Social Science and Cognitive Processes:

Is Social Science Science?

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Scientific Theories

- Luminiferous aether
- phlogiston
- Lysenkoism
- Lamarckism
- the geocentric universe
- Ptolemy's solar system
- brain as radiator
- nerves as tubes
- stars as fires
- Atlas on turtle
- sun a fire on chariot
- indivisibility of atoms
- spontaneous generation of flies
- perfection of heavenly spheres
- corpuscular theory of light
- flat earth hypothesis
- Aristotle's theory of motion
- disease caused by body fluids
- earth, air water, fire
- Many, many more....

Social Science Theories

- Rational actor model
- free will
- Calvinist predestination
- needs and gratifications approach
- Freudian psychodynamics
- Jung's cultural archetypes
- cognitive dissonance theory
- Wisconsin status attainment model
- Marxism
- Capitalism
- Weber's Ideal Types
- The Galileo model

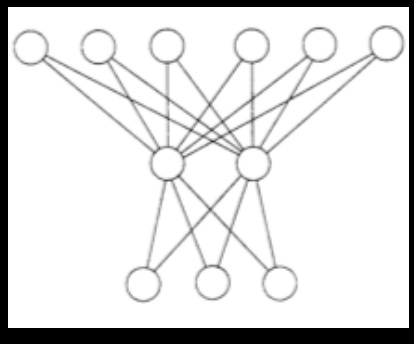
http://changingminds.org/explanations/theories/a_alphabetic.htm

- Lists over 300 (!) theories *of persuasion alone*...
- And adds one of their own...
- Shouldn't at least *one* ought to be shown wrong by now?

Ya got trouble

The Problem

- What is it?
- How did it get started?
- How do we fix it?



Conversation with Galileo*SPOT
O: = Other; S: = SPOT

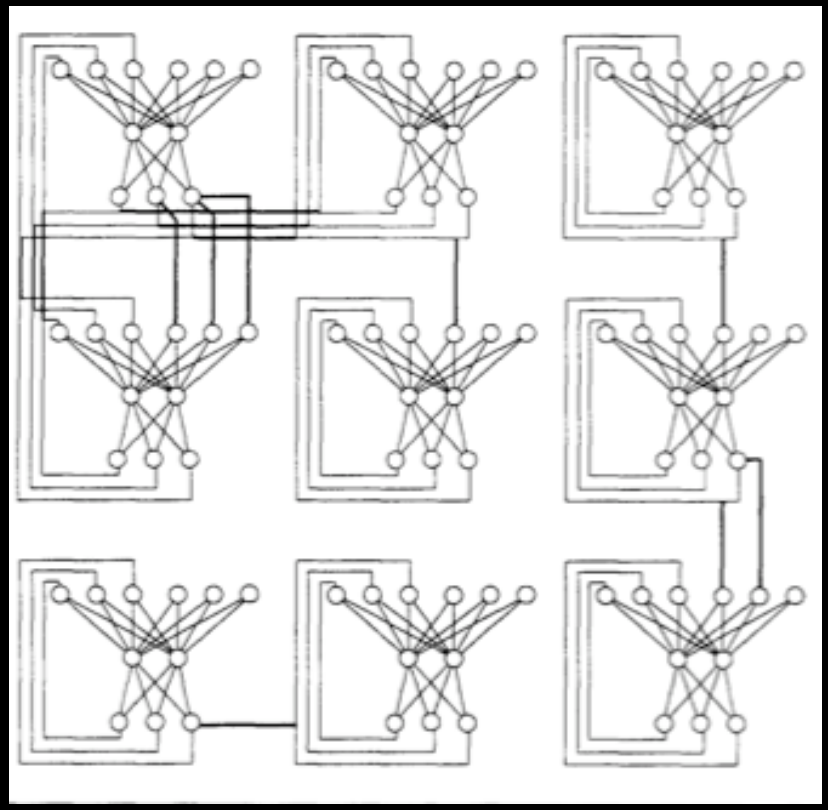
O: How are you, Spot? S: I'm well, thank you.	O: Hew are you, Spit? S: I'm well, thank you.
O: How are you, Sopt? S: I'm well, thank you.	O: How are S: A'm well, thank you.
O: How are you? S: I'm well, thank you.	O: How you doin', Buddy? S: Agm weld, t _nk)>v,
O: Hou art yee, Spet? S: I'm well, thank you.	O: Howdy do? S: A'm"weld, phanc yov(

Neural Network Characteristics

- Grabs onto the "best" alternative and blots out all others
- Early training vital; influences all subsequent training
- Is not "rational" but recognizes patterns
- Acts holistically; individual nodes insignificant and replaceable

The pattern is in the whole network

Society is a network of networks

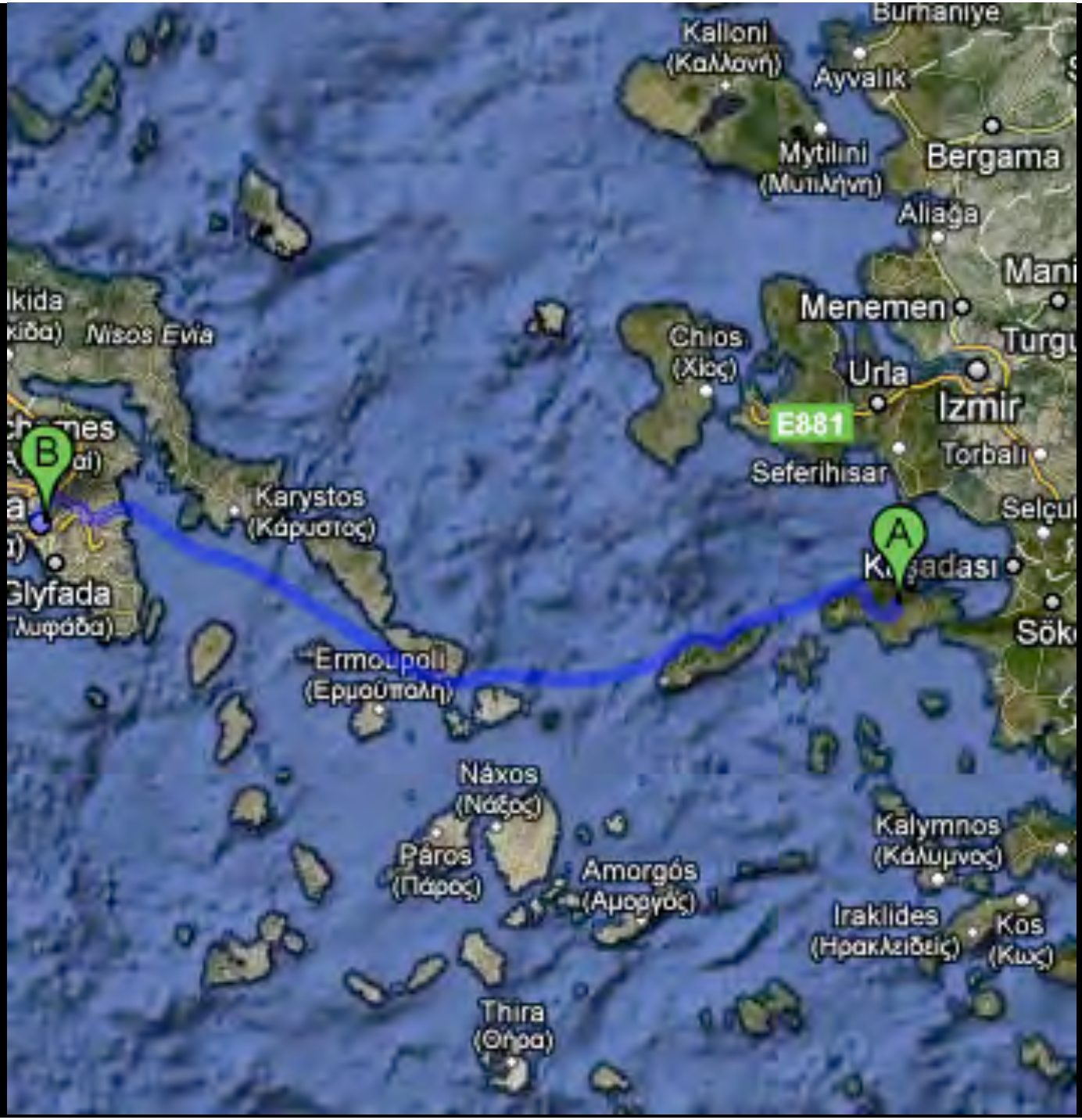


Patterns Come from Networks, not Indivdiuals

- Science is a pattern of thought and action
- There is an identifiable social network that gives rise to science
- Social Scientists are not members of that network

