Questions and Explorations Probing the GCP database
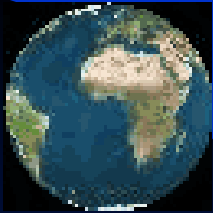
What matters, What doesn't

What questions we can ask

Society for Scientific Exploration
Las Vegas, Nevada, May 2004
Roger Nelson, Princeton, NJ

Global Consciousness Project

5.5 Years of Continuous Data

International collaboration

100 Scientists, Artists, Friends, …

REG technology, Field application

Network of Host Sites around the world

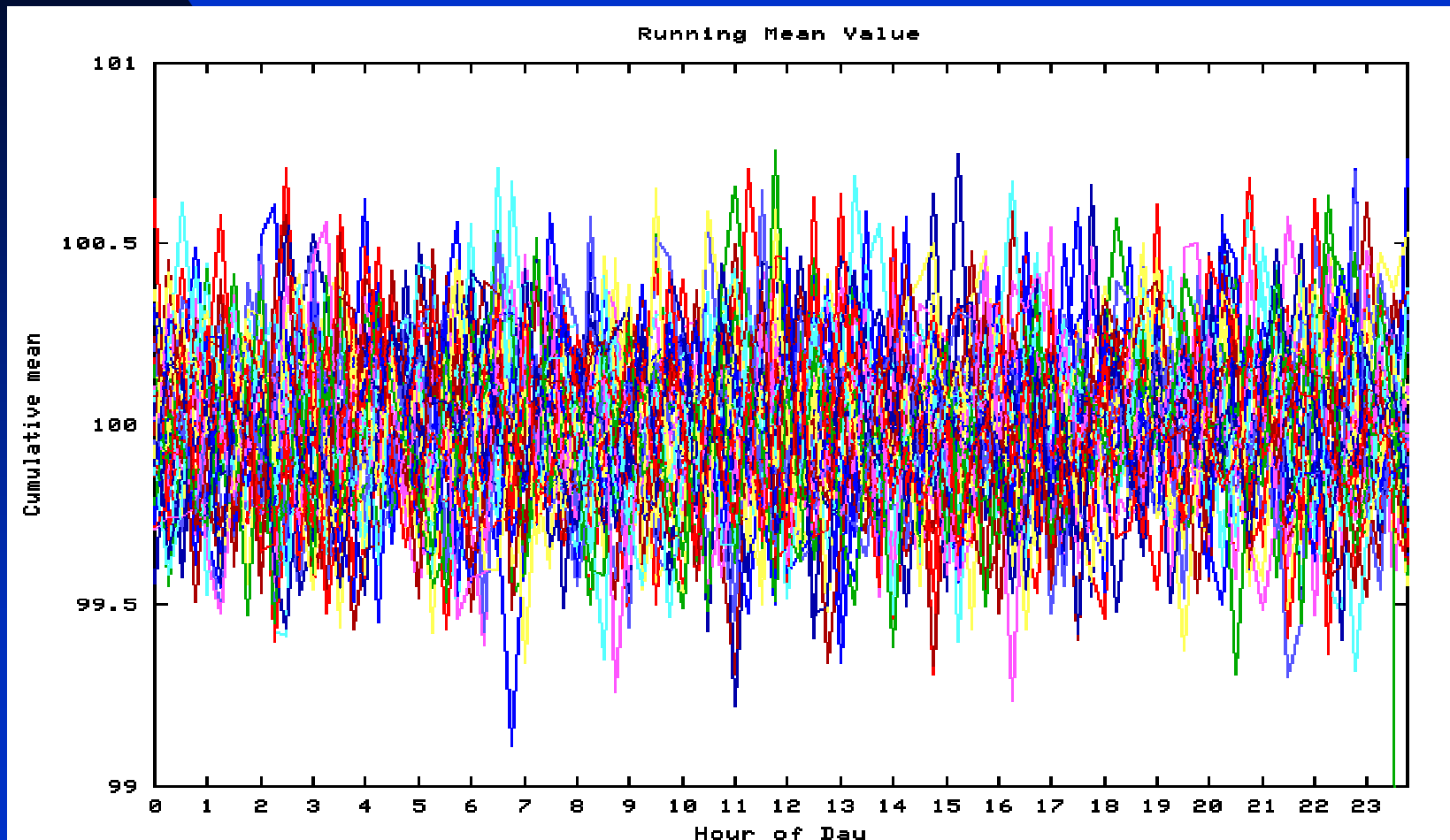Structurally somewhat like an EEG

Call it an ElectroGaiaGram (EGG)

A Worldwide Network of EGGs
(An REG, A Computer, The Internet)

Yellow dots are nodes in the network

Internet Transfer to Data Archive in Princeton
Here are the data for a whole day, from 48 eggs

Continuous Monitor
Look for Changes and Patterns
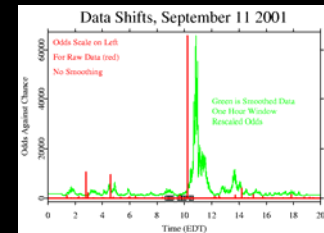## Correlated with Engaging Events

Natural Disasters
Terrible Accidents
Beginnings of War
Grand Celebrations
Political Excitement
Worldwide Meditations
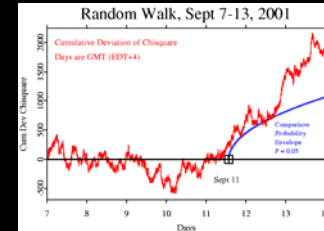
Global Emotion: Transfixed by Tragedy

On September 11 2001, early in the morning, a network of physical random event generators (called "eggs") took on a striking trend. By 8:45 the non-random behavior was unmistakable. It peaked at about 10:30 with odds against chance of a thousand to one. See the red trace below.

Other measures also deviated from expectation on that day, creating an unmistakable pattern where there should be none. The eggs became linked across distance and time in some subtle way that we do not yet know how to explain.
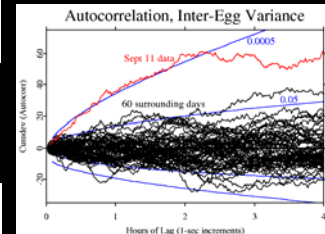
This is not a physical or electromagnetic effect. It's not due to extraordinary mobile phone use, or saturation TV. It appears to be related to our profound engagement.

Data Shifts, September 11 2001

On 9/11 the data showed extraordinary moments

On 9/11 the data contained unique sequential structure

Autocorrelation, Inter-Egg Variance

Random Walk, Sept 7-13, 2001

On 9/11 deviations began that persisted for 2 days

The jagged red line shows three days of a measure (squared cumulative deviation of variance) that represents the composite randomness of 37 eggs.

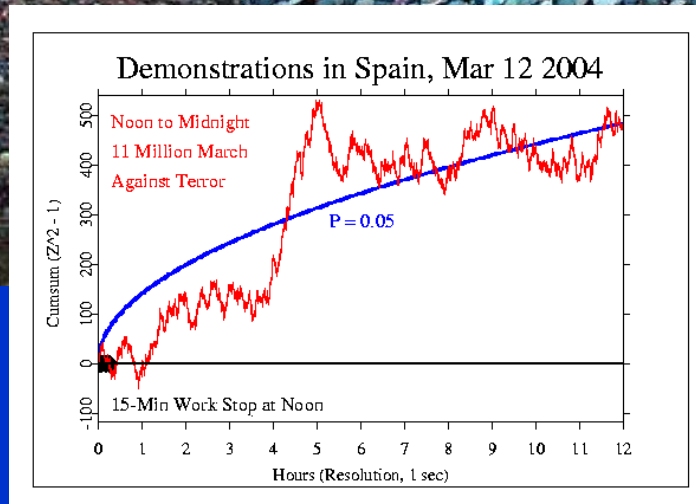On September 11, the data show clear structure where there should be none.

