Hot issue publics on Twitter:
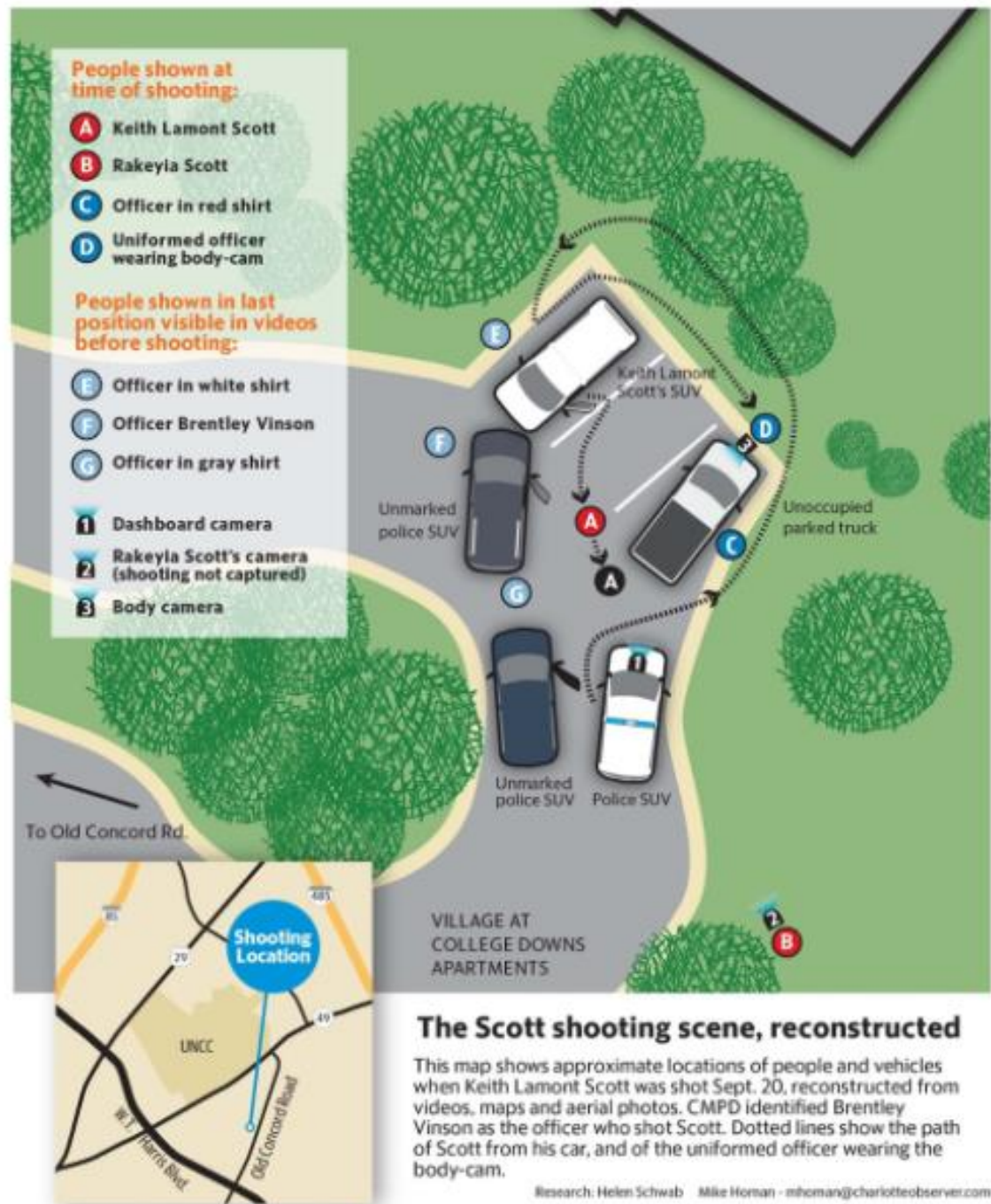## Analyzing Charlotte protests with computer-assisted text analysis

Ryan Wesslen, Tiffany Gallicano,

Jean-Claude Thill & Sagar Nandu

UNC Charlotte

IC^{2}S^2, July 12, 2017

The Incident
Tuesday, Sept. 20, 2016

People shown at time of shooting:

- **A** Keith Lamont Scott
- **B** Rakeyia Scott
- **C** Officer in red shirt
- **D** Uniformed officer wearing body-cam

People shown in last position visible in videos before shooting:

- **E** Officer in white shirt
- **F** Officer Brentley Vinson
- **G** Officer in gray shirt

- **1** Dashboard camera
- **2** Rakeyia Scott's camera (shooting not captured)
- **3** Body camera

Keith Lamont Scott's SUV

Unoccupied parked truck

Unmarked police SUV

To Old Concord Rd.

Shooting Location

UNCC

Unmarked police SUV

Police SUV

VILLAGE AT COLLEGE DOWNS APARTMENTS

The Scott shooting scene, reconstructed

This map shows approximate locations of people and vehicles when Keith Lamont Scott was shot Sept. 20, reconstructed from videos, maps and aerial photos. CMPD identified Brentley Vinson as the officer who shot Scott. Dotted lines show the path of Scott from his car, and of the uniformed officer wearing the body-cam.

