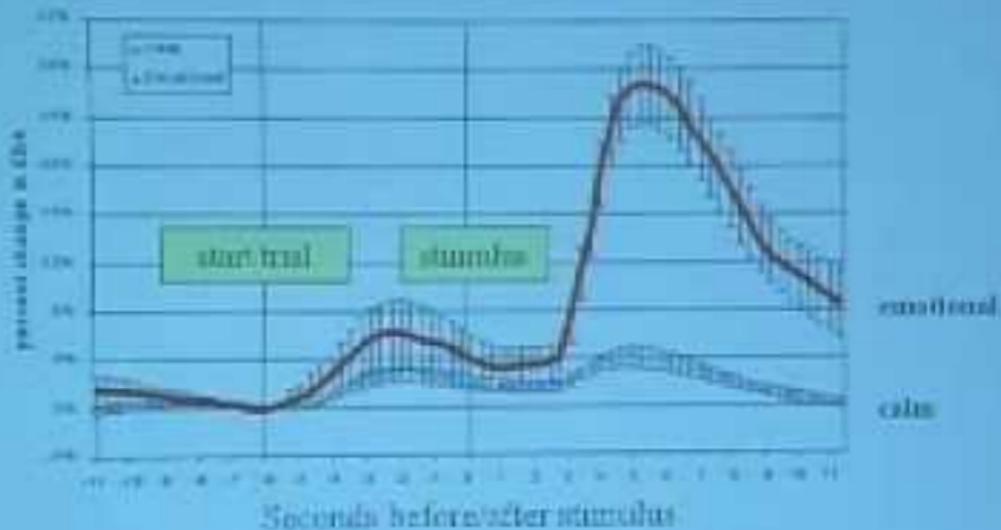# Ensemble analysis – one subject

1
00:00:06,650 --> 00:00:03,700
beaker Dean Radin he is I'm sure

2
00:00:08,330 --> 00:00:06,660
familiar to the majority of the people

3
00:00:10,430 --> 00:00:08,340
here if you're not familiar with his

4
00:00:13,520 --> 00:00:10,440
work i recommend you become familiar

5
00:00:16,129 --> 00:00:13,530
he's the senior scientist at ions he's

6
00:00:17,990 --> 00:00:16,139
got several faculty appointments he's

7
00:00:20,810 --> 00:00:18,000
the author of I think about two hundred

8
00:00:22,580 --> 00:00:20,820
articles two wonderful books the

9
00:00:27,050 --> 00:00:22,590
conscious universe and most recently

10
00:00:29,179 --> 00:00:27,060
entangled minds he speaks widely many

11
00:00:31,519 --> 00:00:29,189
conferences were very happy to have him

12
00:00:33,290 --> 00:00:31,529
here he was at I seem as an invited

13
00:00:36,290 --> 00:00:33,300

speaker just before he's been on

14
00:00:38,420 --> 00:00:36,300
television radio all over his work is

15
00:00:47,319 --> 00:00:38,430
wonderful and he will be speaking on

16
00:00:53,540 --> 00:00:50,029
I'm going to talk about two experiments

17
00:00:55,520 --> 00:00:53,550
and a little bit about an experiment

18
00:01:00,619 --> 00:00:55,530
that's on the drawing board and about to

19
00:01:02,990 --> 00:01:00,629
be run first one is presenting it which

20
00:01:05,719 --> 00:01:03,000
Garrett gave a good overview for

21
00:01:07,100 --> 00:01:05,729
presenta men is a feeling about an event

22
00:01:09,289 --> 00:01:07,110
in the future as opposed to a

23
00:01:12,200 --> 00:01:09,299
precognition which is a knowing about an

24
00:01:14,179 --> 00:01:12,210
event it could also be thought of

25
00:01:24,210 --> 00:01:14,189
typically as a vague sense of impending

26
00:01:28,360 --> 00:01:26,350
so here's how the experiment is designed

27
00:01:29,680 --> 00:01:28,370
it's it's intentionally designed to be

28
00:01:32,080 --> 00:01:29,690
very simple and to look like

29
00:01:34,210 --> 00:01:32,090
psychophysiology 101 and it's based on

30
00:01:36,040 --> 00:01:34,220
that kind of design so you sit somebody

31
00:01:38,070 --> 00:01:36,050
down in front of a blank computer screen

32
00:01:40,240 --> 00:01:38,080
and you record some form of

33
00:01:41,680 --> 00:01:40,250
physiological measurement I typically

34
00:01:44,650 --> 00:01:41,690
use skin conductance although have you

35
00:01:46,180 --> 00:01:44,660
looked at others as well then they press

36
00:01:48,550 --> 00:01:46,190
a button when they're ready to begin the

37
00:01:50,470 --> 00:01:48,560
screen remains blank for five seconds

38
00:01:53,230 --> 00:01:50,480

and after the five seconds in the

39
00:01:56,110 --> 00:01:53,240
computer makes a truly random decision

40
00:01:58,360 --> 00:01:56,120
by dipping into a pool of six or seven

41
00:02:00,850 --> 00:01:58,370
hundred pictures and selects one and

42
00:02:02,560 --> 00:02:00,860
then it shows it for three seconds it

43
00:02:04,870 --> 00:02:02,570
could either be a calm picture like a

44
00:02:07,540 --> 00:02:04,880
