Causal Reasoning in the News

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Multimodal Research Network

- Television is a major channel through which the world thinks
- We study cognitive processes in news
- Our teams around the world need multimodal data
- We're developing new techniques and conceptual models

Distributed Little Red Hen

- Data acquisition -- global capture
- Data storage -- distributed
- Data enhancement -- align captions to speech, transcripts, speech-to-text ...
- Data mining research -- joint image / text parsing
- Communications research -- cognitive, social
- User interface development, publication platforms

1.1. Archive Origins

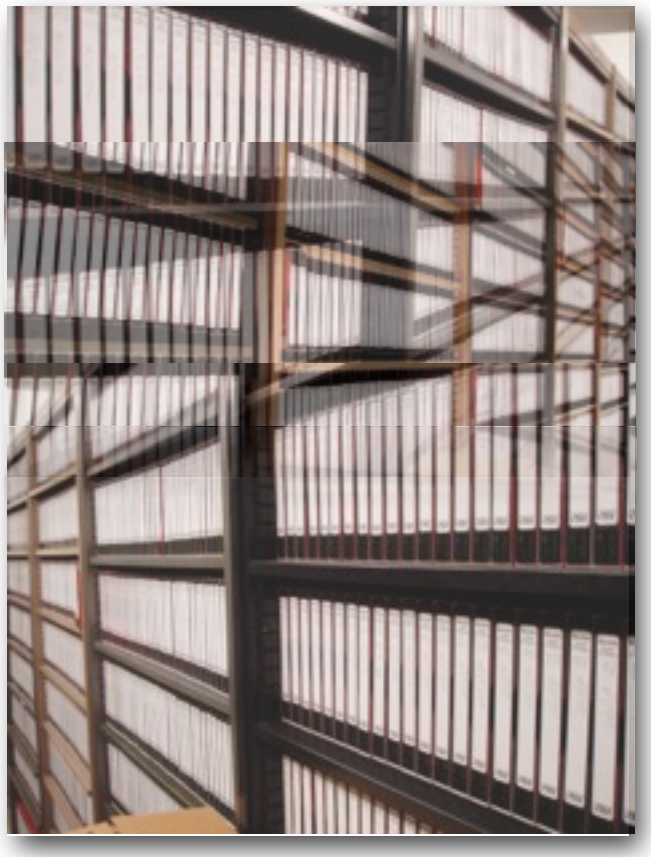
- Watergate Hearings
  - Ephemeral TV
- Late 1970s:
  - Expanded daily schedule
  - Local and national news & public affairs
  - Tremendous volume of content

1. Plan for this Talk

1. UCLA Library CSA
    1.1. Origins & Philosophy
    1.2. Recent Developments
2. Causal Reasoning
    2.1. Media Case Study
    2.2. Cultural Dimensions
3. Interface developments (discussion)

1.1 Archive Philosophy

- Complete time series
- Technology will catch up
  - Contrast with Vanderbilt
- Result: Massive mountain of video
  - Taped material is difficult to access and search



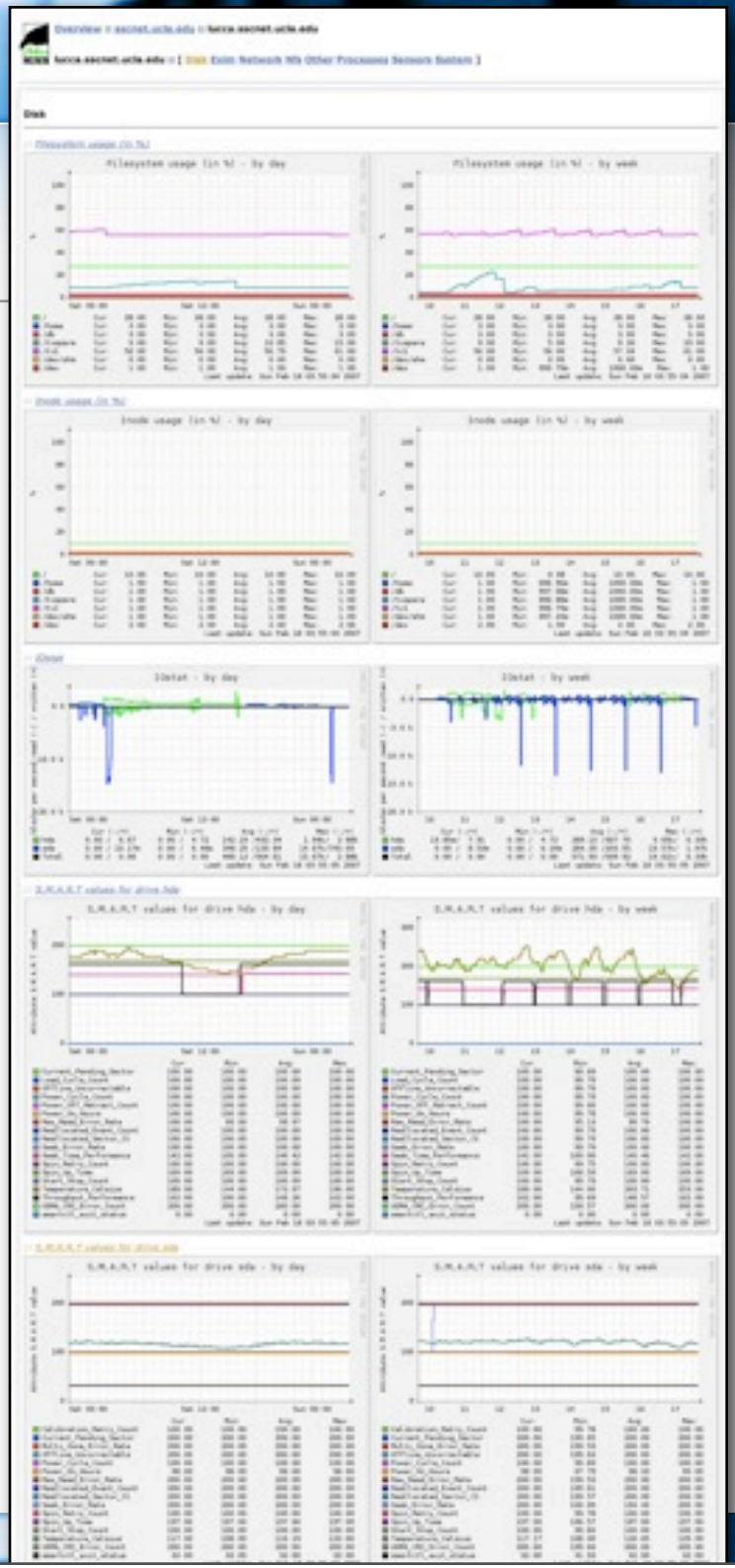
Haystack...
Meet Needle

1.2 Recent Developments

- 2005: Began a pilot direct-to-digital capture project
- October 1, 2006: all recording became digital
  - Around 200,000 News and Public Affairs programs digitized (2,000+/month)
  - 1,000,000,000 words of closed captioning indexed
  - Over 50 million screencap images generated

1.2. Digital Recording

- Redundant recording, storage
- Physical vs. remote monitoring of equipment
- Automated quality assurance
  - Scripts allow comparison of captured files against baseline specs
- Automated text and visual indexing (overnight turnaround)
  - Allows instant search and access to this massive collection



