THEORY AND APPLICATION OF QUANTITATIVE NARRATIVE ANALYSIS IN THE CONTEXT OF POPULISM

Alberto Purpura - Università degli Studi di Padova
alb.purpura@gmail.com
“[POPULISM IS] AN IDEOLOGY THAT CONSIDERS SOCIETY TO BE ULTIMATELY SEPARATED INTO TWO HOMOGENEOUS AND ANTAGONISTIC GROUPS, “THE PURE PEOPLE” VERSUS “THE CORRUPT ELITE”, AND WHICH ARGUES THAT POLITICS SHOULD BE AN EXPRESSION OF THE VOLONTÉ GÉNÉRALE (GENERAL WILL) OF THE PEOPLE”

ANALYZING POLITICAL TEXTS

- Classical content analysis
- Holistic grading
- Automated/Computer-assisted content analysis
CLASSICAL CONTENT ANALYSIS

- Human coders (extensively trained)
- Often based on a codebook
- Different units of measurement according to topic
- Validity, are we measuring what we want to measure?
- Reliability, are the analyses consistent?
- In the case of populism the codebook should contain ALL the words that can refer to the entities we mentioned before, “the elite” and “the people”
HOLISTIC GRADING

- Human coders (extensively trained)
- Grading scale (i.e. 0 = not populist, 1 = mixed; 2 = populist)
- Sampling units coincide with coding units (documents) or may use paragraphs
- Validity, are we measuring what we want to measure?
- Reliability, are the analyses consistent?
AUTOMATED CONTENT ANALYSIS

- Fully or partially automated

- Usually dictionary based (some changes expected in the future)

- Words are usually the units of measurement

- Validity, *are we really measuring what we want to measure?*

- Reliability, *are the analyses consistent?*

- Matthijs Rooduijn & Teun Pauwels, *Measuring Populism: Comparing Two Methods of Content Analysis, West European Politics, Nov 2011*

- Example with populism:
  
  - how to describe the aforementioned entities that may allow you to detect populism?
  
  - synonyms
  
  - the importance of context
QUANTITATIVE NARRATIVE ANALYSIS (QNA)

In order to understand collective dynamics we must study the **collectivity as a whole**, but we must not study it as a collective entity. Only by taking into account the individual entities, and most critically the **relations** between them and their activities, can we understand the macro structure we observe. Predicting and explaining macro-level dynamics is one of the most central goals of analytical sociology.

Hedström and Berman, 2009, The Oxford Handbook of Analytical Sociology

1. Key to social explanation are individuals' actions and the relations that link actors to one another.

2. The macro level can only be fully understood in terms of the micro level of individuals' actions and relations.
QUANTITATIVE NARRATIVE ANALYSIS (QNA)

Quantitative Narrative Analysis or QNA is a methodological approach to texts that allows researchers to structure the information contained in narrative texts in ways that make possible a statistical analysis of the information.

- Identify and assemble a set of narrative documents for analysis (newspaper articles, police reports, personal narratives, interviews, speeches, ...)

- Design a “story grammar” (a basic structure that will capture in a set of categories the information contained in narrative documents) namely information on actors, their actions and the attributes of actors and actions

- Choose a software to store the grammar and the coded information so as to make possible large-scale projects

\[
\begin{align*}
\text{<subject>} & \rightarrow \{\text{<actor>}\}\{\text{<characteristics}>\} \\
\text{<actor>} & \rightarrow \text{crowd | mob | posse | Negro | Sheriff |...} \\
\text{<characteristics>} & \rightarrow \text{<type> <number> <organization> <name> ...} \\
\text{<verb>} & \rightarrow \text{<verbal phrase> <circumstances> ...} \\
\text{<verbal phrase>} & \rightarrow \text{bring | burn | shoot | kill | hang |...} \\
\text{<circumstances>} & \rightarrow \text{<time> <space> <reason> <instrument> <outcome>}
\end{align*}
\]
QNA VS CLASSICAL CONTENT ANALYSIS

1. The coding categories are based on invariant structural properties of narrative, rather than the ad hoc, abstract, and theoretically defined categories of classical content analysis.

