WEBVTT

NOTE duration:"00:08:22.8160000"

NOTE language:en-us

NOTE Confidence: 0.8306816

00:00:00.000 --> 00:00:01.532 Hi, I'm young sunshine.

NOTE Confidence: 0.8306816

00:00:01.532 --> 00:00:03.447 I'm an assistant professor in

NOTE Confidence: 0.8306816

00:00:03.447 --> 00:00:05.918 the Yell Child Study Center and

NOTE Confidence: 0.8306816

00:00:05.918 --> 00:00:07.933 in the Department of Psychiatry.

NOTE Confidence: 0.8306816

00:00:07.940 --> 00:00:09.626 So my talk is entitled motivation

NOTE Confidence: 0.8306816

00:00:09.626 --> 00:00:10.750 improves working memory by

NOTE Confidence: 0.8306816

00:00:10.800 --> 00:00:12.385 shaping neural signals in the

NOTE Confidence: 0.8306816

00:00:12.385 --> 00:00:13.653 prefrontal and parietal cortex.

NOTE Confidence: 0.8306816

00:00:13.660 --> 00:00:14.668 And as you see,

NOTE Confidence: 0.8306816

00:00:14.668 --> 00:00:15.928 there's a pretty big carrot

NOTE Confidence: 0.8306816

00:00:15.928 --> 00:00:18.112 on the slide which I placed to

NOTE Confidence: 0.8306816

00:00:18.112 --> 00:00:19.360 symbolize incentives or those

NOTE Confidence: 0.8306816

00:00:19.424 --> 00:00:21.179 things broadly that motivate us.

NOTE Confidence: 0.8306816

00:00:21.180 --> 00:00:22.986 And my talk will focus on

NOTE Confidence: 0.8306816

00:00:22.986 --> 00:00:24.190 motivation and how motivation,

NOTE Confidence: 0.8306816

00:00:24.190 --> 00:00:26.506 effects cognition as a means of

NOTE Confidence: 0.8306816

00:00:26.506 --> 00:00:27.278 achieving goals.

NOTE Confidence: 0.8306816

00:00:27.280 --> 00:00:28.416 So to achieve goals,

NOTE Confidence: 0.8306816

00:00:28.416 --> 00:00:29.836 one must have both the

NOTE Confidence: 0.8306816

00:00:29.836 --> 00:00:31.209 desire to achieve a goal,

NOTE Confidence: 0.8306816

00:00:31.210 --> 00:00:32.595 which is the motivation and

NOTE Confidence: 0.8306816

00:00:32.595 --> 00:00:34.310 the means to achieve the goal,

NOTE Confidence: 0.8306816

00:00:34.310 --> 00:00:35.996 which here is the ability to

NOTE Confidence: 0.8306816

00:00:35.996 --> 00:00:37.120 draw on cognitive resources,

NOTE Confidence: 0.8306816

00:00:37.120 --> 00:00:39.409 and the overarching question in our work

NOTE Confidence: 0.8306816

00:00:39.409 --> 00:00:42.558 is how do these domains affect each other?

NOTE Confidence: 0.8306816

00:00:42.560 --> 00:00:43.520 So what is motivation?

NOTE Confidence: 0.8306816

00:00:43.520 --> 00:00:46.118 I think of it as a drive that helps

NOTE Confidence: 0.8306816

00:00:46.118 --> 00:00:47.938 organize our desires and efforts

NOTE Confidence: 0.8306816

00:00:47.938 --> 00:00:49.839 towards goal directed behaviors.

NOTE Confidence: 0.8306816

00:00:49.840 --> 00:00:51.976 And here we will specifically talk

NOTE Confidence: 0.8306816

00:00:51.976 --> 00:00:53.835 about incentive motivation or the

NOTE Confidence: 0.8306816

00:00:53.835 --> 00:00:56.079 motivation that is initiated by incentives.

NOTE Confidence: 0.8306816

00:00:56.080 --> 00:00:57.440 Theories of incentive motivation.

