

# Perspective Matters: Event Framing in Language and Society

**Gosse Minnema**  
December 2022



/ university of  
groningen



# The project

## NWO Dutch FrameNet project

- Core focus: how can the **same event** be expressed in different ways in language? In + +
- Collaboration:
  - **VU Amsterdam:** Piek Vossen, Antske Fokkens, Marten Postma, Levi Remijne, