UNIVERSITY OF WATERLOO

Trans-Atlantic Platform
Social Sciences and Humanities

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## Theoretical and Empirical Modeling of Identity and Sentiments in Collaborative Groups

FH;P
Fachhochschule Potsdam
University of
Applied Sciences

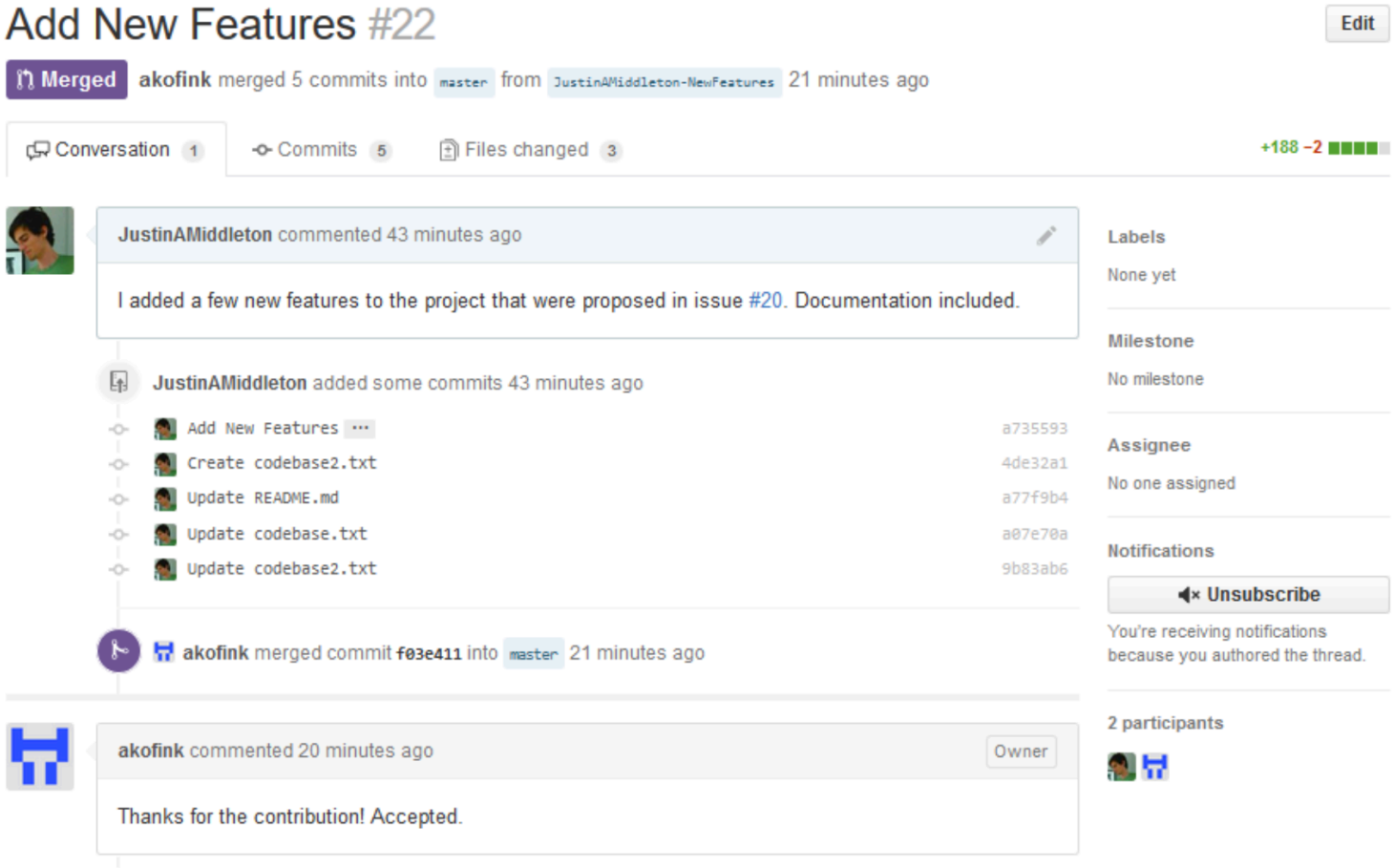
DARTMOUTH

# PROJECT GOALS

- ***Understanding New Forms of Collaboration***
  - Online Collaborative Networks
  - GitHub
- ***Expanding Theories of Social Interaction***
  - maintaining social relationships vs. maximizing personal gains
  - relational vs. transactional interactions
- ***Leveraging Theories of Identity for Computational Social Science and Targeted Analysis of Big Data***
  - Affect Control Theory
  - Affective alignment as key motivating factor for group interactions