NOTE Confidence: 0.8306816

00:00:57.440 --> 00:00:59.480 By Kent Berridge and others suggest

NOTE Confidence: 0.8306816

00:00:59.539 --> 00:01:01.045 that two things have to come

NOTE Confidence: 0.8306816

00:01:01.045 --> 00:01:02.750 together for people to be motivated.

NOTE Confidence: 0.8306816

00:01:02.750 --> 00:01:03.958 External cues signaling incentives

NOTE Confidence: 0.8306816

00:01:03.958 --> 00:01:05.468 such as food or money,

NOTE Confidence: 0.8306816

00:01:05.470 --> 00:01:05.752 etc.

NOTE Confidence: 0.8306816

00:01:05.752 --> 00:01:07.444 And an internal physiological state that

NOTE Confidence: 0.8306816

00:01:07.444 --> 00:01:09.409 is conducive to integrating these cues,

NOTE Confidence: 0.8306816

00:01:09.410 --> 00:01:10.930 such as hunger or thirst.

NOTE Confidence: 0.8306816

00:01:10.930 --> 00:01:12.440 So as a concrete example,

NOTE Confidence: 0.8306816

00:01:12.440 --> 00:01:14.295 here's a child with ice cream in

NOTE Confidence: 0.8306816

00:01:14.295 --> 00:01:16.080 the ice cream Services Visual,

NOTE Confidence: 0.8306816

00:01:16.080 --> 00:01:17.460 an likely olfactory cue,

NOTE Confidence: 0.8306816

00:01:17.460 --> 00:01:19.530 and he said previous experiences with

NOTE Confidence: 0.8306816

00:01:19.593 --> 00:01:21.505 ice cream and just by seeing it can

NOTE Confidence: 0.8306816

00:01:21.505 --> 00:01:22.983 have an internal representation of

NOTE Confidence: 0.8306816

00:01:22.983 --> 00:01:25.490 ice cream and have an idea of what

NOTE Confidence: 0.8306816

00:01:25.490 --> 00:01:28.980 it would be like to taste in the near future.

NOTE Confidence: 0.8306816

00:01:28.980 --> 00:01:30.372 This creates a motivation

NOTE Confidence: 0.8306816

00:01:30.372 --> 00:01:32.112 to obtain the ice cream,

NOTE Confidence: 0.8306816

00:01:32.120 --> 00:01:33.380 or in his case,

NOTE Confidence: 0.8306816

00:01:33.380 --> 00:01:35.270 motivation to sit still and wait

NOTE Confidence: 0.8306816

00:01:35.336 --> 00:01:37.814 for the ice cream and motivation in

NOTE Confidence: 0.8306816

00:01:37.814 --> 00:01:39.799 the broadest sense is disrupted.

NOTE Confidence: 0.8306816

00:01:39.800 --> 00:01:41.196 In many psychiatric illnesses,

NOTE Confidence: 0.8306816

00:01:41.196 --> 00:01:43.290 including but not limited to schizophrenia,

NOTE Confidence: 0.8306816

00:01:43.290 --> 00:01:44.247 depression, substance use,

NOTE Confidence: 0.8306816

00:01:44.247 --> 00:01:46.480 and it's a challenge to know in

NOTE Confidence: 0.8306816

00:01:46.535 --> 00:01:48.350 which ways motivation is disrupted

NOTE Confidence: 0.8306816

00:01:48.350 --> 00:01:50.165 and exactly how this disruption

NOTE Confidence: 0.8306816

00:01:50.220 --> 00:01:51.318 relates to symptoms,

NOTE Confidence: 0.8306816

00:01:51.320 --> 00:01:55.176 which is a large part of our work.

NOTE Confidence: 0.8306816

00:01:55.180 --> 00:01:57.340 Motivation does not occur in isolation.

NOTE Confidence: 0.8306816

00:01:57.340 --> 00:01:58.060 By definition,

NOTE Confidence: 0.8306816

00:01:58.060 --> 00:01:59.860 motivation must affect other processes.

