

A close-up photograph of two lorikeets. They have vibrant blue heads with a yellow patch on the forehead, a large orange and yellow ruff, and green wings. The bird on the left is slightly in front of the one on the right.

Cambridge Network Days 2019

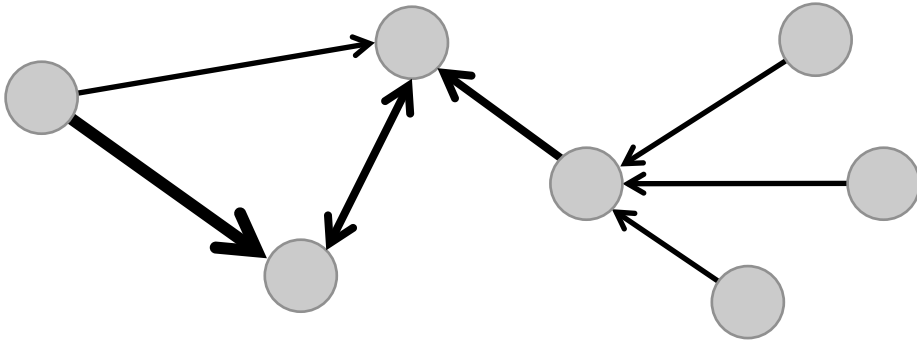
Coloring Social Links

**Luca Maria
Aiello**

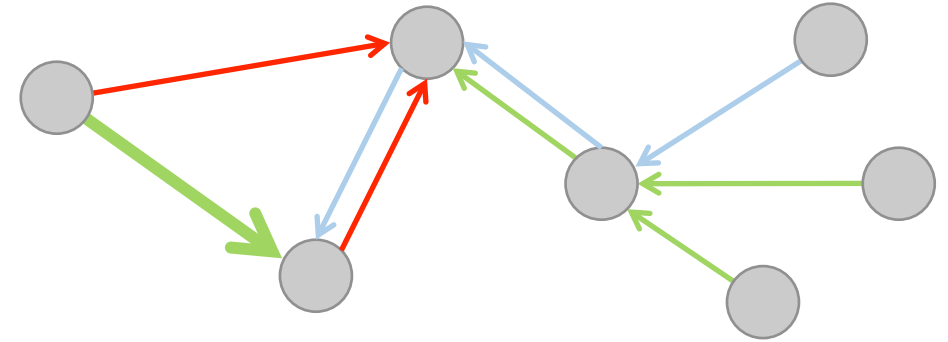
NOKIA Bell Labs

Not all ties are created equal

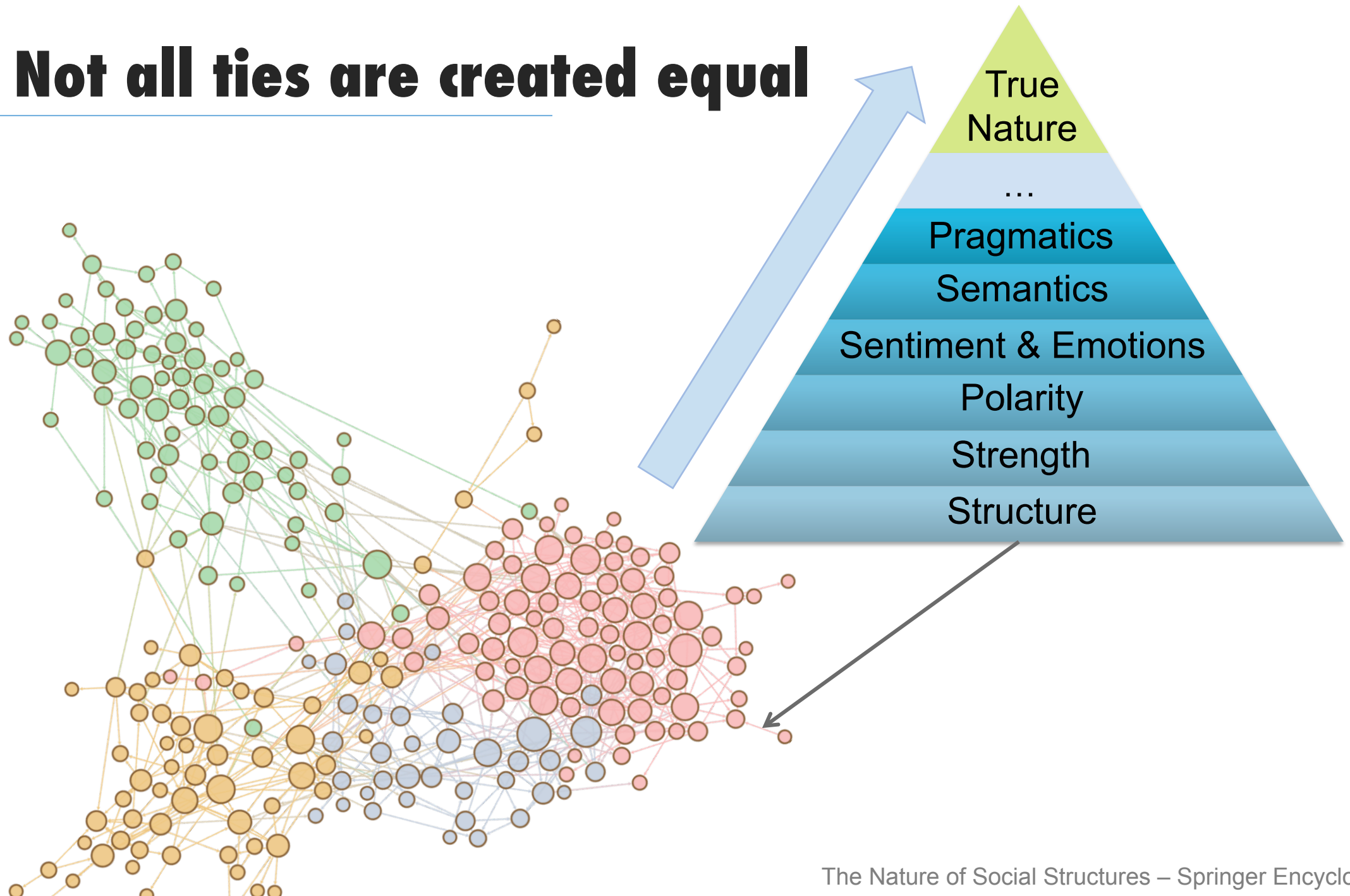
Today



Tomorrow



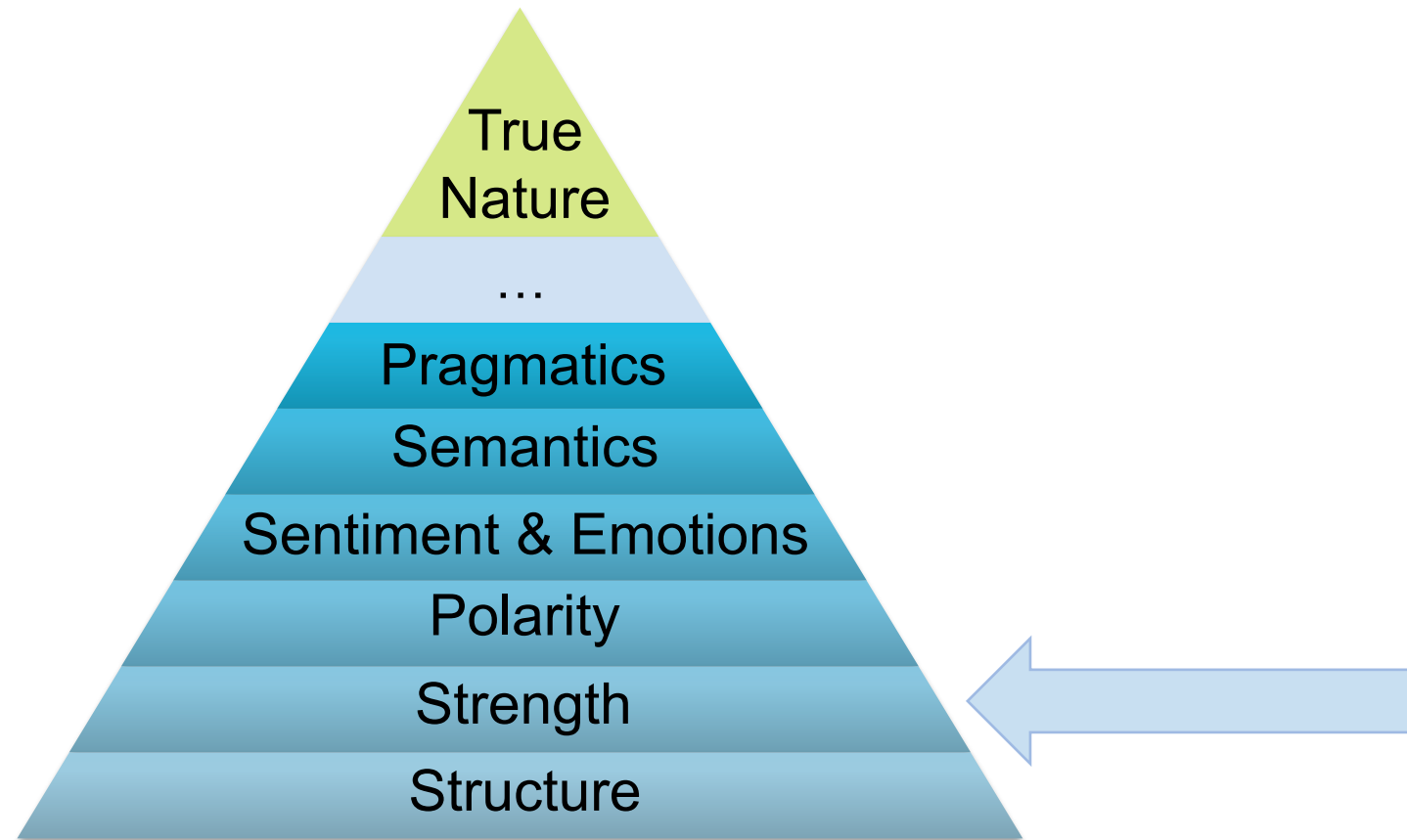
Not all ties are created equal





Operationalize

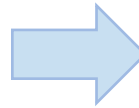