Research: Helen Schwab   Mike Horman - mhoman@charlotteobserver.com

By **Catherine E. Shoichet**, CNN
Updated 4:11 PM ET, Fri September 23, 2016

FACEBOOK: KEIRRAMSPRETTYBABE.SCOTT

Lyric Scott, Scott's daughter, live streamed as she confronted police about the shooting

0:21 / 1:14

Source: CNN

Charlotte shooting: Disabled black man shot dead by police 'was reading book while waiting for son's school bus'

Keith Lamont Scott, 43, was shot by police who say he was armed while getting out of a vehicle

Keith Lamont Scott's wife releases video of deadly Charlotte encounter

NEW VIDEO OF SHOOTING SCENE IN CHARLOTTE · CBSN
DEADLY ENCOUNTER BETWEEN POLICE AND KEITH SCOTT

Charlotte Police Chief Says Dead Man Had a Gun, Not a Book

Keith Lamont Scott was shot and killed by police in North Carolina on 20 September 2016.

By Brooke Binkowski f y   Sep 23rd, 2016

Protest Tweet Counts: 48 Hours

Police Deploy Tear Gas

8:30pm: Protester Shot

Looting in Uptown Charlotte

Crowd gathers

Incident

Retweets
Posts

- 1,000
- 750
- 500
- 250
- 0

03PM 06PM 09PM 12AM 03AM 06AM 09AM 12PM 03PM 06PM 09PM 12AM 03AM 06AM 09AM 12PM 03PM

Tuesday Sept. 20th

Wednesday Sept. 21st

11pm: State of Emergency Declared

Thursday Sept. 22nd
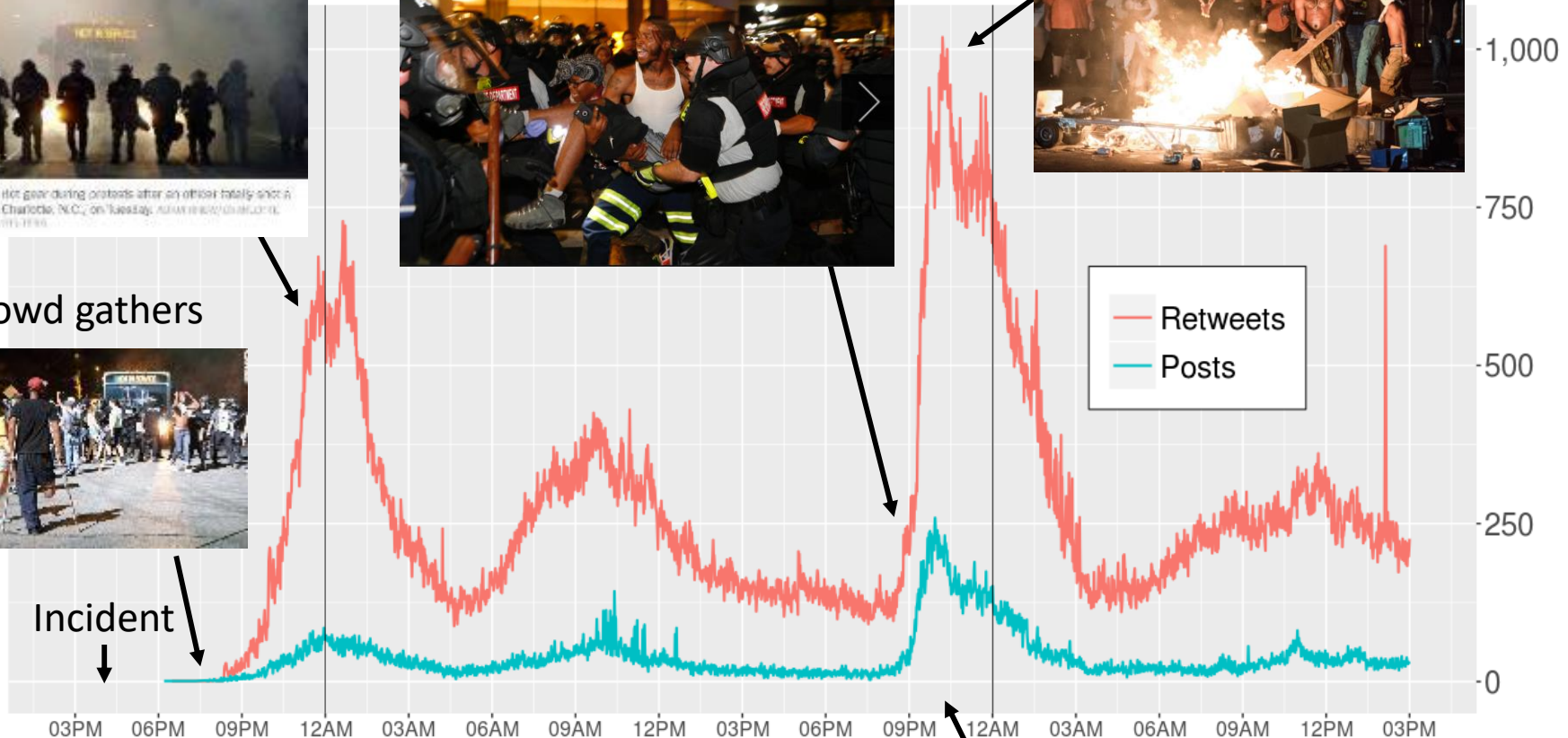
PR Theory: Hot Issue Publics

What is a public?

