

# Emotion Contagion via NLP

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# Emotional Contagion



# What is emotion contagion?

Occurs when someone's emotions and related behaviors lead to similar emotions and behaviors in others.

## The Powerful Role of Social Media in Contagion

- Kramer, Guillory, and Hancock (2014) explored whether emotional contagion can occur without in-person contact, through social media platform.

# Overview of Facebook Study

“Experimental evidence of massive-scale emotional contagion through social networks”



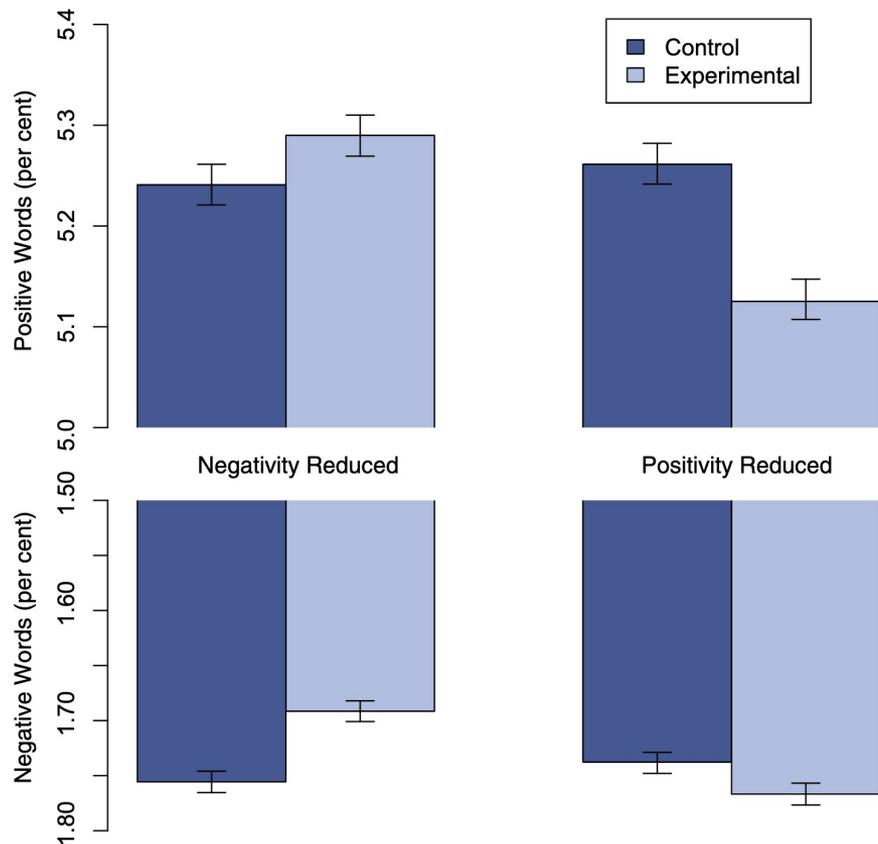
*Or “How contagious are Zuck’s emotions?”*

# Facebook Emotional Contagion Study Overview

- **Construct of Interest**: transferability of emotional states through written information on social media
- **Design**: manipulate Facebook “News Feeds”; treatment was reducing either positive or negative content, with dosage range 10-90% over one week (Jan. 11-18, 2012)
- **Measurement Strategy**: % of status update words produced by subject that were positive or negative (using LIWC2007)
- **Sampling Scheme**:  $N \approx 700,000$  randomly selected user ids (equally divided into treatments and control), resulting in  $\approx 155,000$  individuals with at least one post in each condition

# Results

- $H_0$ : % of +/- word exposure in News Feed will not affect % of +/- words produced.
- **Statistically significant** effects ( $p < 0.001$ ) of manipulation dosages on % of +/- words produced
- However, **effect sizes** were  $d \leq 0.02$ , with some as small as 0.001



**Fig. 1.** Mean number of positive (*Upper*) and negative (*Lower*) emotion words (percent) generated people, by condition. Bars represent standard errors.