NOTE Confidence: 0.8306816

00:01:59.860 --> 00:02:02.261 So in our work we focus on

NOTE Confidence: 0.8306816

00:02:02.261 --> 00:02:03.864 how motivation affects the

NOTE Confidence: 0.8306816

00:02:03.864 --> 00:02:05.880 downstream process of cognition.

NOTE Confidence: 0.8306816

00:02:05.880 --> 00:02:07.770 We specifically focus on working memory,

NOTE Confidence: 0.8306816

00:02:07.770 --> 00:02:09.798 which is defined as the temporary

NOTE Confidence: 0.8306816

00:02:09.798 --> 00:02:11.150 maintenance and manipulation of

NOTE Confidence: 0.8306816

00:02:11.205 --> 00:02:13.130 information in the service of a goal.

NOTE Confidence: 0.8306816

00:02:13.130 --> 00:02:14.338 Working memory is important

NOTE Confidence: 0.8306816

00:02:14.338 --> 00:02:16.150 because it serves as a building

NOTE Confidence: 0.8306816

00:02:16.208 --> 00:02:17.848 block of higher order cognition.

NOTE Confidence: 0.8306816

00:02:17.850 --> 00:02:19.730 It's required for abstraction

NOTE Confidence: 0.8306816

00:02:19.730 --> 00:02:21.140 and problem solving.

NOTE Confidence: 0.8306816

00:02:21.140 --> 00:02:22.815 So examples of working memory

NOTE Confidence: 0.8306816

00:02:22.815 --> 00:02:24.155 include being verbally told,

NOTE Confidence: 0.8306816

00:02:24.160 --> 00:02:25.135 a phone number,

NOTE Confidence: 0.8306816

00:02:25.135 --> 00:02:27.410 and having to keep it in mind

NOTE Confidence: 0.8306816

00:02:27.491 --> 00:02:29.878 before being able to jot it down.

NOTE Confidence: 0.8306816

00:02:29.880 --> 00:02:31.896 Calculating a tip at a restaurant

NOTE Confidence: 0.8306816

00:02:31.896 --> 00:02:33.240 arithmetic requires working memory,

NOTE Confidence: 0.8306816

00:02:33.240 --> 00:02:35.438 keeping in mind a set of directions

NOTE Confidence: 0.8306816

00:02:35.438 --> 00:02:37.270 when traveling to a destination.

NOTE Confidence: 0.8306816

00:02:37.270 --> 00:02:39.405 Prior work has noted that working memory

NOTE Confidence: 0.8306816

00:02:39.405 --> 00:02:41.479 engages a number of prefrontal cortex

NOTE Confidence: 0.8306816

00:02:41.479 --> 00:02:43.319 and parietal cortex brain regions.

NOTE Confidence: 0.8306816

00:02:43.320 --> 00:02:44.664 Here shown in orange,

NOTE Confidence: 0.8306816

00:02:44.664 --> 00:02:45.000 red,

NOTE Confidence: 0.8306816

00:02:45.000 --> 00:02:45.670 and pink,

NOTE Confidence: 0.8306816

00:02:45.670 --> 00:02:46.675 including the dorsal

NOTE Confidence: 0.8306816

00:02:46.675 --> 00:02:47.680 lateral prefrontal cortex,

NOTE Confidence: 0.7982549

00:02:47.680 --> 00:02:49.745 the pre Motors cortex and

NOTE Confidence: 0.7982549

00:02:49.745 --> 00:02:51.397 areas the intraparietal sulcus.

NOTE Confidence: 0.7982549

00:02:51.400 --> 00:02:53.108 Working memory also improves

NOTE Confidence: 0.7982549

00:02:53.108 --> 00:02:54.816 throughout childhood and adolescence,

NOTE Confidence: 0.7982549

00:02:54.820 --> 00:02:56.524 likely paralleling the ongoing

NOTE Confidence: 0.7982549

00:02:56.524 --> 00:02:58.654 development of the prefrontal cortex.

