



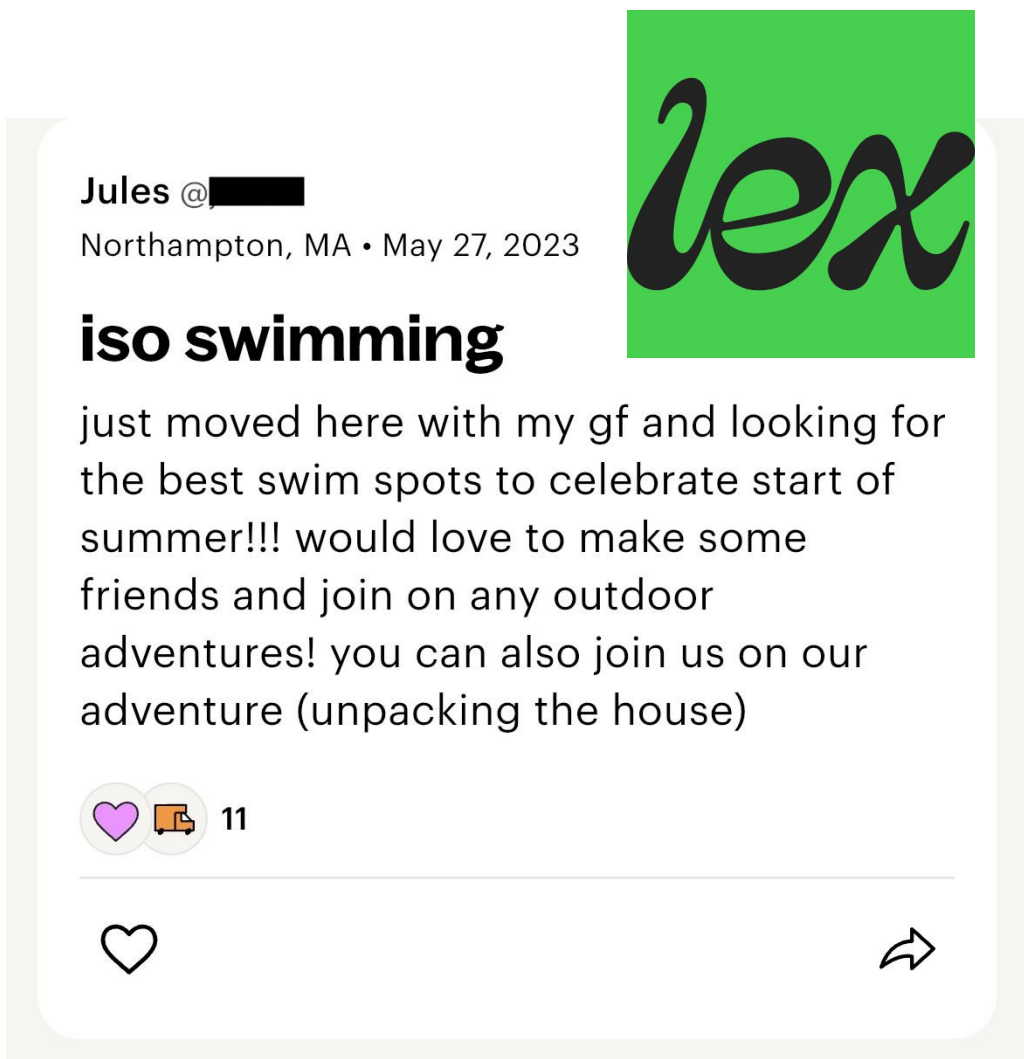
# Exploring Online Tie Formation in Local Queer Communities

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DACSS 758: Text-as-Data and DACSS790N: Network Inference, Spring 2025

## Background

With homophobia and transphobia on the rise in American culture and politics, as well as increasing trends of loneliness in a post-pandemic world, there exists a strong need for community relationships among LGBTQ+ people. The geolocation-based mobile app Lex provides users with a platform to create and comment on text-based posts within their local community. Scraping posts, comments, and user profiles from the app within a 50-mile radius of Amherst, Massachusetts provides a robust corpus of what self-identified queer people are discussing in the local area.

