



Figure 1. A 5x5 grid of 25 small, dark, rectangular objects, possibly seeds or small stones, arranged in five rows and five columns. The objects are set against a light background. The grid is framed by a thin black border. On the right side, there is a vertical scale bar with markings and a small black arrow pointing downwards. The scale bar has the number '10' at the top and '0' at the bottom, with intermediate markings at 2, 4, 6, and 8. The objects are arranged in a regular pattern, with one object in the center of the grid (row 3, column 3) appearing slightly different in color or texture compared to the others.

1
00:00:07,400 --> 00:00:05,990
is it on okay now time okay okay good

2
00:00:08,990 --> 00:00:07,410
morning everyone I am going to talk

3
00:00:11,240 --> 00:00:09,000
about an EEG experiment with Bill

4
00:00:15,530 --> 00:00:11,250
Bankston and I'm going to jump right

5
00:00:17,000 --> 00:00:15,540
into the data there's a lot to say I'm

6
00:00:19,700 --> 00:00:17,010
going to skip right through here here's

7
00:00:21,890 --> 00:00:19,710
the basic design of the experiment early

8
00:00:24,140 --> 00:00:21,900
on I took a look at the data and I

9
00:00:26,900 --> 00:00:24,150
started taking interest in this one

10
00:00:28,820 --> 00:00:26,910
right here I started digging into it and

11
00:00:30,800 --> 00:00:28,830
even though there are a lot of different

12
00:00:33,620 --> 00:00:30,810
interesting aspects of the data I took a

13
00:00:34,790 --> 00:00:33,630

look at one aspect and so that's what

14

00:00:36,260 --> 00:00:34,800

we're gonna be looking at today that's

15

00:00:37,970 --> 00:00:36,270

that's what's been done so far and if

16

00:00:42,500 --> 00:00:37,980

that seems a little incomplete to you

17

00:00:44,270 --> 00:00:42,510

that's because it is but that's but

18

00:00:45,709 --> 00:00:44,280

that's what we have so far and so I'm

19

00:00:47,779 --> 00:00:45,719

going to tell you what's been done how

20

00:00:53,299 --> 00:00:47,789

it's been done and some of the curious

21

00:00:55,310 --> 00:00:53,309

data that's resulted from it here is the

22

00:00:57,709 --> 00:00:55,320

montage for those who know and care

23

00:00:59,330 --> 00:00:57,719

about such things for the rest of you

24

00:01:01,700 --> 00:00:59,340

just take a look at the placement of

25

00:01:03,830 --> 00:01:01,710

those electrodes are going to be the

26
00:01:07,640 --> 00:01:03,840
same placements as when we look at a

27
00:01:10,730 --> 00:01:07,650
spectral display and here's bills

28
00:01:12,320 --> 00:01:10,740
baseline of his eyes open right before

29
00:01:15,289 --> 00:01:12,330
he is doing the healing sessions and

30
00:01:16,730 --> 00:01:15,299
just just just glanced at it we're going

31
00:01:17,960 --> 00:01:16,740
to be looking at the back of the head

32
00:01:19,820 --> 00:01:17,970
primarily and we're going to be looking

33
00:01:22,730 --> 00:01:19,830
around eight Hertz and that would be

34
00:01:24,770 --> 00:01:22,740
right here if there's only one spectral

35
00:01:26,719 --> 00:01:24,780
display or only one box showing it's

36
00:01:31,130 --> 00:01:26,729
going to be this P Z location in the

37
00:01:33,170 --> 00:01:31,140
back of the head in the center so that's

38
00:01:35,289 --> 00:01:33,180

eyes open and that's relevant because he

39

00:01:37,850 --> 00:01:35,299

did his healings with his eyes open and

40

00:01:41,450 --> 00:01:37,860

yet it looks a lot more like eyes closed

41

00:01:44,210 --> 00:01:41,460

and here here's a session that we're

42

00:01:45,770 --> 00:01:44,220

going to be focusing on and that's a lot

43

00:01:49,130 --> 00:01:45,780

more like eyes closed and that has very

44

00:01:51,499 --> 00:01:49,140

big waves in the back of his head the

45

00:01:55,060 --> 00:01:51,509

difference being that the frequency is

46

00:01:57,230 --> 00:01:55,070

lower and the amplitude is higher

47

00:01:59,810 --> 00:01:57,240

another thing that's interesting to note

48

00:02:02,090 --> 00:01:59,820

is that this peak right here is the same

49

00:02:04,130 --> 00:02:02,100

and is reflected on the right back side

50

00:02:06,260 --> 00:02:04,140

of the head whereas the other peak is

51
00:02:07,580 --> 00:02:06,270
