

A/B Testing

Crowdsourcing and Human Computation

Instructor: Chris Callison-Burch

Website: crowdsourcing-class.org

Active versus Passive Crowdsourcing

- So far we have mainly looked at *active* crowdsourcing, where we explicitly solicit help from the crowd
- Many applications of crowdsourcing rely on *passive* information collection from multitudes of individual

Example: Apple Maps

- iOS allows users to “help improve maps” by enabling a feature called “frequent locations”
- Frequent locations gives Apple a method to verify business locations and other destinations by tracking user movements in the aggregate
- Participation also transmits drive and other travel time data to Apple

A/B Testing

- A/B Split Testing is a mechanism for passive crowdsourcing that allows web developers to empirically optimize the design of their sites
- Splits web users into two groups and shows them slightly different versions of the site
- Measures the behavior of the groups in aggregate and calculates whether one design leads to a better measurable outcome

Why A/B tests?

- Lets us evaluate the goodness of alternate designs, instead of relying on our intuitions
- A typical web site may convert only 2% of its visitors into customers
- Small changes can have a big impact
- Google uses A/B testing all the time, and makes it available through Google Analytics

What sorts of things can you optimize with A/B tests?

- Whether changing the order of collecting form information gets users to stick through to the end
- Whether changing the copywriting on your page improves things
- Whether different images are better at motivating web site visitors to do something that you want them to


What outcomes could
you measure?

A/B testing was used to optimize the Obama Campaign

- Kyle Rush was the deputy director of frontend web development at Obama for America
- Managed online fundraising totaling \$690 million in 20 months
- Conducted 500+ A/B tests, which increased the donation conversion rate by 49% and the email acquisition conversion rate by 161%

CONTROL


OBAMA



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Log in

Create account



You could be there

Michael Jordan, Patrick Ewing, Sheryl Swoopes, Carmelo Anthony, and many, many more basketball greats are all stepping up to support President Obama.

You and a guest will meet the President—and shoot hoops with some of the best basketball players alive.

More players to be announced.

Contributor

First name

Last name

Address

City

State

ZIP

Email

Phone number

Select amount

\$18

\$28

\$80

\$100

\$250


\$500


\$1,000


Other

Credit card

VISA







Card number

Expiration

Month

Year

☐ Make this a monthly donation to sustain this campaign in the time we have left — Election Day is closer than you think.

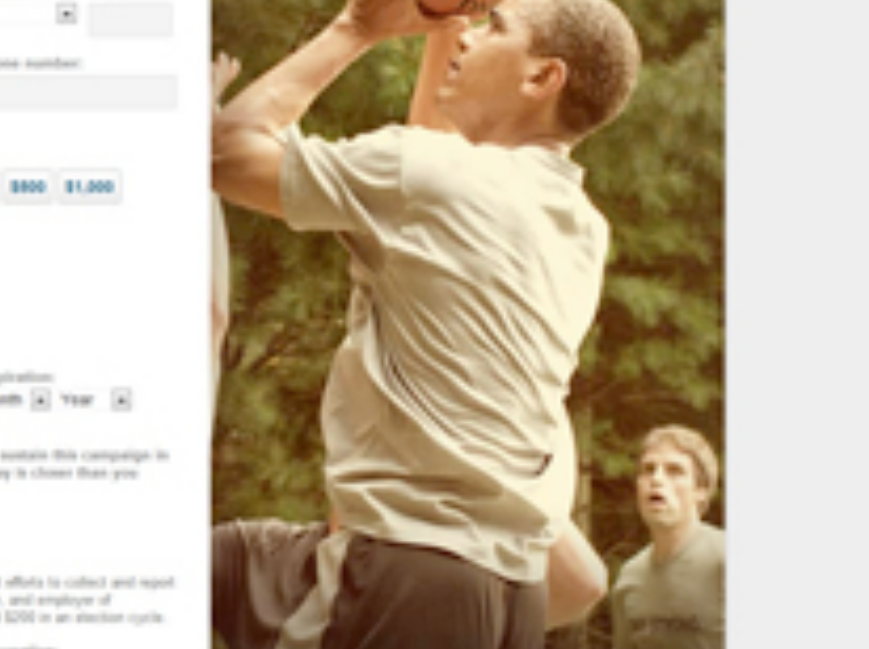
Employment

Federal law requires us to use our best efforts to collect and report the name, mailing address, occupation, and employer of individuals whose contributions exceed \$200 in an election cycle.

