

# Research Protocol

1. The subject explores 40 Hz neurofeedback for 10 minutes.
2. The subject is asked to verbally describe the state associated with 40 Hz.
3. The subject is asked to cultivate a specific state specified by an adjective, and asked to determine, on a scale from -100 to +100, to what extent the adjective is related to the 40 Hz state. 16 different adjectives used.
4. The subject is asked to engage in the "baseline" state—a neutral state of consciousness, without focus or intent. 40 Hz is recorded for 1 min.
5. The subject is asked to produce as high an amplitude of 40 Hz brainwaves as possible in 3 consecutive 10 s periods using neurofeedback.

1  
00:00:05,539 --> 00:00:02,690  
good morning it's my pleasure to be here

2  
00:00:08,330 --> 00:00:05,549  
and today I'm going to speak about an

3  
00:00:11,330 --> 00:00:08,340  
ongoing study it's incomplete on the

4  
00:00:15,259 --> 00:00:11,340  
interrelationship of higher frequencies

5  
00:00:17,599 --> 00:00:15,269  
in the brain and higher states of

6  
00:00:19,609 --> 00:00:17,609  
consciousness and the question is does

7  
00:00:22,210 --> 00:00:19,619  
40 Hertz brainwave emission correlate

8  
00:00:24,349 --> 00:00:22,220  
with higher consciousness

9  
00:00:26,029 --> 00:00:24,359  
there's been a fair amount of work

10  
00:00:28,580 --> 00:00:26,039  
implicating the frontal lobe of the

11  
00:00:31,400 --> 00:00:28,590  
brain that's the the upper cerebral

12  
00:00:33,650 --> 00:00:31,410  
cortex in the front of the head with

13  
00:00:37,430 --> 00:00:33,660

higher consciousness and actually in my

14

00:00:40,780 --> 00:00:37,440

study I'm recording frequencies at 40

15

00:00:43,250 --> 00:00:40,790

Hertz right above the third eye so it's

16

00:00:45,049 --> 00:00:43,260

in the centre of the forehead and it's

17

00:00:48,410 --> 00:00:45,059

interestingly just a very short distance

18

00:00:50,930 --> 00:00:48,420

from a spot that is in the esoteric

19

00:00:55,939 --> 00:00:50,940

literature associated with clairvoyance

20

00:00:59,290 --> 00:00:55,949

etc known as the third eye you probably

21

00:01:03,410 --> 00:00:59,300

know this I'll go over it quickly that

22

00:01:05,479 --> 00:01:03,420

the various bands in the EEG have been

23

00:01:08,359 --> 00:01:05,489

correlated functionally for example the

24

00:01:11,960 --> 00:01:08,369

slowest waves Delta 0 to 4 Hertz with

25

00:01:15,109 --> 00:01:11,970

deep dreamless sleep theta waves 4 to 7

26  
00:01:17,749 --> 00:01:15,119  
Hertz with dreams a sort of reverie and

27  
00:01:19,060 --> 00:01:17,759  
also certain paranormal experiences

28  
00:01:22,570 --> 00:01:19,070  
including out of the body

29  
00:01:26,810 --> 00:01:22,580  
alpha is sort of the baseline alert

30  
00:01:30,020 --> 00:01:26,820  
relaxed state 7 to 12 Hertz beta is the

31  
00:01:34,069 --> 00:01:30,030  
act of concentration 13 to 35 Hertz and

32  
00:01:36,319 --> 00:01:34,079  
then we have a gamma band beyond that 35

33  
00:01:38,480 --> 00:01:36,329  
to 50 Hertz and actually there may be

34  
00:01:39,679 --> 00:01:38,490  
even higher emissions from the brain the

35  
00:01:41,469 --> 00:01:39,689  
question the point is that people

36  
00:01:45,020 --> 00:01:41,479  
haven't looked until relatively recently

37  
00:01:46,429 --> 00:01:45,030  
because their analog recorders weren't

38  
00:01:48,859 --> 00:01:46,439

fast enough to record these high

39

00:01:51,050 --> 00:01:48,869

frequencies so only in the digital age

40

00:01:52,760 --> 00:01:51,060