2. The coding categories are tightly interlinked and interrelated through a set of rewrite rules (e.g., actors are linked to actions, and both actors and actions are linked to their attributes); in content analysis, coding categories are organized as lists, thus making it impossible to find out who did what, for instance or more in general the relations between different entities.

3. A grammar produces coded output that preserves much of the wording and narrative flavor of the original input text; coded output, then, will possess the same degree of semantic coherence of the original input.

4. It will give you the possibility to search for relations between the social actors in your data, using automated methods.
QUANTITATIVE NARRATIVE ANALYSIS (QNA)

- Human coders or automated information extraction phase
- Information extraction phase based on a codebook
- Relations are the units of measurement
- Validity, *are we really measuring what we want to measure?*
- Reliability, *are the analyses consistent?*
STORY GRAMMARS

- Structured data VS unstructured data

- “[A story grammar] is nothing but the simple linguistic structure subject-action-object or actor-action-actor with their respective modifiers (for example, number of actors involved, type of actor, time and space of action, reason, outcome)” - Roberto Franzosi, From Words To Numbers; Narrative, data, and social science; Cambridge: Cambridge University Press, 2004.

- The approach of QNA exploits the invariant linguistic structural properties of narrative (namely, the chronological sequential order of narrative clauses and their simple linguistic structure SVO, or Subject-Verb-Object). In narrative, Subjects are typically social actors, Verbs are social actions, and Objects are either social actors or physical objects.

- Each SVO element can also have attributes, namely, the characteristics of both Subject and Object.

- The SVO and their attributes provide an invariant structure of narrative also known as “story grammar”
STORY GRAMMARS

- Semantic triplets are reliable coding units compared to whole documents, paragraphs or single words.

- Strict rules of grammar guarantee reliability of the collected data and rigorous and systematic handling of textual materials, even in different languages (subject-verb-object structure).

- Compatible with texts of any length -> increased resolution than other approaches.

- The structure of semantic triplets is very similar to the structure of populist discourse.

- Preserve qualitative information of documents, facilitating mixed-method research.
- Dealing with non-narrative documents
- Capture relations between words and concepts exploiting linguistic properties of statements
- In the social sciences, framing comprises a set of concepts and theoretical perspectives on how individuals, groups, and societies, organize, perceive, and communicate about reality.

### Central frame concepts.

<table>
<thead>
<tr>
<th>Element</th>
<th>Value</th>
<th>Meaning</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framing task</td>
<td>Diagnostic</td>
<td>Problem identification</td>
<td>Snow and Benford (1988, 2000)</td>
</tr>
<tr>
<td></td>
<td>Prognostic</td>
<td>Proposed solution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motivational</td>
<td>Call for action</td>
<td></td>
</tr>
<tr>
<td>Frame component</td>
<td>Injustice</td>
<td>Moral indignation</td>
<td>Gamson (1992a,b)</td>
</tr>
<tr>
<td></td>
<td>Agency</td>
<td>Potential of action</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identity</td>
<td>Self-recognition</td>
<td></td>
</tr>
</tbody>
</table>

Stefania Vicari, *Measuring collective action frames: A linguistic approach to frame analysis*
SEMANTIC GRAMMARS

- Frame analysis investigates processes of signification: it looks at the way meaning becomes functional to mobilize collective action.

- The scheme of signification that frames belong to can be understood as the “mental structure” (Johnston, 1995) that social movement participants adopt to get involved in collective action. Frames, as “schemata of interpretation” (Goffman, 1974), can be uncovered, reconstructed and made explicit through the analysis of their textual form.
FROM TEXT TO FRAMES, HOW LINGUISTS CAN HELP

- If frames are represented by textual content, the search for a tool to conduct frame studies should lead us towards textual analysis strategies.