# GitHub.com

- **6 million** active users
- **20 million** active repositories
- **10 million** active issues
- **331 thousand** active organizations
- **Open source**



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# The Good, The Bad, and the Ugly

yay  no more saving addresses twice in memory

i am grateful that you took the time to write it

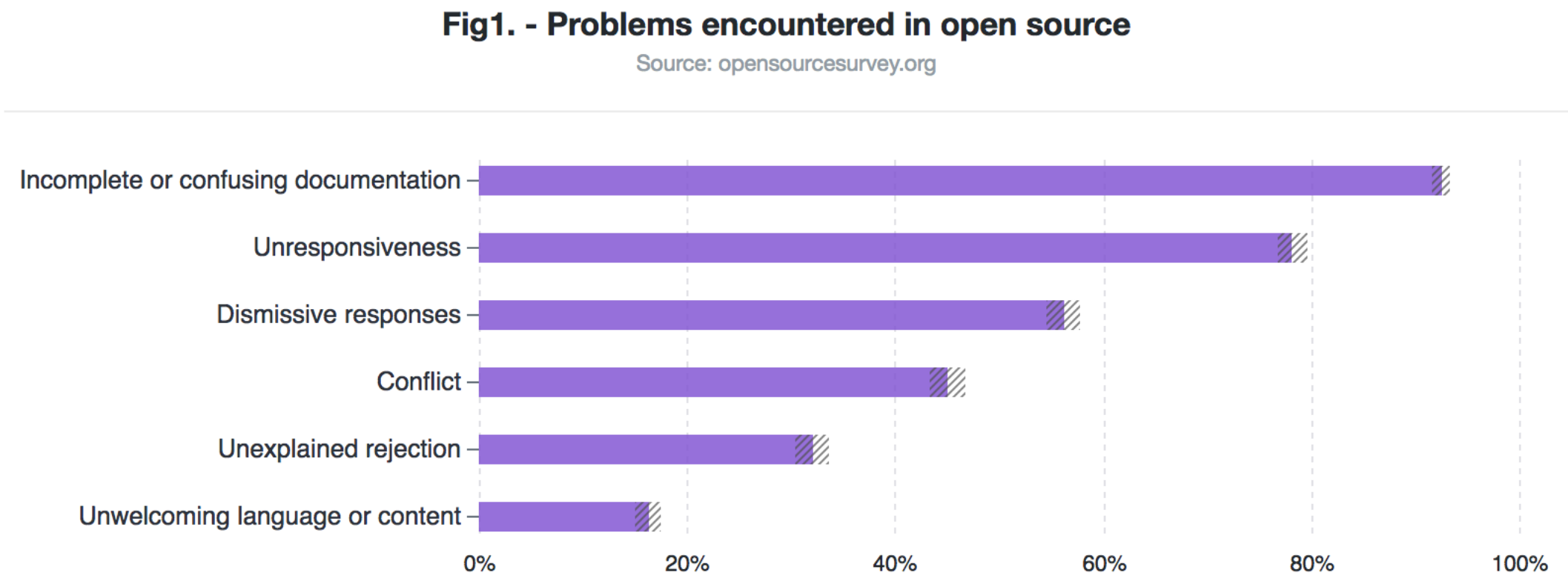
is this github being stupid?

dam  i was sleeapy sorry let me fix that

Christ people. This is just sh*t.