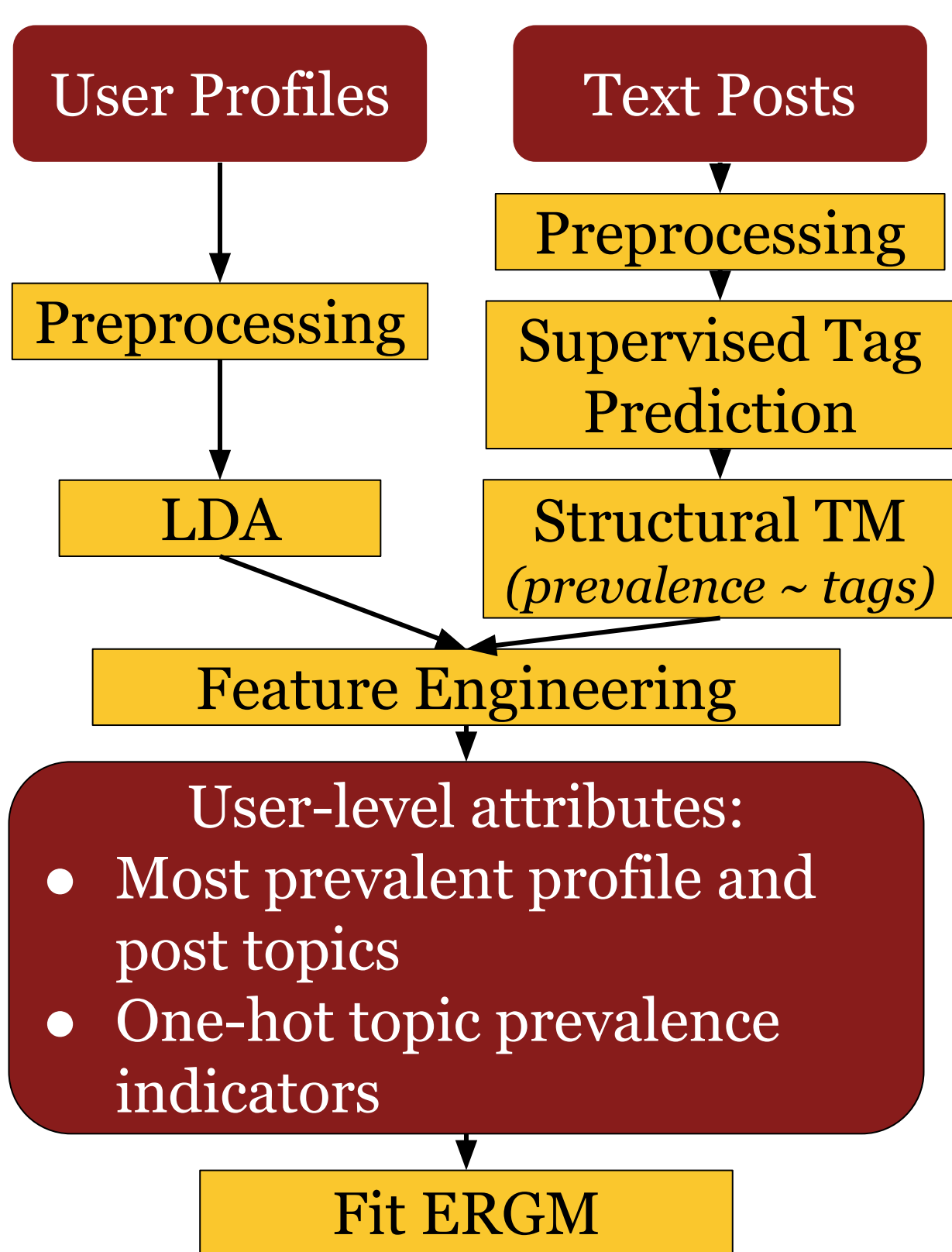


## Research Hypotheses

**H1:** Tag usage will influence what topics local LGBTQ+ people are discussing on the alternative social media platform Lex.