bunny or an emotional picture like a

45
00:02:11,350 --> 00:02:07,550
snake unless you're a bunny ologist or a

46
00:02:12,910 --> 00:02:11,360
herpetologist to their always

47
00:02:16,360 --> 00:02:12,920
idiosyncratic responses to these

48
00:02:19,870 --> 00:02:16,370
pictures and then 10 seconds goes by and

49
00:02:22,000 --> 00:02:19,880
you repeat this typically 30 to 40

50
00:02:23,949 --> 00:02:22,010
trials in one session so the whole

51
00:02:26,530 --> 00:02:23,959
experiment takes maybe 15 minutes at

52
00:02:28,000 --> 00:02:26,540
most what I'm going to show you now is a

53
00:02:29,800 --> 00:02:28,010
video clip that lasts about three

54
00:02:32,860 --> 00:02:29,810
minutes three or four minutes that was

55
00:02:35,170 --> 00:02:32,870
taken by the BBC for their science show

56
00:02:38,560 --> 00:02:35,180
called the horizon it's also now being

57
00:02:44,820 --> 00:02:38,570
shown in the US by discovery science by

58
00:02:51,520 --> 00:02:49,720
this dr. Dean Radin is hoping that he

59
00:02:54,009 --> 00:02:51,530
can prove that what the pilots call

60
00:02:56,860 --> 00:02:54,019
prediction could in fact be precognition

61
00:03:01,650 --> 00:02:56,870
a real ability to actually sense the

62
00:03:06,430 --> 00:03:04,300
his experiment records a person's

63
00:03:09,220 --> 00:03:06,440

emotional response to a series of

64
00:03:11,230 --> 00:03:09,230
pictures the images are from an

65
00:03:13,870 --> 00:03:11,240
internationally approved clinical test

66
00:03:19,000 --> 00:03:13,880
for emotional response and are selected

67
00:03:21,010 --> 00:03:19,010
by the computer at random well we're

68
00:03:23,020 --> 00:03:21,020
expecting to see is that after a picture

69
00:03:24,730 --> 00:03:23,030
is seen if it's an emotional picture you

70
00:03:28,270 --> 00:03:24,740
get a large rise and skin conductance

71
00:03:33,190 --> 00:03:28,280
and after a calm picture person remains

72
00:03:36,910 --> 00:03:33,200
calm it'll continue to go down so far so

73
00:03:39,910 --> 00:03:36,920
good and unremarkable but what Dean is

74
00:03:44,110 --> 00:03:39,920
looking for is what happens before the

75
00:03:45,970 --> 00:03:44,120
randomly selected picture is shown we

76
00:03:47,770 --> 00:03:45,980
hope to see then as at before the

77
00:03:50,350 --> 00:03:47,780
emotional picture skin conductance will

78
00:03:51,760 --> 00:03:50,360
already begin to go up and before the

79
00:03:57,940 --> 00:03:51,770
calm picture skin conductance will

80
00:04:00,700 --> 00:03:57,950
remain low and if that occurs and it

81
00:04:02,710 --> 00:04:00,710
shows that there's some aspect of us

82
00:04:06,800 --> 00:04:02,720
that is able to outguess what is

83
00:04:13,050 --> 00:04:10,050
if this happens then Dean will have

84
00:04:18,930 --> 00:04:13,060
tangible evidence of an ability to sense

85
00:04:21,210 --> 00:04:18,940
the future but for the experiment to

86
00:04:27,030 --> 00:04:21,220
carry any weight the effect has to be

87
00:04:29,219 --> 00:04:27,040
observed consistently well if it happens

88
00:04:30,960 --> 00:04:29,229

completely randomly that's guessing if

89