Operationalizing tie strength



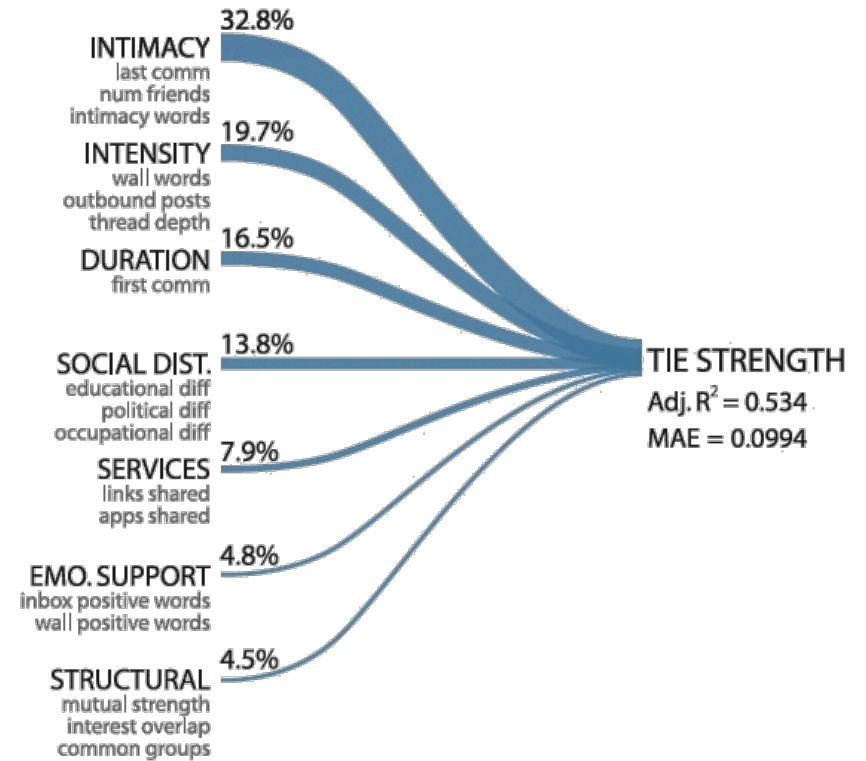
Operationalizing tie strength

Granovetter's theory

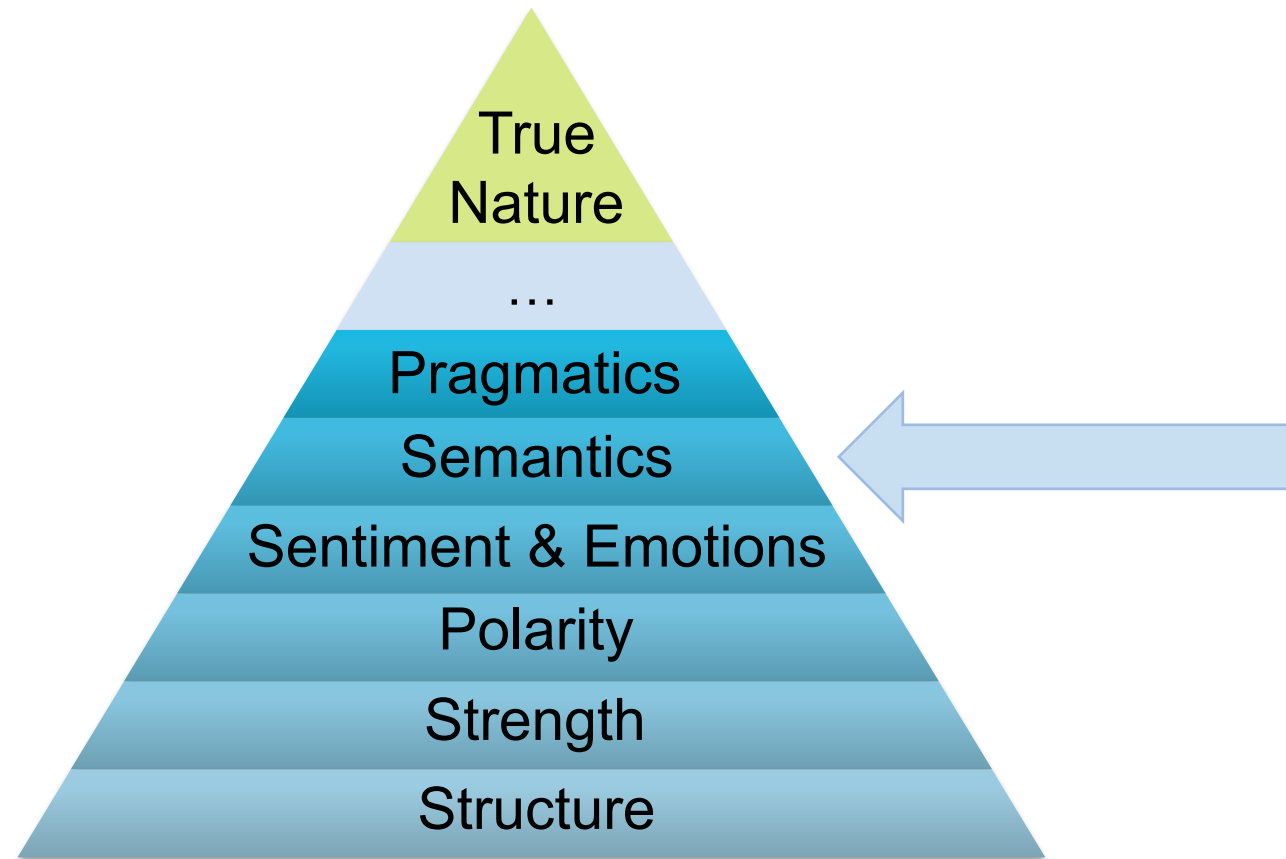
Strength of a tie is a combination of amount of time, emotional intensity, intimacy, and reciprocal services which characterize a tie



Strength from social conversations



Operationalizing topicality



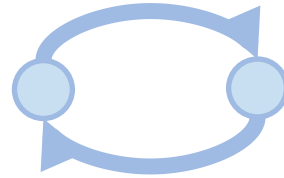
Operationalizing topicality

Common identity and bond theory

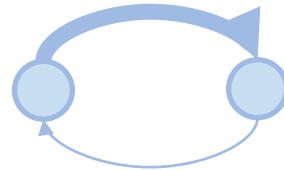
Reciprocity

Topical diversity

Social

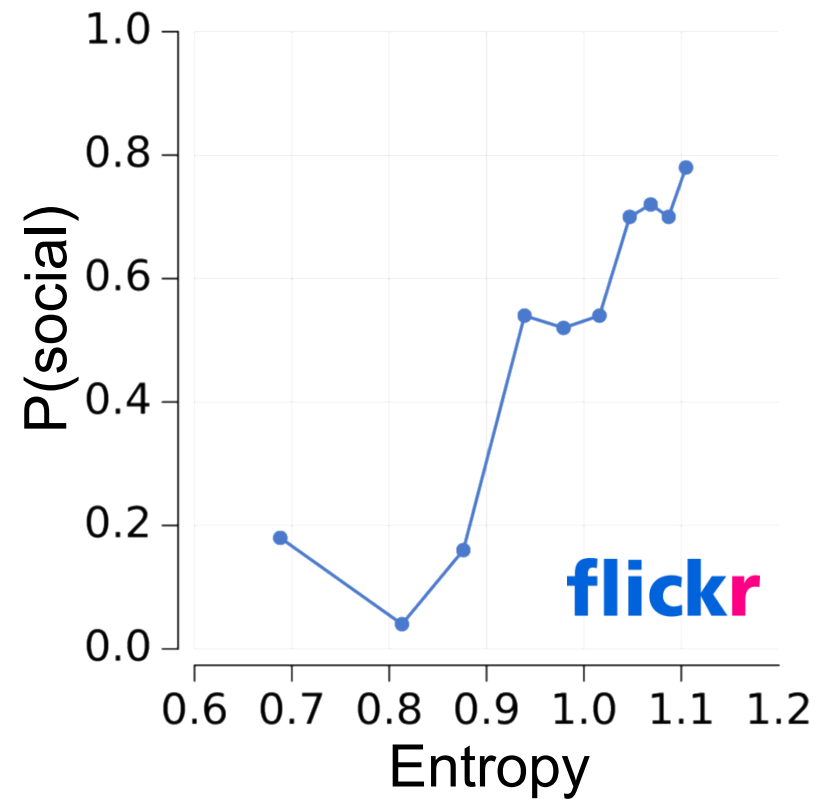
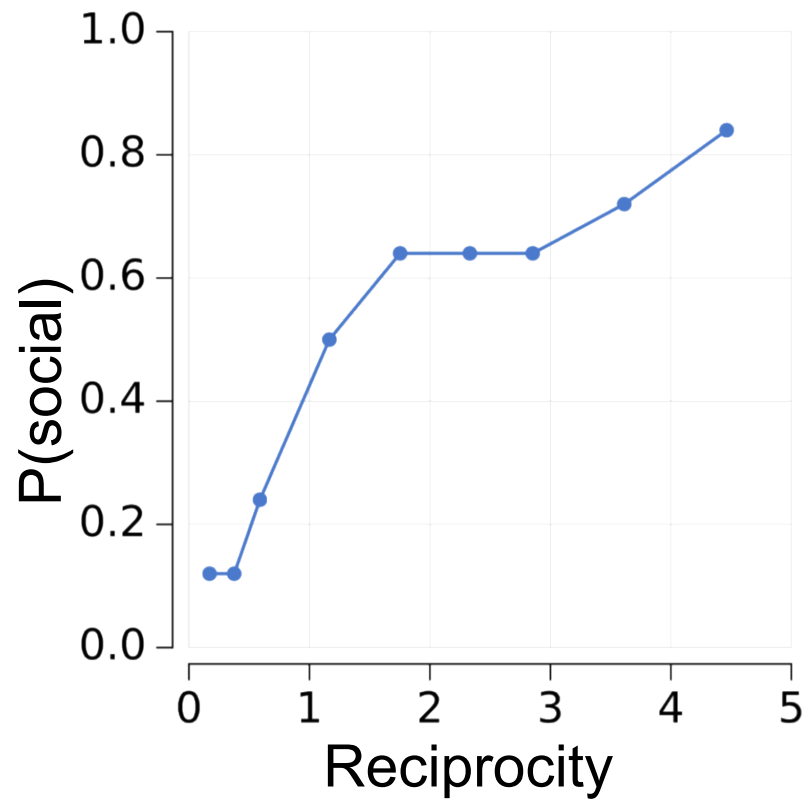