Automated Quality Assurance

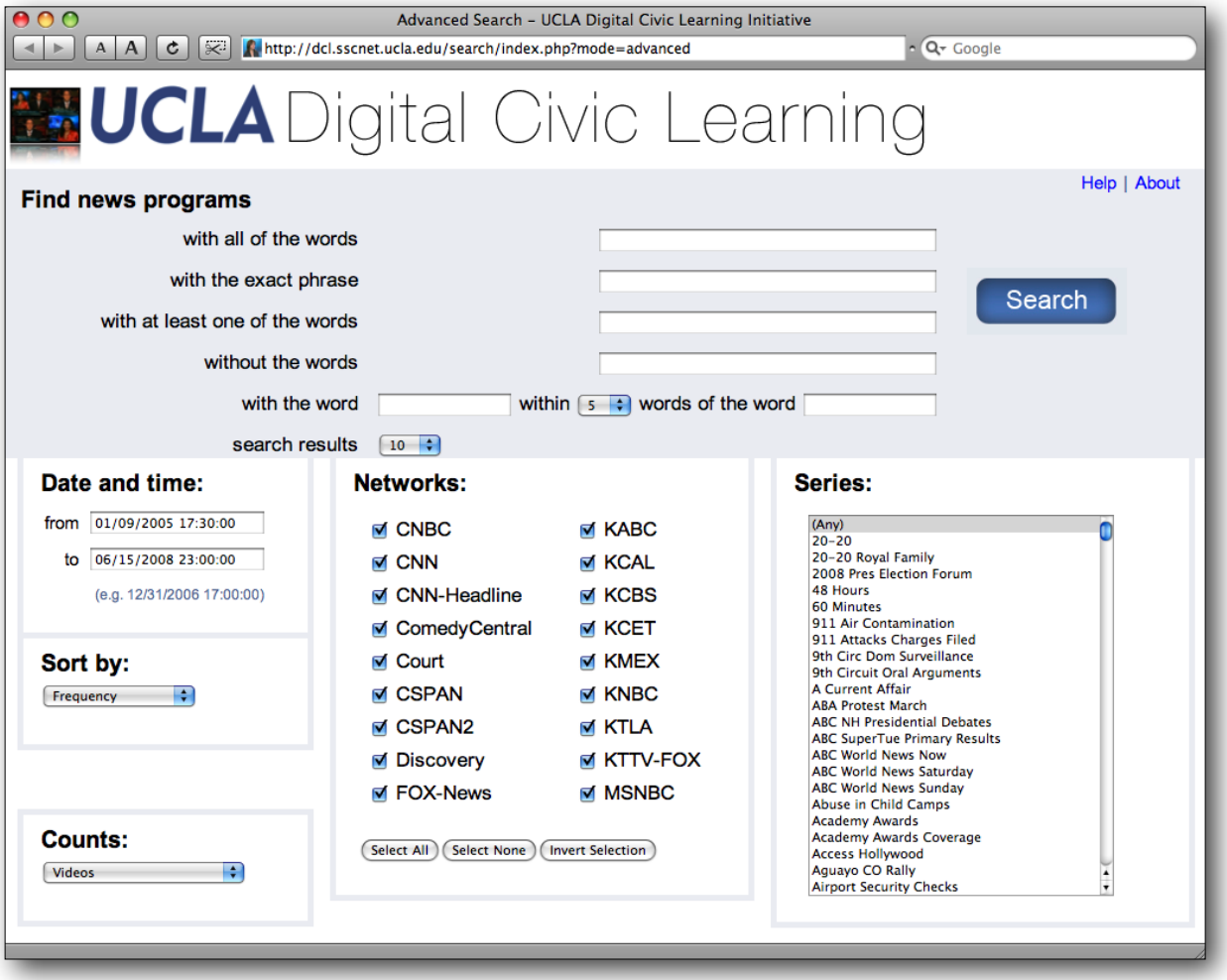
- Shows are recorded according to a regular schedule updated on the fly for special events
- Recordings are made in duplicate and the best video, audio, and text track is selected automatically
- Closed captioning is time-stamped every ten seconds, and a frame is extracted from the video at ten-second intervals

Automated storage and streaming

- Post-processing includes deinterlacing and recompression to h.264 for streaming
- Files are backed up twice; collection grows by around half a terabyte a month
- Collection includes 200,000 recordings, mostly one-hour long
- The entire collection is available through streaming video (as of early April 2010)

2.1 Search Technology

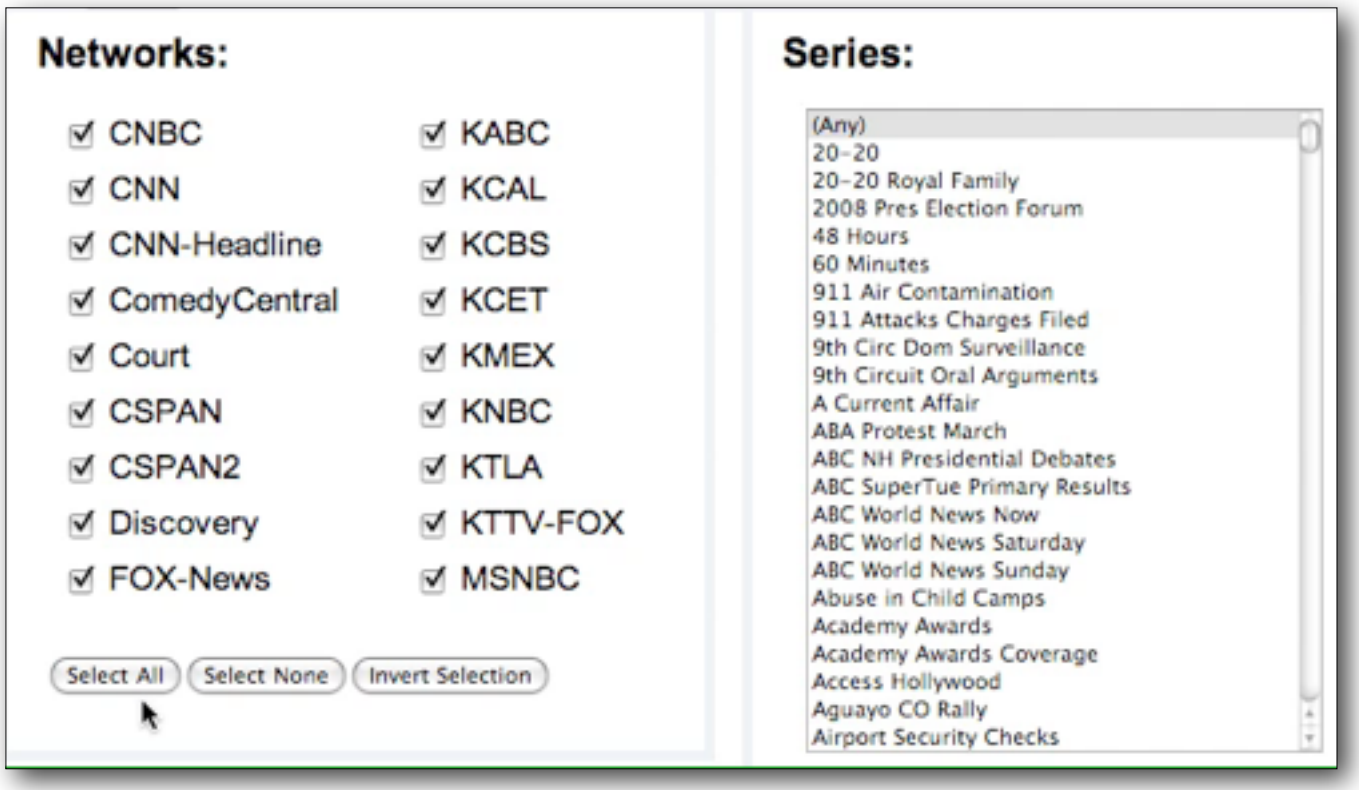
- Access avenues:
  - Visual browsing
  - Text search
    - Key words
    - RegEx