00:04:33,330 --> 00:04:30,970
it happens in such a way so that it is

90
00:04:35,250 --> 00:04:33,340
systematic and it suggests that it's not

91
00:04:39,450 --> 00:04:35,260
guessing but it's actually some

92
00:04:41,100 --> 00:04:39,460
perception of the future pictures where

93
00:04:44,129 --> 00:04:41,110
you're interested teams analyzed the

94
00:04:46,650 --> 00:04:44,139
data from his experiments this is the

95
00:04:49,770 --> 00:04:46,660
sector period before the picture

96
00:04:54,290 --> 00:04:49,780
appeared and as you see in both cases

97
00:04:59,969 --> 00:04:57,360
they show that for three or more seconds

98
00:05:03,690 --> 00:04:59,979
before an image is shown skin

99
00:05:06,830 --> 00:05:03,700
conductance does change consistently in

100
00:05:09,990 --> 00:05:06,840
anticipation of that future image

101
00:05:12,719 --> 00:05:10,000
incredibly the blue graph shows that

102
00:05:15,600 --> 00:05:12,729
before a calm picture the anticipation

103
00:05:18,690 --> 00:05:15,610
is calm but before an emotional picture

104
00:05:26,760 --> 00:05:18,700
is shown the red trace shows that the

105
00:05:31,690 --> 00:05:29,890
so when you do an in Samba LAN alisis

106
00:05:34,120 --> 00:05:31,700
you do one subject who does repeated

107
00:05:36,580 --> 00:05:34,130
trials of this type what you can do is

108
00:05:38,710 --> 00:05:36,590
show the average of all of the emotional

109
00:05:41,560 --> 00:05:38,720
trials that they got average of all of

110
00:05:44,170 --> 00:05:41,570
the calm trials you see where the trial

111
00:05:47,230 --> 00:05:44,180
begins they press a button where the

112
00:05:50,440 --> 00:05:47,240
stimulus occurs and that difference in

113
00:05:51,970 --> 00:05:50,450

the baseline is the presentment effect

114
00:05:54,460 --> 00:05:51,980
in this case it's statistically

115
00:05:56,200 --> 00:05:54,470
significant in one subject so I've done

116
00:05:58,990 --> 00:05:56,210
this kind of experiment many times

117
00:06:01,000 --> 00:05:59,000
probably most between 96 and 2000 one

118
00:06:03,670 --> 00:06:01,010
using skin conductance SEL is skin

119
00:06:05,230 --> 00:06:03,680
conductance level and you get a very

120
00:06:06,970 --> 00:06:05,240
strong result and these are typically

121
00:06:08,980 --> 00:06:06,980
unselected people who happen to just be

122
00:06:11,230 --> 00:06:08,990
around who are interested in trying it

123
00:06:13,540 --> 00:06:11,240
some people who claim that they have

124
00:06:15,880 --> 00:06:13,550
precognitive experiences tend to do

125
00:06:18,340 --> 00:06:15,890
better on this test than an average

126
00:06:21,100 --> 00:06:18,350
person there are also people who don't

127
00:06:24,070 --> 00:06:21,110
do very well at this at all typically

128
00:06:26,920 --> 00:06:24,080
psychotherapist do very badly on this

129
00:06:28,570 --> 00:06:26,930
test and I think the reason is that it's

130
00:06:30,270 --> 00:06:28,580
a test that that's looking at your

131
00:06:32,140 --> 00:06:30,280
emotional response to pictures and

132
00:06:34,450 --> 00:06:32,150
psychotherapist tend to go into therapy

133
