

# Finding Happiness

Last updated: 2023/08/22, 11:48:21 EDT

Principles of Complex Systems, Vols. 1, 2, & 3D  
CSYS/MATH 6701, 6713, & a pretend number,  
2023-2024 | @pocsvox

Prof. Peter Sheridan Dodds | @peterdodds

Computational Story Lab | Vermont Complex Systems Center  
Santa Fe Institute | University of Vermont



Licensed under the [Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License](https://creativecommons.org/licenses/by-nc-sa/3.0/).

- The PoCSverse
- Finding Happiness
- Happiness
- 1 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

## A few more key papers:



"Sentiment analysis methods for understanding large-scale texts: A case for using continuum-scored words and word shift graphs" [↗](#), Reagan et al., EPJ Data Science, **6**, 2017. <sup>[37]</sup>



"Generalized word shift graphs: A method for visualizing and explaining pairwise comparisons between texts" [↗](#) Gallagher et al., EPJ Data Science, **10**, 4, 2021. <sup>[17]</sup>



"Ousiometrics and Telegnomics: The essence of meaning conforms to a two-dimensional powerful-weak and dangerous-safe framework with diverse corpora presenting a safety bias" [↗](#) Dodds et al., 2021. <sup>[9]</sup>

## This is a Collateralized Debt Obligation:



- The PoCSverse
- Finding Happiness
- Happiness
- 4 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

## Outline

- Introduction
- Measurement
- Happiness
  - Some motivation
  - Measuring emotional content
  - Hedonometer
  - Analysis
  - Songs
  - Bligs
  - SOTU
  - A Better Lexical Lens
  - Geography
  - Movement
  - Extras

## References

- The PoCSverse
- Finding Happiness
- Happiness
- 2 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

## Economics, Schmeconomics

### Alan Greenspan (September 18, 2007):

"I've been dealing with these big mathematical models of forecasting the economy ...

If I could figure out a way to determine whether or not people are more fearful or changing to more euphoric,

I don't need any of this other stuff.

I could forecast the economy better than any way I know."



<http://wikipedia.org>

- The PoCSverse
- Finding Happiness
- Happiness
- 5 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSverse
- Finding Happiness
- Happiness
- 8 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

### Robert Kennedy on the Gross Domestic Product (GDP) in 1968:

"It measures everything except that which makes life worthwhile. And it can tell us everything about America except why we are proud that we are Americans." <sup>[26, 25]</sup>

## A few key papers:



"Measuring the happiness of large-scale written expression: Songs, bligs, and presidents," [↗](#), Dodds and Danforth, Journal of Happiness Studies, **11**, 441-456, 2009. <sup>[11]</sup>



"Temporal patterns of happiness and information in a global social network: Hedonometrics and Twitter" [↗](#) Dodds et al., PLoS ONE, **6**, e26752, 2011. <sup>[13]</sup>



"Positivity of the English language" [↗](#), Kloumann et al., PLoS ONE, **7**, e29484, 2012. <sup>[28]</sup>



"Human language reveals a universal positivity bias" [↗](#), Dodds et al., Proc. Natl. Acad. Sci., **112**, 2389-2394, 2015. <sup>[10]</sup>

- The PoCSverse
- Finding Happiness
- Happiness
- 3 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

## Economics, Schmeconomics

### Greenspan continues:

"The trouble is that we can't figure that out. I've been in the forecasting business for 50 years. I'm no better than I ever was, and nobody else is. Forecasting 50 years ago was as good or as bad as it is today. And the reason is that human nature hasn't changed. We can't improve ourselves."

### Jon Stewart:

"You just bummed the @\*!# out of me."



[wildbluffmedia.com](http://wildbluffmedia.com)

- [↗](#) From the Daily Show [↗](#) (September 18, 2007; @5:13)
- [↗](#) The full interview is [here](#) [↗](#).

- The PoCSverse
- Finding Happiness
- Happiness
- 6 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

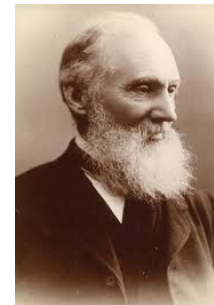
## Basic Science ≈ Describe + Explain:

### Lord Kelvin (possibly):

- [↗](#) "To measure is to know."
- [↗](#) "If you cannot measure it, you cannot improve it."

### But also:

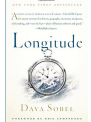
- [↗](#) "There is nothing new to be discovered in physics now. All that remains is more and more precise measurement."
- [↗](#) "X-rays will prove to be a hoax."



- The PoCSverse
- Finding Happiness
- Happiness
- 9 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

## A brief history of measuring time:

- Megaliths for Big Time
- Sundials, 1500 BC, Egypt (solid for over 2000 years)
- Escapements (200s), Hourglasses (1300s?), Pendulum clocks (Galileo, 1500s)
- Chronometers, 1700s:



"Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time" by Dava Sobel (2007). [39]

- Billionths of a second accuracy: Atomic clocks (Lord Kelvin, 1879)

The PoCSVerse  
Finding  
Happiness  
10 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

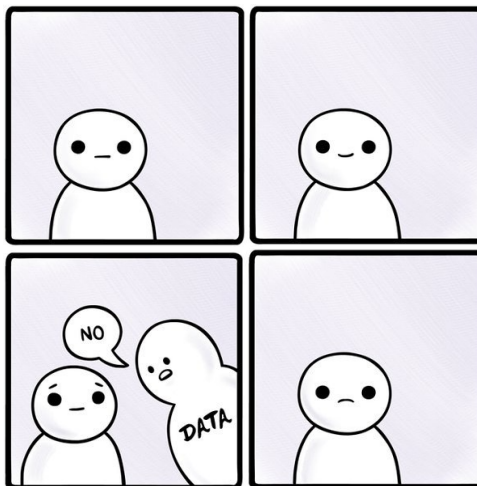
A Better Lexical Lens

Geography

Movement

Extras

References



THIS COMIC MADE POSSIBLE THANKS TO ADAM LINGELBACH

MRLOVENSTEIN.COM

The PoCSVerse  
Finding  
Happiness  
13 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

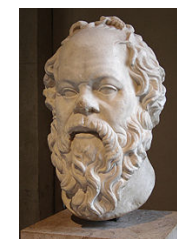
A Better Lexical Lens

Geography

Movement

Extras

References



Socrates et al.: eudaimonia [23]



Bentham: hedonistic calculus



Jefferson: ...the pursuit of happiness

The PoCSVerse  
Finding  
Happiness  
17 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

A Better Lexical Lens

Geography

Movement

Extras

References

## Measuring temperature was thought impossible:

The properties measured by our instruments usually begin as subjective judgments. Temperature is a good example. People were aware of variations in temperature long before there were any objective measurements of temperature. Judgments of temperature are imperfectly correlated among different persons, or even the same person at different times, depending on the humidity, the person's activity level and age, surrounding air currents, and so on. The idea that anything as subtle and complex as all the manifestations of changes in temperature could be measured and quantified on a single numerical scale was scoffed at as impossible, even by the leading philosophers of the sixteenth century.

The first thermometer invented by Galileo in 1592 did not go far in dispelling the notion that temperature was inherently unmeasurable, because the earliest thermometers, for about their first hundred years, were so imperfect as to make it possible for those who wished to do so to argue that no one could ever succeed in measuring temperature. Temperature was then confounded with all the subtleties of subjective judgment, which easily seem incompatible with a single numerical scale of measurement. How could the height of a column of mercury in a glass tube possibly reflect the rich varieties of temperature—damp cold, dank cold, frosty cold, crisp cold, humid heat, searing heat, scalding heat, dry heat, feverish heat, prickly heat, and so on?

From "Bias in Mental Testing", Arthur Jensen, 1980 [22]  
per @SilverVulpes: Also: Inventing Temperature, Hasok Chang, 2004 [3]

The PoCSVerse  
Finding  
Happiness  
11 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

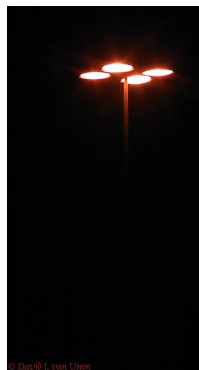
A Better Lexical Lens

Geography

Movement

Extras

References



© Dan© J. van Driel

## What matters and what's measurable:

The PoCSVerse  
Finding  
Happiness  
14 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

A Better Lexical Lens

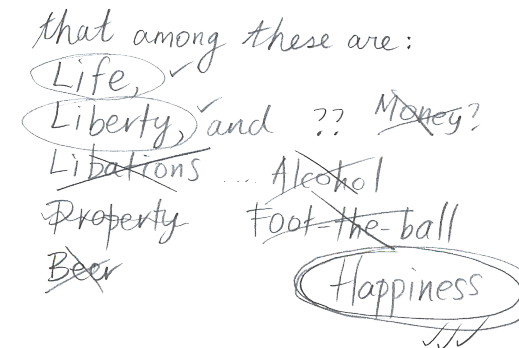
Geography

Movement

Extras

References

### Early drafts:



The PoCSVerse  
Finding  
Happiness  
18 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

A Better Lexical Lens

Geography

Movement

Extras

References

## Measuring temperature was thought impossible:

The early thermometers were inconsistent, both with themselves and with each other. Because they consisted of open-ended glass tubes, they were sensitive to changes in barometric pressure as well as to temperature. And there were problems of calibration, such as where to locate the zero point and how to divide the column of mercury into units. It was believed, incorrectly, that all caves had the same temperature, so thermometers were calibrated in caves. The freezing and boiling points of water were also used in calibration, but, as these vary with impurities in the water and the barometric pressure, the calibration of different thermometers at different times and places resulted in thermometers that failed to correlate perfectly with one another in any given instance. They lacked reliability, as we now would say.