more reflected on the left and this is a

52
00:02:10,759 --> 00:02:07,590
little deceptive here

53
00:02:15,440 --> 00:02:10,769
this does Twin Peaks because in most of

54
00:02:17,119 --> 00:02:15,450
the time the left is dominating on the

55
00:02:18,979 --> 00:02:17,129
higher frequency and it's just the

56
00:02:22,699 --> 00:02:18,989
occasional bursts that bring up that

57
00:02:26,539 --> 00:02:22,709
second lower peak okay here's the data

58
00:02:27,860 --> 00:02:26,549
set itself this blue right here

59
00:02:32,030 --> 00:02:27,870
indicates that we're going to we're

60
00:02:33,470 --> 00:02:32,040
going to erase this section of data from

61
00:02:35,660 --> 00:02:33,480
a spectral analysis if we were going to

62
00:02:38,780 --> 00:02:35,670
analyze this whole this whole set here

63
00:02:40,160 --> 00:02:38,790

and these waves right here correspond to

64

00:02:42,140 --> 00:02:40,170

those big spikes were looking at earlier

65

00:02:45,410 --> 00:02:42,150

so these are these big waves in the back

66

00:02:47,030 --> 00:02:45,420

of the head so here would be a selection

67

00:02:48,729 --> 00:02:47,040

of data and this is how I started

68

00:02:51,440 --> 00:02:48,739

looking at it I just started looking at

69

00:02:54,080 --> 00:02:51,450

snapshots like this here's a second and

70

00:02:56,240 --> 00:02:54,090

a half of data and then when I bring up

71

00:02:59,150 --> 00:02:56,250

a spectral analysis I'll see a peak like

72

00:03:01,729 --> 00:02:59,160

this and did this many times just just

73

00:03:03,319 --> 00:03:01,739

looking around and when I went up with

74

00:03:05,809 --> 00:03:03,329

my mouse over the top of that peak the

75

00:03:08,930 --> 00:03:05,819

software will tell me what frequency it

76
00:03:11,840 --> 00:03:08,940
is and here comes up 7.81 and I did this

77
00:03:14,720 --> 00:03:11,850
many times I would see I would see a

78
00:03:16,400 --> 00:03:14,730
little one second bursts of these or

79
00:03:18,470 --> 00:03:16,410
even half second verse of these and then

80
00:03:23,420 --> 00:03:18,480
I would surround it and it would keep

81
00:03:25,069 --> 00:03:23,430
coming up 7.81 and that number seemed

82
00:03:27,620 --> 00:03:25,079
familiar to me and I just like what is

83
00:03:29,330 --> 00:03:27,630
going on with that number and then and

84
00:03:31,580 --> 00:03:29,340
then I stopped looking at the power

85
00:03:32,900 --> 00:03:31,590
spectra which which squares all the

86
00:03:34,819 --> 00:03:32,910
amplitudes and just started looking at

87
00:03:36,289 --> 00:03:34,829
straight amplitude then it started

88
00:03:39,319 --> 00:03:36,299

seeing secondary peaks and started

89

00:03:40,789 --> 00:03:39,329

measuring what those were and so then

90

00:03:45,830 --> 00:03:40,799

the pattern emerged that it would be

91

00:03:47,599 --> 00:03:45,840

7.81 and 15.6 too and it didn't take me

92

00:03:52,500 --> 00:03:47,609

long to realize that was an exact double

93

00:03:56,130 --> 00:03:52,510

and so yeah thnkx my math fantastic

94

00:03:58,530 --> 00:03:56,140

so so I kept seeing that pattern and and

95

00:04:00,390 --> 00:03:58,540

I I couldn't remember from years ago

96

00:04:02,910 --> 00:04:00,400

when I worked at a biofeedback clinic I

97

00:04:04,470 --> 00:04:02,920

could remember anything about EEG

98

00:04:07,050 --> 00:04:04,480

harmonics I couldn't remember anything

99

00:04:08,640 --> 00:04:07,060

about alpha harmonics I googled it I

100

00:04:10,890 --> 00:04:08,650

looked in books I hope I picked up the

101
00:04:12,330 --> 00:04:10,900
phone I didn't see anything but i just

102
00:04:14,580 --> 00:04:12,340
thought i took a note of it and i kept

103
00:04:20,340 --> 00:04:14,590
looking for it until i saw this one

104
00:04:23,879 --> 00:04:20,350
there's one double triple okay i think

105
00:04:26,189 --> 00:04:23,889
there's something here so i looked at

106
00:04:28,350 --> 00:04:26,199
this and and I got a little bit excited

107
00:04:31,230 --> 00:04:28,360
and then I said you know I think I know

108
00:04:33,900 --> 00:04:31,240
what 7.81 reminds me of it it's a

109
00:04:37,020 --> 00:04:33,910
Schumann frequency it's the it's the

110
00:04:39,990 --> 00:04:37,030