Employer

Occupation

DONATE NOW



“SEQUENTIAL”

You could be there

Michael Jordan, Patrick Ewing, Sheryl Swoopes, Carmelo Anthony, and many, many more basketball greats are all stepping up to support President Obama.

You and a guest will meet the President—and shoot hoops with some of the best basketball players alive.

[More prizes to be announced](#)

How much would you like to donate today?

Select amount

☒ CONTINUE

[Amount](#) | [Name](#) | [Payment](#) | [Employment](#)

↑ +5%

<http://kybernetik.ch>

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DINNER WITH BARACK

Your chance to meet the President



No purchase, payment, or contribution necessary to enter or win. Contributing will not improve chances of winning. Void where prohibited. Entries must be received by September 26, 2012. You may enter by contributing to Obama Victory Fund 2012 here or click here to enter without contributing. Three winners will each receive the following prize package: round-trip tickets for winner from within the 48 U.S. States, DC, or Puerto Rico to a destination to be determined by the Sponsor; hotel accommodations; and dinner with President Obama on a date to be determined by the Sponsor (approximate retail value of all prizes: \$4,800). Odds of winning depend on number of entries received. Promotion open only to U.S. citizens, or lawful permanent U.S. residents who are legal residents of 48 United States, District of Columbia and Puerto Rico, and 18 or older (or age of majority under applicable law). Promotion subject to Official Rules. Official rules and additional restrictions on eligibility. Sponsor: Obama for America, 1300 S. Randolph St., Chicago, IL 60607.

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Contributions or gifts to Obama Victory Fund 2012 are not tax deductible.

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IMAGE VARIATION

OBAMA BIDEN

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↑ +19%

<http://ky.lerush.es.t>

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✔ Your donation was successful. Thank you.

Secure

Save your payment information for next time.

Save the payment information from this donation into your existing BarackObama.com account so that you don't have to enter it more than once.

You can manage your saved payment information by clicking your name in the top right when you are logged in.

Email

Enter your BarackObama.com account password

[Forgot your password?](#)

☐ Link my mobile phone number with my account so that I can donate and receive campaign updates via text message. Message and data rates may apply. My mobile number is: [Change this number](#)

☐ Keep me logged in. (If this is a public computer or you are concerned about unauthorized access to this device, you should not enable this setting.)

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Email

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☐ Keep me logged in. (If this is a public computer or you are concerned about unauthorized access to this device, you should not enable this setting.)

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↑ +21%

Optimizely

- <http://www.optimizely.com>
- 4 minute video

A/B Split Testing Protocol

- Identify your initial control web page – this could be your current landing page or whatever you want to optimize
- Establish your goals – what is the thing that you want to optimize? Number of people signing up for your service? Revenue generated by a particular ad campaign?

A/B Split Testing Protocol

- Determine how long you need to run the experiment – this depends on how much traffic your web site gets, and what level of statistical significance you want
- Create 1 to 3 significant re-designs – your designers can propose a bunch of different overhauls, use the initial phase to hone in on the best high-level re-design

A/B Split Testing Protocol

- Use A/B testing to choose among the different re-designs. Ideally you can test every pages against every other one, but if that is impractical, you can do a tournament
- Based on the results, choose your true control page – this initial pick will likely generate the lion's share of the improvements

A/B Split Testing Protocol

- Finally, optimize the nitty-gritty elements of the web page using A/B testing
 - Headline
 - Call to Action
 - Page Copy
 - Graphics
 - Color
 - Configuration of Page Elements
 - Etc.

You are part of an experiment

- Who uses A/B testing?
- Pretty much every web site out there
- Google, Amazon, Facebook
- At what point does it become creepy?

Not Creepy

Creepy

Layout of a web site

Manipulating our Facebook feeds
to modify our emotions

Font choice

Dating matches who would be bad
for our tastes

What ads we see (mostly)

Ads for arrest record that are more
strongly associated with African
American names

Companies trying to make a
good product

People at companies playing
social scientists w/o normal
safeguards

Experimental evidence of massive-scale emotional contagion through social networks

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Edited by Susan T. Fiske, Princeton University, Princeton, NJ, and approved March 25, 2014 (received for review October 23, 2013)

Emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. Emotional contagion is well established in laboratory experiments, with people transferring positive and negative emotions to others. Data from a large real-world social

network, collected over a 20
moods (e.g., depression, ha
networks [Fowler JH, Chris
though the results are contro
who use Facebook, we test
outside of in-person interac
the amount of emotional co
expressions were reduced, p
and more negative posts;
duced, the opposite pattern
emotions expressed by oth
emotions, constituting exp
contagion via social netwo

contrast to prevailing assumptions, in-person interaction and non-verbal cues are not strictly necessary for emotional contagion, and that the observation of others' positive experiences constitutes a positive experience for people.

computer-mediated communication | social media | big data

Emotional states can be transferred to others via emotional contagion, leading them to experience the same emotions as those around them. Emotional contagion is well established in

demonstrated that (i) emotional contagion occurs via text-based computer-mediated communication (7); (ii) contagion of psychological and physiological qualities has been suggested based on correlational data for social networks generally (7, 8); and (iii) people's emotional expressions on Facebook predict friends'

though some shared late, however, there foods are contagious erienter and target. motions, which are ews Feed” product oduce much more Feed filters posts, News Feed is the that friends share. News Feed is de-facebook continually viewers the content

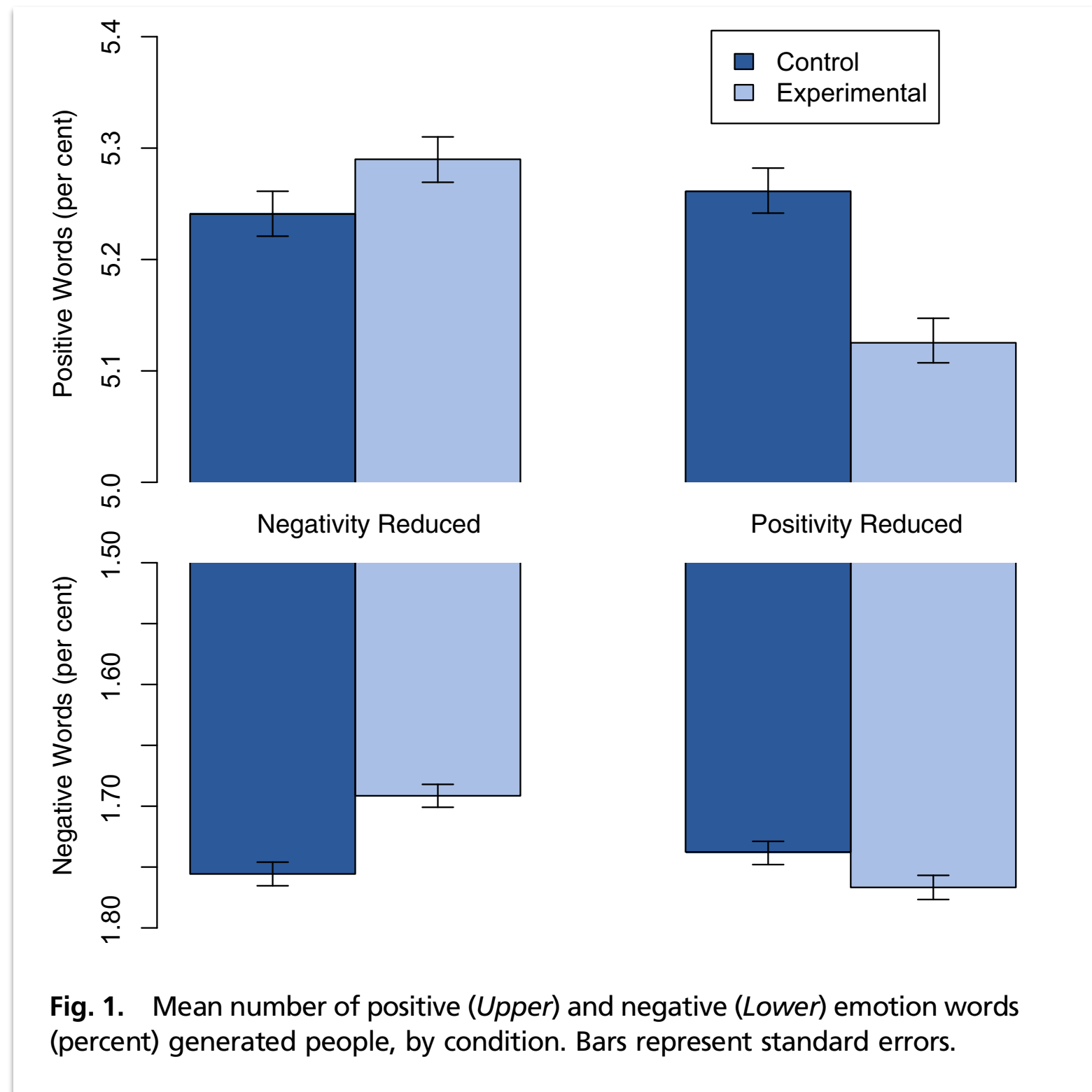
they will find most relevant and engaging. One such test is reported in this study: A test of whether posts with emotional content are more engaging.