- A semantic grammar is the essential semantic structure that a text can be translated into. It depends upon the linguistic properties of the text.

- As a consequence, every semantic element coded in the text is marked by a series of categories and subcategories it belongs to.

Abstract from the inauguration speech of Donald Trump (19-01-2017)

“For too long, a small group in our nation's capital has reaped the rewards of government while the people have borne the cost.”

<1> (Paragraph:
(<1.1> Clause: (type of clause: adversarial) (Subject: (actor: a small group in our nation’s capital)) (Process: (Type of process: (Verbal predicate: (non-modal: (Action: (verb: has reaped)))))) (Object: (non-actor: the rewards of government))) (clauses relation: while)
(<1.2> Clause: type of clause: adversarial)(Subject: (actor: the people)) Process: (Type of process: (Verbal predicate: (non-modal: (Action: verb: have borne)))) (Object: (non-actor: the cost)))
FROM TEXT TO FRAMES, HOW LINGUISTS CAN HELP

If a verb has a passive voice, like:

“We will be protected by the great men and women of our military and law enforcement.”

It may be useful to invert the agent and the object coding as subject “the great men and women of our military ...” and as object “We”.

<1> (Paragraph:
(<1.1> Clause: (type of clause: self-referential) (Subject: (actor: the great men and women of our military and law enforcement))
(Process: (Type of process: (Verbal predicate: (modal: (Intention: ((auxiliary modal: will) (verb: protect)))))
(Object: (actor: We)))))
MORE ON FRAMING

Social movements frame discourse to provide movement members with a “collective us” in opposition to an “adversarial them” (Gamson, 1992).

In the analysis of social movements’ textual production, Stefania Vicari (Measuring collective action frames: A linguistic approach to frame analysis) suggests one should distinguish between “self-referential” and “adversarial” passages.

Self-referential: stories and descriptions whose subject is the social movement itself or one of its allies.
Adversarial: all passages having an oppositional actor as the subject.

For the frame semantic analysis to be significant, subjects must be categorized as “collective us” or “adversarial them” and processes must be clustered by their modal or non-modal lexical semantics.

Adversarial passages: i.e., with subject “They”, frame enemies and faults.

i.e. From Donald Trump inauguration speech:

“And while they celebrated in our nation's capital, there was little to celebrate for struggling families all across our land.”
**NON-MODAL SEMANTICS**

- Non-modal semantics, linguistic tasks:

  - Action ("he went")
  - Character ("he has power")
  - Definition ("this is a global movement")

Extracting diagnosis, prognosis and motivation from a text.

<table>
<thead>
<tr>
<th>Process</th>
<th>Subject</th>
<th>Modal</th>
<th>Nonmodal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Obligation</td>
<td>Action</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ability/possibility</td>
<td>Character</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intention</td>
<td>Definition</td>
</tr>
<tr>
<td></td>
<td>We</td>
<td>Diagnosis</td>
<td>Motivational</td>
</tr>
<tr>
<td></td>
<td>They</td>
<td>Diagnosis</td>
<td>Diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prognosis</td>
<td>Diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prognosis</td>
<td>Diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motivational</td>
<td>Diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motivational</td>
<td>Diagnosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motivational</td>
<td>Diagnosis</td>
</tr>
</tbody>
</table>
Modal semantics, framing tasks:

- Diagnosis: “We must take action”
- Prognosis: what can be done (ability), what will be done (possibility)
- Motivation: Intention

Linguistic and framing typologies.