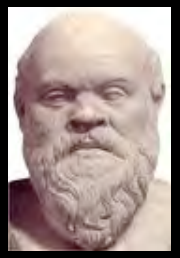
Two Great Networks

- Athens
- Samos


Kalloni
(Καλλονή)
Ayvalık
Mytilini
(Μυτιλήνη)
Bergama
Aliağa
Menemen
Chios
(Χίος)
Urla
İzmir
E881
Torbalı
Seferihisar
Karystos
(Κάρυστος)
A
B
Ermoupoli
(Ερμούπολη)
Náxos
(Νάξος)
Páros
(Πάρος)
Amorgós
(Αμοργός)
Kalymnos
(Κάλυμνος)
Iraklides
(Ηρακλειδείς)
Kos
(Κως)
Thira
(Θήρα)

Athens

- Socrates
- Plato
- Aristotle



The Culture of Athens

- Two worlds
- Two kinds of knowledge
- Categorical
- Perfect
- Unchanging
- Anthrocentric (psychological)

Classical Athenians

- Augustine
- Thomas Aquinas
- Christianity
- Islam

Modern Athenians

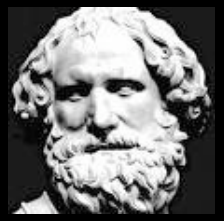
- Freud 
- Karl Popper 
- Karl & Egon Pearson/Jerzey Neyman   
- S. S. Stevens 
- Marvin Minsky 

Modern Athenian Culture

- Physical/Social Phenomena
- Conscious/Unconscious Mind
- Universe/Sample
- Categorical Measurement
- Rational Actor Model
- Validity

Samos

- Pythagoras (570-490)
- Philolaos (470-385)
- Archytas (428-337)
- Aristarchus (310-230)
- Archimedes (287-212)



The Culture of Samos

- One world
- Comparative
- Approximate
- Changing
- Non-teleological
- Humans not special; just part of nature

Classical Samosans

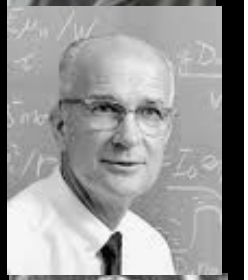
- Copernicus
- Galileo
- Newton

Modern Samosans

- Einstein
- Bohr
- Mach
- Feynman
- Rosenblatt

Modern Samosan Culture

- "...science is the observation of phenomena and the communication of the results to others, who must check them" --Niels Bohr.
- "A measurement is a comparison to a standard." -- William Shockley
- "Science is a way of trying not to fool ourselves." -- R. P. Feynman
- "How's your wife? Compared to what?" --Henny Youngman

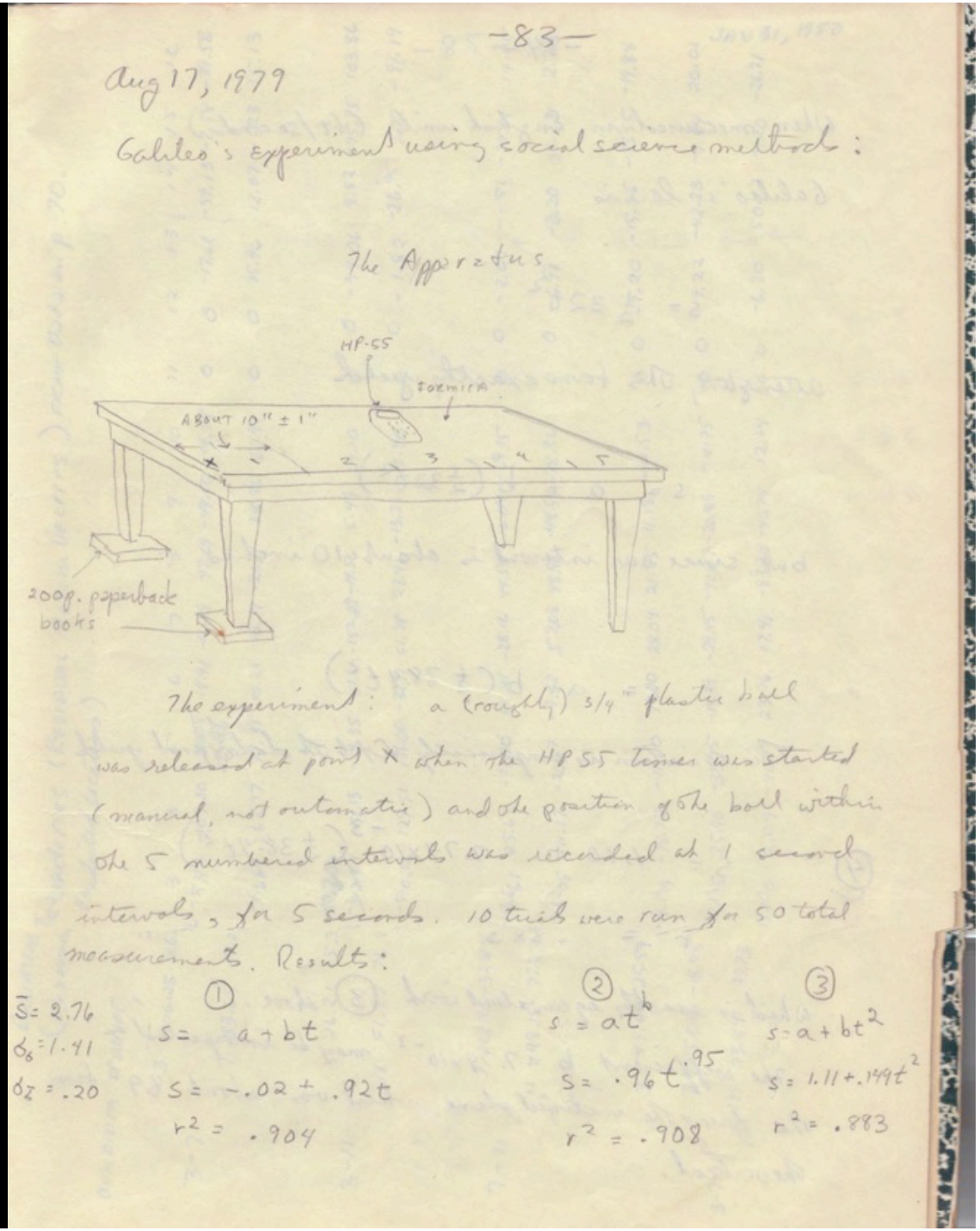


Science

- Science is a pattern within the Samosan Network
- Science is incompatible with the Athenian Network

Athenian Law of Falling Bodies

- Galileo



-83-

Aug 17, 1979

Galileo's experiment using social science methods:

The Apparatus

The experiment: a (roughly) 3/4" plastic ball was released at point X when the HP 55 timer was started (manual, not automatic) and the position of the ball within the 5 numbered intervals was recorded at 1 second intervals, for 5 seconds. 10 trials were run for 50 total measurements. Results:

$\bar{s} = 2.76$
$\sigma_s = 1.41$
$\sigma_{\bar{s}} = .20$

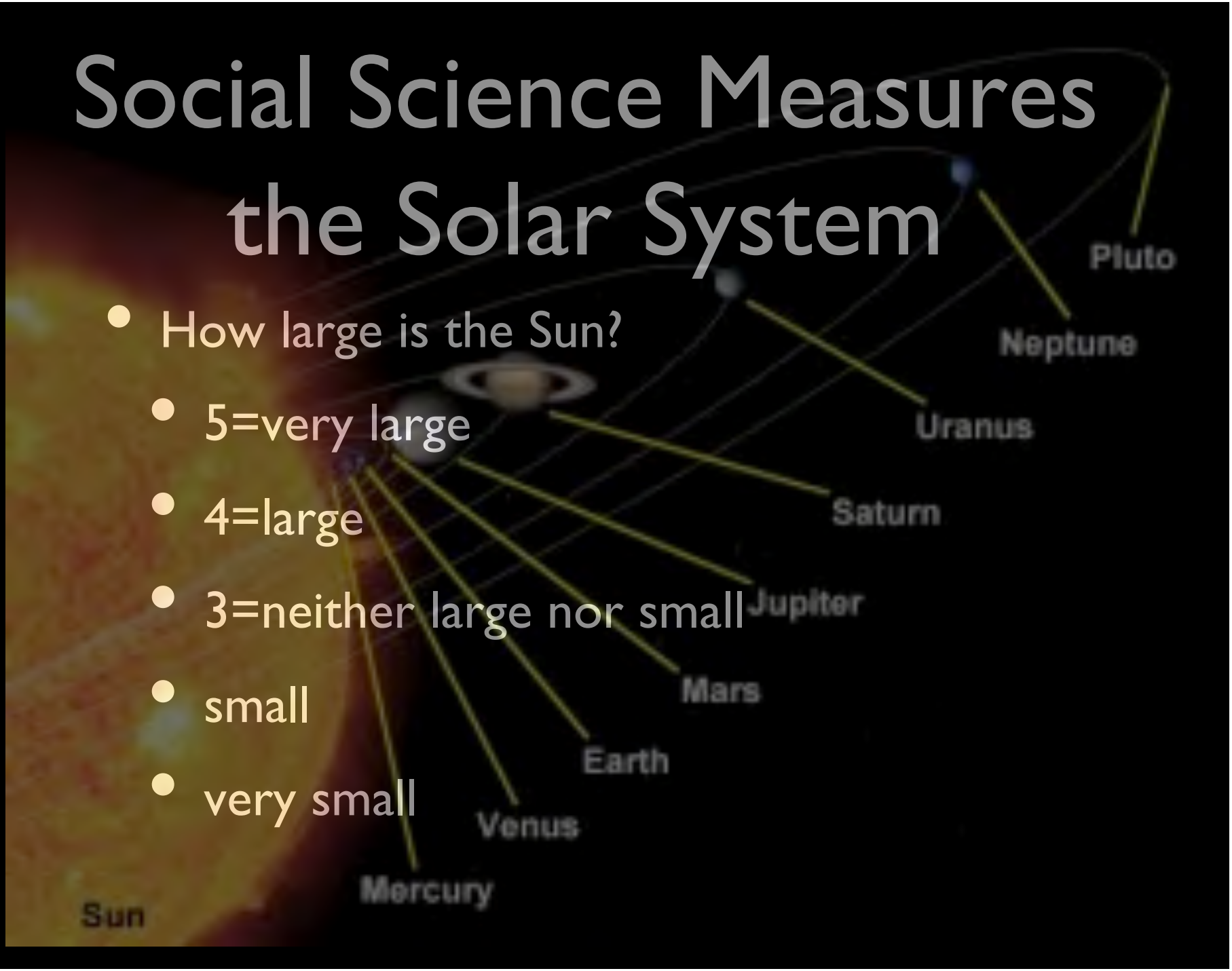
① $s = a + bt$
$s = -.02 + .92t$
$r^2 = .904$

② $s = at^b$
$s = .96t^{.95}$
$r^2 = .908$

③ $s = a + bt^2$
$s = 1.11 + .149t^2$
$r^2 = .883$

Social Science Measures the Solar System

- How large is the Sun?
  - 5=very large
  - 4=large
  - 3=neither large nor small
  - small
  - very small



Athenian Solar System

	Group 1	Group 2	Group 3
Moon	3.38±1.41	4.00±.93	3.88±1.25
Sun	4.25±1.16	4.25±1.04	4.13±.99
Nickel	2.13±.64	2.25±.71	2.50±.53
Quarter	2.13±.64	2.38±.52	3.25±.71

- Sizes above; ratios below

	Group 1	Group 2	Group 3
Moon/Sun	.80±1.82	.94±1.40	.94±.59
Moon/Nickel	2.0±1.72	1.89±1.07	1.65±1.36
Sun/Quarter	2.0±1.32	1.79±1.16	1.27±1.21
Nickel/Quarter	1.0±1.17	.95±.88	.77±.89

Universe/Sample

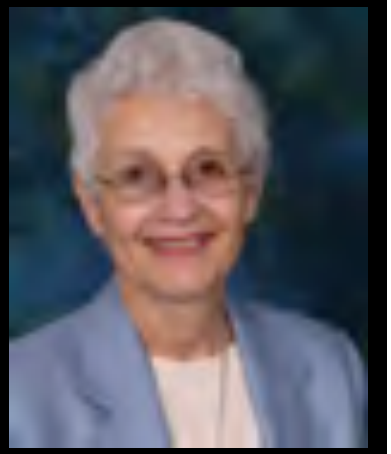



- In the sample, all are very similar
- In the Universe, they are all *the same size*
- This is "scientifically rigorous" in the social sciences.

Women's Health Initiative

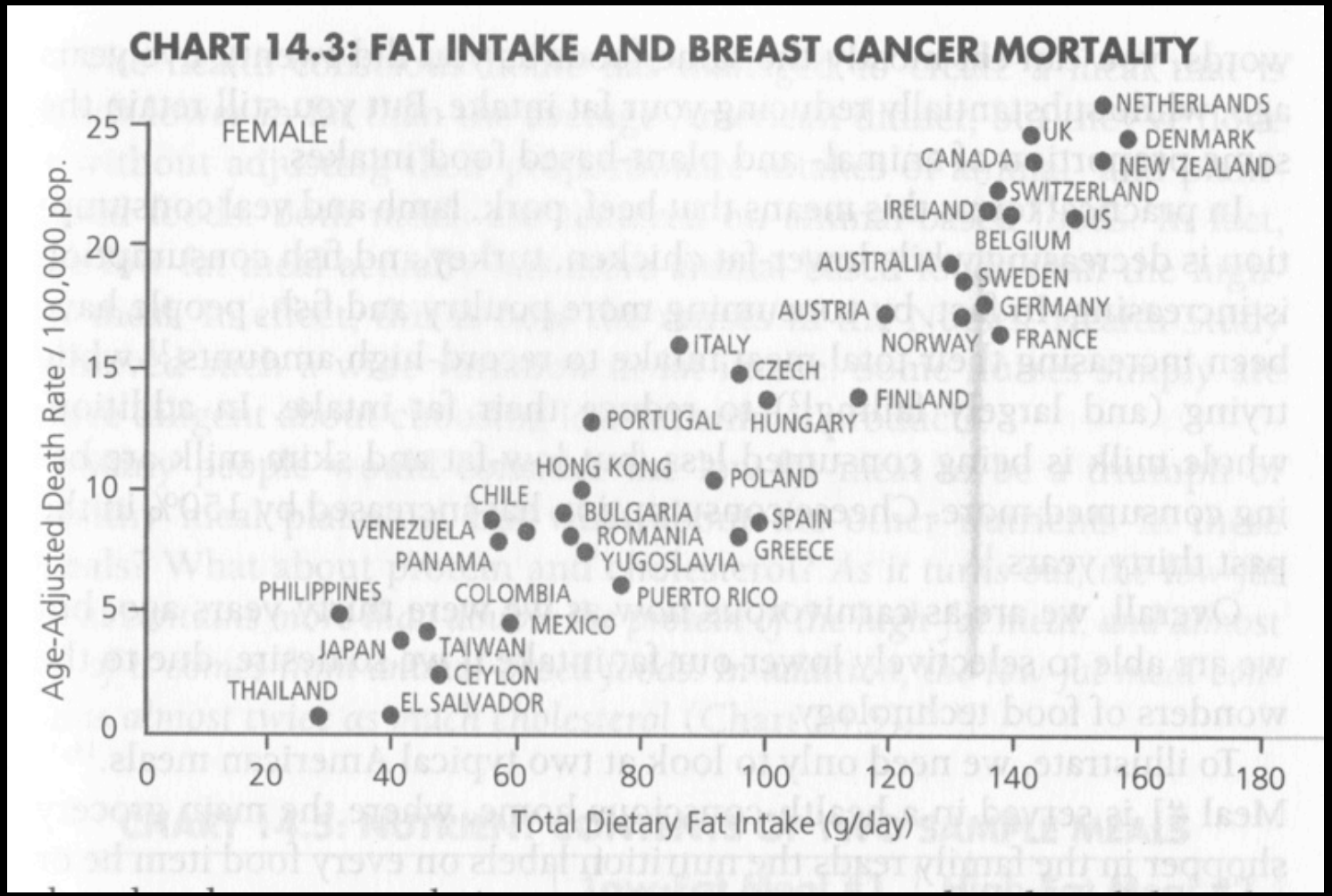
- 161,000 women
- 15 years
- $725 million
- fat-heart disease? NS
- fat-breast cancer? NS
- fat-colon cancer? NS
- calcium/vitamin D - broken bones? NS

Good Science?



