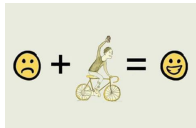


# Measuring Large-Scale Happiness & Health with Social Media

Data Science Initiative, Brown University  
February 2, 2017

Chris Danforth @chrisdanforth  
Computational Story Lab

Department of Mathematics & Statistics }  
Vermont Complex Systems Center } University of Vermont  
Vermont Advanced Computing Core }



Measuring  
Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 1/61

## Measuring Happiness

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Mental Health

### Measuring Happiness

The Hedonometer

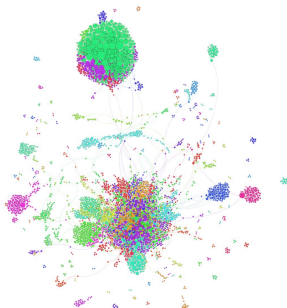
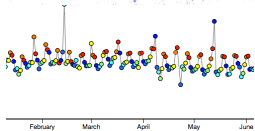
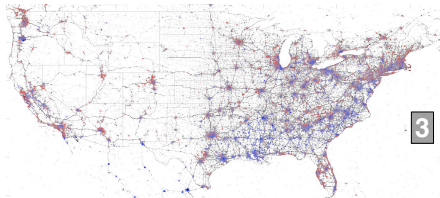
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the hedonometer



1



2

happy	8.30
hahaha	7.94
fresh	7.26
cherry	7.04
pancake	6.96
piano	6.94
and	5.22
the	4.98
of	4.94
down	3.66
worse	2.70
crash	2.60
:(	2.36
war	1.80
jail	1.76



## Measuring Happiness

The Hedonometer

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Tweets

Harry Potter

Mental Health

Measuring  
Happiness

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Blogs

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Mental Health

# language assessment by Mechanical Turk

## Measuring the happiness of words

### Goal:

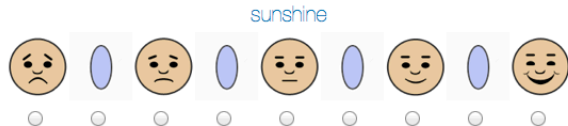
- Our overall aim is to assess how people feel about individual words.
- With this particular survey, we are focusing on the dual emotions of happiness and sadness.

### Time required:

- 6 to 8 minutes.

### Instructions and Example:

- You are to rate individual words on a 9 point unhappy-happy scale:



1. Read the word, ("sunshine" in the above example) and observe your emotional response.
2. Click on the face that best corresponds to your response.

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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

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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
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

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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	-	4115	2977
10221	suicide	1.30	0.84	2124	4707	3319	2107
10222	terrorist	1.30	0.91	3576	-	3026	-

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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

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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
:	:	:	:	:	:	:	:

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Blogs

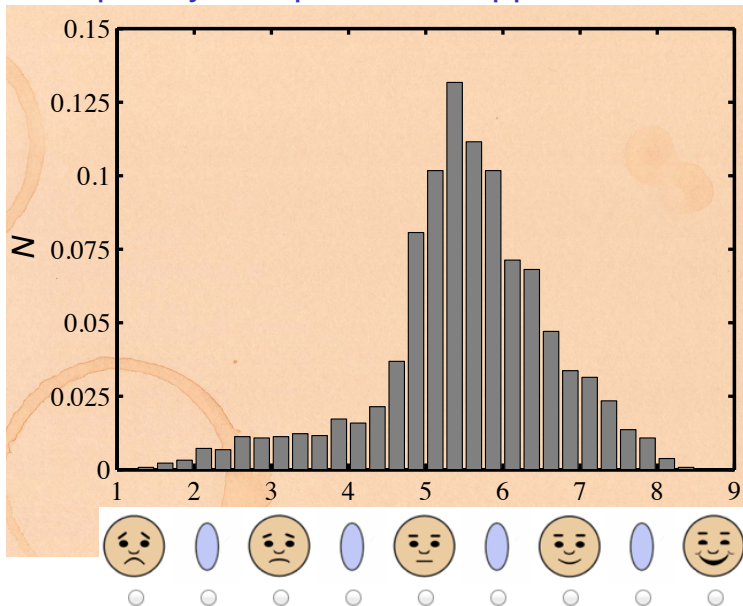
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# A Frequency-Independent Happiness Bias



## Measuring Happiness

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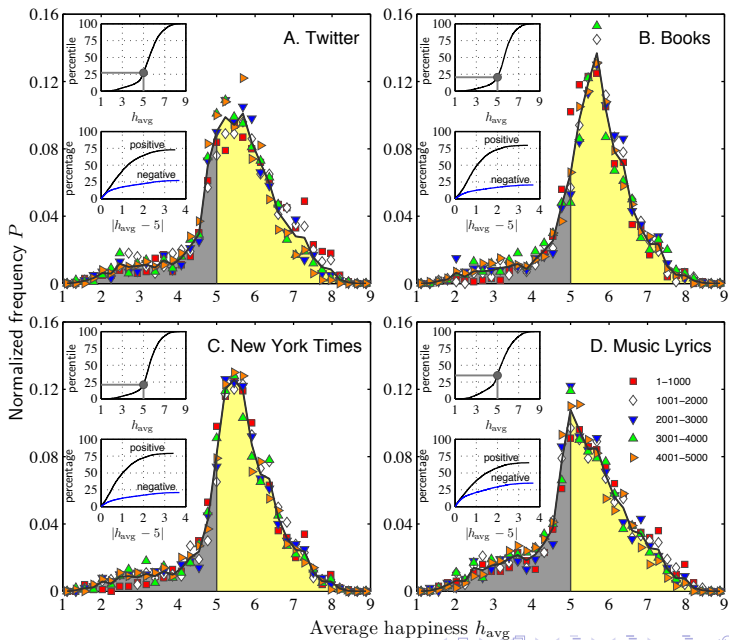
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# A Frequency-Independent Happiness Bias



## Measuring Happiness

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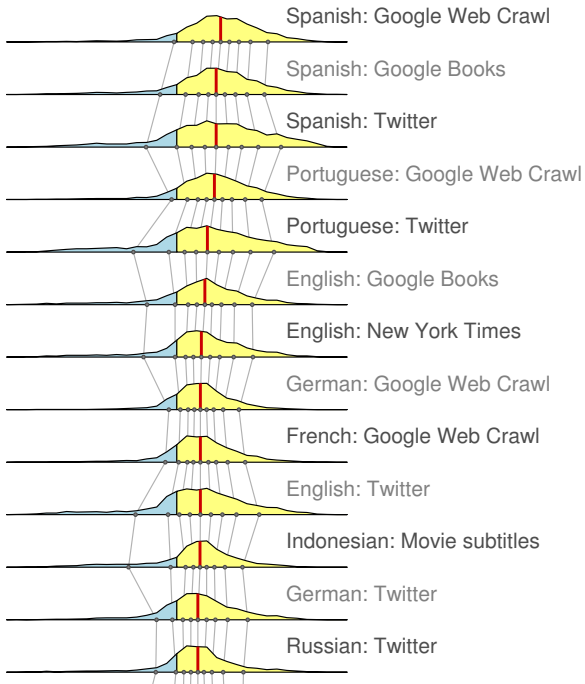
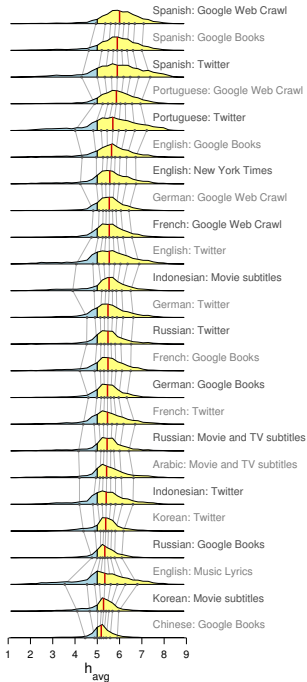
Music Lyrics

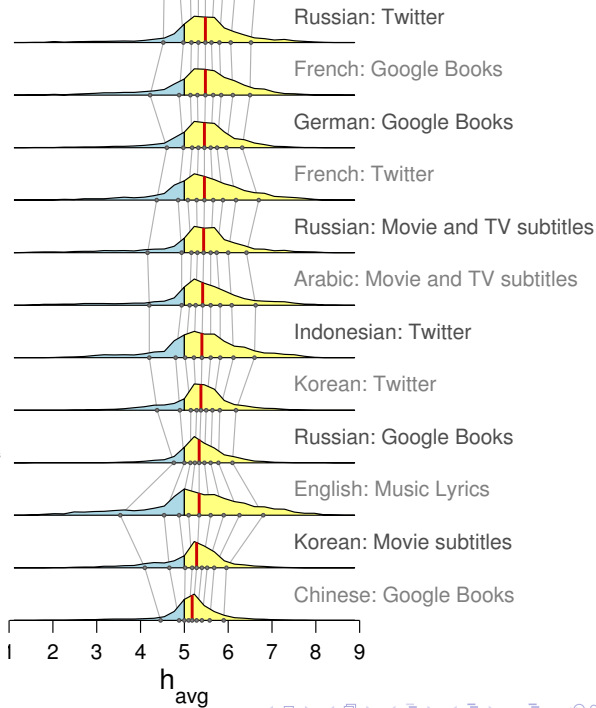
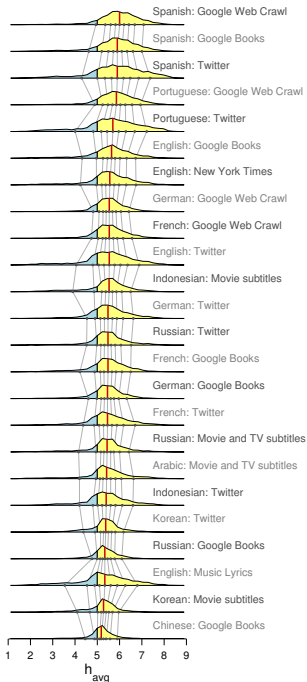
Blogs

Tweets

Harry Potter

Mental Health



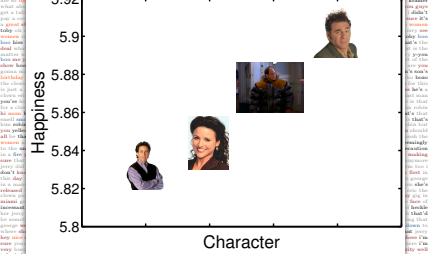


opening monologue to see the thing about birthday parties is that the first birthday party you have and the last birthday party you have are actually quite similar you know you just kinda do it three years or the best birthday parties at the party you don't even really realize that there is a party you don't know what's going on but both birthday parties people have to think help you know out the candles you can't do it you don't even know why you're doing it or what the reason what is going on it's after the only two birthday parties where other people have to gather your friends together for you sometimes they're gone you're friends that make the tradition there later on in three or six down and then tell you those are your friends will there thank you for coming to see

KRAMER: what did you go up there to heckle her for JERRY: because she came down to the club and heckled me give her a taste of her own medicine  
 KRAMER: oh yeah you gave her a taste of medicine alright JERRY: well i didn't want her to have an accident GEORGE: what accident KRAMER: well after he heckled toby she got so upset she ran out of the building and a street sweeper ran over her foot and severed her pinky toe GEORGE: that's unbelievable  
 KRAMER: yeah then after the ambulance left i found the toe so i put it in a cracker jack box filled it with ice and took off for the hospital GEORGE: what you ran KRAMER: no i jumped on the bus i told the driver i got a toe here buddy step on it GEORGE: holy cow KRAMER: yeah yeah then all of a sudden this guy pulls out a gun well i knew any delay is gonna cost her her pinky toe so i got out of the seat and i started walking towards him he says where do you think you're going cracker jack i said well i got a little prize for ya buddy knocked him out cold GEORGE: how could you do that KRAMER: then everybody is screaming because the driver he's passed out from all the commotion the bus is out of control so i grab him by the collar i take him out of the seat i get behind the wheel and now i'm drivin the bus GEORGE: you're batman KRAMER: yeah yeah i am batman then the mugger he comes to and he starts chokin me so i'm fightin him off with one hand and i kept drivin the bus with the other y'know then i managed to open up the door and i kicked him out the door you know with my foot you know at the next stop JERRY: you kept makin all the stops KRAMER: well people kept ringin the bell GEORGE: well what about about the toe what happened to the toe KRAMER: well i am happy to say that the little guy is back in place at the end of the line GEORGE: you did all this for a pinky toe KRAMER: well it's a valuable appendage

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Reference: Jerry, Comparison: Kramer

Click on the graph and drag up to reveal additional words.