More at http://noosphere.princeton.edu

5:00 am

8:45 am

10:30 am

Normal range of variation
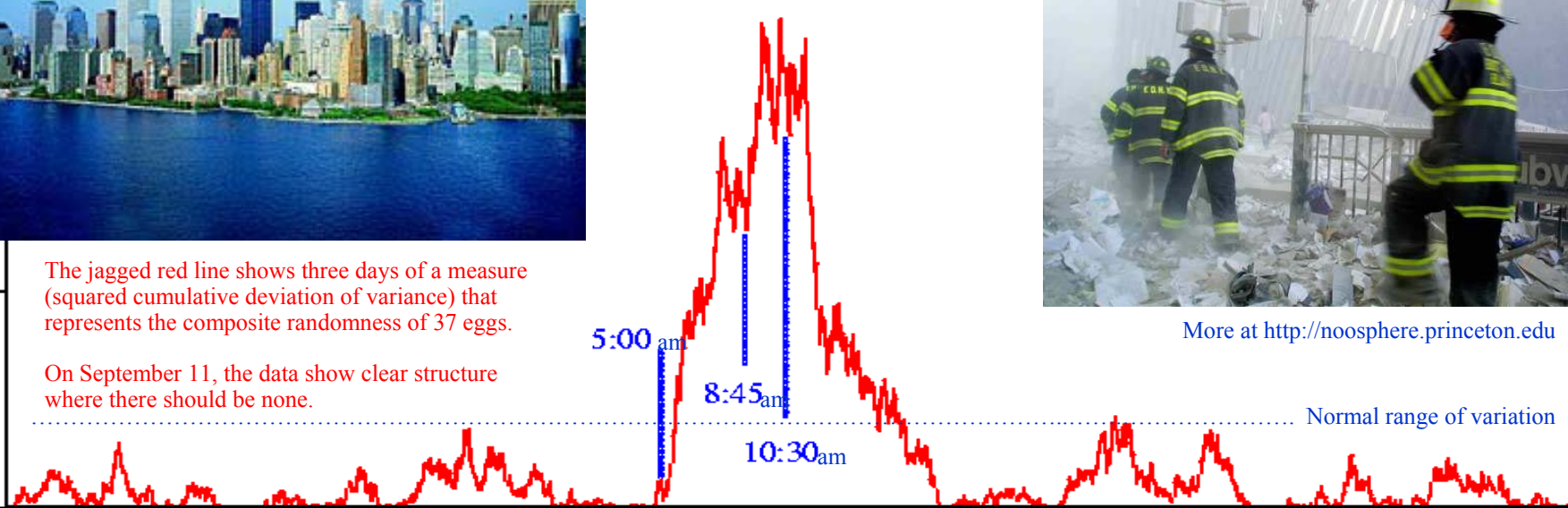
9/10   9/11   9/12

Great Participatory Gatherings
After Terrorist Bombings in Madrid
All of Spain Came Out in Commiseration

Demonstrations in Spain, Mar 12 2004

Noon to Midnight
11 Million March
Against Terror

P = 0.05

15-Min Work Stop at Noon
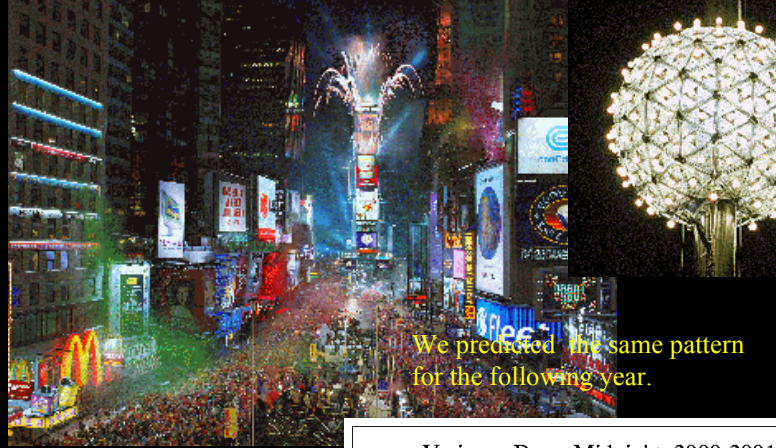
Cumsum (Z^2 - 1)

Hours (Resolution, 1 sec)

Global Attention: Sharing New Year's Eve

All over the world, people celebrate the change to a New Year. Since 1998, we have recorded data from a network of physical random event generators (called "eggs"). Here we look at what happens at midnight around the world.
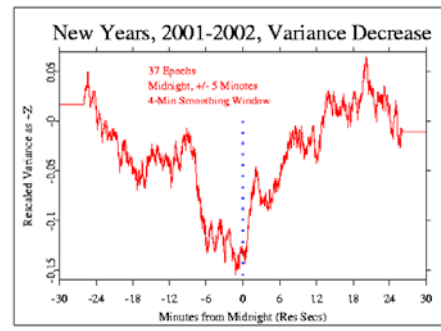
The scientific prediction is that there will be a pattern of increased correlation among the eggs. We test for trends away from the expected "random walk". We have learned to expect reductions in the variation across the eggs.

The figures on this page almost speak for themselves. They are pictures of our engagement with each other.
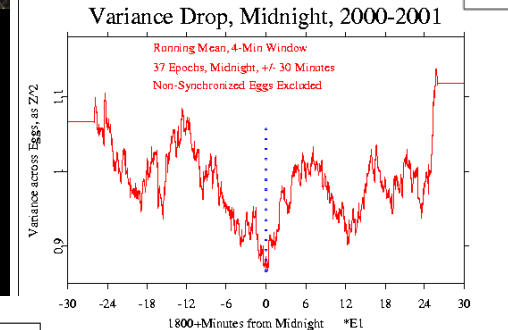
And again for last year. The pattern is replicated for the third time.

New Years, 2001-2002, Variance Decrease

We predicted the same pattern for the following year.

In the first year, 1998-1999, we looked for a change in the average deviation, and compared Maxi- and Mini-celebration time zones.

Then, for the infamous Y2K transition, we looked at a measure of the variability among the eggs and predicted it would decrease as we all focused on midnight.
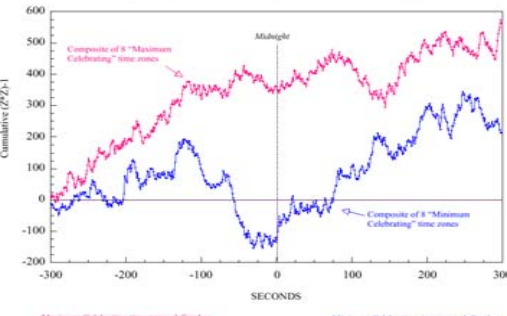

Variance Drop, Midnight, 2000-2001
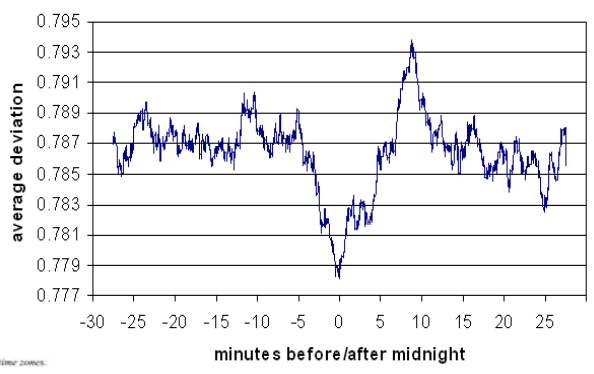
New Year's "Evoked Response"
9-EGG Comparison of "maximum celebrating" vs. "minimum celebrating" global time zones.