- 26-29% reduction in fractures
- “We have to report it, in a scientific article, the way it's expected for good science, and that then the news report is going to show the primary finding. And, if people don't read past the headline, they don't get the rest of it.” -- Dr. Barbara V. Howard

Fat and Breast Cancer in the Real World



This just in...

- In a 10 year study of 13,000 people by the WHO:
- Brisbane Times Mobile phones linked to brain cancer risk - 42 mins ago
- Yahoo! UK and Ireland Study finds no brain cancer link to mobile phone use - 7 hrs ago
- MSNBC No answer, just fuzz, from cell phone study - 9 hrs ago
- Guardian.co.uk Cell phone cancer study shows problems with method - Reuters - 11 hrs ago
- Reuters UK WHO study has no clear answer on phones and cancer - 11 hrs ago

Galileo

- A Samosan Theory of Cognitive Processes

The Galileo System

- Rejects Social Science Methodology
- Only Ratios and Proportions
- Observation Trumps Reasoning (What you see is what you get)
- No Inferential Statistics
- No Validity and Reliability Testing

WHAT IS IT? | ANCESTORS | HISTORY | TUTORIAL | LITERATURE | SOFTWARE | COMMERCE

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ID	Download	Author	Year	Title	Journal
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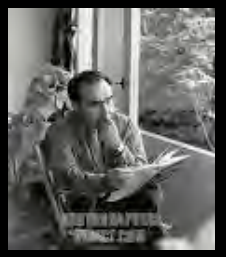
2	PDF Adobe	Woelfel, J., Holmes, R. A., Cody, M. J., & Fink, E. L. (1988). A multi-dimensional scaling based procedure for designing persuasive messages and measuring their effects. In G. A. Barnett & J. Woelfel (eds.), *Readings in the Galileo system: Theory, methods, and applications* (pp. 313-332). Dubuque, IA: Kendall-Hunt. abstract			
		Haller, A., & Woelfel, J. (1972). Significant others and their expectations: Concepts and			

"One of the more interesting approaches to communication and attitude change we found was Joseph Woelfel's metric multidimensional scaling approach, which is called Galileo. In many ways, Woelfel's theory was the closest that any social science approach came to providing the basis for an end-to-end engineering solution for planning, conducting, and assessing the impact of communications on attitudes and behaviors (Larson, et. al., 2009)."

Objects

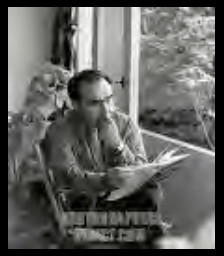






- The collective neural network creates objects out of continuous sensory data -- in this case, Jacob Bronowski...









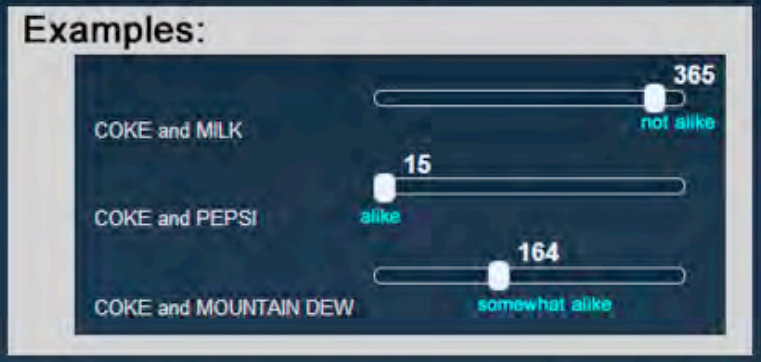


Relationships

- Objects are defined by their relationship to other objects
- All relationships are comparisons: if a and b are u units apart, how far apart are x and y?

Sliders

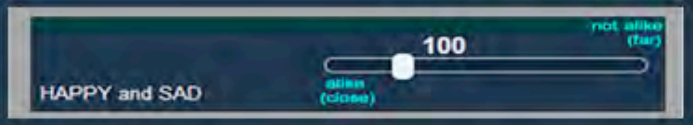
The following survey asks you to consider how different or "far apart" different words are from one another. The more different you feel two words are, the more they do not go together or are seldom associated with one another, the larger the number you will choose...



In this example "Coke" and "Pepsi" are considered to be quite similar, "Coke" and "Mountain Dew" are considered a little more different, and "Coke" and "Milk" are considered to be the most different.

You ("yourself") are a concept in this survey too. Judgements involving "yourself" should indicate how close you feel to a particular word. For example: I always drink Mountain Dew but never drink coffee. So if I were completing a survey with those concepts (words), I would choose a very small number for the word pair "yourself" and "mountain dew" and a very large number for the word pair "yourself" and "coffee".

To help you know how large a number to use with the following word pairs, keep in mind that:

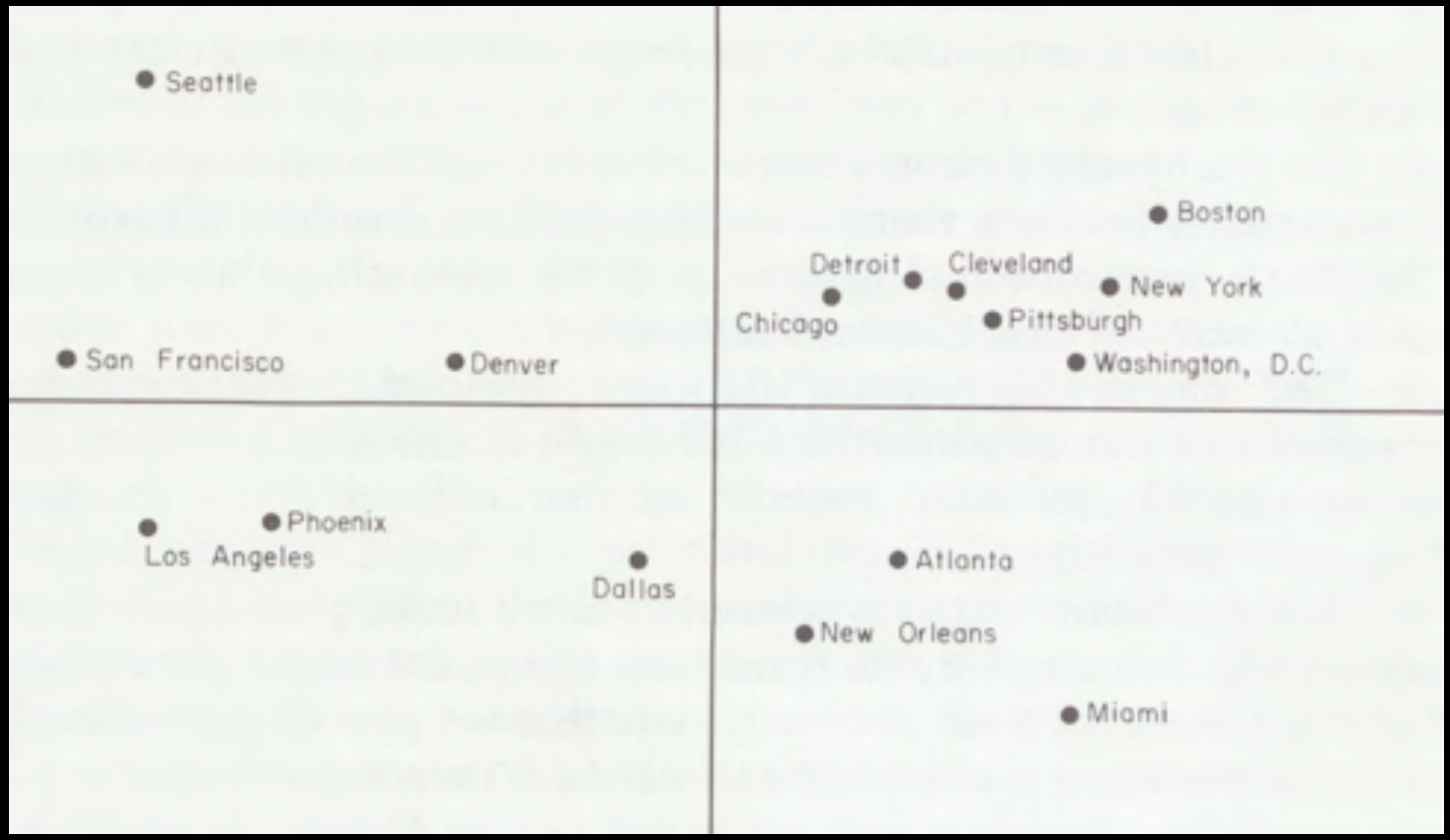


**There are no right or wrong answers, this is not a test. Just remember that the answer sliding bar is always a little above, and to the right, of the word pair you are considering.