have we been able to really see the high

41

00:01:55,639 --> 00:01:52,770

frequency emission from the brain and

42

00:02:00,289 --> 00:01:55,649

consequently the literature in this area

43

00:02:02,420 --> 00:02:00,299

is way behind just to give you a summary

44

00:02:05,060 --> 00:02:02,430

of what has been done here people

45

00:02:07,490 --> 00:02:05,070

looking at practices such as yoga

46

00:02:10,430 --> 00:02:07,500

meditation and other mind/body/spirit

47

00:02:11,660 --> 00:02:10,440

practices find up to 20% more activity

48

00:02:13,520 --> 00:02:11,670

in the EEG

49

00:02:15,110 --> 00:02:13,530

coming out of the frontal lobe

50

00:02:16,699 --> 00:02:15,120

there are a few studies on yoga and

51  
00:02:20,030 --> 00:02:16,709  
meditation but not very many that

52  
00:02:21,830 --> 00:02:20,040  
suggests an association of 40 Hertz from

53  
00:02:24,440 --> 00:02:21,840  
the frontal lobe with clarity and

54  
00:02:26,270 --> 00:02:24,450  
compassion so in particular meditations

55  
00:02:28,309 --> 00:02:26,280  
for example certain Buddhist meditations

56  
00:02:30,400 --> 00:02:28,319  
in the lineage of the Dalai Lama in

57  
00:02:32,960 --> 00:02:30,410  
particular have been studied with that

58  
00:02:35,780 --> 00:02:32,970  
couple of recent studies again on

59  
00:02:39,050 --> 00:02:35,790  
Buddhist meditation there was a study by

60  
00:02:42,320 --> 00:02:39,060  
Lutz at all published in 2004 showing

61  
00:02:45,229 --> 00:02:42,330  
increases in that band the gamma band

62  
00:02:46,910 --> 00:02:45,239  
and high beta at the prefrontal location

63  
00:02:49,009 --> 00:02:46,920

during meditations where they were

64

00:02:51,590 --> 00:02:49,019

trying to enhance unconditional love and

65

00:02:54,820 --> 00:02:51,600

compassion and another studies showed

66

00:02:57,410 --> 00:02:54,830

even more detail correlations between

67

00:02:59,960 --> 00:02:57,420

amplitudes of 40 Hertz recorded from

68

00:03:02,150 --> 00:02:59,970

this site and a reported clarity of

69

00:03:04,330 --> 00:03:02,160

meditation on a moment-to-moment basis

70

00:03:08,030 --> 00:03:04,340

and that was published by Davidson in

71

00:03:11,390 --> 00:03:08,040

2005 here is a little bit of data from

72

00:03:12,890 --> 00:03:11,400

the data Davidson paper controls shown

73

00:03:15,290 --> 00:03:12,900

in the left hand side of people who are

74

00:03:17,960 --> 00:03:15,300

non meditators and this is the percent

75

00:03:22,250 --> 00:03:17,970

more 40 Hertz from the prefrontal region

76  
00:03:25,610 --> 00:03:22,260  
during baseline etc they can't make much

77  
00:03:27,229 --> 00:03:25,620  
more than just a few percent over

78  
00:03:30,800 --> 00:03:27,239  
baseline whereas the meditation

79  
00:03:32,810 --> 00:03:30,810  
practitioners make highly significantly

80  
00:03:35,840 --> 00:03:32,820  
more above baseline furthermore

81  
00:03:38,270 --> 00:03:35,850  
meditators have a higher baseline of 40

82  
00:03:40,039 --> 00:03:38,280  
Hertz as well as during meditation and

83  
00:03:43,970 --> 00:03:40,049  
post meditation they don't return to

84  
00:03:46,190 --> 00:03:43,980  
their normal baseline as quickly another

85  
00:03:49,039 --> 00:03:46,200  
key function however of 40 Hertz goes

86  
00:03:53,900 --> 00:03:49,049  
beyond higher brain functions it seems

87  
00:03:55,759 --> 00:03:53,910  
to have what we call a more important

88  
00:03:57,319 --> 00:03:55,769

role in the brain associated with

89  
