

# Reading between the Emails: Gendered Patterns of Communication in Local Government

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# Gender and Communication in Local Government

- ▶ Gender bias in organizations.
- ▶ How does gender shape communication?
- ▶ Differences across domains?
- ▶ Relation to previous findings?

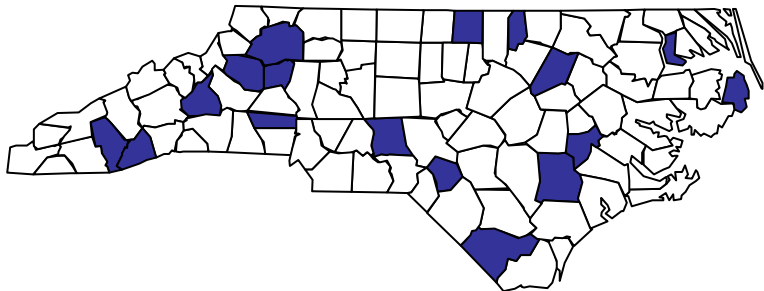
## Challenges and Opportunities

- ▶ Observational and self report data.
  - ▶ Restricted in scope. Biased?
- ▶ Electronic communication data.
  - ▶ Primary source, day-to-day.
  - ▶ Public records laws.
- ▶ Study micro-level interactions.

# Public Domain Email Data

## County Government Email Data

- ▶ Public records requests.
- ▶ Department manager email data from 17 North Carolina Counties.
- ▶ 500,000 emails, 17,000 between managers.



## The Data

County	Manager Gender		# Emails
	Male	Female	
Alexander	12	9	907
Caldwell	12	8	121
Chowan	12	11	2,027
Columbus	14	10	920
Dare	15	12	2,247
Duplin	13	14	1,914
⋮	⋮	⋮	⋮
Transylvania	16	4	1,857
Vance	10	8	185
Wilkes	15	2	303
Total	223	139	17,863

# Aggregate Analysis

# Aggregate Patterns

	Manager Gender	
	Male	Female
Average # emails sent	48.3	51
Average # recipients per email sent	1.45	1.43
Average # emails received	70.8	71.6

- Mild gender-heterophily.



# Department Affiliation as Domain

# Individual Department Gender Breakdown

	Emergency Manager		HR	Finance	IT	Health	Plan/Dev	Util/Waste	Tax	Parks/Rec	Soc_Serv	Transport	Info	Misc	Inspections
Male	29	15	3	5	11	6	17	15	11	9	8	8	2	5	13
Female	3	2	12	12	2	11	6	2	7	5	10	1	6	2	3
Total	32	17	15	17	13	17	23	17	18	14	18	9	8	7	16

Male dominated positions

Female dominated positions

# Female-Centric Dyads

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FF > FM > MF > MM

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HR & Health

HR & Information Technology

HR & County Manager

Planning & HR

Register of Deeds & HR

Parks and Recreation & HR

Finance & HR

Finance & Parks and Recreation

Social Services & HR

Solid Waste and Recycling & HR

Tax Administrator & HR

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# Male-Centric Dyads

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MM > FM > MF > FF

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Planning & Information Technology

Solid Waste and Recycling & Health

Sheriff & Health

Tax Administrator & Planning

Tax Administrator & Social Services

Inspections & Tax Administrator

Animal Control & Finance

Environment & Health

Environment & Solid Waste and Recycling

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# Email Content as Domain

# A Generative Model for Email Data

finance, budget, year, pay, fiscal

shots, flu, health, senior, hospital

police, judge, jail, firearm, testify

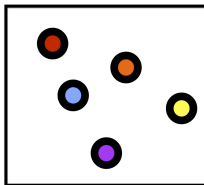
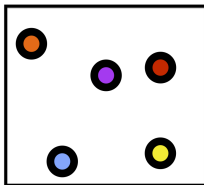
meeting, office, schedule, afternoon

} **Topics**

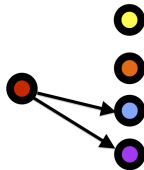
**Content** {

Here is the draft **budget** for the coming **fiscal year**. Please take a look at it before the **meeting** this **afternoon**.  
Thanks,  
Keith

**Interaction Patterns**



**Recipients**



## Specification and Methods

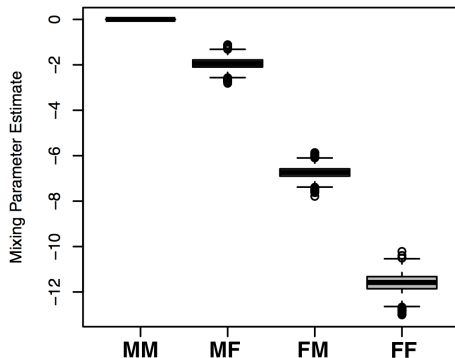
- ▶ Bayesian inference via MCMC.
- ▶ Separate model for each county.
- ▶ Include gender mixing covariates.
- ▶ 40 topics, 4 interaction patterns.

# Human Coding Topics Used in Analysis

- ▶ Validate interpretation of top words
- ▶ Top ten emails.
  - ▶ Rank:  $\frac{(\text{tokens assigned to topic})^2}{\text{tokens in email}}$
- ▶ Label: common thread among emails.



## Example Model Output



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Coding

Topic top words

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**Sandy**

will, track, winds, system, forecast

**Sandy**

storm, sandy, high, coastal, tides, night

**Harbor**

status, update, boat, today, weather

**Planning**

board, meeting, planning, seafood, hearing

**Storm**

box, planning, director, permit, building

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# Female-Centric Topics of Communication

Coding	FF > FM > MF > MM
<b>Finance</b>	order, time, good, april, attached, requests
<b>Finance</b>	budget, phone, finance, media, ext, department
<b>Health</b>	meeting, going, fyi, tricester, health, project
<b>Finance</b>	meeting, box, fax, finance, attached, resolution
<b>Finance</b>	equity, fax, debt, refunding, time, finance, call
<b>Finance</b>	debt, box, fax, finance, policies, contract, audit
<b>Finance</b>	learn, leader, director, washington, dream
<b>Finance</b>	fax, ext, phone, finance, director, street
<b>Health</b>	public, health, email, contact, disclosure
<b>Finance</b>	good, time, increase, call, pay, office, today
<b>Budget</b>	manager, street, main, fax, office, east, budget
<b>Budget</b>	fund, budget, balance, year, funds, pay, original

# Male-Centric Topics of Communication

Coding	MM > FM > MF > FF
Manager	office, email, time, staff, meeting, work, good
IT	electronic, mail, intended, email, message
Health	health, department, project, email, code, garden
Comments	jail, mobile, inmates, ago, money, jails
Planning	east, planning, street, court, administrator
Public Works	public, nashville, suite, washington
Public Works	email, energy, carolina, north, address
Planning	description, director, street, church, suite
Planning	description, fax, phone, director, street, church
Zoning	board, meeting, planning, amendment
Emergency	operations, emergency, director, lines, street
Development	description, director, development, projects

## Open Questions, Future Directions

- ▶ Locus of control.
- ▶ Direction of causality.
- ▶ Interventions to improve gender mixing.
- ▶ Cross-organization communication.