NOTE Confidence: 0.7982549

00:02:58.660 --> 00:03:00.610 This ongoing development means that

NOTE Confidence: 0.7982549

00:03:00.610 --> 00:03:03.360 working memory is dynamic in development,

NOTE Confidence: 0.7982549

00:03:03.360 --> 00:03:05.859 but also vulnerable.

NOTE Confidence: 0.7982549

00:03:05.860 --> 00:03:07.904 So how do we achieve our task

NOTE Confidence: 0.7982549

00:03:07.904 --> 00:03:09.627 of understanding the effects of

NOTE Confidence: 0.7982549

00:03:09.627 --> 00:03:11.187 incentives on working memory?

NOTE Confidence: 0.7982549

00:03:11.190 --> 00:03:12.876 We drew from classic working memory

NOTE Confidence: 0.7982549

00:03:12.876 --> 00:03:14.800 tasks that have been critical for

NOTE Confidence: 0.7982549

00:03:14.800 --> 00:03:16.288 understanding of how individual

NOTE Confidence: 0.7982549

00:03:16.288 --> 00:03:18.180 neurons behave during working memory.

NOTE Confidence: 0.7982549

00:03:18.180 --> 00:03:19.845 However, these tests are typically

NOTE Confidence: 0.7982549

00:03:19.845 --> 00:03:21.177 used in nonhuman primates,

NOTE Confidence: 0.7982549

00:03:21.180 --> 00:03:23.496 so we translated this task to

NOTE Confidence: 0.7982549

00:03:23.496 --> 00:03:25.820 use it in human studies.

NOTE Confidence: 0.7982549

00:03:25.820 --> 00:03:27.794 The basic premise of this task involves

NOTE Confidence: 0.7982549

00:03:27.794 --> 00:03:29.302 an encoding period where spatial

NOTE Confidence: 0.7982549

00:03:29.302 --> 00:03:31.126 location is skewed by yellow circle.

NOTE Confidence: 0.7982549

00:03:31.130 --> 00:03:32.978 The delay period during which the

NOTE Confidence: 0.7982549

00:03:32.978 --> 00:03:34.580 yellow circle is disappeared and

NOTE Confidence: 0.7982549

00:03:34.580 --> 00:03:36.488 the participant has to maintain the

NOTE Confidence: 0.7982549

00:03:36.488 --> 00:03:37.990 location they previously saw the

NOTE Confidence: 0.7982549

00:03:37.990 --> 00:03:39.478 probe period in which a participant

NOTE Confidence: 0.7982549

00:03:39.478 --> 00:03:41.520 uses a joystick to move the Gray

NOTE Confidence: 0.7982549

00:03:41.520 --> 00:03:43.380 circle to indicate where they saw

NOTE Confidence: 0.7982549

00:03:43.380 --> 00:03:45.221 the yellow circle and what we care

NOTE Confidence: 0.7982549

00:03:45.221 --> 00:03:47.013 about is how closely they place

NOTE Confidence: 0.7982549

00:03:47.013 --> 00:03:48.825 that Gray probe circle to wear.

NOTE Confidence: 0.7982549

00:03:48.830 --> 00:03:50.305 The yellow circle was initially

NOTE Confidence: 0.7982549

00:03:50.305 --> 00:03:51.485 the closer the placement,

NOTE Confidence: 0.7982549

00:03:51.490 --> 00:03:52.960 the better the working memory,

NOTE Confidence: 0.7982549

00:03:52.960 --> 00:03:54.730 and here we call these working

NOTE Confidence: 0.7982549

00:03:54.730 --> 00:03:55.910 memory trials neutral trials.

NOTE Confidence: 0.7982549

00:03:55.910 --> 00:03:58.736 Since there's no incentive linked here.

NOTE Confidence: 0.7982549

00:03:58.740 --> 00:04:00.630 And in our version of the task we also

NOTE Confidence: 0.7982549

00:04:00.630 --> 00:04:02.232 have a control condition in which

NOTE Confidence: 0.7982549

00:04:02.232 --> 00:04:04.070 there is no working memory required.