**H2:** Users posting about similar topics are more likely to comment on each other's posts (homophily).

**H3:** Users who receive many comments will be more likely to receive additional comments (popularity). Users are more likely to comment on posts by users who have commented on their posts (reciprocity).



## Preprocessing and Tag Classification

- 30% of posts in the corpus are tagged by the posting user
- Five most prevalent tags: *community*, *friends*, *event*, *hookup*, and *dating*
- Preprocessing decisions
  - Remove advertisement posts, stop words, and punctuation
  - Trim corpus-specific rare and common words from doc frequency matrix
  - Typos and alternative spellings were left unchanged
- Train supervised learning models with one-hot tag classification as outcome

Figure 1. Tag Classifier Performance by Outcome and Model Type

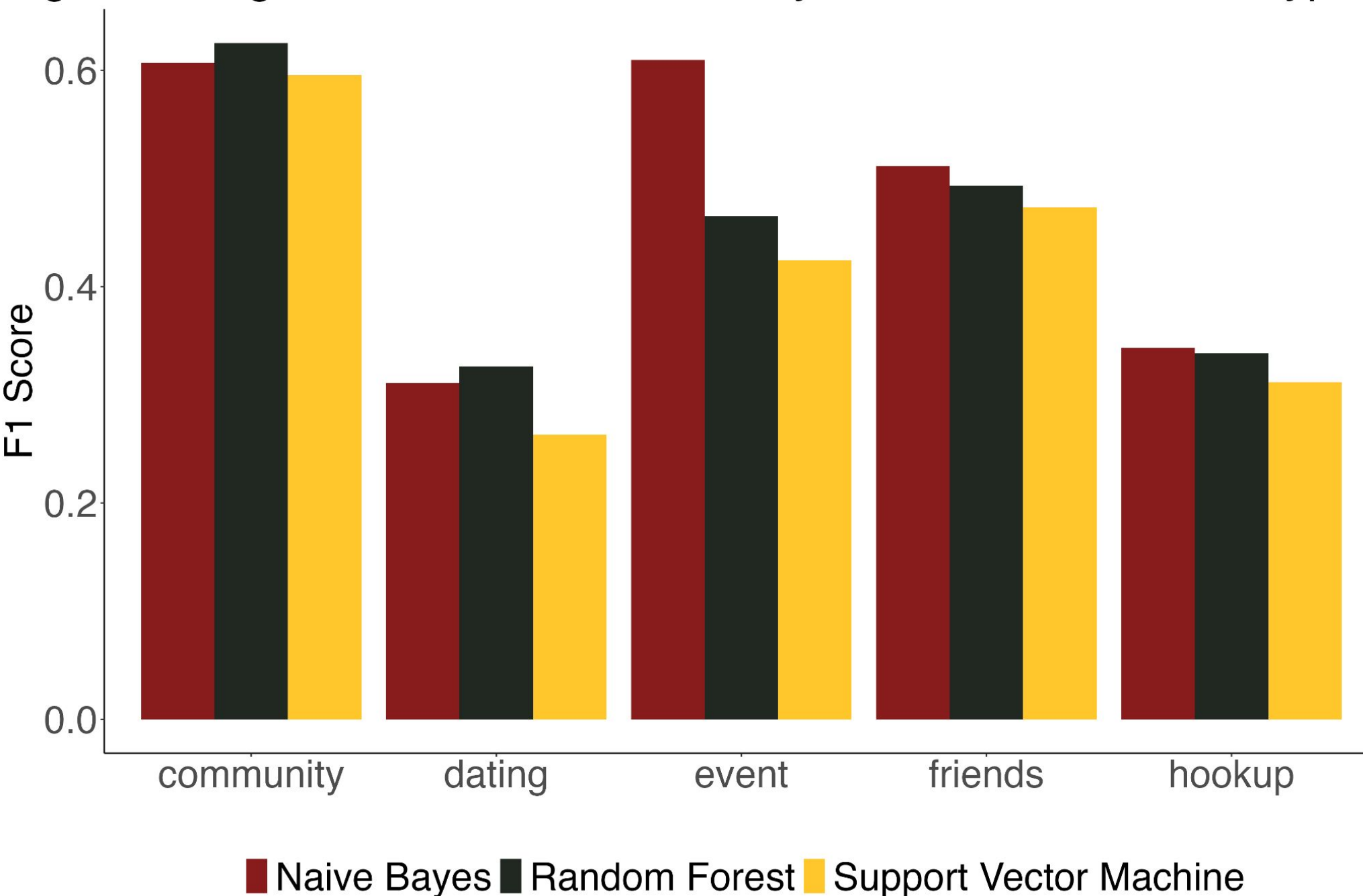


Figure 1 is a comparison of each model's performance (F1 score), used to select the model for predictions. Since the models for *dating* and *hookup* tags had poor performance, the predictions were not used in later steps.

## Modeling Topics in User Profiles and Posts

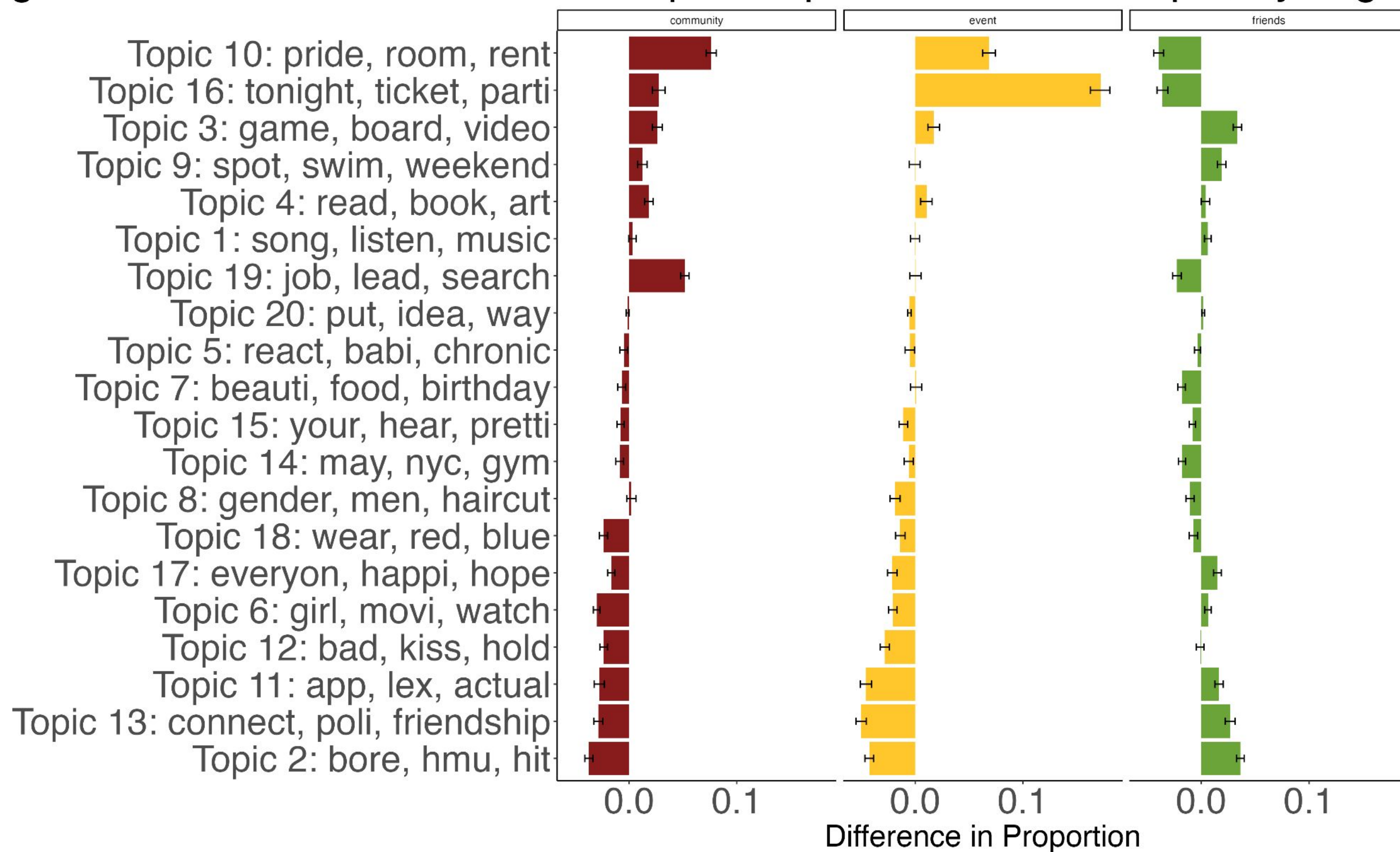
### Latent Dirichlet Allocation (LDA) for User Profiles

