



What were the Tweets about? Topical Associations between Public Events and Twitter Feeds

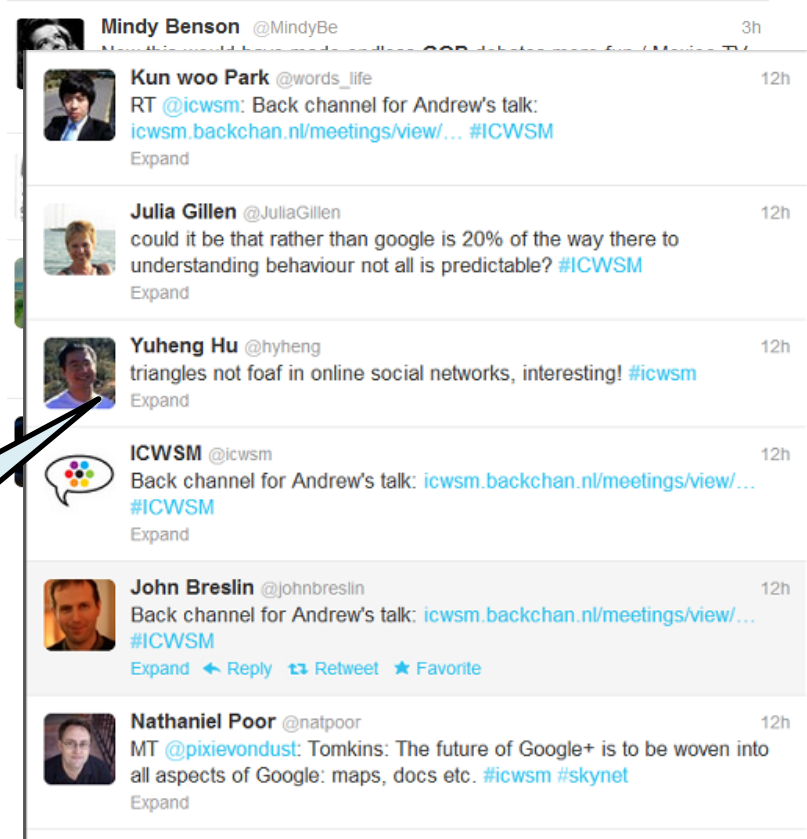
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Social media has changed our way of responding to events



triangles not foaf in online social networks, interesting! [#icwsm](#)

