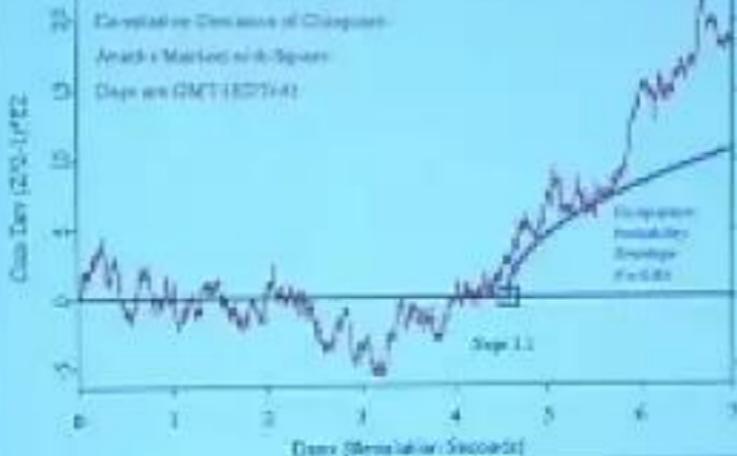September 11 2001
Destruction of the World Trade Towers
A 50-hour trend followed the attacks

Terrorist Attacks Context, Sept 7-13, 2001

1
00:00:07,010 --> 00:00:03,350
we're in a long streak of people who

2
00:00:09,890 --> 00:00:07,020
need no introduction Roger Nelson was at

3
00:00:14,419 --> 00:00:09,900
the pear lab and princeton from 1982

4
00:00:16,760 --> 00:00:14,429
2002 in 1997 he started the global

5
00:00:19,400 --> 00:00:16,770
consciousness project is it forward and

6
00:00:22,370 --> 00:00:19,410
he wants you to know that although he

7
00:00:23,990 --> 00:00:22,380
retired from Princeton in 2002 his wife

8
00:00:25,279 --> 00:00:24,000
claims that he didn't really retire

9
00:00:29,480 --> 00:00:25,289
because of the global consciousness

10
00:00:31,749 --> 00:00:29,490
project so Roger thank you and good

11
00:00:35,870 --> 00:00:31,759
morning or as bob says whatever it is

12
00:00:39,590 --> 00:00:35,880
are these are wonderful long days I want

13
00:00:44,180 --> 00:00:39,600

to talk about basically the what amounts

14
00:00:48,560 --> 00:00:44,190
to hard-edged scientific statistically

15
00:00:52,010 --> 00:00:48,570
based material but i would like to start

16
00:00:54,290 --> 00:00:52,020
by mentioning that this project began

17
00:00:56,540 --> 00:00:54,300
because we were interested in

18
00:00:57,950 --> 00:00:56,550
consciousness we were interested in the

19
00:01:00,470 --> 00:00:57,960
possibility that there is inter

20
00:01:01,880 --> 00:01:00,480
connection among people that there might

21
00:01:03,830 --> 00:01:01,890
even be something that could be

22
00:01:06,469 --> 00:01:03,840
construed as a global consciousness I

23
00:01:08,570 --> 00:01:06,479
won't prove or demonstrate that

24
00:01:12,200 --> 00:01:08,580
necessarily but we have some very

25
00:01:15,200 --> 00:01:12,210
interesting results over time I guess

26
00:01:18,170 --> 00:01:15,210
most importantly I think we're able to

27
00:01:22,060 --> 00:01:18,180
show with clarity that there really is

28
00:01:26,469 --> 00:01:22,070
as gertrude stein said some there there

29
00:01:30,859 --> 00:01:26,479
the odds are of this being just chances

30
00:01:32,600 --> 00:01:30,869
million to one or ten million to one we

31
00:01:34,749 --> 00:01:32,610
have independent measures and they're

32
00:01:38,480 --> 00:01:34,759
correlated they have correlated response

33
00:01:40,460 --> 00:01:38,490
to these events there's some structure

34
00:01:44,210 --> 00:01:40,470
in terms of distance in terms of time

35
00:01:45,760 --> 00:01:44,220
and also in terms of what you might

36
00:01:48,980 --> 00:01:45,770
think of the psychological qualities

37
00:01:51,999 --> 00:01:48,990
there's a lot of structure where there

38
00:01:54,800 --> 00:01:52,009

shouldn't be any this is what the

39
00:01:56,510 --> 00:01:54,810
network looks like inter has spread out

40
00:01:59,179 --> 00:01:56,520
over the world we'll see a lot of

41
00:02:00,920 --> 00:01:59,189
concentration in the US and Europe but

42
00:02:03,350 --> 00:02:00,930
we have tried to get a distribution that

43
00:02:08,300 --> 00:02:03,360
was big enough so we could ask questions

44
00:02:10,820 --> 00:02:08,310
about distance the data flow through the

45
00:02:12,170 --> 00:02:10,830
internet to Princeton and that's what

46
00:02:13,430 --> 00:02:12,180
the data looked like when they are

47
00:02:16,670 --> 00:02:13,440
coming in

48
00:02:19,850 --> 00:02:16,680
we have to do a lot of processing to

49
00:02:22,130 --> 00:02:19,860
make sense or make find out whether

50