2.1.1. Visual Search Tool: Montage

2.1.2. Text Search Tools

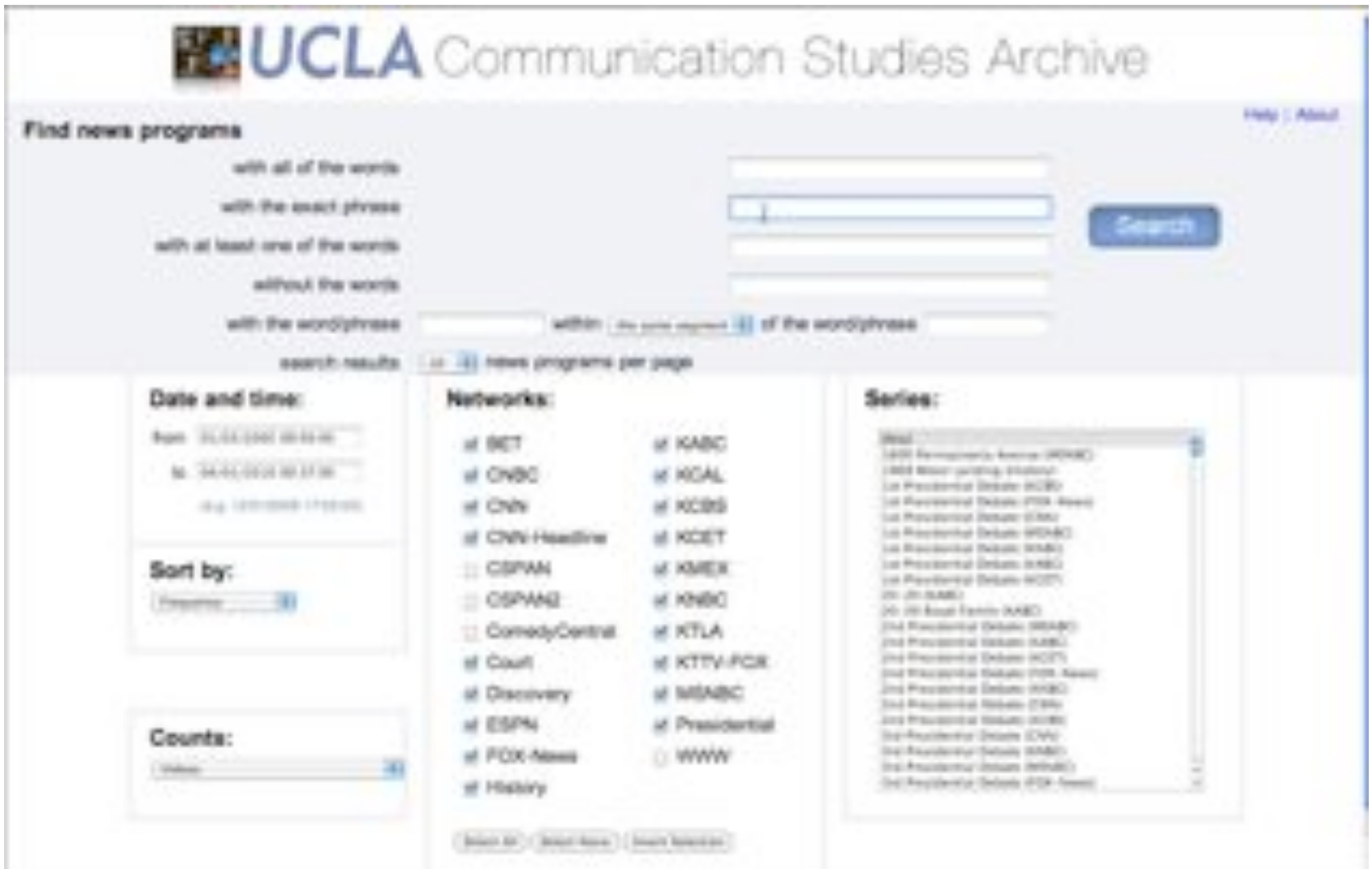
- A moving target, but currently allows:
  - Word and phrase search, alternative words, exclusions, and proximity searches.
- Can restrict by date range, network, or program