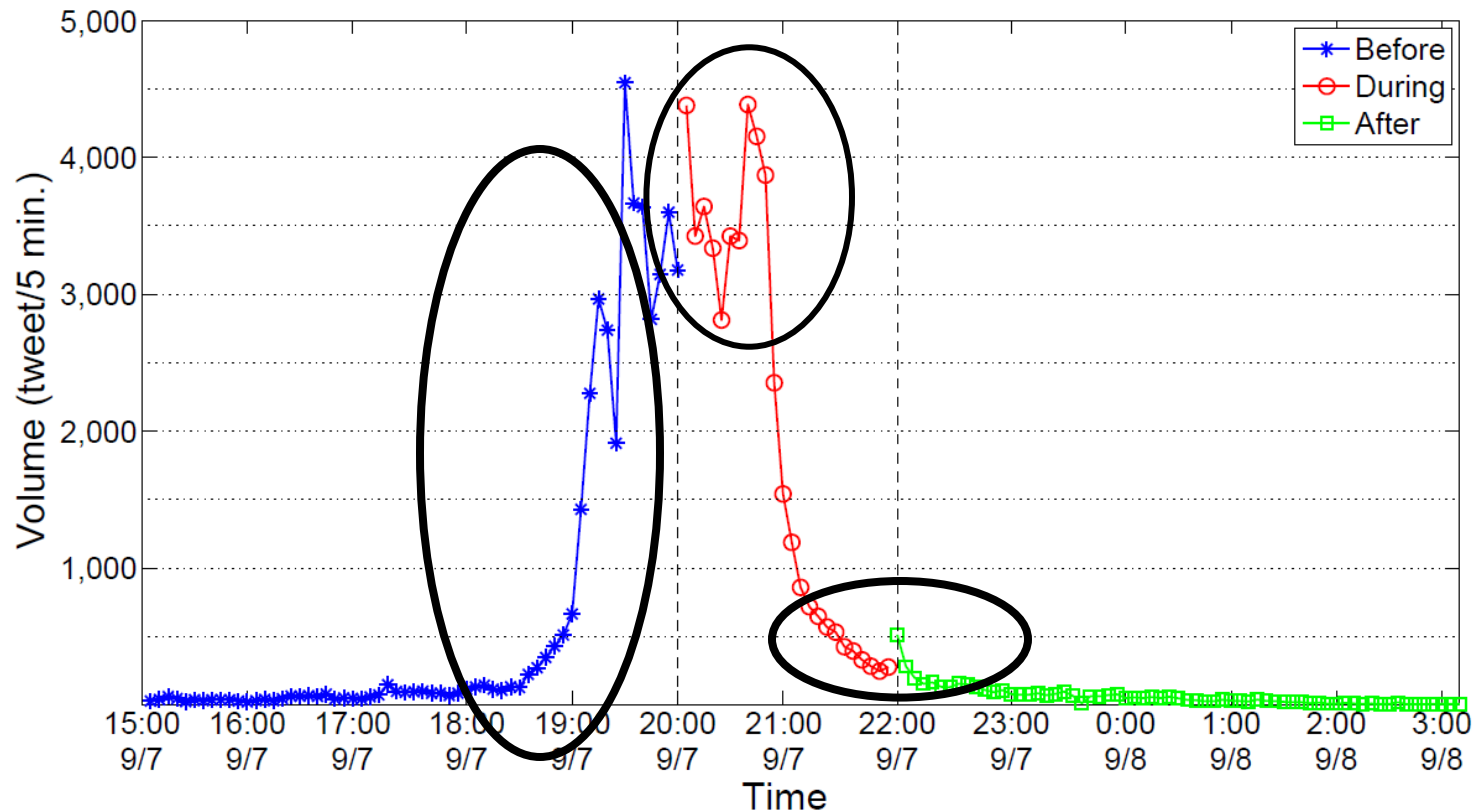
How do we make sense of the responses?

Research goals

- Make sense of a crowd's responses to a media event
 - What these tweets were about?
 - How did the event influence the tweeting behavior of the crowd?
 - Did these tweets refer to specific parts of the event and if so, what parts?
- Related work
 - Monitoring Twitter usage patterns during debate [Shamma et al 2009]
 - Sentimental analysis of tweets to understand the events [Diakopoulos et al 2010]

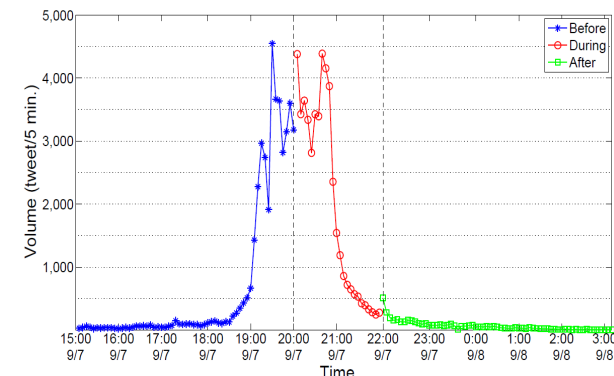
Preliminary understanding

- Event: Republican Primary debate on Sept 7 2011 20:00-22:00
- Data: over 110,000 tweets tagged #ReaganDebate



