants, 20 of them,
NOTE Confidence: 0.930154107142857
00:45:17.910 --> 00:45:19.830 also received an alcoholic beverage.
NOTE Confidence: 0.930154107142857
00:45:19.830 --> 00:45:21.972 So we had this nice two by two design
NOTE Confidence: 0.930154107142857
00:45:21.972 --> 00:45:23.906 THC and placebo, alcohol, placebo,
NOTE Confidence: 0.930154107142857
00:45:23.906 --> 00:45:26.498 THC, real alcohol, THC and alcohol,
NOTE Confidence: 0.930154107142857
00:45:26.498 --> 00:45:29.270 and then double placebo to see if
NOTE Confidence: 0.930154107142857
00:45:29.350 --> 00:45:32.578 alcohol interferes with our ability to
NOTE Confidence: 0.930154107142857
00:45:32.578 --> 00:45:35.450 detect THC intoxication using F nears.
NOTE Confidence: 0.930154107142857
00:45:35.450 --> 00:45:37.200 And we found that even with alcohol
NOTE Confidence: 0.930154107142857
00:45:37.200 --> 00:45:39.224 on board we could still decrease
NOTE Confidence: 0.930154107142857
00:45:39.224 --> 00:45:40.844 detect this decreased functional
NOTE Confidence: 0.930154107142857
00:45:40.844 --> 00:45:43.020 connectivity in people who are impaired.
NOTE Confidence: 0.930154107142857
00:45:43.020 --> 00:45:45.225 And this is different channels in the
NOTE Confidence: 0.930154107142857
00:45:45.225 --> 00:45:47.715 brain that I showed you and this is
NOTE Confidence: 0.930154107142857

00:45:47.715 --> 00:45:49.915 pre dose before they got anything and
NOTE Confidence: 0.930154107142857

00:45:49.915 --> 00:45:52.136 this is after both THC and alcohol.
NOTE Confidence: 0.930154107142857

00:45:52.136 --> 00:45:54.840 So you have this reduction in connectivity.
NOTE Confidence: 0.930154107142857

00:45:54.840 --> 00:45:56.065 So I think this is real and
NOTE Confidence: 0.930154107142857

00:45:56.065 --> 00:45:57.079 I think this is robust.
NOTE Confidence: 0.896711756

00:45:59.150 --> 00:46:00.400 So what can we say?
NOTE Confidence: 0.896711756

00:46:00.400 --> 00:46:02.144 So prefrontal cortical activation
NOTE Confidence: 0.896711756

00:46:02.144 --> 00:46:03.888 collected with portable fnirs
NOTE Confidence: 0.896711756

00:46:03.888 --> 00:46:06.417 appears to be a biomarker of THC
NOTE Confidence: 0.896711756

00:46:06.417 --> 00:46:08.444 impairment and not exposure that could
NOTE Confidence: 0.896711756

00:46:08.444 --> 00:46:10.670 potentially be collected in the field.
NOTE Confidence: 0.896711756

00:46:10.670 --> 00:46:12.210 It's different only in
NOTE Confidence: 0.896711756

00:46:12.210 --> 00:46:13.750 people who are impaired.
NOTE Confidence: 0.896711756

00:46:13.750 --> 00:46:15.070 It's the first biomarker that
NOTE Confidence: 0.896711756

00:46:15.070 --> 00:46:16.630 we know of impairment from THC,
NOTE Confidence: 0.896711756

00:46:16.630 --> 00:46:18.254 not just THC exposure.

NOTE Confidence: 0.896711756

00:46:18.254 --> 00:46:21.061 This biomarker can be detected when people

NOTE Confidence: 0.896711756

00:46:21.061 --> 00:46:23.770 are doing a task or at risk at rest.

NOTE Confidence: 0.896711756

00:46:23.770 --> 00:46:25.688 And what we're doing now is we're

NOTE Confidence: 0.896711756

00:46:25.688 --> 00:46:27.938 writing a grant with folks from MIT

NOTE Confidence: 0.896711756

00:46:27.938 --> 00:46:29.648 to incorporate a driving simulator.

NOTE Confidence: 0.896711756

00:46:29.650 --> 00:46:30.358 So we'll have.

NOTE Confidence: 0.896711756

00:46:30.358 --> 00:46:31.774 People do the fears getting the

NOTE Confidence: 0.896711756

00:46:31.774 --> 00:46:33.146 driving simulator and see how

NOTE Confidence: 0.896711756

00:46:33.146 --> 00:46:34.506 they actually drive because again,

NOTE Confidence: 0.896711756

00:46:34.510 --> 00:46:35.014 you know,

NOTE Confidence: 0.896711756

00:46:35.014 --> 00:46:36.526 F nears task doesn't really have

NOTE Confidence: 0.896711756

00:46:36.526 --> 00:46:38.298 a lot of ecological validity.