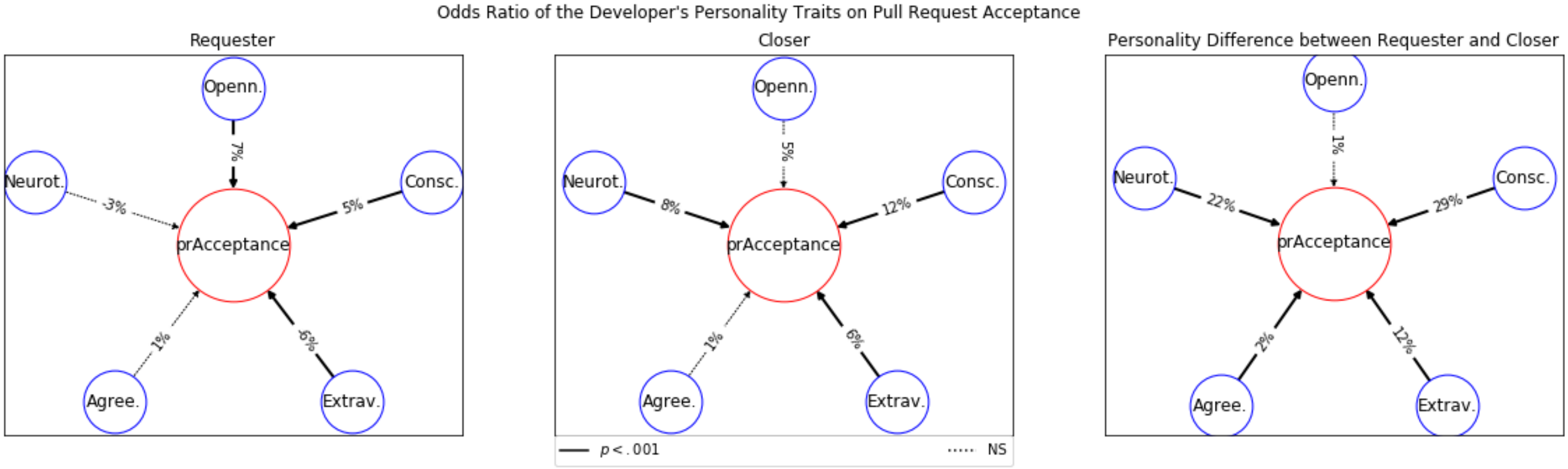
Wtf ? Who is fucking with my if Statement?!

# *Understanding New Forms of Collaboration:* Effects of Emotions

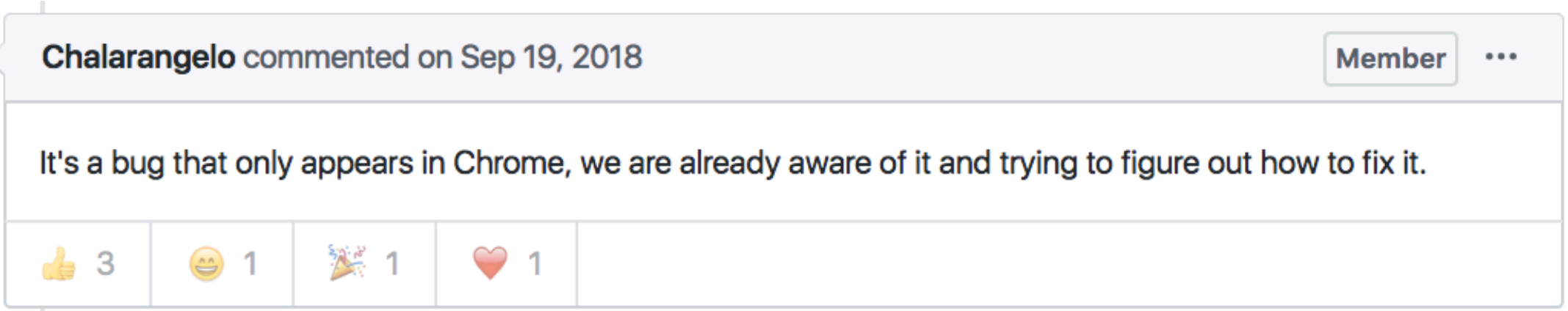


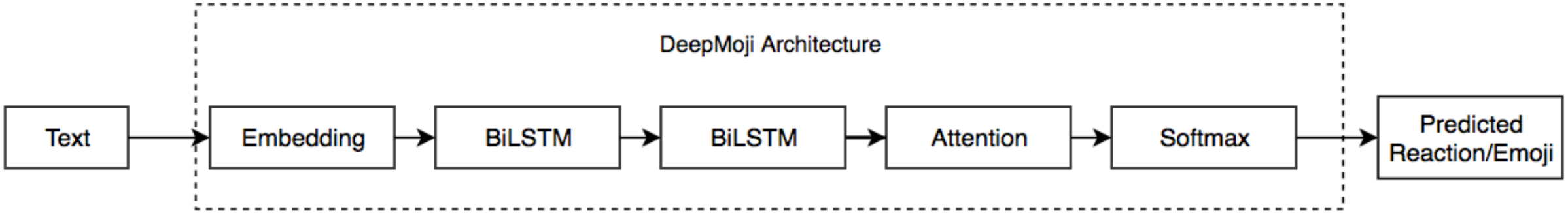
# *Understanding New Forms of Collaboration:* Effects of Personality Traits