More at http://noosphere.princeton.edu

Current Result: Formal Database
170+ Global Events Over 5.5 Years
Odds: Less Than 2 Parts in a Million

GCP Results, Aug 1998 to Mar 2004
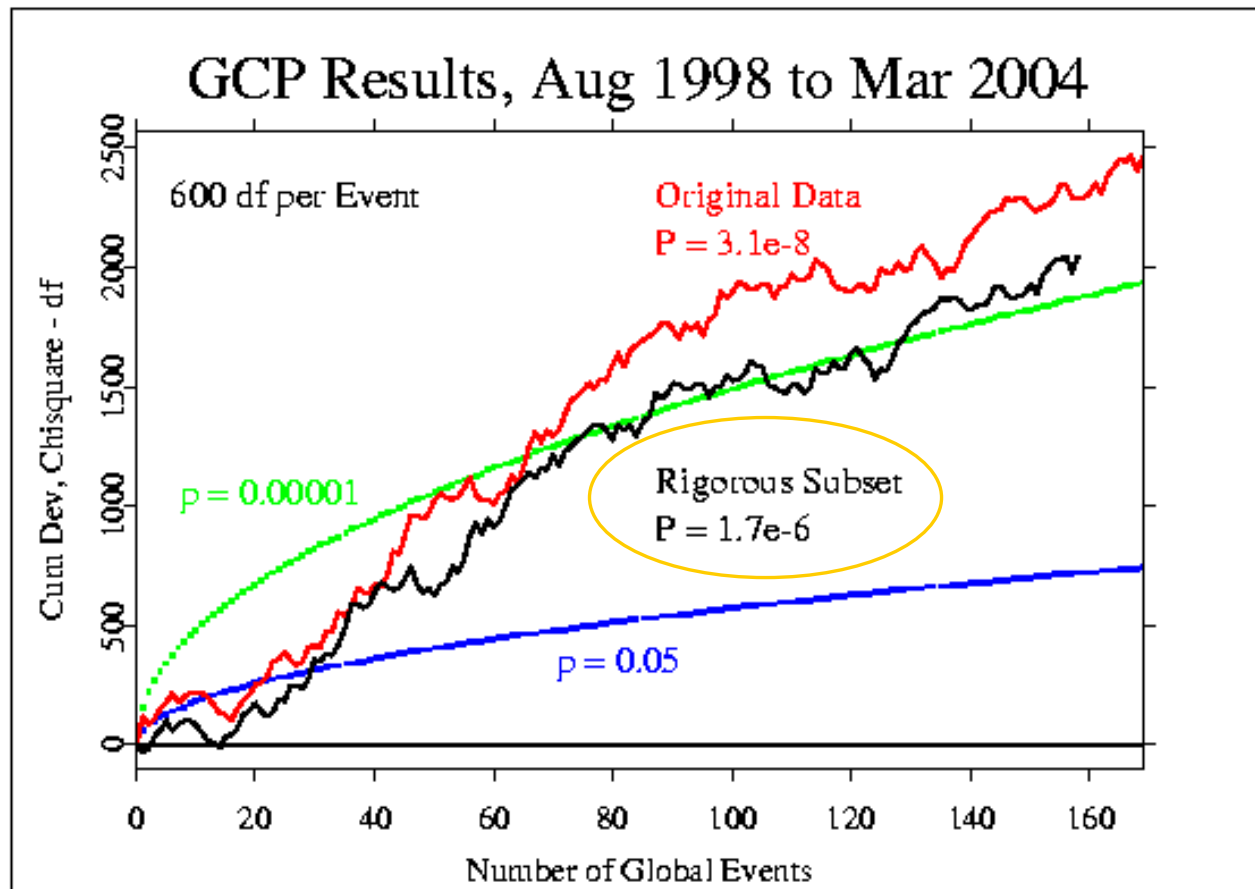
Now for Some Interesting Questions

Does the Type of Event Matter?
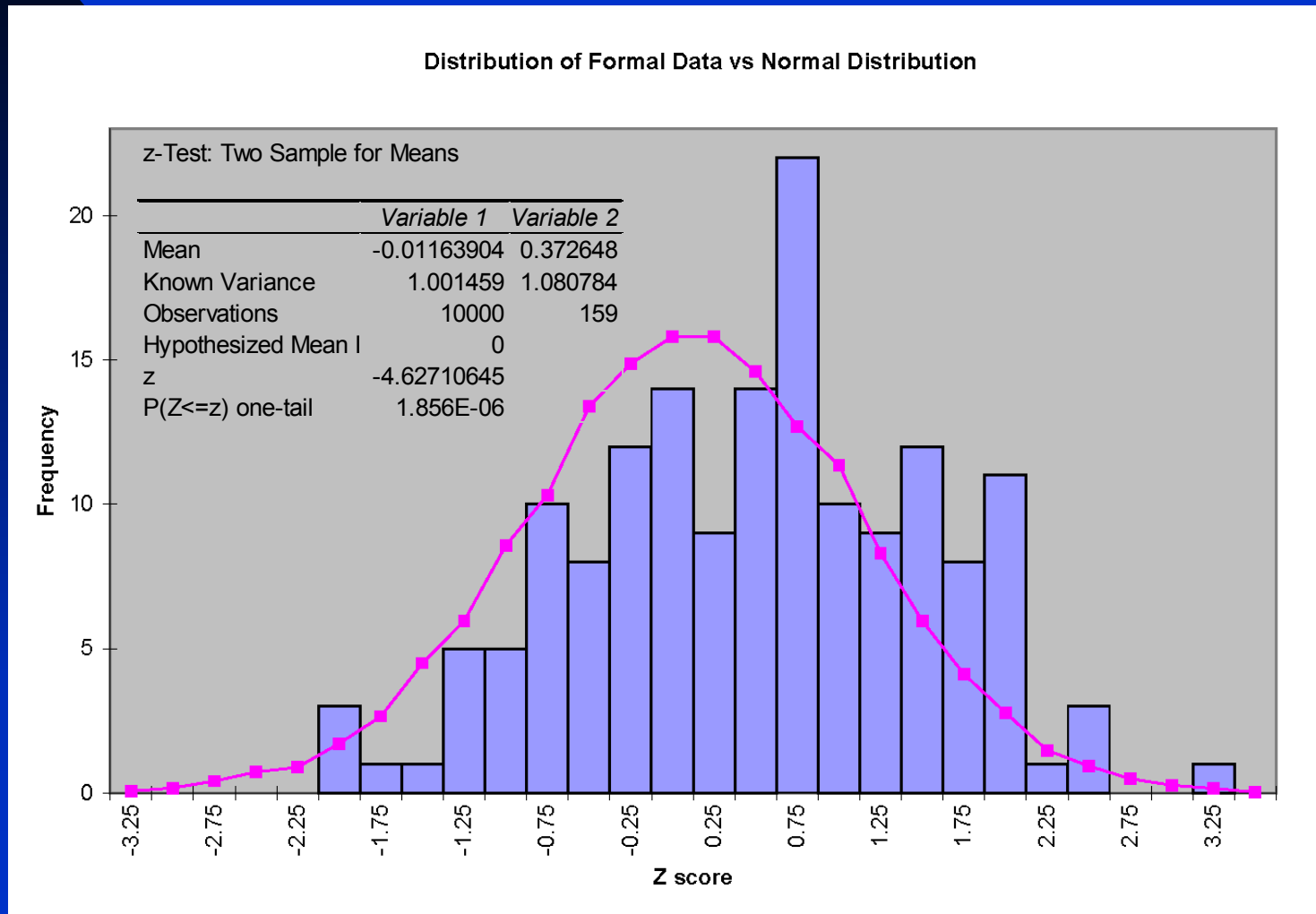
Positive or Negative Valence?

Compassion? Predictability?

Number of People Engaged?

Distance of EGGs from Event?

Is it Just an Experimenter Effect?