Three conjectures about the crowd's responses

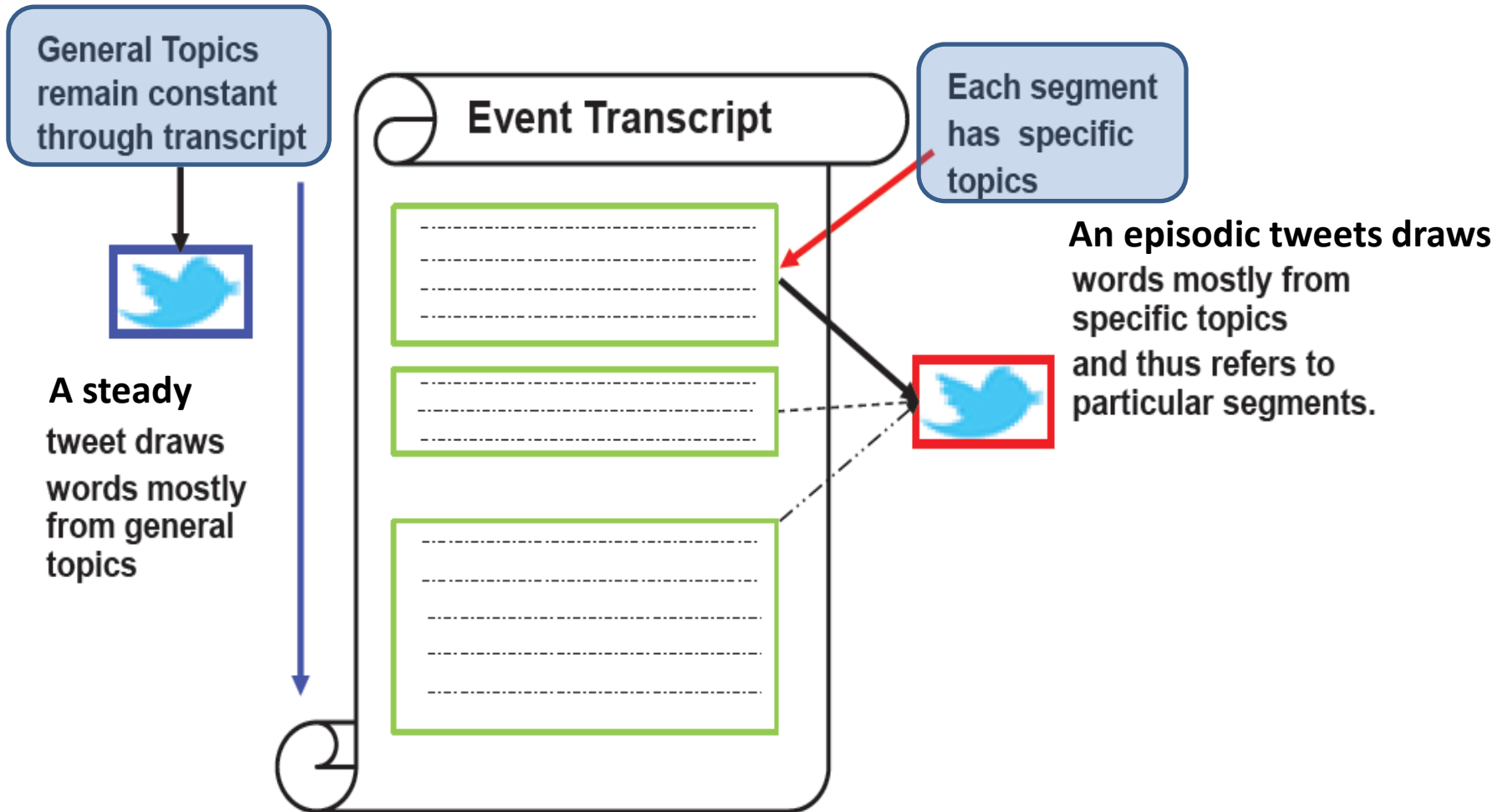
- **Before the event**, responses tend to be mostly tangential or very general
- **During the event**, responses tend to be very specific to parts of the event
- **After the event**, responses tend to be slightly more specific to the event from the ones posted before the event