All the while, no one knew what temperature is in a theoretical or scientific sense. There was no theory of thermodynamics that could explain temperature phenomena and provide a complete scientific rationale for the construction and calibration of thermometers. Yet quite adequate and accurate thermometers, hardly differing from those we use today, were eventually developed by the middle of the eighteenth century. Thus the objective measurement of temperature considerably preceded the development of an adequate theory of temperature and heat, and necessarily so, as the science of thermodynamics could not possibly have developed without first having been able to quantify or measure the temperatures of liquids, gasses, and other substances independently of

From "Bias in Mental Testing", Arthur Jensen, 1980 [22]  
per @SilverVulpes: Also: Inventing Temperature, Hasok Chang, 2004 [3]

The PoCSVerse  
Finding  
Happiness  
12 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

A Better Lexical Lens

Geography

Movement

Extras

References

## Panometer—Three kinds of lexical meters:



- Principled lexical meters:
  - The Hedonometer.
  - The Lexicocalorimeter.
- Ground truth lexical meters:
  - Insomniometer.
  - Hangoverometer.
- Bootstrap lexical meters:
  - Boredometer.
  - Hashtagometers.

The PoCSVerse  
Finding  
Happiness  
16 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

A Better Lexical Lens

Geography

Movement

Extras

References

## Happiness:

Even the odd modern economist is happy:

"Happiness" by Richard Layard [29]



[amazon]

The PoCSVerse  
Finding  
Happiness  
19 of 159

Introduction

Measurement

Happiness

Some motivation

Measuring emotional content

Hedonometer

Analysis

Songs

Bligs

SOTU

A Better Lexical Lens

Geography

Movement

Extras

References

# What makes us happy?—Layard's summary:

## Dominant factors:

- Family relationships
- Financial situation
- Work
- Community and Friends
- Health
- Personal Values
- Personal Freedom

## Unimportant factors:

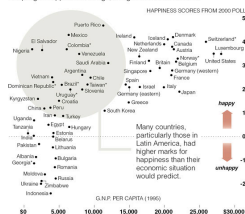
- Age
- Gender
- Education
- Inherent intelligence
- Looks

## Desiring happiness—not just for boffins:

- Average people routinely report being happy is what they want most in life [29, 30, 8]
- And it matters: “Happy people live longer:…” Survey by Diener and Chan. [8]

### A Plateau of Happiness

A country's wealth may not always dictate the happiness of its people. As part of the World Values Survey project, inhabitants of different countries and territories were asked how happy or satisfied they were. Below is a sampling of happiness rankings, along with economic status.



## National indices of well-being:

- Bhutan
- UK
- France
- Australia

# Some easy knocks:

Colbert: “Happiness is totally overrated ...”

“Happiness is for the weak.”



Full interview with Jennifer Senior [here](#) (2014/02/03)

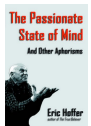
30 Rock, S7E8:



JD: “Before she died, Colleen told me—she just wants me to be happy. ‘I just want you to be happy.’ You know who you say that to? A loser. Someone who can't hope for anything more in life than just being happy. You say that to someone who has disappointed you.”  
LL: “Jack.”

JD: “No. It's perfect. She's a genius. One last twist of the knife. Well, thank you for coming, Lemon, but I better get going. The funeral is tomorrow. Colleen wanted to be buried before the rest of the family found out and sold her body to a haunted house. And, of course, I get to eulogize Colleen at the service. One more chance to disappoint her as she looks up at me from her throne in hell.

# Some easy knocks:



“The Passionate State of Mind: And Other Aphorisms” by Eric Hoffer (1954). [21]

“The search for happiness is one of the chief sources of unhappiness.”

- The PoCSVerse Finding Happiness 20 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSVerse Finding Happiness 21 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSVerse Finding Happiness 23 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

## Meaning rather than happiness:



“Mindfulness in Plain English” by Henepola Gunaratana (1992). [20]



“Flow” by Mihaly Csikszentmihalyi (1990). [6]

- Can we measure Flow in a big data way?
- Maybe drops in social media usage indicate people are doing okay?

# Emotional content

## So how does one measure

- happiness?
- levels of other emotional states?

## Just ask people how happy they are.

- Experience sampling [5, 7, 6] (Csikszentmihalyi et al.)
- Day reconstruction [24] (Kahneman et al.)

## But self-reporting has some drawbacks:

- relies on memory and self-perception
- induces misreporting [31]
- costly

# Happiness, attention, and doing:

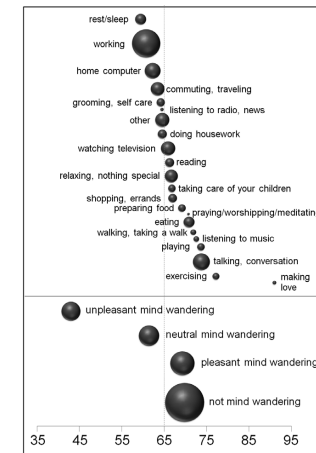


Fig. 1. Mean happiness reported during each activity (top) and while mind wandering (bottom). Dashed line indicates mean of happiness across all samples. Bubble area indicates the frequency of occurrence. The largest bubble (“not mind wandering”) corresponds to 53.1% of the samples, and the smallest bubble (“praying/worshipping/meditating”) corresponds to 0.1% of the samples.

Killingsworth and Gilbert, Science, 2010 [27]

## We'd like to build an ‘hedonometer’:



- An instrument to ‘remotely-sense’ emotional states and levels, in real time or post hoc.

## Ideally:

- Transparent
- Fast
- Based on written expression
- Uses human evaluation
- Non-reactive
- Complementary to self-reported measures
- Improvable

- The PoCSVerse Finding Happiness 24 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSVerse Finding Happiness 26 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSVerse Finding Happiness 27 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

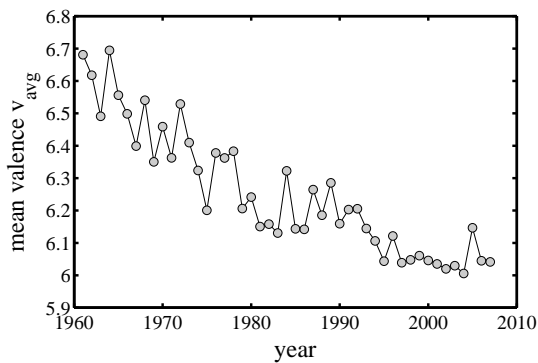
- The PoCSVerse Finding Happiness 28 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSVerse Finding Happiness 29 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

- The PoCSVerse Finding Happiness 31 of 159
- Introduction
- Measurement
- Happiness
- Some motivation
- Measuring emotional content
- Hedonometer
- Analysis
- Songs
- Bligs
- SOTU
- A Better Lexical Lens
- Geography
- Movement
- Extras
- References

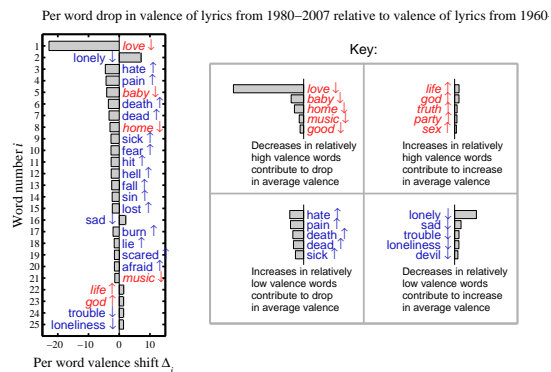


## Song Lyrics—average happiness



The PoCSverse  
Finding Happiness  
43 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Happiness Word Shift Graph (early version):

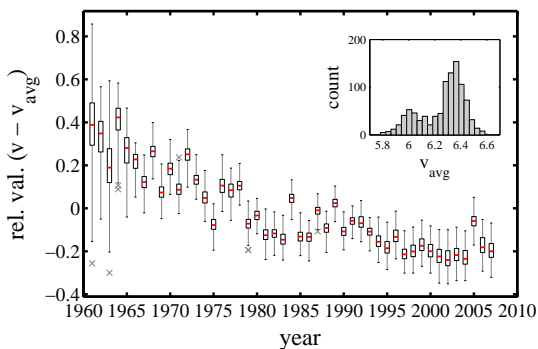


☞ Word shifts are word clouds for grown ups.

The PoCSverse  
Finding Happiness  
46 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

- ↑: Increased usage of relatively positive words—If a word is happier than text  $T_{ref}$  (+) and appears relatively more often in text  $T_{comp}$  (↑), then the contribution to the difference  $h_{avg}^{(comp)} - h_{avg}^{(ref)}$  is positive;
- ↓: Decreased usage of relatively negative words—If a word is less happy than text  $T_{ref}$  (-) and appears relatively less often in text  $T_{comp}$  (↓), then the contribution to the difference  $h_{avg}^{(comp)} - h_{avg}^{(ref)}$  is also positive;
- ↑↓: Decreased usage of relatively positive words—If a word is happier than text  $T_{ref}$  (+) and appears relatively less often in text  $T_{comp}$  (↓), then the contribution to the difference  $h_{avg}^{(comp)} - h_{avg}^{(ref)}$  is negative; and
- ↓↑: Increased usage of relatively negative words—If a word is less happy than text  $T_{ref}$  (-) and appears relatively more often in text  $T_{comp}$  (↑), then the contribution to the difference  $h_{avg}^{(comp)} - h_{avg}^{(ref)}$  is also negative.