Reference happiness: 5.83  
 Comparison happiness: 5.90  
 Why comparison is happier than reference:

Happy words Kramer uses more frequently than Jerry:

Per word average happiness shift

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# Unhappiness (we're working on it)

Some obvious problems/issues:

- ▶ Partial coverage of all words.

Measuring  
Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 9/61

# Unhappiness (we're working on it)

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Measuring  
Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 9/61



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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

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- ▶ Word evaluations distributed in space, time.



# Unhappiness (we're working on it)

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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

## Some obvious problems/issues:

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## Clearly:

- ▶ Only suitable for large-scale texts.

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Tweets

Harry Potter

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Measuring  
Happiness

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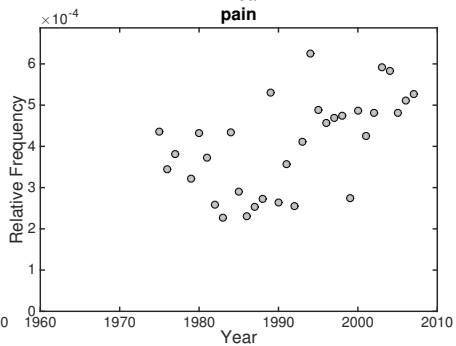
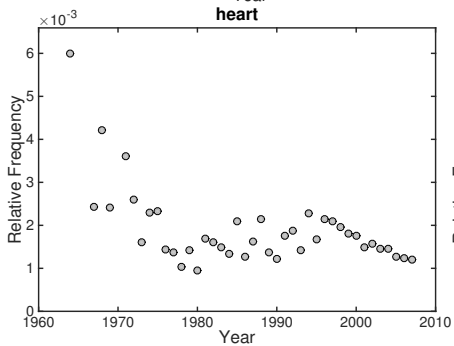
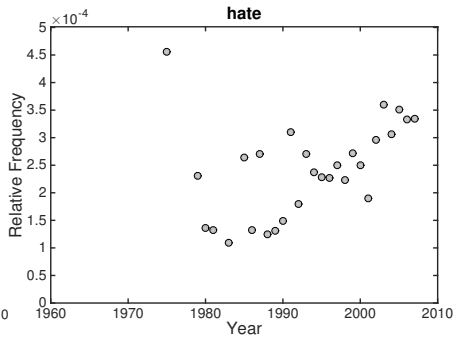
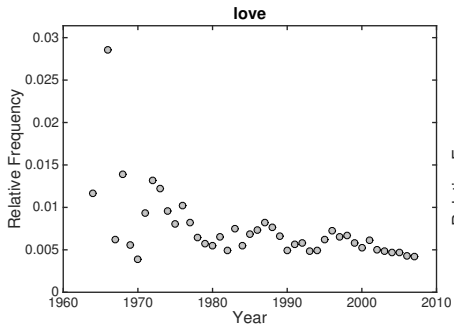
**Music Lyrics**

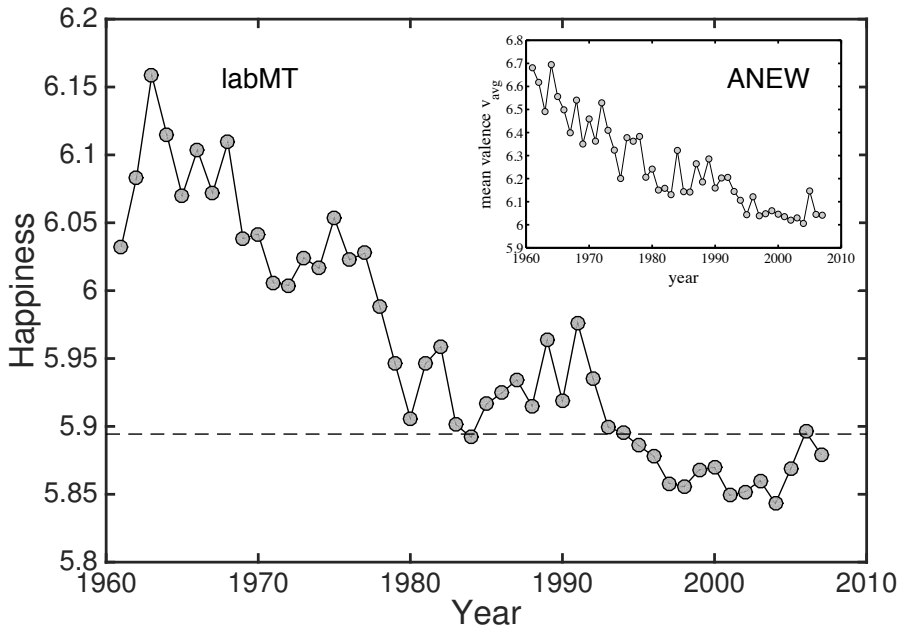
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Tweets

Harry Potter

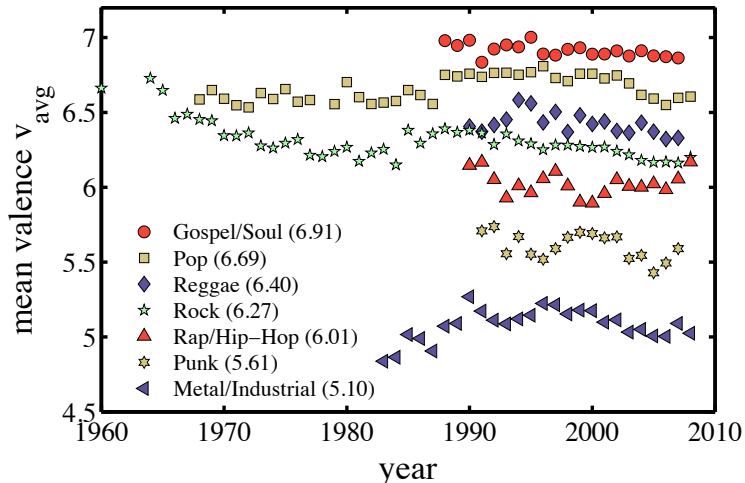
Mental Health





Dodds and Danforth, "Measuring the Happiness of Large Scale Written Expression: Songs, Blogs & Presidents", 2010.

## Lyrics—average valence of genres:



Dodds and Danforth, "Measuring the Happiness of Large Scale Written Expression: Songs, Blogs & Presidents", 2010.

## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 13/61



## Some of my favorites:

Artist	avg	Words
The Beatles	6.16	69860
Michael Jackson	6.05	140460
U2	6.03	46827
Dave Matthews Band	5.99	95123
Pink Floyd	5.90	24150
Ben Harper	5.88	19429
Pearl Jam	5.84	27661
Nirvana	5.82	20809
Guns N Roses	5.79	20957
Tool	5.78	15772
Snoop Dogg	5.75	226993
Nine Inch Nails	5.72	59541
Wu Tang Clan	5.60	49560
2Pac	5.60	217268
Korn	5.54	26032
Metallica	5.46	45370
Rage Against The Machine	5.44	22141

Measuring  
Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 14/61



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Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 14/61







# Top 25 of $\approx 20,000$ artists:

Rank	Artist	avg	Words
1	Darlene Zschech	6.41	23170
2	All 4 One	6.40	15515
3	Perry Como	6.39	94194
4	Earth Wind And Fire	6.36	16930
5	Earth Wind Fire	6.36	12462
6	Marco Borsato	6.35	12158
7	The Beach Boys	6.34	16510
8	Earth Wind amp Fire	6.33	22197
9	New Kids On The Block	6.31	12449
10	Aqua	6.31	15876
11	Beach Boys	6.29	63017
12	India Arie	6.29	10574
13	Enya	6.28	13412
14	New Edition	6.27	16033
15	Dianne Reeves	6.27	17590
16	Daft Punk	6.27	17175
17	Children Lyrics	6.27	13342
18	Kenny Loggins	6.27	19530
19	Chris Brown	6.27	10511
20	Steve Miller Band	6.26	24310
21	Luther Vandross	6.26	17429
22	Faith Hill	6.26	42435
23	Otis Redding	6.25	11480
24	Billy Gilman	6.25	13916
25	Celine Dion	6.25	166034

(criterion:  $\geq 10000$  words)

## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

# Top 25 of $\approx 20,000$ artists:

Rank	Artist	avg	Words
1	Darlene Zschech	6.41	23170
2	All 4 One	6.40	15515
3	Perry Como	6.39	94194
4	<b>Earth Wind And Fire</b>	6.36	16930
5	<b>Earth Wind Fire</b>	6.36	12462
6	Marco Borsato	6.35	12158
7	The Beach Boys	6.34	16510
8	<b>Earth Wind amp Fire</b>	6.33	22197
9	New Kids On The Block	6.31	12449
10	Aqua	6.31	15876
11	Beach Boys	6.29	63017
12	India Arie	6.29	10574
13	Enya	6.28	13412
14	New Edition	6.27	16033
15	Dianne Reeves	6.27	17590
16	Daft Punk	6.27	17175
17	Children Lyrics	6.27	13342
18	Kenny Loggins	6.27	19530
19	Chris Brown	6.27	10511
20	Steve Miller Band	6.26	24310
21	Luther Vandross	6.26	17429
22	Faith Hill	6.26	42435
23	Otis Redding	6.25	11480
24	Billy Gilman	6.25	13916
25	Celine Dion	6.25	166034

(criterion:  $\geq 10000$  words)

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(criterion:  $\geq 10000$  words)

## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health



Bottom 25 of  $\simeq$  20,000 artists:

Rank	Artist	havg	Words
1	Dayton Family	5.17	13910
2	Slayer	5.18	19441
3	Ana Gabriel	5.24	14861
4	MC Ren	5.32	13113
5	Blaze Ya Dead Homie	5.32	20145
6	Die Arzte	5.33	20089
7	Ricardo Arjona	5.34	16749
8	Krazyie Bone	5.36	13962
9	Black Label Society	5.36	12783
10	Mudvayne	5.36	21514
11	Biohazard	5.36	17911
12	Psychopathic Rydas	5.37	14398
13	Don Omar	5.37	20336
14	Dark Tranquillity	5.37	12403
15	Misfits	5.38	10909
16	Death	5.38	16254
17	Papa Roach	5.40	26998
18	Darkthrone	5.41	10272
19	Dark Tranquility	5.41	23368
20	NWA	5.42	17730
21	Annihilator	5.42	14121
22	Slipknot	5.43	24956
23	Esham	5.43	22964
24	Rage Against The Machine	5.44	17140
25	Iced Earth	5.45	14469

(criterion:  $\geq$  10000 words)Measuring  
Happiness

The Hedonometer

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(criterion:  $\geq 10000$  words)Measuring  
Happiness

The Hedonometer

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Mental Health

# Lexicon Valley: The Pollyanna Hypothesis

Hedonometer



Measuring  
Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 19/61

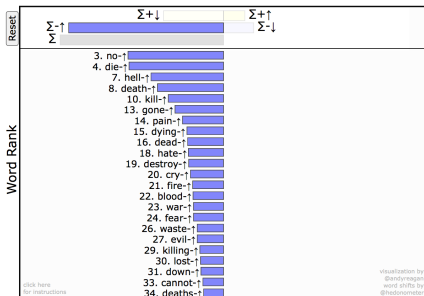


Click on the graph and drag up to reveal additional words.

Reference happiness: 6.21

Comparison happiness: 5.36

Why comparison is less happy than reference:



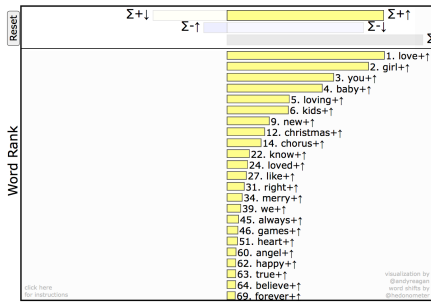
Per word average happiness shift



Reference happiness: 5.36

Comparison happiness: 6.21

Why comparison is happier than reference:



Per word average happiness shift



## Measuring Happiness

The Hedonometer

Music Lyrics

**Blogs**

Tweets

Harry Potter

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### Measuring Happiness

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Harry Potter

Mental Health





## *An exploration of human emotion, in six movements*

*by Jonathan Harris and Sep Kamvar*

*Open We Feel Fine*

*Mission*  
*Movements*  
*Methodology*  
*Findings*  
*Creators*  
*Gallery*  
*News*  
*API*

Feeling	lover sick	Gender	Female	Age	20 - 29	Weather	Cloudy	Location	All	Date	Feb 14, 2006
All Feelings	Both Genders			All Ages			All Weather	All Locations	All Dates		
A	lopsided			0s				afghanistan	2005	Jan	1
B	loquacious								2006	Feb	2
C	lost								Mar	3	
D	loud								Apr	4	
E	lounging								5		
F	lousy								6		
G	lovable								7		
H	loveable								8		
I	loved								9		
J	loveless								10		
K	lovely								11		
L	loverly								12		
M	lovesick								13		
N	loving	14									
O	low	15									
P	lower	16									
Q	lowered	17									
R	lowering	18									
S	lowest	19									
T	lowly	20									
U	loyal	21									
V	lucid	22									
W	luckier	23									
X	luckiest	24									
Y	lucky	25									
Z		26									
		27									
		28									



**Find Feelings**

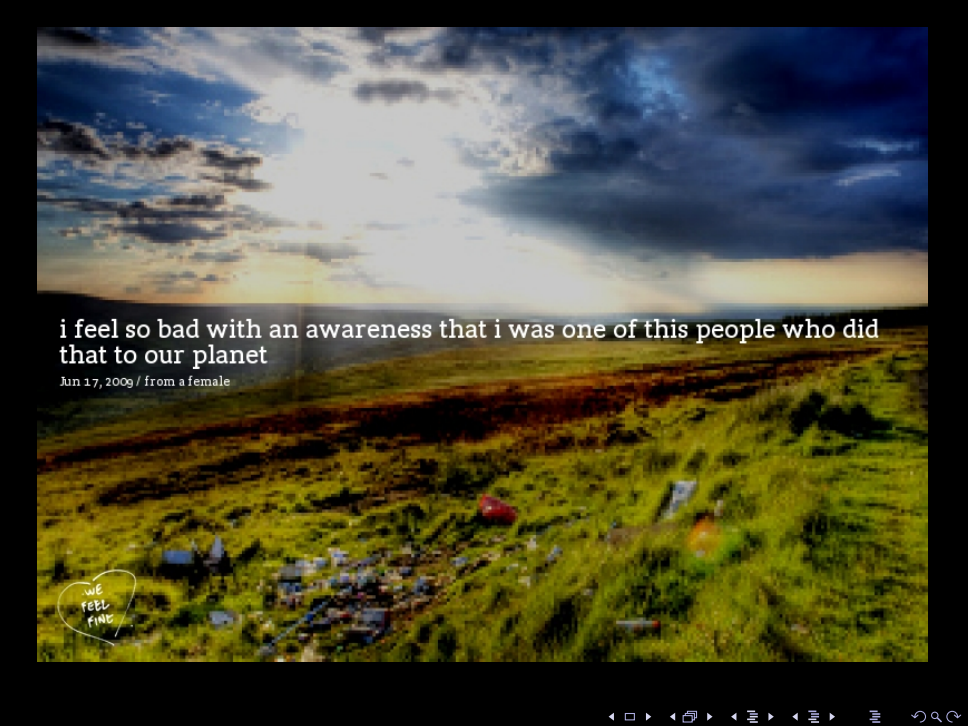
i feel so much of my dad alive in me that there isn't even room for me

October 17, 2005 / from someone in wheaton illinois united states



Save





i feel so bad with an awareness that i was one of this people who did that to our planet

Jun 17, 2009 / from a female

WE  
FEEL  
FINE

THE BEAUTY EXPERT

NOVEMBER 2009

# Shiny, Bouncy Hair

Easy, Speedy

i feel like i am doomed to be only attractive to weirdos

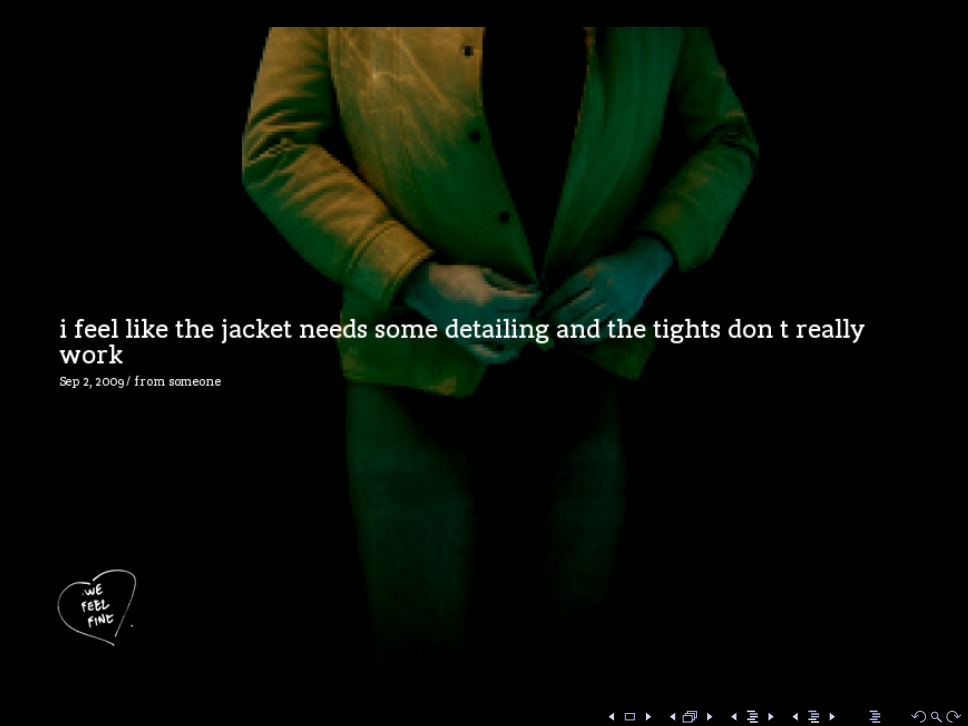
Nov 2, 2009 / from someone in united states

# Hollywood Skinny

13 Crazy Celebrity Diets

 THE SEXIEST

Kristen



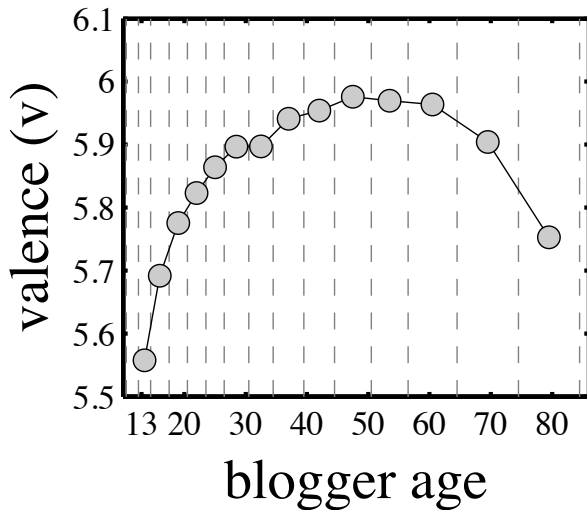
i feel like the jacket needs some detailing and the tights don t really work

Sep 2, 2009 / from someone









Dodds and Danforth, 2010

## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

Frame 24/61

## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

**Tweets**

Harry Potter

Mental Health

### Measuring Happiness

The Hedonometer

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**Tweets**

Harry Potter

Mental Health

I make awesome decisions in bike stores!!!

9:55 PM Sep 18th via web  
Retweeted by 100+ people

Reply Retweet



**kanyewest**  
Kanye West



**Lurk @ Home Mom**  
@LurkAtHomeMom



Follow

Oh, you're making an important phone call?  
Hold on, let me get my trumpet.

-kids



RETWEETS 222 FAVORITES 378



9:00 AM - 13 Nov 2014



**Philae Lander**  
@Philae2014

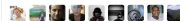


Follow

Now that I'm safely on the ground, here is what my new home #67P looks like from where I am. #CometLanding



RETWEETS 15,472 FAVORITES 9,332



5:05 AM - 13 Nov 2014



**bananafanafofisa**  
@lisaxy424



Follow

i ate quinoa and kale like three days ago and still aren't skinny what the heck

RETWEETS 11 FAVORITES 47



11:13 AM - 21 May 2015



**Chris Oestereich**  
@costrike



Follow

Made an irresponsible dad breakfast today:  
donuts, bacon & chocolate milk

Little one: "That's not breakfast. That's junk."