**BIG 5 Personality: Openn**ess, **Consc**ientiousness, **Neurot**icism, **Agree**ableness, **Extrav**ersion



# ***Understanding New Forms of Collaboration:*** Predicting reactions



# *Understanding New Forms of Collaboration:* Predicting reactions

| Github Pull Request comment | Predicted reaction/emoji |
| --- | --- |
| Open source software is a thankless task. I dont fault any package maintainer for walking away without explanation | 👎 93.0% 🚀 4.35% 👍 1.41% |
| This isn't expected to be resolved anytime soon, so I opted for a joke! | 😄 25.8% 👎 21.9% 🚀 18.8% |
| I would like this feature as well! Passing a cert would be easier since we have multiple developers using these build scripts that run match | 👍 65.0% 👎 21.9% ❤️ 18.8% |

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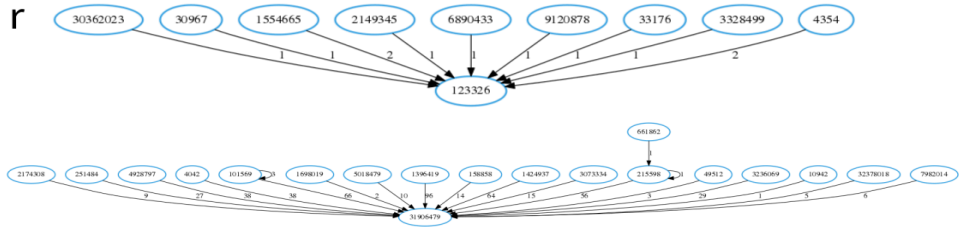
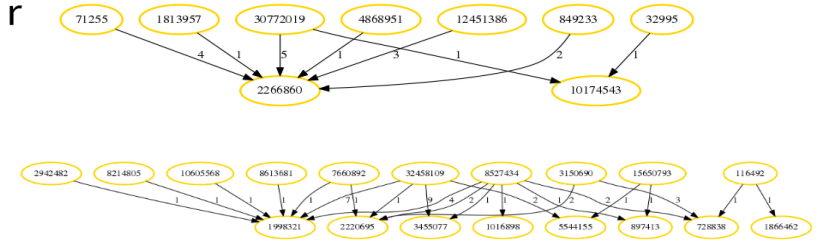
# ***Understanding New Forms of Collaboration:*** Topology of Groups on GitHub