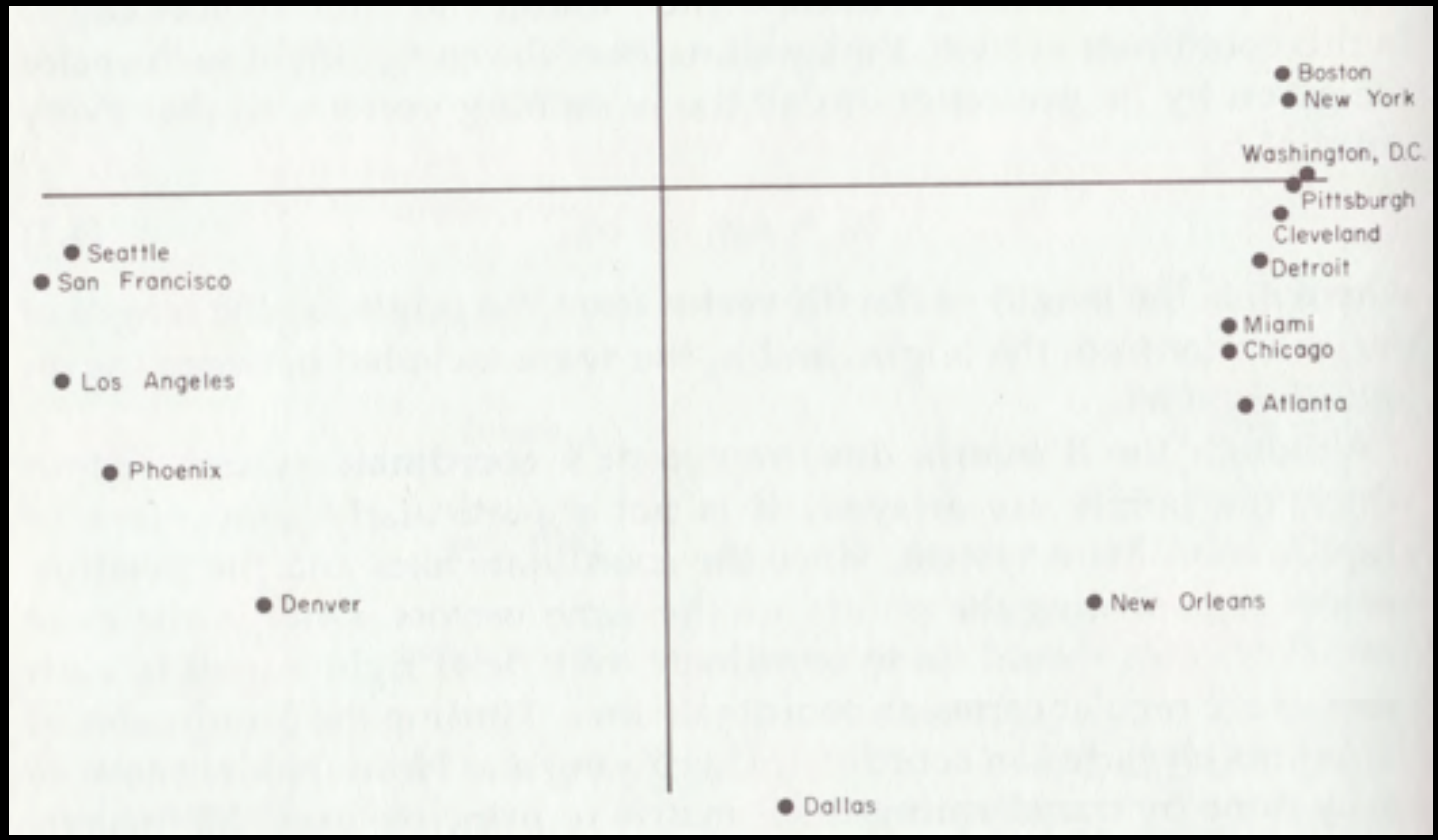
Distances among Cities

	Albany	Bangor	Boston	Buffal	New Yo	Philad	Portlnd	Scrant	Syrac	Watertwn
Albany	0	405	165	283	157	249	272	179	132	204
Bangor	405	0	240	688	451	543	133	581	537	609
Boston	165	240	0	448	211	303	107	341	297	369
Buffalo	283	688	448	0	418	418	555	288	151	223
New York	157	451	211	418	0	92	318	130	267	339
Philadelphia	249	543	303	418	92	0	410	130	267	339
Portland	272	133	107	555	318	410	0	448	404	476
Scranton	179	581	341	288	130	130	448	0	137	209
Syracuse	132	537	297	151	267	267	404	137	0	72
Watertown	204	609	369	223	339	339	476	209	72	0

Galileo Map of USA



Pearson Map of USA



6 people

Please read the following short paragraph:

Raul is conservative, intelligent, and very tall.

Varsha is very conservative, unintelligent, and tall.

Biff is liberal, very unintelligent, and short.

Lurlene is liberal, unintelligent, and very short.

Bobbie is conservative, intelligent, and short.

Ray is very liberal, intelligent, and very tall.

and click the "Next" button below to begin the survey...

Load Unfinished Survey | Next >> | [Exit and Clear Survey]

6 people

Remember that TALL and VERY TALL are 100 units apart.