The experiment manipulated the extent to which people ($N = 689,003$) were exposed to emotional expressions in their News Feed. This tested whether exposure to emotions led people to change their own posting behaviors, in particular whether exposure to emotional content led people to post content that was consistent with the exposure—thereby testing whether exposure to verbal affective expressions leads to similar verbal expressions

Significance


We show, via a massive ($N = 689,003$) experiment on Facebook, that emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. We provide experimental evidence that emotional contagion occurs without direct interaction between people (exposure to a friend expressing an emotion is sufficient), and in the complete absence of nonverbal cues.

Two parallel experiments were conducted for positive and negative emotion: One in which exposure to friends positive emotional content in their News Feed was reduced, and one in which exposure to negative emotional content in their News Feed was reduced.



Senator asks FTC to investigate Facebook's mood study

After the social network altered the news feeds of nearly 700,000 users without telling them, Sen. Mark R. Warner wants to know if there should be oversight on these types of experiments.

by **Dara Kerr**  @darakerr / July 9, 2014 5:32 PM PDT

 4 /  66 /  214 /  11 /  /  more +

The US government might now weigh in on Facebook's secret 2012 study on the moods of nearly 700,000 users.

Sen. Mark R. Warner (D-Va.) has penned a letter ([PDF](#)) to the Federal Trade Commission asking the regulatory agency to investigate the issue. He requested that the FTC look into the ramifications of the experiment and to consider whether rules should be put in place for such types of experiments on social networks.

"I understand that social-media companies are looking for ways to extract value from the information willingly provided by their huge customer base," Warner said in a **statement**. "But I think many consumers were surprised to learn they had given permission by agreeing to Facebook's terms of service. And I think the industry could benefit from a conversation about what are the appropriate rules of the road going forward."

Basic Ethical Principles

1. Respect for Persons – individuals should be treated as autonomous agents, and persons with diminished autonomy are entitled to protection
2. Beneficence – do not harm and maximize possible benefits and minimize possible harms
3. Justice – Who ought to receive the benefits of research and bear its burdens?



Dating Research from OkCupid

We Experiment On Human Beings!