frequency of the earth so here it looks

111
00:04:42,779 --> 00:04:40,000
like bill is doing harmonics on the

112
00:04:47,070 --> 00:04:42,789
frequency of Earth that might be

113
00:04:48,750 --> 00:04:47,080

important so so ever since that day

114

00:04:50,010 --> 00:04:48,760

there's it's almost as if there's this

115

00:04:51,450 --> 00:04:50,020

guy named Schumann that's kind of

116

00:04:57,240 --> 00:04:51,460

hanging over my shoulder watching me

117

00:04:59,760 --> 00:04:57,250

work and saying is this about me so I

118

00:05:00,810 --> 00:04:59,770

knew I needed more data oh and and I

119

00:05:02,219 --> 00:05:00,820

didn't really get that excited

120

00:05:03,839 --> 00:05:02,229

intelligent the by spectra because

121

00:05:05,310 --> 00:05:03,849

that's what that's the tool Jay said

122

00:05:06,870 --> 00:05:05,320

well you're going to look at the by

123

00:05:08,629 --> 00:05:06,880

Spector and I didn't know what he had in

124

00:05:10,830 --> 00:05:08,639

mind but this is what he had in mind and

125

00:05:12,540 --> 00:05:10,840

so I wanted to know if those frequencies

126
00:05:15,930 --> 00:05:12,550
were really happening at the same time

127
00:05:19,890 --> 00:05:15,940
is it really like a bell and and here it

128
00:05:22,890 --> 00:05:19,900
is you can see 7.81 15.6 three I think

129
00:05:25,950 --> 00:05:22,900
it's 23.4 for you can see one two three

130
00:05:28,050 --> 00:05:25,960
lines there and then I think then I

131
00:05:30,089 --> 00:05:28,060
started to wonder well are they really

132
00:05:32,730 --> 00:05:30,099
happening in the same place or is this

133
00:05:35,399 --> 00:05:32,740
being reflected from somewhere else so I

134
00:05:37,770 --> 00:05:35,409
map that out and then they are right on

135
00:05:41,189 --> 00:05:37,780
top of each other and the highest

136
00:05:42,689 --> 00:05:41,199
amplitude in the same place so then I'm

137
00:05:44,370 --> 00:05:42,699
really wanting to get back to the data

138
00:05:47,850 --> 00:05:44,380

and I'm going to want to isolate all

139

00:05:50,370 --> 00:05:47,860

those little bits and and get at that

140

00:05:54,089 --> 00:05:50,380

and the software doesn't really allow me

141

00:05:55,890 --> 00:05:54,099

to do that in any sensible way and I

142

00:05:58,260 --> 00:05:55,900

keep banging at it and have them all

143

00:06:01,610 --> 00:05:58,270

kinds of bad ideas and then I start

144

00:06:05,140 --> 00:06:01,620

staring into space on this question and

145

00:06:07,300 --> 00:06:05,150

two days later I come up with an answer

146

00:06:12,820 --> 00:06:07,310

and I realize there's an export button I

147

00:06:14,290 --> 00:06:12,830

can put it into Excel and you know so

148

00:06:18,040 --> 00:06:14,300

what if it's a half a million rows I've

149

00:06:20,560 --> 00:06:18,050

got a newish computer and I can put my

150

00:06:23,620 --> 00:06:20,570

funny little formulas here and ask pz

151
00:06:26,190 --> 00:06:23,630
what kind of how big these waves are and

152
00:06:29,980 --> 00:06:26,200
then assign values in these columns and

153
00:06:32,560 --> 00:06:29,990
then pour that data back into my EEG

154
00:06:34,210 --> 00:06:32,570
software and tell the EEG software that

155
00:06:37,270 --> 00:06:34,220
these are a couple anonymous electrodes

156
00:06:38,800 --> 00:06:37,280
and then on that basis I can select the

157
00:06:42,430 --> 00:06:38,810
data that i want to see here the big

158
00:06:45,460 --> 00:06:42,440
waves are passing through and I can also

159
00:06:47,380 --> 00:06:45,470
do the inverse and see the contrast and

160
00:06:51,160 --> 00:06:47,390
I was pretty excited about myself at

161
00:06:52,540 --> 00:06:51,170
that point and then I look at the data

162
00:06:54,490 --> 00:06:52,550
and sure enough it looks really good

163
00:06:57,190 --> 00:06:54,500

really nice contrast where everything's

164

00:06:59,140 --> 00:06:57,200

great until i realized that it's only

165

00:07:01,660 --> 00:06:59,150

analyzing the really big chunks of data

166

00:07:03,700 --> 00:07:01,670

and its really skipping over most of

167

00:07:07,270 --> 00:07:03,710

most of the sample most of the things

168

00:07:09,100 --> 00:07:07,280