<table>
<thead>
<tr>
<th>Modal</th>
<th>Example</th>
<th>Linguistic task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Must, ought, should</td>
<td>We must do something now</td>
<td>Obligation</td>
</tr>
<tr>
<td>Have to, be to, need to, be bound to, ...</td>
<td>They ought to stop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>We need to do something</td>
<td></td>
</tr>
<tr>
<td>Can, could, may, might</td>
<td>We can control our lives</td>
<td>Ability/possibility</td>
</tr>
<tr>
<td>Be able to, be capable to, ...</td>
<td>We could change the world</td>
<td></td>
</tr>
<tr>
<td></td>
<td>We are capable of making it work</td>
<td></td>
</tr>
<tr>
<td>Will, shall,</td>
<td>We will do that for our country</td>
<td>Intention</td>
</tr>
<tr>
<td>Want to, mean to, be going to, ...</td>
<td>We want to start action</td>
<td></td>
</tr>
<tr>
<td></td>
<td>We are going to fight</td>
<td></td>
</tr>
</tbody>
</table>
GLOBAL VIEW

This frame semantic grammar allows the researcher to show where, how and how often in a text a social movement portrays adversarial and own processes.

Stefania Vicari, Measuring collective action frames: A linguistic approach to frame analysis
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ANALYZE THE DATA

Acquire Documents → Preprocess → Research Objective

- Existing Corpora
- Undigitized text
- Electronic sources

Classification

Known Categories

Dictionary Methods

Supervised Methods

Individual Classification

Measuring Proportions (ReadMe)

Individual Methods

Ensembles

Unknown Categories

Fully Automated Clustering

Single Membership Models

Document Level (LDA)

Date Level (Dynamic Multitopic Model)

Author Level (Expressed Agenda Model)

Mixed Membership Models

Computer Assisted Clustering

Supervised (wordscores)

Unsupervised (wordfish)

Grimmer & Stewart: Text as Data: The Promise and Pitfalls of Automatic Content Analysis Methods for Political Texts, Political Analysis Advance Access, January 22, 2013
ANALYZE THE DATA

- Data preparation: involves collecting and checking your data for accuracy
- Descriptive statistics: are used to describe the basic features of the data in a study
- Inferential statistics: investigate questions, models and hypotheses (i.e. infer from the sample data what is the most significant reason of conflict between two entities)
DESCRIPTIVE STATISTICS

- Helpful to simplify large amounts of data in a sensible way
- Each descriptive statistic reduces lots of data into a simpler summary
- Every time you try to describe a large set of observations with a single indicator you run the risk of distorting the original data or losing important detail
- Univariate analysis: (i.e. the frequency of adversarial clauses in multiple speeches)
  - Distribution: the actual frequency in each speech
  - Central tendency: mean, median, mode of the previous distribution
  - Dispersion: range, standard deviation of the previous distribution
- Exploiting relations between elements in a story grammar helps to discover relations between coded entities such as who does what
- If your grammar contains location information you can compute general information about where did specific events took place and with what frequency and consequences
OTHER ANALYSES (1)

Try to reach conclusions that extend beyond the immediate data alone. For instance, we use inferential statistics to try to infer from the sample data what the population might think. Or, we use inferential statistics to make judgments of the probability that an observed difference between groups is a dependable one or one that might have happened by chance in this study.

- We can exploit the relational properties of the story grammar and combine them with the characteristics of relational databases

- Usage of aggregate codes for specific elements such as actions and actors may help with computation of useful statistics
OTHER ANALYSES (2)

Focus on collective action frames as systematically built on the three variable components: injustice, agency, and identity.

1) Given that the attributional function of diagnostic framing assigns causes to problematic issues and therefore implies a moral definition of societal problems, it was argued that diagnostic elements tend to generate a sense of **injustice**.

2) The **agency** component is rather built up by prognostic elements. Specifically, it defines what “collective us” has the ability and the possibility to do in the future.

3) The **identity** dimension delivers a movement’s salience, or characteristic features.

Relations between framing tasks and frame components.