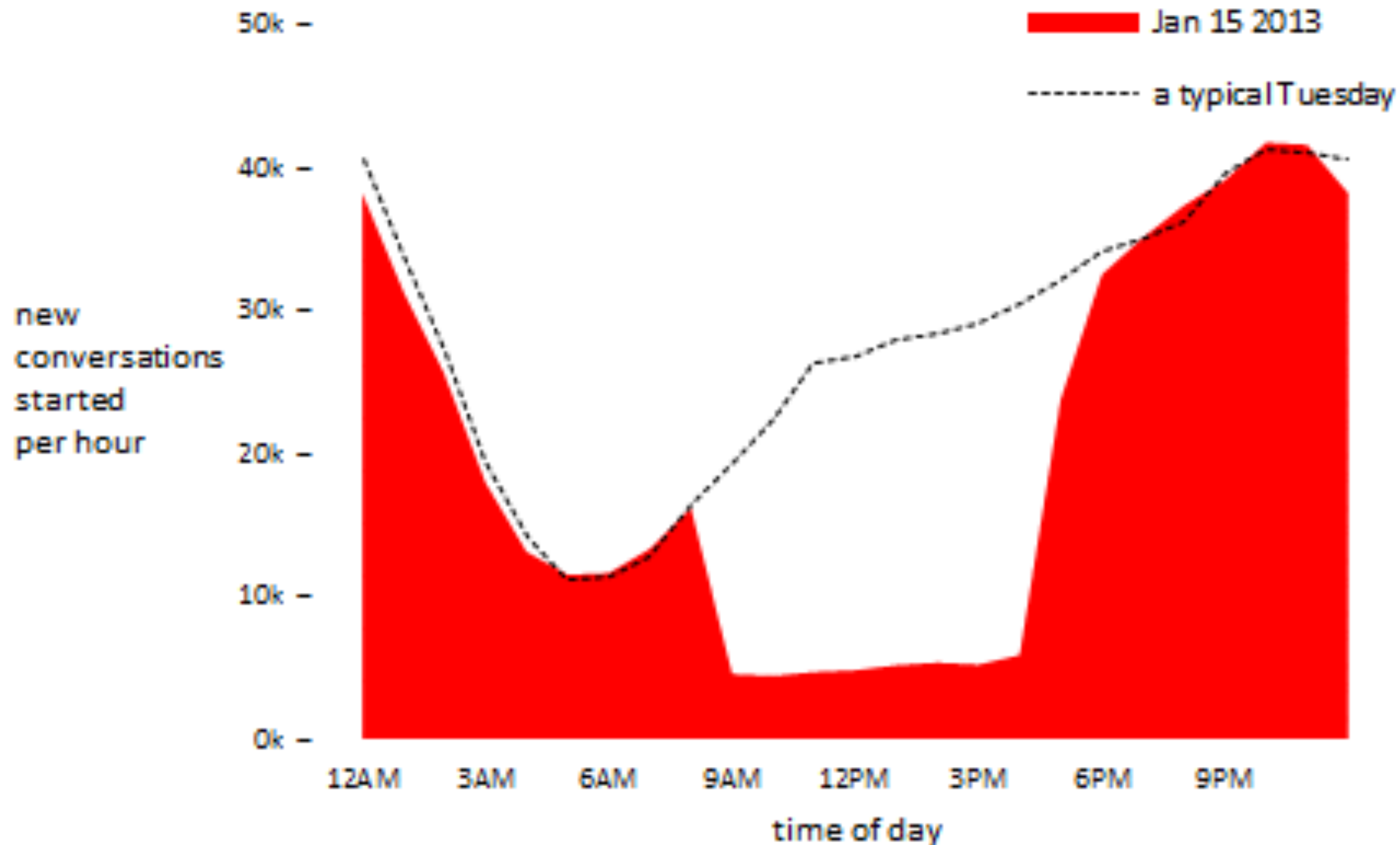
July 28th, 2014 by [Christian Rudder](#)

Tweet 2,831

Share 10k

I'm the first to admit it: we might be popular, we might create a lot of great relationships, we might blah blah blah. But OkCupid doesn't really know what it's doing. Neither does any other website. It's not like people have been building these things for very long, or you can go look up a blueprint or something. Most ideas are bad. Even good ideas could be better. Experiments are how you sort all this out. Like this