00:02:26,090 --> 00:02:22,140
they're in indeed is in any kind of

51
00:02:29,390 --> 00:02:26,100
structure in the data the we look at

52
00:02:33,040 --> 00:02:29,400
each of the devices which we often call

53
00:02:35,360 --> 00:02:33,050
eggs there that's a node in the network

54
00:02:38,360 --> 00:02:35,370
it's a random event generator with

55
00:02:40,280 --> 00:02:38,370
custom software and if we look at them

56
00:02:43,730 --> 00:02:40,290
separately and then calculate an average

57
00:02:45,710 --> 00:02:43,740
of their accumulating deviation over

58
00:02:50,840 --> 00:02:45,720
time it will look something like this

59
00:02:54,950 --> 00:02:50,850
black summary trace and it may looks

60
00:02:59,810 --> 00:02:54,960
like this in our formal experiments we

61
00:03:01,720 --> 00:02:59,820
first define the event we figure out we

62
00:03:04,450 --> 00:03:01,730
decide that there's an interesting event

63
00:03:07,130 --> 00:03:04,460

something that might possibly affect

64
00:03:09,560 --> 00:03:07,140
global consciousness if you will by

65
00:03:12,290 --> 00:03:09,570
because it makes an awful lot of people

66
00:03:15,410 --> 00:03:12,300
feel the same emotions think the same

67
00:03:19,390 --> 00:03:15,420
kind of thoughts so we discover the

68
00:03:22,370 --> 00:03:19,400
event in the news Perhaps and then we

69
00:03:24,560 --> 00:03:22,380
define the beginning and end and extract

70
00:03:27,740 --> 00:03:24,570
the data and do the calculations so the

71
00:03:31,699 --> 00:03:27,750
experiment is done in a hypothesis

72
00:03:34,130 --> 00:03:31,709
testing since we know a ahead of time

73
00:03:38,090 --> 00:03:34,140
without looking at the data which data

74
00:03:40,040 --> 00:03:38,100
we're interested in and we often show

75
00:03:43,840 --> 00:03:40,050
use these kind of figures to plot the

76
00:03:48,080 --> 00:03:43,850
result they're really just a historical

77
00:03:50,750 --> 00:03:48,090
record of the duration of the event but

78
00:03:53,360 --> 00:03:50,760
this point at the end is the point we're

79
00:03:57,380 --> 00:03:53,370
interested in in terms of a bottom-line

80
00:03:58,910 --> 00:03:57,390
statistic for each of the events here I

81
00:04:01,550 --> 00:03:58,920
will just give you two or three examples

82
00:04:05,120 --> 00:04:01,560
and then get on to the kind of analytic

83
00:04:09,170 --> 00:04:05,130
details this is sep tember 11th in the

84
00:04:11,240 --> 00:04:09,180
context of a week of surrounding days so

85
00:04:13,759 --> 00:04:11,250
we if we look at at the our first

86
00:04:15,920 --> 00:04:13,769
prediction really only encompassed four

87
00:04:18,500 --> 00:04:15,930
hours that's the formal prediction and

88
00:04:20,750 --> 00:04:18,510

it was marginally significant it was at

89
00:04:24,680 --> 00:04:20,760
the point 0 2 level or something like

90
00:04:26,660 --> 00:04:24,690
that had we realized the magnitude and

91
00:04:30,890 --> 00:04:26,670
and consciousness space we might have

92
00:04:33,710 --> 00:04:30,900
said let's look at two days that effect

93
00:04:35,990 --> 00:04:33,720
in the data data should look like what

94
00:04:38,870 --> 00:04:36,000
it looks like on the left a kind of

95
00:04:42,500 --> 00:04:38,880
random walk with a level trend and and

96
00:04:45,080 --> 00:04:42,510
of course you see when we examine over a

97
00:04:48,620 --> 00:04:45,090
longer period of time there's a

98
00:04:50,840 --> 00:04:48,630
tremendous persistence in the effect a

99
00:04:52,340 --> 00:04:50,850
big deviation that's apparently

100
00:04:56,150 --> 00:04:52,350
associated with the feelings and