00:03:59,870 --> 00:03:57,329  
heightened awareness some have called it

90  
00:04:02,330 --> 00:03:59,880  
the events binding rhythm in response to

91  
00:04:05,780 --> 00:04:02,340  
meaningful stimuli so for example when

92  
00:04:08,240 --> 00:04:05,790  
you are seeing hearing and feeling the

93  
00:04:11,060 --> 00:04:08,250  
presence of a UFO 40 Hertz brainwaves

94  
00:04:13,460 --> 00:04:11,070  
are being produced and Benjamin Libet

95  
00:04:15,560 --> 00:04:13,470  
found that increase in 40 Hertz precedes

96  
00:04:18,140 --> 00:04:15,570  
the awareness of a perception by about

97  
00:04:19,819 --> 00:04:18,150  
half a second Francis Crick who did a

98  
00:04:22,730 --> 00:04:19,829  
lot of work in neuroscience after his

99  
00:04:24,469 --> 00:04:22,740  
work on DNA called 40 Hertz the neural

100  
00:04:27,200 --> 00:04:24,479  
correlate of consciousness in the

101  
00:04:31,010 --> 00:04:27,210  
literature it's abbreviated NCC

102  
00:04:32,659 --> 00:04:31,020  
I conducted a pilot study which is still

103  
00:04:34,279 --> 00:04:32,669  
in progress looking at the functional

104  
00:04:36,409 --> 00:04:34,289  
significance of 40 Hertz from the

105  
00:04:38,749 --> 00:04:36,419  
prefrontal region and here are my three

106  
00:04:42,140 --> 00:04:38,759  
research questions what is the perceived

107  
00:04:44,210 --> 00:04:42,150  
interstate during 40 Hertz emission do

108  
00:04:46,490 --> 00:04:44,220  
meditators produce more 40 Hertz and

109  
00:04:47,360 --> 00:04:46,500  
non-meditators at baseline and with

110  
00:04:50,420 --> 00:04:47,370  
neurofeedback

111  
00:04:53,180 --> 00:04:50,430  
which supports feedback particularly at

112  
00:04:54,800 --> 00:04:53,190  
40 Hertz and then I have one case to

113  
00:04:57,379 --> 00:04:54,810

show you on the effect of taking an

114

00:04:59,029 --> 00:04:57,389

entheogen salvia divinorum and the

115

00:05:01,909 --> 00:04:59,039

effect on 40 Hertz brain waves from

116

00:05:05,450 --> 00:05:01,919

prefrontal region the subjects in the

117

00:05:07,850 --> 00:05:05,460

meditation experiment were 10 of them so

118

00:05:10,700 --> 00:05:07,860

far I hope to increase that meditators

119

00:05:16,400 --> 00:05:10,710

and non-meditators ranging from 31 to 62

120

00:05:18,170 --> 00:05:16,410

years old 7 women 3 men the inclusion

121

00:05:20,060 --> 00:05:18,180

and exclusion criteria were such that I

122

00:05:22,580 --> 00:05:20,070

took people who are not ill neither

123

00:05:24,770 --> 00:05:22,590

acute or chronic diseases and with no

124

00:05:27,439 --> 00:05:24,780

diagnosed cognitive problems or issues

125

00:05:30,909 --> 00:05:27,449

the meditators were fairly advanced

126

00:05:34,460 --> 00:05:30,919

practicing at least 5 to 6 times a week

127

00:05:36,320 --> 00:05:34,470

for 10 plus years and I have two of the

128

00:05:39,920 --> 00:05:36,330

meditators in my study were over 20 year

129

00:05:41,240 --> 00:05:39,930

meditators and I it we did record their

130

00:05:44,749 --> 00:05:41,250

practices there were a variety of

131

00:05:46,520 --> 00:05:44,759

practices from zhen de Vaca sauna and

132

00:05:49,219 --> 00:05:46,530

the third i think is a transcendental

133

00:05:50,990 --> 00:05:49,229

meditative though the protocol was as

134

00:05:52,879 --> 00:05:51,000

follows the subjects came in one at a

135

00:05:56,480 --> 00:05:52,889

time on appointments for about an hour

136

00:05:57,350 --> 00:05:56,490

and first they were exploring the 40

137