More insights

- A tweet's content can be either **weakly** or **strongly** influenced by the debate's content
- Tweets with weak correlations used words mostly about the **general** topics of the debate (*steady* tweets)
- Tweets with strong correlations used words mostly related to **specific** topics discussed in the debate (*episodic* tweets)

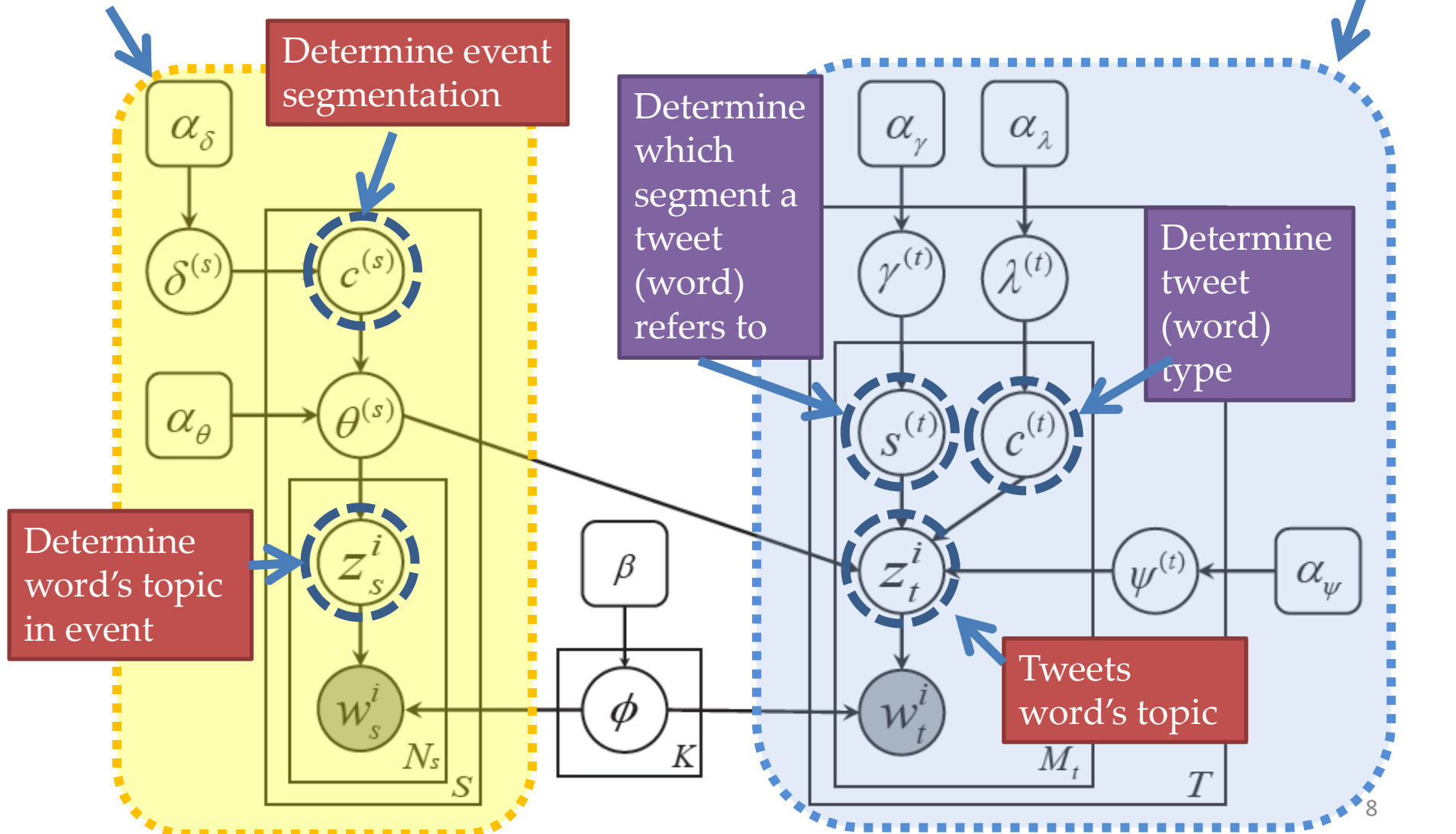
Our approach



ET-LDA in a nutshell

Event

Tweets



Experiments

- Setup
 - Tweets for President Obama's speech on the Middle East on May 19 2011 (#MESpeech, 11,988) and Republican Primary debate in the US on Sept 7 2011 (#ReaganDebate, 112,414)
 - Expanding tweets by search snippets
 - Event transcripts from New York Times
 - Model settings: Gibbs sampling and pick #topics by maximizing log-likelihood

General/Specific topics from #MESpeech

S	Specific	Top Words
S1	Human rights	Rights Transition People Power
	Foreign policy	Secure Mideast Arab Clinton State
S2	Terrorism	Bin Laden Mass Murderer Cry
	People	Dignity Power Street Square people
S3	Arab democracy	Democracy Yemen Syrian Bahrain
	Egypt revolution	Mubarak Resign Policy Reform
S4	Youth	Promote Untapped Arab talent youth
	Free speech	Open Internet Mind Access Paper
S5	Economics	Aid Trade Debt Billion Dollar
	Reform	Egypt Reform Support Resource
S6	Border problem	Israel Palestine Borders State Jordan
	Peace treaty	Palestine Peace Jewish Agreed treaty
S7	Human rights	Rights Transition People Power
	Foreign policy	Secure Mideast Arab Clinton State