note: the 0%-100% bar below shows how much of the survey you have completed

0% 100%

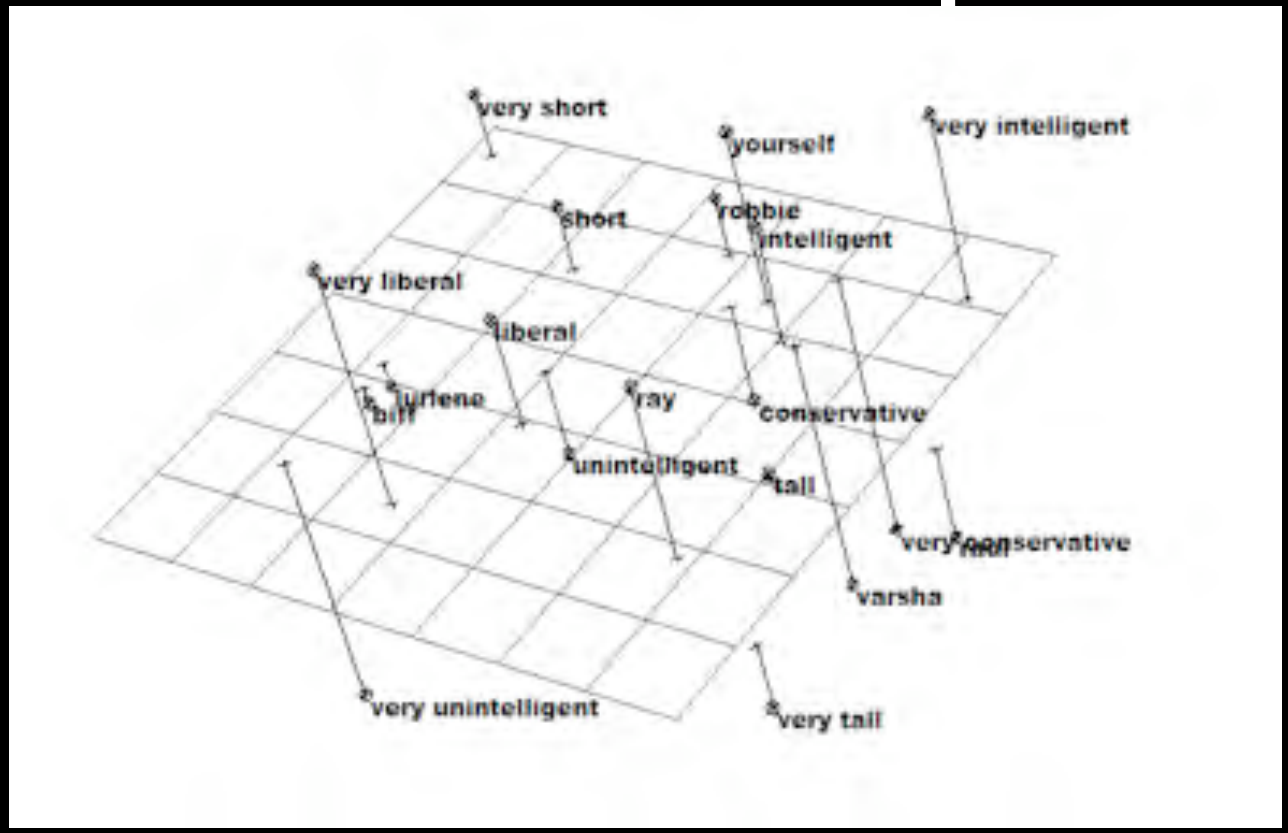
pairs1

RAUL and VARSHA are _____ units apart?

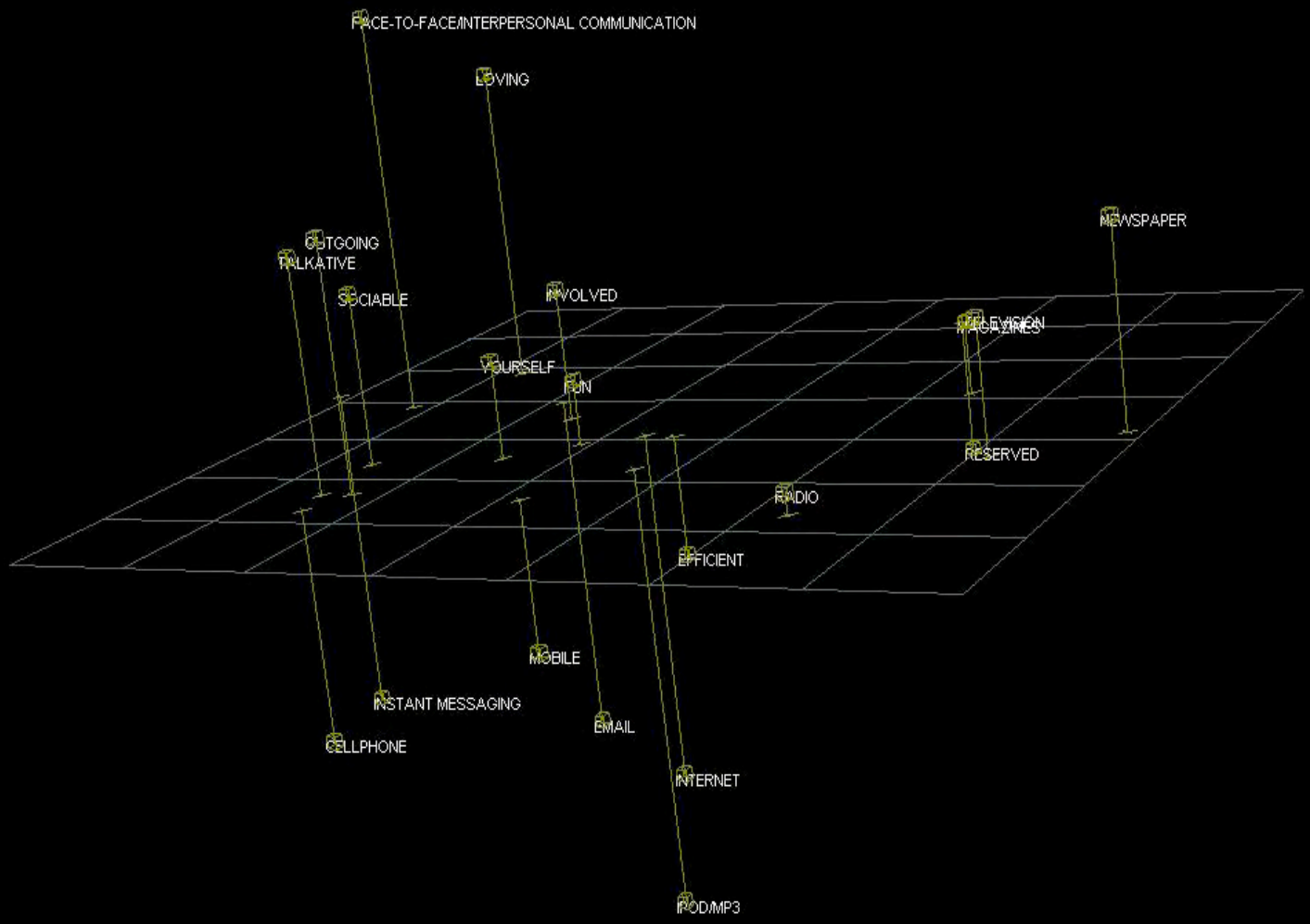
Only numbers may be entered in this field

Resume Later << Previous Next >> [Exit and Clear Survey]