2.1.2 Search Example 1: Obama

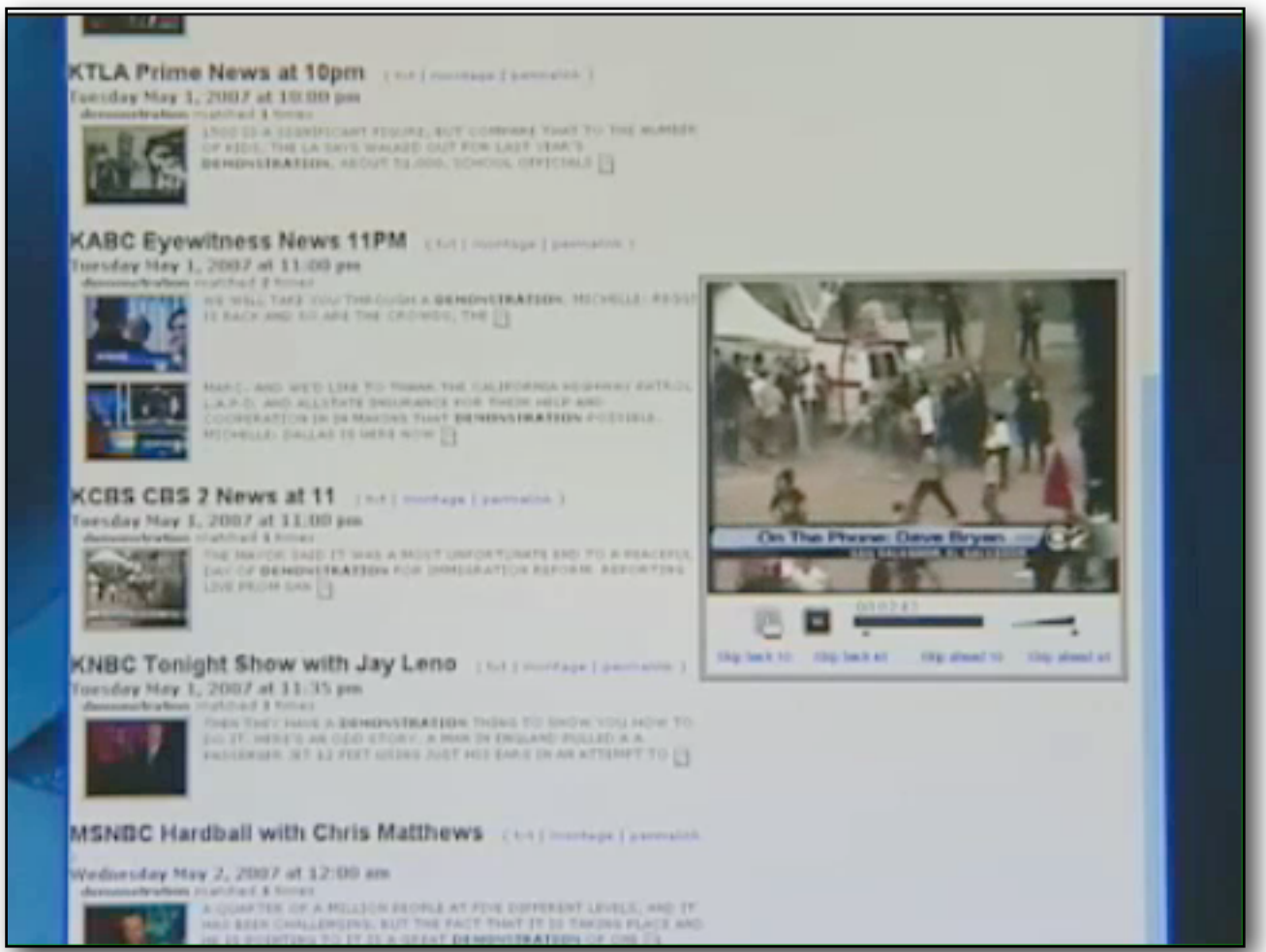
2.1.2 Search Example 2: Counts

2.1.3 Search Example 3: Paul Ryan



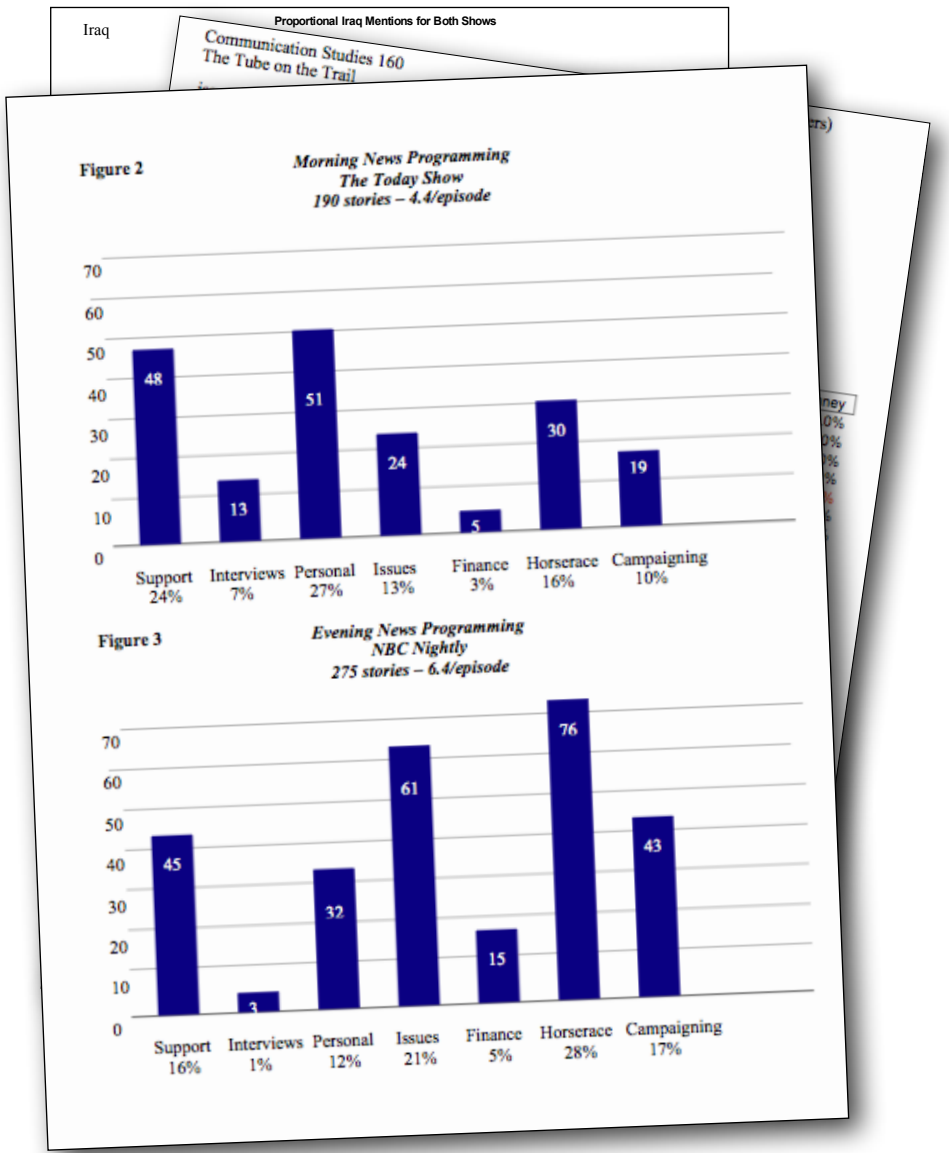
2.2. Use Case 1: 2007 Immigration

- Otto Santa Ana built a course structured around coverage of Macarthur Park police beatings
- Honored with a Copenhaver Award



2.2. Use Case 2: 2008 Primaries

- CS162: Presidential Communication
- Students used the search engine to locate and analyze patterns of coverage
- Once instructors find out about the archive, they want to use it.



2.3 Analysis of visual persuasion

- I Selection Bias
- II Cognitive effects
- III Spatiotemporal graphs
- IV Multiperspective interface

The aim is to generate metadata on features that can be retrieved mechanically and that are significant for visual judgment

Scene analysis elements

- Agents (party, role, name…)
- Actions (talking heads, street interviews)
- Broadcast time (in the timestamp)
- Broadcast location (in the file name)
- Event time
- Event location
- Scene type (street, studio, field, office)
- News source (RT, CBS, LAPD, AP)

Hierarchical image parsing

Image parsing progress

- National Science Foundation, Cyber-enabled Discovery and Innovation -- half way through a 4-year grant

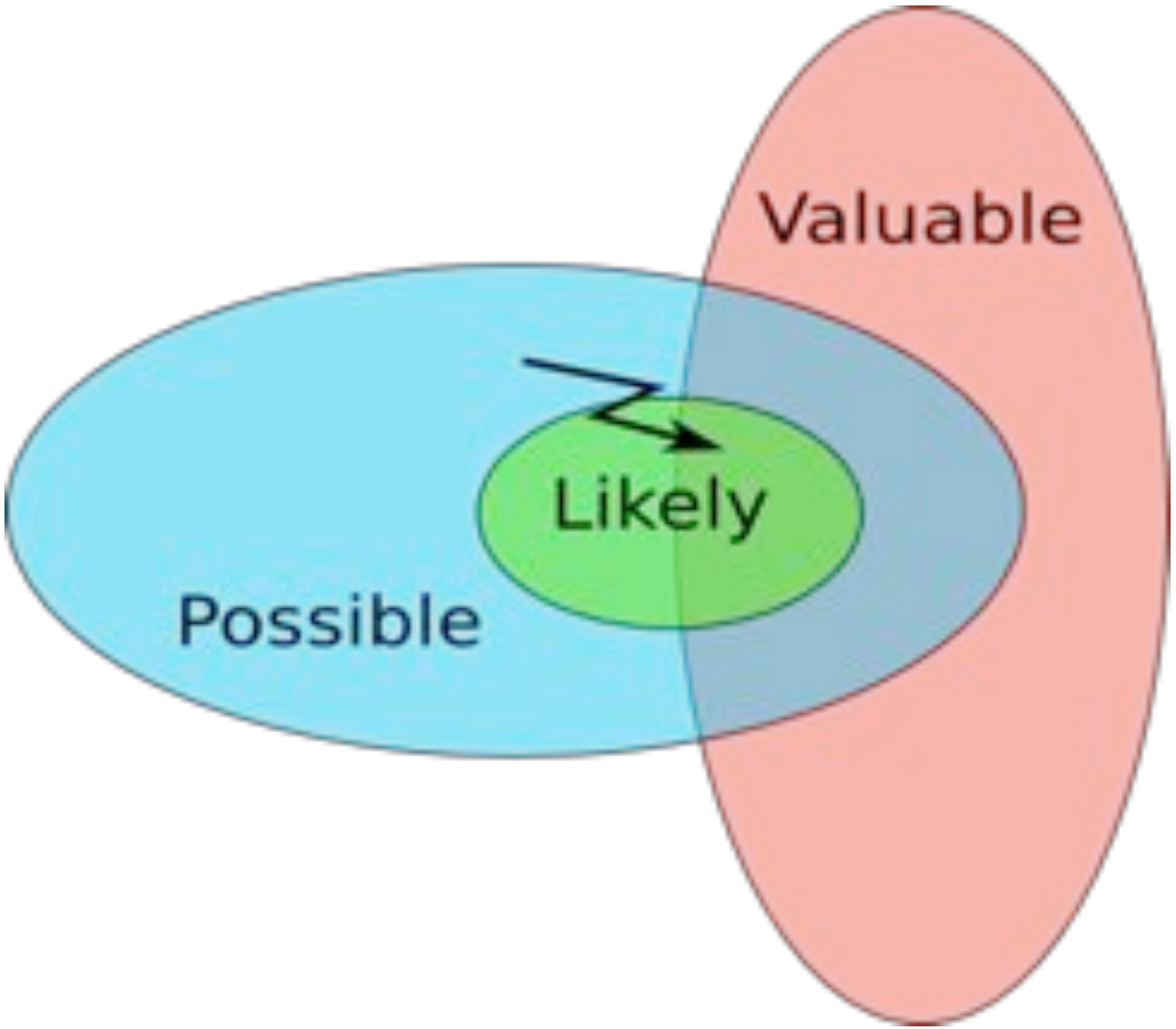
2. Why do we have news at all?

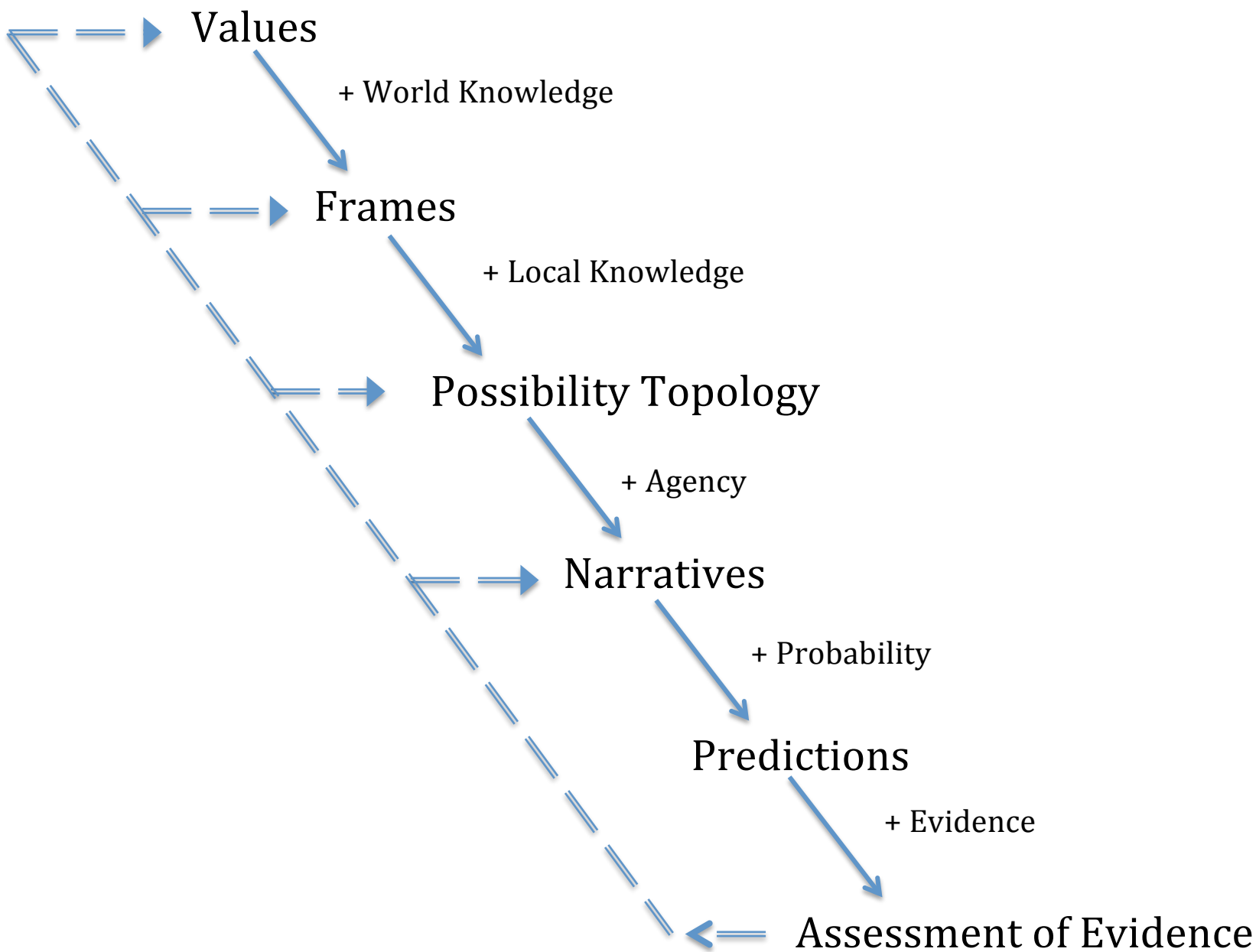
- The purpose of the news is to change the course of history