Love should be blind

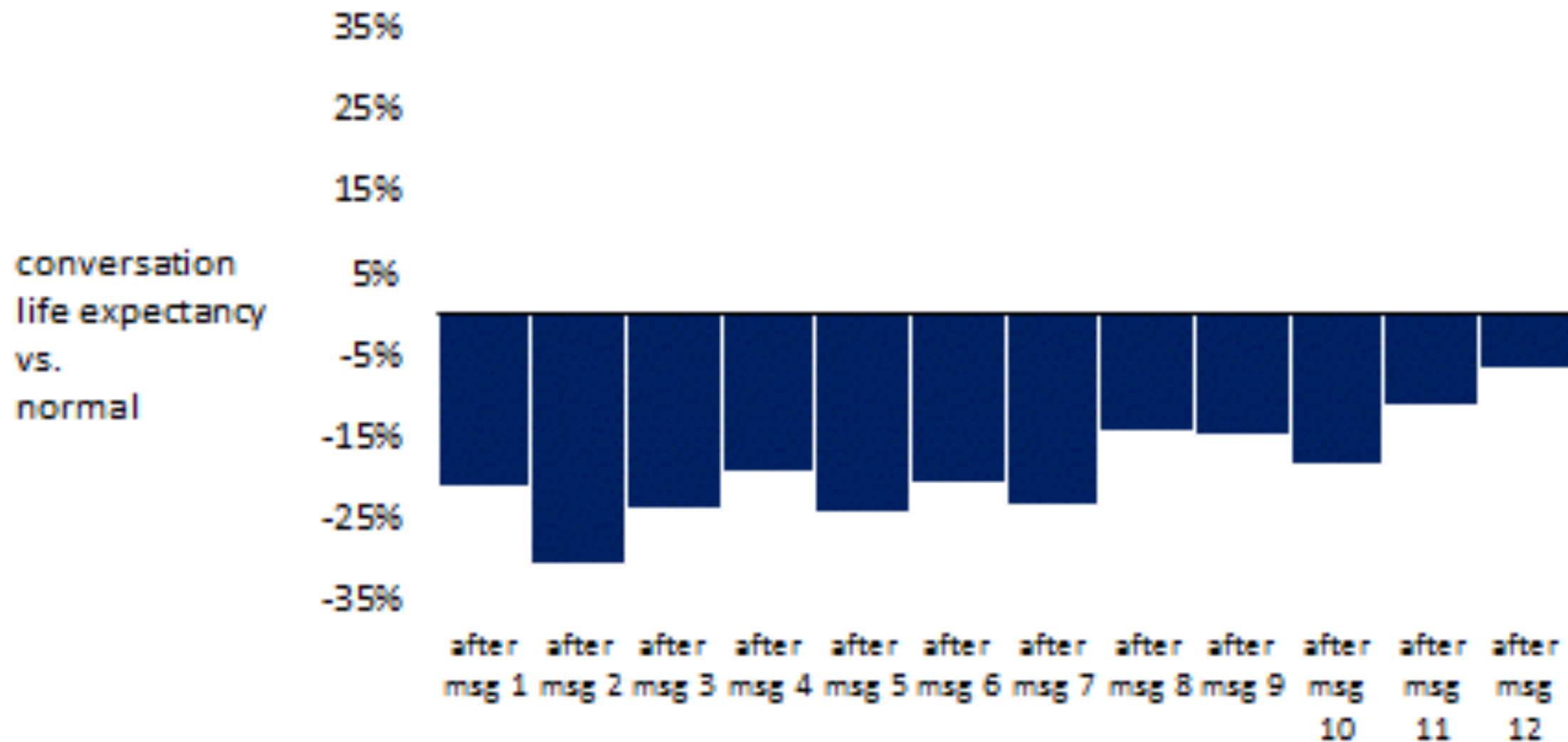


Love should be blind

- people responded to first messages 44% more often
- conversations went deeper
- contact details (phone numbers, emails) were exchanged more quickly
- in short, OkCupid worked better

Love should be blind

What happened to conversations in progress at the end of Love Is Blind Day



where in the thread the photos came back on

Picture is worth 1000 words?

The screenshot shows the OkCupid website interface. At the top, the OkCupid logo is on the left, and language options (Português, Français, English) and links (About Us, Contact Us, Homescreen, Mailbox, Edit Profile, Log Out) are on the right. Below the header is a navigation bar with tabs: MY ACCOUNT, MATCHES, JOURNAL, TESTS, and FUN STUFF. A search bar with the text 'look up user' and a 'GO' button is on the right. A red arrow points from the text 'Picture is worth 1000 words?' to the search bar.