## Song Lyrics—measurement robustness



100 random subsets of 750 ANEW words

The PoCSverse  
Finding Happiness  
44 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Word data shift details:

- ☞ Given two texts  $T_{ref}$  and  $T_{comp}$ :
- ☞ Measure difference in average happiness:  
 $h_{avg}^{(comp)} - h_{avg}^{(ref)}$
- ☞ Evident question: Which words contribute the most to this change?
- ☞ Break difference down by contributions from individual words:

$$\delta h_{avg,i} = \frac{100}{h_{avg}^{(comp)} - h_{avg}^{(ref)}} \underbrace{[h_{avg}(w_i) - h_{avg}^{(ref)}]}_{+/-} \underbrace{[p_i^{(comp)} - p_i^{(ref)}]}_{\uparrow/\downarrow}$$

- ☞ Must have:  $\sum_i \delta h_{avg,i} = \pm 100$
- ☞ Rank words by  $|\delta h_{avg,i}|$

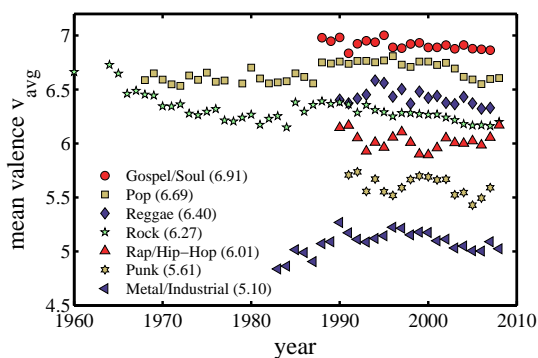
## Top 50 of $\approx 20,000$ artists:

Rank	Artist	$h_{avg}$	Rank	Artist	$h_{avg}$
1	All-4-One	7.15	26	Sarah Connor	6.86
2	Luther Vandross	7.12	27	Darlene Zschech	6.86
3	S Club 7	7.05	28	Mary J Blige	6.86
4	K Ci & JoJo	7.04	29	Steve Miller Band	6.86
5	Perry Como	7.04	30	New Edition	6.86
6	Diana Ross & The Supremes	7.03	31	Mandy Moore	6.86
7	Buddy Holly	7.02	32	Alicia Keys	6.85
8	Faith Evans	7.01	33	Cher	6.85
9	The Beach Boys	7.01	34	Modern Talking	6.85
10	Jon B	6.98	35	Mario	6.84
11	Dru Hill	6.96	36	Aretha Franklin	6.84
12	Earth Wind & Fire	6.95	37	Jessica Simpson	6.84
13	Ashanti	6.95	38	112	6.84
14	Otis Redding	6.93	39	Backstreet Boys	6.83
15	Faith Hill	6.93	40	Billy Gilman	6.83
16	NSync	6.93	41	B2K	6.82
17	The Supremes	6.91	42	Stevie Wonder	6.82
18	The Partridge Family	6.91	43	John Legend	6.81
19	Kelly Price	6.89	44	Ricky Nelson	6.79
20	Tamia	6.89	45	Lionel Richie	6.79
21	Avant	6.88	46	98 Degrees	6.79
22	Jennifer Lopez	6.88	47	Boyzone	6.79
23	Vanessa Williams	6.87	48	Gerald Levert	6.79
24	Vanface	6.87	49	Nat King Cole	6.78
25	E Rotic	6.87	50	Marques Houston	6.78

(criteria:  $\geq 50$  songs and  $\geq 1000$  ANEW words)

The PoCSverse  
Finding Happiness  
49 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Song Lyrics—average happiness of genres:



The PoCSverse  
Finding Happiness  
45 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Word data shift details:

$$\begin{aligned} h_{avg}^{(comp)} - h_{avg}^{(ref)} &= \sum_{i=1}^N h_{avg}(w_i) p_i^{(comp)} - \sum_{i=1}^N h_{avg}(w_i) p_i^{(ref)} \\ &= \sum_{i=1}^N h_{avg}(w_i) [p_i^{(comp)} - p_i^{(ref)}] \\ &= \sum_{i=1}^N [h_{avg}(w_i) - h_{avg}^{(ref)}] [p_i^{(comp)} - p_i^{(ref)}] \end{aligned}$$

where

$$\begin{aligned} \sum_{i=1}^N h_{avg}^{(ref)} [p_i^{(comp)} - p_i^{(ref)}] &= h_{avg}^{(ref)} \sum_{i=1}^N [p_i^{(comp)} - p_i^{(ref)}] \\ &= h_{avg}^{(ref)} (1 - 1) = 0. \end{aligned}$$

The PoCSverse  
Finding Happiness  
48 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Bottom 50 of $\approx 20,000$ artists:

Rank	Artist	$h_{avg}$	Rank	Artist	$h_{avg}$
1	Slayer	4.80	26	Nine Inch Nails	5.34
2	Misfits	4.88	27	Sevendust	5.34
3	Staind	4.93	28	AniMator	5.35
4	Slinknot	4.98	29	Biohazard	5.36
5	Darkthrone	4.98	30	Insane Clown Posse	5.36
6	Death	5.02	31	Megadeth	5.36
7	Black Label Society	5.05	32	Manowar	5.37
8	Pig	5.08	33	Zebrahead	5.38
9	Voivod	5.14	34	Danzig	5.39
10	Fear Factory	5.15	35	Acid Drinkers	5.40
11	Iced Earth	5.16	36	Dag Nasty	5.40
12	Simple Plan	5.16	37	Iron Maiden	5.40
13	Machine Head	5.17	38	Flotsam And Jetsam	5.41
14	Metallica	5.19	39	Powerman 5000	5.42
15	Dimmu Borgir	5.20	40	Anthrax	5.43
16	Mudvayne	5.21	41	Rhapsody	5.43
17	Linkin Park	5.22	42	Korn	5.43
18	Papa Roach	5.22	43	Rage	5.44
19	Audioslave	5.24	44	Accept	5.45
20	Rage Against The Machine	5.24	45	Esham	5.46
21	Cradle Of Filth	5.25	46	Blind Guardian	5.46
22	Dark Tranquillity	5.26	47	White Zombie	5.47
23	Jack Off Jill	5.28	48	Helloween	5.50
24	Evanescence	5.30	49	W A S P	5.50
25	Twiztid	5.33	50	Green Day	5.50

(criteria:  $\geq 50$  songs and  $\geq 1000$  ANEW words)

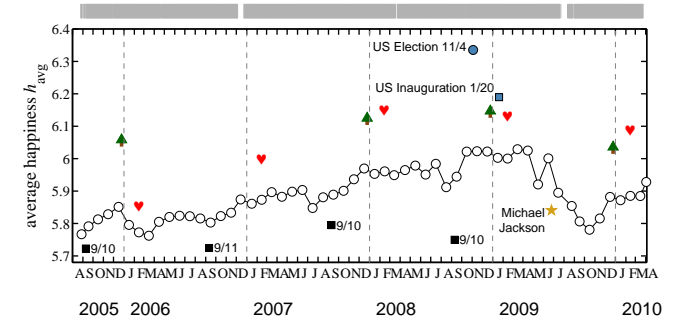
The PoCSverse  
Finding Happiness  
51 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

Text:	$h_{avg}$	Words with a similar score:
Soul/Gospel lyrics [12]	6.9	chocolate (6.88), leisurely (6.88), penthouse (6.81)
Pop lyrics [12]	6.7	dream (6.73), honey (6.73), sugar (6.74)
Dante's Paradise [?]	6.5	muffin (6.57), rabbit (6.57), smooth (6.58)
Tweets, 9/9/2008 to 12/31/2010	6.4	thought (6.39), face (6.39), blond (6.42)
Rock lyrics [12]	6.3	church (6.28), tree (6.32), air (6.34)
Enron Emails [2]	6.2	clouds (6.18), alert (6.20), computer (6.24)
State of the Union Messages [12]	6.1	grass (6.12), idol (6.12), bottle (6.15)
New York Times (1987–2007) [38]	6.0	hotel (6.00), tennis (6.02), wonder (6.03)
Blogs [12]	5.8	owl (5.80), whistle (5.81), humble (5.86)
Dante's Inferno [2]	5.5	glacier (5.50), repentant (5.53), mischief (5.57)
Heavy Metal lyrics [12]	5.4	lamp (5.41), elevator (5.44), truck (5.47)

So I really consider myself a storyteller. But I don't really tell stories in the usual way, in the sense that I don't usually tell my own stories. Instead, I'm really interested in building tools that allow large numbers of other people to tell their stories, people all around the world. I do this because I think that people actually have a lot in common. I think people are very similar, but I also think that we have trouble seeing that.

The PoCSVerse Finding Happiness 57 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Blogs—Overall trend



## Lexicon Valley, Episode #62, June 17, 2015

Mike Vuolo and Bob Garfield.



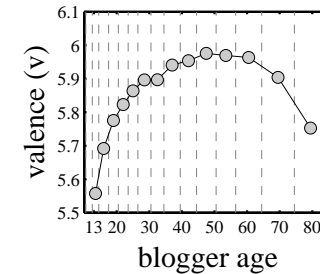
Language has a Positivity Bias. How did we measure that?

