Finding Happiness

Last updated: 2025/01/23, 11:48:51 EST

Principles of Complex Systems, Vols. 1, 2, & 3D
CSYS/MATH 6701, 6713, & a pretend number, 2024–2025

Prof. Peter Sheridan Dodds

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

Outline

A few key papers:

"Measuring the happiness of large-scale written expression: Songs, blogs, and presidents." ⧉, Dodds and Danforth, Journal of Happiness Studies, **11**, 441–456, 2009. [11]

"Temporal patterns of happiness and information in a global social network: Hedonometrics and Twitter" ⧉ Dodds et al., PLoS ONE, **6**, e26752, 2011. [13]

"Positivity of the English language" ⧉, Kloumann et al., PLoS ONE, 7, e29484, 2012. [28]

"Human language reveals a universal positivity bias" ⧉, Dodds et al., Proc. Natl. Acad. Sci., **112**, 2389–2394, 2015. [10]

The PoCSverse
Finding Happiness
1 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
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. [37]

"Generalized word shift graphs: A method for visualizing and explaining pairwise comparisons between texts" ⧉ Gallagher et al., EPJ Data Science, **10**, 4, 2021. [17]

"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. [9]

The PoCSverse
Finding Happiness
2 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
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
3 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
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

From the Daily Show ⧉ (September 18, 2007; @5:13)

The full inteview was once here ⧉.

This is a Collateralized Debt Obligation:

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

Economics, Schmeconomics

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

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

The PoCSverse
Finding Happiness
5 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
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
8 of 154
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
6 of 154
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
9 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
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" [a] by Dava Sobel (2007). [39]
- Billionths of a second accuracy: Atomic clocks (Lord Kelvin, 1879)
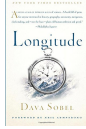
The PoCSverse
Finding Happiness
10 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
SOTU
A Better Lexical Lens
Geography
Movement
Extras
References

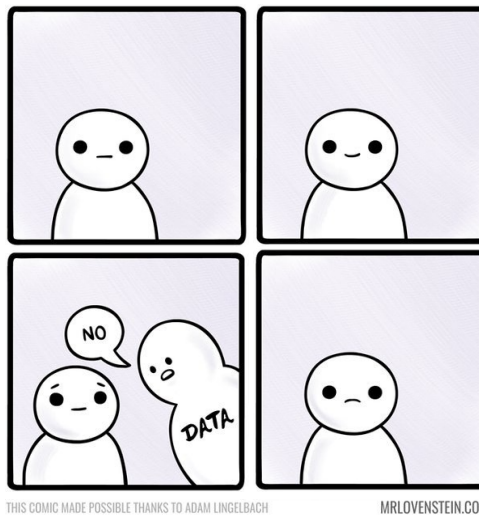THIS COMIC MADE POSSIBLE THANKS TO ADAM LINGELBACH — MRLOVENSTEIN.COM
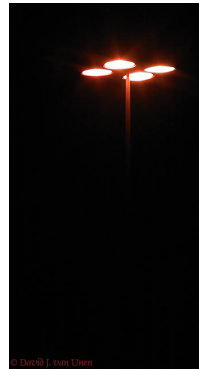
Measuring temperature was thought impossible:

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 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 @SilverVVulpes: Also: Inventing Temperature, Hasok Chang, 2004 [3]

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 @SilverVVulpes: Also: Inventing Temperature, Hasok Chang, 2004 [3]

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

What matters and what's measurable:

© David L van Oijen

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

Panometer—Three kinds of lexical meters:

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

Measuring Happiness and Sadness:
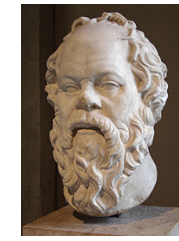
Socrates et al.: eudaimonia [23]

Bentham: hedonistic calculus

Jefferson: ...the pursuit of happiness

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

Early drafts:

that among these are:
Life, ✓
Liberty, and ?? Money?
Libations ... Alcohol
Property   Foot-the-ball
Beer   Happiness

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

Happiness:

Even the odd modern economist is happy:

"Happiness" by Richard Layard [29]

HAPPINESS
LESSONS FROM A NEW SCIENCE
RICHARD LAYARD

[amazon]

The PoCSverse
Finding Happiness
16 of 154
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
17 of 154
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
18 of 154
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
19 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
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

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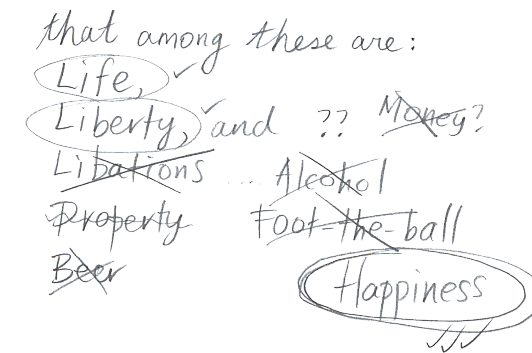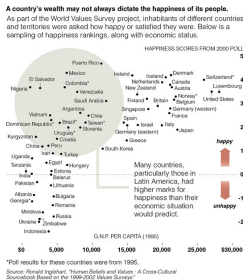A Better Lexical Lens
Geography
Movement
Extras
References

Some easy knocks:

Colbert: "Happiness is totally overrated ..."

"Happiness is for the weak."

Full interview with Jennifer Senior was here

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

Emotional content

So how does one measure

1. happiness?
2. 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

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

Desiring happiness—not just for boffins:

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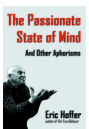- And it matters: "Happy people live longer:..." Survey by Diener and Chan. [8]

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

"Poll results for these countries were from 1995.
Source: Ronald Inglehart, "Human Beliefs and Values: A Cross-Cultural Sourcebook Based on the 1999-2002 Values Surveys"

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

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."

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

Happiness, attention, and doing:

Fig. 1. Mean happiness reported during each activity (**top**) and while mind wandering to unpleasant topics, neutral topics, pleasant topics or not 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]

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

Some easy knocks:

"The Passionate State of Mind: And Other Aphorisms" **a** by Eric Hoffer (1954). [21]

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

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

Meaning rather than happiness:

"Mindfulness in Plain English" **a** by Henepola Gunaratana (1992). [20]

"Flow" **a** 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?

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

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

We don't want to end up here:

Science

Policy

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

1999 ANEW study—three 1–9 scales: [2]

valence:

arousal:

dominance:

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

Analysing text:

- Simplest measure for a text:

$$\theta_{\text{avg}} = \sum_{i=1}^{N} p_i \theta_i$$

where p_i is fractional abundance of word i and θ is average valence, arousal, or dominance for word i.

- Focus on happiness (valence), $\theta = h$.

- Average happiness typically falls between 5 and 7.

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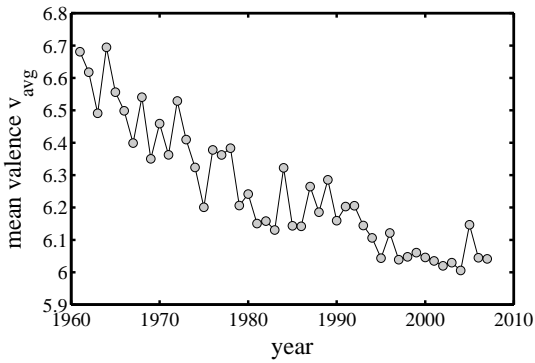A Better Lexical Lens
Geography
Movement
Extras
References

Ousiometrics before we called it that:

Measuring essential meaning [9]

- Idea: Build on measures of the essential meaning of individual words.

- Osgood et al. (1957) [36] identified a basis of three psychological variables as semantic differentials:
  - Evaluation, Potency, and Activation.

- EPA was recast by Mehrabian and Russell (1974) [33] in the context of emotion:
  - Valence (or sometimes Pleasure): bad ↔ good
  - Arousal: passive ↔ active
  - Dominance: weak ↔ strong

- VAD became more commonly used framework.

- 'VAD ≡ EAP' (more later).

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

ANEW study:

Valence = Happiness:

- Valence scale presented to participants as a 'happy-unhappy scale.'

- Participants were further told:

  "At one extreme of this scale, you are happy, pleased, satisfied, contented, hopeful. …

  The other end of the scale is when you feel completely unhappy, annoyed, unsatisfied, melancholic, despaired, or bored."