<table>
<thead>
<tr>
<th>Framing tasks</th>
<th>diagnosis</th>
<th>prognosis</th>
<th>motivational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frame components</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>injustice</td>
<td>agency</td>
<td>identity</td>
</tr>
</tbody>
</table>

Stefania Vicari, *Measuring collective action frames: A linguistic approach to frame analysis*
DONALD TRUMP 19-01-17 INAUGURATION SPEECH

“[…] For too long, a small group in our nation's capital has reaped the rewards of government while the people have borne the cost.

Washington flourished, but the people did not share in its wealth. Politicians prospered, but the jobs left and the factories closed.

The establishment protected itself, but not the citizens of our country. Their victories have not been your victories. Their triumphs have not been your triumphs. And while they celebrated in our nation's capital, there was little to celebrate for struggling families all across our land.

[...] We will bring back our jobs. We will bring back our borders. We will bring back our wealth. And we will bring back our dreams.”
DONALD TRUMP 19–01–17 INAUGURATION SPEECH

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Simplified Grammar:

<clause> -> {<semantic triplet>}

<semantic triplet> -> <subject>, <process>, <object>, type of clause

<subject> -> subject name, subject type

<object> -> object name, object type

<process> -> <verbal phrase>, process type, aggregate code

<verbal phrase> -> [modal], verb, negation
"Washington flourished, but the people did not share in its wealth."

- **<subject>** -> subject name, subject type
  - subject name -> Washington
  - subject type -> elite

- **<process>** -> <verbal phrase>, process type, aggregate code
  - process type -> action
  - aggregate code -> prosper

- **<verbal phrase>** -> [modal], verb, negation
  - verb -> flourished
  - negation -> false
“Washington flourished, but the people did not share in its wealth.”

<2. semantic triplet> -> <subject>, <process>, [<object>], type of clause
   type of clause -> self-referential

   <subject> -> subject name, subject type
   subject name -> the people
   subject type -> people

   <process> -> <verbal phrase>, process type, aggregate code
   process type -> action
   aggregate code -> exclude

   <verbal phrase> -> [modal], verb, negation
   verb -> share
   negation -> true

   [<object>] -> object name, [object type]
   object name -> wealth
“We will bring back our jobs.”

<1 semantic triplet> -> <subject>, <process>, [<object>], type of clause

type of clause -> self-referential

<subject> -> subject name, subject type
subject name -> We
subject type -> people

<process> -> <verbal phrase>, aggregate code, process type
process type -> intention
aggregate code -> accomplish

<verbal phrase> -> [modal], verb, negation
[modal] -> will
verb -> bring back
negation -> false

[<object>] -> object name, [object type]
object name -> our jobs
WASHINGTON flourished, but the people did not share in its wealth. Politicians prospered, but the jobs left and the factories closed.
DATA MANAGEMENT

- Large amounts of data with complex relational properties require appropriate software tools
- CAQDAS softwares: PC-ACE, MAXQDA, NVivo, …

www.pc-ace.com
SETUP YOUR GRAMMAR
Together, we will determine the course of America and the world for many, many years to come.

<table>
<thead>
<tr>
<th>Original sentence</th>
<th>SVO triplet</th>
<th>Subject</th>
<th>Subject-We</th>
<th>Verb</th>
<th>Verb-negation</th>
<th>object</th>
<th>object-adjective1</th>
<th>object-adjective2</th>
<th>Circumstances-time</th>
<th>Circumstances-Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Together, we will determine the course of America and the world for many, many years to come.</td>
<td>We</td>
<td>The citizens of America</td>
<td>will determine the course of America and the world for many, many years to come</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
THEORY AND APPLICATION OF QUANTITATIVE NARRATIVE ANALYSIS IN THE CONTEXT OF POPULISM

DATA ENTRY

Chief Justice Roberts, President Carter, President Clinton, President Bush, President Obama, fellow Americans and people of the world, thank you. We, the citizens of America, are now joined in a great national effort to rebuild our country and restore its promise for all of our people.