The PoCSVerse Finding Happiness 53 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## wefeelfine.org:

The PoCSVerse Finding Happiness 58 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## From wefeelfine.org by Jonathan Harris & Sep Kamvar

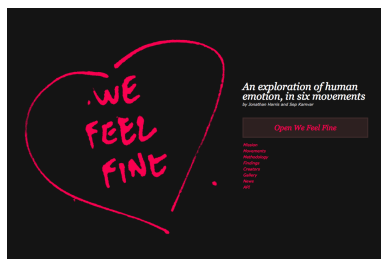


Average happiness as a function of the age bloggers report they will turn in the year of their posting.

The PoCSVerse Finding Happiness 62 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Data sets:

Blog phrases containing "I feel...", "I am feeling", etc., taken from wefeelfine.org (API, 2005–2010)



Created by Jonathan Harris & Sep Kamvar

The PoCSVerse Finding Happiness 55 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

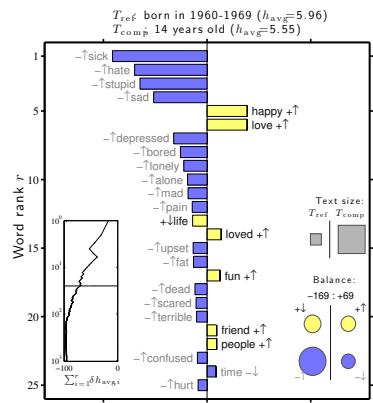
## wefeelfine.org:

The PoCSVerse Finding Happiness 59 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## Blogs—Age

- Self-report studies find **little variation** in happiness with age [14, 15]
- Surprising: Expect a rise and fall.
- A 'challenge' for theory...
- Related to the **Easterlin Paradox**: **Money doesn't buy happiness**
- But maybe it does a little bit—Veenhoven & Hagerty (2003) and Wolfers & Stevenson (2008).

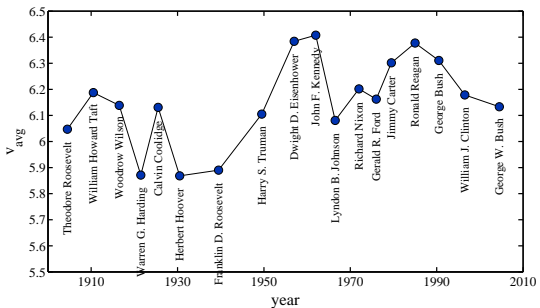
The PoCSVerse Finding Happiness 63 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



Per word average happiness shift  $\delta h_{avg,r}$  (%)

PoCVerse Finding Happiness 64 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Presidential happiness:



PoCVerse Finding Happiness 68 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### labMT 1.0:

### language assessment by Mechanical Turk



Four corpora:  
 Twitter  
 Google Books  
 Music Lyrics  
 New York Times

5000 most frequently used words for each corpus.  
 10,222 words, 50 evaluations each, 1-9 scale: [32]

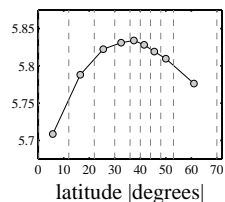


PoCVerse Finding Happiness 72 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Blogs—Latitude

Near equator—social factors

- Increase in 'sad', 'bored', 'lonely', 'stupid', 'guilty'
- Decrease in 'good' and 'people'

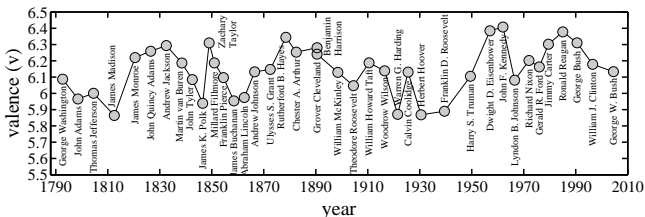


Near poles—social/psychological/climate

- Increase in 'sick', 'guilty', 'cold', 'depressed', and 'headache' and decrease of 'love' and 'life.'
- Offset by decrease in 'hurt' and 'pain.'
- More 'bed' and 'sleep.'

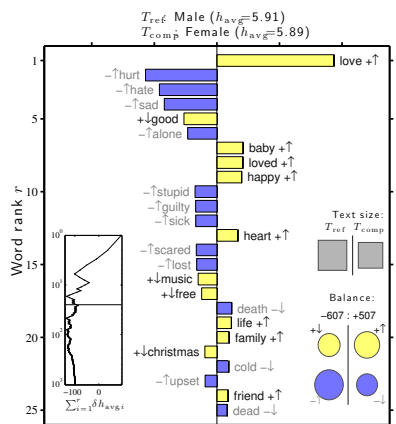
PoCVerse Finding Happiness 65 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Presidential happiness:

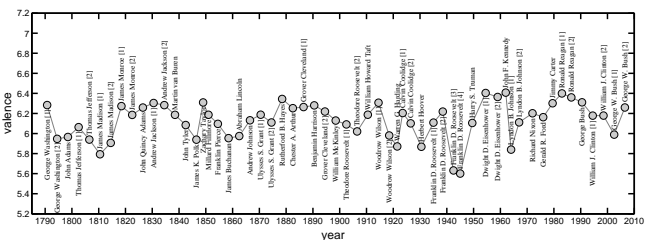


PoCVerse Finding Happiness 73 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

PoCVerse Finding Happiness 66 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



Per word average happiness shift  $\delta h_{avg,r}$  (%)



valence rank	word	valence	std dev	twitter rank	g-books rank	nyt rank	lyrics rank
1	laughter	8.50	0.93	3600	-	-	1728
2	happiness	8.44	0.97	1853	2458	-	1230
3	love	8.42	1.11	25	317	328	23
4	happy	8.30	0.99	65	1372	1313	375
5	laughed	8.26	1.16	3334	3542	-	2332
6	laugh	8.22	1.37	1002	3998	4488	647
7	laughing	8.20	1.11	1579	-	-	1122
8	excellent	8.18	1.10	1496	1756	3155	-
9	laughs	8.18	1.16	3554	-	-	2856
10	joy	8.16	1.06	988	2336	2723	809
11	successful	8.16	1.08	2176	1198	1565	-
12	win	8.12	1.08	154	3031	776	694
13	rainbow	8.10	0.99	2726	-	-	1723
14	smile	8.10	1.02	925	2666	2898	349
15	won	8.10	1.22	810	1167	439	1493
16	pleasure	8.08	0.97	1497	1526	4253	1398
17	smiled	8.08	1.07	-	3537	-	2248
18	rainbows	8.06	1.36	-	-	-	4216
19	winning	8.04	1.05	1876	-	1426	3646
20	celebration	8.02	1.53	3306	-	2762	4070
21	enjoyed	8.02	1.53	1530	2908	3502	-
22	healthy	8.02	1.06	1393	3200	3252	4619
23	music	8.02	1.12	132	875	167	374
24	celebrating	8.00	1.14	2550	-	-	-
25	congratulations	8.00	1.63	2246	-	-	-
26	weekend	8.00	1.29	317	-	833	2256
27	celebrate	7.98	1.15	1606	-	3574	2108
28	comedy	7.98	1.15	1444	-	2566	-
29	jokes	7.98	1.36	2312	-	-	3808
30	rich	7.98	1.32	1625	1221	1469	890
0		0	0	0	0	0	0

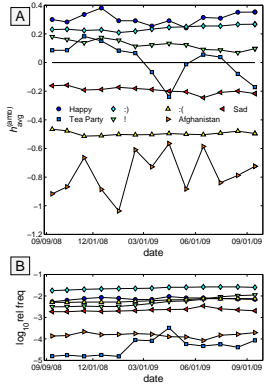
PoCVerse Finding Happiness 74 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



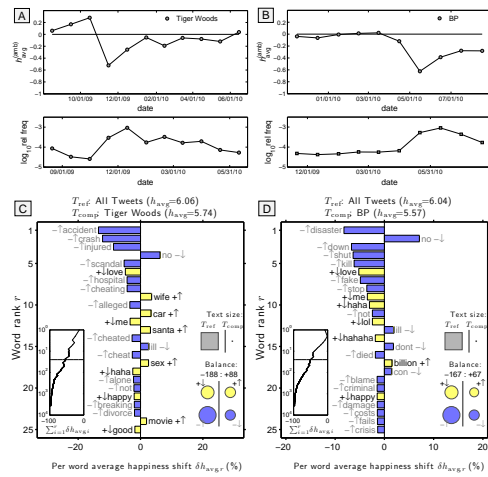




# Ambient happiness:

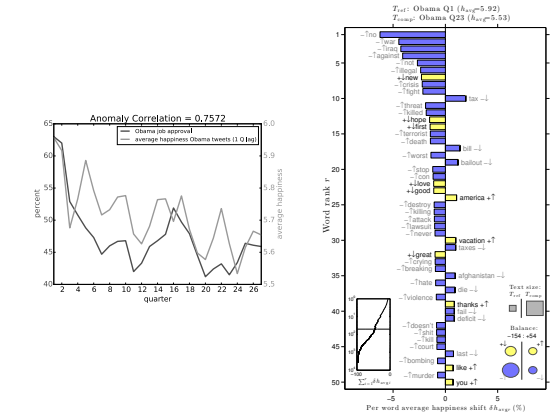


The PoCServe  
Finding  
Happiness  
93 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