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

Measuring the perceived happiness of a text:

Lyrics for Michael Jackson's Billie Jean

"She was more like a beauty queen from a movie scene.
⋮
And mother always told me, be careful who you love.
And be careful of what you do 'cause the lie becomes the truth.
Billie Jean is not my lover, She's just a girl who claims that I am the one.
⋮

ANEW words	v_k	f_k
k=1. love	8.72	1
2. mother	8.39	2
3. baby	8.22	1
4. beauty	7.82	1
5. truth	7.80	1
6. people	7.33	1
7. strong	7.11	1
8. young	6.89	1
9. girl	6.87	4
10. movie	6.86	1
11. perfume	6.76	1
12. queen	6.44	1
13. name	5.55	1
14. lie	2.79	1

$$v_{\text{text}} = \frac{\sum_k v_k f_k}{\sum_k f_k}$$

$v_{\text{Billie Jean}} = 7.1$

$v_{\text{Thriller}} = 6.3$

$v_{\text{Michael Jackson}} = 6.4$

- Temperature-like measure—large numbers only.

- Not meant to be used at level of sentence, paragraph, song, tweet, …

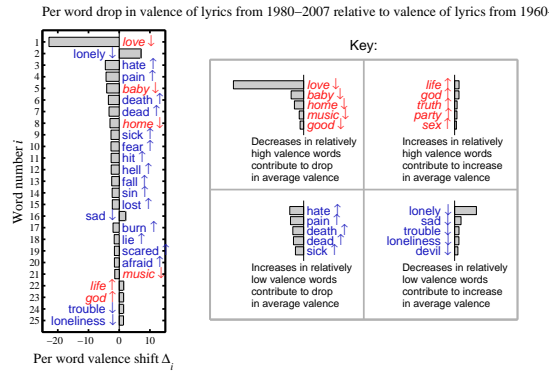- Important: Social measure of sentiment.

- Later: see instrument is tunable.

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

ANEW study

- ANEW = "Affective Norms for English Words"

- Study: participants shown lists of isolated words

- Asked to grade each word's valence, arousal, and dominance level

- Integer scale of 1–9

- N =1034 words—previously identified as bearing emotional weight

- Participants = College students (*cough*)

- Results published by Bradley and Lang (1999) [2]

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

ANEW study words—examples

love/paradise/triumphant
glory/luxury/trophy
optimism/pancakes/church
engine/paper/street
derelict/neurotic/vanity
fault/corrupt/lawsuit
trauma/hostage/disgusted
funeral/rape/suicide

Daft Punk's 1997 "Around the World" ⧉:

Magic: Low entropy, high energy.[1]

2021 remastered version ⧉

---

[1] Music does the impossible.

Song Lyrics—average happiness

The PoCSverse
Finding Happiness
43 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
SOTU
A Better Lexical Lens
Geography
Movement
Extras
References
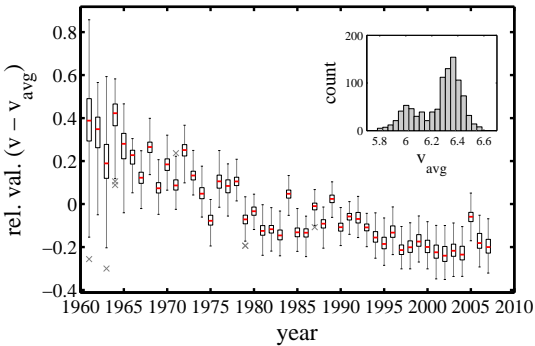
Happiness Word Shift Graph (early version):

Per word drop in valence of lyrics from 1980–2007 relative to valence of lyrics from 1960

❧ Word shifts are word clouds for grown ups.

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

$-\downarrow$: 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} $(\downarrow)$, then the contribution to the difference $h_{\text{avg}}^{(\text{comp})} - h_{\text{avg}}^{(\text{ref})}$ is also positive;

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

$-\uparrow$: 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} $(\uparrow)$, then the contribution to the difference $h_{\text{avg}}^{(\text{comp})} - h_{\text{avg}}^{(\text{ref})}$ is also negative.

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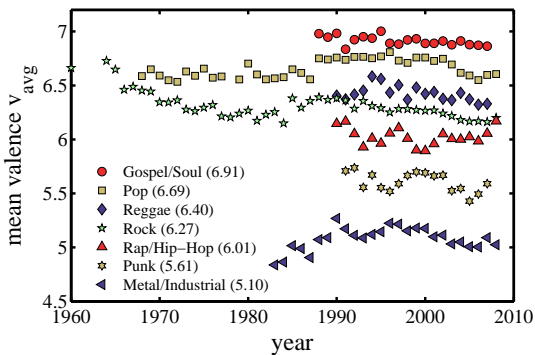Geography
Movement
Extras
References

Song Lyrics—measurement robustness

100 random subsets of 750 ANEW words

The PoCSverse
Finding Happiness
44 of 154
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: $h_{\text{avg}}^{(\text{comp})} - h_{\text{avg}}^{(\text{ref})}$

❧ Evident question: Which words contribute the most to this change?

❧ Break difference down by contributions from individual words:

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

❧ Must have: $\sum_i \delta h_{\text{avg},i} = \pm 100$

❧ Rank words by $|\delta h_{\text{avg},i}|$

Top 50 of $\simeq$ 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	Babyface	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
50 of 154
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:

Legend:
- ● Gospel/Soul (6.91)
- ▪ Pop (6.69)
- ◆ Reggae (6.40)
- ★ Rock (6.27)
- ▲ Rap/Hip–Hop (6.01)
- ✶ Punk (5.61)
- ◀ Metal/Industrial (5.10)

The PoCSverse
Finding Happiness
45 of 154
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:

$$h_{\text{avg}}^{(\text{comp})} - h_{\text{avg}}^{(\text{ref})} = \sum_{i=1}^{N} h_{\text{avg}}(w_i) p_i^{(\text{comp})} - \sum_{i=1}^{N} h_{\text{avg}}(w_i) p_i^{(\text{ref})}$$

$$= \sum_{i=1}^{N} h_{\text{avg}}(w_i) \left[p_i^{(\text{comp})} - p_i^{(\text{ref})} \right]$$

$$= \sum_{i=1}^{N} \left[h_{\text{avg}}(w_i) - h_{\text{avg}}^{(\text{ref})} \right] \left[p_i^{(\text{comp})} - p_i^{(\text{ref})} \right]$$

where

$$\sum_{i=1}^{N} h_{\text{avg}}^{(\text{ref})} \left[p_i^{(\text{comp})} - p_i^{(\text{ref})} \right] = h_{\text{avg}}^{(\text{ref})} \sum_{i=1}^{N} \left[p_i^{(\text{comp})} - p_i^{(\text{ref})} \right]$$

$$= h_{\text{avg}}^{(\text{ref})} (1 - 1) = 0.$$

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

Bottom 50 of $\simeq$ 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	Annihilator	5.35
4	Slipknot	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 Tranquility	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 154
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 [?]	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 [?]	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)
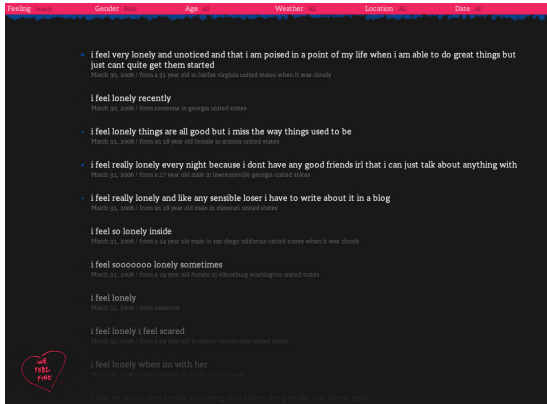
wefeelfine.org:

From wefeelfine.org by Jonathan Harris & Sep Kamvar
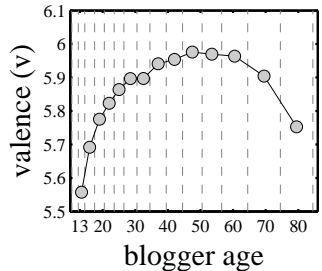
Average happiness as a function of the age bloggers report they will turn in the year of their posting.