FAVORITE 1



11:53 AM - 6 May 2015

INDU ↓ **14690.06** +122.89 14688.12 / 14692.81  
At 13:34 0 14567.17 H 14720.34 L 14554.29 Prev 14567.17

INDU Index 95 Save As 96 Actions 97 Edit Intraday Chart

1 day(s) 04/23/2013 - 04/23/2013 09:30 - 14:15 Trade Compare USD

1D 3D 1M 6M YTD 1Y 5Y Max Tick Security/Study Event

Track Annotate News Zoom



**AP** The Associated Press @AP Follow

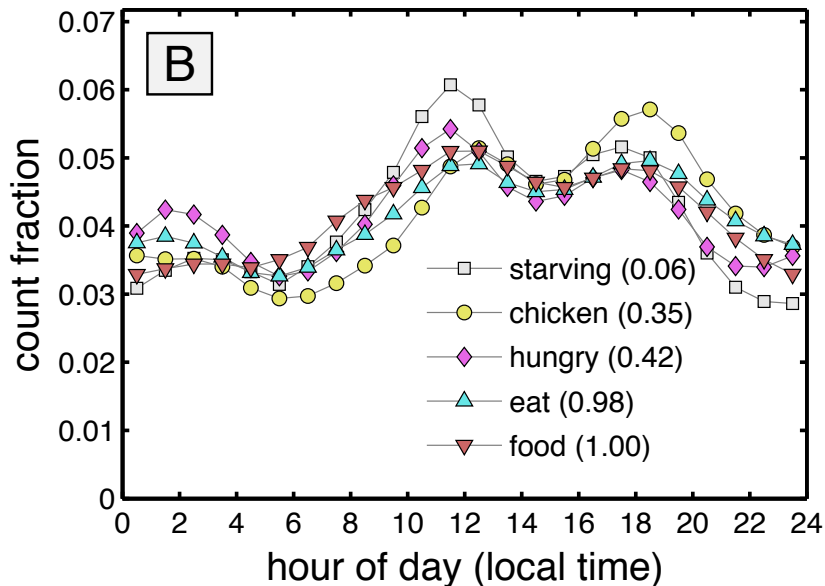
### Breaking: Two Explosions in the White House and Barack Obama is injured