People who "begin as **disconnected systems** of **individuals** experiencing common problems" with the potential to "evolve into **organized** and **powerful activist groups**" (Grunig, 1997, p. 9)

A group of people that engages in activism on...

...a single issue ➡ **Single Issue Public** (e.g., #BLM)

...many issues ➡ **All Issues Public**

...a single issue that:
- involves nearly everyone in a population
- has received extensive media coverage

➡ **Hot Issues Public**

- **Hot issue publics** only become active on an issue when it affects their lives, **often due to locality.**

- Involvement with the issue is more **ego-related** than related to the actual problem itself.

Research Questions

RQ 1. How do **hot issue publics'** Twitter topics differ from **single/all issue publics**?

RQ 2. How do **local ties** (e.g., city or state level) affect Twitter topics?

RQ 3. What effect does **time** have on Twitter topics?

Structural Topic Modeling (STM)

- **Topic models** are unsupervised text algorithms to detect **word co-occurrence clusters**.

- **Structural Topic Modeling** (STM) incorporates a regression framework to test the **effect of metadata (e.g., covariates)** on topics.

Roberts, Stewart, & Airoldi, 2016.

What and How Effects on Topics

Prevalence Covariates: Effect on Topic Proportions ("what")

Covariate	Levels	Definition
Publics Type	Hot Issue, All/Single	All/Single = tweeted #BLM 14 days prior to incident Hot Issue = did not tweet #BLM 14 days prior…
Locality	Charlotte, Carolinas, Non-Local or Missing	• Inferred from profile information. • Supervised classifier to predict missing (if possible).
Time	Hour	Spline to smooth

Content Covariate: Effect on Word Proportions ("how")

Covariate	Levels	Definition
Locality	Charlotte, Carolinas, Non-Local or Missing	• Inferred from profile information. • Supervised classifier to predict missing (if possible).

Dataset & Pre-Processing

1.3MM tweets over seven days: Sept. 20-26, 2016.

- Seven hashtags: e.g., #KeithLamontScott, #CharlotteProtest
- Gnip Historical PowerTrack: 100% Twitter firehose

Additional firehose data for feature extraction.

- **Hot Issue**: Did not tweet #BLM 14 days prior to protests.
- Predict **Missing Locality**: Classifier based on 14 days prior tweets.

Exclusions:

- **Remove retweets** (83% of data set) due to "**echo effect**," problem of attribution, and limited tweet firehose allocation.
- Excluded short, non-English tweets & trending bots (with supervised classifier)

Hypothesis

Hot issue public topics will be **short-lived**.

◦ Expect they will be high in peaks (esp. 2nd night) but should **quickly subside** in days that follow.

◦ Interaction with locality => Local & Hot Issue

◦ Alternatively, Non-local & Single/All Issue Topics should be the **most persistent**.

Hot Issue & Local Topics

Difference Topic Proportions with 99% Confidence Intervals
Color by K-Means Clustering (k = 4)
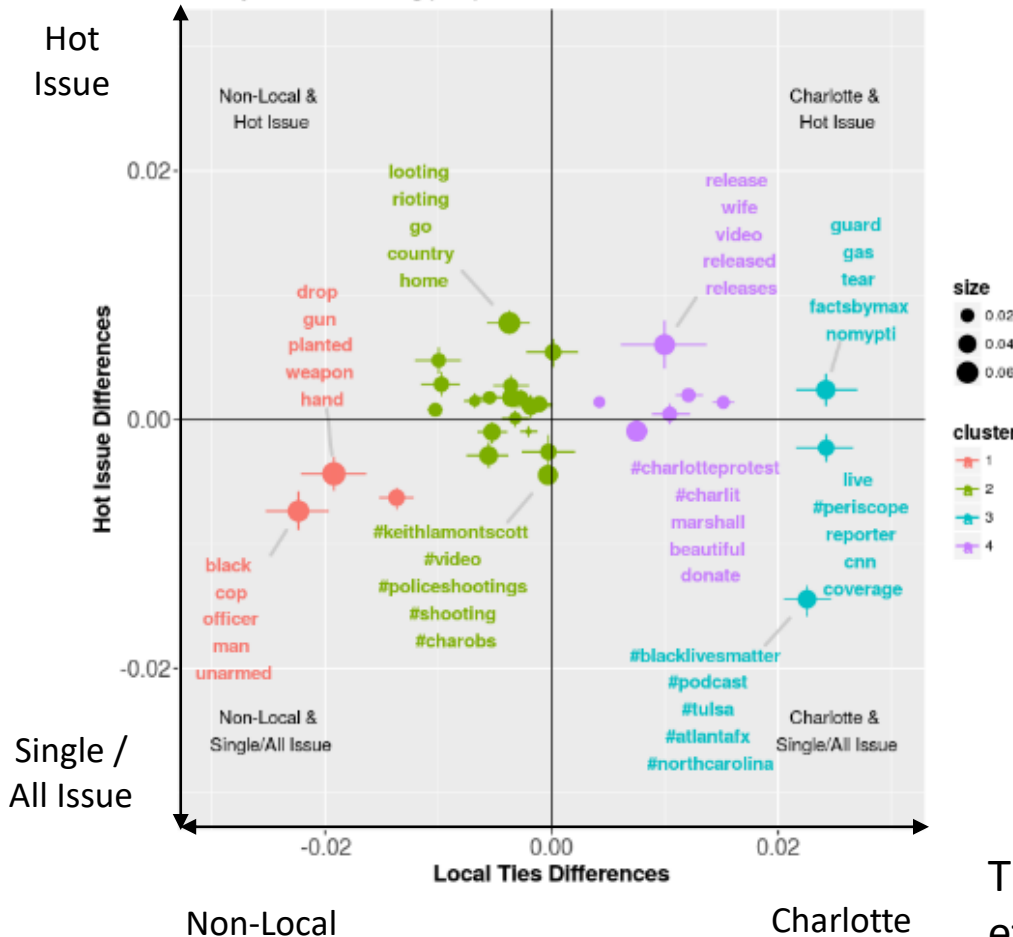
- Cluster topics into four categories (k-means).

- Expect **Non-Local** & **Single/All Issue** (red) will be the **most persistent**.

- **Charlotte/Hot Issue** (purple) expected to be the **least persistent**.

This example only considers the "Charlotte" effect. See Appendix for "Carolinas".

Top 3 topics by hour

Protest Periods (red line)
City Curfews (blue line)

LEGEND
- 1st Highest (black)
- 2nd Highest (dark gray)
- 3rd Highest (light gray)

Top Topics by Top Five Words

- reading + book + disabled + son + sick
- black + cop + officer + man + unarmed
- drop + gun + planted + weapon + hand
- #keithlamontscott + #video + #policeshootings
- riots + telling + erupt + calm + also
- violence + stop + act + congress + must
- looting + rioting + go + country + home
- #charlotteprotest + #charlit + marshall
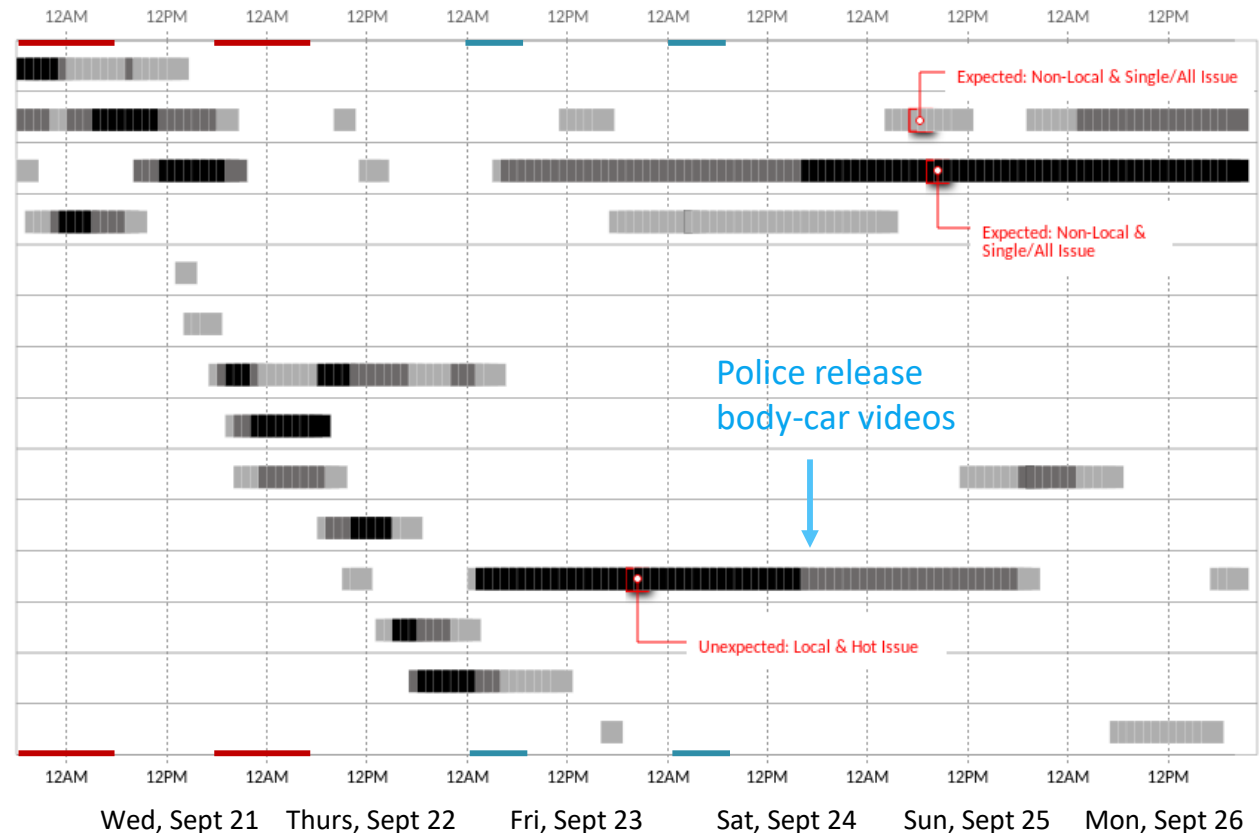- guard + gas + tear + factsbymax + nomypti
- obama + thugs + rioters + obamas + blm
- release + wife + video + released + releases
- #charlotteriots + #msnbc + organization + group
- curfew + midnight + #hillary + #charlotteprotests
- last + hide + died + bullets + rubber