Distribution of Event Z Scores: Roughly Normal, Shifted by 0.37 Std Dev

Distribution of Formal Data vs Normal Distribution

z-Test: Two Sample for Means

	Variable 1	Variable 2
Mean	-0.01163904	0.372648
Known Variance	1.001459	1.080784
Observations	10000	159
Hypothesized Mean I	0	
z	-4.62710645	
P(Z<=z) one-tail	1.856E-06	

There Is a Slight Decline in the Z Score Over Time, but It Is Not Significant

Formal Events, Linear Regression

$y = -0.0021x + 0.5432$

$R^2 = 0.0089$

Z-score

Chronological Order
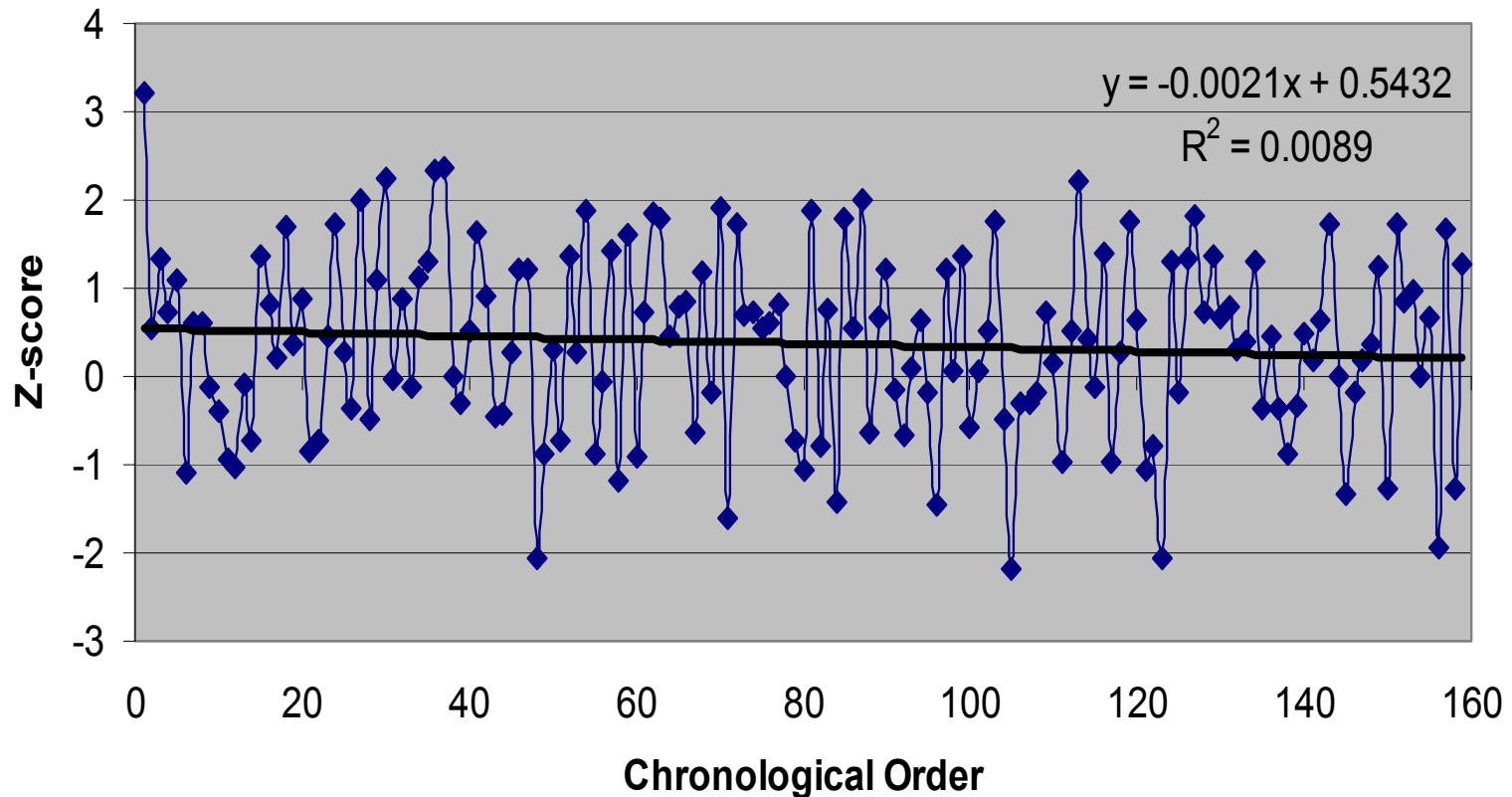
Grouping into Reasonable Categories Shows a Substantial Differentiation

Effects as a Function of Event Type

Statistically Significant

$y = -0.0841x + 1.0846$
$R^2 = 0.9713$

Effect > 1 Std Dev

Not Distinguishable

Effect Size

1

0

-1

Categories

demonstration
relief, ending
celebration
ceremony, relig
act of war
accident, crash
astron, astrol
sports event
meditation
social event
terror attack
nat disaster
political event
web promotion
anniversary
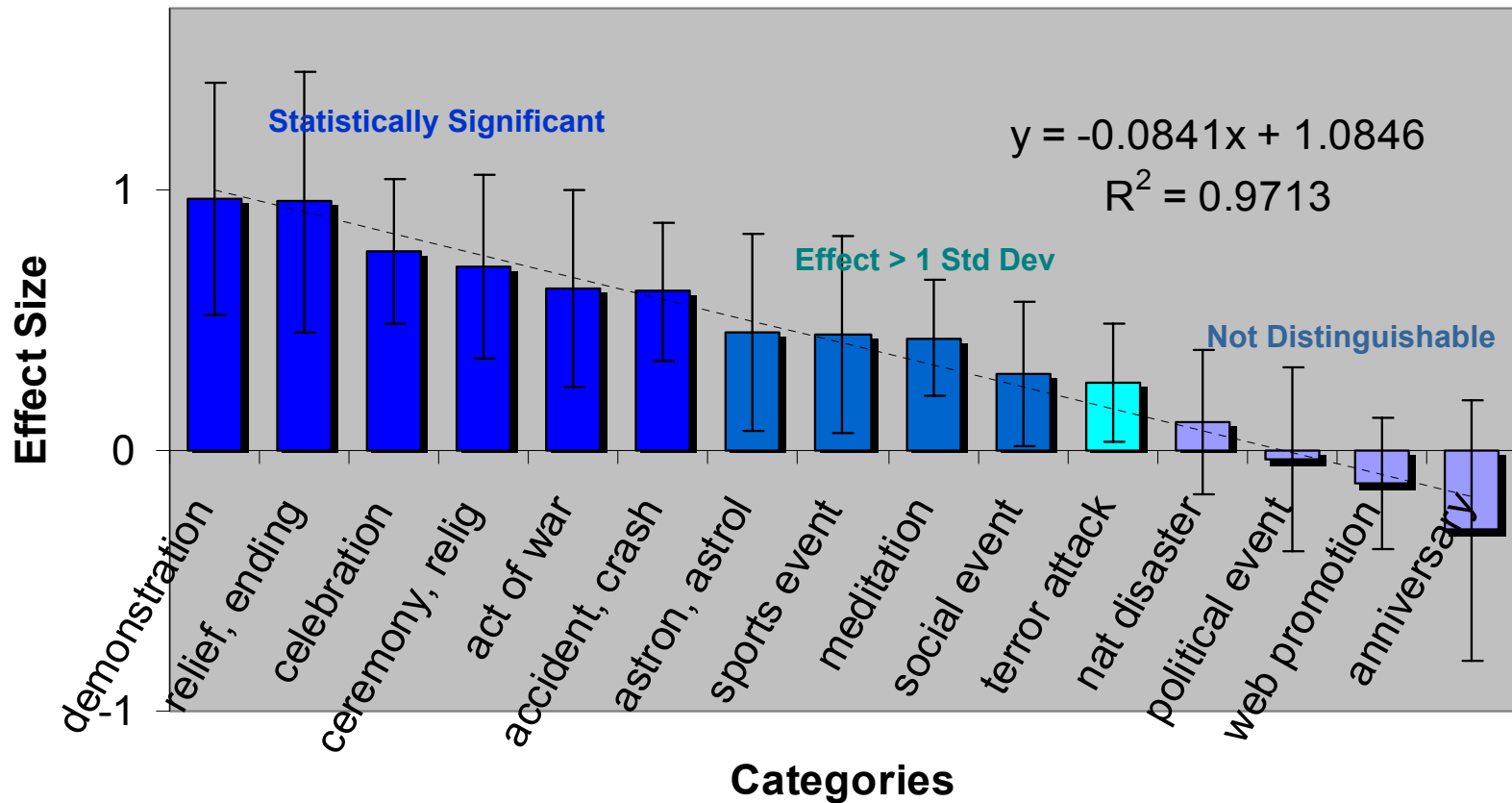
Categories and Caveats

Despite *variation*, we find illuminating differences among event subsets.