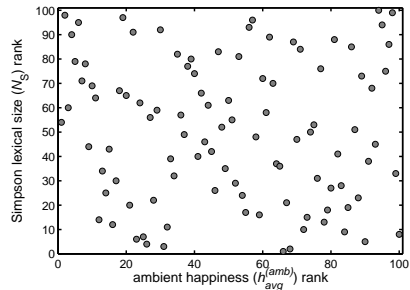


# Twitter's Feels predict Obama's Approval Rating:

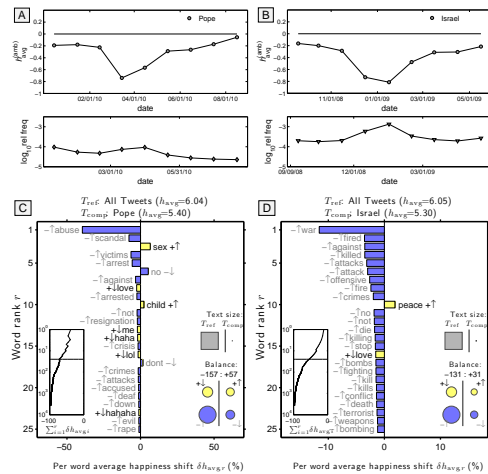
The PoCServe  
Finding  
Happiness  
95 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



The PoCServe  
Finding  
Happiness  
99 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

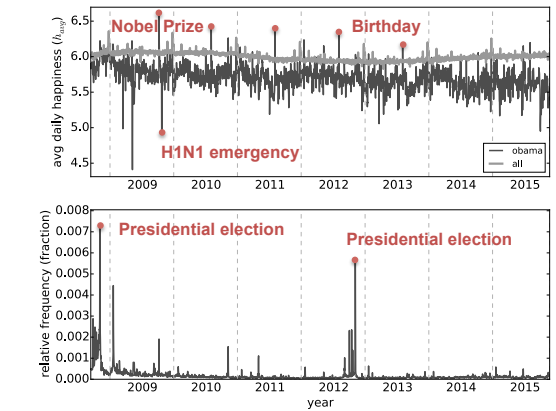


The PoCServe  
Finding  
Happiness  
94 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

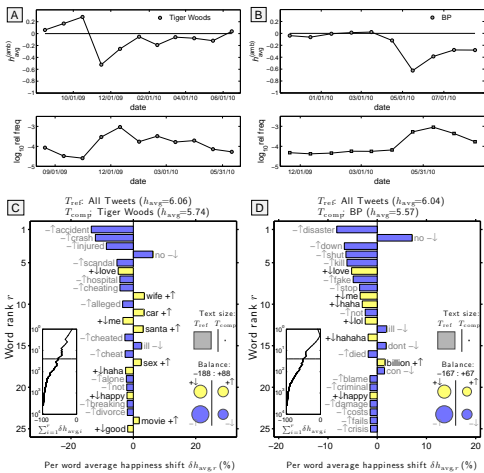


The PoCServe  
Finding  
Happiness  
97 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

# Ambient happiness for "Obama":

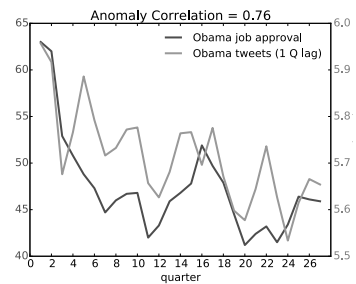


The PoCServe  
Finding  
Happiness  
100 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



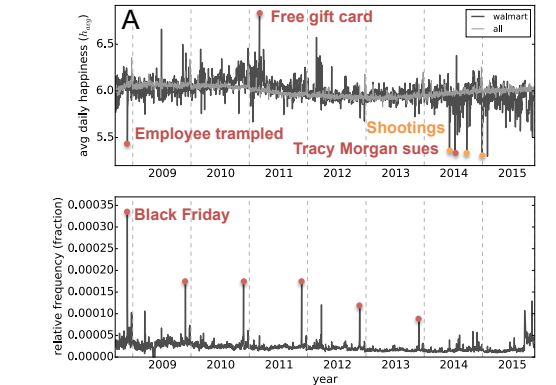
The PoCServe  
Finding  
Happiness  
95 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

"Public opinion polling with Twitter"  
Cody et al.,  
Available online at  
<https://arxiv.org/abs/1608.02024>, 2016. [4]



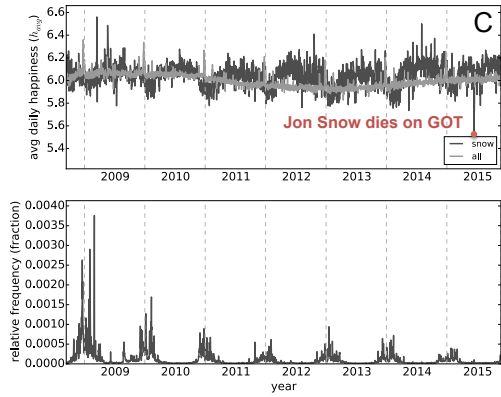
The PoCServe  
Finding  
Happiness  
98 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

# Ambient happiness for "Walmart":



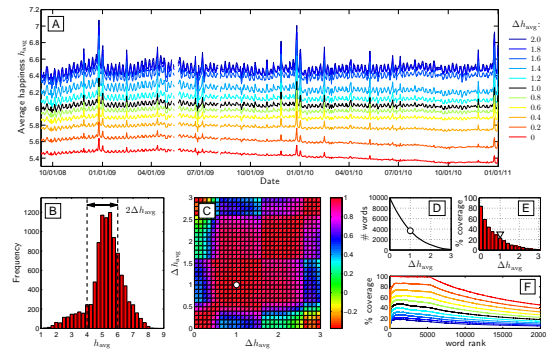
The PoCServe  
Finding  
Happiness  
101 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Ambient happiness for "snow":



The PoCServe  
Finding  
Happiness  
102 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### The very surprising tunable hedonometer:



The PoCServe  
Finding  
Happiness  
105 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

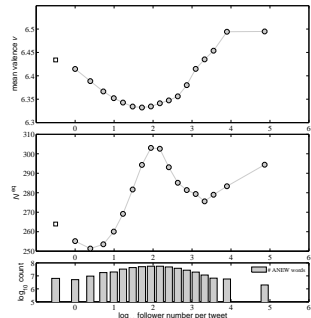
### hedonometer.org

projects About Instructions Words Blog Press Papers Talks Fund us

Average Happiness for Twitter

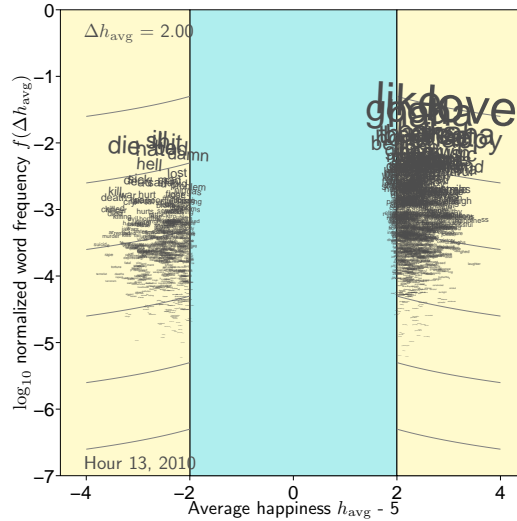
Machine: @andyreagan

### Dunbar number action:



- Early Twitter data—follower counts are not worth so much.
- Unpublished.

The PoCServe  
Finding  
Happiness  
103 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



The PoCServe  
Finding  
Happiness  
106 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

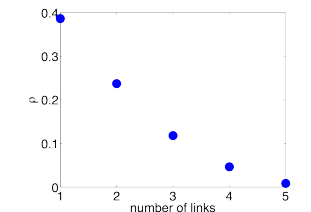
### hedonometer.org

projects About Instructions Words Blog Press Papers Talks Fund us

Average Happiness for Twitter

Machine: @andyreagan

"Twitter reciprocal reply networks exhibit assortativity with respect to happiness"  
Bliss et al.,  
Journal of Computational Science, 3, 388-397, 2012. [1]



- Decay in happiness correlation in social network.
- Not a test of contagion ...

The PoCServe  
Finding  
Happiness  
104 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Online instrument: hedonometer.org

projects About Instructions Words Blog Press Papers Talks Fund us My Wordshifts

Average Happiness for Twitter

- Machine: @andyreagan
- Planned happiness versus tragedies.