Expected: Non-Local & Single/All Issue
Expected: Non-Local & Single/All Issue
Unexpected: Local & Hot Issue

Police release body-car videos

Time axis: 12AM / 12PM markers
Wed, Sept 21   Thurs, Sept 22   Fri, Sept 23   Sat, Sept 24   Sun, Sept 25   Mon, Sept 26

Volume scale: 0, 4000, 8000
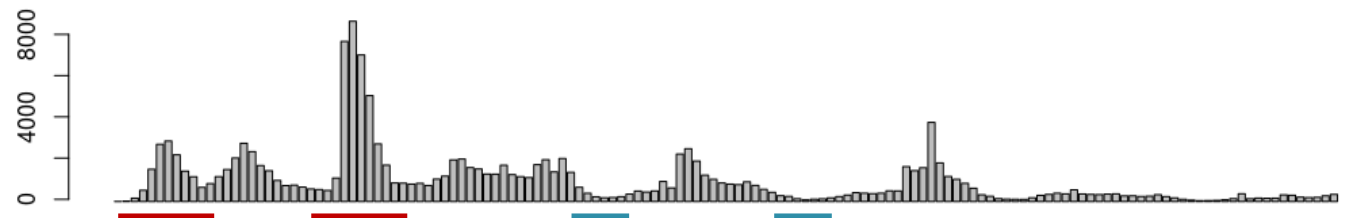
Timeline created by
Microsoft's Timelines Storyteller
https://timelinestoryteller.com/

Results and Discussion

The **most persistent topics** tended to be by Non-Locals and Single/All Issue Publics (i.e., previously engaged in #BlackLivesMatter).

However, we find an unexpected persistence of "release the video" topic, which was **Local & Hot Issue**.

Explore the role local and national organizations (e.g., Color of Change, ACLU) to influence topics with "cluster tweets" (Gallicano, Wesslen and Thill, 2017).

Future Work

Need for additional studies
- "Natural Experiment": Compare 2014 Charlotte incident vs 2016.
- Other #BlackLivesMatters and non-protests events.

Problems with topic modeling/STM:
- Zero-sum problem of topic models (Fong & Grimmer, 2016)
- Effect of retweets: weighted STM?

Social Network & Information Diffusion
- Can hot issue relate to periphery vs. core? (Barberá et al., 2015)

Questions?

Thanks to Tiffany Gallicano, Jean-Claude Thill, Sagar Nandu, Wenwen Dou and Ali Karduni.

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UNC CHARLOTTE

Project Mosaic
Data Science Initiative
Charlotte Visualization Center

References

Grunig, J. E. (1997). A situational theory of publics: Conceptual history, recent challenges and new research. In D. Moss, T. MacManus, & D. Vercic (Eds.), *Public relations research: An international perspective* (pp. 3-48). London: Thomson.

Roberts, M. E., Stewart, B. M., and Airoldi, E. M. (2016). A model of text for experimentation in the social sciences. *Journal of the American Statistical Association* 111.515: 988-1003.

Fong, C., & Grimmer, J. (2016). Discovery of Treatments from Text Corpora. In *ACL (1)*.

Gallicano, T. D., Wesslen, R., and Thill, J.C. (2017). From cluster tweets to retweets: A big data, rhetorical exploration of digital social advocacy in the context of the Charlotte protests on Twitter. In 2017 International Public Relations Research Conference.

Barberá, P., Wang, N., Bonneau, R., Jost, J. T., Nagler, J., Tucker, J., & González-Bailón, S. (2015). The critical periphery in the growth of social protests. *PloS one*, *10*(11), e0143611.

Feature Extraction

Local ties extraction on Twitter profile location

1. Use a list of North and South Carolina terms.
2. Location entity recognition & geolocation. Google Maps APIs
3. Build supervised classifier (CV Ridge Regression) on out-of-sample tweets (10% two weeks prior) to predict labels for missing; remaining are "Missing."

Hot Issue vs. Single/All Issue Publics

◦ Single/All Issue = Tweeted #BLM two weeks before protest
◦ Hot Issue = Did not tweet #BLM two weeks before protest

Count of Tweets	Charlotte	Carolinas	Non-Local	Missing	Total
Hot Issue	7,860	6,024	81,423	13,404	**108,711**
Single/All Issue	739	1,914	37,787	1,888	**42,328**
Total	**8,599**	**7,938**	**118,210**	**15,292**	**151,039**

Local Ties Effect on Content

Topic 7: drop + gun + planted + weapon + hand + marijuana + @thejusticedept

Topic 15: looting + rioting + country + home + protesting + way

Carolinas
cmpd putney #wral chief investigation #cmpd sbi evidence #releasethetape kerr marijuana gun case drop

Charlotte
putney investigation chief sbi says kerr marijuana case possession handgun evidence information original gun

Missing
hear drop ankle holster didn't planted day empty weapon knew wearing cmpd commands hand