00:05:59,330 --> 00:05:57,360

Hertz neurofeedback

138

00:06:02,120 --> 00:05:59,340

on their own for 10 minutes to just see

139

00:06:03,469 --> 00:06:02,130

what they thought about it in terms of

140

00:06:06,200 --> 00:06:03,479

whether they could increase

141

00:06:07,999 --> 00:06:06,210

40 Hertz production and and notice what

142

00:06:10,670 --> 00:06:08,009

states were associated with that and

143

00:06:13,040 --> 00:06:10,680

after they did this for 10 minutes i

144

00:06:15,950 --> 00:06:13,050

asked him to verbally describe the state

145

00:06:18,860 --> 00:06:15,960

associated with enhanced peaks of 40

146

00:06:21,230 --> 00:06:18,870

Hertz and we took down their responses

147

00:06:23,120 --> 00:06:21,240

as qualitative data then I asked the

148

00:06:25,430 --> 00:06:23,130

subject to cultivate a specific state

149

00:06:27,670 --> 00:06:25,440

specified by an adjective for example

150

00:06:31,430 --> 00:06:27,680

the word satisfied or the word

151  
00:06:34,100 --> 00:06:31,440  
disappointed and asked them to determine

152  
00:06:37,550 --> 00:06:34,110  
and give me a value on a scale between

153  
00:06:40,189 --> 00:06:37,560  
minus 100 to plus 100 to what extent

154  
00:06:40,730 --> 00:06:40,199  
that state was related to the 40 Hertz

155  
00:06:43,840 --> 00:06:40,740  
state

156  
00:06:46,760 --> 00:06:43,850  
and we used 16 different adjectives

157  
00:06:48,560 --> 00:06:46,770  
forth the subject was asked to engage in

158  
00:06:50,690 --> 00:06:48,570  
a baseline state which is a neutral

159  
00:06:53,420 --> 00:06:50,700  
state of consciousness without focus or

160  
00:06:56,930 --> 00:06:53,430  
intent and I recorded 40 Hertz for one

161  
00:06:59,000 --> 00:06:56,940  
minute and finally after the subject had

162  
00:07:00,980 --> 00:06:59,010  
all of this experience that toward the

163  
00:07:03,770 --> 00:07:00,990

end of the hour I asked the subject to

164

00:07:06,740 --> 00:07:03,780

try to produce as high a value of our

165

00:07:09,290 --> 00:07:06,750

amplitude of 40 Hertz in three

166

00:07:11,290 --> 00:07:09,300

consecutive 10-second periods using the

167

00:07:14,510 --> 00:07:11,300

neurofeedback which was either

168

00:07:16,270 --> 00:07:14,520

audio-visual or both so they could

169

00:07:18,110 --> 00:07:16,280

meditate or do as they wish

170

00:07:19,430 --> 00:07:18,120

neurofeedback in case you're not

171

00:07:22,340 --> 00:07:19,440

familiar with it as a type of

172

00:07:25,160 --> 00:07:22,350

biofeedback in which a person is fed

173

00:07:28,070 --> 00:07:25,170

back some information about their own

174

00:07:31,460 --> 00:07:28,080

brain waves in a real sensory mode using

175

00:07:33,110 --> 00:07:31,470

auditory or visual means or both and the

176

00:07:35,450 --> 00:07:33,120

purpose of this is to allow them to

177

00:07:38,780 --> 00:07:35,460

change or shift their brain waves shift

178

00:07:40,460 --> 00:07:38,790

their function it's used in research as

179

00:07:42,410 --> 00:07:40,470

well as in the clinic for learning

180

00:07:44,780 --> 00:07:42,420

disorders mood disorders sleeplessness

181

00:07:49,840 --> 00:07:44,790

addictions and other disorders and

182

00:07:52,280 --> 00:07:49,850

conditions typically by psychologists a

183

00:07:53,600 --> 00:07:52,290

particular neurofeedback system that I

184

00:07:55,760 --> 00:07:53,610

use in the study was the peak

185

00:07:58,340 --> 00:07:55,770

achievement trainer by neuro tech it

186