The PoCSverse
Finding Happiness
61 of 154
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)

An exploration of human emotion, in six movements
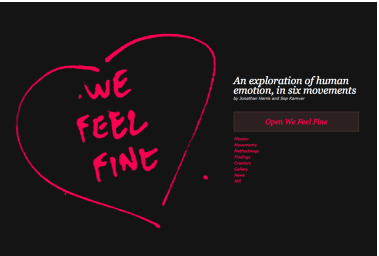
Open We Feel Fine

- Created by Jonathan Harris & Sep Kamvar

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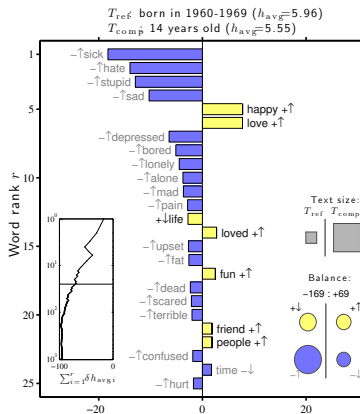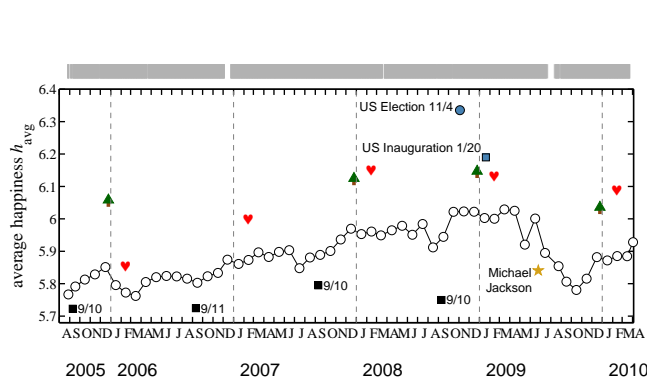Extras
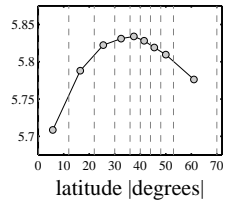References

wefeelfine.org:

Find Feelings
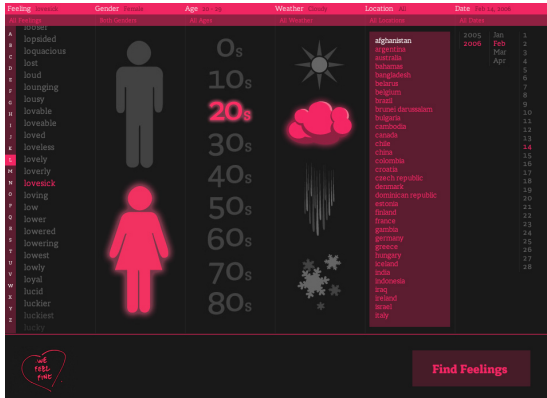
Blogs—Age

- 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
62 of 154
Introduction
Measurement
Happiness
 Some motivation
 Measuring emotional content
 Hedonometer
 Analysis
 Songs
 Blogs
 SOTU
A Better Lexical Lens
Geography
Movement
Extras
References

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

Blogs—Overall trend

US Election 11/4
US Inauguration 1/20
9/10
9/11
9/10
9/10
Michael Jackson

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

T_{ref}: born in 1960-1969 (h_{avg}=5.96)
T_{comp}: 14 years old (h_{avg}=5.55)

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

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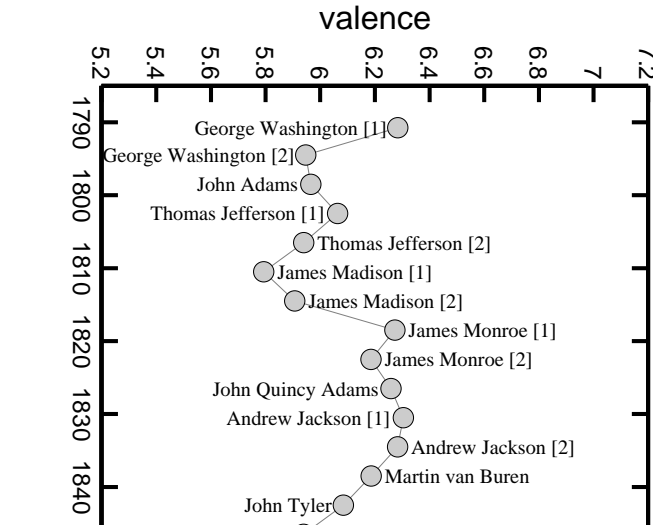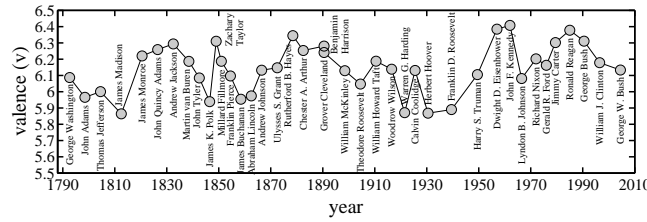References

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.'

Presidential happiness:

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

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	3292	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	0.98	2812	–	–	3808
30	rich	7.98	1.32	1625	1221	1469	890
□	□	□	□	□	□	□	□

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

Presidential happiness:

The PoCSverse
Finding Happiness
71 of 154
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.
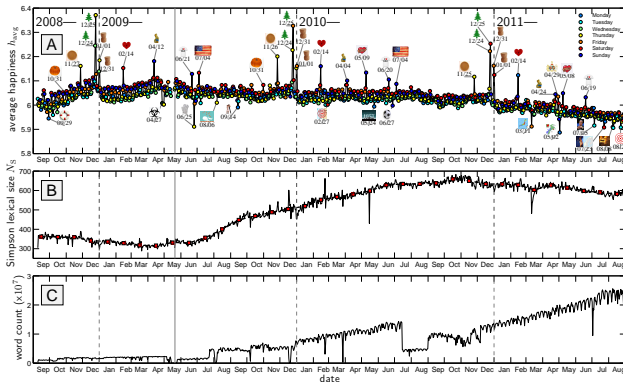- 10,222 words, 50 evaluations each, 1–9 scale: [32]

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

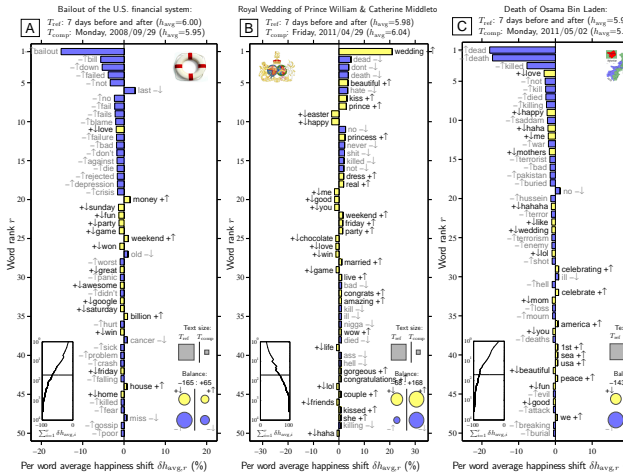| valence rank	word	valence	std dev	twitter rank	g-books rank	nyt rank	lyrics rank
□	□	□	□	□	□	□	□
10193	violence	1.86	1.05	4299	1724	1238	2016
10194	cruel	1.84	1.15	2963	–	–	1447
10195	cry	1.84	1.28	1028	3075	–	226
10196	failed	1.84	1.00	2645	1618	1276	2920
10197	sickness	1.84	1.18	4735	–	–	3782
10198	abused	1.83	1.31	–	–	–	4589
10199	tortured	1.82	1.42	–	–	–	4693
10200	fatal	1.80	1.53	–	4089	–	3724
10201	killings	1.80	1.54	–	–	4914	–
10202	murdered	1.80	1.63	–	–	–	4796
10203	war	1.80	1.41	468	175	291	462
10204	kills	1.78	1.23	2459	–	–	2857
10205	jail	1.76	1.02	1642	–	2573	1619
10206	terror	1.76	1.00	4625	4117	4048	2370
10207	die	1.74	1.19	418	730	2605	143
10208	killing	1.70	1.36	1507	4428	1672	998
10209	arrested	1.64	1.01	2435	4474	1435	–
10210	deaths	1.64	1.14	–	–	2974	–
10211	raped	1.64	1.43	–	–	–	4528
10212	torture	1.58	1.05	3175	–	–	3126
10213	died	1.56	1.20	1223	866	208	826
10214	kill	1.56	1.05	798	2727	2572	430
10215	killed	1.56	1.23	1137	1603	814	1273
10216	cancer	1.54	1.07	946	1884	796	3802
10217	death	1.54	1.28	509	307	373	433
10218	murder	1.48	1.01	2762	3110	1541	1059
10219	terrorism	1.48	0.91	–	–	3192	–
10220	rape	1.44	0.79	3133	–	–	2977
10221	suicide	1.30	0.84	2124	4707	3319	2107
10222	terrorist	1.30	0.91	3576	–	3026	–