General		Top Words
Arab spring		Arabia Bahrain Iran Mosques Syrian Leader Government Stepped
Israel & Palestine		Israel Palestine Borders Lines Hamas Negotiate Permanent Occupation
Obama		President Job Tough Critique Jews Policies Attacking Weakness

MESpeech: specific topics are sensitive to the event's context and keep evolving as the event progresses

General/Specific topics from #ReaganDebate

Specific		Top Words
S1	Campaign	Tonight Republicans Campaign Leadership
	Candidates	Perry Romney Michele Huntsman Governor
S2	Job market	Job Payroll Market Crisis Monstrous
	Taxes	Income Tax Pledges Taxpayer Committed
S3	Healthcare	Obamacare Wrong Unconstitutional Deal
	Economics	Debt Fence Economics Commitment Cured
S6	Candidates	Perry Romney Michele Huntsman Governor
	Immigration	Legal Mexico Immigrants citizen Solution
S9	Debts	Government Financially Failure China
	Regulations	Fed Up Wrong Funding Expenditures
S10	Social Sec.	Social Security Benefits Ponzi Scheme
	Healthcare	Obamacare Wrong Unconstitutional Deal
S13	Immigration	Legal Mexico Immigrants citizens Solution
	Economics	Debt Fence Economics Commitment Cured
General		Top Words
Social security		Perry Social Security Ponzi scheme Check Constitutional Lowest Wage Vote Wrong
Economics		Private Sector Obama Conservative Budget Amendment Growth Employment Taxes Job
Health Care		Legislative Legal Solution Homelessness
		Obamacare Jeopardizes Medicare Doctor

ReaganDebate: specific topics are rather disordered and occur repeatedly.