Categories are *arbitrary*, but groupings we think make sense.

There are *confounds* that make answers tentative even if interesting.

Some Events We Examine Are Expected But Many Come Without Warning (The Difference Is Not Significant)
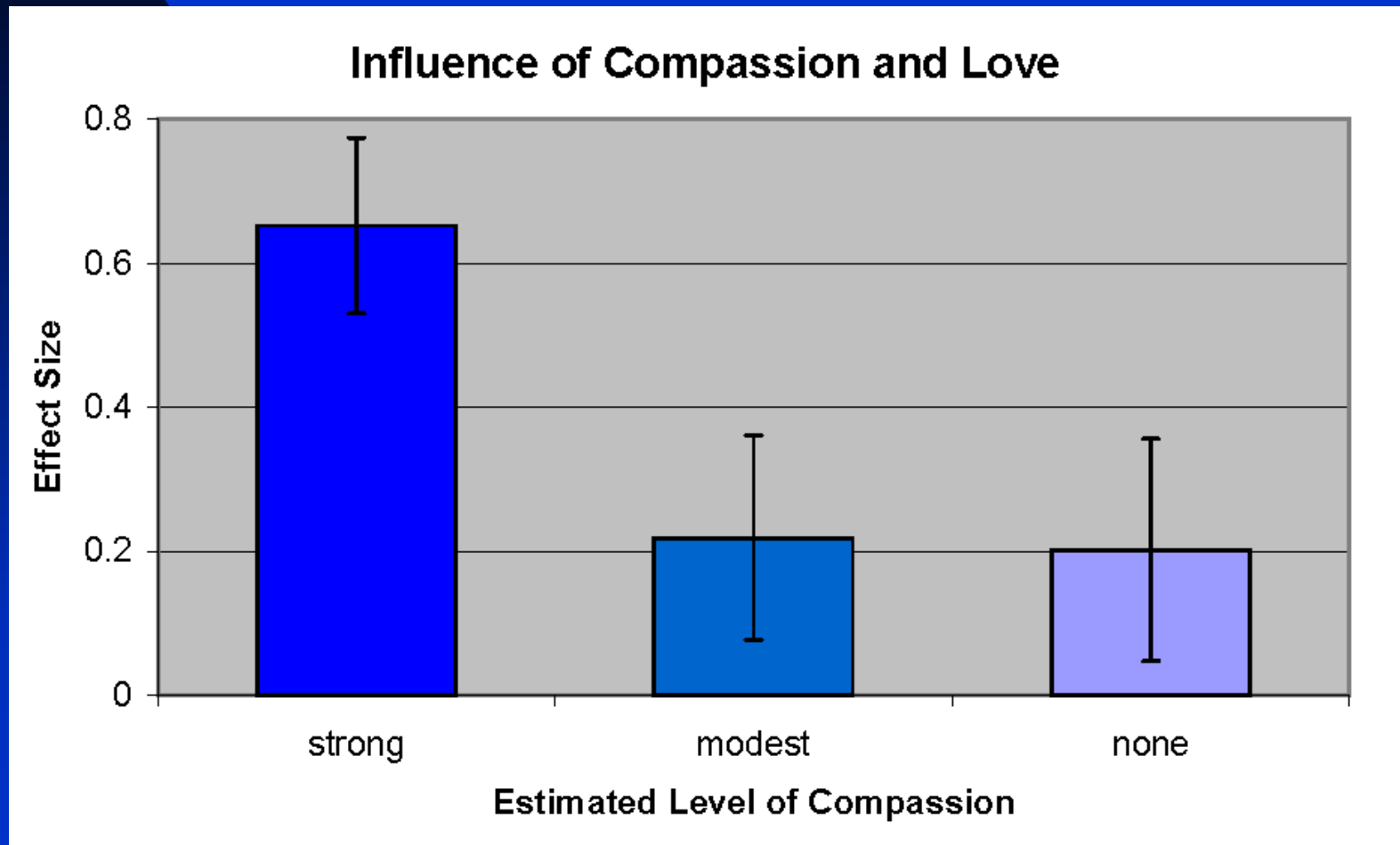

Influence of Predictability on Effect Size
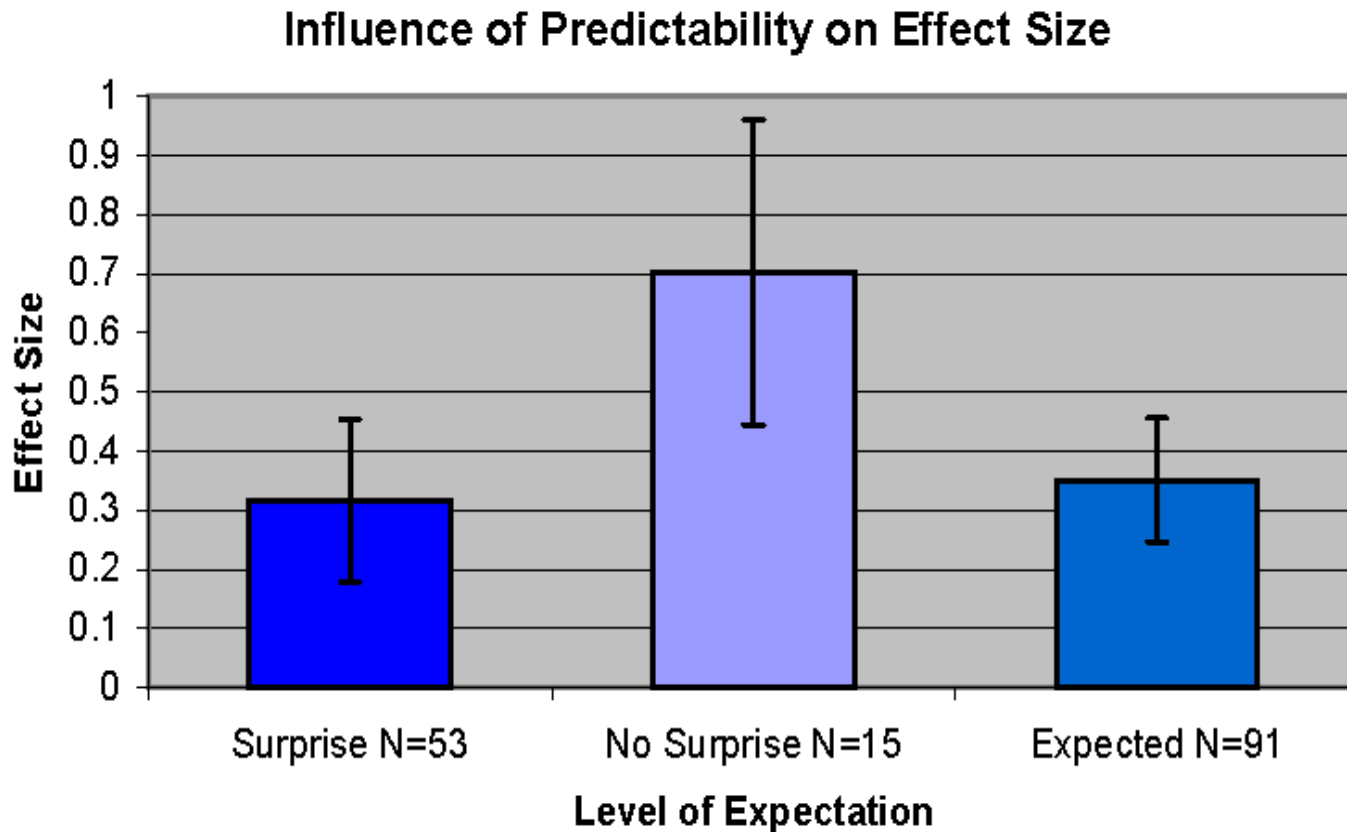
The Number of People Paying Attention Has a Substantial Effect on the Network Significant but Confounded with Importance
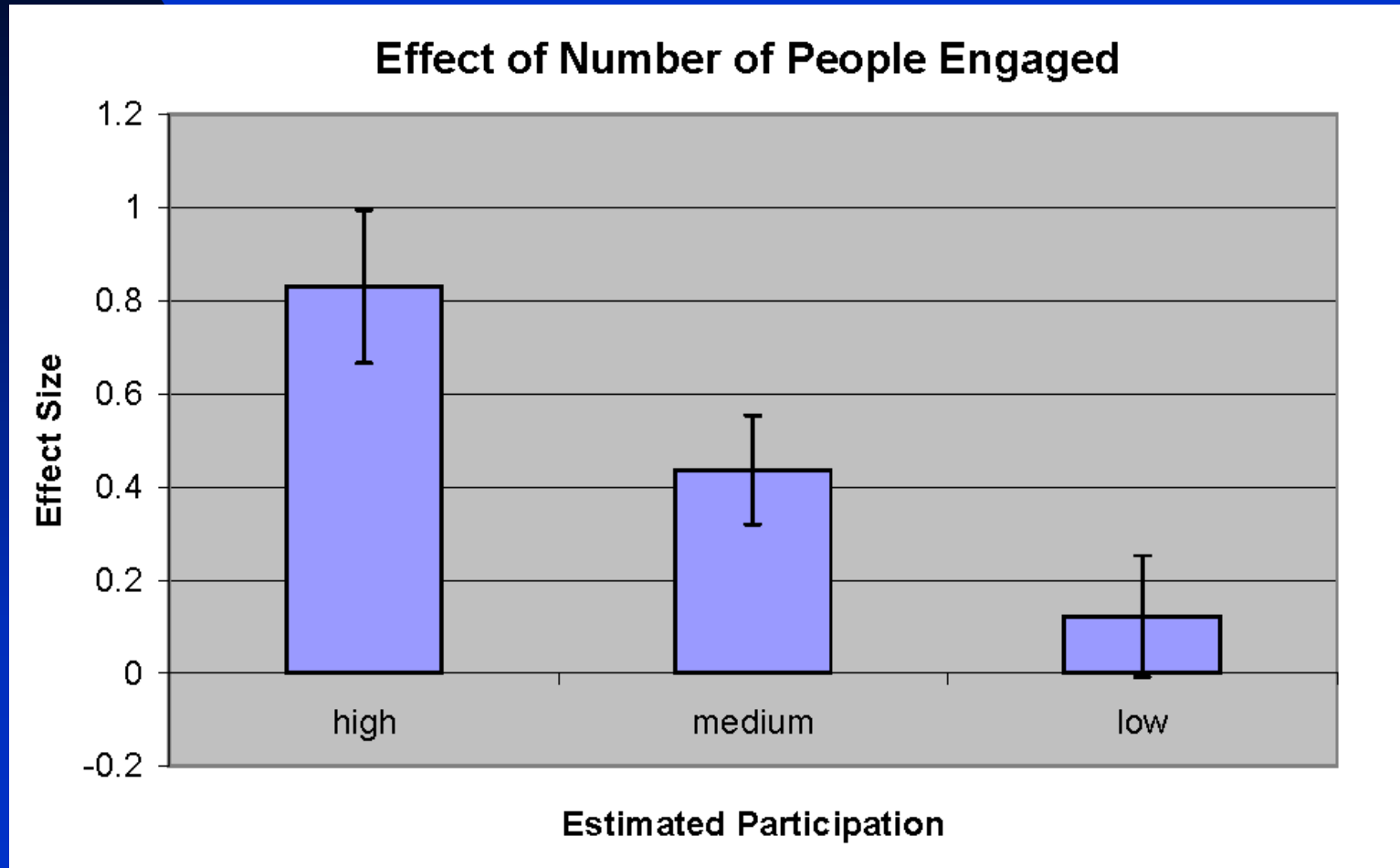
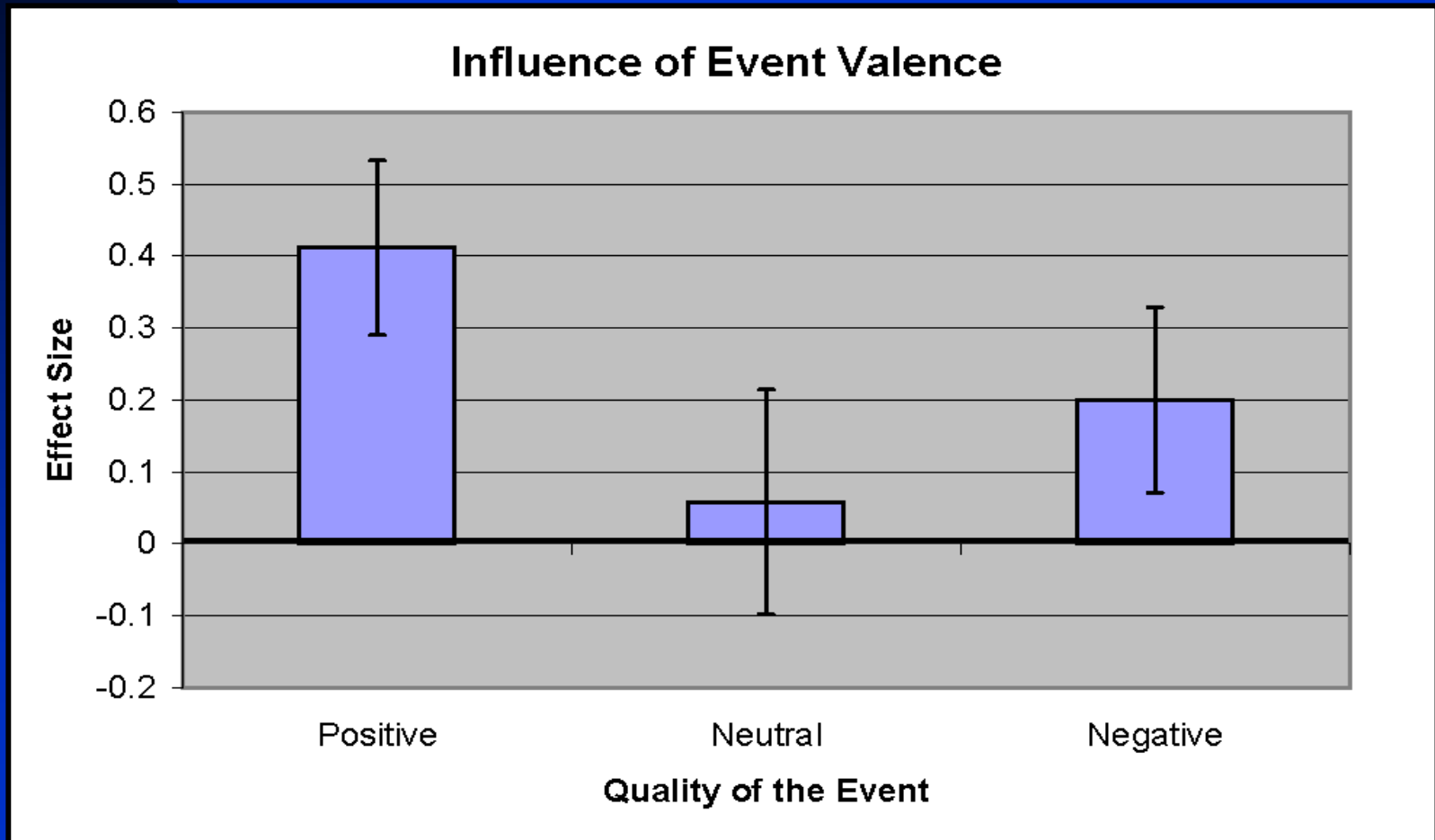# Events That Seem to Evoke or Comprise Love and Compassion Have Larger Effects

Hypothesis proposed by Jaan Suurkula


Influence of Compassion and Love

Positive and Negative Valence Events Have Larger Effects Than Neutral Events (For Positive, the Difference Is Significant)

Does the Distance of the Eggs From the Event Make a Difference? The form of the question affects the answer.