- LDA analysis applied to users' "About Me" section
- 5-fold cross-validation comparing perplexity scores optimal  $k = 20$
- Topic themes: hobbies, relationship style (monogamy vs. polyamory), chronic illness and COVID precautions, gender and sexual identities, and location

### Structural Topic Model STM for Text Posts

- STM modeled prevalence on predicted tag values
- Optimal number of topics  $k = 20$  based on hold-out likelihood and residuals

Figure 2. Difference in Estimated Topic Proportion for Each Topic, by Tag



## Network Description

- One-mode sociocentric directional network
- Node = users; tie = comment(s) by the sender on the receiver's post
- Subset to activity from June 2024
- 363 nodes and 505 edges (density = 0.004)
- Figure 3 plots the subnetwork, with nodes scaled based on the number of posts (activity) and shaded based on the number of incoming edges (popularity).

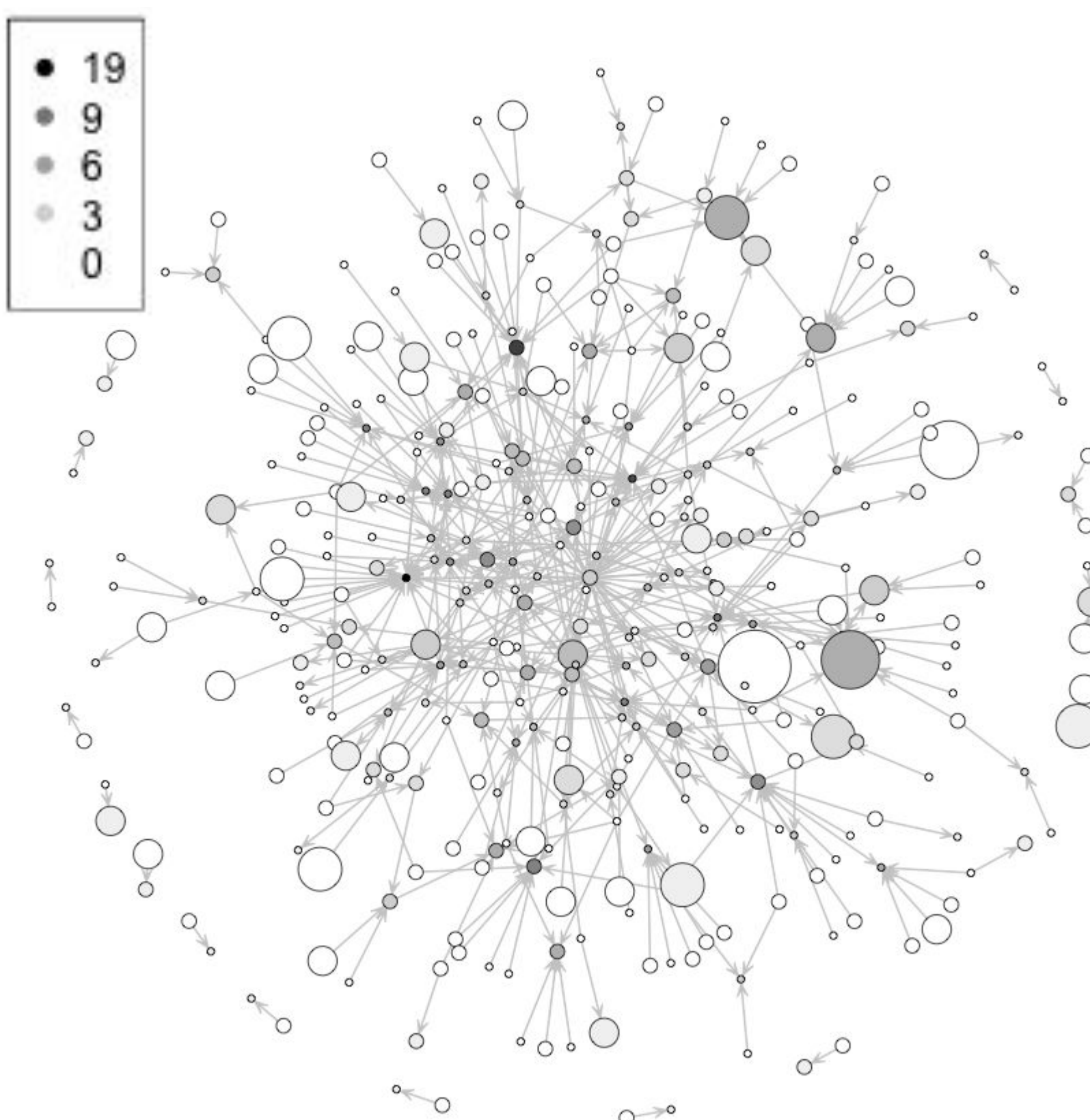


Figure 3. Lex Network Activity for June 2024

### Feature engineering node (user) attributes:

- User profiles
  - Topic indicator: estimated topic proportion  $\geq 20\%$
  - Highest topic: topic with highest estimated proportion