101
00:04:58,100 --> 00:04:56,160
thoughts that people had this one is a

102
00:05:00,620 --> 00:04:58,110
completely different kind of event this

103
00:05:04,040 --> 00:05:00,630
one was a planned and organized

104
00:05:06,290 --> 00:05:04,050
synchronized meditation which we as best

105
00:05:08,690 --> 00:05:06,300
we can tell involved about a half a

106
00:05:10,490 --> 00:05:08,700
million people around the world that's

107
00:05:13,220 --> 00:05:10,500
not a huge number in comparison to what

108
00:05:16,250 --> 00:05:13,230
911 might produce nevertheless there's a

109
00:05:20,120 --> 00:05:16,260
powerful deviation from the expected

110
00:05:22,970 --> 00:05:20,130
level trend another completely different

111
00:05:24,740 --> 00:05:22,980
kind of event new years we've now had

112
00:05:27,260 --> 00:05:24,750
ten new years that we could look at and

113
00:05:30,230 --> 00:05:27,270

the question one of the questions we

114
00:05:33,470 --> 00:05:30,240
asked is does the variability of the

115
00:05:36,800 --> 00:05:33,480
data stay constant or does it decrease

116
00:05:38,270 --> 00:05:36,810
and as you can see a few minutes before

117
00:05:41,240 --> 00:05:38,280
midnight when people are beginning to

118
00:05:44,930 --> 00:05:41,250
think Midnight's coming I am I have to

119
00:05:46,640 --> 00:05:44,940
find my partner so I can get a hug or I

120
00:05:49,940 --> 00:05:46,650
have to get my glass ready so I can

121
00:05:54,020 --> 00:05:49,950
toast the new year and so forth fairly

122
00:05:58,130 --> 00:05:54,030
strong evidence that there's even in an

123
00:06:01,850 --> 00:05:58,140
unimportant event and this coalescence

124
00:06:05,360 --> 00:06:01,860
of large numbers of people in a similar

125
00:06:08,840 --> 00:06:05,370
direction or the same interest can

126
00:06:11,300 --> 00:06:08,850
produce an effect on our random event

127
00:06:14,920 --> 00:06:11,310
generator network this is a picture of

128
00:06:19,460 --> 00:06:14,930
the data over almost ten years there are

129
00:06:20,930 --> 00:06:19,470
250 events and the cumulative even

130
00:06:22,580 --> 00:06:20,940
though sometimes it's backwards

131
00:06:25,970 --> 00:06:22,590
sometimes we're flat sometimes there's

132
00:06:27,740 --> 00:06:25,980
no kind of effect the tendency is for

133
00:06:30,170 --> 00:06:27,750
there to be in effect it's relatively

134
00:06:33,080 --> 00:06:30,180
small but the accumulation over such a

135
00:06:36,290 --> 00:06:33,090
large number of formal trials is highly

136
00:06:38,700 --> 00:06:36,300
significant with a z-score equivalent to

137
00:06:44,570 --> 00:06:38,710
five plus standard

138
00:06:49,050 --> 00:06:44,580

creations million one odds or smaller

139
00:06:50,670 --> 00:06:49,060
the independent statistics are we have

140
00:06:53,970 --> 00:06:50,680
names for them we call one of them

141
00:06:57,210 --> 00:06:53,980
network variance or net net far and a

142
00:06:59,300 --> 00:06:57,220
second one which is called kovar they're

143
00:07:02,940 --> 00:06:59,310
really pair products in one case of

144
00:07:05,000 --> 00:07:02,950
z-scores in the other case of squared c

145
00:07:09,330 --> 00:07:05,010
scores one is more responsive to

146
00:07:14,100 --> 00:07:09,340
distance implications and one more

147
00:07:19,380 --> 00:07:14,110
responsive to temporal interconnections

148
00:07:21,750 --> 00:07:19,390
in the data if we plot those over time

149
00:07:24,990 --> 00:07:21,760
that we see and compare that with the

150
00:07:27,300 --> 00:07:25,000
kind of control data the gray cloud is a

151
00:07:30,110 --> 00:07:27,310