Selecting what is newsworthy

- The news covers what matters, in the sense of outcomes that have an emotional delta
- We care whether events go one way or the other
- There are implied goals in our preferences

State spaces of television news




Values
+ World Knowledge
Frames
+ Local Knowledge
Possibility Topology
+ Agency
Narratives
+ Probability
Predictions
+ Evidence
Assessment of Evidence

Core stages: Evidence

- The first stage of the news is to provide you with evidence

@chaglen
July 22, 2011
What do
BREAKING NEWS
NEWS ROOM
BLAST AT OSLO GOVT. BUILDING
Reuters: Several hurt; PM's office is in bldg.
CNN
S&P -2.70

BREAKING NEWS
DOW 12678.02
EXPLOSION ROCKS NORWAY'S CAPITAL
MAJOR DAMAGE AT GOV'T BUILDINGS
8:02
65°
OYED WORKERS HAVE NOW BEEN OUT OF WORK FOR MORE THAN ONE YEAR, SURVEY F

OSLO, NORWAY
LINDA REINHOLDSEN
REPORTER, NRK
ATLANTIC OCEAN
NORWAY
SWEDEN
FINLAND
NORTH SEA
Oslo
BREAKING NEWS
NEWS ROOM
BLAST AT OSLO GOVT. BUILDING
Reuters: Nearby oil ministry is on fire
CNN
More killings in Syria's Homs, group says

Google Earth | GeoEye
BREAKING NEWS
NEWS ROOM
BLAST AT OSLO GOVT. BUILDING
Reuters: Windows blown out of 17-story building
CNN
CNN Poll: Perry near the top in GOP nomination race

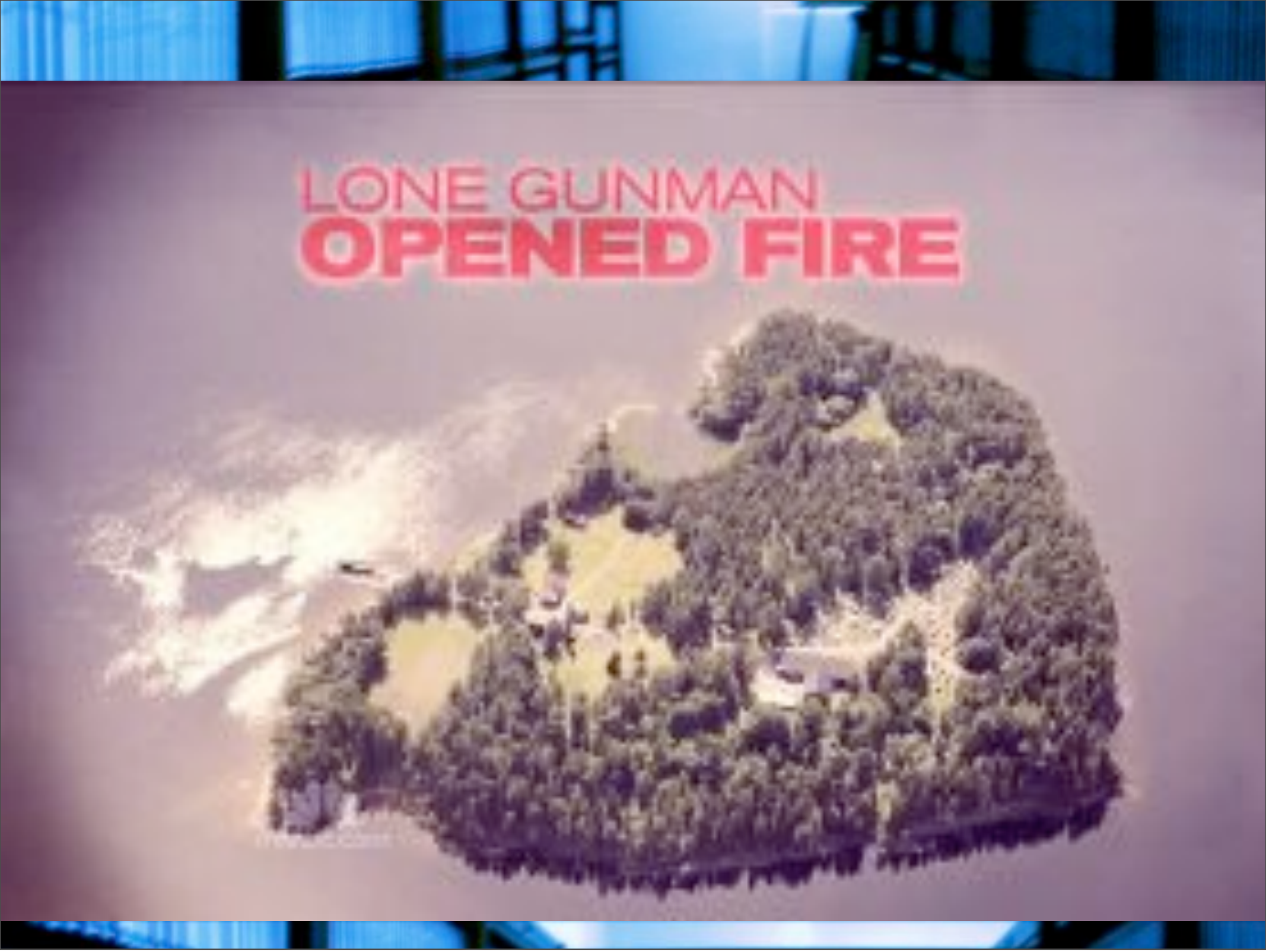
Oslo, Norway
BREAKING NEWS
2 BLASTS AT OSLO GOVT. BUILDINGS
Reports: At least 8 hurt; PM's office is in bldg.
CNN
President still pushing to 'go big' on debt deal