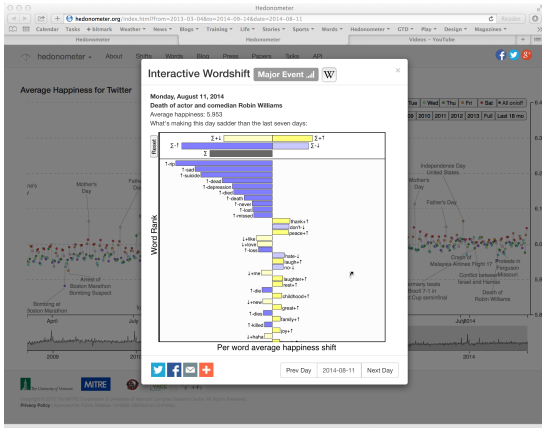
### hedonometer.org—word shifts:

hedonometer.org

Average Happiness for Twitter

The PoCServe  
Finding  
Happiness  
110 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

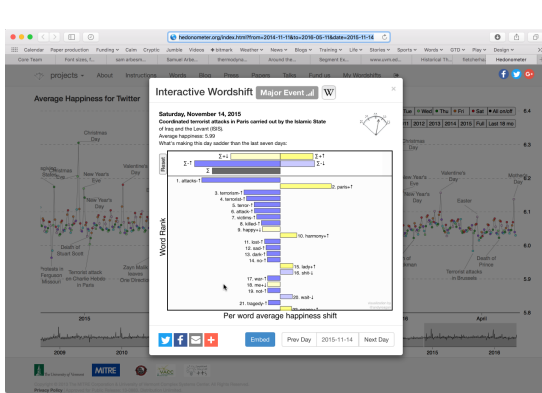
hedonometer.org — word shifts:



The PoCSverse  
Finding  
Happiness  
111 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

hedonometer.org — word shifts:



The PoCSverse  
Finding  
Happiness  
114 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

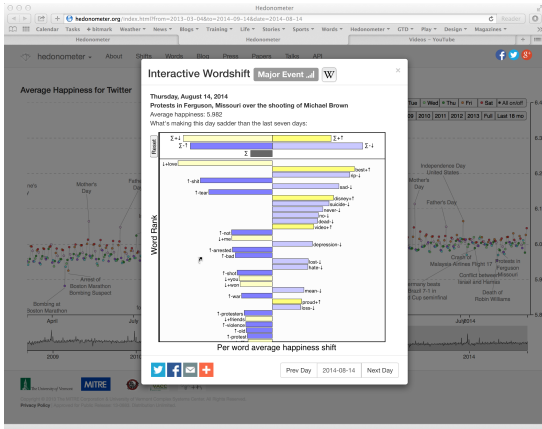


Quokka Labs

The PoCSverse  
Finding  
Happiness  
117 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

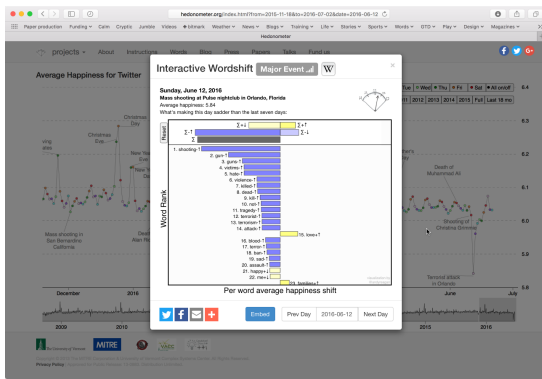
hedonometer.org — word shifts:



The PoCSverse  
Finding  
Happiness  
112 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

hedonometer.org — word shifts:

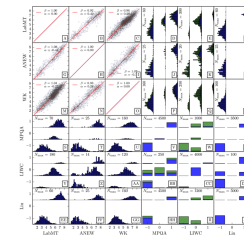


The PoCSverse  
Finding  
Happiness  
115 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



“Sentiment analysis methods for understanding large-scale texts: A case for using continuum-scored words and word shift graphs”  
Reagan et al.,  
EPJ Data Science, 6, 2017. [37]

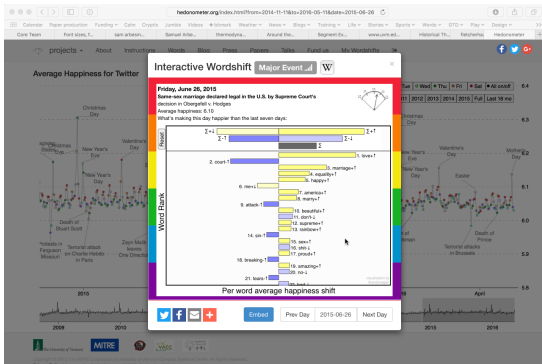


Uphots: (1) do use wordshifts, and (2) do not use LIWC ...

The PoCSverse  
Finding  
Happiness  
118 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

hedonometer.org — word shifts:



The PoCSverse  
Finding  
Happiness  
113 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

Make your own: [↗](#)

### The Wordshifterator.

Generate your own embeddable, shareable wordshifts for any pair of texts.

Note: Text must contain at least 1,000 words. Details about how this works can be found [here](#).

Reference text:	Comparison text:
<input type="text"/>	<input type="text"/>
Reference text:	Comparison text:
<input type="text"/>	<input type="text"/>

Title:

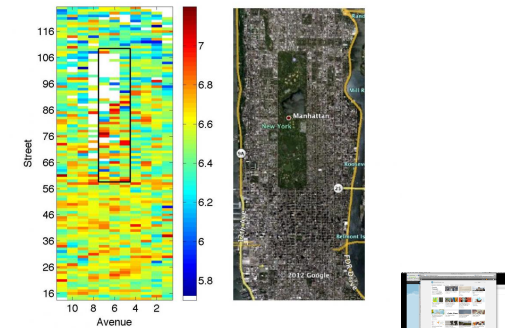
Response:

Language:

The PoCSverse  
Finding  
Happiness  
116 of 159

Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

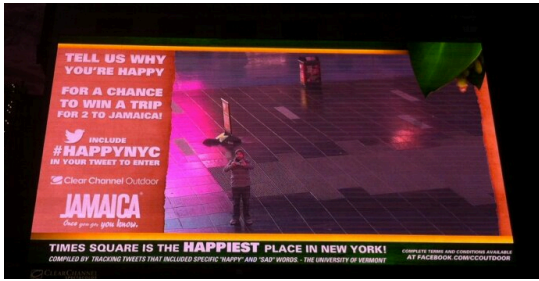
Happiness in Manhattan:



See Blog post on [compstoriolab.org](#) [↗](#)

The PoCSverse  
Finding  
Happiness  
120 of 159

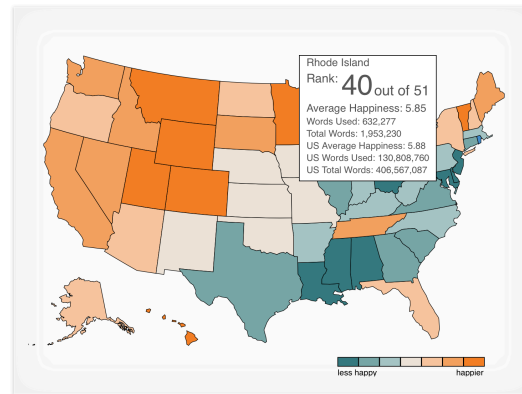
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



The PoCSVerse  
Finding  
Happiness  
121 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

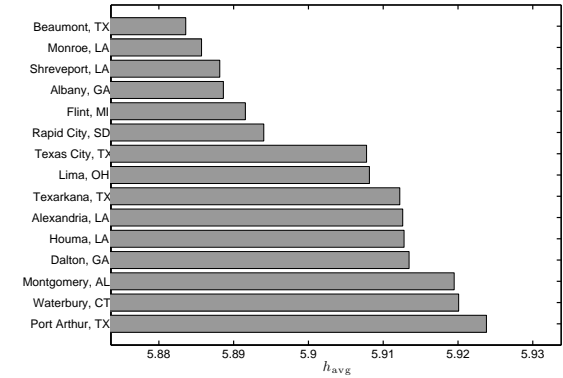
Online, interactive US map at [hedonometer.org](http://hedonometer.org)

Average Happiness of United States for 2013



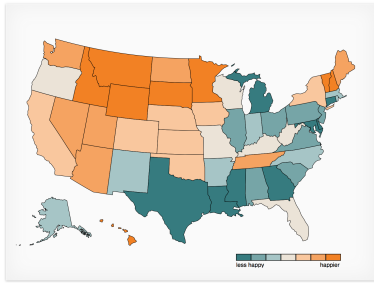
The PoCSVerse  
Finding  
Happiness  
124 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Saddest Cities (Sorry Beaumont):



The PoCSVerse  
Finding  
Happiness  
127 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### The Geography of Happiness:



The PoCSVerse  
Finding  
Happiness  
122 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

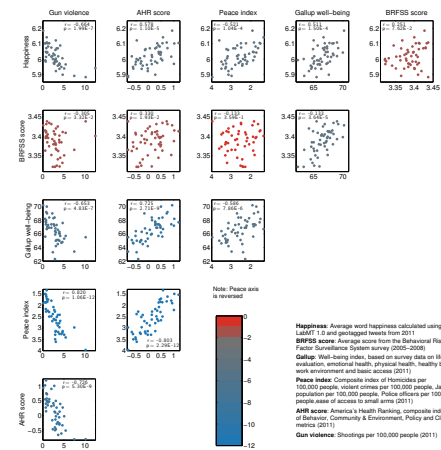
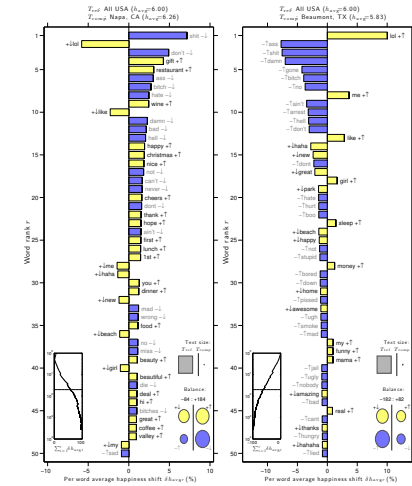


FIG. 2. Scatter plot matrix of correlations between different well-being measures. Points are colored by p-value, statistically insignificant correlations above  $p = 0.01$  are shown in red. Spearman's  $r$  and p-value are reported in the inset.