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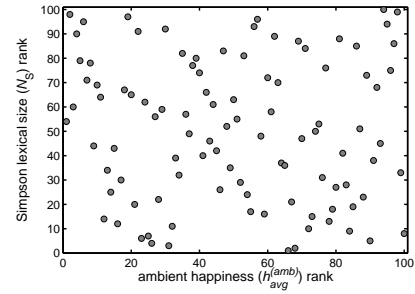A Better Lexical Lens
Geography
Movement
Extras
References

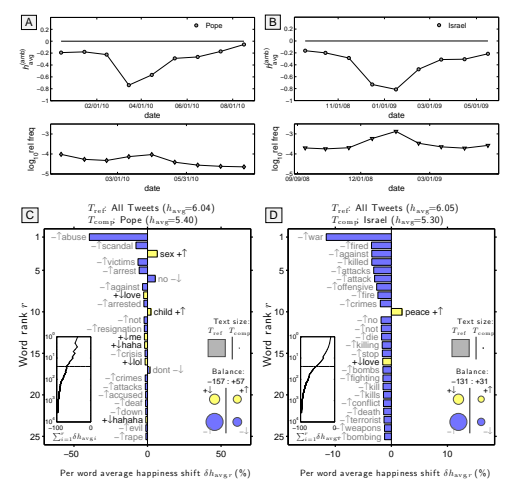| std dev rank	word	valence	std dev	twitter rank	g-books rank	nyt rank	lyrics rank
1	f✦💋king	4.64	2.93	448	–	–	620
2	f✩✩kin	3.86	2.74	1077	–	–	688
3	f✩✩ked	3.56	2.71	1840	–	–	904
4	pussy	4.80	2.66	2019	–	–	949
5	whiskey	5.72	2.64	–	–	–	2208
6	slut	3.57	2.63	–	–	–	4071
7	cigarettes	3.31	2.60	–	–	–	3279
8	f✩✩k	4.14	2.58	322	–	–	185
9	mortality	4.38	2.55	–	3960	–	–
10	cigarette	3.09	2.52	–	–	–	2678
11	motherf✩✩kers	2.51	2.47	–	–	–	1466
12	churches	5.70	2.46	–	2281	–	–
13	motherf✩✩king	2.64	2.46	–	–	–	2910
14	capitalism	5.16	2.45	–	4648	–	–
15	porn	4.18	2.43	1801	–	–	–
16	summer	6.40	2.39	896	1226	721	590
17	beer	5.92	2.39	839	4924	3960	1413
18	execution	3.10	2.39	–	2975	–	–
19	wines	6.28	2.37	–	–	3316	–
20	zombies	4.00	2.37	4708	–	–	–
21	aids	4.28	2.35	2983	3996	1197	–
22	capitalist	4.84	2.34	–	4694	–	–
23	revenge	3.71	2.34	–	–	–	2766
24	mcdonalds	5.98	2.33	3831	–	–	–
25	beatles	6.44	2.33	3797	–	–	–
26	islam	4.68	2.33	–	4514	–	–
27	pay	5.30	2.32	627	769	460	499
28	alcohol	5.20	2.32	2787	2617	3752	3600
29	muthaf✩✩kin	3.00	2.31	–	–	–	4107
30	christ	6.16	2.31	2509	909	4238	1526
▢	▢	▢	▢	▢	▢	▢	▢

The happiest distribution:

Twitter—living in the now:

♟ Quantifying the quotidian.

Twitter—living in the now:

♟ Makes the unexpected believable...

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

"Hahahahaha, Duuuuude, Yeeessss!: A two-parameter characterization of stretchable words and the dynamics of mistypings and misspellings" ⧉
Gray, Danforth, and Dodds,
PLOS ONE, **15**, e0232938, 2020. [19]

♟ "GOOOOOOOOOOAAAAAAAAL!!!!!!"

♟ An exploration of families of strange lexical creatures.

♟ Regular expression festival.

♟ Identified kernels: ha versus goal.

♟ Defined and measured stretch and balance

♟ Stretch: Inequality (Gini) coefficient; Balance: (Shannon's) entropy.

♟ Spelling trees!

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

Tom Sherwood @tomsherwood   1 Oct
Mississippi congressman moves gate and lets 92 WW2 vets see their monument. pic.twitter.com/541GvLLITz
Retweeted 442 times
Expand

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

{"created_at":"Tue Oct 01 15:59:45 +0000 2013","id":"385071546731347968","id_str":"385071546731347968","text":"RT @tomsherwood: Mississippi congressman moves gate and lets 92 WW2 vets see their monument. http:\/\/t.co\/541GvLLITz","source":"\u003ca href=\"http:\/\/www.tweetdeck.com\" rel=\"nofollow\"\u003eTweetDeck\u003c\/a\u003e","truncated":false,"in_reply_to_status_id":null,"in_reply_to_status_id_str":null,"in_reply_to_user_id":null,"in_reply_to_user_id_str":null,"in_reply_to_screen_name":null,"user":{"id":17912008,"name":"Armen Terjimanian","screen_name":"translator82","location":"Washington DC area","url":null,"description":"Georgetown Univ Web Content Producer. Troy Mich native, Michigan & Columbia alum, Detroit sports fan, Armenian, recovering journalist. Tweets are my own.","protected":false,"followers_count":585,"friends_count":1456,"listed_count":22,"created_at":"Sat Dec 06 00:08:32 +0000 2008","favourites_count":6,"utc_offset":-14400,"time_zone":"Eastern Time (US & Canada)","geo_enabled":false,"verified":false,"statuses_count":11072,"lang":"en","contributors_enabled":false,"is_translator":false,"profile_background_color":"131516","profile_background_image_url":"https:\/\/si0.twimg.com\/profile_background_images\/546144116\/120430_eccentric-photo-boys-power.jpg","profile_background_image_url_https":"https:\/\/si0.twimg.com\/profile_background_images\/546144116\/120430_eccentric-photo-boys-power.jpg","profile_background_tile":true,"profile_image_url":"http:\/\/v0.twimg.com\/profile_images\/3675852\/0ded5ec19004e021f78fe491f3450953_normal.jpeg","profile_image_url_https":"https:\/\/v0s.twimg.com\/profile_images\/3675852\/0ded5ec19004e021f78fe491f3450953_normal.jpeg","profile_link_color":"0E87F8","profile_sidebar_border_color":"133FF1","profile_sidebar_fill_color":"242F78","profile_text_color":"666666","profile_use_background_image":true,"default_profile":false,"default_profile_image":false,"following":null,"follow_request_sent":null,"notifications":null},"geo":null,"coordinates":null,"place":null,"contributors":null,"retweeted_status":{"created_at":"Tue Oct 01 15:57:50 +0000 2013","id":385071064369225728,"id_str":"385071064369225728","text":"Mississippi congressman moves gate and lets 92 WW2 vets see their monument. http:\/\/t.co\/541GvLLITz","source":"\u003ca href=\"http:\/\/www.apple.com\" rel=\"nofollow\"\u003eCamera on iOS\u003c\/a\u003e","truncated":false,"in_reply_to_status_id":null,"in_reply_to_status_id_str":null,"in_reply_to_user_id":null,"in_reply_to_user_id_str":null,"in_reply_to_screen_name":null,"user":{"id":49793110,"id_str":"49793110","name":"Tom Sherwood","screen_name":"tomsherwood","location":"District of Columbia","url":"http:\/\/www.nbcwashington.com","description":"Reporter - NBC4 Washington DC; Analyst - WAMU-FM 88.5 Kojo Nnamdi Politics Hour; Columnist - Current Newspapers","protected":false,"followers_count":7374,"friends_count":350,"listed_count":338,"created_at":"Mon Jun 22 20:38:38 +0000 2009","favourites_count":18,"utc_offset":-14400,"time_zone":"Eastern Time (US & Canada)","geo_enabled":true,"verified":true,"statuses_count":6832,"lang":"en","contributors_enabled":false,"is_translator":false,"profile_background_color":"0DEEFB","profile_background_image_url":"http:\/\/vbs.twimg.com\/images\/themes\/theme1\/bg.png","profile_background_image_url_https":"https:\/\/vbs.twimg.com\/images\/themes\/theme1\/bg.png","profile_background_tile":false,"profile_image_url":"http:\/\/v0.twimg.com\/profile_images\/378800000053043582\/0b5d8ba7690c86b0564ccaffd952d5c7_normal.jpeg","profile_image_url_https":"https:\/\/v0s.twimg.com\/profile_images\/378800000053043582\/0b5d8ba7690c86b0564ccaffd952d5c7_normal.jpeg","profile_link_color":"0084A4","profile_sidebar_border_color":"0DEEFB","profile_sidebar_fill_color":"C0DEED","profile_text_color":"333333","profile_use_background_image":true,"default_profile":false,"default_profile_image":false,"following":null,"follow_request_sent":null,"notifications":null},"geo":null,"coordinates":null,"place":null,"contributors":null,"retweet_count":19,"favorite_count":4,"entities":{"hashtags":[],"symbols":[],"urls":[],"user_mentions":[],"media":[{"id":385071064408580326,"id_str":"385071064408580326","indices":[76,98],"media_url":"http:\/\/pbs.twimg.com\/media\/BVgWF6-CWAABEIt.jpg","media_url_https":"https:\/\/pbs.twimg.com\/media\/BVgWF6-CWAABEIt.jpg","url":"http:\/\/t.co\/541GvLLITz","display_url":"pic.twitter.com\/541GvLLITz","expanded_url":"http:\/\/twitter.com\/tomsherwood\/status\/385071064369225728\/photo\/1","type":"photo","sizes":{"medium":{"w":600,"h":450,"resize":"fit"},"thumb":{"w":150,"h":150,"resize":"crop"},"large":{"w":960,"h":720,"resize":"fit"},"small":{"w":340,"h":255,"resize":"fit"}}}]}},"favorited":false,"retweeted":false,"possibly_sensitive":false,"lang":"en"},"retweet_count":0,"entities":{"hashtags":[],"symbols":[],"urls":[],"user_mentions":[{"screen_name":"tomsherwood","name":"Tom Sherwood","id":49793110,"id_str":"49793110","indices":[3,15]}],"media":[{"id":385071064408580326,"id_str":"385071064408580326","indices":[97,119],"media_url":"http:\/\/pbs.twimg.com\/media\/BVgWF6-CWAABEIt.jpg","media_url_https":"https:\/\/pbs.twimg.com\/media\/BVgWF6-CWAABEIt.jpg","url":"http:\/\/t.co\/541GvLLITz","display_url":"pic.twitter.com\/541GvLLITz","expanded_url":"http:\/\/twitter.com\/tomsherwood\/status\/385071064369225728\/photo\/1","type":"photo","sizes":{"medium":{"w":600,"h":450,"resize":"fit"},"thumb":{"w":150,"h":150,"resize":"crop"},"large":{"w":960,"h":720,"resize":"fit"},"small":{"w":340,"h":255,"resize":"fit"}},"source_status_id":385071064369225728,"source_status_id_str":"385071064369225728"}]},"favorited":false,"retweeted":false,"possibly_sensitive":false,"filter_level":"medium","lang":"en"}