Examples of Steady/Episodic tweets

- **ReaganDebate**

- Steady

Something the #GOP candidates won't mention about Reagan - Reagan grew the size of the federal government tremendously. #reagandebate

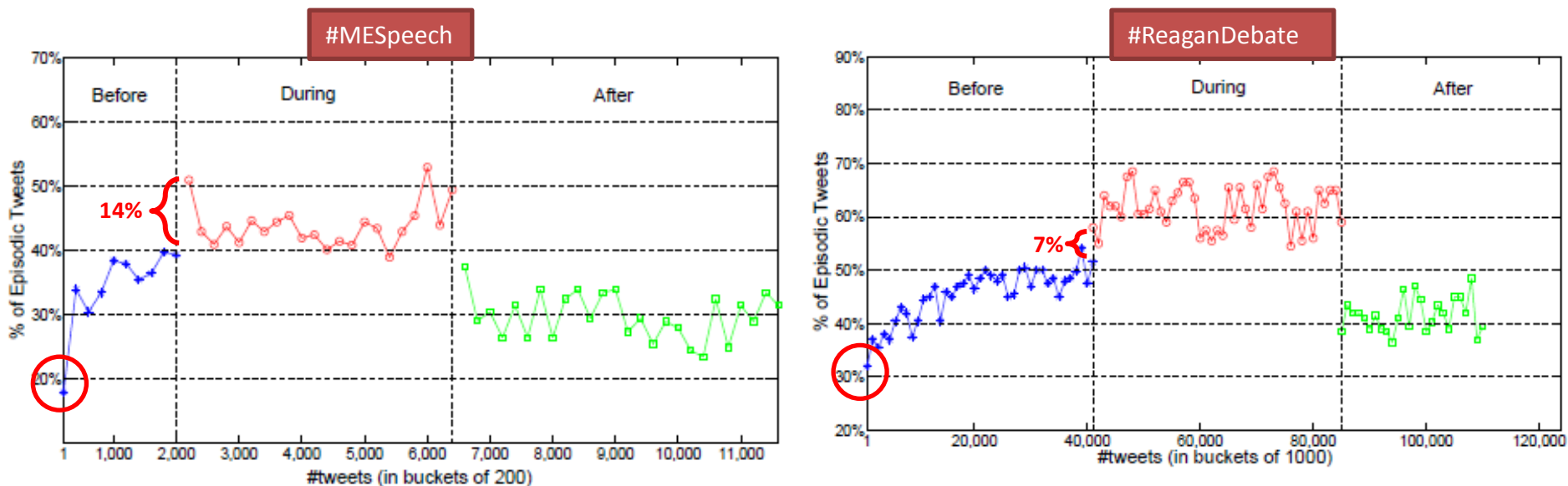
Yes, we need to talk about jobs and teachers needing jobs!
#Reagandebate

- Episodic

Huntsman said Ronnie!! Take a shot! #GOPDebate #tcot #ReaganDebate

Wow, Ron Paul. Really, you think airlines would give a rip about security?
Free market nonsense. #reagandebate