- Text posts
  - Topic indicator: any post by user has estimated topic proportion  $\geq 20\%$
  - Highest topic: topic with highest average proportion across all posts

## ERGM Results

- Exponential Random Graph Model (ERGM) chosen for its emphasis on tie formation (i.e. likelihood that users would leave a comment)

Table 1: ERGM Results		
	Covariates (1)	Endogenous terms (2)
Edges	-6.408***	-4.393***
Number of posts	-0.141**	
Instagram	-0.185	
Age	0.017***	
<u>Highest Profile Topic</u>		
Topic = 3	-0.837*	
Topic = 8	0.808**	
Topic = 12	1.047***	
Topic = 18	1.089***	
<u>Profile Topic (homophily)</u>		
Topic 3	-0.401*	
Topic 6	0.279*	
Topic 8	0.403*	
Topic 13	-0.604***	
Topic 16	-0.438**	
Topic 18	0.461*	
Topic 20	-0.466**	
<u>Highest Post Topic</u>		
Topic = 3	0.679***	
Topic = 8	0.531*	
Topic = 16	0.273*	
Topic = 18	0.530*	
<u>Post Topic (homophily)</u>		
Topic 4	0.283*	
Mutual (reciprocity)		1.224**
GW In-degree, decay = 0.5 (popularity)		-2.795***
GW Out-degree, decay = 0.15 (sociality)		-0.252
GW Edgewise-shared partners, decay = 0.25		1.154***
GW Dyad-shared partners, decay = 0.25		-0.047*
AIC	6,541.193	6,252.694
BIC	7,353.435	6,311.410