abc NEWS

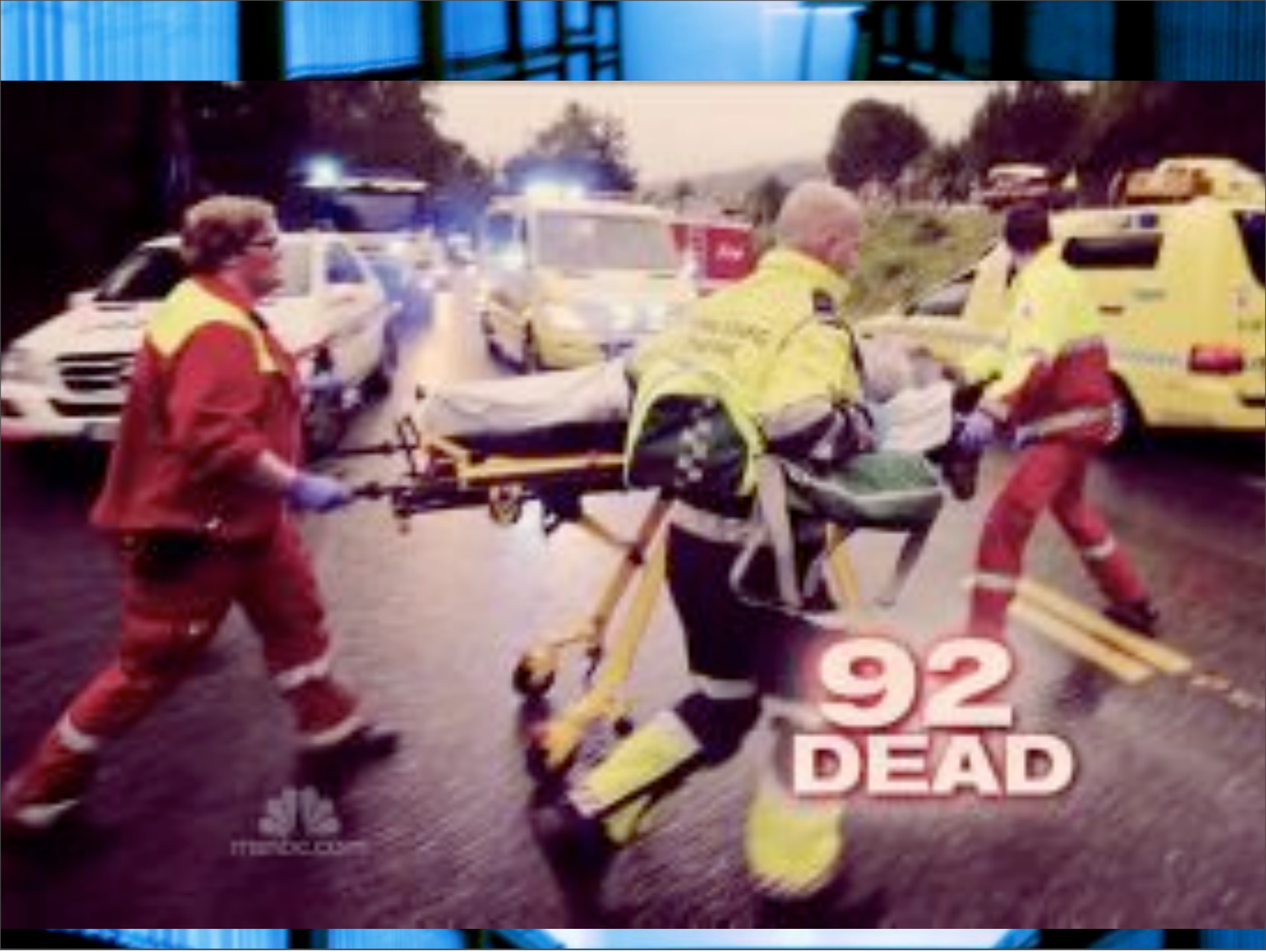
AT LEAST
1 BOMB
AT LEAST
7 DEAD

Evidence

- The evidence is cognitively experienced as or close to a first-person witness:
- Eyewitness news
- Telelusion effect: eye maps onto camera lens
- Different perspectives have distinctive emotional effects


LONE GUNMAN
OPENED FIRE

LONE GUNMAN
OPENED FIRE
AT LEAST
10 DEAD


92
DEAD

93
DEAD

Where did what happen?

Voices

- Victims are interviewed right away

ADRIAN PRACON
Shooting Victim
abc NEWS .com

SVEIN GUSTAF MARTINSEN
Witness
abc NEWS

sky NEWS
UTOYA ISLAND LIVE
BREAKING NEWS NORWAY ATTACKS
SPEAKING FROM UTOYA ISLAND
EMILIE BERSAAS
19:18 RED
BREAKING NEWS
SKY SOURCES: OSLO POLICE
11:08 61°
2 HD

7:13 62°
TODAY.COM
IN SUSPECTS IN THE BRYAN STOW BEATING CASE MAY SOON

Core stages: Explanation

- It's not sufficient for the news to be about what happens -- just the evidence
- Why not?
- What is the work we expect the production team to do for us?
- They must assemble a narrative

Terrible news

- The Communication Studies Archive allows us to reconstruct in detail how the different news outlets rise to the occasion
- The first stage involves a rapid opening of multiple possible causes
- These causes have known properties, and these are measured informally against the known evidence

Terrible news: Mullah Krekar

Muhammed cartoons

NATO bombs Libya

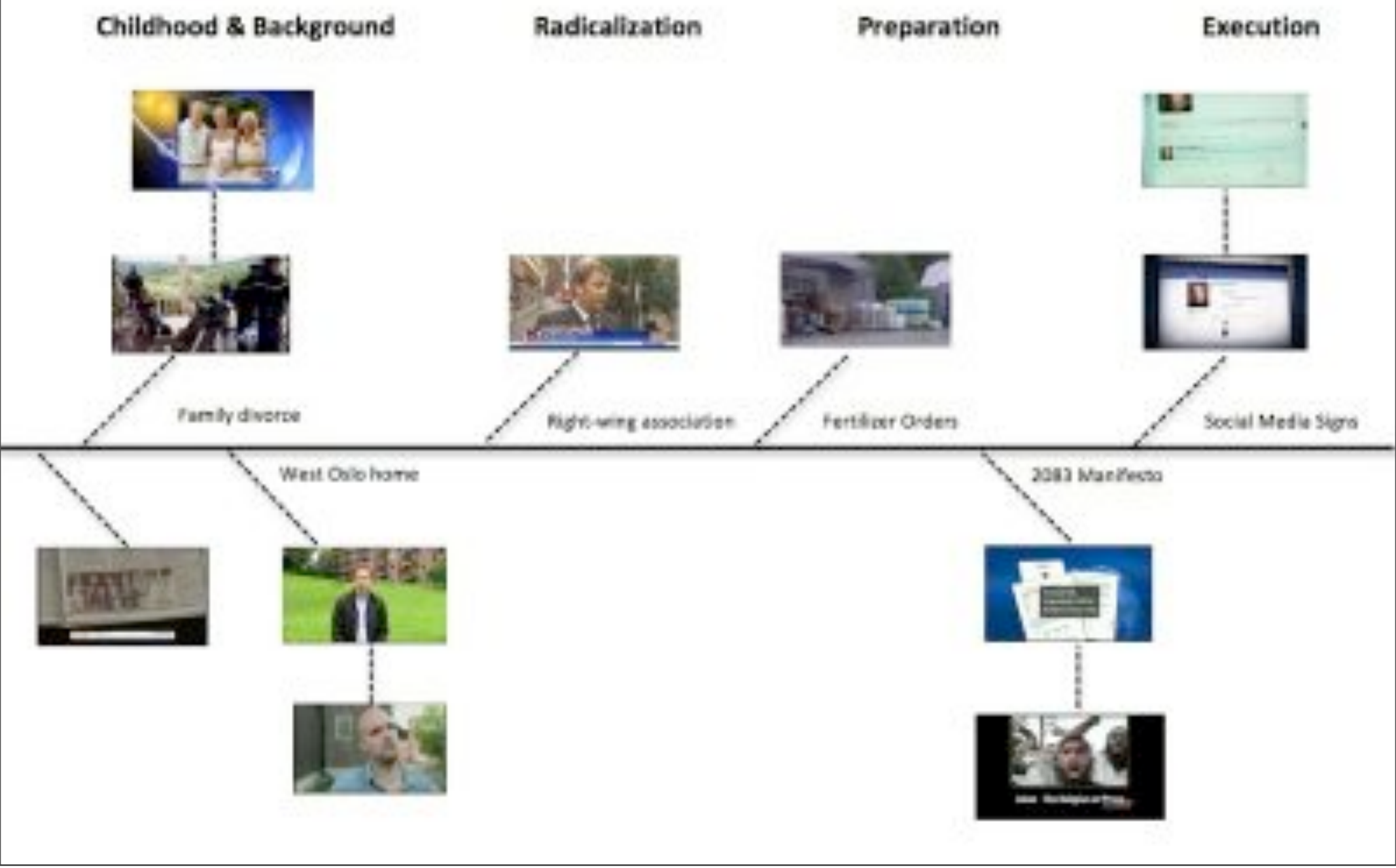
Norway in Afghanistan

abc NEWS
.com

The killer had released a press kit

THE MIND OF A KILLER
GMA

Anatomy of a life: Causal factors



From sorrow to anger

- The explanation merely attempts to reconstruct what happened -- to create a causal diagram
- Yet this is not enough -- even understanding the how, where, and why is not enough
- The grief of the victims and their families turns to anger
- This anger is widely portrayed in the media
- This supplies the energy or drives the next

The Victims' Stories

BAILANGA: SECURITY AGENCIES ARE BLIND AND NAIVE..
THE WORST VIOLENCE SINCE WORLD WAR TWO - COMMITTED
BY A SINGLE MAN! WE ARE NOT PROTECTED AT ALL, WE ARE
TOTALLY EXPOSED TO THE THREAT OF TERROR.
RT.COM
HAVE YOUR SAY!
NEWS
MAY HAVE BEEN ACCOMPLICE.
FOLLOW RT