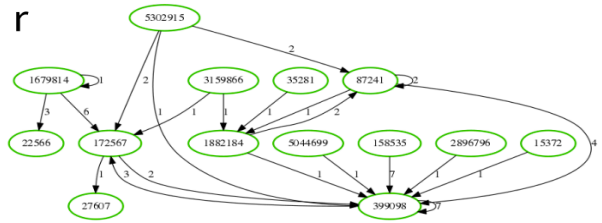
## Cluster 1

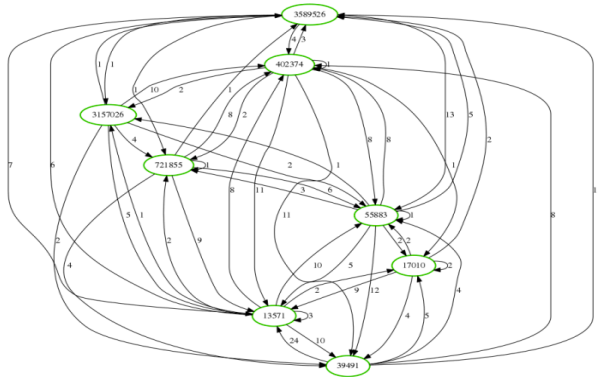



## Cluster 3



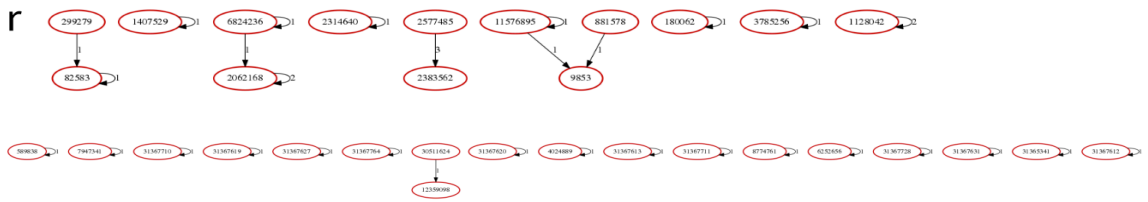

## Cluster 2



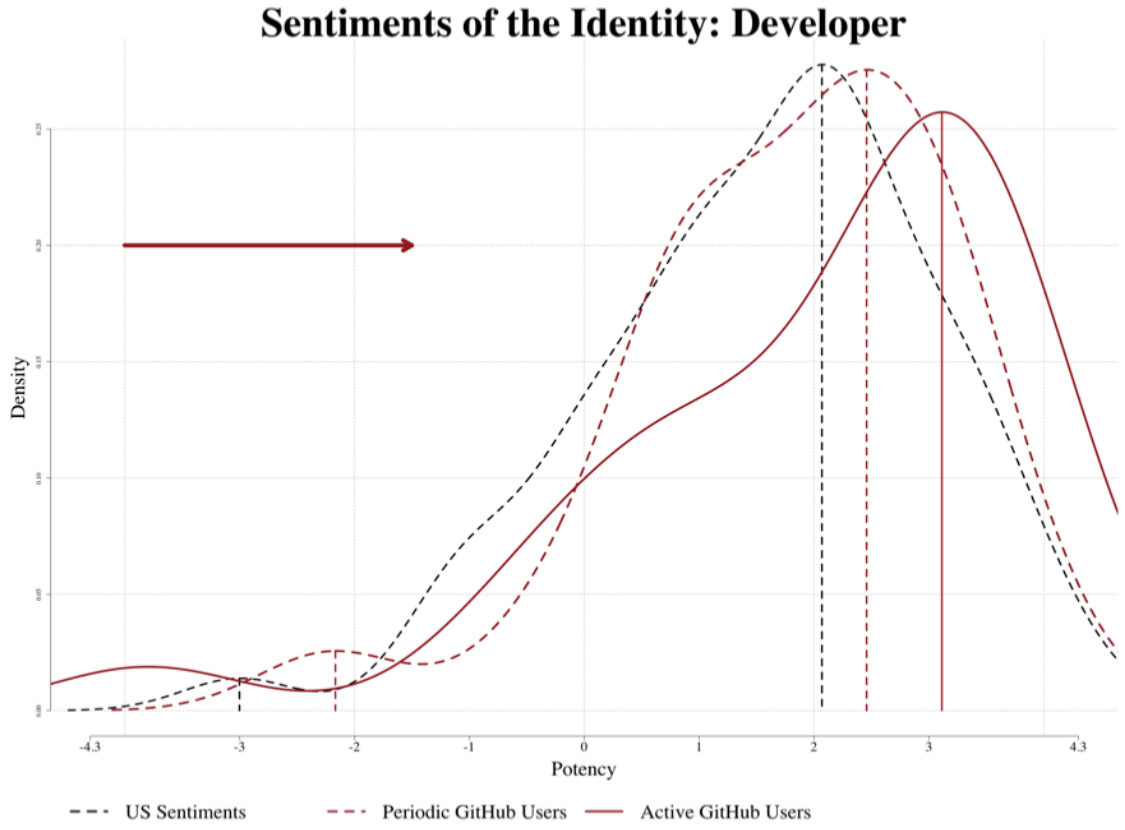