# Discussion: Limitations, Implications, and Controversy



# To what extent was the study ethical?

In groups of people near you and be prepared to share with the whole group



*Discuss in groups of 2 to 5 people*

# Ethical Considerations



## Run of the mill?

- How different are the changes in this from ubiquitous A/B testing, where trials attempt to manipulate user behaviors?

## Did potential benefits outweigh harm?

- Does an effect size of  $d = 0.001$  even matter?

**Authors conclude that small effect sizes are still significant. Agree or disagree?**

*“an effect size of  $d=0.001$  at Facebook’s scale...would have corresponded to hundreds of thousands of emotion expressions in status updates per day”*

# Ethical Considerations

## Informed consent?

- For example, was the Facebook Data Use Policy, to which every user agrees, sufficient consent for participation in research?
  - Were participants provided sufficient information?
  - Did participants fully understand the study?
  - Were users children, prisoners, people with impaired cognitive capacity?

### **From Facebook's Data Use Policy**

*Facebook uses information “for internal operations, including troubleshooting, data analysis, testing, research and service improvement.”*

## Who does it benefit?

- Who benefits from this information?

# Using Hindsight: Questions

## Facebook's Influence

- Considering what we know now about Facebook's influence (e.g., in politics) since 2013, to what extent is this study important?



## Facebook's Practice Transparency

- Facebook is likely to allow publishing of studies and experiments that are deemed "safer".
- Do you believe that they have been, are, and will be conducting "research that would be even more controversial?"
- If they received such ethical blowback for this, are they more/less likely to continue such research?
- Are they more/less likely to share what they are doing with their research or A/B testing?

# What limitations exist in the study design?

*Discuss in groups of 2 to 5 people*



## Construct of Interest

transferability of emotional states through written information on social media

## Study Design

Manipulate Facebook “News Feeds”; treatment was reducing either positive or negative content, with dosage range 10-90%) over one week (Jan. 11-18, 2012)

# What improvements could be made to design?

It has been over 10 years since this study was conducted.

- What improvements might you have made back then?
- What improvements might you make today?



Whole group discussion

# Design Considerations

Could design be done quasi-experimentally, using data *in situ* to better understand how others' emotions ?

- Maybe using better algorithms to tease out latent constructs from social network models

**How does the layout of the “News Feed”**

# What limitations exist in the measurement strategy?

## Construct of Interest

transferability of emotional states through written information on social media

## Measurement Strategy

Percent of status update words produced by subject that were positive or negative (using LIWC2007)

# Possible Limitations in Measurement Strategy

## LIWC2007 (“Linguistic Inquiry and Word Count”)

- Three word-level classifications of sentiment: “positive”, “negative”, and “neither”
- Use of **pre-identified keywords** to classify a post
- Cannot understand context, semantic meaning, or other idiomatic expressions

## Example Using LIWC (current model)

“Oh, *wonderful!* I’m delighted to hear that my Amazon delivery will not be on time. Again.”

Traditional LIWC Dimension	Your Text	Average for Social Media Language
I-words (I, me, my)	11.76	5.44
Positive Tone	11.76	5.93
Negative Tone	0.00	2.34

# What limitations exist in the sampling scheme?

*Discuss in groups of 2 to 5 people*



## Construct of Interest

transferability of emotional states through written information on social media

## Sampling Scheme

$N \approx 700,000$  randomly selected user ids (equally divided into treatments and control), resulting in  $\approx 155,000$  individuals with at least one post in each condition

# To what extent can the conclusions generalize?

- For example: does reacting to “News Feed” constitute “Emotional Contagion”?
  - True emotion contagion or just mimicry?
- Are users who look at News Feed a self-selecting group? Do others ignore?
- Should social media platforms actively promote positive content?

# Questions