Reply Retweet Favorite More

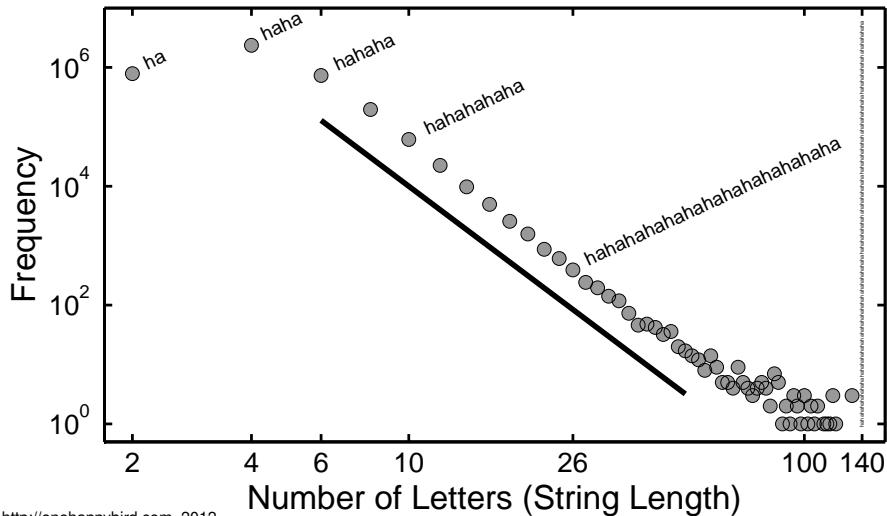
579 RETWEETS 19 FAVORITES

```
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":5
1241574,"id_str":"51241574","name":"The Associated Press","screen_name":"AP","location":"Global","url":"http://www.ap.org","descriptio
n":"News, discussion and a 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 J
un 26 21:48:52 +0000 2009","favourites_count":0,"utc_offset":-18000,"time_zone":"Eastern Time (US & Canada)","geo_enabled":false,"verifi
ed":true,"statuses_count":50187,"lang":"en","contributors_enabled":false,"is_translator":false,"profile_background_color":"333333","prof
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background_image_url_https":"https://si0.twimg.com/profile_background_images/734506342/vb3be603514207db70cb0a991c26f2718.jpeg","prof
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_https":"https://si0.twimg.com/profile_images/1848193664/APLogo_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":"CCCC
C","profile_text_color":"333333","profile_use_background_image":true,"default_profile":false,"default_profile_image":false,"following":n
ull,"follow_request_sent":null,"notifications":null},"geo":null,"coordinates":null,"place":null,"contributors":null,"retweet_count":0,"f
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```

# Twitter—Spontaneous Bursts of Being



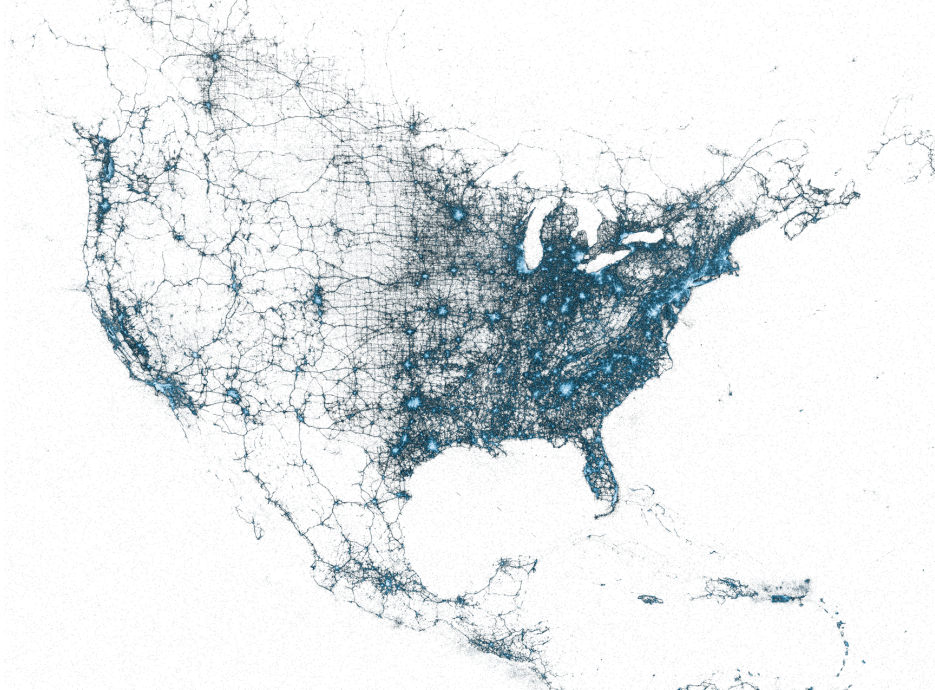
# Twitter—The Happiest Distribution...



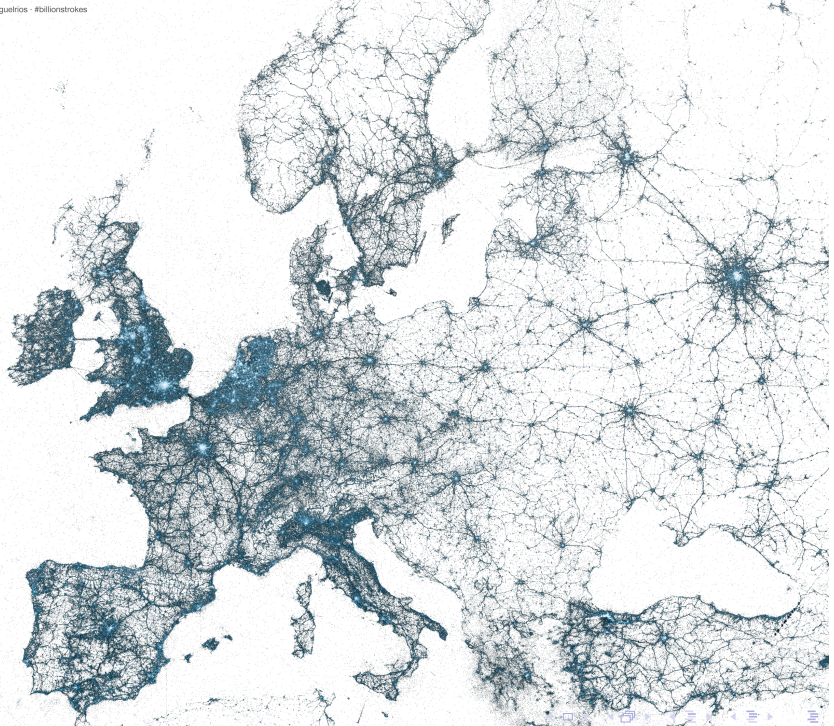
<http://onehappybird.com>, 2012

# Twitter—Cartography

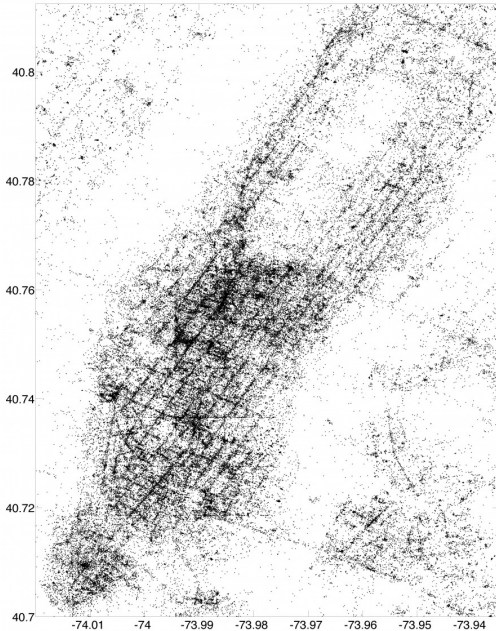




@miguelrios



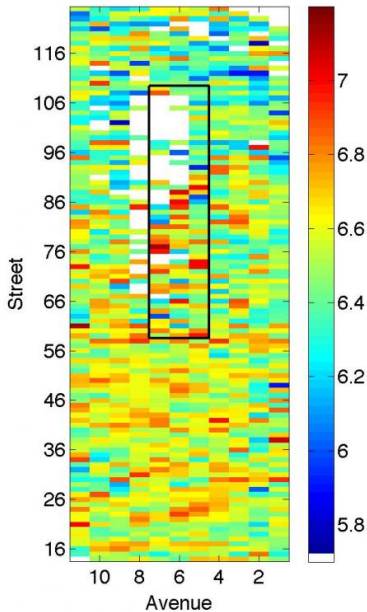
# Twitter—Manhattan Happiness



## Measuring Happiness

- The Hedonometer
- Music Lyrics
- Blogs
- Tweets**
- Harry Potter
- Mental Health

# Twitter—Manhattan Happiness



## Measuring Happiness

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- Blogs
- Tweets
- Harry Potter
- Mental Health



**Chris Danforth**

@ChrisDanforth

 Follow

Standing at the happiest spot in NYC!  
[onehappybird.com/2012/03/22/que](http://onehappybird.com/2012/03/22/que)  
... [pic.twitter.com/7IZUDlik9Y](http://pic.twitter.com/7IZUDlik9Y)

 Reply  Retweet  Favorite  More



FAVORITES

3



6:59 AM - 21 Feb 2014  from Manhattan, NY


Flag media

**TELL US WHY  
YOU'RE HAPPY**

**FOR A CHANCE  
TO WIN A TRIP  
FOR 2 TO JAMAICA!**



INCLUDE  
**#HAPPYNYC**  
IN YOUR TWEET TO ENTER

 Clear Channel Outdoor

**JAMAICA**

*Once you go, YOU KNOW.*



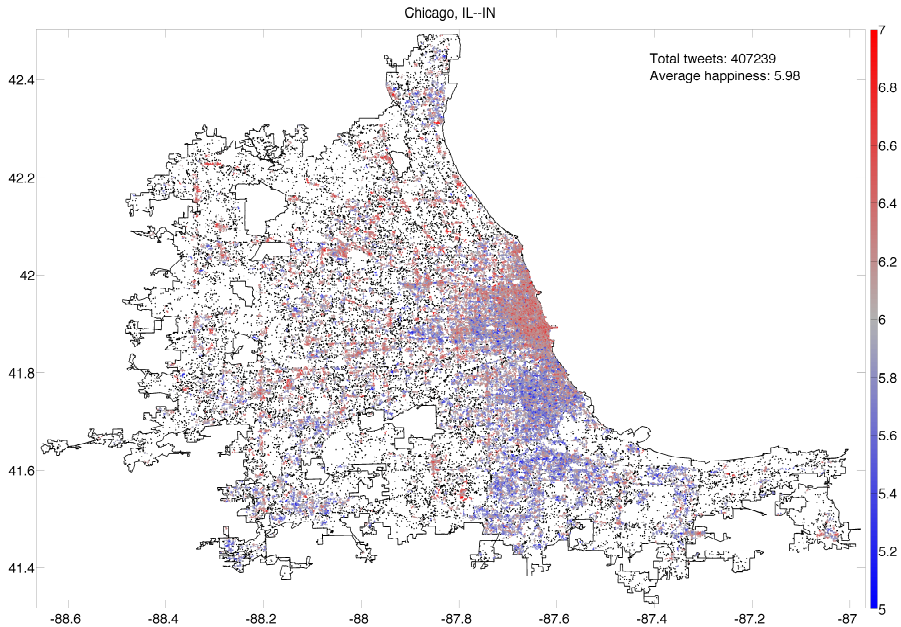
**TIMES SQUARE IS THE HAPPIEST PLACE IN NEW YORK!**

COMPILED BY TRACKING TWEETS THAT INCLUDED SPECIFIC "HAPPY" AND "SAD" WORDS - THE UNIVERSITY OF VERMONT

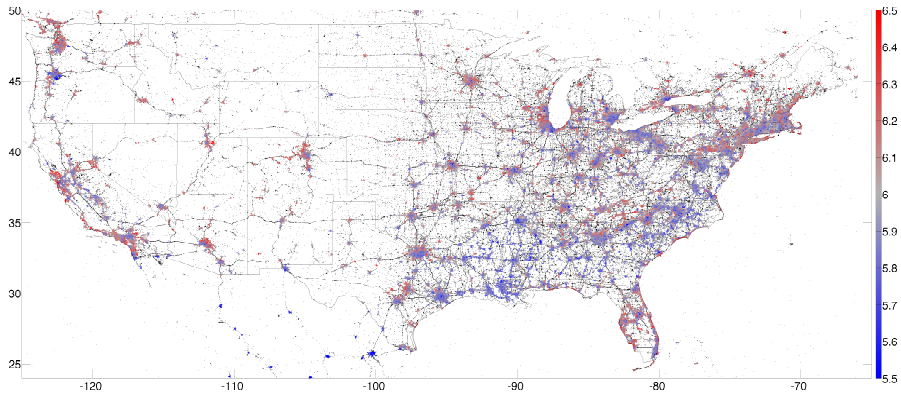
COMPLETE TERMS AND CONDITIONS AVAILABLE  
AT [FACEBOOK.COM/CCOUTDOOR](https://www.facebook.com/ccoutdoor)



# Twitter—Cities



# Twitter—Cities



Mitchell et al. PLoS ONE 2013



# Twitter—Cities

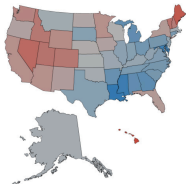
## The Atlantic

### The Geography of Happiness According to 10 Million Tweets

ALEXIS C. MADRIGAL | FEB 19 2013, 12:59 PM ET



The happiest city in America is Napa, California -- and the saddest all swear too much.



# beaumontenterprise.com

beaumont enterprise  Web Search by **YAHOO!**  Businesses

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- [cat5](#)
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## The Bayou

Biting satire, commentary & opinion Southeast-Texas style

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## Eggheads find Beaumont IS the 'saddest city'

Tuesday, February 19, 2013 by: [gator](#)

[Comments\(4\)](#) | [Email](#) | [Print](#)

[f Share](#) 55

[g +1](#) 0