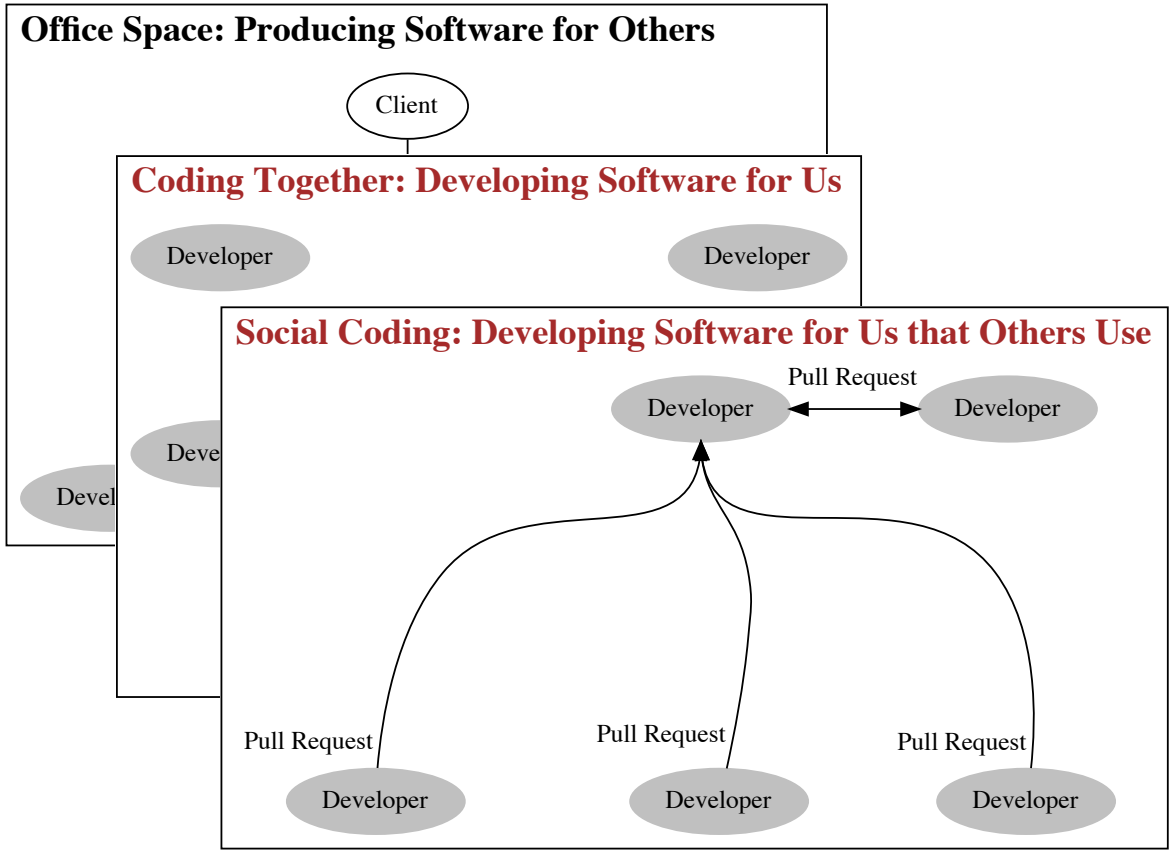

## Cluster 4

## Cluster 5



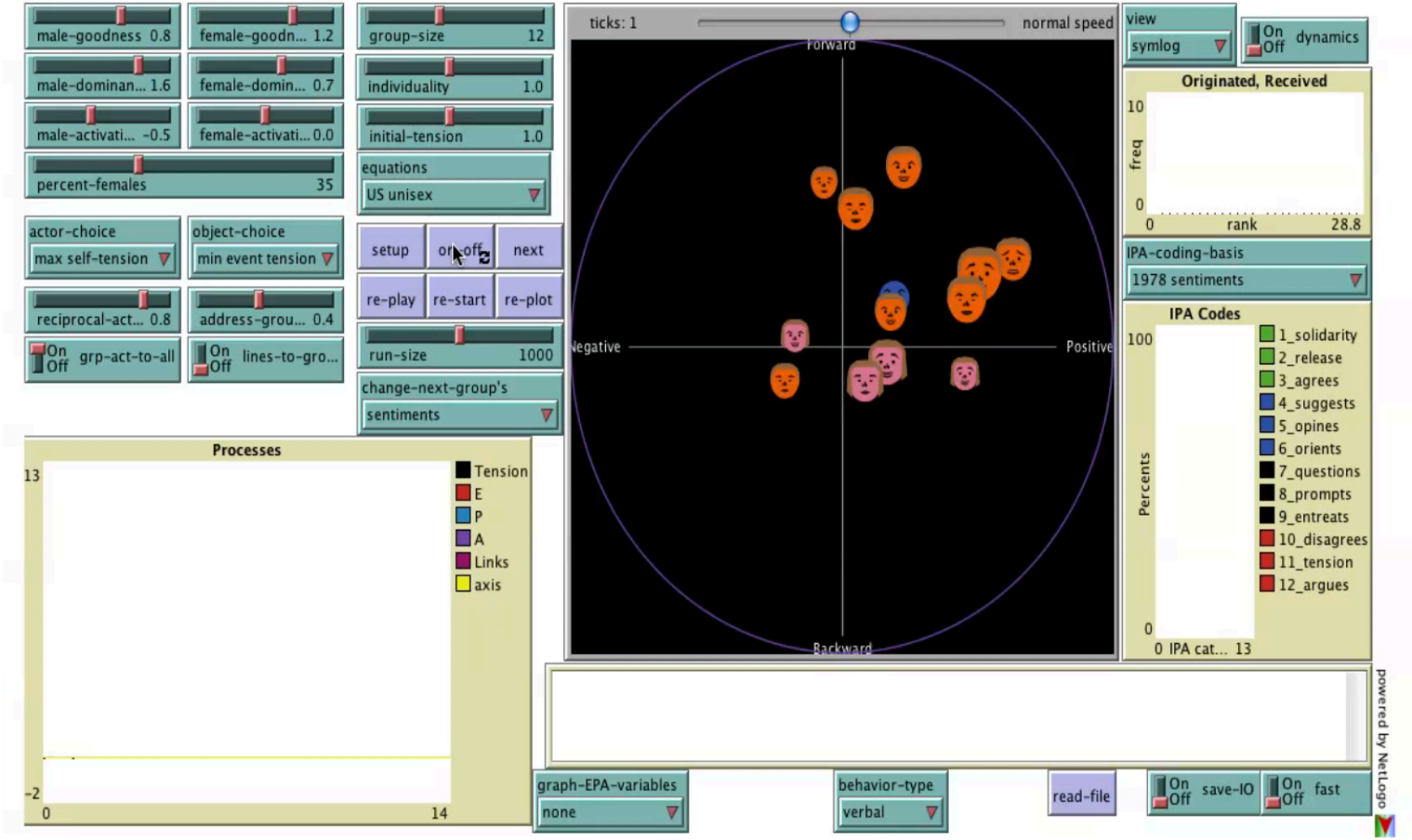
# ***Expanding Theories of Social Interaction***: Modeling the Development of Subcultural Meanings as the Interaction of Culture and Structure