00:08:00,530 --> 00:07:58,350

records 40 Hertz and other brainwaves

187

00:08:03,560 --> 00:08:00,540

from a single point in the center of the

188

00:08:06,110 --> 00:08:03,570

forehead while filtering out EMG I

189

00:08:08,000 --> 00:08:06,120

should point out that a lot of people

190

00:08:09,440 --> 00:08:08,010

have not recorded 40 Hertz and higher

191

00:08:11,440 --> 00:08:09,450

frequencies from the brain because

192

00:08:14,360 --> 00:08:11,450

they're concerned about potential

193

00:08:16,100 --> 00:08:14,370

contamination from muscle tension and

194

00:08:19,100 --> 00:08:16,110

twitching because there is some overlap

195

00:08:23,150 --> 00:08:19,110

at high frequencies but this system does

196

00:08:25,460 --> 00:08:23,160

filter out EMG the system further

197

00:08:26,960 --> 00:08:25,470

integrates the signals from both

198

00:08:29,030 --> 00:08:26,970

hemispheres as we're recording in the

199

00:08:31,220 --> 00:08:29,040

center to measure synchrony between the

200

00:08:33,530 --> 00:08:31,230

hemispheres and it provides both

201  
00:08:35,960 --> 00:08:33,540  
auditory and visual feedback in its

202  
00:08:38,750 --> 00:08:35,970  
software it prevents eyeblink artifact

203  
00:08:41,350 --> 00:08:38,760  
by using a low frequency filter and not

204  
00:08:43,910 --> 00:08:41,360  
collecting data during eye blink

205  
00:08:46,850 --> 00:08:43,920  
there's a picture of one of the

206  
00:08:49,160 --> 00:08:46,860  
headbands used the band is simply placed

207  
00:08:50,480 --> 00:08:49,170  
around the head and the active recording

208  
00:08:52,970 --> 00:08:50,490  
electrode at the center of the forehead

209  
00:08:54,470 --> 00:08:52,980  
there's a neutral in the ground and it's

210  
00:08:56,449 --> 00:08:54,480  
a wireless system so one could

211  
00:09:02,379 --> 00:08:56,459  
presumably also study people doing

212  
00:09:05,210 --> 00:09:02,389  
various activities even golf the results

213  
00:09:07,160 --> 00:09:05,220

the non-meditators self-assessment at

214

00:09:08,569 --> 00:09:07,170

peak values of 40 Hertz are as follows

215

00:09:10,900 --> 00:09:08,579

these are statements or abstract

216

00:09:13,100 --> 00:09:10,910

abstracted bits from their comments

217

00:09:15,139 --> 00:09:13,110

detachment from myself trust in

218

00:09:17,389 --> 00:09:15,149

something bigger letting something

219

00:09:20,960 --> 00:09:17,399

higher come into my consciousness not

220

00:09:23,329 --> 00:09:20,970

trying from the ego joy and bliss alert

221

00:09:25,850 --> 00:09:23,339

focused on something new being in the

222

00:09:28,220 --> 00:09:25,860

moment warmth from the heart chakra in

223

00:09:30,139 --> 00:09:28,230

the bottom of feet thinking of people I

224

00:09:31,210 --> 00:09:30,149

love including love for those who have

225

00:09:34,220 --> 00:09:31,220

passed on

226

00:09:36,350 --> 00:09:34,230

curiosity enthusiasm novelty of

227

00:09:40,400 --> 00:09:36,360

experience connection with an angelic

228

00:09:42,800 --> 00:09:40,410

realm I should say here's the meditators

229

00:09:45,710 --> 00:09:42,810

the meditators some had these things to

230

00:09:48,350 --> 00:09:45,720

say and for their peak values of 40

231

00:09:51,129 --> 00:09:48,360

Hertz joy clairvoyance a loving feeling

232

00:09:54,259 --> 00:09:51,139

open heart chakra relaxed and calm

233

00:09:56,750 --> 00:09:54,269

receptive a fuzzy feeling feeling close

234

00:09:59,090 --> 00:09:56,760

to the center of the brain pure love