Not Local
gun drop planted evidence holster transparency weapon @thejusticedept putney chief hand scene marijuana planting
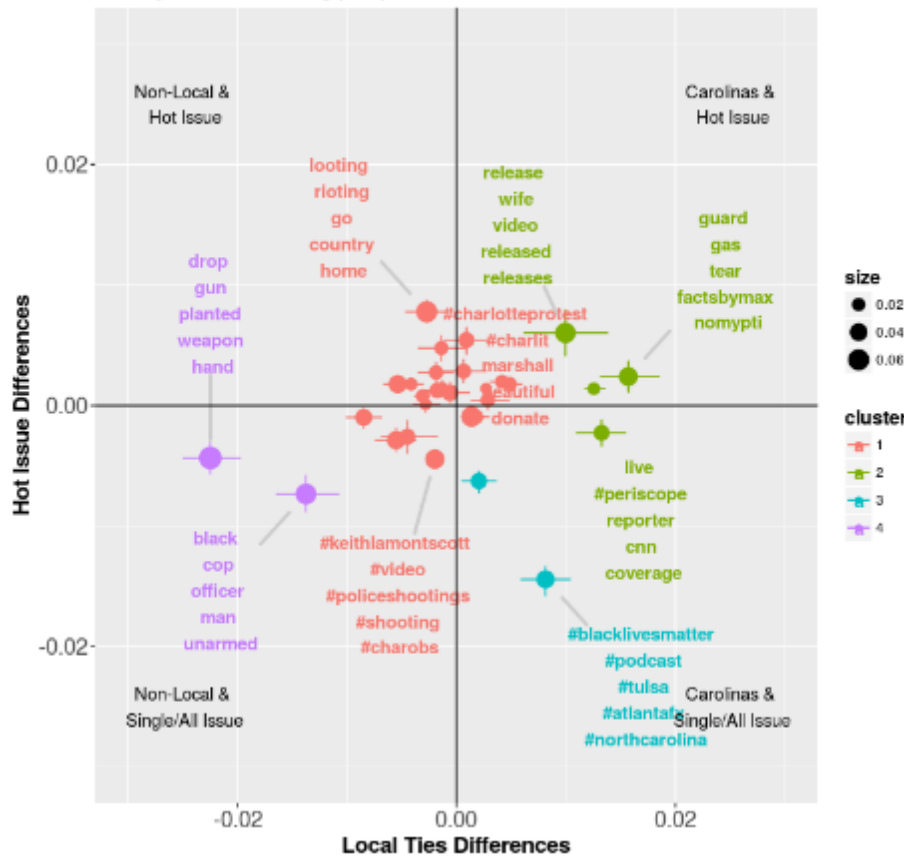
Carolinas
home rioting looting work protesting people close go youre way really bring country destroying

Charlotte
city home together work people come way looting go close protesting rioting isnt leave

Missing
rioting looting bunch start city country isnt movement cause everyone go way respect acting

Not Local
looting rioting go country protesting home way change destroying like property youre work animals
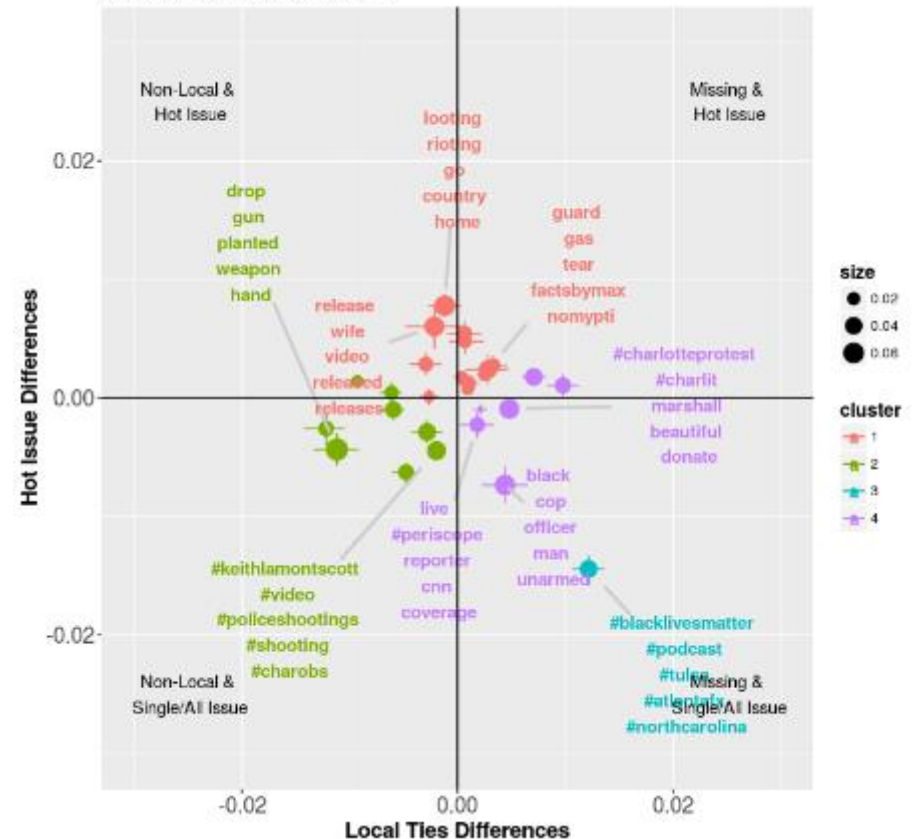
Non-Local vs Carolinas/Missing

Predicting Missing Locality

- Used 5-fold Ridge Regression to predict users with missing profile location.