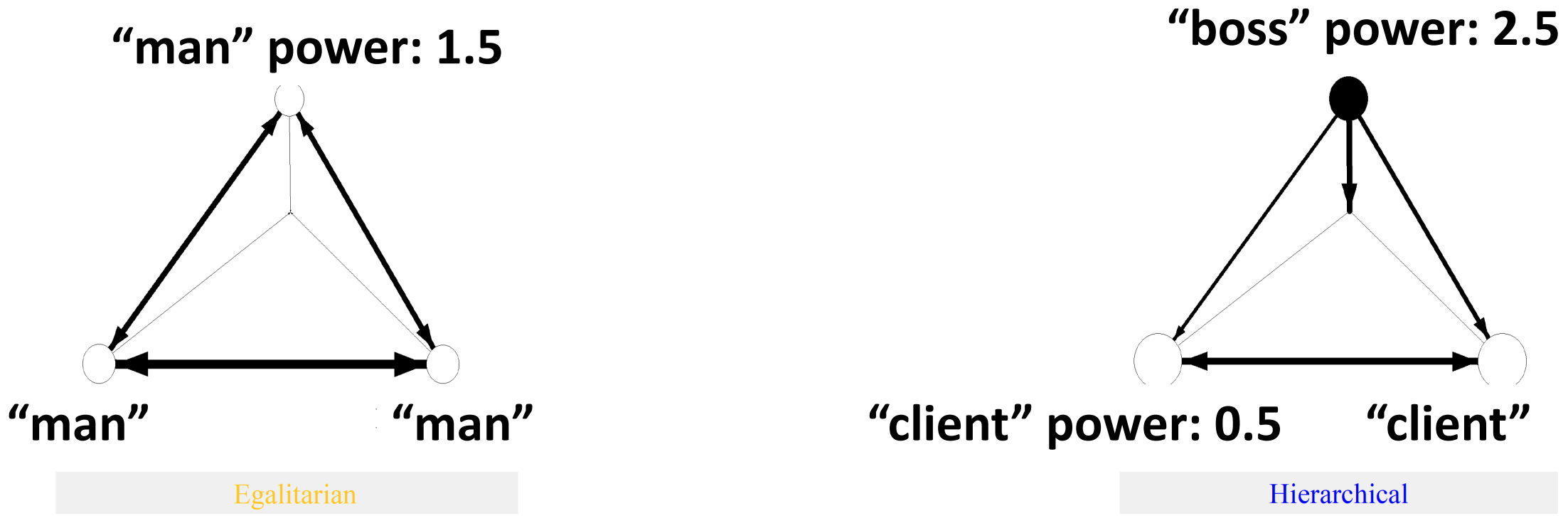



# *Leveraging Theories of Identity*: Group Simulator

- **Affect Control Theory**
- **Emotional Alignment**
- **Based on Identity**
- Social dynamics from **group structure**
- **Dyadic** Interactions
- Action **on-the-group**