NOTE Confidence: 0.885722912

00:46:40.930 --> 00:46:44.610 So just to wrap up,

NOTE Confidence: 0.885722912

00:46:44.610 --> 00:46:46.242 I hope I've convinced you that

NOTE Confidence: 0.885722912

00:46:46.242 --> 00:46:48.335 this is a really active area of

NOTE Confidence: 0.885722912

00:46:48.335 --> 00:46:50.345 research with so many more questions,
NOTE Confidence: 0.885722912

00:46:50.350 --> 00:46:52.926 so studies that we're working on now,
NOTE Confidence: 0.885722912

00:46:52.930 --> 00:46:54.986 we have an RO one looking at medical
NOTE Confidence: 0.885722912

00:46:54.986 --> 00:46:56.743 marijuana pain and opioid use in
NOTE Confidence: 0.885722912

00:46:56.743 --> 00:46:58.228 patients on chronic opioid therapy.
NOTE Confidence: 0.885722912

00:46:58.230 --> 00:47:00.651 And we want to see if medical cannabis does
NOTE Confidence: 0.885722912

00:47:00.651 --> 00:47:03.387 in fact help people taper their opioid dose.
NOTE Confidence: 0.885722912

00:47:03.390 --> 00:47:05.007 There's a lot of speculation out there.
NOTE Confidence: 0.885722912

00:47:05.010 --> 00:47:07.166 This hasn't really been shown very well.
NOTE Confidence: 0.885722912

00:47:07.170 --> 00:47:07.896 So we're doing,
NOTE Confidence: 0.885722912

00:47:07.896 --> 00:47:10.300 we're doing a trial to see if that's true.
NOTE Confidence: 0.885722912

00:47:10.300 --> 00:47:12.253 And something else that I thought of
NOTE Confidence: 0.885722912

00:47:12.253 --> 00:47:14.133 might might be interested interesting to
NOTE Confidence: 0.885722912

00:47:14.133 --> 00:47:16.820 this group is we're also doing PET scans.
NOTE Confidence: 0.885722912

00:47:16.820 --> 00:47:19.220 We're we're evaluating CBD for
NOTE Confidence: 0.885722912

00:47:19.220 --> 00:47:21.140 reduction of brain neuroinflammation.

NOTE Confidence: 0.885722912

00:47:21.140 --> 00:47:23.072 There's a a pet marker called PBR

NOTE Confidence: 0.885722912

00:47:23.072 --> 00:47:25.238 28 that's a a marker of microglial

NOTE Confidence: 0.885722912

00:47:25.238 --> 00:47:27.600 activation and we want to see if

NOTE Confidence: 0.885722912

00:47:27.600 --> 00:47:29.530 CBD reduces neural glial activation

NOTE Confidence: 0.885722912

00:47:29.530 --> 00:47:31.360 in patients with chronic pain.

NOTE Confidence: 0.884693072352941

00:47:33.610 --> 00:47:36.123 So with that, I just need to

NOTE Confidence: 0.884693072352941

00:47:36.123 --> 00:47:38.044 acknowledge everyone in my group

NOTE Confidence: 0.884693072352941

00:47:38.044 --> 00:47:39.969 who helped with this research.

NOTE Confidence: 0.884693072352941

00:47:39.970 --> 00:47:42.106 My the director of our center.

NOTE Confidence: 0.884693072352941

00:47:42.110 --> 00:47:43.076 You didn't Evans,

NOTE Confidence: 0.884693072352941

00:47:43.076 --> 00:47:44.686 our project manager Gladys Patches,

NOTE Confidence: 0.884693072352941

00:47:44.690 --> 00:47:45.294 Randy Schuster,

NOTE Confidence: 0.884693072352941

00:47:45.294 --> 00:47:47.106 who did the the adolescent studies,

NOTE Confidence: 0.884693072352941

00:47:47.110 --> 00:47:48.322 Kevin, our statistician, Michael,

NOTE Confidence: 0.884693072352941

00:47:48.322 --> 00:47:49.837 our programmer Nissan who did

NOTE Confidence: 0.884693072352941

00:47:49.837 --> 00:47:51.550 a lot of the Effner's analysis,
NOTE Confidence: 0.884693072352941

00:47:51.550 --> 00:47:53.636 and all of the CRC's who did
NOTE Confidence: 0.884693072352941

00:47:53.636 --> 00:47:54.961 fantastic work in collecting
NOTE Confidence: 0.884693072352941

00:47:54.961 --> 00:47:57.127 all this data and of course,
NOTE Confidence: 0.884693072352941

00:47:57.130 --> 00:47:57.860 funding sources.
NOTE Confidence: 0.957929186666667

00:48:00.770 --> 00:48:04.300 So thank you. Thank you so much,
NOTE Confidence: 0.957929186666667

00:48:04.300 --> 00:48:05.000 Jody. That was a wonderful talk.