thousand resampling from the database

152
00:07:31,950 --> 00:07:30,120
with the same kind of the same event

153
00:07:34,650 --> 00:07:31,960
definitions except now they're just

154
00:07:37,160 --> 00:07:34,660
randomly pieces of data randomly

155
00:07:40,020 --> 00:07:37,170
extracted that's a kind of background

156
00:07:42,870 --> 00:07:40,030
that we would you expect from truly

157
00:07:44,450 --> 00:07:42,880
random data all three or both of those

158
00:07:47,210 --> 00:07:44,460
measures or a combination of those

159
00:07:49,860 --> 00:07:47,220
independent measures show pretty strong

160
00:07:53,280 --> 00:07:49,870
difference here's another way to look at

161
00:07:56,940 --> 00:07:53,290
the independent measure question we

162
00:08:00,840 --> 00:07:56,950
created a random sample of pseudo events

163
00:08:02,850 --> 00:08:00,850

with a an effect size equivalent to what

164
00:08:05,040 --> 00:08:02,860
we find in a database and that blue

165
00:08:08,570 --> 00:08:05,050
curve shows what happens not

166
00:08:13,470 --> 00:08:08,580
unexpectedly because we've constructed a

167
00:08:16,740 --> 00:08:13,480
powerful large database of small effect

168
00:08:19,770 --> 00:08:16,750
sizes we get a peek z score of seven or

169
00:08:22,080 --> 00:08:19,780
eight standard deviations now the neck

170
00:08:24,530 --> 00:08:22,090
the question is what happens if we on

171
00:08:28,140 --> 00:08:24,540
these pseudo events calculate the same

172
00:08:30,750 --> 00:08:28,150
kind of the same do the same

173
00:08:33,120 --> 00:08:30,760
calculations but now with our covariance

174
00:08:35,820 --> 00:08:33,130
measure and the red tray shows that

175
00:08:38,130 --> 00:08:35,830
there's basically no nothing there this

176
00:08:40,160 --> 00:08:38,140
is a I think of good demonstration of

177
00:08:42,870 --> 00:08:40,170
the true independence of these measures

178
00:08:47,670 --> 00:08:42,880
now going on to some of the other is the

179
00:08:51,330 --> 00:08:47,680
structure we see that if we move the

180
00:08:52,470 --> 00:08:51,340
event from its real time slide it toward

181
00:08:58,310 --> 00:08:52,480
the future toward

182
00:09:02,610 --> 00:08:58,320
past we quickly lose the high high

183
00:09:04,560 --> 00:09:02,620
departure from expectation and and enter

184
00:09:06,120 --> 00:09:04,570
in a kind of random space this also

185
00:09:08,189 --> 00:09:06,130
answers the question that some people

186
00:09:10,319 --> 00:09:08,199
ask aren't there a lot of other spikes

187
00:09:12,870 --> 00:09:10,329
in the database and this in a sense

188
00:09:15,090 --> 00:09:12,880

shows that the spikes associated with

189
00:09:17,970 --> 00:09:15,100
the events that are predefined are

190
00:09:20,850 --> 00:09:17,980
themselves spectacular the correlation

191
00:09:25,079 --> 00:09:20,860
between the two measures is shown in the

192
00:09:27,569 --> 00:09:25,089
right hand figure they both are centered

193
00:09:32,250 --> 00:09:27,579
on the time of the real event and if you

194
00:09:35,660 --> 00:09:32,260
move the event artificially from either

195
00:09:39,810 --> 00:09:35,670
to the future of the past it changes

196
00:09:42,480 --> 00:09:39,820
another version of time structure this

197
00:09:44,819 --> 00:09:42,490
by the way I should I believe was on the

198
00:09:48,930 --> 00:09:44,829
first lie but much of this work is that

199
00:09:51,540 --> 00:09:48,940
is from Peter Bensel who was here at the

200
00:09:55,800 --> 00:09:51,550
SSC meeting and gave a present

201
00:09:58,230 --> 00:09:55,810
presentation last year he in this case