# *Leveraging Theories of Identity:* Impact of Structures on Group Dynamics



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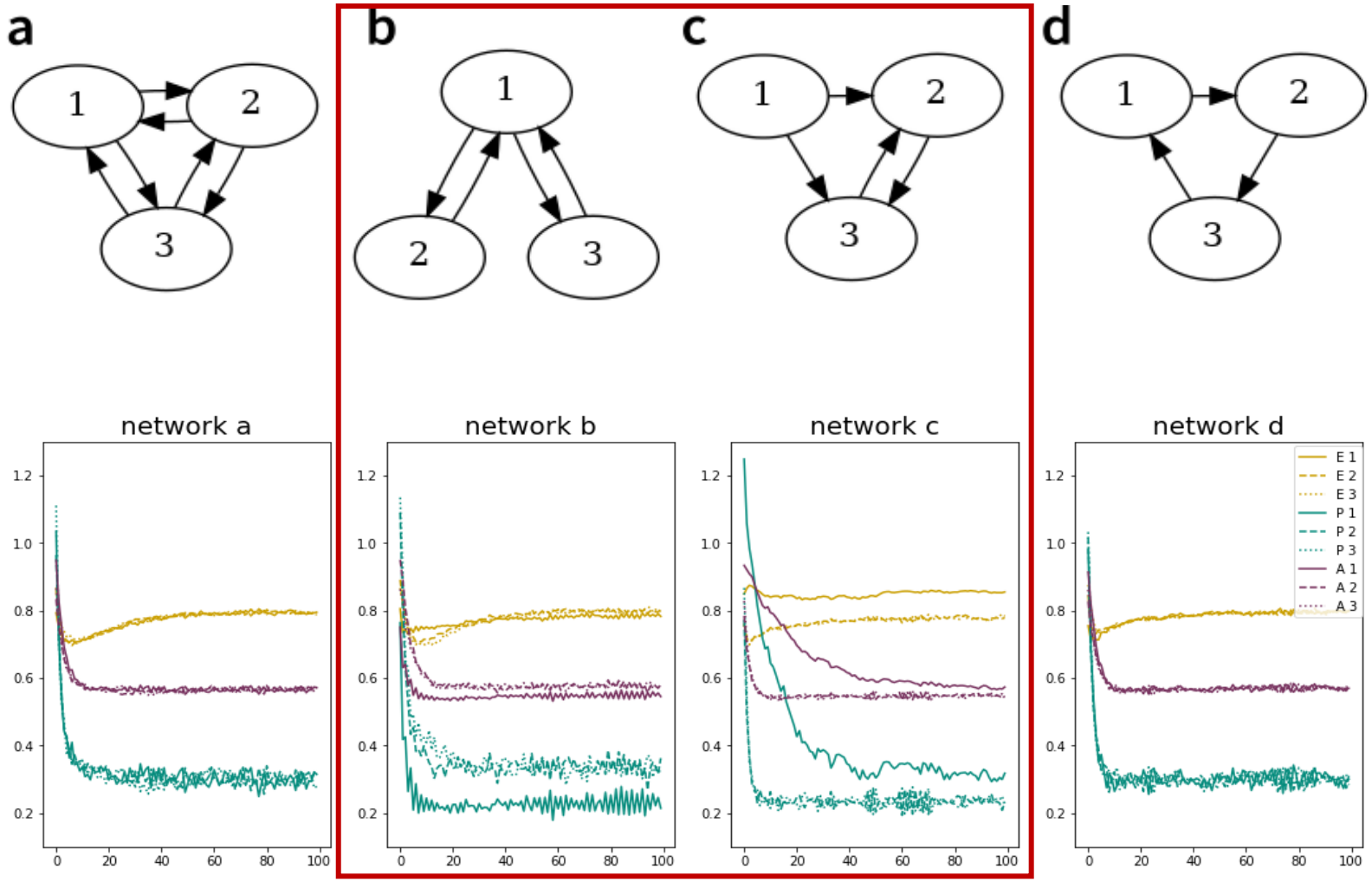
***Leveraging Theories of Identity:*** Simulating the Impact of Group Structures on Group Dynamics



## *Conclusions*

- Group dynamics on GitHub are partially based on **emotion** and **identity**
- **Emotion** is difficult to measure on GitHub
- **Other social networks** may provide more varied emotional content
- Network analysis of groups provides deep insights into **relational structures** in online collaborative work
- Leveraging this information is crucial for **positive impacts** of online collaborations

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