The Network Learns Relationships

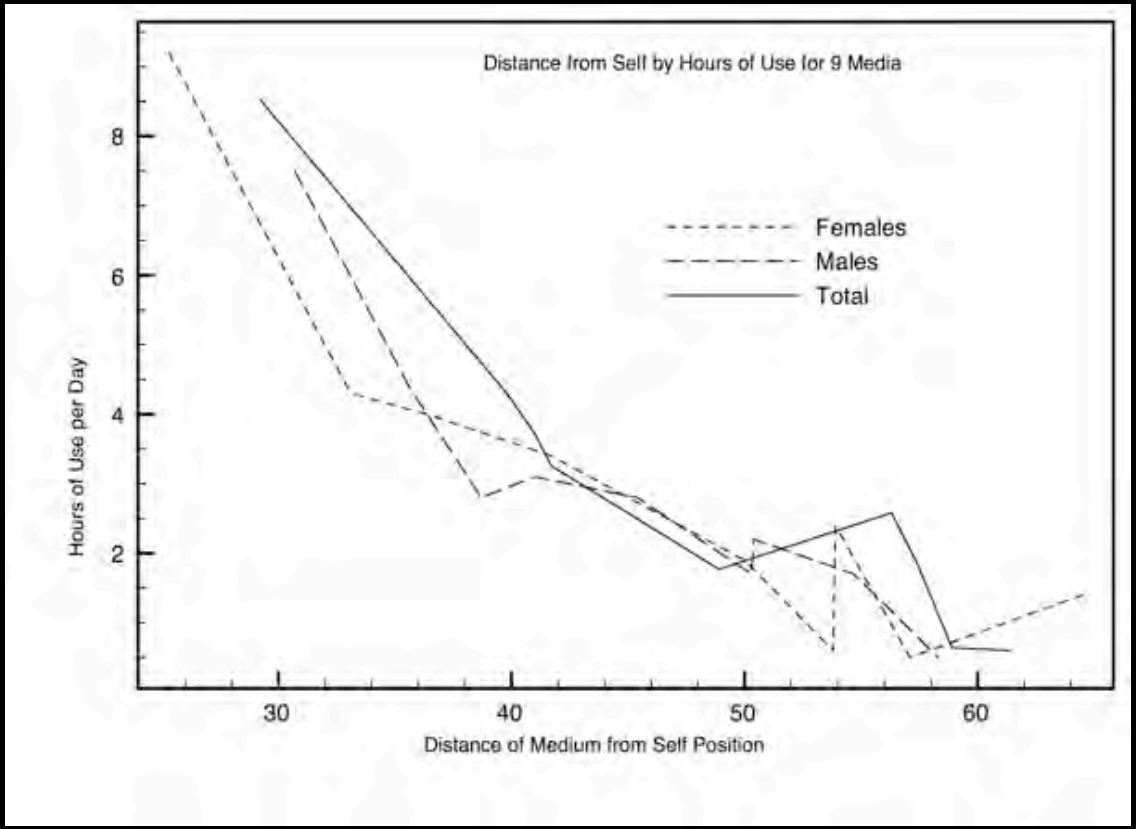


Media

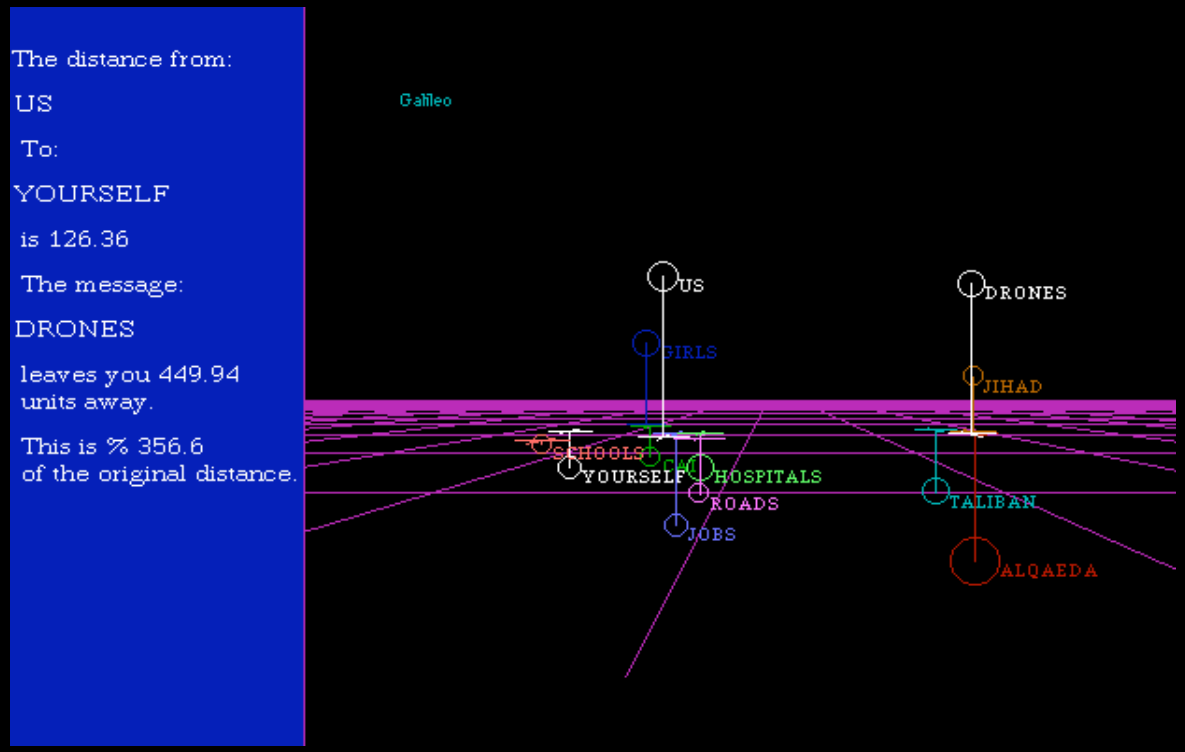

FACE-TO-FACE/INTERPERSONAL COMMUNICATION
LOVING
OUTGOING
TALKATIVE
SOCIABLE
INVOLVED
NEWSPAPER
TELEVISION
MAGAZINES
YOURSELF
FUN
RESERVED
RADIO
EFFICIENT
MOBILE
INSTANT MESSAGING
EMAIL
CELLPHONE
INTERNET
IPOD/MP3

Distance from "Yourself" predicts behavior:

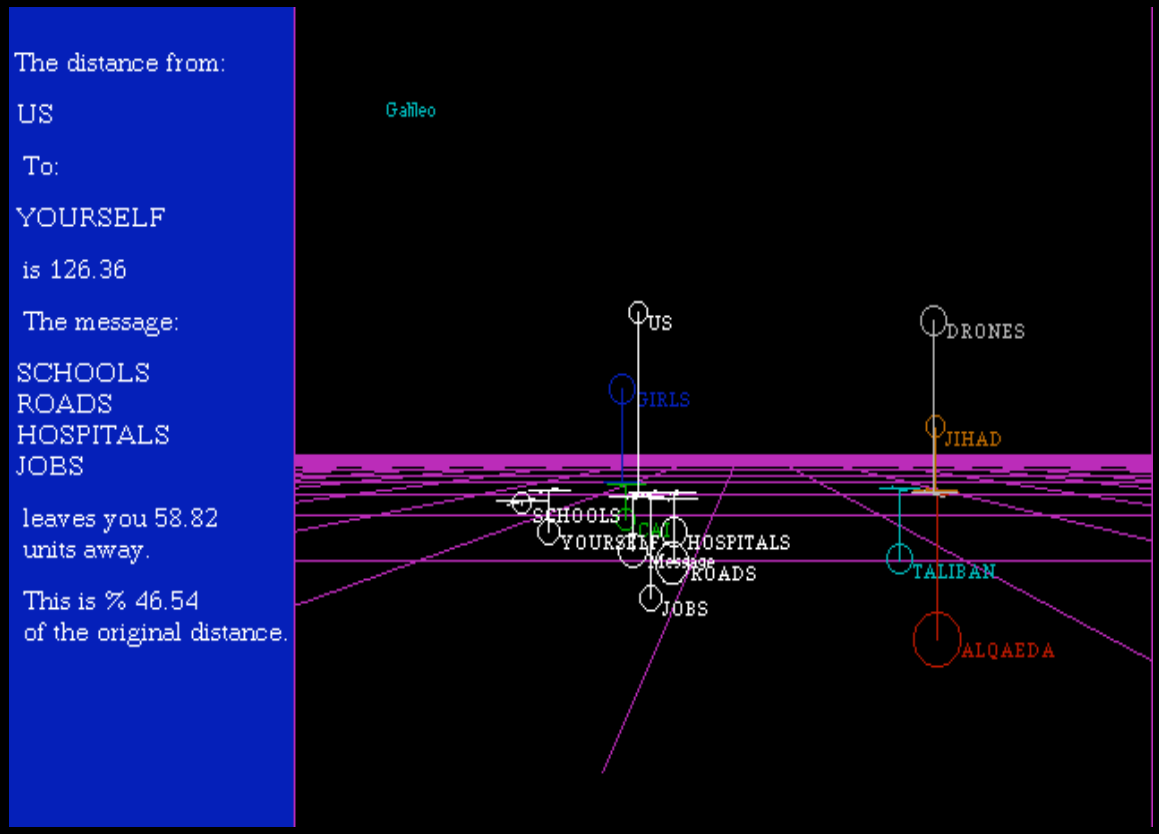
For each unit closer to the self in Galileo space the
rate of use goes up about 12 minutes per day