The PoCSVerse  
Finding  
Happiness  
125 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

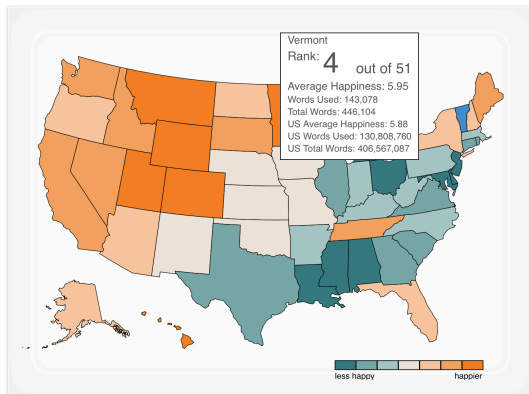


The PoCSVerse  
Finding  
Happiness  
128 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

- Mitchell et al., PLoS ONE, 2013. [35]
- It's a paper that tweets: [@geographyofhapp](https://twitter.com/geographyofhapp)
- Online Appendices
- Much interesting and amusing press ...
- Online, interactive US map at [hedonometer.org](http://hedonometer.org)

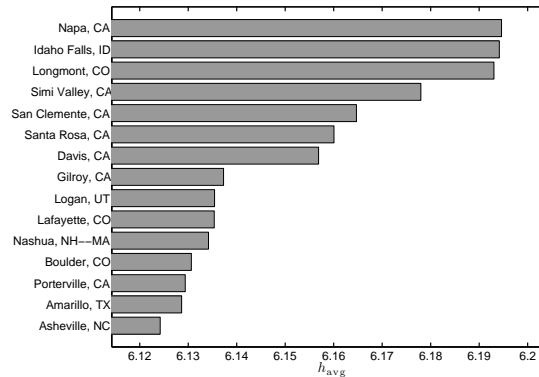
Online, interactive US map at [hedonometer.org](http://hedonometer.org)

Average Happiness of United States for 2013



The PoCSVerse  
Finding  
Happiness  
123 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

### Happiest Cities:



The PoCSVerse  
Finding  
Happiness  
126 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

rednnneecckckkkkkkkk  
2013/02/18 at 8:53 pm (Edit)



I've lived in quite a few places. The most recently Beaumont, TX. It's a pure hellhole. Hot, humid, trashy, terrible schools, corrupt government, lots of crime, no public parks or activities, terrible culture (other than crawfish boils), completely lacks diversity. This study confirms my suspicions that cities don't get any more miserable than this.

Reply  
Blog post: [Where is the happiest city in the US?](#)

The PoCSVerse  
Finding  
Happiness  
132 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

beaumontenterprise.com

News Entertainment Sports Biz Obituaries Opinion Photo Video Blogs Addiction Autos Shopping Jobs Homes

The Bayou  
Bling satire, commentary & opinion Southeast-Texas style

Eggheads find Beaumont IS the 'saddest city'

February 19, 2013 at 10:41 am by gator

Beaumont Enterprise Blogs

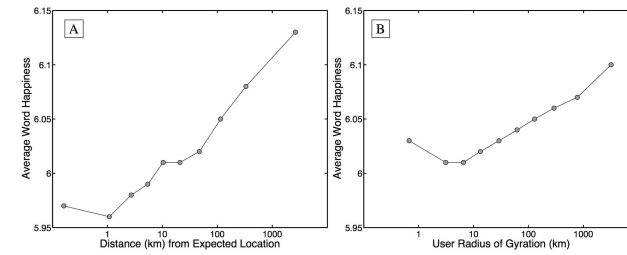
The Bayou  
Bling satire, Southeast Texas style

Newsworthy  
Breaking news for Southeast Texas

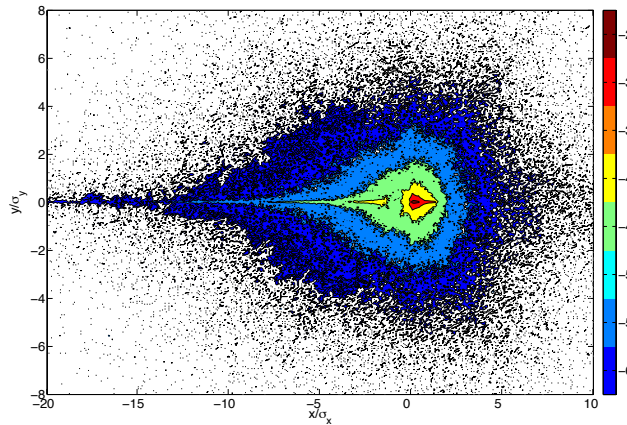
Whedya Think?  
We want to hear from you

The Huddle

The PoCVerse  
Finding  
Happiness  
133 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References



We grow fonder as we wander.



Raw movement patterns agree with cell phone data findings. [18]

For cell phone data: Time spent at locations

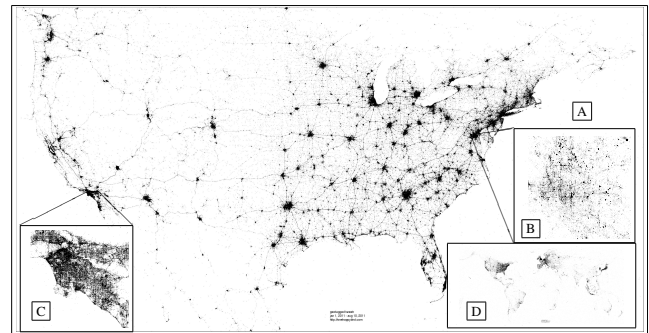


Figure 1. Each point corresponds to a geo-located tweet posted between 1/1/11 and 8/10/11. Twitter activity seems to correlate with urban areas. Note that the image contains no cartographic borders, simply a small dot for each message. Insets: A (U.S.), B (Washington, D.C.), C (Los Angeles, C.A.), and D (Earth).

"Happiness and the Patterns of Life: A Study of Geolocated Tweets" [Frank et al., Nature Scientific Reports, 3, 2625, 2013. \[16\]](#)

Summarize the PLOS one publication entitled "The Geography of Happiness: Connecting Twitter Sentiment and Expression, Demographics, and Objective Characteristics of Place" by Lewis Mitchell, Morgan R. Frank, Kameron Decker Harris, Peter Sheridan Dodds, and Christopher M. Danforth using a rhyme scheme like Dr. Seuss

In this study of sentiment on Twitter, The authors sought to see if they could deliver A connection between happiness and place, By analyzing tweets and what they could trace.

They found that location played a big part, In the positivity of a Twitter art, With income, education, and nature too, All contributing to a happier view.

The words people used were also telling, In happier places, there was more yelling, About love and friends and other good things, And fewer mentions of money or bling.

Overall, the study makes clear, That social media data can help us steer, Towards a better understanding of community well-being, And how we can improve it, by seeing what we're feeling.

Summarize the PNAS article entitled "Human language reveals a universal positivity bias" by Peter Sheridan Dodds, Eric M Clark, Suma Dasu, Morgan R Frank, Andrew J Reagan, Jake Ryland Williams, Lewis Mitchell, Kameron Decker Harris, Isabel M Kloumann, James P Bagrow, Karine Megerdooian, Matthew T McMahon, Brian F Twinn, and Christopher M Danforth. Write the summary in a rhyming scheme like Dr. Seuss.

This study looked at language, and what it can teach, About how people express themselves when they speak. The researchers analyzed words that were used, To see if there was a bias, positive or abused.

And what they found was quite revealing, A positivity bias, all people revealing. From English to Chinese, to Spanish and more, People speak positively, that's what the data bore.

Words like "love" and "happy" are used with more weight, Than negative ones like "hate" that people debate. This bias is universal, across all tongues, A happy outlook, with few pessimistic slings.

So next time you're talking, try to keep in mind, That positive words can be quite a find. They make people happier, and that's no fable, As this study shows, with language on the table.

Summarize the PLOS one publication entitled "The Geography of Happiness: Connecting Twitter Sentiment and Expression, Demographics, and Objective Characteristics of Place" by Lewis Mitchell, Morgan R. Frank, Kameron Decker Harris, Peter Sheridan Dodds, and Christopher M. Danforth. Write the summary as a sad poem in the style of Edgar Allan Poe.

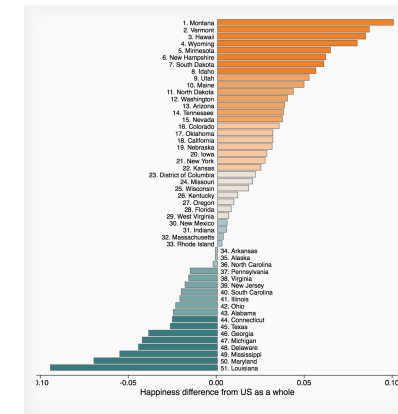
Upon Twitter's vast and dreary plain, A study sought to find what brings us pain, By analyzing tweets from sea to sea, To uncover what plagues our society.

"The Geography of Happiness" was its name, A study in PLOS ONE that sought to claim, That our well-being is tied to location, And objective factors cause our damnation.

Income, education, and access to nature, Were all factors that could shape our future, And the sentiment expressed on Twitter, Could reveal what makes us bitter.

In sad communities, words were often bleak, Depression, suicide, and loneliness we'd seek, But in happier places, joy was all around, Hope, laughter, and love could be easily found.

So take heed, dear reader, and look around, Your community's health may be easily found, In the words that we tweet and the things that we say, Our well-being is tied to our environment, come what may.



Developmental Sankey diagrams states and cities.