Topical

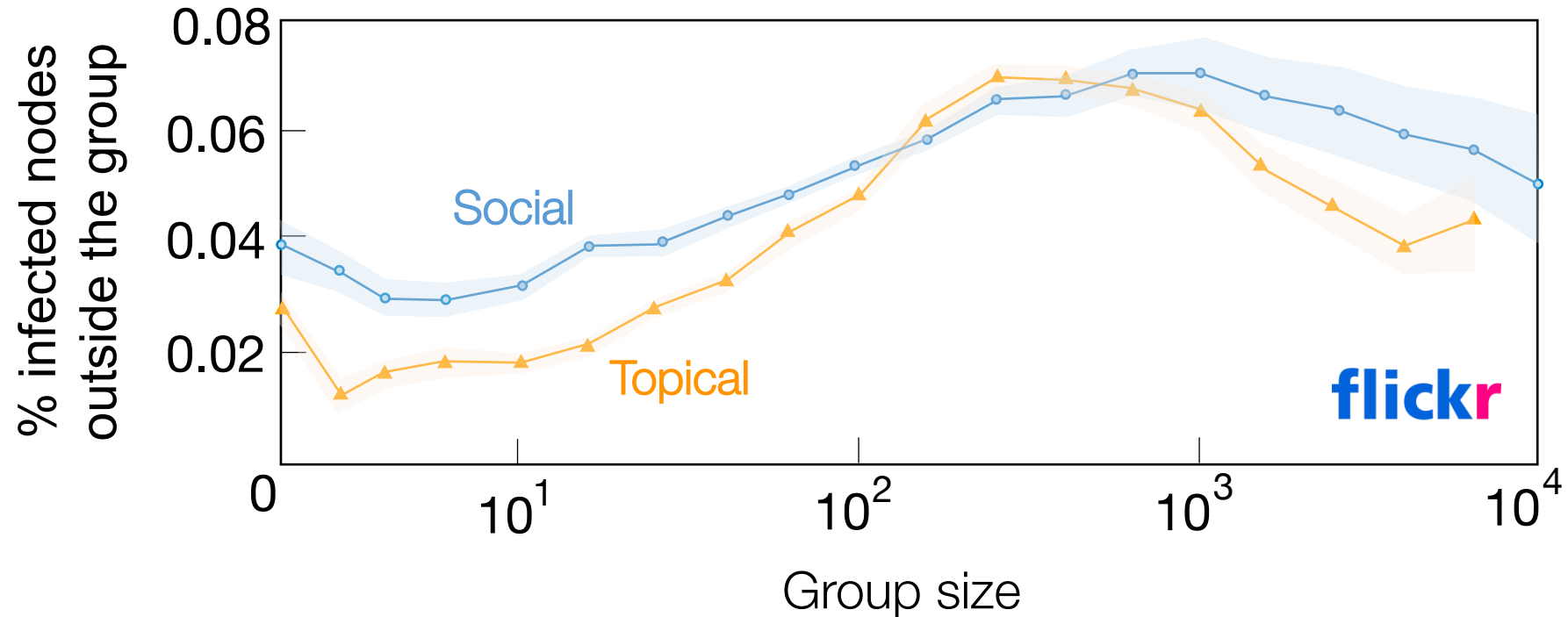
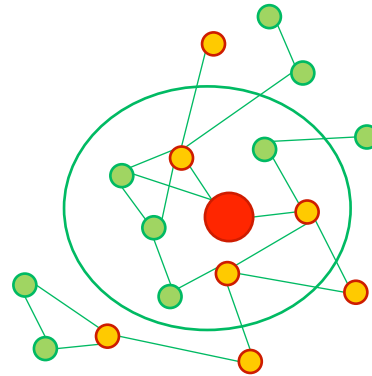


Operationalizing topicality

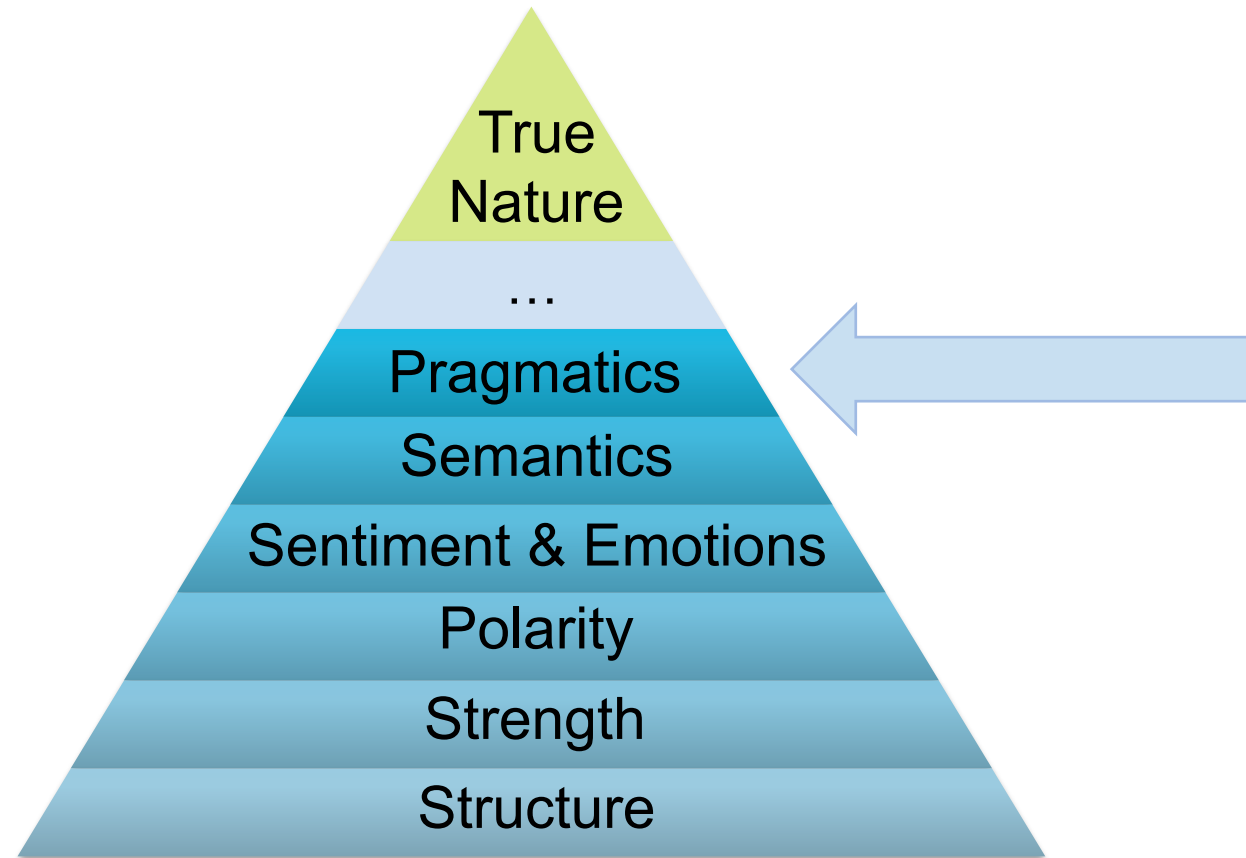
Topical/Social conversations



Group type and information spreading



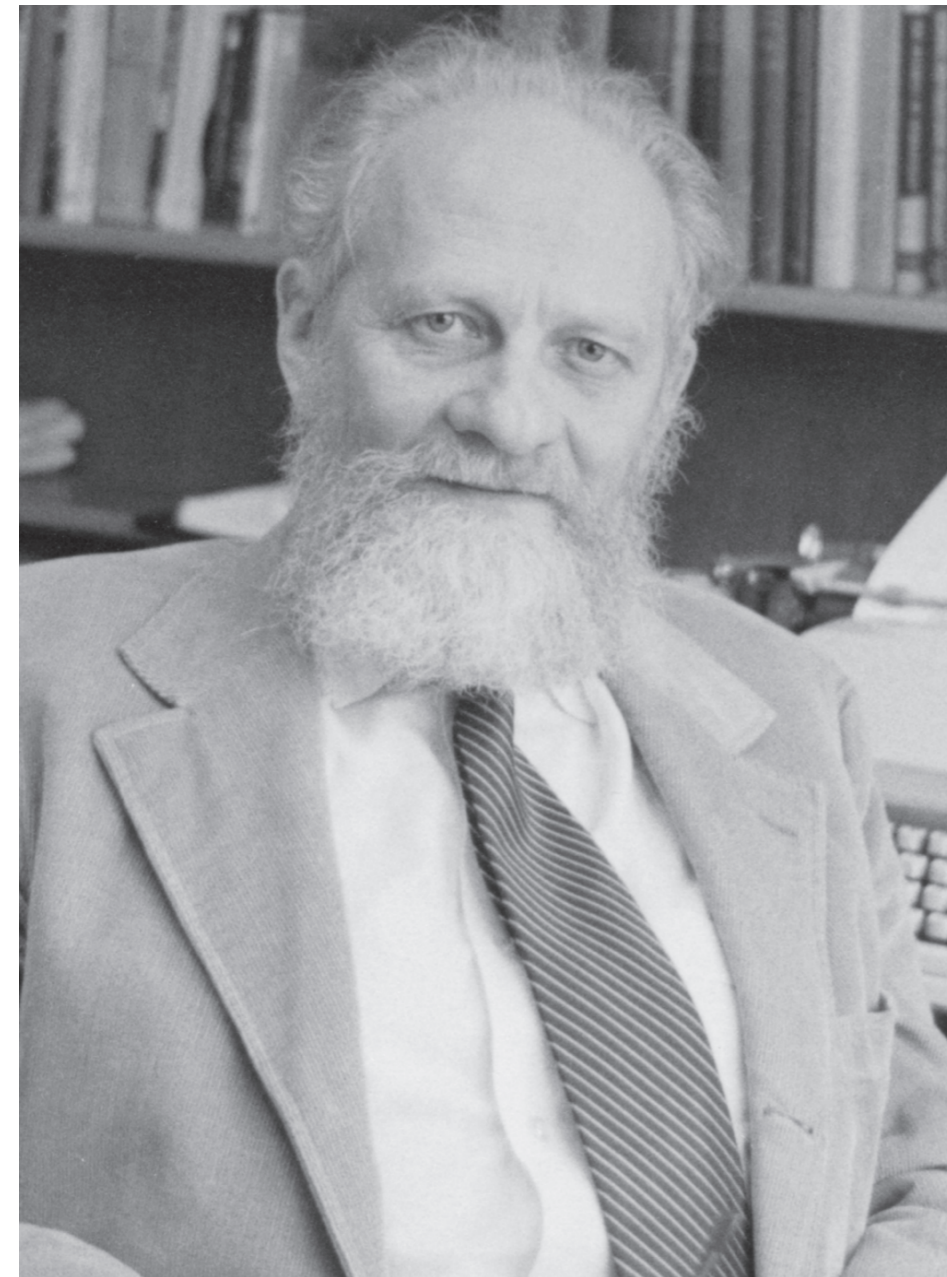
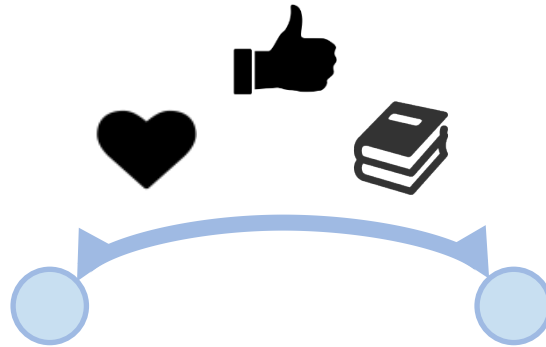
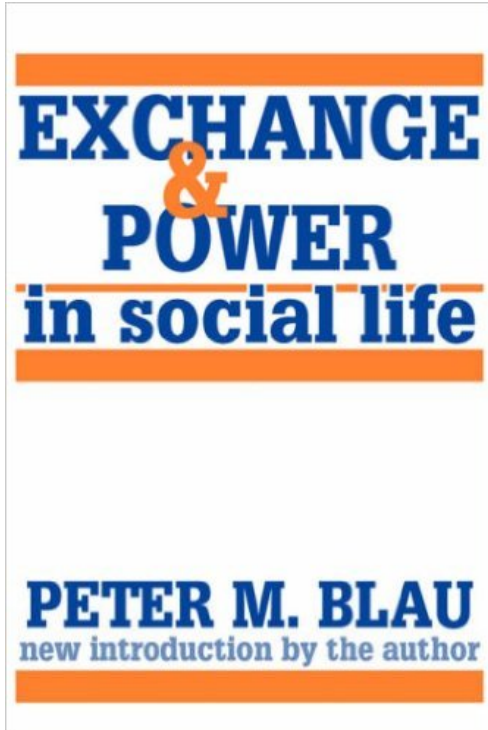
Operationalizing pragmatics





Communicative acts

Peter Blau's Social Exchange Theory





What are the types of resources people exchange?