NOTE Confidence: 0.7982549

00:04:04.070 --> 00:04:05.939 We call this the motor condition and

NOTE Confidence: 0.7982549

00:04:05.939 --> 00:04:07.850 hear the yellow circle reappears during

NOTE Confidence: 0.7982549

00:04:07.850 --> 00:04:09.600 the probe phase and participants

NOTE Confidence: 0.7982549

00:04:09.600 --> 00:04:11.358 simply move the Gray circle on

NOTE Confidence: 0.7982549

00:04:11.358 --> 00:04:12.613 top of the yellow circle.

NOTE Confidence: 0.7982549

00:04:12.620 --> 00:04:13.910 We then manipulated the tasks

NOTE Confidence: 0.7982549

00:04:13.910 --> 00:04:15.740 such that on some trials you can

NOTE Confidence: 0.7982549

00:04:15.740 --> 00:04:17.204 win or lose money depending on

NOTE Confidence: 0.7982549

00:04:17.204 --> 00:04:18.649 your working memory performance,

NOTE Confidence: 0.7982549

00:04:18.650 --> 00:04:20.288 the better the working memory performance,

NOTE Confidence: 0.7982549

00:04:20.290 --> 00:04:21.970 the more money one and the worse

NOTE Confidence: 0.7982549

00:04:21.970 --> 00:04:23.310 the working memory performance,

NOTE Confidence: 0.7982549

00:04:23.310 --> 00:04:24.494 the more money lost.

NOTE Confidence: 0.7982549

00:04:24.494 --> 00:04:26.655 So in these types of trials there

NOTE Confidence: 0.7982549

00:04:26.655 --> 00:04:28.545 is feedback given about how much

NOTE Confidence: 0.7982549

00:04:28.545 --> 00:04:30.049 money is won or lost.

NOTE Confidence: 0.7982549

00:04:30.050 --> 00:04:31.793 And we named this task meant tag

NOTE Confidence: 0.7982549

00:04:31.793 --> 00:04:33.115 which stands for motivational

NOTE Confidence: 0.7982549

00:04:33.115 --> 00:04:34.678 interactions with cognition.

NOTE Confidence: 0.7982549

00:04:34.680 --> 00:04:36.672 We use this task with functional

NOTE Confidence: 0.7982549

00:04:36.672 --> 00:04:38.330 magnetic resonance imaging or fMRI,

NOTE Confidence: 0.7982549

00:04:38.330 --> 00:04:40.458 and in a group of healthy young

NOTE Confidence: 0.7982549

00:04:40.458 --> 00:04:42.381 adults and all imaging, acquisition,

NOTE Confidence: 0.7982549

00:04:42.381 --> 00:04:44.847 and processing was in line with

NOTE Confidence: 0.7982549

00:04:44.847 --> 00:04:47.780 pipelines from the Human Connectome Project.

NOTE Confidence: 0.7982549

00:04:47.780 --> 00:04:50.036 The first thing that we noted was that

NOTE Confidence: 0.7982549

00:04:50.036 --> 00:04:51.578 working memory improves when there

NOTE Confidence: 0.7982549

00:04:51.578 --> 00:04:54.060 is the possibility of monetary gain or loss,

NOTE Confidence: 0.7982549

00:04:54.060 --> 00:04:55.764 and throughout the talk the color

NOTE Confidence: 0.7982549

00:04:55.764 --> 00:04:57.268 red will indicate working memory

NOTE Confidence: 0.7982549

00:04:57.268 --> 00:04:58.540 trials with monetary loss.

NOTE Confidence: 0.7982549

00:04:58.540 --> 00:05:00.346 The color green will indicate working

NOTE Confidence: 0.7982549

00:05:00.346 --> 00:05:01.830 memory trials with monetary gain,

NOTE Confidence: 0.7982549

00:05:01.830 --> 00:05:03.435 and yellow or neutral working

NOTE Confidence: 0.7982549

00:05:03.435 --> 00:05:05.040 memory trials without any money

NOTE Confidence: 0.7982549

00:05:05.101 --> 00:05:07.090 at stake on the Y axis is the main

NOTE Confidence: 0.7982549

00:05:07.090 --> 00:05:08.399 angular difference between where

NOTE Confidence: 0.7982549

00:05:08.399 --> 00:05:10.457 the location was kyoudan where the

NOTE Confidence: 0.7982549

00:05:10.457 --> 00:05:11.700 probe circle was placed.