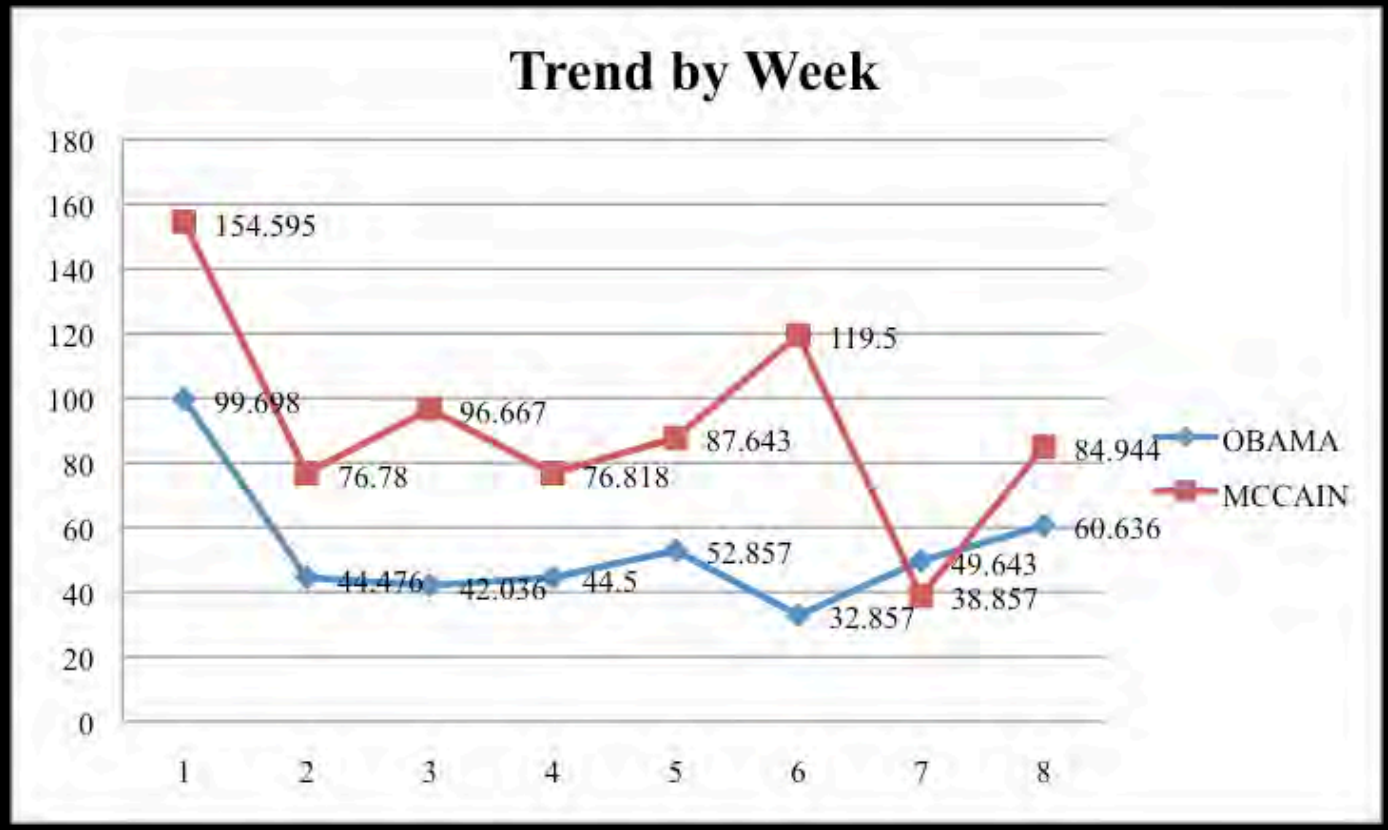
Engineering Beliefs and Attitudes



A Better Strategy?



Measuring Collective Processes: The Presidential Election



In many ways, Woelfel's theory was the closest that any social science approach came to providing the basis for an end-to-end engineering solution for planning, conducting, and assessing the impact of communications on attitudes and behaviors. This theory appears to provide a generalized framework for

• visualizing attitude structures in a multidimensional space in which the distance between attitude objects connotes their similarity or dissimilarity, with attitude objects that are judged to be similar closer together and those judged to be dissimilar farther apart

- assessing the degree of similarity in attitude structure within subgroups based on the dispersion around the average positions of attitude objects in multidimensional space

- assessing the level of crystallization, stability, or inertia in attitudes by comparing the average position of attitude objects in space at different time intervals and ascertaining whether differences are accountable to a lack of crystallization in beliefs about the objects or whether they actually reflect the movement of these objects in response to persuasive messages or other factors

identifying the most effective and efficient campaign themes and messages for changing attitudes in a target audience by identifying where in multidimensional space an attitude object (e.g., “the United States”) is relative to other concepts, such as “good” and “evil,” and what other attitude objects (e.g., “England”) might be associated with “the United States” to move it to a more favorable position. (Larson, et. al., 2009)

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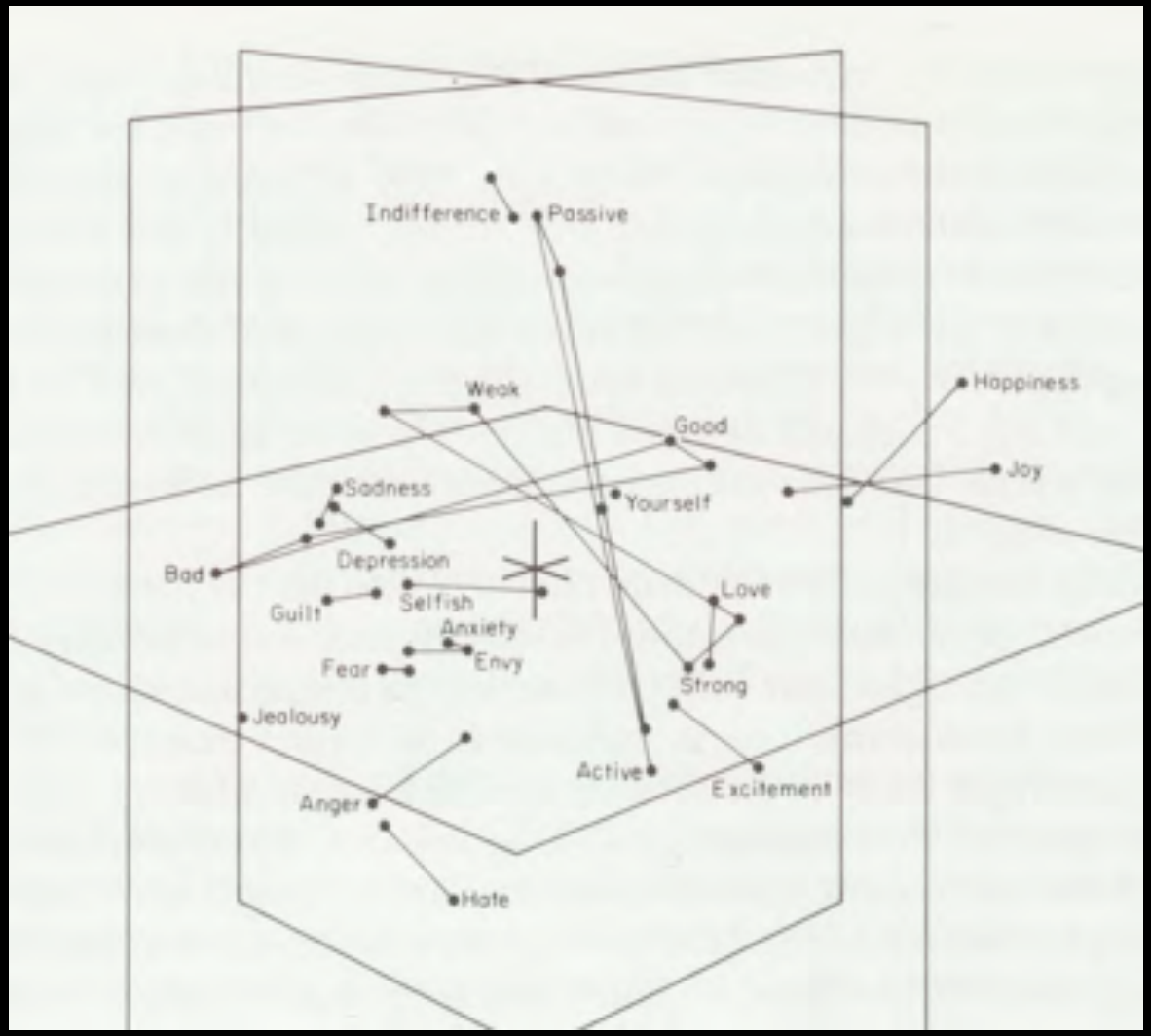
Attributes as Points



Social Science is Harder, Because it's Unmeasureable

- Immaterial
- "Volatile and evenescent"
- Free will
- Socially constructed

Physical Reality is Socially Constructed

- *(T)he idea of material objects that are completely independent of the manner in which we observe them proved to be nothing but an abstract extrapolation, something which has no counterpart in nature. Werner Heisenberg*

- *A careful analysis of the process of observation in atomic physics has shown that the subatomic particles have no meaning as isolated entities, but can only be understood as interconnections between the preparation of an experiment and the subsequent measurement. Erwin Schrodinger*

- *The first principle is that you must not fool yourself and you are the easiest person to fool. Richard Feynmann*

Scaling