Literature review

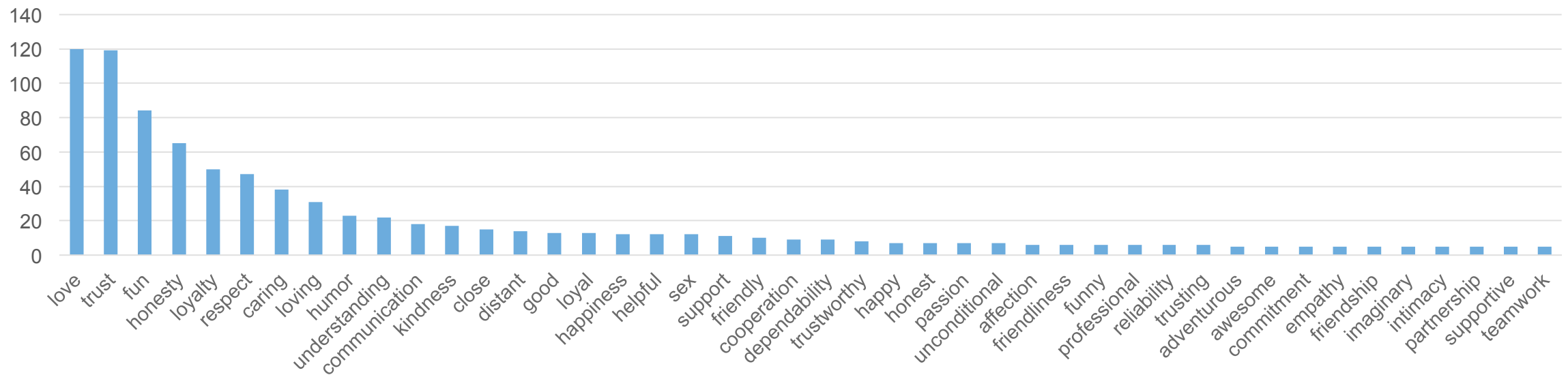
Crowdsourcing



Word-collection on MTurk

“Write down the words that best describe your social relationships”

Most frequent terms



362 Unique words, 151 non-redundant
200 workers. 45% women, 81% White from Canada, UK, US

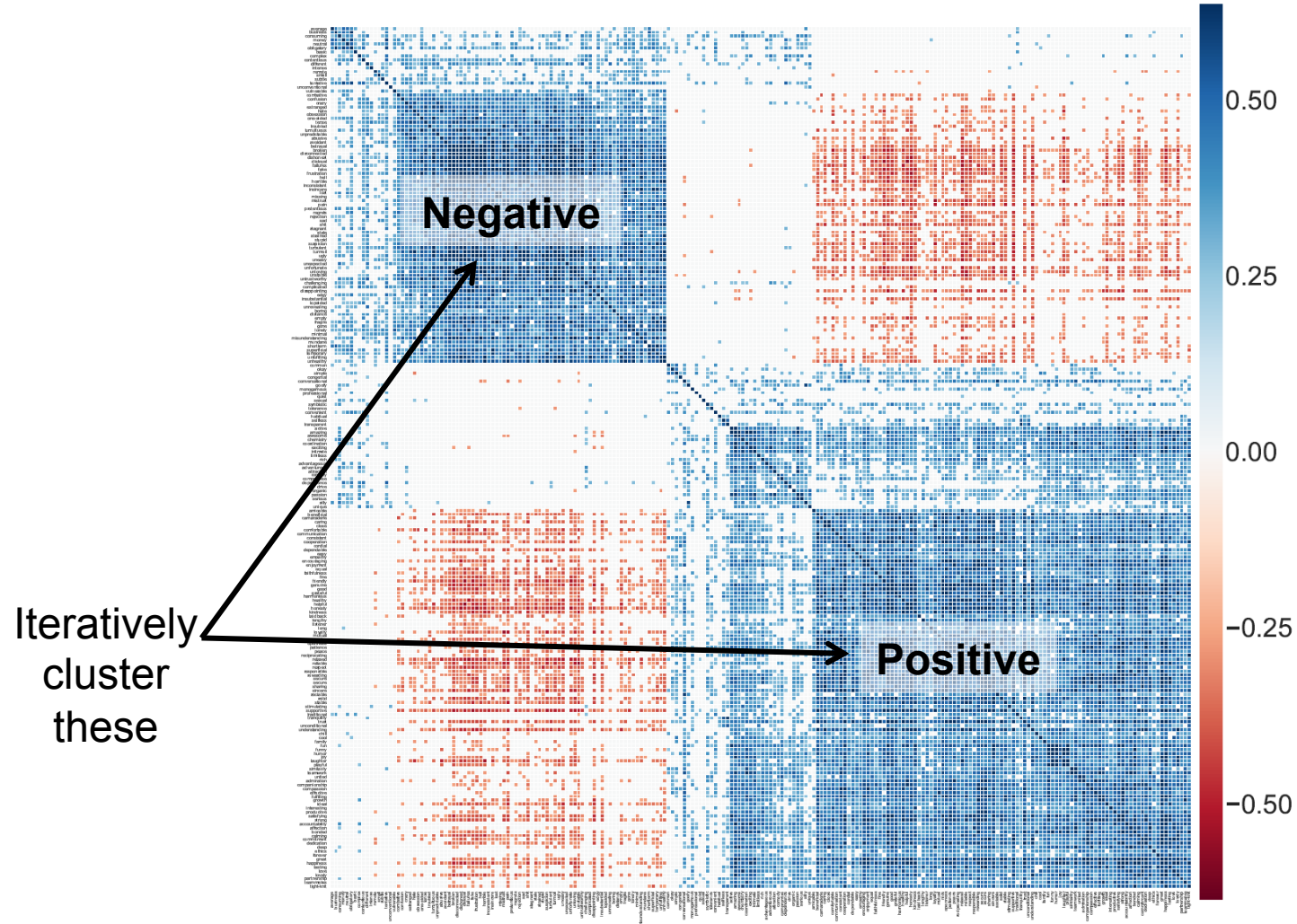
Word-scoring on MTurk

Think about the relationships in your life, in general (e.g. friends, family, coworkers, romantic partners). Now look at the words below. How well do the words below describe those relationships?

	1 Does not describe well at all	2	3 Describes fairly well	4	5 Describes very well
abusive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
accountability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
admiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
advantageous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
adventurous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
affection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
amazing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
amicable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
attraction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

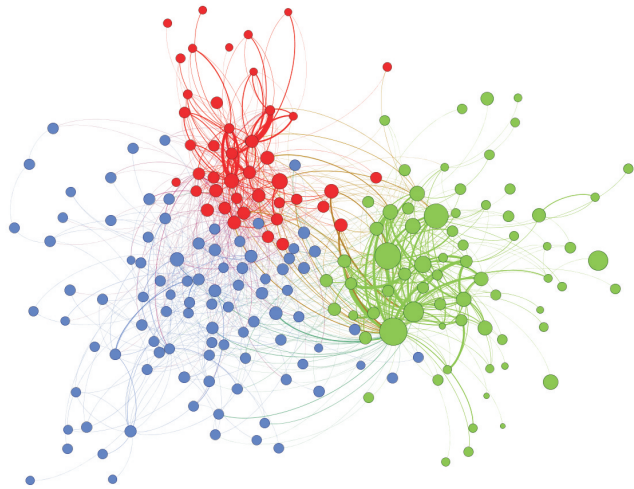
Each word is represented by a 200-dimensional vector of scores (1 entry per worker)