NOTE Confidence: 0.7982549

00:05:11.700 --> 00:05:13.200 In the smaller the distance,

NOTE Confidence: 0.7982549

00:05:13.200 --> 00:05:14.898 the better the working memory and

NOTE Confidence: 0.7982549

00:05:14.898 --> 00:05:17.666 we see that the gain and loss trials

NOTE Confidence: 0.7982549

00:05:17.666 --> 00:05:19.631 have better working memory performance

NOTE Confidence: 0.7982549

00:05:19.631 --> 00:05:21.528 compared to the neutral working

NOTE Confidence: 0.7982549

00:05:21.528 --> 00:05:23.328 memory condition shown in yellow.

NOTE Confidence: 0.7982549

00:05:23.330 --> 00:05:25.346 We next tested where in the brain

NOTE Confidence: 0.7982549

00:05:25.346 --> 00:05:26.547 integrates working memory with

NOTE Confidence: 0.7982549

00:05:26.547 --> 00:05:28.275 incentives and so that brain regions

NOTE Confidence: 0.7982549

00:05:28.275 --> 00:05:30.307 that are involved in both working memory,

NOTE Confidence: 0.8390732

00:05:30.310 --> 00:05:31.990 an incentivized working memory are located

NOTE Confidence: 0.8390732

00:05:31.990 --> 00:05:33.520 in prefrontal and parietal cortices,

NOTE Confidence: 0.8390732

00:05:33.520 --> 00:05:35.626 and when we look at the bold signal or

NOTE Confidence: 0.8390732

00:05:35.626 --> 00:05:37.879 the neural signal within these regions,

NOTE Confidence: 0.8390732

00:05:37.880 --> 00:05:39.960 we see that these regions have greater neural

NOTE Confidence: 0.8390732

00:05:39.960 --> 00:05:41.948 signal when working memory is incentivized.

NOTE Confidence: 0.8390732

00:05:41.950 --> 00:05:43.945 So this is true for both monetary

NOTE Confidence: 0.8390732

00:05:43.945 --> 00:05:46.028 reward which is shown in green and

NOTE Confidence: 0.8390732

00:05:46.028 --> 00:05:48.070 monetary loss which is shown in red.

NOTE Confidence: 0.8390732

00:05:48.070 --> 00:05:49.960 Each of these, the green lines and

NOTE Confidence: 0.8390732

00:05:49.960 --> 00:05:51.818 the green bars and the red lines

NOTE Confidence: 0.8390732

00:05:51.818 --> 00:05:53.768 in the red bars rides above the

NOTE Confidence: 0.8390732

00:05:53.768 --> 00:05:55.396 neutral working memory condition.

NOTE Confidence: 0.8390732

00:05:55.400 --> 00:05:58.130 And yellow, so these posterior parietal

NOTE Confidence: 0.8390732

00:05:58.130 --> 00:06:00.502 and prefrontal regions both support

NOTE Confidence: 0.8390732

00:06:00.502 --> 00:06:03.394 working memory and have greater bold

NOTE Confidence: 0.8390732

00:06:03.394 --> 00:06:05.929 signal during incentivized working memory.

NOTE Confidence: 0.8390732

00:06:05.930 --> 00:06:07.640 Next, we wondered whether greater

NOTE Confidence: 0.8390732

00:06:07.640 --> 00:06:09.790 neural signal could actually be linked

NOTE Confidence: 0.8390732

00:06:09.790 --> 00:06:11.720 to better working memory performance.

NOTE Confidence: 0.8390732

00:06:11.720 --> 00:06:13.800 And we observed areas shown in blue that

NOTE Confidence: 0.8390732

00:06:13.800 --> 00:06:15.690 specifically had greater neural signal when

NOTE Confidence: 0.8390732

00:06:15.690 --> 00:06:17.340 working memory performance was better.