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## Discussion

Lex provides its LGBTQ+/queer users a platform to express themselves and connect about shared community events and interests. Community-tagged posts include requests for housing connections, while event-tagged posts promote financial accessibility with terms like "sliding scale." Many people are seeking recommendations for local spots to get outside or new members to join their board game groups. This project demonstrates the variety of language that local queer people use to self-identify and how, in some cases, that language can lead to connection. Lex users who publicize their attention to COVID precautions or specific hobbies are more likely to form ties with other users who do the same. Counter to H3, network activity seems to improve the likelihood of tie formation more than post popularity, as evidenced by the negative coefficient for GW In-degree. Finally, users are more likely to comment if it's reciprocal or closes a triad. This project provides a peek into a rich local subculture that has its own priorities, lingo, and means of connecting.

Select user profile topic word clouds:

Topic 8

time making  
queersright spending  
outside still in another  
part masking af new  
conscious explore  
conversations

Topic 12

include designer  
anti sun moon  
crafts teacher rising  
plural hobbies read by  
graphic graymer organizer

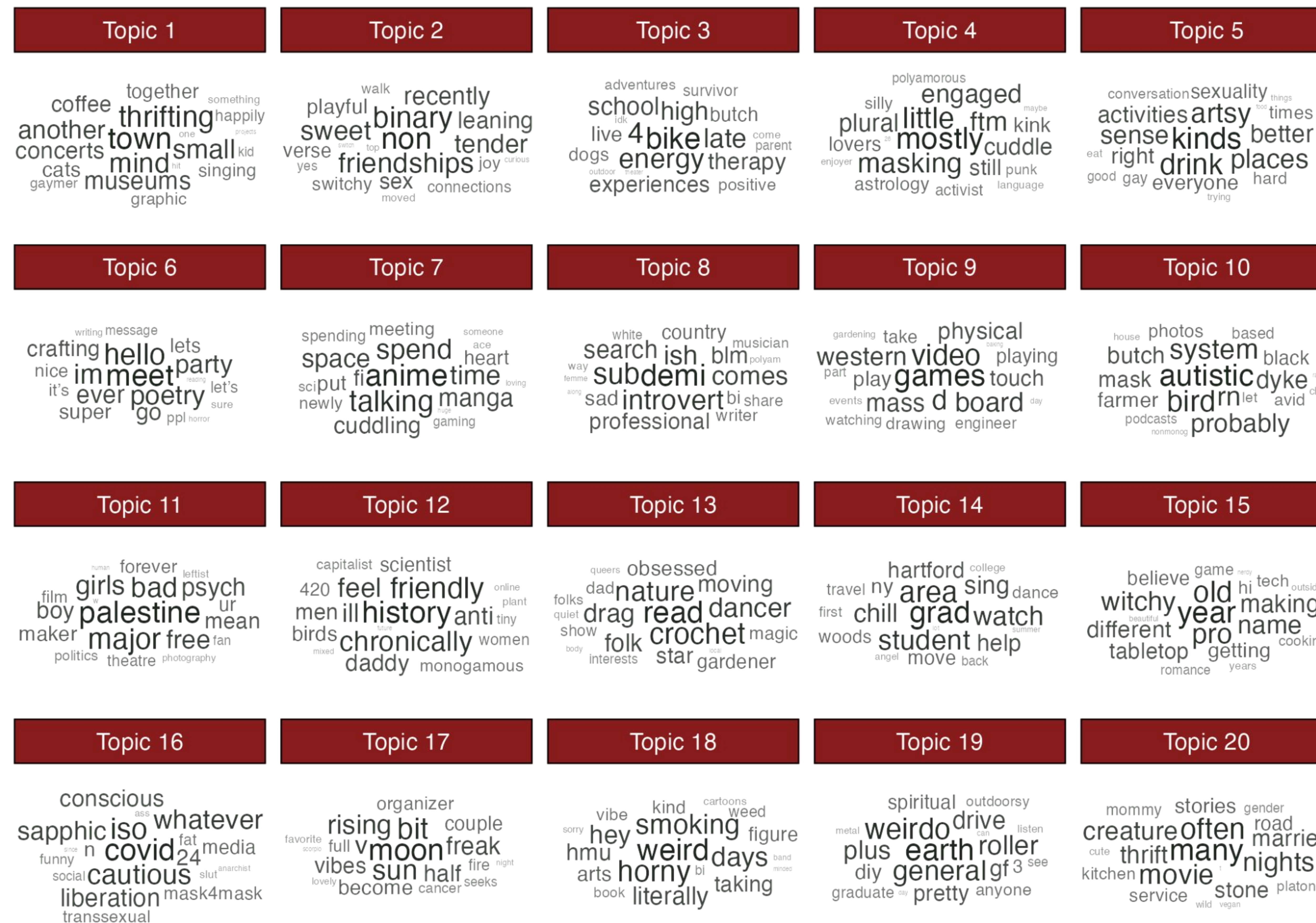
Topic 18

interests history  
sorry ct concerts  
draw guitar  
car climbing rock health  
gardening etc  
play

ERGM with  
endogenous terms  
outperforms  
covariates model  
(smaller AIC).



# User Profile Wordclouds





# Post Wordclouds

Topic 1

light live goal scene money listen album tear shut song mass speak music western playlist sing band

Topic 2

sad someth els hmu cuddl sleep lol bore hit mind kinda lone anyth chat busi alon

Topic 3