00:06:37,930 --> 00:06:34,460
mode where they specifically learned to

134
00:06:39,400 --> 00:06:37,940
not respond to the the emotional input

135
00:06:43,120 --> 00:06:39,410
because otherwise it would freak out

136
00:06:46,090 --> 00:06:43,130
client so I tell both psychotherapist

137
00:06:47,560 --> 00:06:46,100
and also meditators to not do that but

138
00:06:48,790 --> 00:06:47,570

to allow that yourself to feel the

139
00:06:52,480 --> 00:06:48,800
emotion because otherwise there's

140
00:06:54,490 --> 00:06:52,490
nothing in your future to respond to so

141
00:06:56,290 --> 00:06:54,500
of course we do due diligence on this to

142
00:06:58,030 --> 00:06:56,300
look at every possible conventional

143
00:07:01,630 --> 00:06:58,040
explanation we can think of that might

144
00:07:04,090 --> 00:07:01,640
explain these results the all of the

145
00:07:05,740 --> 00:07:04,100
ones on the top from sensory cues all

146
00:07:07,720 --> 00:07:05,750
the way down to subject fraud we're

147
00:07:09,940 --> 00:07:07,730
pretty well sure that this is not a good

148
00:07:11,230 --> 00:07:09,950
explanation the one that usually people

149
00:07:13,480 --> 00:07:11,240
then think about is maybe it's an

150
00:07:16,300 --> 00:07:13,490
anticipatory effect it's a physiological

151
00:07:18,040 --> 00:07:16,310
form of the gamblers fallacy but we've

152
00:07:19,690 --> 00:07:18,050
looked at that in detail as well and

153
00:07:21,910 --> 00:07:19,700
everyone who's conducted these

154
00:07:23,800 --> 00:07:21,920
experiments and get significant results

155
00:07:25,390 --> 00:07:23,810
don't find any evidence that this is an

156
00:07:28,780 --> 00:07:25,400
anticipatory effect he's not a

157
00:07:30,340 --> 00:07:28,790
conventional one and as Garrett

158
00:07:32,350 --> 00:07:30,350
mentioned a dick bearman has done a

159
00:07:35,620 --> 00:07:32,360
version of this in the functional MRI

160
00:07:36,430 --> 00:07:35,630
and found that the amygdala is the spot

161
00:07:40,990 --> 00:07:36,440
that

162
00:07:43,090 --> 00:07:41,000
slightly larger effect in the right

163
00:07:46,930 --> 00:07:43,100

brain which I'm going to talk about a

164
00:07:49,360 --> 00:07:46,940
little bit later so today I'm aware of

165
00:07:50,980 --> 00:07:49,370
twenty presentiments periments using a

166
00:07:52,480 --> 00:07:50,990
variety of different kinds of

167
00:07:56,470 --> 00:07:52,490
physiological measurements from skin

168
00:07:57,610 --> 00:07:56,480
conductance fMRI heart rate EEG this

169
00:08:00,190 --> 00:07:57,620
what I'm going to talk about now is

170
00:08:02,530 --> 00:08:00,200
pupil dilation of these experiments I

171
00:08:04,930 --> 00:08:02,540
think only two went in the non predicted

172
00:08:07,120 --> 00:08:04,940
direction and 11 are statistically

173
00:08:09,010 --> 00:08:07,130
significant so we haven't done a formal

174
00:08:10,480 --> 00:08:09,020
meta-analysis yet but if we do one it's

175
00:08:15,280 --> 00:08:10,490
going to be a whopping ly significant

176
00:08:17,200 --> 00:08:15,290
effect so presenting and pupil dilation

177
00:08:19,300 --> 00:08:17,210