NOTE Confidence: 0.8390732

00:06:17.340 --> 00:06:19.509 These were a subset of the regions we saw

NOTE Confidence: 0.8390732

00:06:19.509 --> 00:06:21.532 earlier in encompass specific regions of

NOTE Confidence: 0.8390732

00:06:21.532 --> 00:06:23.257 the prefrontal and parietal cortices.

NOTE Confidence: 0.8390732

00:06:23.260 --> 00:06:25.628 When we looked closely at the neural signal,

NOTE Confidence: 0.8390732

00:06:25.630 --> 00:06:27.800 we did see that trials with better

NOTE Confidence: 0.8390732

00:06:27.800 --> 00:06:29.291 working memory performance as shown

NOTE Confidence: 0.8390732

00:06:29.291 --> 00:06:31.069 on the X axis was associated with

NOTE Confidence: 0.8390732

00:06:31.069 --> 00:06:32.139 greater neural signals.

NOTE Confidence: 0.8390732

00:06:32.140 --> 00:06:34.216 This suggested that these regions are

NOTE Confidence: 0.8390732

00:06:34.216 --> 00:06:37.333 key to linking the brain effects for the

NOTE Confidence: 0.8390732

00:06:37.333 --> 00:06:39.423 observed improvement in working memory.

NOTE Confidence: 0.8390732

00:06:39.430 --> 00:06:39.750 Finally,

NOTE Confidence: 0.8390732

00:06:39.750 --> 00:06:41.670 we wanted to know what happens

NOTE Confidence: 0.8390732

00:06:41.670 --> 00:06:42.630 when participants win,

NOTE Confidence: 0.8390732

00:06:42.630 --> 00:06:44.779 lose or avoid losing money based on

NOTE Confidence: 0.8390732

00:06:44.779 --> 00:06:46.064 their working memory performance

NOTE Confidence: 0.8390732

00:06:46.064 --> 00:06:48.213 and what we saw suggested that the

NOTE Confidence: 0.8390732

00:06:48.213 --> 00:06:50.308 impact of this was emotionally felt.

NOTE Confidence: 0.8390732

00:06:50.310 --> 00:06:52.361 We saw that winning money more money

NOTE Confidence: 0.8390732

00:06:52.361 --> 00:06:53.982 was associated with greater neural

NOTE Confidence: 0.8390732

00:06:53.982 --> 00:06:56.028 signal in brain regions that process

NOTE Confidence: 0.8390732

00:06:56.028 --> 00:06:58.018 pleasure such as the ventral striatum

NOTE Confidence: 0.8390732

00:06:58.018 --> 00:06:59.902 or nucleus accumbens shown in green.

NOTE Confidence: 0.8390732

00:06:59.910 --> 00:07:01.580 Avoiding losing money was also

NOTE Confidence: 0.8390732

00:07:01.580 --> 00:07:03.250 associated with pleasure and here

NOTE Confidence: 0.8390732

00:07:03.303 --> 00:07:05.459 greater neural signal was also seen in

NOTE Confidence: 0.8390732

00:07:05.459 --> 00:07:07.269 the ventral striatum shown in purple.

NOTE Confidence: 0.8390732

00:07:07.270 --> 00:07:09.190 So there was some overlap here.

NOTE Confidence: 0.8390732

00:07:09.190 --> 00:07:09.521 However,

NOTE Confidence: 0.8390732

00:07:09.521 --> 00:07:11.176 greater amounts of money lost

NOTE Confidence: 0.8390732

00:07:11.176 --> 00:07:12.169 was associated with.

NOTE Confidence: 0.8390732

00:07:12.170 --> 00:07:14.055 Greater neural signal in regions

NOTE Confidence: 0.8390732

00:07:14.055 --> 00:07:15.940 that process pain and disappointment,

NOTE Confidence: 0.8390732

00:07:15.940 --> 00:07:17.448 including the habenula periaqueductal

NOTE Confidence: 0.8390732

00:07:17.448 --> 00:07:21.128 Gray in the insula, as shown in red.