Distance: Effect sizes for the 11 hours beginning with the Attack, Continuing to the end of the GMT day

Effect vs Dist, Stouffer Z, Full Day, Sept 11
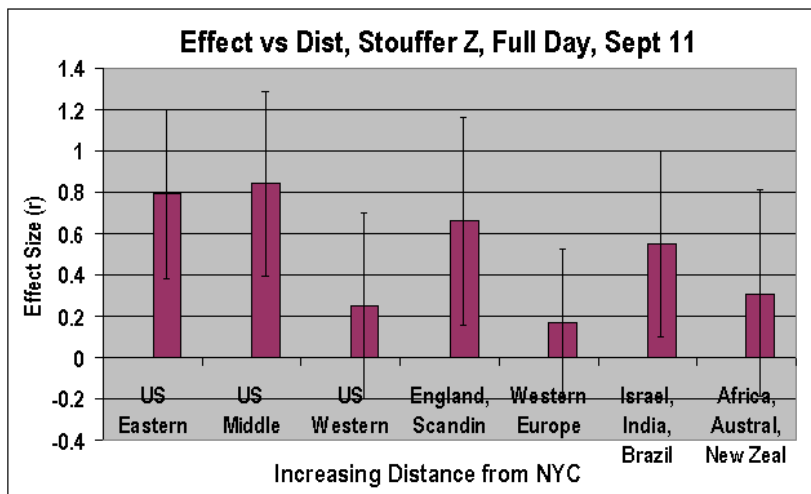
Distance: Effect Sizes Calculated for the Device Variance During 20 Hours Beginning at 00:00 on Sept 11th, EDT

Effect Size vs Distance, Variance, Sept 11 2001
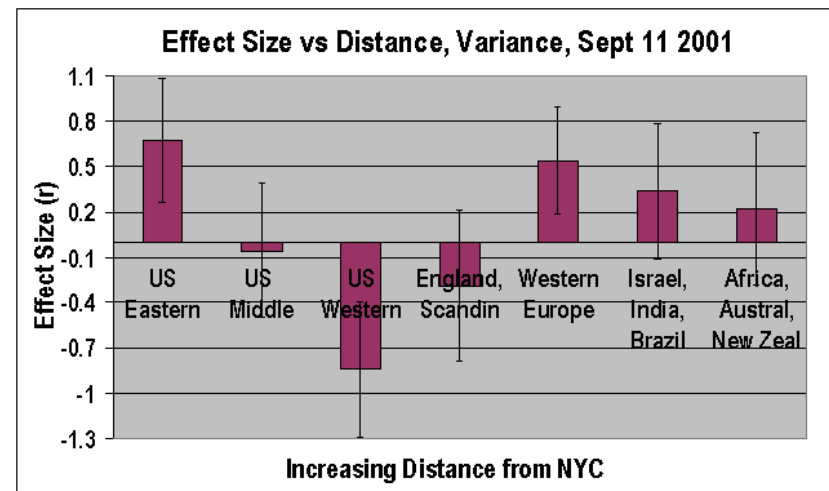
Bottom line: It looks like there is modest evidence that closer eggs show bigger effect.

And what about the Experimenter Effect?
Is this all a result of our wishful thinking?
No Significant Difference
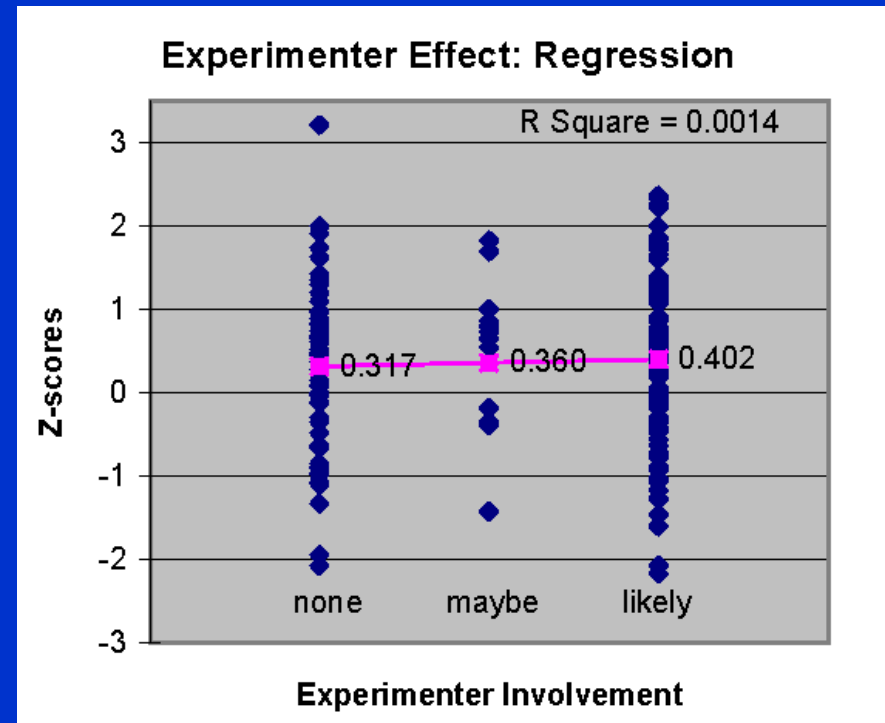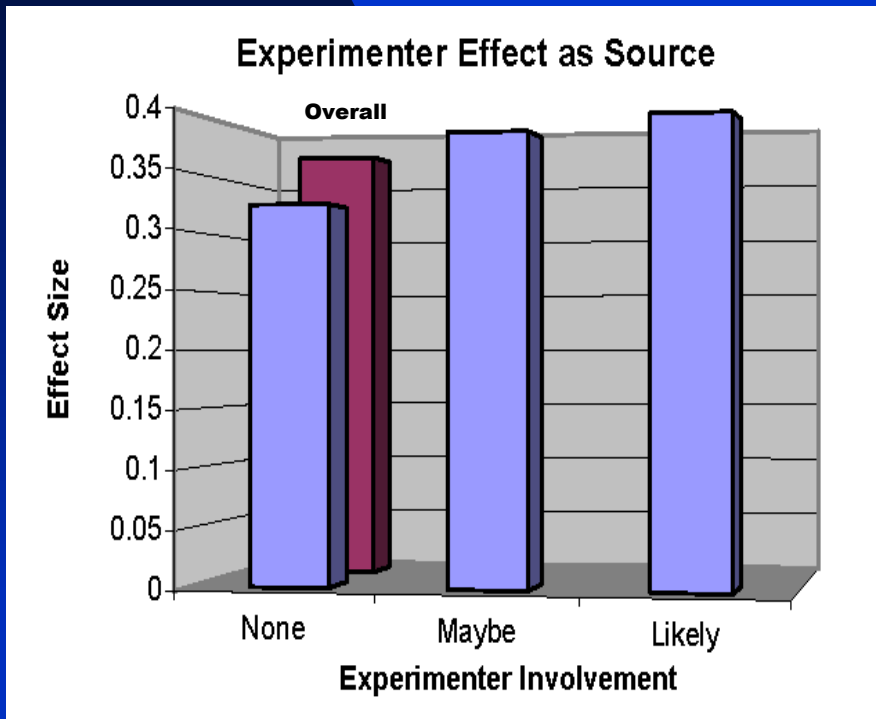
But Remember the Source ☺

Bigger Picture:
What is our aspiration?