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

# Twitter—Cities

**rednnneecckckkkkkkkk**

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

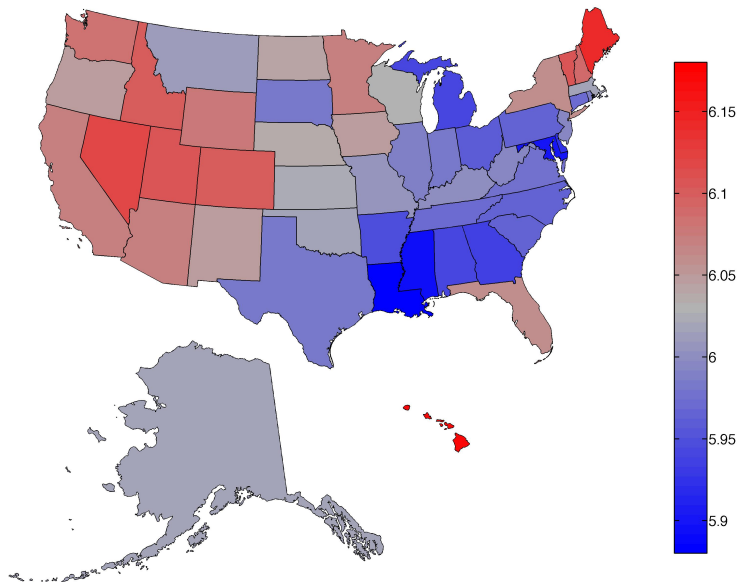


I've lived in quite a few places. The most recently Beaumont, TX. Its a pure hellhole. Hot, humid, trashy, terrible schools, corrupt government, lots of crime, no public parks or activities, terrible culture (other than crawfish boils), completely lacks diversity. This study confirms my suspicions that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

[Reply](#)

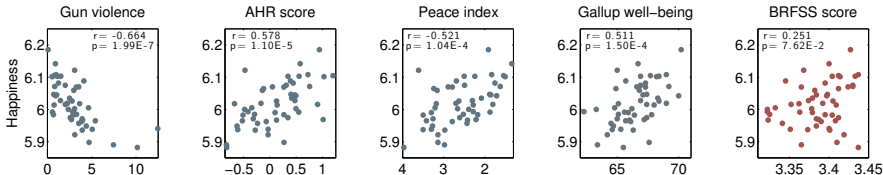


# Twitter—US Happiness—States



## Measuring Happiness

- The Hedonometer
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- Tweets
- Harry Potter
- Mental Health



**Happiness:** Average word happiness calculated using LabMT 1.0 and geotagged tweets from 2011

**Gun violence:** Shootings per 100,000 people (2011)

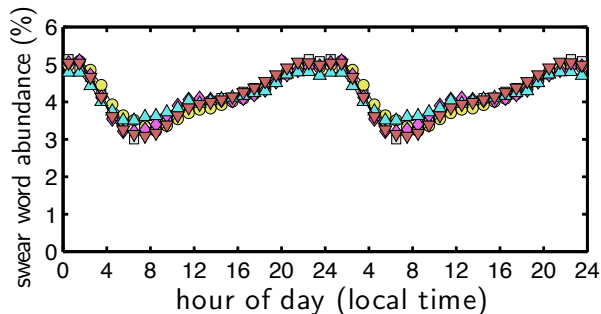
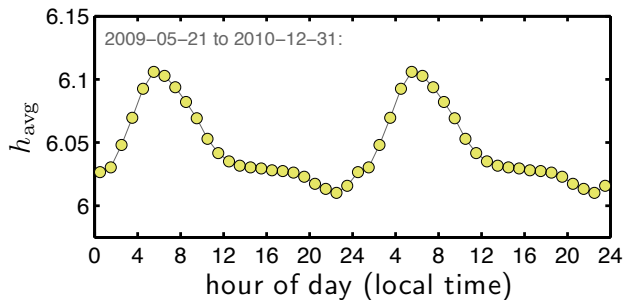
**Peace Index:** Composite index of Homicides per 100,000 people, violent crimes per 100,000 people, Jailed population per 100,000 people, Police officers per 100,000 people, ease of access to small arms (2011)

**AHR Score:** America's Health Ranking, composite index of Behavior, Community & Environment, Policy and Clinical Care metrics (2011)

**BRFSS Score:** Average score from the Behavioral Risk Factor Surveillance System survey (2005–2008)

Mitchell et al. PLoS ONE 2013

# The Daily Unravelling of the Human Mind



## Measuring Happiness

The Hedonometer

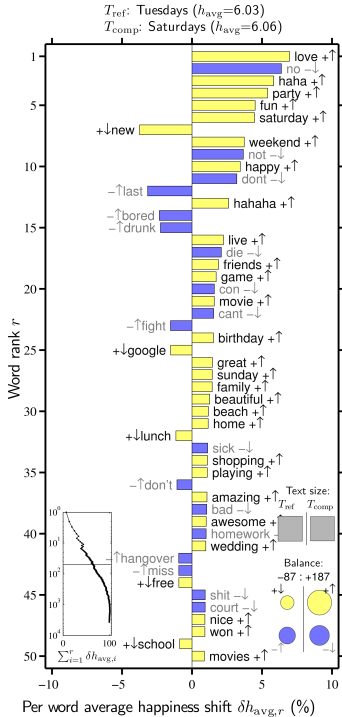
Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health



## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

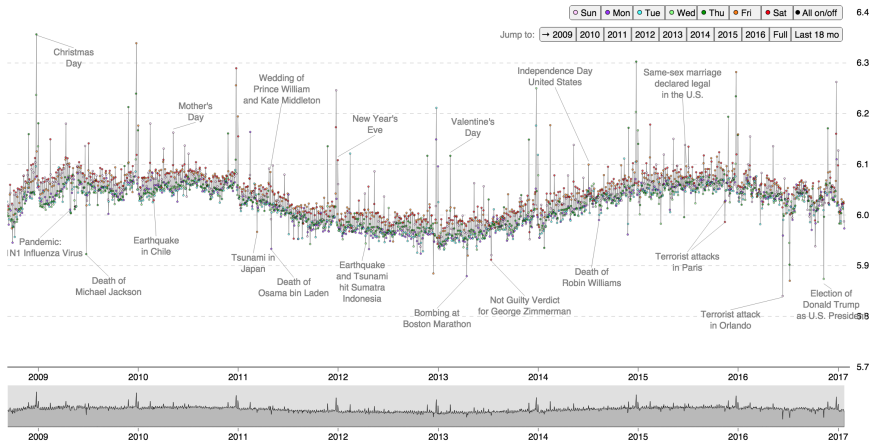
Tweets

Harry Potter

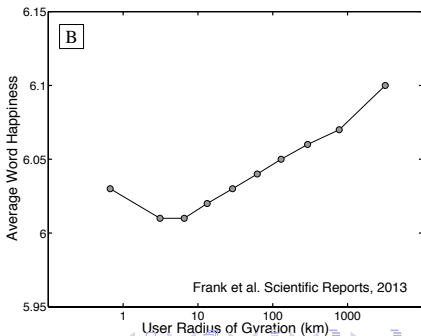
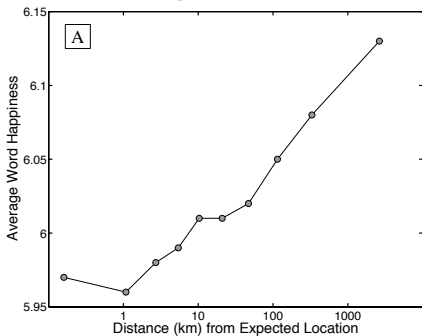
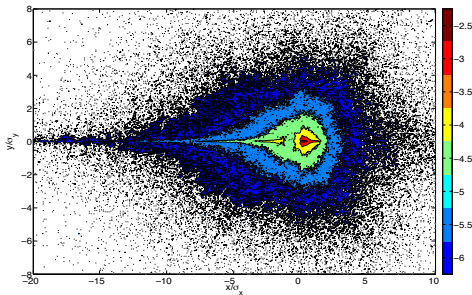
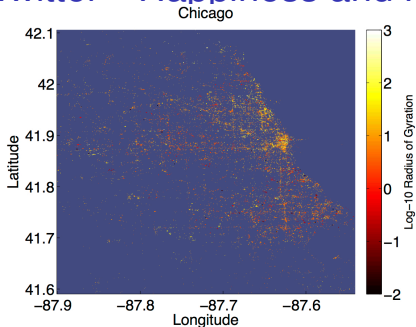
Mental Health

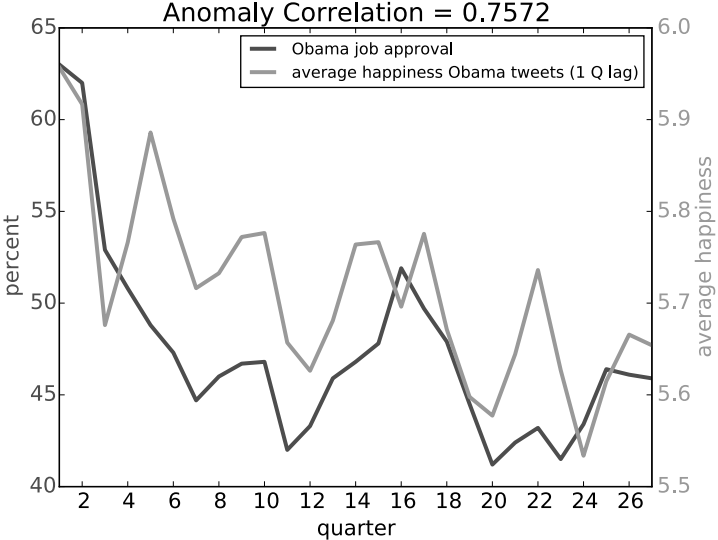


## Average Happiness for Twitter



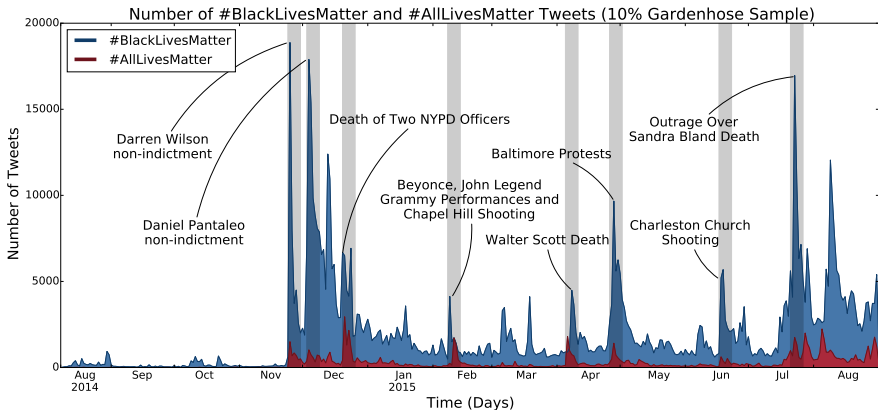
# Twitter—Happiness and Movement



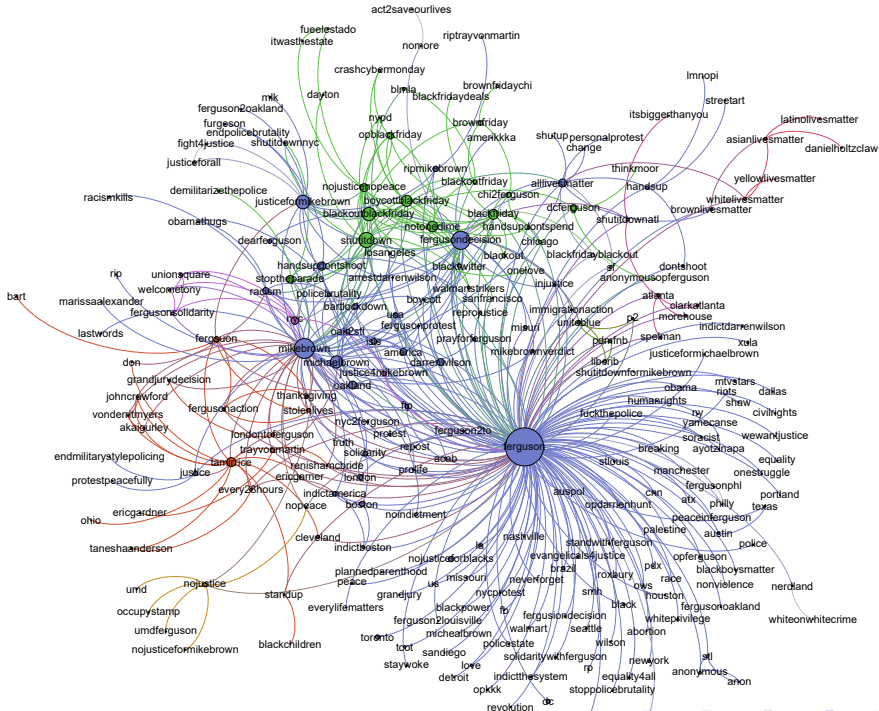


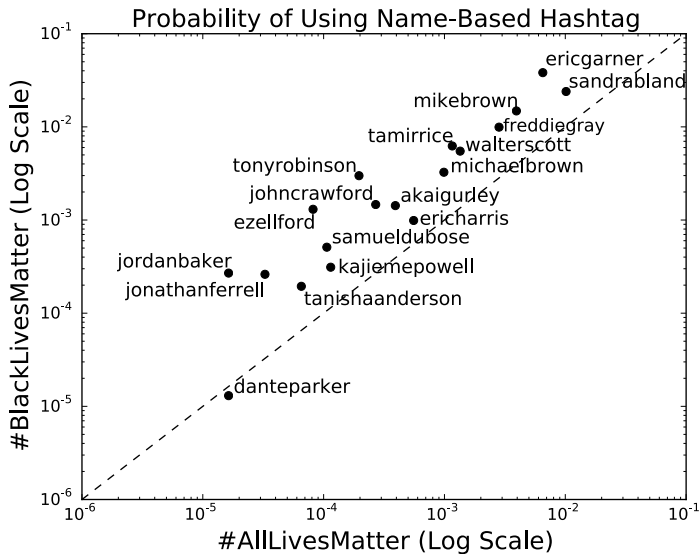
## Measuring Happiness

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Gallagher et al. "Divergent Discourse Between Protests and Counter-Protests: #BlackLivesMatter and #AllLivesMatter." 2017





Gallagher et al. "Divergent Discourse Between Protests and Counter-Protests: #BlackLivesMatter and #AllLivesMatter." 2017

## Measuring Happiness

The Hedonometer

Music Lyrics

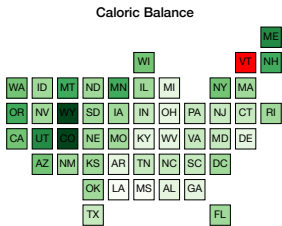
Blogs

Tweets

Harry Potter

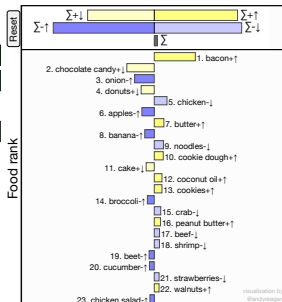
Mental Health

Frame 48/61



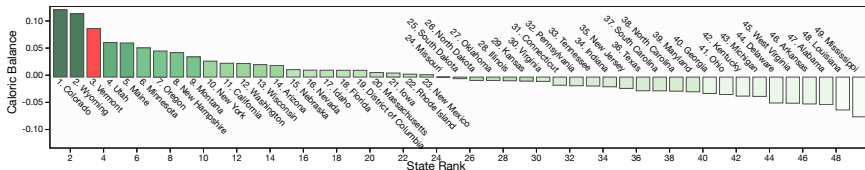
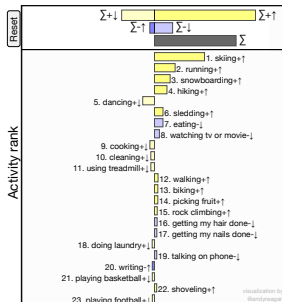
### Why Vermont consumes more calories on average:

Average US calories = 267.92  
 Vermont calories = 268.66 (Rank 29 out of 49)

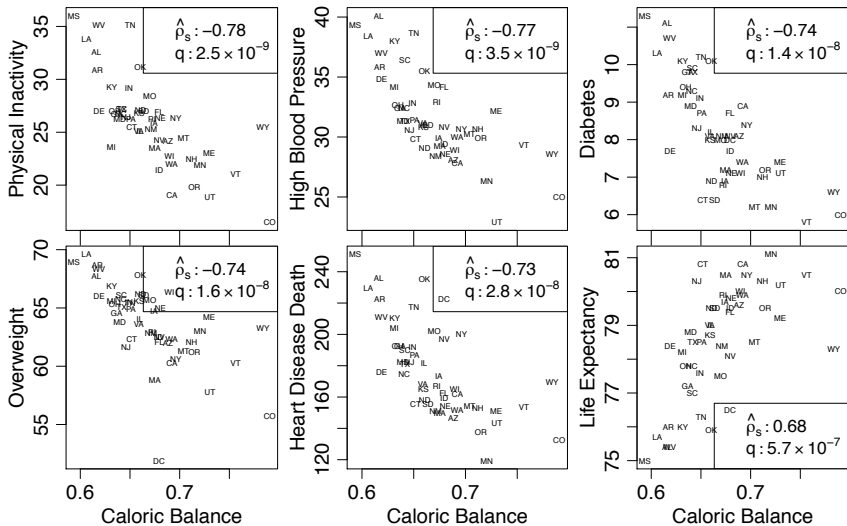


### Why Vermont spends more calories on average:

Average US caloric expenditure = 176.60  
 Vermont caloric expenditure = 203.22 (Rank 3 out of 49)



Alajajian et al.,  
 "The Lexicocalorimeter: Gauging public health through caloric input and output on social media"  
 In Review, 2017



Alajajian et al.,  
 "The Lexicocalorimeter: Gauging public health through caloric input and output on social media"  
 In Review, 2017



## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

**Harry Potter**

Mental Health

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The Hedonometer

Music Lyrics

Blogs

Tweets

**Harry Potter**

Mental Health



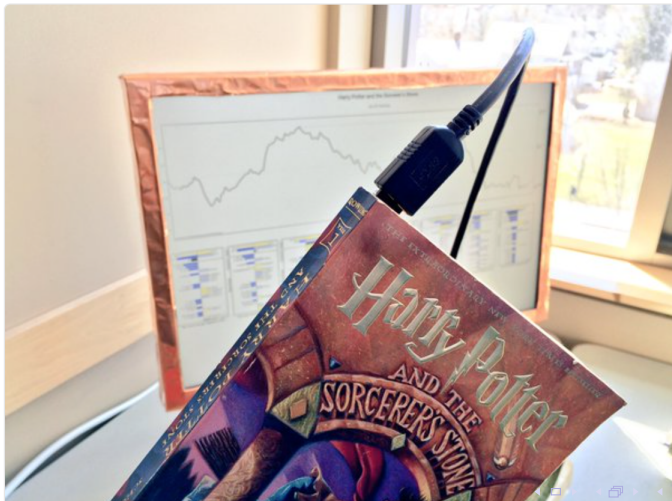
UVM

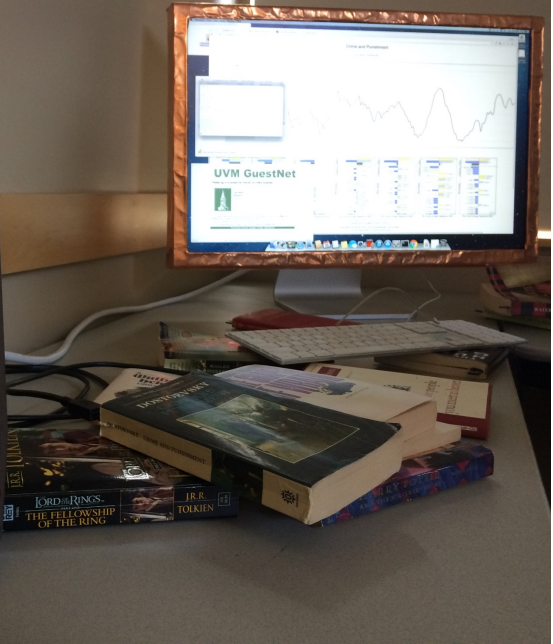