Word clustering



Blockmodeling on correlation matrix

The 10 building blocks of social interactions

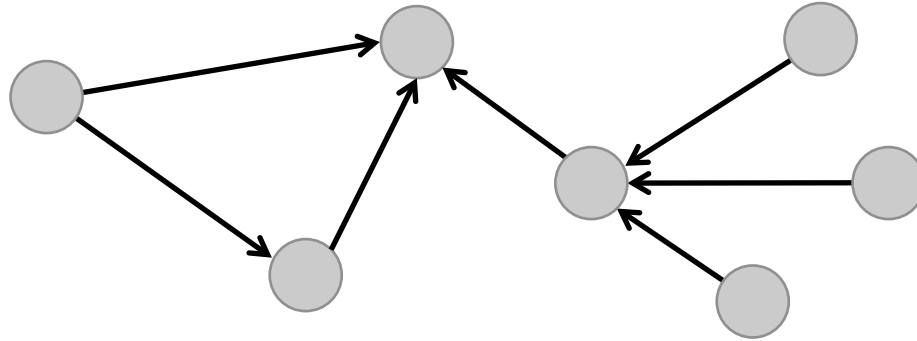


Reading the Source Code of Social Ties
WebSci 2014

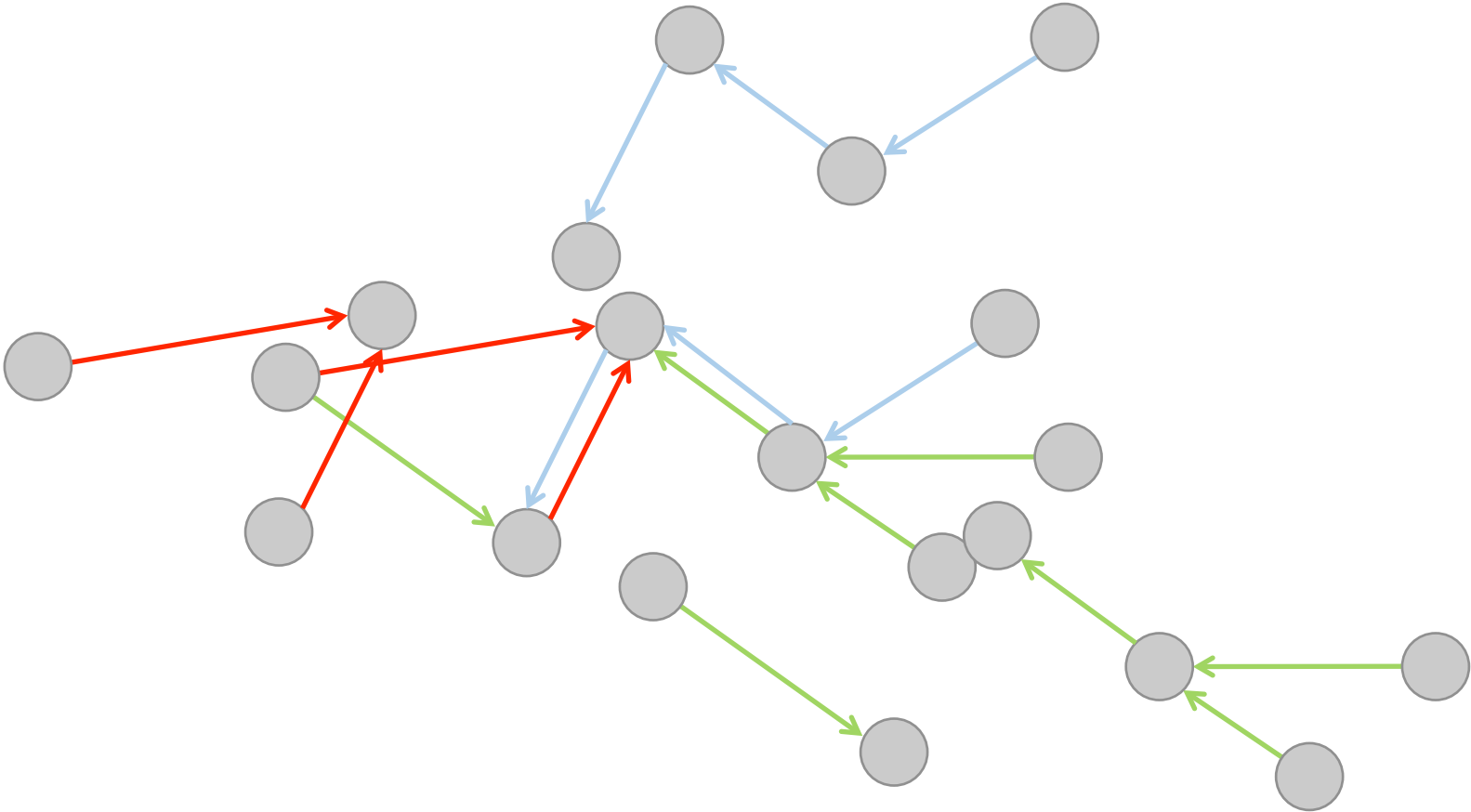
{ Social Support
Power
Knowledge
Similarity
Identity


Trust
Respect
Romance
Fun
Conflict

Coloring social ties



Coloring social ties








Aliceassassina




Female, 34. Roma, Italy

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Neighbors [more](#)


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-  [maldido duen...](#)
-  [ginocchiaapu...](#)

Books


[All books](#) ▾ [Rating \(Highest\)](#)



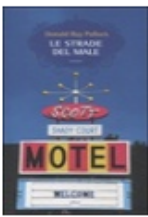
L'Erbario delle Fate (85)
By Benjamin Lacombe, Sébastien Perez
Finished on Nov 28, 2013
★★★★★ [Add...](#)




La profezia dell'armadillo (2931)
By Zerocalcare
Finished on Jan 6, 2013
★★★★★ [Add...](#)




Biancaneve (171)
By Jacob Grimm, Wilhelm Grimm
Finished on Feb 11, 2012
★★★★★ [Add...](#)




Le strade del male (107)
By Donald Ray Pollock
Finished on Aug 17, 2012
★★★★★ [Add...](#)



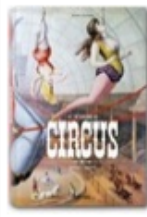
Hablando claro (14)
Curso intensivo de Espanol para italianos
By Carla Poletti, José Pérez Navarro
Finished in 1999
★★★★★ [Add...](#)




La ballata di Trenchmouth (50)




C'era una volta... (113)
Libro pop-up



Circus Book 1870-1950 (4)
Reference




Papà tatuato (67)
By Daniel



Venere privata (2507)
By Giorgio

Shoutbox

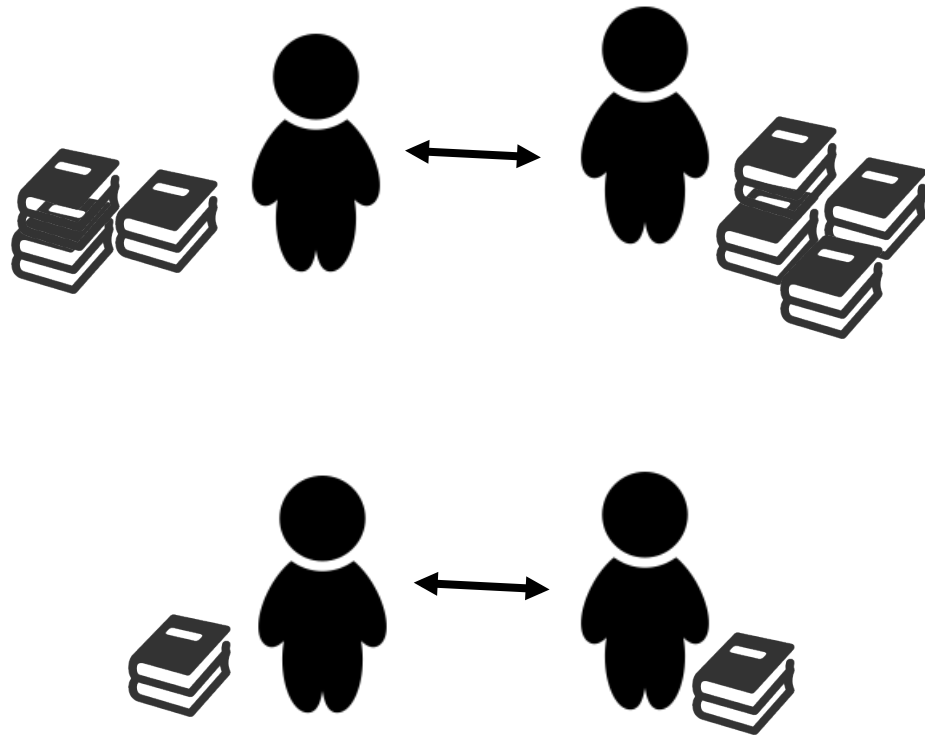
[See all](#)

 [Morgana1981](#) "16 Novembre 2013 è uscito "Le Lenzuola nere di Khloe", Oct 28, 2013

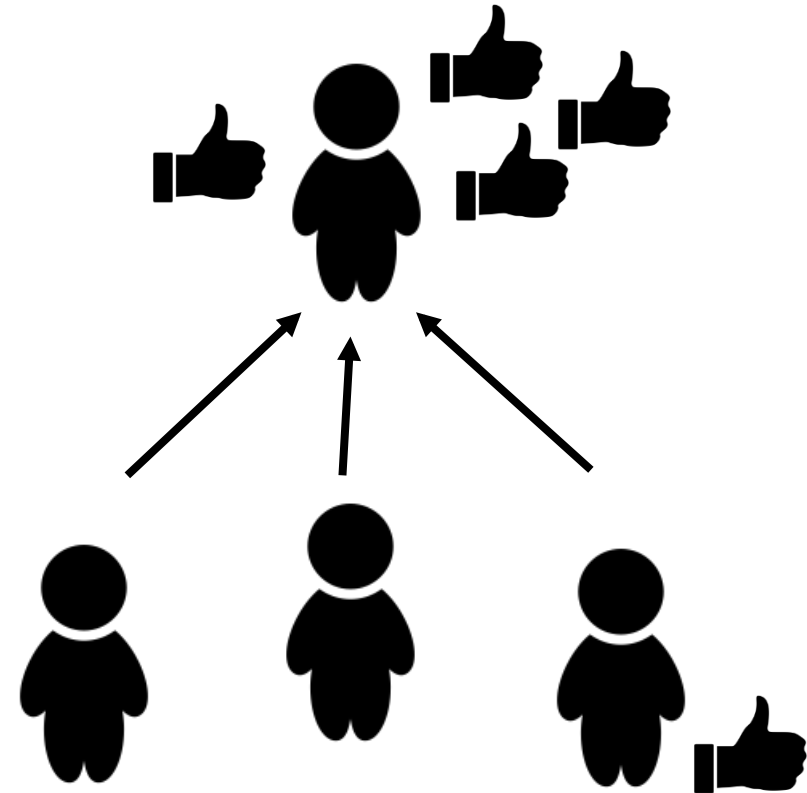
CIAO!
Questo è il booktrailer del mio nuovo libro: "Le Lenzuola Nere di Khloe". Dura 2 minutini scarsi!
Buona Visione! :)