The PoCVerse  
Finding  
Happiness  
143 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

# Or here: Facebook Lexicon Sentiment Analysis (2008)



## Facebook Lexicon Sentiment Analysis

### Binary decision on emotional content



Limitation: Sentiments are classified as either **positive** or **negative**.

'I like Sarah Palin' given same score as 'Sarah Palin's voice fills me with unbridled joy!'

## References I

- [1] C. A. Bliss, I. M. Kloumann, K. D. Harris, C. M. Danforth, and P. S. Dodds. Twitter reciprocal reply networks exhibit assortativity with respect to happiness. *Journal of Computational Science*, 3:388–397, 2012. [pdf](#)
- [2] M. M. Bradley and P. J. Lang. Affective norms for English words (ANEW): Stimuli, instruction manual and affective ratings. Technical report c-1, University of Florida, Gainesville, FL, 1999.
- [3] H. Chang. Inventing temperature: Measurement and scientific progress. Oxford University Press, 2004.

The PoCSverse  
Finding  
Happiness  
144 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
145 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
146 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References II

- [4] E. M. Cody, A. J. Reagan, P. S. Dodds, and C. M. Danforth. Public opinion polling with Twitter, 2016. Available online at <https://arxiv.org/abs/1608.02024>. [pdf](#)
- [5] T. Conner Christensen, L. Feldman Barrett, E. Bliss-Moreau, K. Lebo, and C. Kaschub. A practical guide to experience-sampling procedures. *Journal of Happiness Studies*, 4:53–78, 2003.
- [6] M. Csikszentmihalyi. Flow. Harper & Row, New York, 1990.

## References III

- [7] M. Csikszentmihalyi, R. Larson, and S. Prescott. The ecology of adolescent activity and experience. *Journal of Youth and Adolescence*, 6:281–294, 1977.
- [8] E. Diener and M. Y. Chan. Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being*, 3:1–43, 2011. [pdf](#)
- [9] P. S. Dodds, T. Alshaabi, M. I. Fudolig, J. W. Zimmerman, J. Lovato, S. Beaulieu, J. R. Minot, M. V. Arnold, A. J. Reagan, and C. M. Danforth. Ousiometrics and Telegnomics: The essence of meaning conforms to a two-dimensional powerful-weak and dangerous-safe framework

## References IV

- with diverse corpora presenting a safety bias, 2021. Available online at <https://arxiv.org/abs/2110.06847>. [pdf](#)
- [10] P. S. Dodds, E. M. Clark, S. Desu, M. R. Frank, A. J. Reagan, J. R. Williams, L. Mitchell, K. D. Harris, I. M. Kloumann, J. P. Bagrow, K. Megerdoomian, M. T. McMahon, B. F. Tivnan, and C. M. Danforth. Human language reveals a universal positivity bias. *Proc. Natl. Acad. Sci.*, 112(8):2389–2394, 2015. Available online at <http://www.pnas.org/content/112/8/2389>. [pdf](#)

## References V

- [11] P. S. Dodds and C. M. Danforth. Measuring the happiness of large-scale written expression: Songs, blogs, and presidents. *Journal of Happiness Studies*, 11(4):441–456, 2009. [pdf](#)
- [12] P. S. Dodds and C. M. Danforth. Measuring the happiness of large-scale written expression: songs, blogs, and presidents. *Journal of Happiness Studies*, 2009. doi:10.1007/s10902-009-9150-9. [pdf](#)
- [13] P. S. Dodds, K. D. Harris, I. M. Kloumann, C. A. Bliss, and C. M. Danforth. Temporal patterns of happiness and information in a global social network: Hedonometrics and Twitter. *PLoS ONE*, 6:e26752, 2011. [pdf](#)

## References VI

- [14] R. A. Easterlin. Income and happiness: towards a unified theory. *The Economic Journal*, 111:465–484, 2001. [pdf](#)
- [15] R. A. Easterlin. Explaining happiness. *Proc. Natl. Acad. Sci.*, 100:11176–11183, 2003. [pdf](#)
- [16] M. R. Frank, L. Mitchell, P. S. Dodds, and C. M. Danforth. Happiness and the patterns of life: A study of geolocated Tweets. *Nature Scientific Reports*, 3:2625, 2013. [pdf](#)

## References VII

- [17] R. J. Gallagher, M. R. Frank, L. Mitchell, A. J. Schwartz, A. J. Reagan, C. M. Danforth, and P. S. Dodds. Generalized word shift graphs: A method for visualizing and explaining pairwise comparisons between texts. *EPJ Data Science*, 10:4, 2021. Available online at <https://arxiv.org/abs/2008.02250>. [pdf](#)
- [18] M. C. González, C. A. Hidalgo, and A.-L. Barabási. Understanding individual human mobility patterns. *Nature*, 453:779–782, 2008. [pdf](#)

The PoCSverse  
Finding  
Happiness  
147 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
148 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
149 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
150 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
151 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

The PoCSverse  
Finding  
Happiness  
152 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional content  
Hedonometer  
Analysis  
Songs  
Bligs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References VIII

- [19] T. J. Gray, C. M. Danforth, and P. S. Dodds. Hahahahaha, Duuuuude, Yeeessss!: A two-parameter characterization of stretchable words and the dynamics of mistypings and misspellings. [PLOS ONE](https://doi.org/10.1371/journal.pone.0232938), 15:e0232938, 2020. Available online at <https://arxiv.org/abs/1907.03920>. pdf ↗
- [20] H. Gunaratana. Mindfulness in Plain English. Wisdom Publications, Somerville, Massachusetts, 1992.
- [21] E. Hoffer. The Passionate State of Mind: And Other Aphorisms. Buccaneer Books, 1954.

The PoCSverse  
Finding  
Happiness  
153 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References XI

- [28] I. M. Kloumann, C. M. Danforth, K. D. Harris, C. A. Bliss, and P. S. Dodds. Positivity of the English language. [PLoS ONE](https://doi.org/10.1371/journal.pone.0249484), 7:e29484, 2012. pdf ↗
- [29] R. Layard. Happiness. The Penguin Press, London, 2005.
- [30] S. Lyubomirsky. The How of Happiness. The Penguin Press, New York, 2007.
- [31] C. Martinelli and S. W. Parker. Deception and misreporting in a social program. forthcoming in *Journal of the European Economic Association*, 2007. pdf ↗

The PoCSverse  
Finding  
Happiness  
156 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References XIII

- [36] C. Osgood, G. Suci, and P. Tannenbaum. The Measurement of Meaning. University of Illinois, Urbana, IL, 1957.
- [37] A. J. Reagan, B. F. Tivnan, J. R. Williams, C. M. Danforth, and P. S. Dodds. Sentiment analysis methods for understanding large-scale texts: A case for using continuum-scored words and word shift graphs. [EPJ Data Science](https://doi.org/10.1145/3121211.3121212), 6, 2017. pdf ↗
- [38] E. Sandhaus. The New York Times Annotated Corpus. Linguistic Data Consortium, Philadelphia, 2008. Available online at: <https://doi.org/10.35111/77ba-9x74>.

The PoCSverse  
Finding  
Happiness  
158 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References IX

- [22] A. R. Jensen. Bias in mental testing. ERIC, 1980.
- [23] W. T. Jones. The Classical Mind. Harcourt, Brace, Jovanovich, New York, 1970.
- [24] D. Kahneman, A. B. Krueger, D. A. Schkade, N. Schwarz, and A. A. Stone. A survey method for characterizing daily life experience: The day reconstruction method. [Science](https://doi.org/10.1126/science.1100526), 306(5702):1776–1780, 2004. pdf ↗

The PoCSverse  
Finding  
Happiness  
154 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References XII

- [32] S. McCloud. Making Comics. William Morrow, 2006.
- [33] A. Mehrabian and J. A. Russell. An Approach to Environmental Psychology. MIT Press, 1974.
- [34] G. Miller. Social Scientists wade into the Tweet stream. [Science](https://doi.org/10.1126/science.1211111), 333:1814–1815, 2011. pdf ↗
- [35] L. Mitchell, M. R. Frank, K. D. Harris, P. S. Dodds, and C. M. Danforth. The geography of happiness: Connecting Twitter sentiment and expression, demographics, and objective characteristics of place. [PLoS ONE](https://doi.org/10.1371/journal.pone.0244417), 8:e64417, 2013. pdf ↗

The PoCSverse  
Finding  
Happiness  
157 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References XIV

- [39] D. Sobel. Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time. Bloomsbury Publishing, US, 2007.

The PoCSverse  
Finding  
Happiness  
159 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References

## References X

- [25] K. Kennedy Townsend. The Pursuit of Happiness: What the Founders meant—And didn't. The Atlantic, 2011. <http://www.theatlantic.com/business/archive/2011/06/the-pursuit-of-happiness-what-the-founders-meant-and-didnt/240708/>.
- [26] K. Kennedy Townsend. What makes life worthwhile? GDP won't tell you. The Atlantic, 2011. <http://www.theatlantic.com/business/archive/2011/06/what-makes-life-worthwhile-gdp-wont-tell-you/240343/>.
- [27] M. A. Killingsworth and D. T. Gilbert. A wondering mind is an unhappy mind. [Science](https://doi.org/10.1126/science.1197793), 330:932, 2010. pdf ↗

The PoCSverse  
Finding  
Happiness  
155 of 159  
Introduction  
Measurement  
Happiness  
Some motivation  
Measuring emotional  
content  
Hedonometer  
Analysis  
Songs  
Blogs  
SOTU  
A Better Lexical Lens  
Geography  
Movement  
Extras  
References