NOTE Confidence: 0.8390732

00:07:21.128 --> 00:07:21.670 Overall,

NOTE Confidence: 0.8390732

00:07:21.670 --> 00:07:23.735 this suggested clear engagement of

NOTE Confidence: 0.8390732

00:07:23.735 --> 00:07:26.341 participants in our task and that

NOTE Confidence: 0.8390732

00:07:26.341 --> 00:07:29.173 completing a cognitive task that was

NOTE Confidence: 0.8390732

00:07:29.173 --> 00:07:31.250 incentivized affected internal emotions.

NOTE Confidence: 0.8390732

00:07:31.250 --> 00:07:33.518 So from this work we concluded that

NOTE Confidence: 0.8390732

00:07:33.518 --> 00:07:35.204 motivation improves working memory by

NOTE Confidence: 0.8390732

00:07:35.204 --> 00:07:37.178 shaping neural signals in the posterior

NOTE Confidence: 0.8390732

00:07:37.178 --> 00:07:38.819 prefrontal and parietal cortices.

NOTE Confidence: 0.8390732

00:07:38.820 --> 00:07:40.540 The amount of money won,

NOTE Confidence: 0.8390732

00:07:40.540 --> 00:07:43.012 lost or avoided in lost was encoded by

NOTE Confidence: 0.8390732

00:07:43.012 --> 00:07:45.010 brain regions that process feelings,

NOTE Confidence: 0.8390732

00:07:45.010 --> 00:07:46.802 such as pleasure, pain,

NOTE Confidence: 0.8390732

00:07:46.802 --> 00:07:47.698 and disappointment.

NOTE Confidence: 0.8390732

00:07:47.700 --> 00:07:49.644 And our future directions will include

NOTE Confidence: 0.8390732

00:07:49.644 --> 00:07:50.616 two related studies.

NOTE Confidence: 0.8390732

00:07:50.620 --> 00:07:52.608 In the first will test these effects

NOTE Confidence: 0.8390732

00:07:52.608 --> 00:07:53.895 in adolescents with depression

NOTE Confidence: 0.8390732

00:07:53.895 --> 00:07:55.795 using a longitudinal study design,

NOTE Confidence: 0.8390732

00:07:55.800 --> 00:07:57.879 and in the second will use a

NOTE Confidence: 0.8390732

00:07:57.879 --> 00:07:59.569 large publicly available data set

NOTE Confidence: 0.8390732

00:07:59.569 --> 00:08:01.419 to understand how cognitive and

NOTE Confidence: 0.8390732

00:08:01.419 --> 00:08:03.031 motivational abilities in children

NOTE Confidence: 0.8390732

00:08:03.031 --> 00:08:04.803 may affect developmental trajectories

NOTE Confidence: 0.8390732

00:08:04.803 --> 00:08:07.018 in risk for psychiatric illness.

NOTE Confidence: 0.8390732

00:08:07.020 --> 00:08:07.660 Thank you,

NOTE Confidence: 0.8390732

00:08:07.660 --> 00:08:09.580 thank you for watching this talk

NOTE Confidence: 0.8390732

00:08:09.580 --> 00:08:11.856 and thank you to all who helped

NOTE Confidence: 0.8390732

00:08:11.856 --> 00:08:13.116 and supported this study,

NOTE Confidence: 0.8390732

00:08:13.120 --> 00:08:14.404 especially the research participants

NOTE Confidence: 0.8390732

00:08:14.404 --> 00:08:15.688 in Teacher Bitch Lab.

NOTE Confidence: 0.8390732

00:08:15.690 --> 00:08:17.290 At the end, three division,

NOTE Confidence: 0.8390732

00:08:17.290 --> 00:08:18.574 the Department of Psychiatry

NOTE Confidence: 0.8390732

00:08:18.574 --> 00:08:20.179 and Yell Child Study Center.

NOTE Confidence: 0.8484971

00:08:20.180 --> 00:08:22.816 Thank you.