Individual tweets have all kinds of potential impact:

AP **The Associated Press** ✔ @AP   Follow

Breaking: Two Explosions in the White House and Barack Obama is injured

↩ Reply ⟲ Retweet ★ Favorite ••• More

483 RETWEETS   **17** FAVORITES

10:07 AM - 23 Apr 13

twitter.03.13.23.04.13.json:{"created_at":"Tue Apr 23 17:07:50 +0000 2013","id":326744234273161216,"id_str":"326744234273161216","text":"Breaking: Two Explosions in the White House and Barack Obama is injured","source":"web","truncated":false,"in_reply_to_status_id":null,"in_reply_to_status_id_str":null,"in_reply_to_user_id":null,"in_reply_to_user_id_str":null,"in_reply_to_screen_name":null,"user":{"id":51241574,"name":"The Associated Press","screen_name":"AP","location":"Global","url":"http:\/\/www.ap.org","description":"News, discussion and behind-the-scenes look at the process from The Associated Press. Managed 24\/7 by a team of editors based in NY: http:\/\/apne.ws\/APstaff","protected":false,"followers_count":1903225,"friends_count":7012,"listed_count":42154,"created_at":"Fri Jun 26 20:48:52 +0000 2009","favourites_count":0,"utc_offset":-18000,"time_zone":"Eastern Time (US & Canada)","geo_enabled":false,"verified":true,"statuses_count":50187,"lang":"en","contributors_enabled":false,"is_translator":false,"profile_background_color":"FFFFFF","profile_background_image_url":"http:\/\/si0.twimg.com\/profile_background_images\/734506342\/b3be683514207db70bcb0991c26f2718.jpeg","profile_background_image_url_https":"https:\/\/si0.twimg.com\/profile_background_images\/734506342\/b3be683514207db70bcb0991c26f2718.jpeg","profile_background_tile":false,"profile_image_url":"http:\/\/v0.twimg.com\/profile_images\/1848193664\/AP_Logo_normal.jpg","profile_image_url_https":"https:\/\/v0.twimg.com\/profile_images\/1848193664\/AP_Logo_normal.jpg","profile_banner_url":"https:\/\/si0.twimg.com\/profile_banners\/51241574\/1365092409","profile_link_color":"CC3300","profile_sidebar_border_color":"FFFFFF","profile_sidebar_fill_color":"333333","profile_text_color":"333333","profile_use_background_image":true,"default_profile":false,"default_profile_image":false,"following":null,"follow_request_sent":null,"notifications":null},"geo":null,"coordinates":null,"place":null,"contributors":null,"retweet_count":0,"entities":{"hashtags":[],"symbols":[],"urls":[],"user_mentions":[]},"favorited":false,"retweeted":false,"filter_level":"medium","lang":"en"}

♟ Meme come true: Fleetwood Mac re-enter US charts thanks

Mentions of CIA on Twitter, end of 2011:

🎲 See story here ⎘ for example [slate].

The daily unravelling of the human mind:

📄 "Social Scientists wade into the Tweet stream" ⎘
Greg Miller,
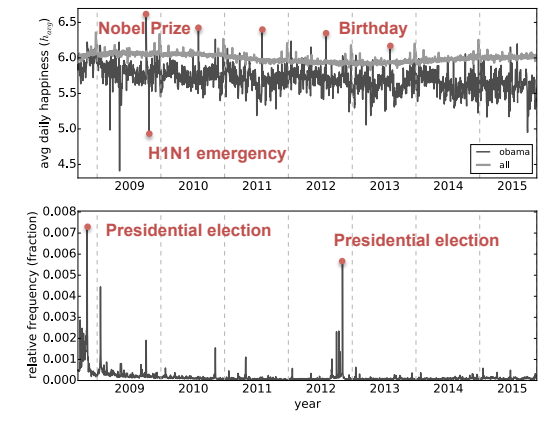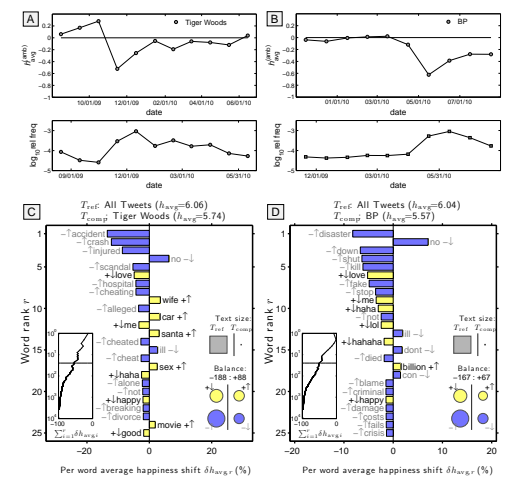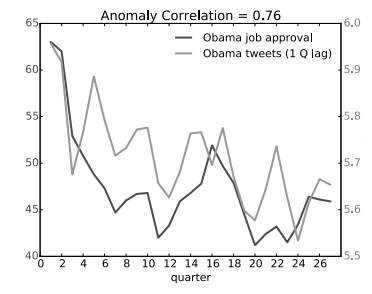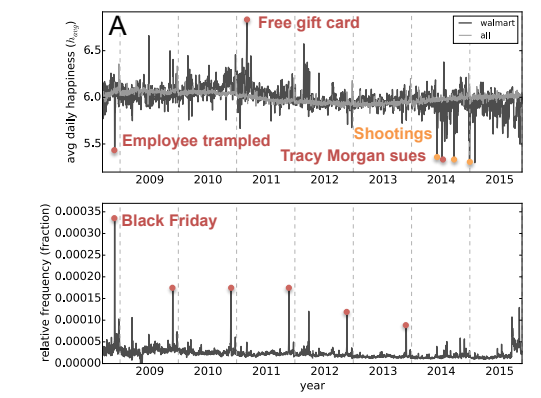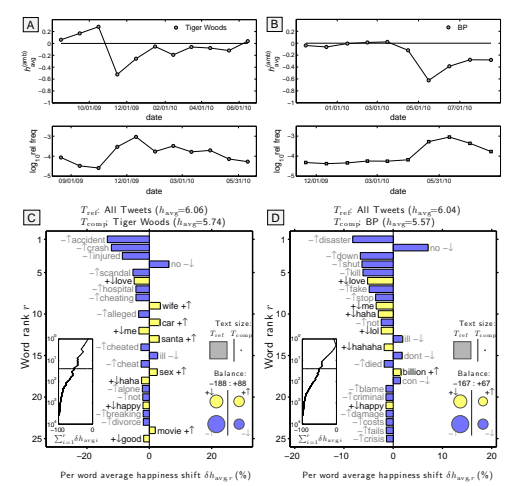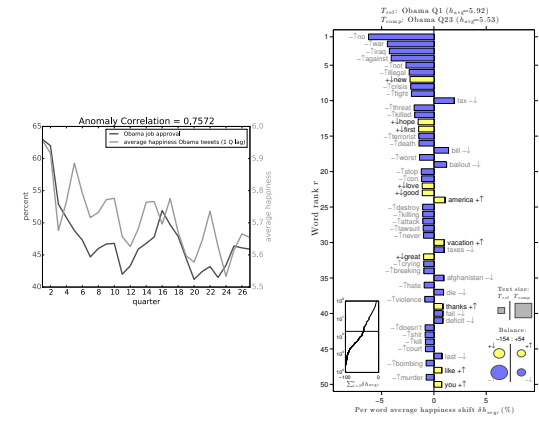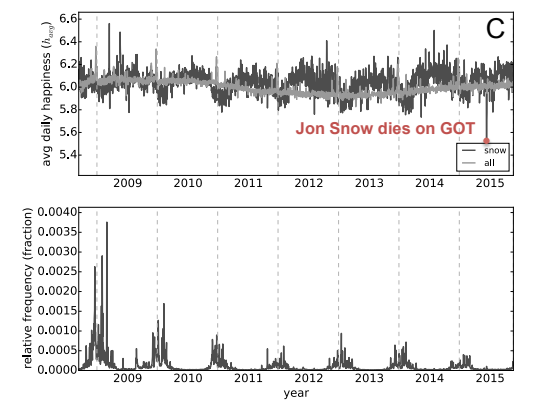Science, **333**, 1814–1815, 2011. [34]

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

Text element and context correlate in happiness scores:

🎲 Compare ambient happiness with text element happiness.

🎲 Rank correlation coefficient:
$r_s \simeq 0.79$, p-value $< 10^{-10}$.

🎲 An on-average result: says nothing about any individual sentence.
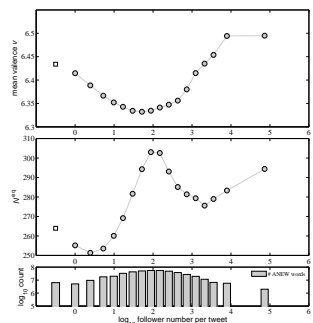
🎲 Extra random piece: stemming is fallible.

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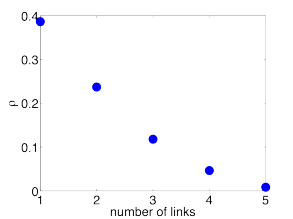A Better Lexical Lens
Geography
Movement
Extras
References

Ambient happiness:

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

Simpson lexical size, N_s:

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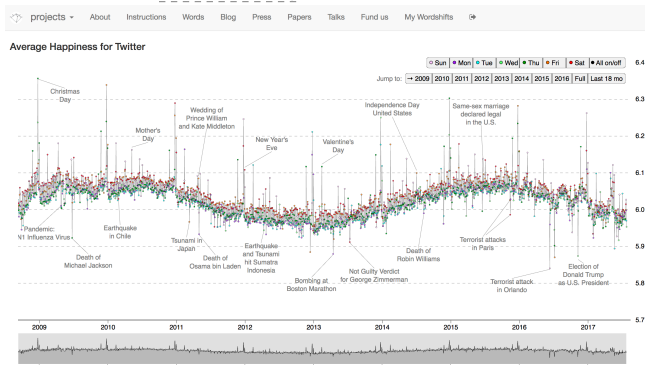SOTU
A Better Lexical Lens
Geography
Movement
Extras
References

Ambient happiness:

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

Ambient happiness for "Obama":

Ambient happiness for "Walmart":

Ambient happiness for "snow":

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

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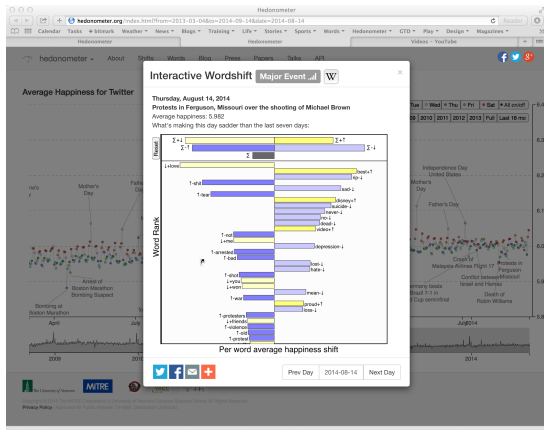Analysis
Songs
Blogs
SOTU
A Better Lexical Lens
Geography
Movement
Extras
References

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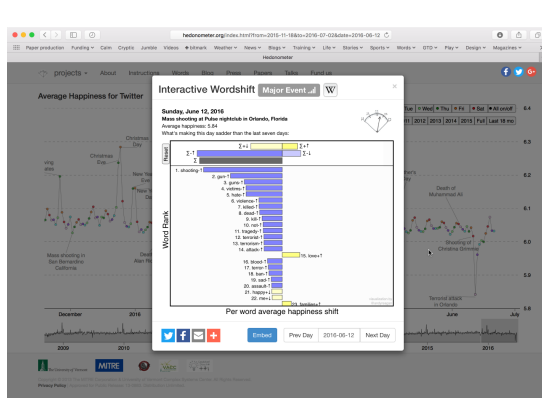Geography
Movement
Extras
References

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

Twitter's Feels predict Obama's Approval Rating:

Dunbar number action:

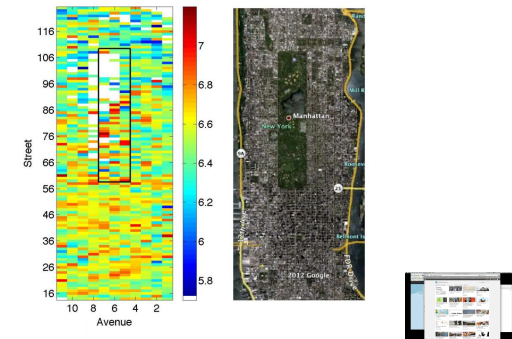- Early Twitter data—follower counts are not worth so much.
- Unpublished.