the reason I got interested in this is

178
00:08:21,760 --> 00:08:19,310
because the pupil is a very interesting

179
00:08:23,350 --> 00:08:21,770
target to use it shows a balance between

180
00:08:26,140 --> 00:08:23,360
the sympathetic and the parasympathetic

181
00:08:27,880 --> 00:08:26,150
nervous system you can also tell you can

182
00:08:29,620 --> 00:08:27,890
infer all kinds of interesting things by

183
00:08:32,409 --> 00:08:29,630
where the eye is looking and also by how

184
00:08:34,570 --> 00:08:32,419
often you blink an addition allows us to

185
00:08:37,209 --> 00:08:34,580
look more poetically at this idea of

186
00:08:39,310 --> 00:08:37,219
what does the C or C when you're seeing

187
00:08:41,770 --> 00:08:39,320
something especially you're seeing it in

188
00:08:44,260 --> 00:08:41,780

the future well what is that so it

189
00:08:47,320 --> 00:08:44,270
allowed us to do a test of that sort so

190
00:08:49,360 --> 00:08:47,330
here is a Celeste sitting in the eye

191
00:08:52,810 --> 00:08:49,370
tracker there's a little camera over

192
00:08:54,940 --> 00:08:52,820
here that's looking at awry but the

193
00:08:57,460 --> 00:08:54,950
experimenter QC is a close-up of her

194
00:08:59,200 --> 00:08:57,470
pupil with the software or the firmware

195
00:09:01,150 --> 00:08:59,210
actually will detect where her pupil is

196
00:09:03,250 --> 00:09:01,160
and 60 times a second measure how big it

197
00:09:05,350 --> 00:09:03,260
is and also put crosshairs over where

198
00:09:06,550 --> 00:09:05,360
her eye is looking so on the top I can

199
00:09:08,620 --> 00:09:06,560
see what she's looking at in the

200
00:09:13,780 --> 00:09:08,630
crosshairs tell me exactly where in that

201
00:09:16,060 --> 00:09:13,790
picture she's looking so what we get

202
00:09:19,390 --> 00:09:16,070
then is this section is before the

203
00:09:20,680 --> 00:09:19,400
stimulus appears and this section is

204
00:09:24,250 --> 00:09:20,690
during the stimulus I don't know why

205
00:09:26,350 --> 00:09:24,260
these little esas drop down this that

206
00:09:28,270 --> 00:09:26,360
this curve corresponds to emotional

207
00:09:30,850 --> 00:09:28,280
pictures and this curve to calm pictures

208
00:09:32,470 --> 00:09:30,860
and that difference is the presentment

209
00:09:34,150 --> 00:09:32,480
difference that we're looking for so I

210
00:09:35,500 --> 00:09:34,160
expected to see this because it's

211
00:09:38,410 --> 00:09:35,510
basically the same as using skin

212
00:09:40,030 --> 00:09:38,420
conductance but now that we got a

213
00:09:43,870 --> 00:09:40,040

significant effect it allowed me to look

214
00:09:46,960 --> 00:09:43,880
at some other things for example people

215
00:09:48,310 --> 00:09:46,970
blink more before seeing an emotional

216
00:09:50,230 --> 00:09:48,320
picture than before seeing a calm

217
00:09:51,550 --> 00:09:50,240
picture the way you infer this

218
00:09:53,829 --> 00:09:51,560
the night racking system is when your

219
00:09:56,079 --> 00:09:53,839
eye is closed you lose data about the

220
00:09:59,019 --> 00:09:56,089
pupil and so every time you guys closed