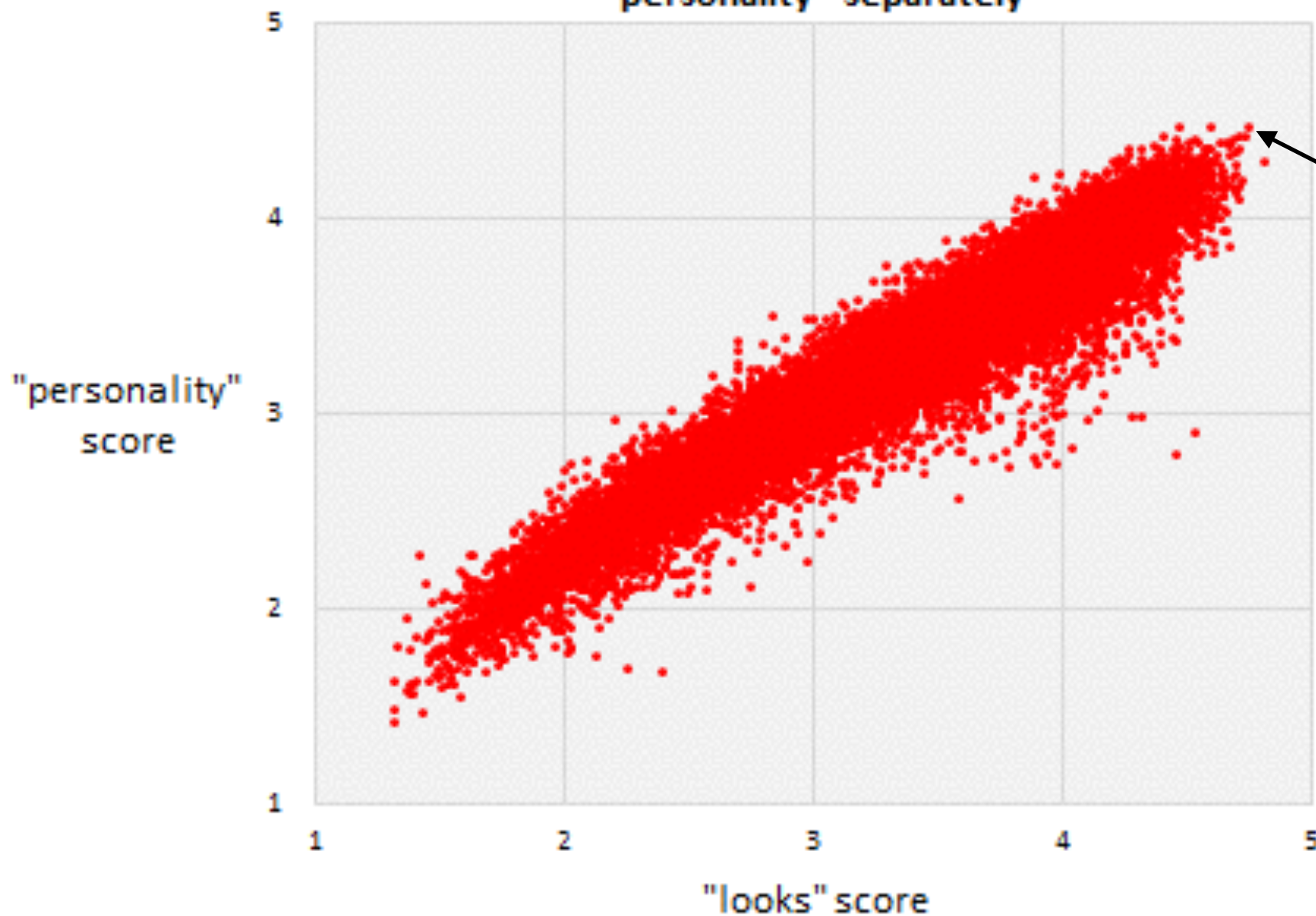
On the left sidebar, there's a section for 'Favorites' showing a user named 'randomcharacter4' with a star icon and a 'show offline' link. Below this is a 'Stats' section titled 'YOUR STATS:' with a list of activities: 10 star votes, 5 questions answered, 4 photos, 0 wikiedits accessed, 28 tests taken, 2 stalks per week, 39 messages exchanged, 7 journal comments, and 3 journal posts.

The main content area displays a profile for 'randomcharacter4'. The profile includes a 'QuickMatch!' section with a 'HER FACTS' tab. The facts listed are: AGE 24, LOCATION Denver, Colorado United States, and PERSONA The Window Shopper. Below this is a 'SELF-SUMMARY' section where the user writes: 'I love my huge family - I'm incredibly loyal to the ones I love - I'm an environmental engineer and I had to kick my own ass to get to this point in my life - I hate cocky people - I could never live without music - I am passionate about yoga - I have dirty blonde hair,'.

To the right of the profile is a large photo of a smiling woman. Below the photo is a 'Loading ...' button. To the right of the photo is a 'Rate her to continue ...' section with two rows of five stars each, labeled 'LOOKS' and 'PERSONALITY', both with a 'CAN'T TELL' button. Below this is a 'YOU JUST RATED ...' section showing a small profile picture of a woman and the name 'dbacksfan630' with stats: 21 / F / Straight, 5% M / 0% F / 5% E. At the bottom right is a 'QUICKMATCH PREFERENCES' section with a 'GENDER + ORIENTATION' section showing checkboxes for SM, GM, and BM.

Picture is worth 1000 words?