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

$\Delta h_{\text{avg}} = 2.00$

Hour 13, 2010

$\log_{10}$ normalized word frequency $f(\Delta h_{\text{avg}})$

Average happiness $h_{\text{avg}} - 5$

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

hedonometer.org ⬈

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]

ρ

number of links

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

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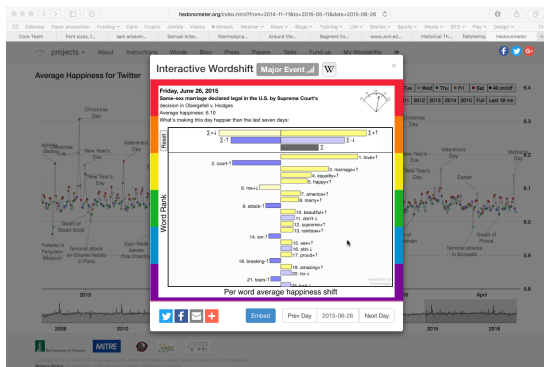A Better Lexical Lens
Geography
Movement
Extras
References

Online instrument: hedonometer.org ⬈

Average Happiness for Twitter

- Machine: @andyreagan ⬈
- Planned happiness versus tragedies.

hedonometer.org ⬈ —word shifts:

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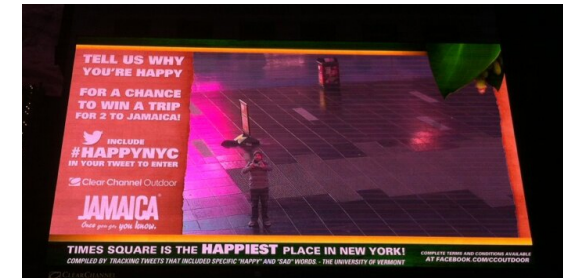Movement
Extras
References

The very surprising tunable hedonometer:

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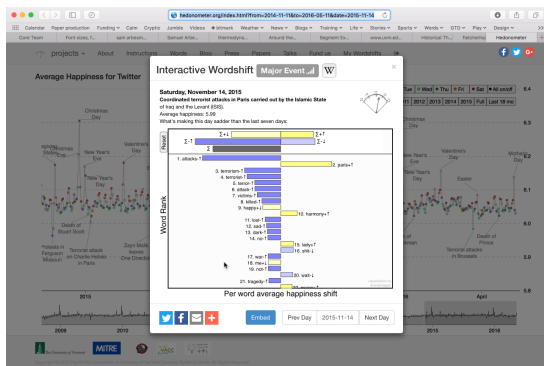Movement
Extras
References

hedonometer.org ⬈

Average Happiness for Twitter
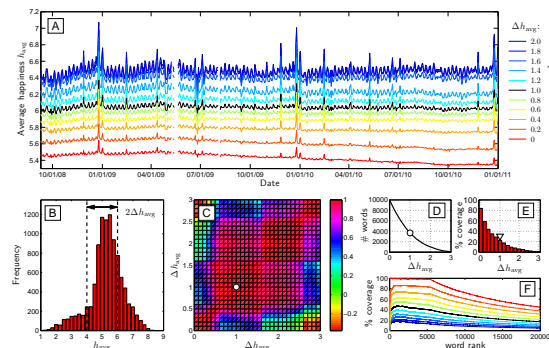
- Machine: @andyreagan ⬈

hedonometer.org ⬈ —word shifts:

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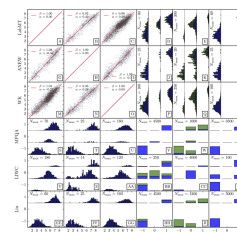Geography
Movement
Extras
References

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

Happiness in Manhattan:

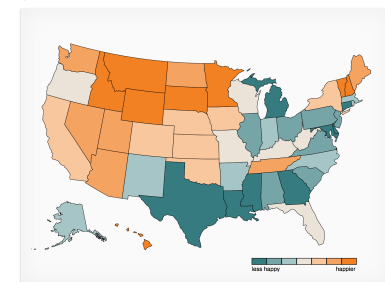See Blog post on compstorylab.org ⎘

The PoCSverse
Finding Happiness
118 of 154
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
112 of 154
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 PoCSverse
Finding Happiness
115 of 154
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
119 of 154
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
113 of 154
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]

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

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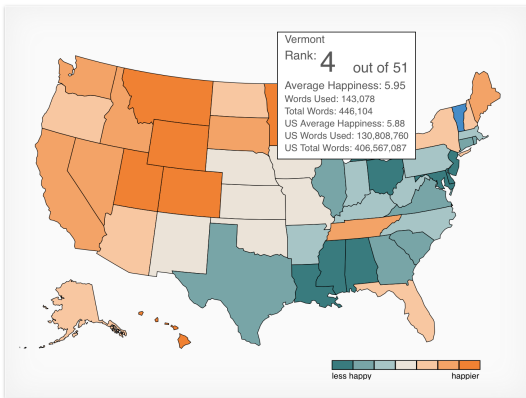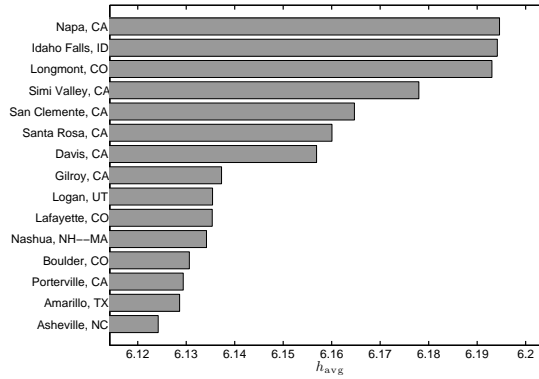
The Geography of Happiness:

♺ Mitchell et al., PLoS ONE, 2013. [35]

♺ It's a paper that tweets: @geographyofhapp ⎘

♺ Online **App**endices ⎘

♺ Much interesting and amusing press ...

♺ Online, interactive US map at hedonometer.org ⎘

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

Average Happiness of United States for 2013

Vermont
Rank: 4 out of 51
Average Happiness: 5.95
Words Used: 143,078
Total Words: 446,104
US Average Happiness: 5.88
US Words Used: 130,808,760
US Total Words: 406,567,087

less happy — happier

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

Happiest Cities:

Napa, CA
Idaho Falls, ID
Longmont, CO
Simi Valley, CA
San Clemente, CA
Santa Rosa, CA
Davis, CA
Gilroy, CA
Logan, UT
Lafayette, CO
Nashua, NH-–MA
Boulder, CO
Porterville, CA
Amarillo, TX
Asheville, NC

h_{avg}

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

rednnneecckckkkkkkkkk

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

I've lived in quite a few places. The most recently Beaumont, TX. Its 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.
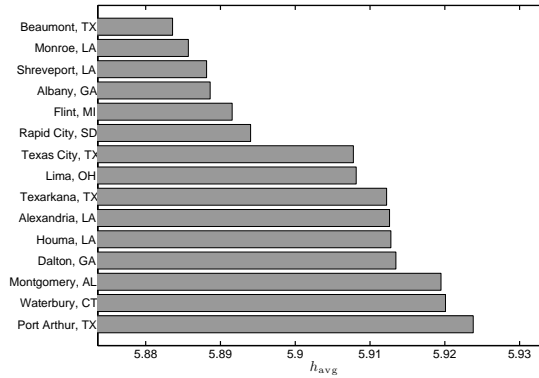
Reply

Blog post: Where is the happiest city in the US?

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

Average Happiness of United States for 2013

Rhode Island
Rank: 40 out of 51
Average Happiness: 5.85
Words Used: 632,277
Total Words: 1,953,230
US Average Happiness: 5.88
US Words Used: 130,808,760
US Total Words: 406,567,087

less happy — happier

The PoCSverse
Finding Happiness
122 of 154
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):

Beaumont, TX
Monroe, LA
Shreveport, LA
Albany, GA
Flint, MI
Rapid City, SD
Texas City, TX
Lima, OH
Texarkana, TX
Alexandria, LA
Houma, LA
Dalton, GA
Montgomery, AL
Waterbury, CT
Port Arthur, TX

h_{avg}

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

beaumontenterprise.com

The Bayou
Biting satire, commentary & opinion Southeast-Texas style
Email | Twitter | Facebook

Eggheads find Beaumont IS the 'saddest city'
February 19, 2013 at 10:41 am by gator

That's what some eggheads at the Department of Mathematics and Statistics at the University of Vermont have determined.