that i want to see so at that point i

169

00:07:15,070 --> 00:07:09,110

stare into space and ask myself a

170

00:07:17,380 --> 00:07:15,080

brand-new question and i come up with an

171

00:07:19,780 --> 00:07:17,390

answer that i was basically almost there

172

00:07:23,800 --> 00:07:19,790

I just needed to do a little bit more

173

00:07:25,630 --> 00:07:23,810

work in Excel and select just the just

174

00:07:28,260 --> 00:07:25,640

the data that I wanted to see or pass in

175

00:07:31,390 --> 00:07:28,270

a zero and from that point I could

176

00:07:34,240 --> 00:07:31,400

create create a file for the EEG that I

177

00:07:35,500 --> 00:07:34,250

could analyze each of these bursts that

178

00:07:38,860 --> 00:07:35,510

comes through individually and

179

00:07:42,640 --> 00:07:38,870

collectively so here I've got 15 of the

180

00:07:45,910 --> 00:07:42,650

most the longest lasting burst let's say

181

00:07:49,180 --> 00:07:45,920

each quarter second was greater than 20

182

00:07:50,920 --> 00:07:49,190

micro volts or something in and so these

183

00:07:52,300 --> 00:07:50,930

15 I took a look at individually and

184

00:07:57,360 --> 00:07:52,310

here we're going to have three views of

185

00:08:00,730 --> 00:07:57,370

all of them so and here's a trade off

186

00:08:02,740 --> 00:08:00,740

the spectral analysis will allow you to

187

00:08:05,650 --> 00:08:02,750

look at one second of data but it will

188

00:08:07,870 --> 00:08:05,660

give you a very poor resolution so I

189

00:08:09,519 --> 00:08:07,880

wanted to know because I've got this

190

00:08:11,529 --> 00:08:09,529

human guy looking over my shoulder I

191

00:08:14,439 --> 00:08:11,539

want to know what that frequency really

192

00:08:16,449 --> 00:08:14,449

is so my trade off is I'm going to have

193

00:08:18,369 --> 00:08:16,459

three seconds of zeros in here to get a

194

00:08:21,279 --> 00:08:18,379

four second analysis to get quarter

195

00:08:23,379 --> 00:08:21,289

second resolution and with that

196

00:08:25,749 --> 00:08:23,389

trade-off is some error so I'm going to

197

00:08:28,479 --> 00:08:25,759

expect some error but i do that knowing

198

00:08:29,949 --> 00:08:28,489

that I've got 15 samples and out of

199

00:08:31,719 --> 00:08:29,959

those at the end I'm going to tell them

200

00:08:34,209 --> 00:08:31,729

up and maybe I'll learn something about

201
00:08:37,860 --> 00:08:34,219
what this frequency is again the

202
00:08:41,379 --> 00:08:37,870
alternative is just always again 7.81

203
00:08:44,650 --> 00:08:41,389
15.6 three so here's one and it comes up

204
00:08:47,470 --> 00:08:44,660
eight point 06 a little higher and this

205
00:08:51,220 --> 00:08:47,480
one has a rounded harmonic and that's

206
00:08:53,980 --> 00:08:51,230
one quarter step quarter hurts away from

207
00:08:55,929 --> 00:08:53,990
a double and given the expected error I

208
00:08:58,749 --> 00:08:55,939
think that is a double and when you look

209
00:09:02,590 --> 00:08:58,759
at the by spectra you can see two nice

210
00:09:07,449 --> 00:09:02,600
lines coming up hey that's the first one

211
00:09:10,840 --> 00:09:07,459
second one is a little bit longer and

212
00:09:14,610 --> 00:09:10,850
again eight point 06 and again nearly on

213
00:09:18,100 --> 00:09:14,620

the double and a nice second line third

214

00:09:24,639 --> 00:09:18,110

one is a seven point eight one and a

215

00:09:25,809 --> 00:09:24,649

nice second line fourth one surprised me

216

00:09:27,819 --> 00:09:25,819

because there's one thing I didn't tell

217

00:09:29,740 --> 00:09:27,829

you about this sample I tried to filter

218

00:09:33,639 --> 00:09:29,750

out anything above 8.3 hurts because

219

00:09:35,259 --> 00:09:33,649

again i had schumann on my mind but but

220

00:09:39,100 --> 00:09:35,269

i tried to filter them out but he was so

221

00:09:41,049 --> 00:09:39,110

strong he came through anyway and he did

222

00:09:45,879 --> 00:09:41,059

have a he does have a little bit of a

223

00:09:48,579 --> 00:09:45,889

second line there this one can't quite

224

00:09:54,429 --> 00:09:48,589

make up his mind on the peak but on the

225

00:09:55,960 --> 00:09:54,439

double it splits the difference and the