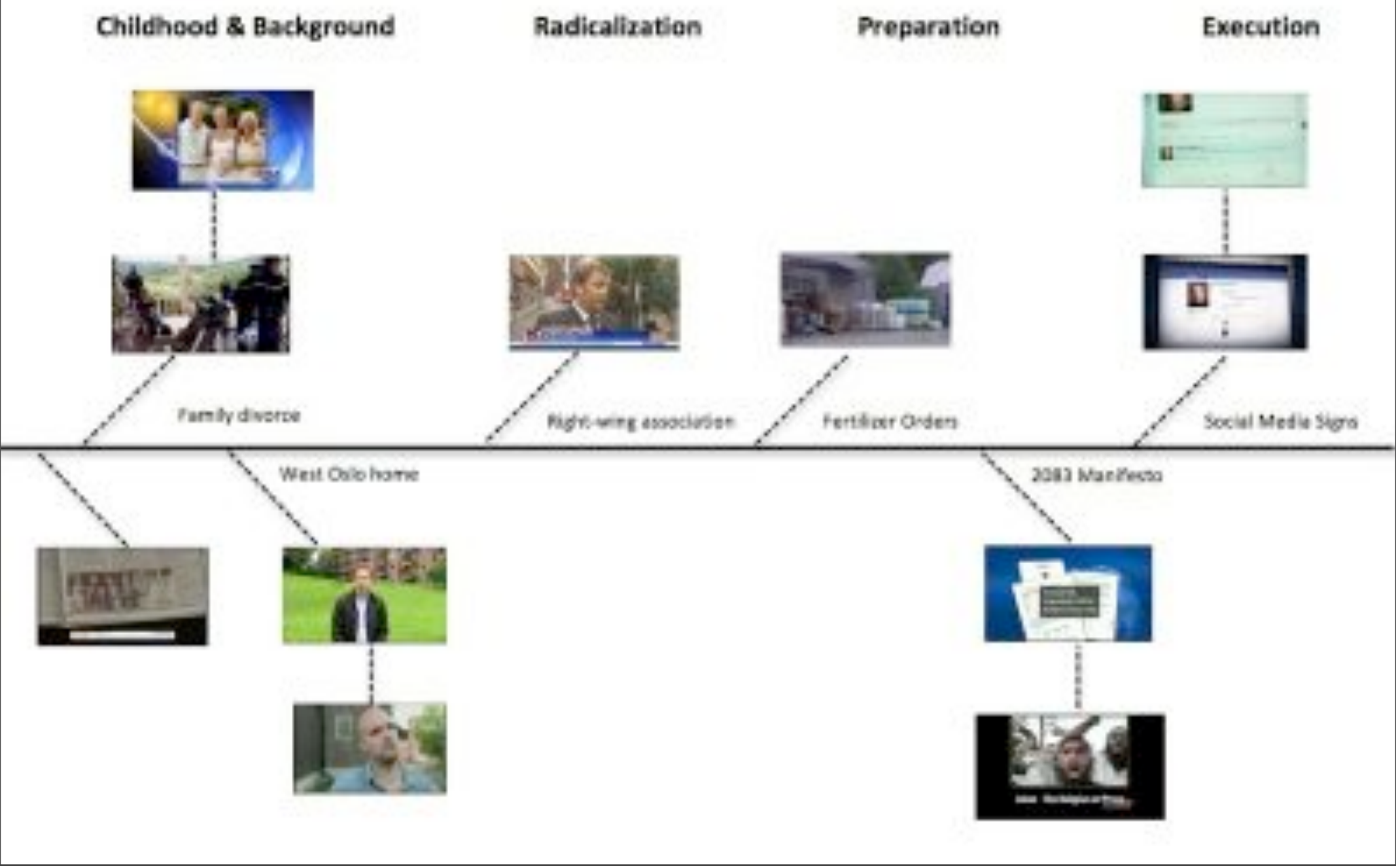
Core stages: Event surgery

- The anger portrayed in the media foregrounds an interpretation of the events that happened
- It makes certain ratios salient and suspends them in consciousness for further processing
- The intensity of the anger provides the drive and warrant for the next stage: causal surgery

Event surgery

- Pearl argues that causal reasoning in science requires an act of intervention
- Diagrams are useful models of causal reasoning -- they let you do causal surgery
- In the news, explanations of terrible events, or of large missed opportunities, cry out for causal surgery

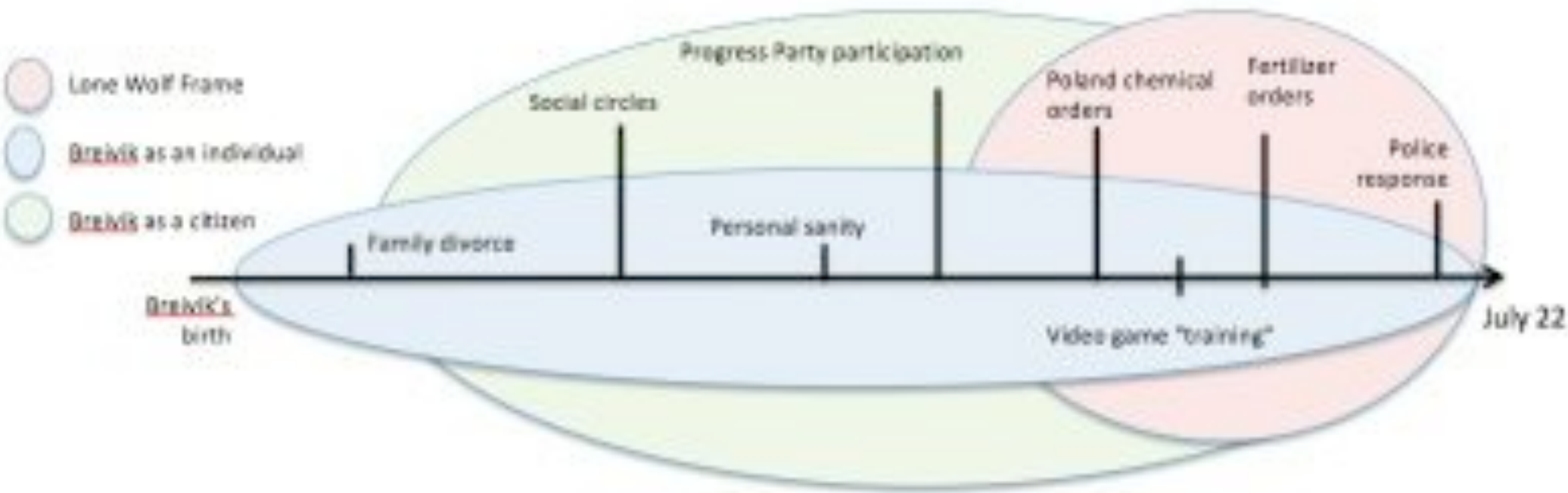
Causal surgery: Where could someone have intervened?



Stages of causal surgery

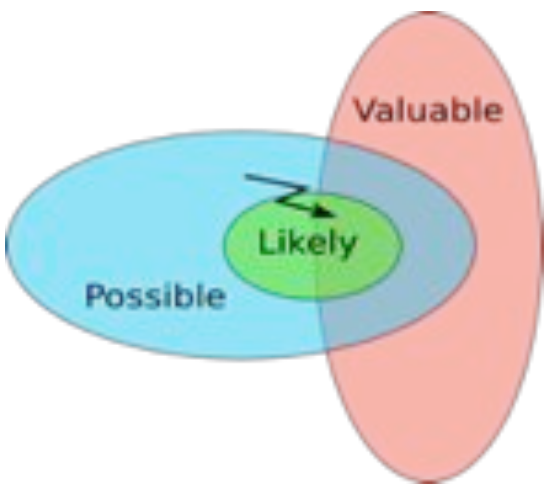
- Causal surgery is expensive: it requires a detailed reconstruction of events
- Its goal is to identify windows of possible intervention
- Within these windows it identifies causal forks
- “Possible” means within multiple dimensions of constraints: money available, social priorities, available candidates for jobs, competing goals