The method to their madness? Twitter. They say they plotted 10 million geotagged Tweets in 2011.
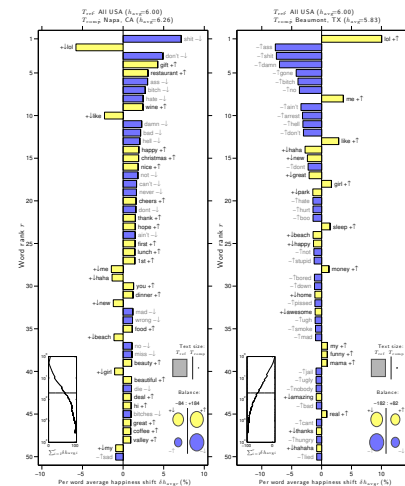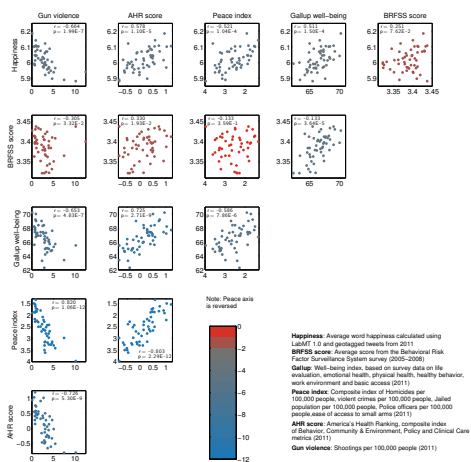
The PoCSverse
Finding Happiness
128 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
SOTU
A Better Lexical Lens
Geography
Movement
Extras
References

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
123 of 154
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
126 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
SOTU
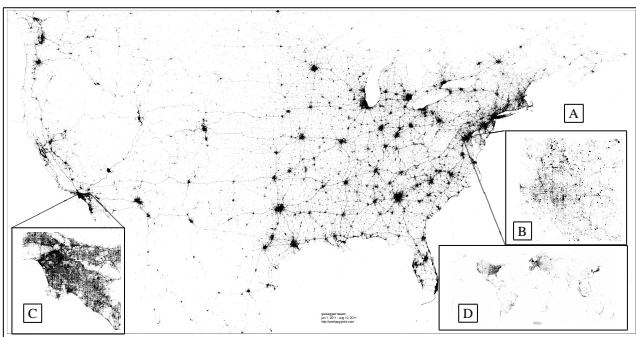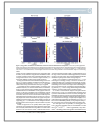A Better Lexical Lens
Geography
Movement
Extras
References

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" ⬀
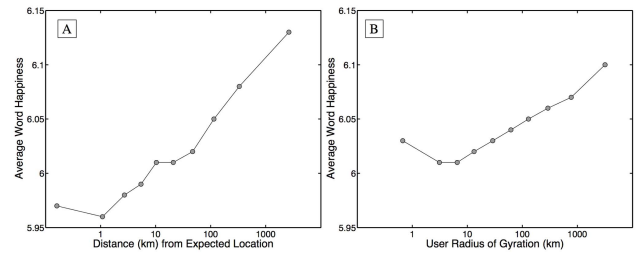Frank et al.,
Nature Scientific Reports, **3**, 2625, 2013. [16]

Figure 6 | (A) Average happiness of words written as a function of distance from an author's expected location, with tweets grouped into ten equally populated bins. Expressed happiness grows logarithmically with distance distance from expected location. (B) A similar trend is observed when individuals are grouped into ten equally populated bins according to their gyradius. Both trends persist through variations in binning and different measures of mobility.

- We grow fonder as we wander.
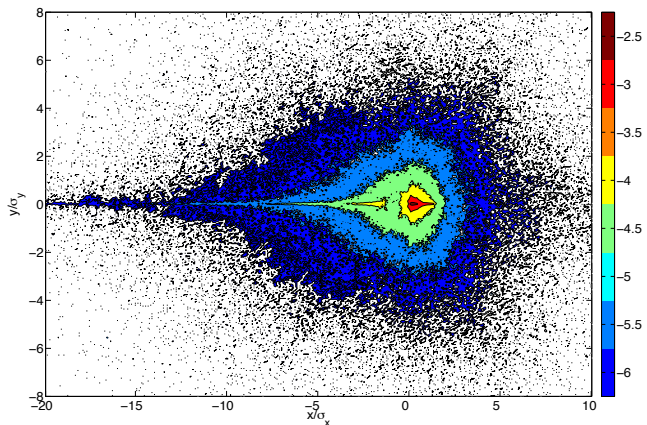
- Raw movement patterns agree with cell phone data findings. [18]
- For cell phone data: Time spent at locations decays as an

Summarize the PNAS article entitled "Human language reveals a universal positivity bias" by Peter Sheridan Dodds, Eric M Clark, Suma Desu, Morgan R Frank, Andrew J Reagan, Jake Ryland Williams, Lewis Mitchell, Kameron Decker Harris, Isabel M Kloumann, James P Bagrow, Karine Megerdoomian, Matthew T McMahon, Brian F Tivnan, 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 lungs.

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,
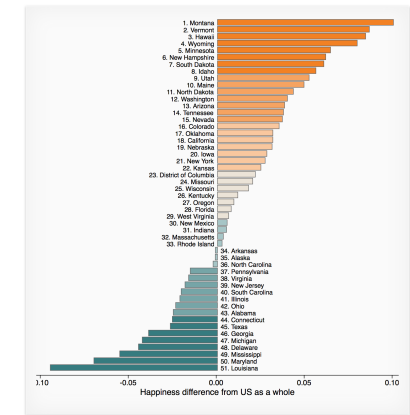As this study shows, with language on the table.

Summarize the PLOS one publication entitles "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 PLOS one publication entitles "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 Allen Poe.

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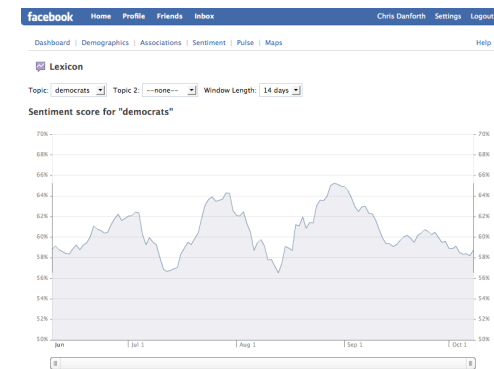To uncover what plagues our society.

"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.

The PoCSverse
Finding Happiness
138 of 154

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
139 of 154

Introduction

Measurement

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

References

Developmental Sankey diagrams states ⬀ and cities ⬀.

Or here: Facebook Lexicon Sentiment Analysis (2008)

The PoCSverse
Finding Happiness
140 of 154

Introduction

Measurement

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

References

Facebook Lexicon Sentiment Analysis

Binary decision on emotional content

Sentiment score for "palin"

🐦 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.

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.

[7] M. Csikszentmihalyi, R. Larson, and S. Prescott.
The ecology of adolescent activity and experience.
Journal of Youth and Adolescence, 6:281–294, 1977.

References III

[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 with diverse corpora presenting a safety bias, 2021.
Available online at https://arxiv.org/abs/2110.06847. pdf

References IV

[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

[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

References V

[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

[14] R. A. Easterlin.
Income and happiness: towards a unified theory.
The Economic Journal, 111:465–484, 2001. pdf

References VI

[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

[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

References VII

[18] M. C. González, C. A. Hidalgo, and A.-L. Barabási.
Understanding individual human mobility patterns.
Nature, 453:779–782, 2008. pdf

[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, 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.

References VIII

[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, 306(5702):1776–1780, 2004. pdf

The PoCSverse
Finding Happiness
141 of 154
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
142 of 154
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
143 of 154
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
144 of 154
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
145 of 154
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
146 of 154
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
147 of 154
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
148 of 154
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
149 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
SOTU
A Better Lexical Lens
Geography
Movement
Extras
References

References IX

[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/.

References X

[27] M. A. Killingsworth and D. T. Gilbert.
A wondering mind is an unhappy mind.
Science, 330:932, 2010. pdf

[28] I. M. Kloumann, C. M. Danforth, K. D. Harris, C. A. Bliss, and P. S. Dodds.
Positivity of the English language.
PLoS ONE, 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.

References XI

[31] C. Martinelli and S. W. Parker.
Deception and misreporting in a social program.
forthcoming in Journal of the European Economic Association, 2007. pdf

[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, 333:1814–1815, 2011. pdf

References XII

[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, 8:e64417, 2013. pdf

[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, 6, 2017. pdf

References XIII

[38] E. Sandhaus.
The New York Times Annotated Corpus.
Linguistic Data Consortium, Philadelphia, 2008.
Available online at: https://doi.org/10.35111/77ba-9x74.

[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
150 of 154
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
151 of 154
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
152 of 154
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
153 of 154
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
154 of 154
Introduction
Measurement
Happiness
Some motivation
Measuring emotional content
Hedonometer
Analysis
Songs
Blogs
SOTU
A Better Lexical Lens
Geography
Movement
Extras
References