Descriptive Power: Assortativity

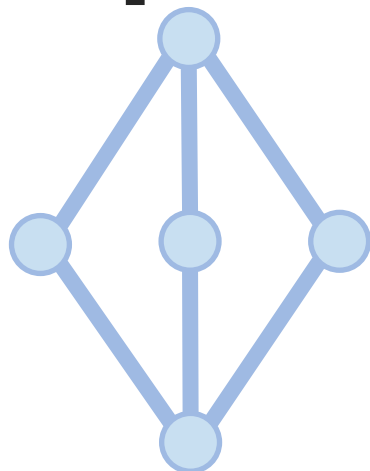
Knowledge net



Status net

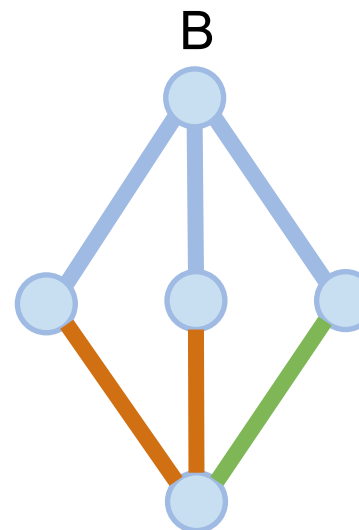


Predictive power: Link prediction



A

$$TO(u, v) = \frac{|\Gamma_{out}(u) \cap \Gamma_{in}(v)|}{|\Gamma_{out}(u)|}$$



A

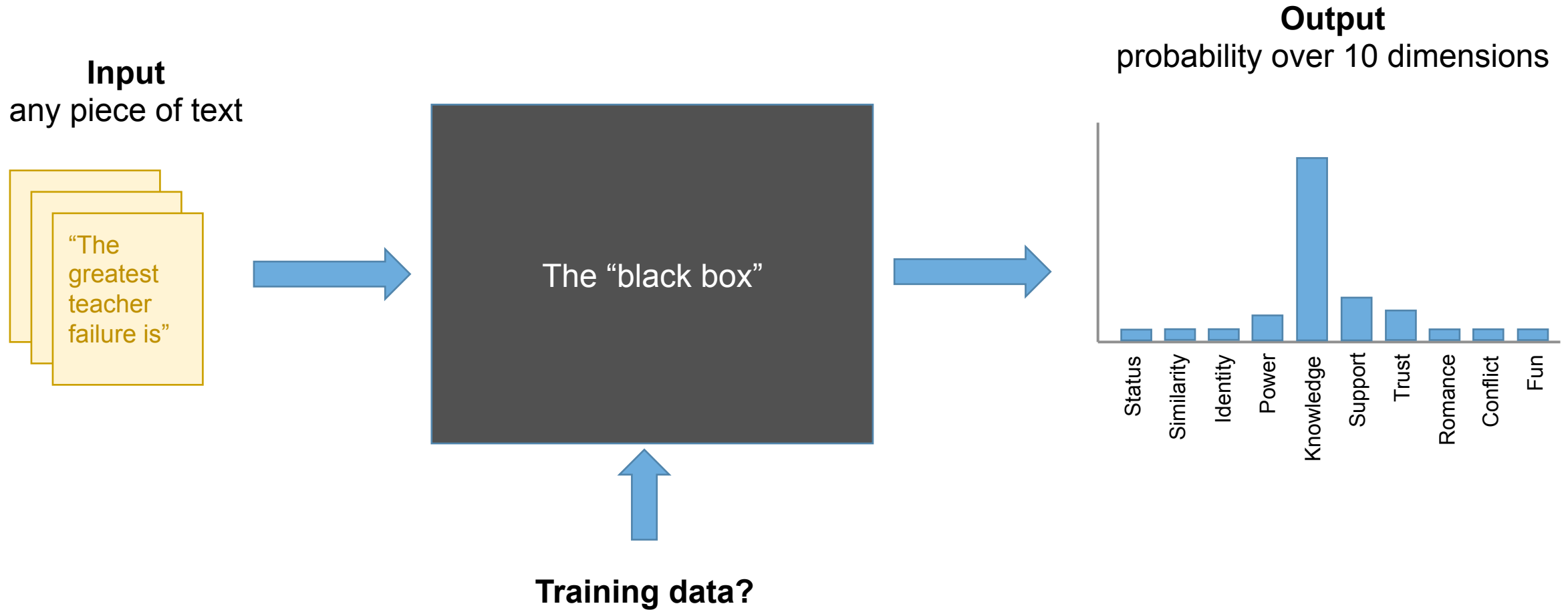
Simple word



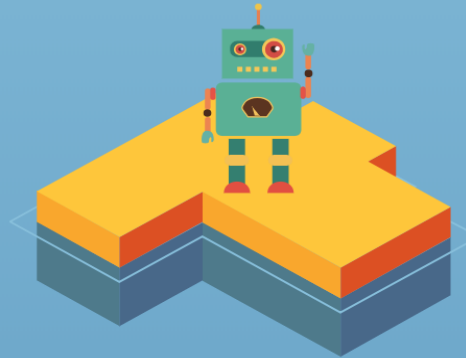
Can we do better than this?

Features	Precision	AUC
Triangle overlap	0.749	0.755
Relationship dimensions	0.800 (+7%)	0.803 (+6%)
All	0.783 (+5%)	0.841 (+11%)

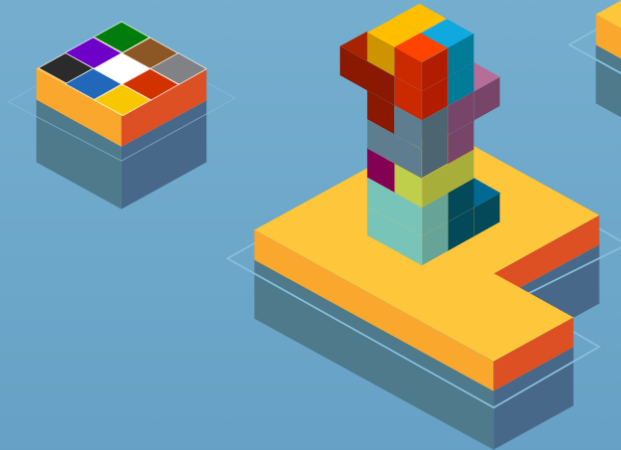
Supervised model



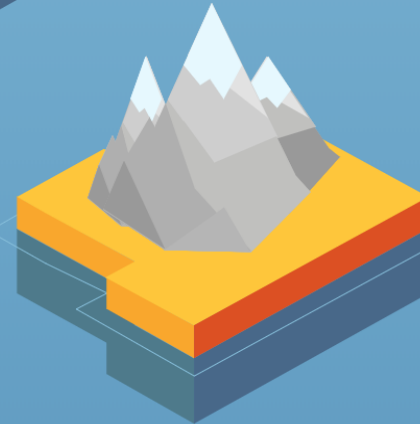
Ability to spot lies



Perception of
Social ties



Well-being and
self-representation



www.tinghy.org

[my profile](#)[f logout](#)

Isle of Ties

You likely know many people, but what are the relationships in your life really about? Play this game to find out what you really value in your relationships and how you compare to others.

[Play](#)[I'd rather play another game.](#)

www.tinghy.org

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Pick three blocks describing your relation with *Alessandra Sala*

If you can think about one thing only, then pick the same block multiple times.

- Similarity
- Trust
- Romance
- Social support
- Identity
- Respect
- Knowledge transfer
- Power
- Fun
- Conflict



~4,000 labeled
pairs



5/10



Undo

Skip

or restart

people, but what are the relationships in your life really about? Play this game to find out what you really value in your relationships and how you compares to others.

Crowdsourced labeling

The interface shows a sidebar on the left with a list of classes for labeling. The main area displays a text snippet from a Reddit post, with a green label 'Social support' applied to the first line. A blue arrow points from the 'Social support' class in the sidebar to the label on the text.

Annotations toolbar: [Icons for delete, zoom in, zoom out, undo, redo, search, and a dropdown menu]

Search Classes

- Similarity
- Identity
- Knowledge
- Social support**
- Trust
- Power
- Respect
- Romance
- Fun
- Conflict
- None

Social support

I am so sorry for your loss

make an adult take care of himself

~10,000 labeled messages
3 workers each, 60% entries with 2+ agreement

The screenshot shows a Reddit post from the r/cancer subreddit. The post title is 'The end'. The text of the post is visible, and a blue arrow points from the 'Social support' class in the sidebar to the label on the text.

reddit r/cancer

64 0 The end

should things get too bad it horrified me to think of her drowning herself, or deliberately overdosing, when a medical professional could help her pass painlessly if only it weren't illegal! In the end she passed in hospital, with some of the indignity that accompanies most deaths by cancer. I still sob when I think of her in that hospital bed, telling me that she wanted to "just go".

I really empathise with everything in your post OP. I'm so sorry for what you and your step dad are going through. Your love for each other is a special thing. All I can say is that I wish you strength during this time.

As an aside, any chance you were referring to St Vincent's in Brisbane? My mum passed there and I agree that the staff there are amazing humans.

Reply Share Report Save Give gold

↑ 59 ↓

↑ 64 ↓

Dan83857 3 points · 7 hours ago

Watching him suffer has been really tough, especially considering he is such a private person (it wasn't until he collapsed that he allowed me to help him in the bathroom).

I'm just really happy that I got a chance to say goodbye as I live on the other side of the world and it was a friend's wedding that happened to get me here at the same time.

Features: NLP

Soon on github!

toolkit

Sentiment

LIWC sentiment
VADER
Emolex
Valence/arousal
Hatesonar

Text quality

Misspellings
Elongations
Visual properties
Formatting
Punctuation

Style/Norms

LIWC
Politeness
Empathy
Empath
Hedging
Evidentiality
Argumentation
Subjectivity
Morality

Syntax/Semantics

POS tags
Dependency subtrees
Semantic role labeling
Distributional semantics
LDA

Complexity

Text length
Entropy
Readability
Concreteness
Lexiles, ATOS, DRP
Simplifications
Memorability
Preplexity