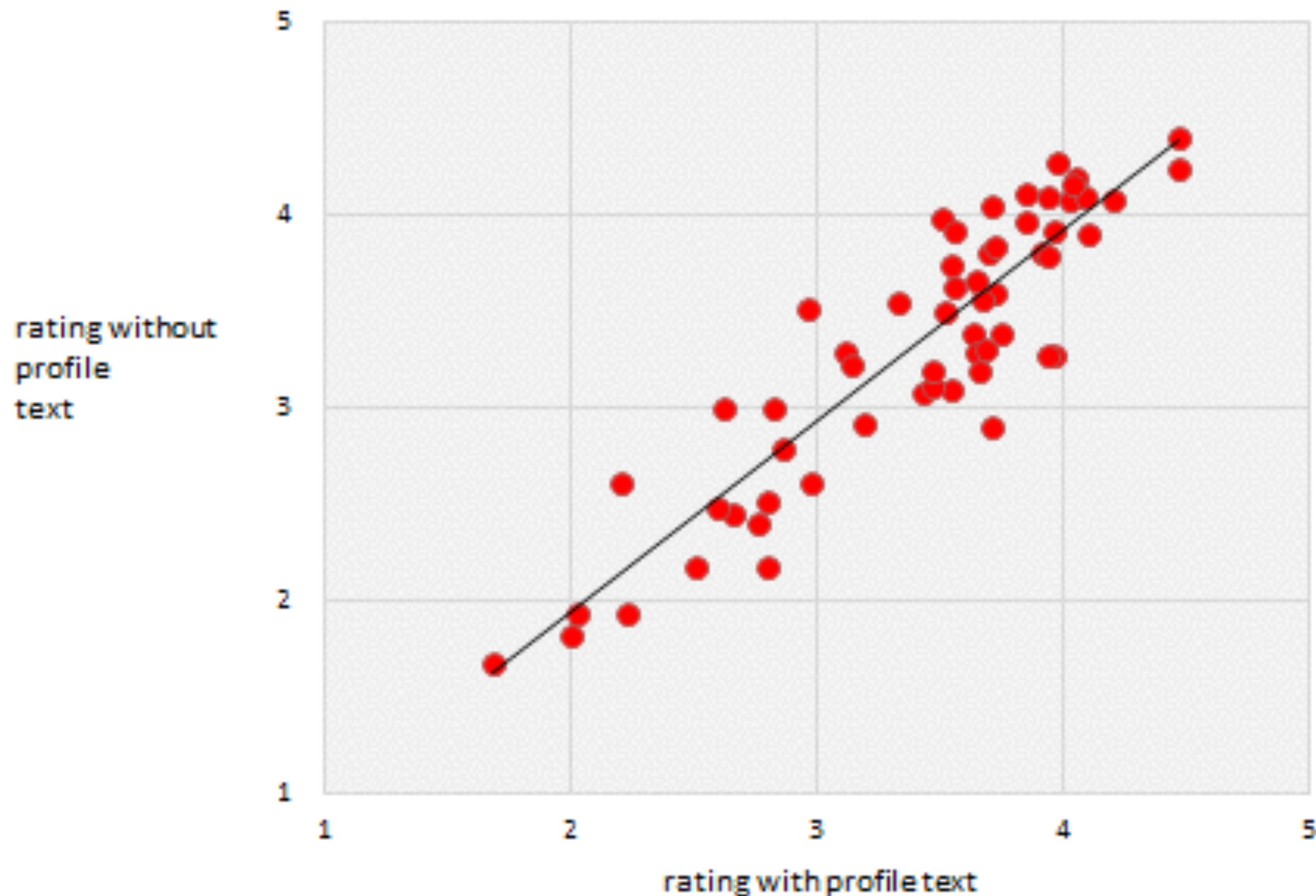
OkCupid ratings back when we let people score "looks" and "personality" separately



Her profile contained **no text**

Picture is worth 1000 words?

people's OkCupid ratings with and without their profile text



Power of Suggestion

For users whose actual match percentage is 30%...
when we DISPLAYED

	<u>30% match</u>	<u>60% match</u>	<u>90% match</u>
Odds of sending one message:	14.2%	16.5%	16.9%

Power of Suggestion

For users whose actual match percentage is 30%...
when we DISPLAYED

	<u>30% match</u>	<u>60% match</u>	<u>90% match</u>
Odds of sending one message:	14.2%	16.5%	16.9%
Given that they sent one message, odds of exchanging four :	9.7%	16.0%	17.4%

Power of Suggestion

Odds of a single message turning into a conversation

		number DISPLAYED to them		
		30% match	60% match	90% match
ACTUAL compatibility of users	30% match	10%	16%	17%
	60% match	13%	13%	16%
	90% match	16%	17%	20%

Good science or creepy
or both?

If you were in charge of
OKCupid, how would you
test the algorithm?