@uvmvermont



Following

USB in a book? What is this wizardry? Check it out at the Student Research Conference creative lounge. #[uvmresearch](#)

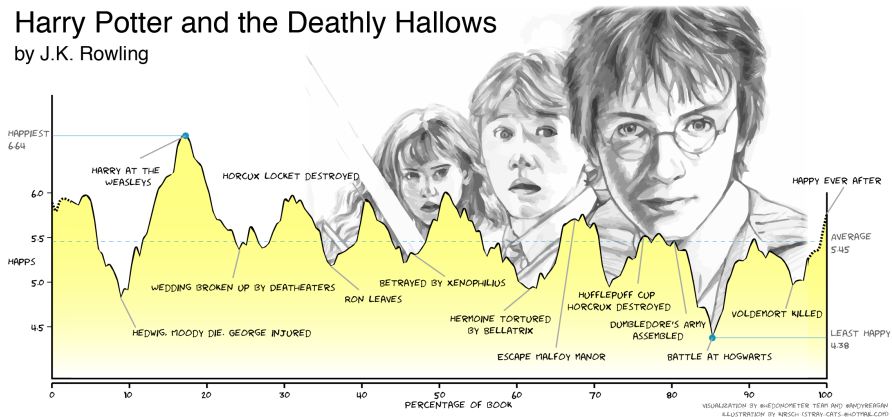






# Harry Potter and the Deathly Hallows

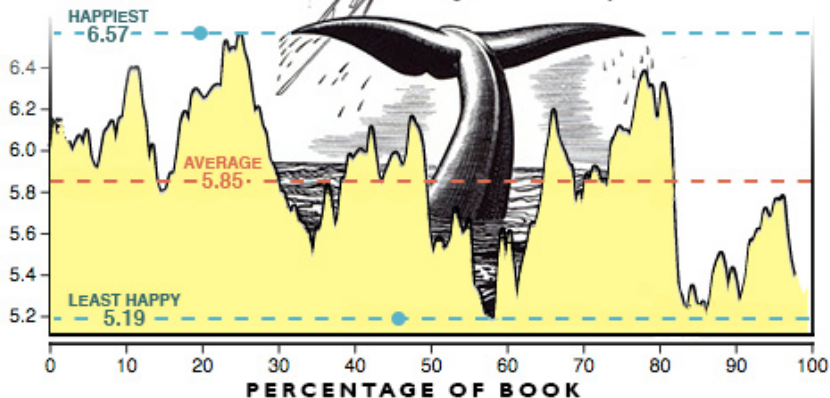
by J.K. Rowling



Reagan et al. "The emotional arcs of stories are dominated by six basic shapes." 2016

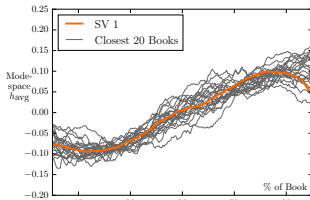
# Moby-Dick

by Herman Melville



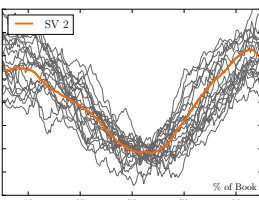
Moby-Dick illustration by Rockwell Kent, 1930

<http://whyfiles.org/2015/in-10-languages-happy-words-beat-sad-ones/>



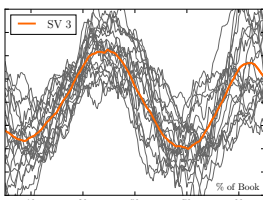
Top Stories:

- 1: Alice's Adventures Under Ground : Bein... (19002, 333)  
<http://hedonometer.org/books/v3/19002/>
- 2: Dreams (1439, 169)  
<http://hedonometer.org/books/v3/1439/>
- 3: The Human Comedy: Introductions and A... (1968, 175)  
<http://hedonometer.org/books/v3/1968/>
- 4: The Ballad of Reading Gaol (301, 227)  
<http://hedonometer.org/books/v3/301/>
- 5: The History Of The Decline And Fall O... (25717, 1697)  
<http://hedonometer.org/books/v3/25717/>



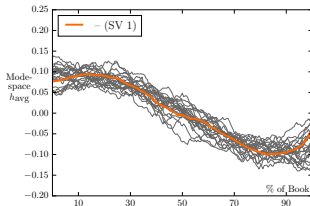
Top Stories:

- 1: Typhoon (1142, 219)  
<http://hedonometer.org/books/v3/1142/>
- 2: Teddy Bears (51199, 944)  
<http://hedonometer.org/books/v3/51199/>
- 3: The Autobiography of St. Ignatius (24534, 201)  
<http://hedonometer.org/books/v3/24534/>
- 4: The Magic of Oz (419, 186)  
<http://hedonometer.org/books/v3/419/>
- 5: Fundamental Principles of the Metaphy... (5682, 1148)  
<http://hedonometer.org/books/v3/5682/>



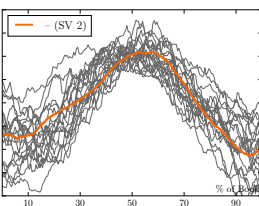
Top Stories:

- 1: The Consolation of Philosophy (14328, 1188)  
<http://hedonometer.org/books/v3/14328/>
- 2: The Scarecrow of Oz (957, 162)  
<http://hedonometer.org/books/v3/957/>
- 3: A Christmas Carol (24022, 188)  
<http://hedonometer.org/books/v3/24022/>
- 4: Sophist (1735, 162)  
<http://hedonometer.org/books/v3/1735/>
- 5: A Christmas Carol in Prose; Being a G... (46, 4602)  
<http://hedonometer.org/books/v3/46/>



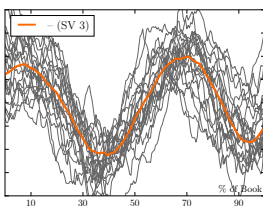
Top Stories:

- 1: A Primary Reader: Old-time Stories, F... (7841, 307)  
<http://hedonometer.org/books/v3/7841/>
- 2: The House of the Vampire (17144, 188)  
<http://hedonometer.org/books/v3/17144/>
- 3: Savrola: A Tale of the Revolution in L... (50906, 682)  
<http://hedonometer.org/books/v3/50906/>
- 4: Romeo and Juliet (1777, 186)  
<http://hedonometer.org/books/v3/1777/>
- 5: The Dance (by An Antiquary): Historic ... (17289, 222)  
<http://hedonometer.org/books/v3/17289/>



Top Stories:

- 1: The Yoga Sutras of Patanjali: The Boo... (2526, 338)  
<http://hedonometer.org/books/v3/2526/>
- 2: Stories from Hans Andersen (17860, 262)  
<http://hedonometer.org/books/v3/17860/>
- 3: How to Read Human Nature: Its Inner S... (41501, 278)  
<http://hedonometer.org/books/v3/41501/>
- 4: The Rome Express (11451, 162)  
<http://hedonometer.org/books/v3/11451/>
- 5: Chambers's Journal of Popular Literat... (51100, 312)  
<http://hedonometer.org/books/v3/51100/>



Top Stories:

- 1: The Wonder Book of Bible Stories (16042, 183)  
<http://hedonometer.org/books/v3/16042/>
- 2: The Serpent River (50923, 306)  
<http://hedonometer.org/books/v3/50923/>
- 3: A Hero of Our Time (913, 337)  
<http://hedonometer.org/books/v3/913/>
- 4: On the Nature of Things (785, 857)  
<http://hedonometer.org/books/v3/785/>
- 5: The Cosmic Computer (20727, 221)  
<http://hedonometer.org/books/v3/20727/>

## Measuring Happiness

The Hedonometer

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Blogs

Tweets

Harry Potter

**Mental Health**

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Music Lyrics