Sharpen and focus our questions
Aim for theoretical understanding

Create accessible data resource
Correlate with external variables

News Intensity
Geomagnetic Weather
Electromagnetic Background

Major Analysis Project With Peter Bancel
Making the GCP Database Into a Data Resource
Error-free, Normalized, Reliable, Flexible, Compact

Cumdev of z^2. August 4, 1998 - January 31, 2003
Ticks show first day of jan, april, july, oct
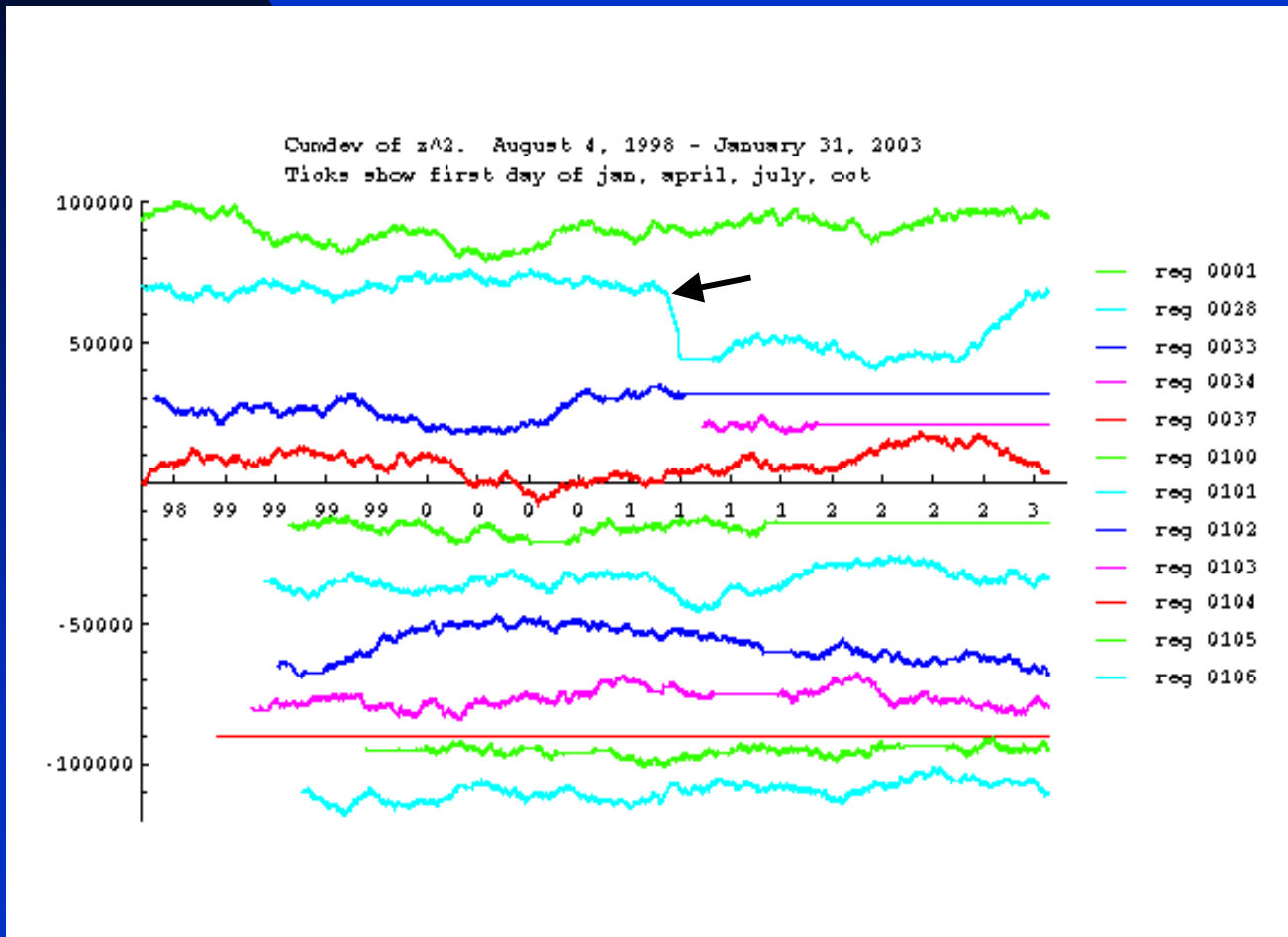
Graph shows stability of a subset of REG devices over years.
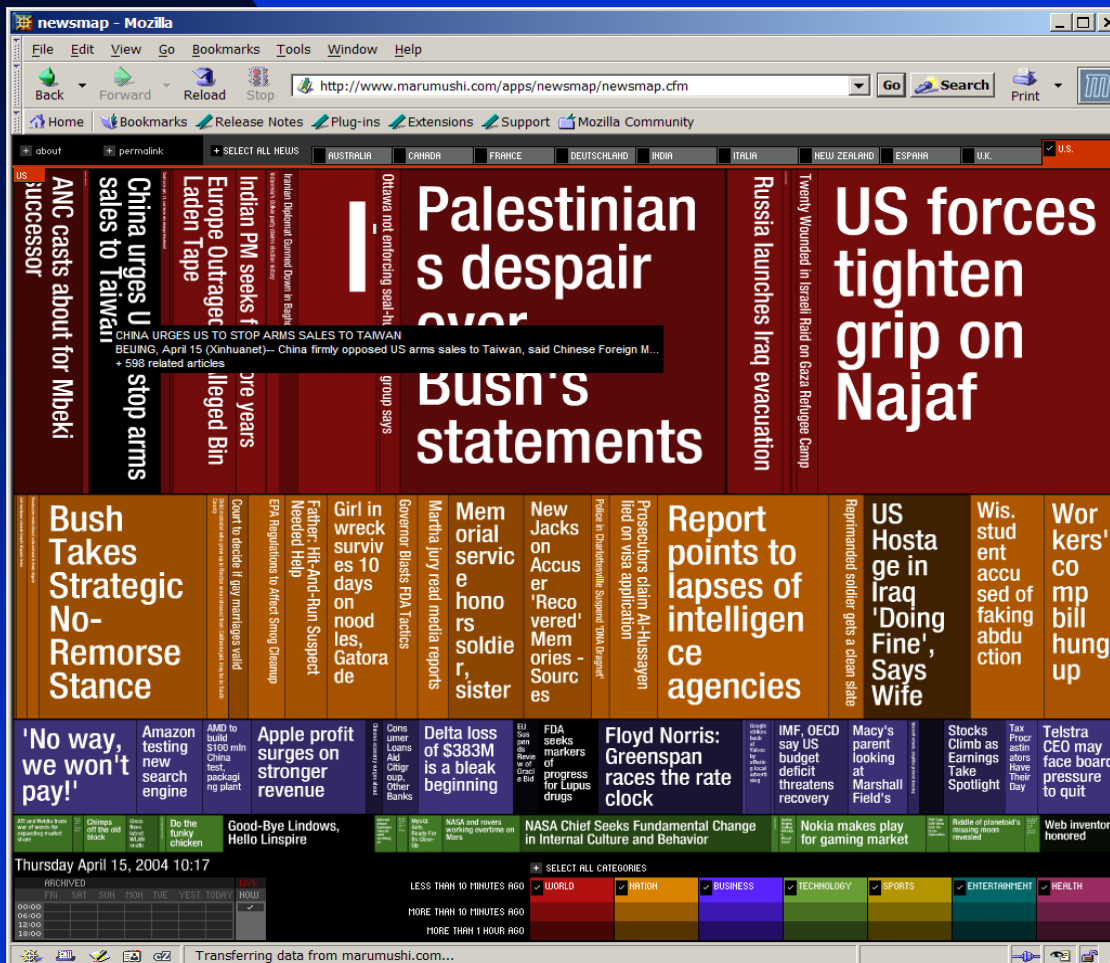
Arrow identifies a failure.

Bad data are excised.

Ideas that have been waiting…
Correlations of News Intensity Index
With Statistical Measures from GCP Data

For example:

Marcos Weskamp's
***Newsmap* at**
www.marumushi.com

Visually reflects the changing Landscape of the Google News news aggregator.

However marvelous we may find the human ability to discover such an elegant and simple law as the Law of Gravitation, equally marvelous is how clever nature is to pay attention to it.

- - Richard Feynman

The Global Consciousness Project
http://noosphere.princeton.edu