Embeddings

Word2vec
InferSent
Paragraph2Vec
SkipThoughts
QuickThought
SDAE
FastSent



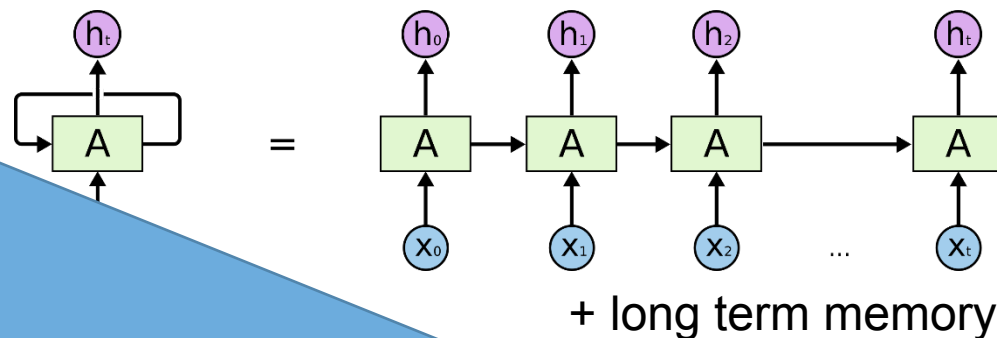
Andrea Baronchelli



Laura Alessandretti

XGBoost

LSTM/BERT



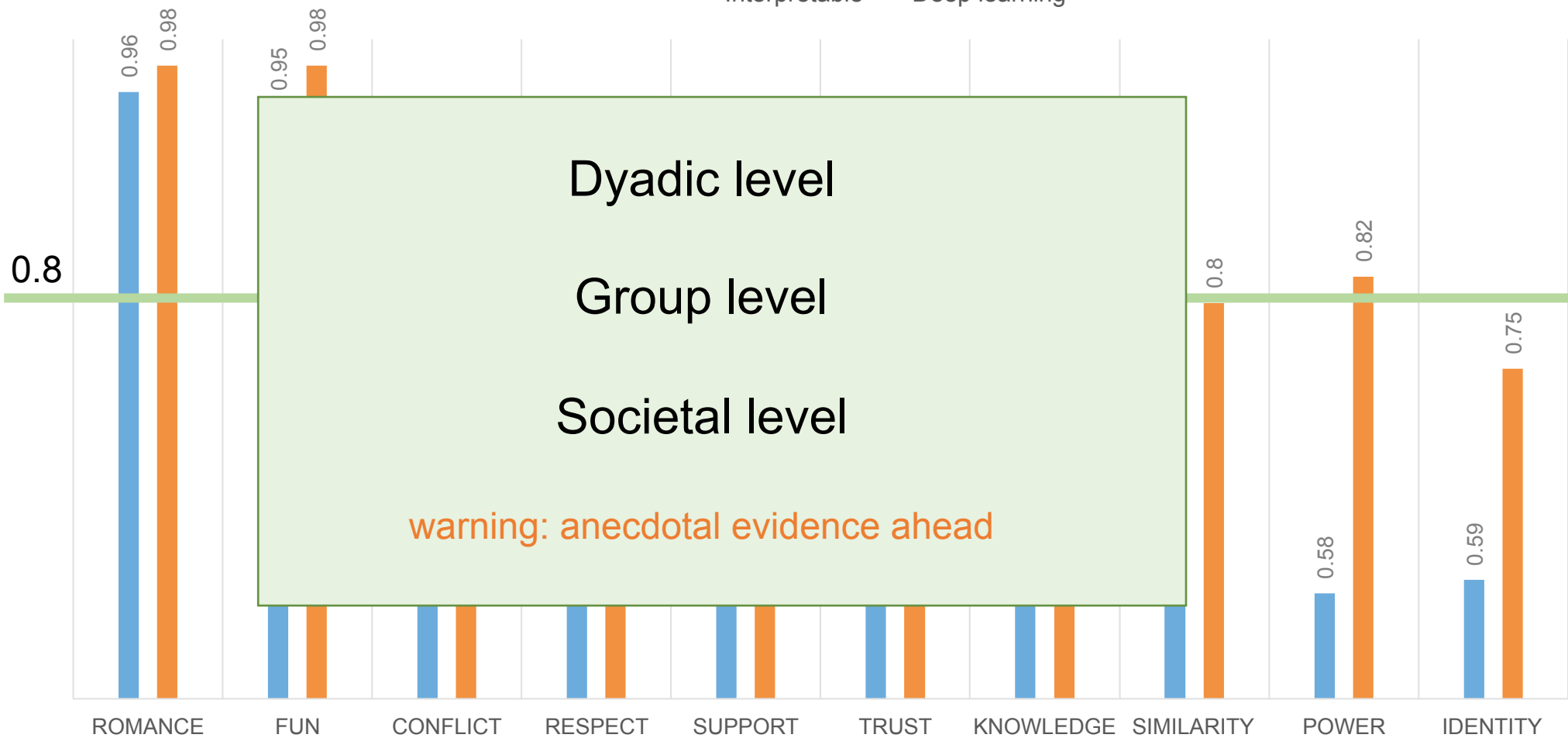
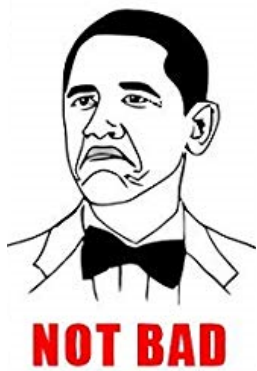
Anticipating Cryptocurrency Prices Using Machine Learning

Complexity 2018

Preliminary results

PERFORMANCE (AUC)

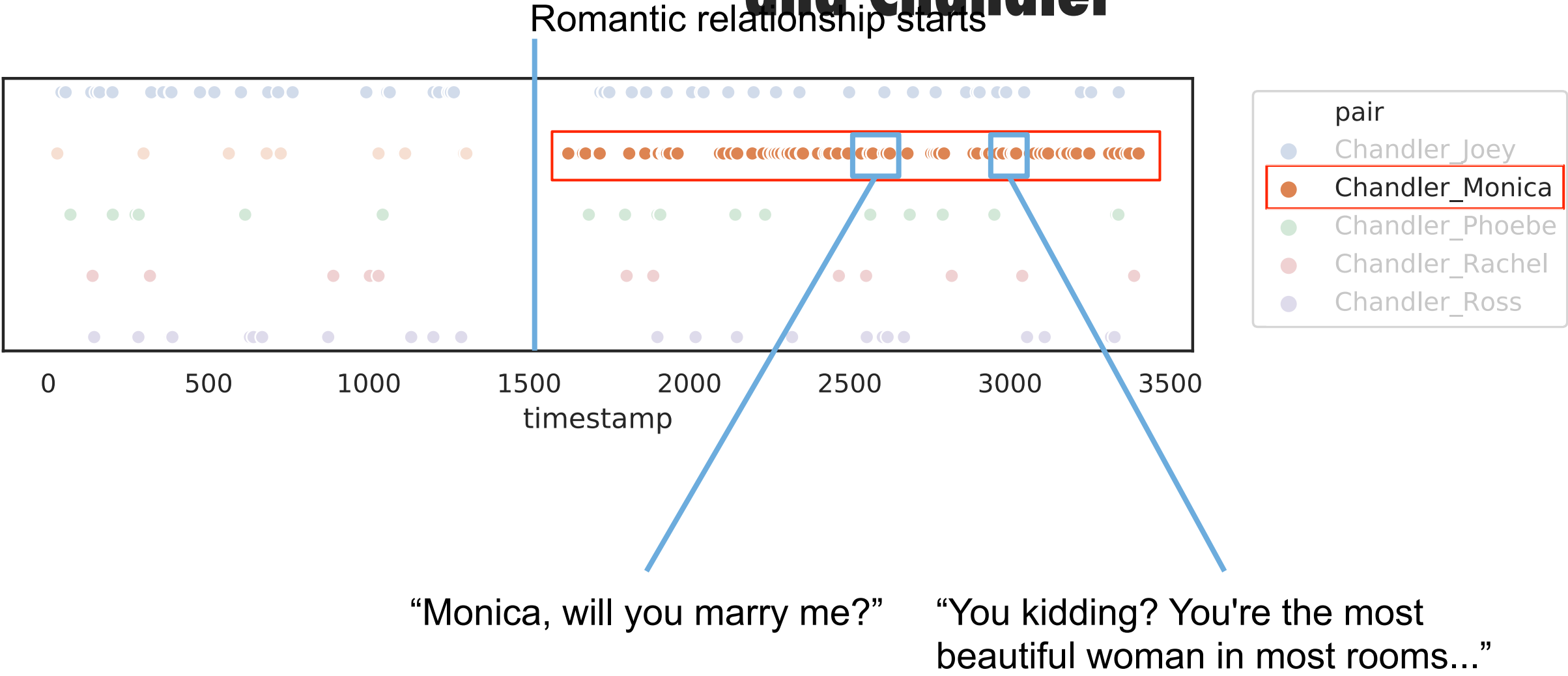
■ Interpretable ■ Deep learning





Relationship evolution

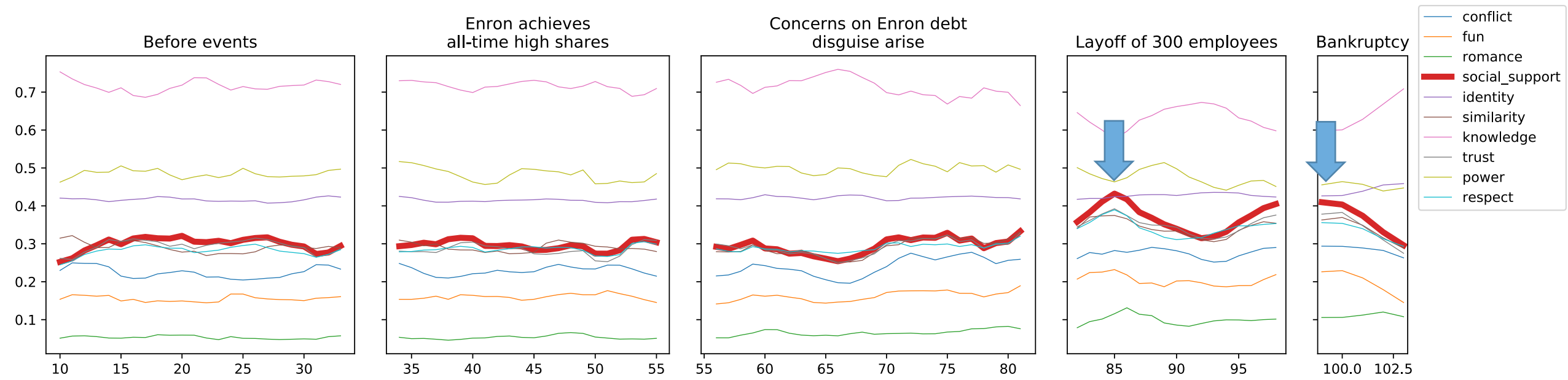
Expression of romance between Monica and Chandler