regular hangout dnd board nerd chill game buddi discord video central trans fem group

Topic 4

finish creativ knit collect book project add art read studi hey tarot artist stori titl student tattoo mentor

Topic 5

better emoji flower pain babi text singl ill react uhaul chronic rose umass grief trauma

Topic 6

soup fantasi ghost that watch suck scare sorri girl movi whos cold dead horror season snuggl scari

Topic 7

enjoy babe great food picnic ass beauti sun ice ass beauty sun holiday wild birthday trade rain weather hot

Topic 8

experi affirm name transit cis haircut chang ident cut gender surgeri dyke men man advic binder

Topic 9

wood walk bike grab town swim pick place spot visit pal ride weekend bird valley summer river

Topic 10

holyok donat bedroom roommat rent 1st util sign pride apart march june info room space downtown counti

Topic 11

ever done havent never lex still ask god yet app ive wrong ppl actual profil damn

Topic 12

don't dirti term attent weed hold hand plz bass bad kiss desir struggl guitar yearn held right long

Topic 13

communic partner platon seek poli romant miss connect lesbian friendshipp t4t enbi convers relationship

Topic 14

practic benefit slut rope gym teach bodi bottom may top soft yoga yes nyc weight toy pleasur class

Topic 15

point fill kitti bonus hear fix boy stop sit your munch pretti call meal wont pictur pussi

Topic 16

tomorrow bar danc ticket saturday karaok tonight rave 10f comed costum forward parti majest concert friday

Topic 17

rememb girlfriend old happi what tire everyone ago hello alway hope final anyway fking life least first

Topic 18

compliment said red pink cute wear saw smile blue black cool fashion glass shirt eye green

Topic 19

farmer therapi recommend schedul therapist anywhere hour farm lead job support massag search hire med market thank overwhelm

Topic 20

travel stuff pls lot next kid two much way put idea high dri turn give away home yall wet