Together, we will determine the course of America and the world for many, many years to come. We will face challenges, we will confront hardships, but we will get the job done. Every four years, we gather on these steps to carry out the orderly and peaceful transfer of power, and we are grateful to President Obama and First Lady Michelle Obama for their gracious aid throughout this transition. They have been magnificent. Thank you.

Today’s ceremony, however, has very special meaning because today we are not merely transferring power from one administration to another or from one party to another, but we are transferring power from Washington, D.C. and giving it back to you, the people.

For too long, a small group in our nation’s capital has reaped the rewards of government while the people have borne the cost. Washington flourished, but the people did not share in its wealth. Politicians prospered, but the jobs left the factories closed. The establishment protected itself, but not the citizens of our country. Their victories have not been your victories. Their triumphs have not been your triumphs. And while they celebrated in our nation’s capital, there was little to celebrate for struggling families all across our land.

That all changes starting right here and right now because this moment is your moment, it belongs to you.

It belongs to everyone gathered here today and everyone watching all across America. This is your day. This is your celebration. And this, the United States of America.

For President Carter, President Clinton, President Bush, President Obama, fellow Americans and people of the world, thank you.
DATA QUERYING

![Diagram of data querying process](image-url)
### TERM FREQUENCY

<table>
<thead>
<tr>
<th>3-GRAM</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>will make america</td>
<td>5</td>
</tr>
<tr>
<td>we will make</td>
<td>5</td>
</tr>
<tr>
<td>will bring back</td>
<td>4</td>
</tr>
<tr>
<td>we will bring</td>
<td>4</td>
</tr>
<tr>
<td>bring back our</td>
<td>4</td>
</tr>
<tr>
<td>together we will</td>
<td>3</td>
</tr>
<tr>
<td>of our country</td>
<td>3</td>
</tr>
<tr>
<td>again we will</td>
<td>3</td>
</tr>
<tr>
<td>you god bless</td>
<td>2</td>
</tr>
<tr>
<td>women of our</td>
<td>2</td>
</tr>
<tr>
<td>will be protected</td>
<td>2</td>
</tr>
<tr>
<td>transferring power from</td>
<td>2</td>
</tr>
</tbody>
</table>
GEOGRAPHIC INFORMATION SYSTEMS (GIS)

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.
SENIMENT ANALYSIS

Sentiment analysis done with Stanford CoreNLP toolkit, smoothing: moving average, window size = 10
SENTENCE ANALYSIS WITH STANFORD CORENLP

http://nlp.stanford.edu:8080/corenlp/
Verb Ontologies: Framenet

Predicate: flourish

Roleset id: flourish.01, prosper, do well, Source: vncls, framnet:

flourish.01: FLOURISH V NOTES: Based on WSJ. Member of VNcls exist: 47.1-1, gorge 39.6, (from flourish.01 v)

Aliases:

<table>
<thead>
<tr>
<th>Alias</th>
<th>FrameNet</th>
<th>VerbNet</th>
</tr>
</thead>
<tbody>
<tr>
<td>flourish (v)</td>
<td>Thriving</td>
<td></td>
</tr>
</tbody>
</table>

Roles:

Arg1-PPT: thing flourishing (vrole: 47.1-1-Theme, 39.6-Agent)

Arg2-PRD: secondary attribute

Example: usual usage

person: ns, tense: present, aspect: progressive, voice: active, form: participle

Back when the Burgess fauna were flourishing, it seems, human evolutionary hopes hung on the survival of a little worm with a backbone called Pikaia.

Arg1: the Burgess fauna
Rel: flourishing

Example: with secondary attribute

person: ns, tense: past, aspect: ns, voice: active, form: full

John flourished as a grad student—no, really!

Arg1: John
Rel: flourished
Arg2: as a grad student

https://framenet.icsi.berkeley.edu
TOPIC MODELING

Lynchings in Georgia 1875-1935
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