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# Instagram

Sign up to see photos and videos from your friends.

 Log in with Facebook

OR

Email

Full Name

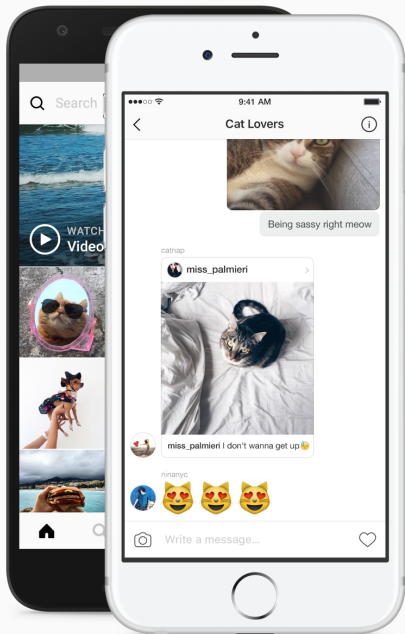
Username

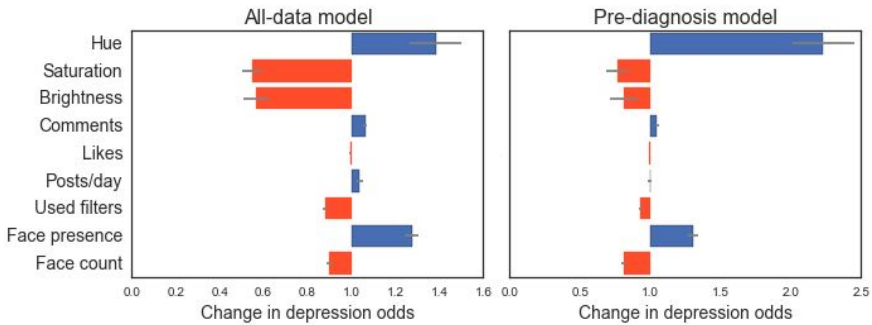
Password

Sign up

By signing up, you agree to our [Terms & Privacy Policy](#).

Have an account? [Log in](#)



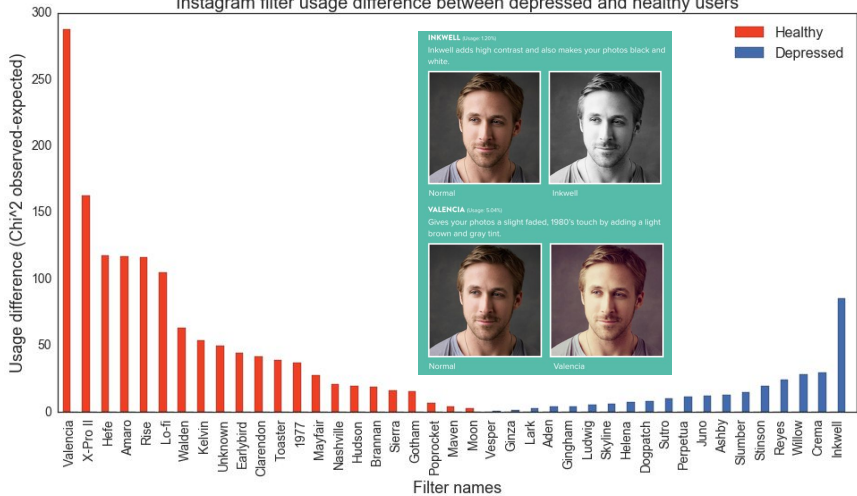


Reece & Danforth,  
 "Instagram photos reveal predictive markers of depression."  
 In Review, 2016

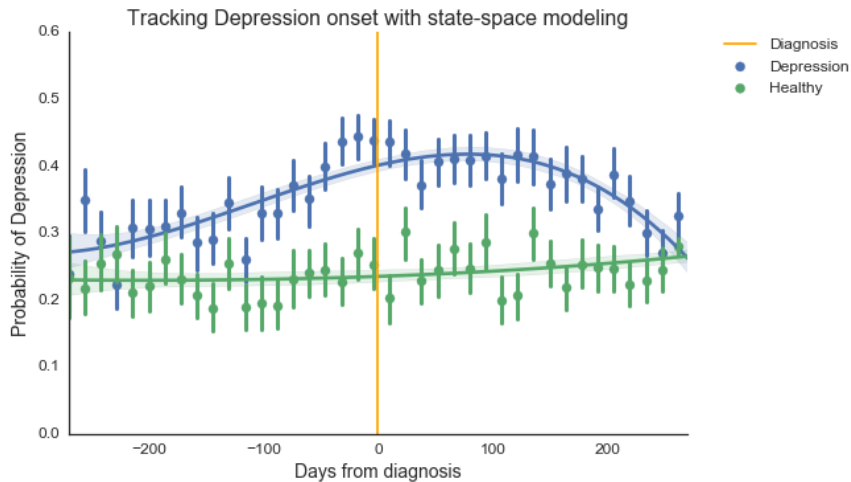


Reece & Danforth,  
"Instagram photos reveal predictive markers of depression."  
In Review, 2016

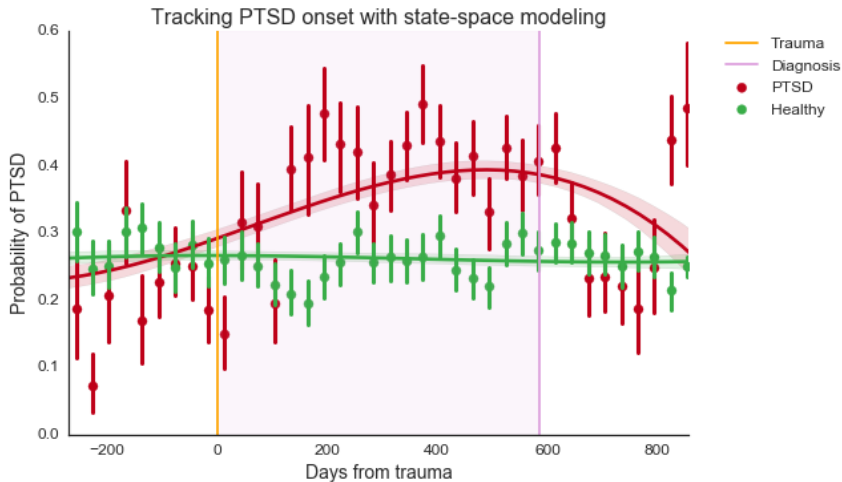
## Instagram filter usage difference between depressed and healthy users



Reece & Danforth,  
 "Instagram photos reveal predictive markers of depression."  
 In Review, 2016



Reece et al.  
"Forecasting the onset and course of mental illness with Twitter data."  
In Review, 2016



Reece et al.  
"Forecasting the onset and course of mental illness with Twitter data."  
In Review, 2016

# Summary



► <http://compstorylab.org>

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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

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The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

- ▶ <http://compstorylab.org>



- ▶ <http://hedonometer.org>





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## Measuring Happiness

The Hedonometer

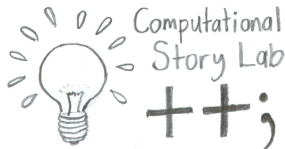
Music Lyrics

Blogs

Tweets

Harry Potter

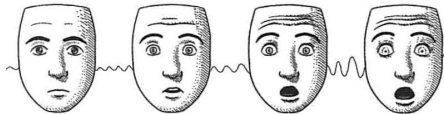
Mental Health



- ▶ <http://compstorylab.org>

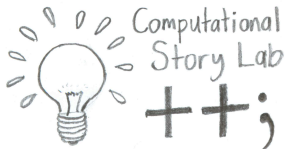


- ▶ <http://hedonometer.org>



- ▶ Other emotions:

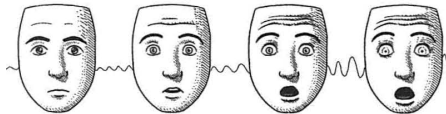
# Summary



- ▶ <http://compstorylab.org>



- ▶ <http://hedonometer.org>



- ▶ Other emotions:
- ▶ "beans" are not surprising

## Measuring Happiness

The Hedonometer

Music Lyrics

Blogs

Tweets

Harry Potter

Mental Health

# Summary

## Measuring Happiness

The Hedonometer

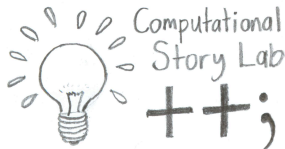
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Blogs

Tweets

Harry Potter

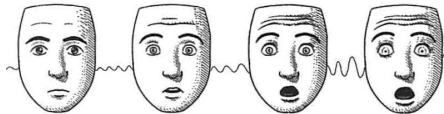
Mental Health



- ▶ <http://compstorylab.org>



- ▶ <http://hedonometer.org>



- ▶ Other emotions:
- ▶ "beans" are not surprising
- ▶ Remote-sensing for public health



Peter Dodds



Andy Reagan



Aaron Schwartz



Abby Ross



Ben Emery



John Ring



David Dewhurst



Colin Van Oort



Chris Danforth



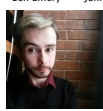
Tyler Gray



Eric Clark



Chris Fusting



Ryan Gallagher



compstorylab.org



Nick Allgaier  
Psychiatry  
Postdoc, UVM



Dilan Kiley  
Chobanian Group



Tom McAndrew  
Cardiovascular  
Research Foundation



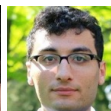
Emily Cody  
Data Scientist  
Adobe



Morgan Frank  
MIT Media Lab  
PhD Student



Cathy Bliss  
UVM Lecturer



Mark Ibrahim  
Data Scientist  
Insight



Ross Lieb-Lappen  
Dartmouth PhD  
Cold Regions Research  
& Engineering Laboratory



Eitan Pechenick



Lewis Mitchell  
Adelaide Faculty



Jake Williams  
Drexel Faculty



Isabel Kloumann  
Cornell PhD  
Facebook  
Data Scientist



Fletcher  
Hazlehurst



Sharon Alajajian  
Research Scientist  
Univ of Pennsylvania



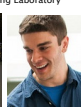
Kameron Harris  
Washington  
PhD Student



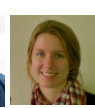
Paul Lessard  
Colorado  
PhD Student



Suma Desu  
Apple  
Data Scientist



Mike Foley  
Northeastern  
PhD student



Darcy Glenn  
Climate Science  
UC London, MS student

Thanks to NSF and MITRE for funding.