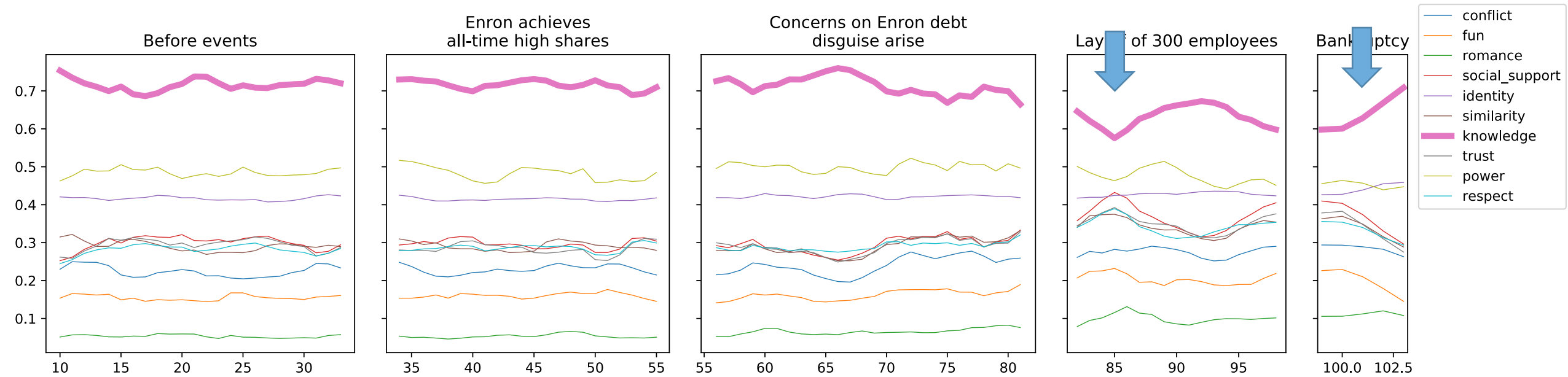


**Collective response to
critical events**

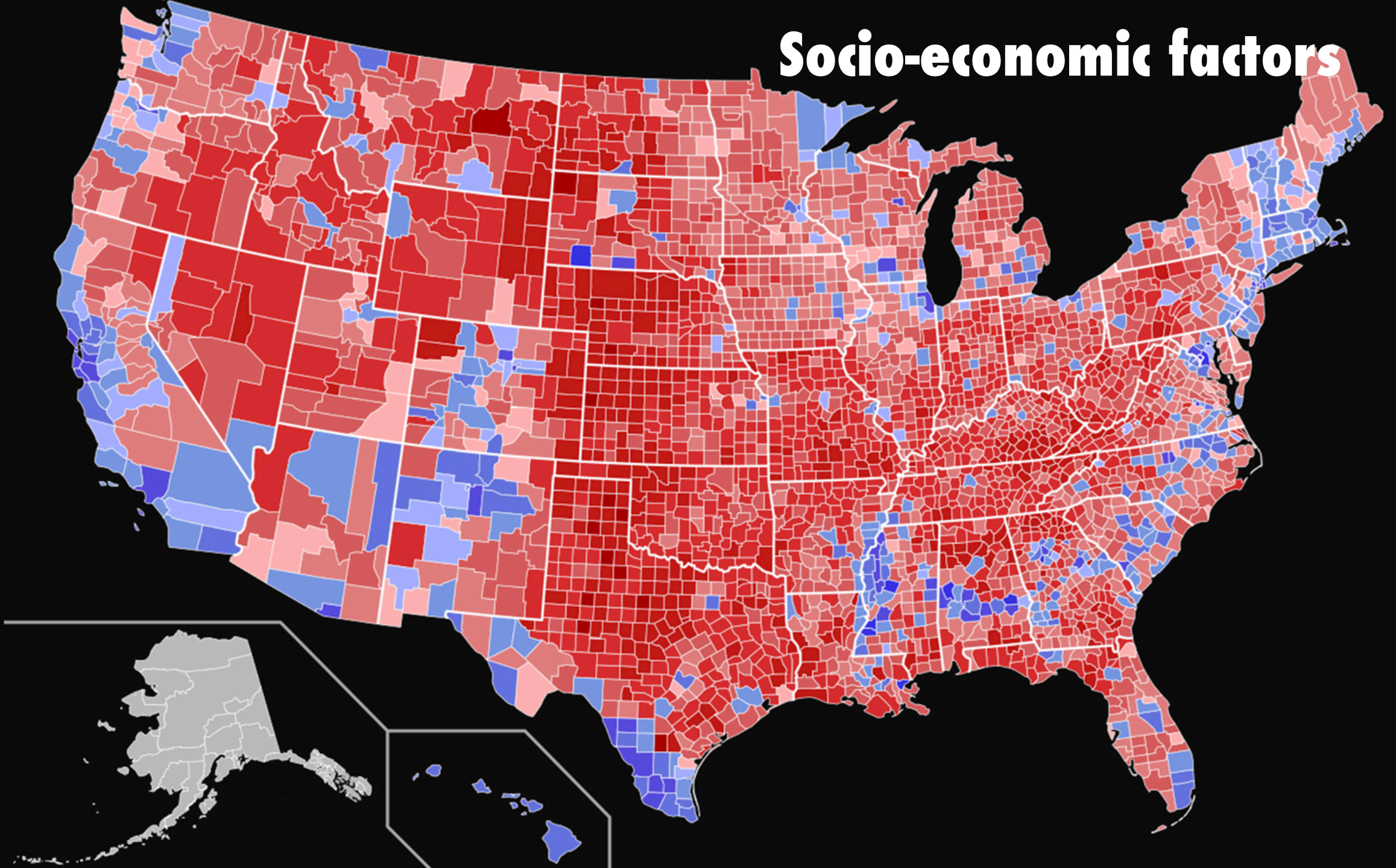
Social support in time of need



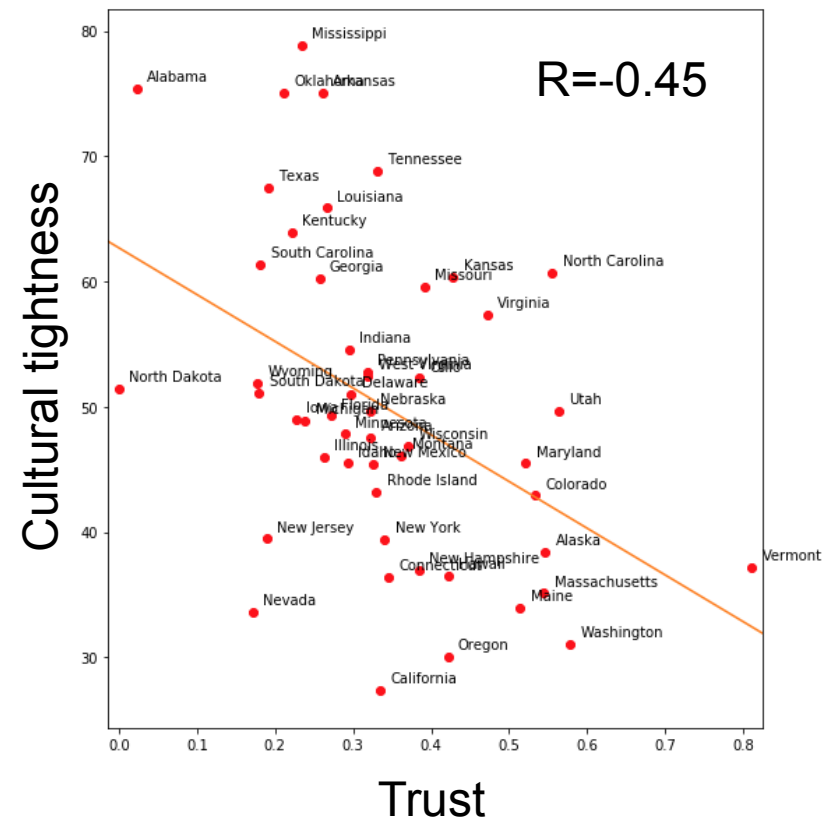
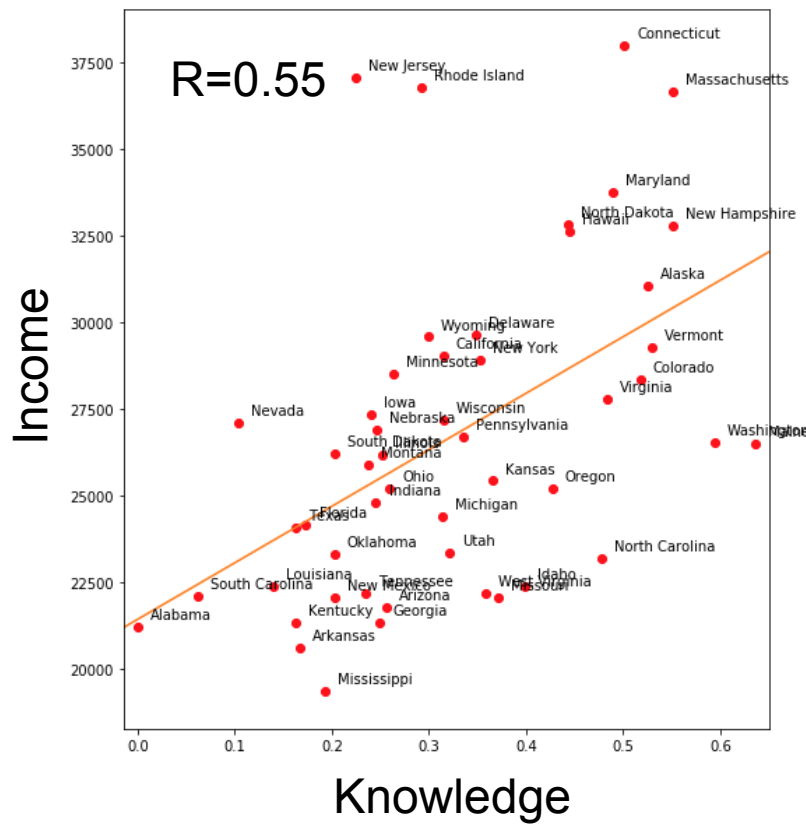
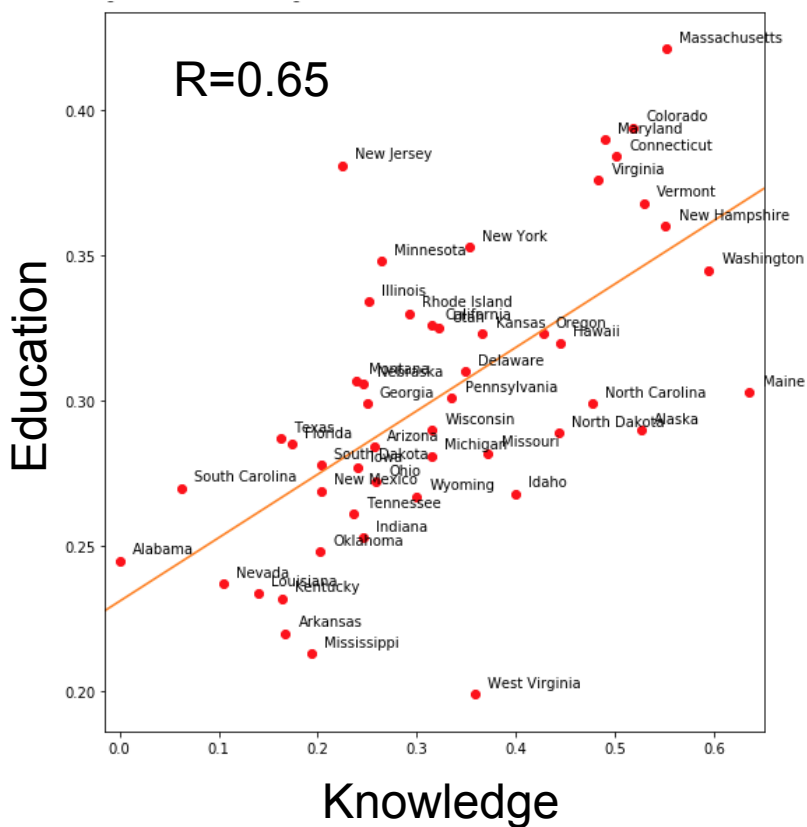
Information exchange in times of uncertainty



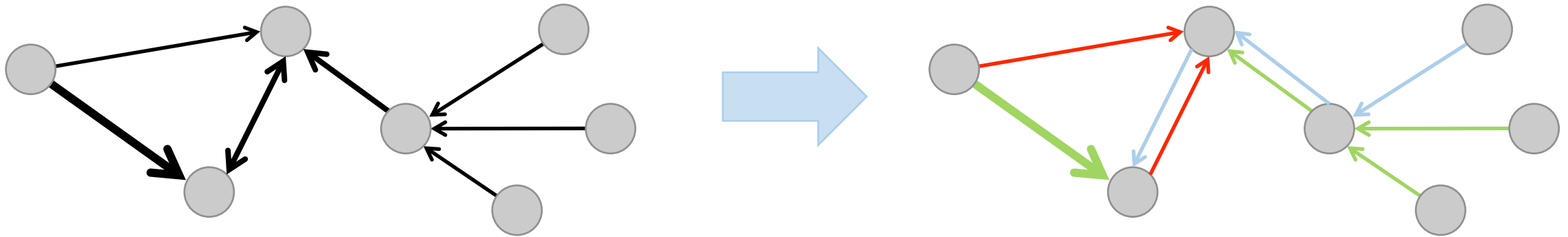
Socio-economic factors



Social exchange and socio-economic factors



The Future





**Jérémie
Rappaz**

**Sebastian
Deri**

**Tobias
Kauer**

**Eva
Sharma**

**Miriam
Redi**



**Krisztián
Varga**

**Bogdan
State**

**Rossano
Schifanella**

**Daniele
Quercia**

**Sagar
Joglekar**

**Minje
Choi**

Collaborators

Thank you!

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