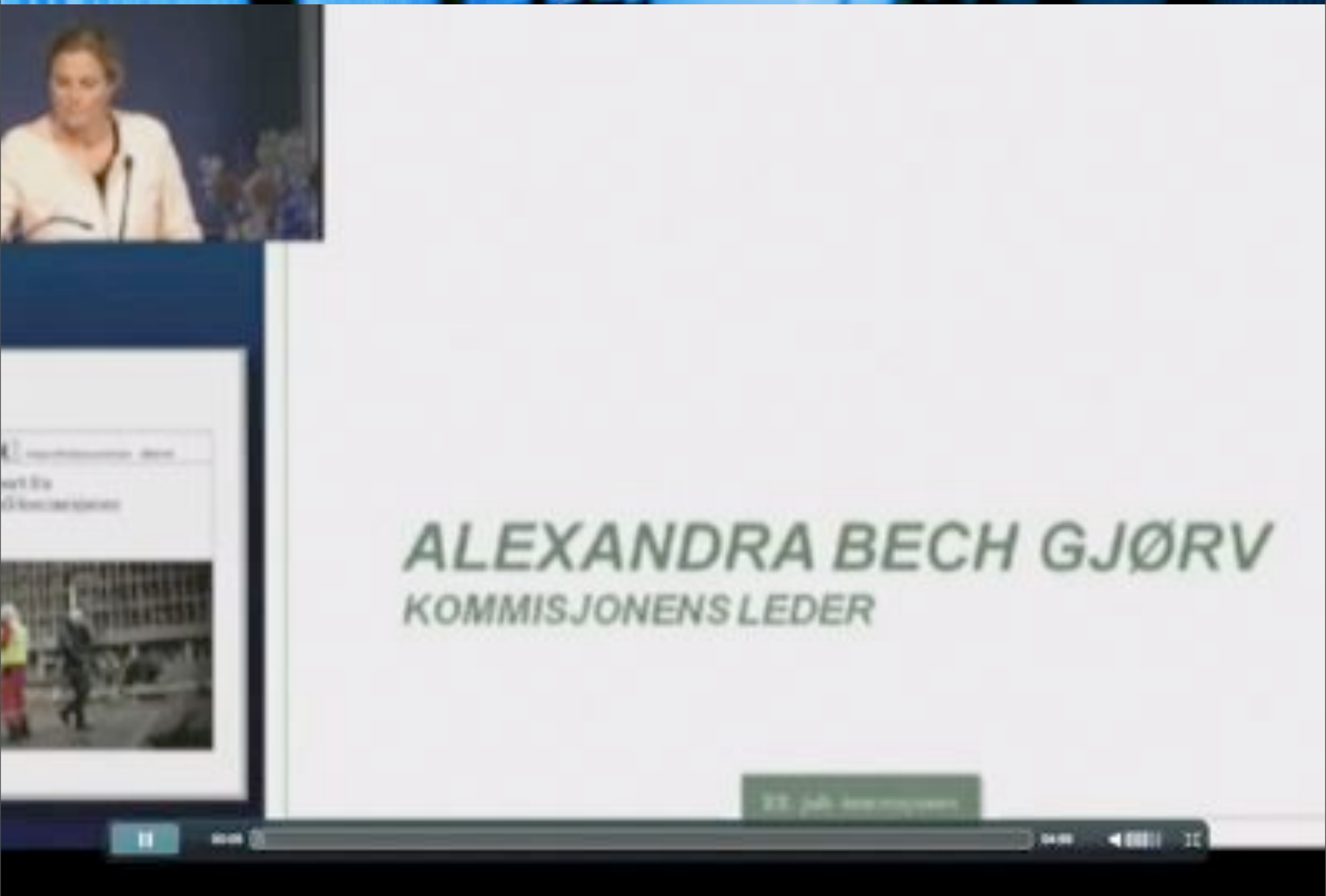
Causal surgery: Framing possibilities



Core stages: Accountability

- Accountability depends on two overlapping state spaces of counterfactual reasoning:
  - What it was possible for someone to do, but they did not (possibility space)
  - What someone should have done, but did not (value space)




ALEXANDRA BECH GJØRV
KOMMISJONENS LEDER

Nesten alle sentrale ledere 22.juli har gått av

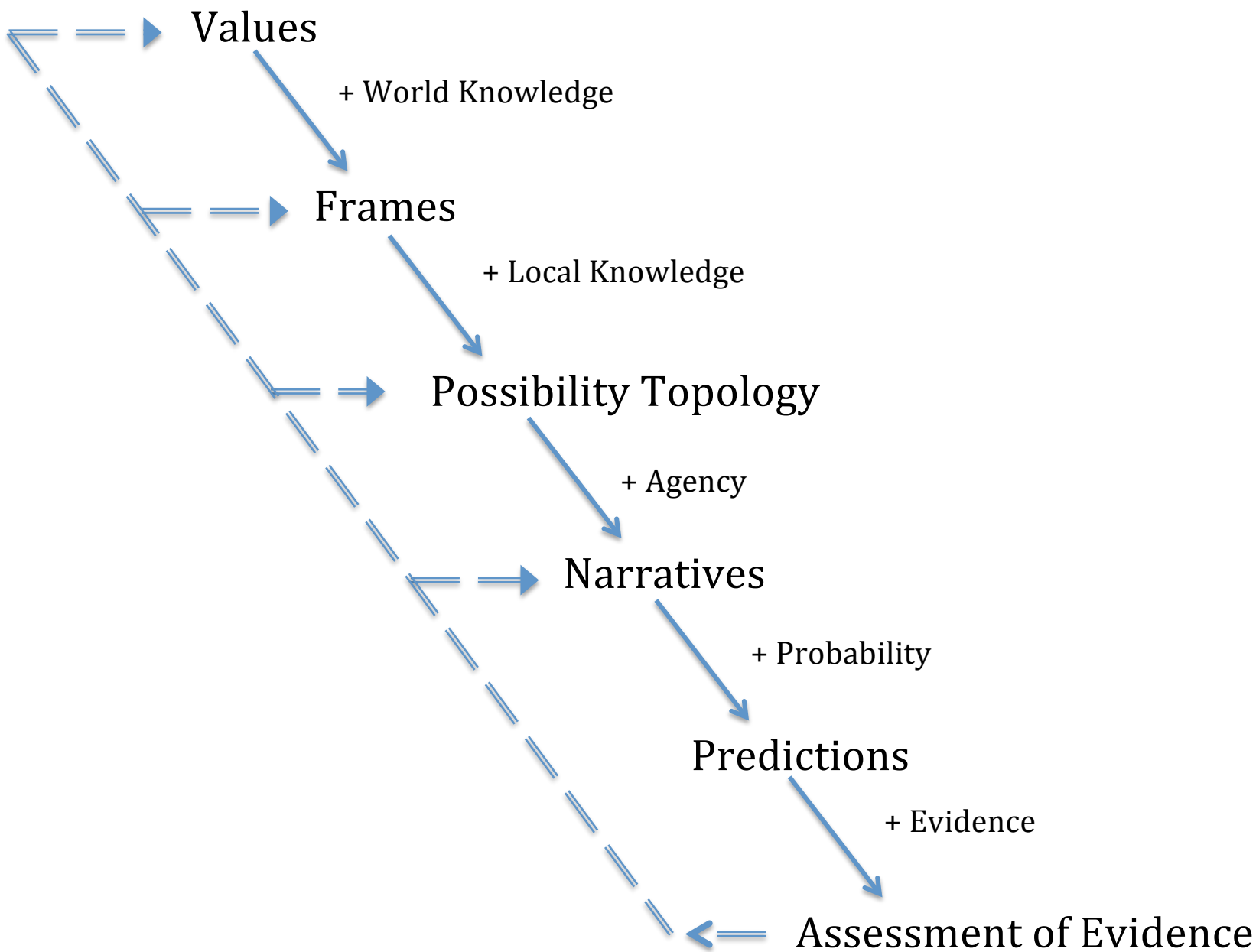
Norway's largest newspaper calls for the Prime Minister to resign

You Should Have

- Deontics of information exposure: you should have paid attention
- Deontics of information seeking: you should have found out
- Deontics of decision making: you should have acted more effectively
- Deontics of leadership: you should have prioritized your charges

We Should Have

- Deontics of infrastructure: we should have
- Deontics of staffing, of training, of resource provision, of law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Cognitive Lessons

- The possible is routinely treated as a more fundamental aspect of actuality than the factual
- The fact is merely a contingent outcome in the field of the possible
- Human information processing routinely results in effective interventions in the course of events

Timescales of changing society

- Legislative process -- timelines of years (elections), decades (formulation of new laws), and centuries (laws remain on the books): general guidelines, little or no adaptation to individual cases
- Courts -- timelines of weeks to years, highly formalized criteria, a rough cut of where we want society to go
- News -- timelines of minutes to days

Changing society

- For this process to work, you need
- High-quality evidence
- Accurate event analysis
- Realistic identification of windows of possible intervention and causal forks
  - This is demanding: respect constraints of physics, resources, knowledge, perception
- Carry through

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