- Built two models: Charlotte and Carolinas. Used the "known" labels and held out 20% for testing.

- Achieved 90%+ accuracy but low precision/recall.

Carolinas	FALSE	TRUE
FALSE	7,325	167
TRUE	295	81

Charlotte	FALSE	TRUE
FALSE	6,948	411
TRUE	348	161

Carolinas Top Features

Rank	Coeff	word
1	0.600672	clt
2	0.589524	raleigh
3	0.438203	mccrory
4	0.436338	durham
5	0.410346	@coliegestudent
6	0.400823	#repealhb2
7	0.393499	#asheville
8	0.390386	uptown
9	0.381046	@wbtv_news
10	0.379816	ecu
11	0.372657	shrimp
12	0.352878	@roycoopernc
13	0.347727	tackling
14	0.343472	triad
15	0.326004	trippin
16	0.319209	unc
17	0.312744	brackeen
18	0.307389	@cameronnewton
19	0.300898	@snapchat
20	0.298132	charlotte

Charlotte Top Features

Rank	Coeff	word
1	1.125938	clt
2	0.920002	uptown
3	0.711054	@coliegestudent
4	0.708484	@wbtv_news
5	0.694427	mod
6	0.679505	parkway
7	0.559287	charlotte
8	0.548697	gemini
9	0.53564	sized
10	0.529665	hannah
11	0.524252	tt
12	0.522303	@cameronnewton
13	0.520000	debuted
14	0.517259	reservation
15	0.515416	menace
16	0.513435	#charobs
17	0.50302	ashes
18	0.499604	plugs
19	0.491436	oak
20	0.489624	tailgate