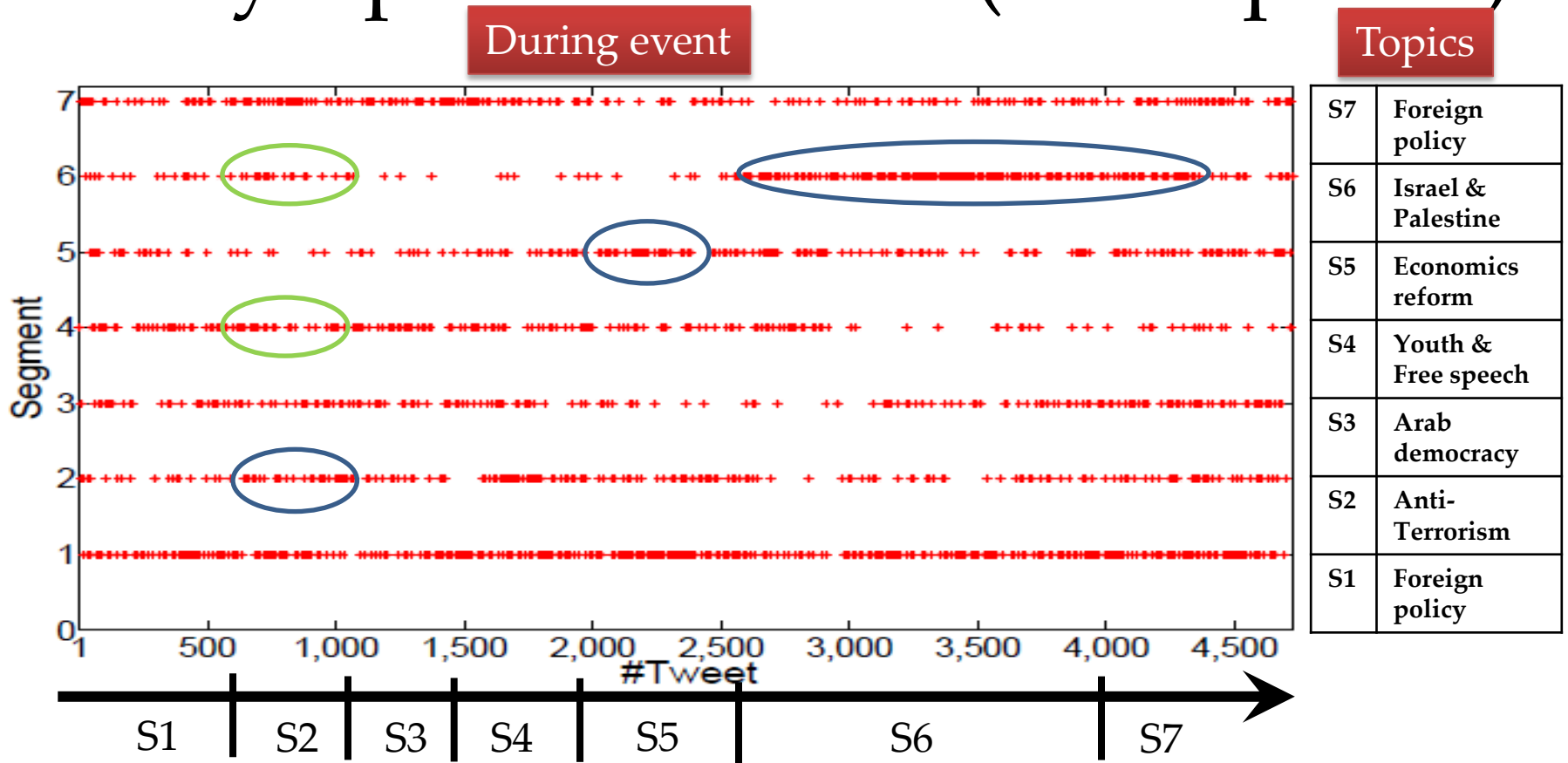
Evolution of Episodic tweets over the event's timeline



MESpeech: Few responses were episodic initially. The percentage of episodic tweets rises up/drops down as the event begins and as it is ending, it remained mostly stable during the event

ReaganDebate: More responses are strongly influenced by the event. The crowd was less excited during the opening. The percentage of episodic tweets rises significantly during the debate.

Distribution of Segments Referred to by Episodic tweets (#MESpeech)



- Horizontally, the crowd's attention tended to shift from one segment to the next as the event progressed
- Vertically, episodic tweets also refer to the segments whose topics were expected to be discussed later on in the event.

Subjective Evaluation

- Participants: 31 graduate students
- Method: questionnaire
- Participants asked to assess quality of topics and soundness of episodic tweets by ET-LDA
- ET-LDA performed consistently better than baselines

Our findings

1. Crowd's responses tended to be steady before the event and after the event, while during the event, they were more episodic. (our conjectures are confirmed!)
2. Crowd showed different levels of engagement in different kinds of events
3. Topical context of the tweets did not always correlate with the timeline of the event

Questions?

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Thank you!