Cluster Tweets
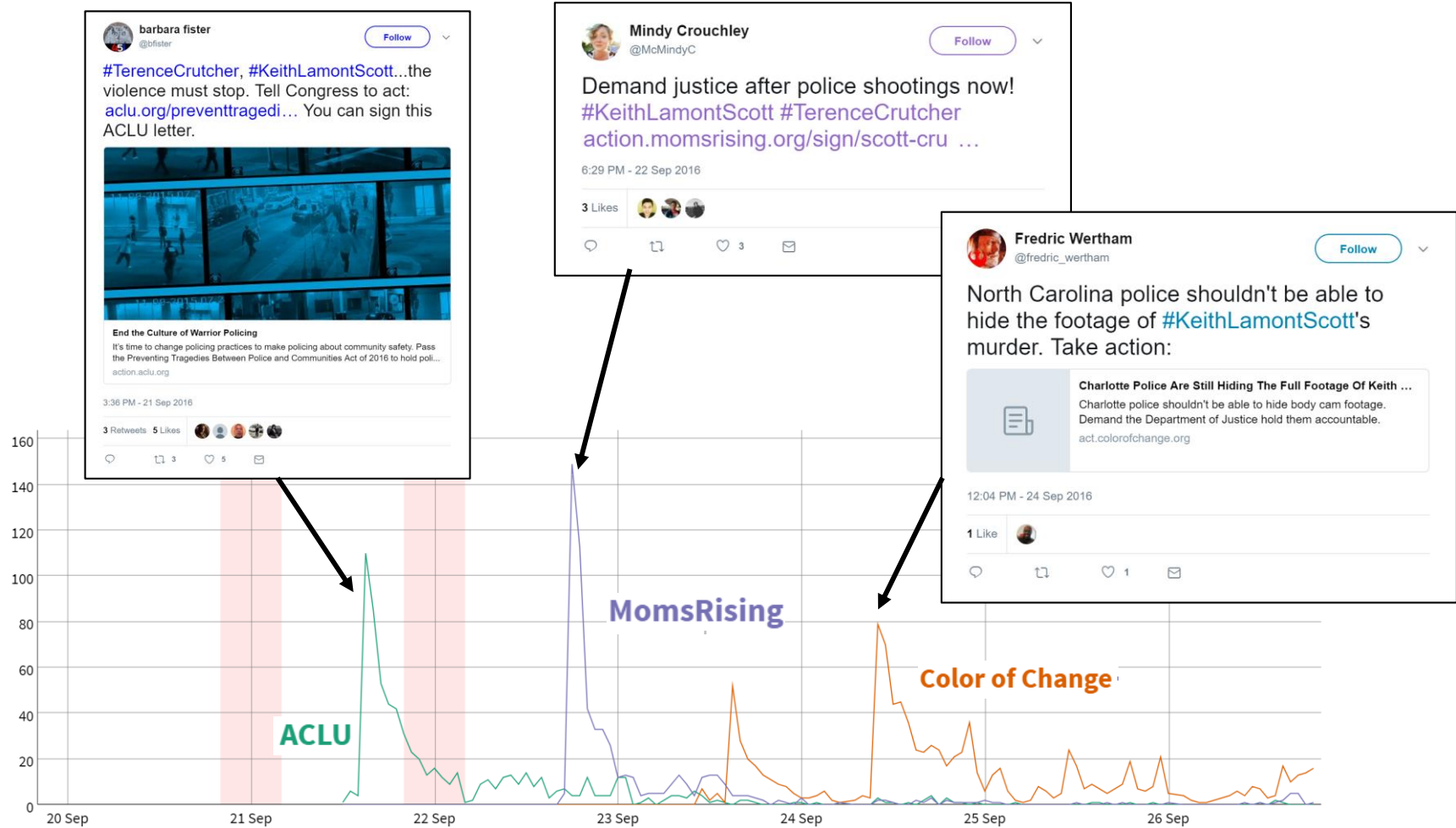
Number of Topics Evaluation
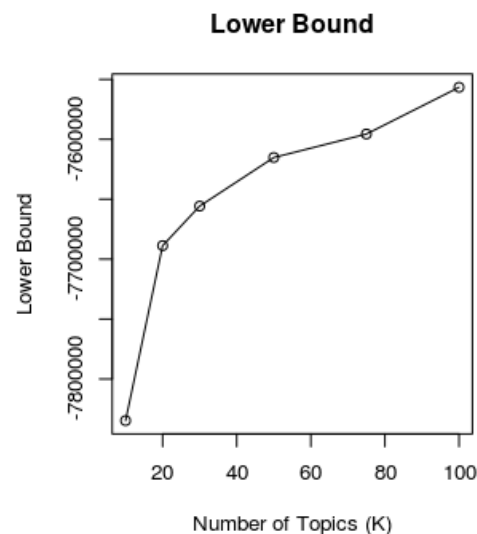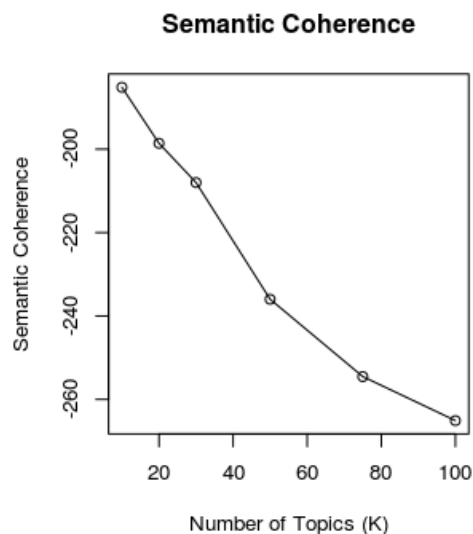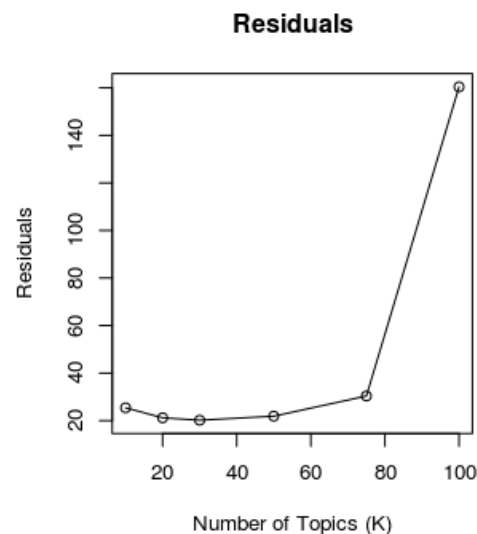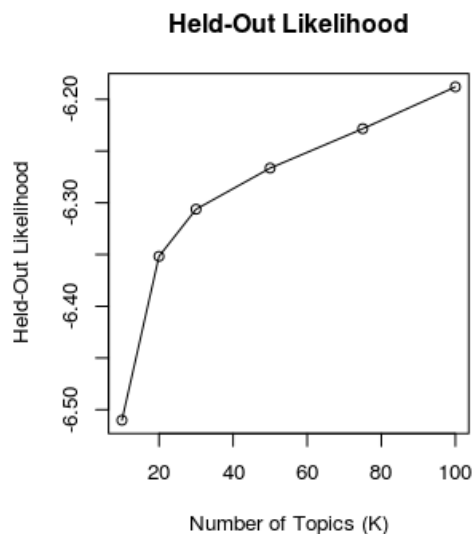
Racial Diversity

Green: African-Americans

Blue: Caucasians

Source:

2010 US Census

Racial Dot Plot Map
University of Virginia
Weldon Cooper Center

Charlotte ranks last in upward mobility study

The study ranked Charlotte dead last among the country's 50 largest cities for upward mobility, meaning it is harder to climb out of poverty here than in any other major U.S. metro area. The odds of moving up in Charlotte - just 4.4%.

Study: Chetty, R., & Hendren, N. (2017). The effects of neighborhoods on intergenerational mobility II: County-level estimates. Retrieved from http://www.equality-of-opportunity.org/documents/

wbtv.com
ON YOUR SIDE

Height

100   120   140   160   180   200

black

people
white

#charlotteriots
#charlotte
#blacklivesmatter

dont

man
shot
officer
killed
cop
will
just
like
get
protest
one
another
im
#charlotteprotest
live
protests
us
#charlotteuprising
protesters
#blm
riot
need
know
see
family
book
say
cops
now
right
#keithlamontscott
#terencecrutcher
stop
violence
gun
police
#keithscott
video
shooting
release
footage
charlotte
via

tf-idf Frequency weighting

Hot Issue Publics

Single/All Issue Publics

Charlotte   Carolinas

Missing   Not Local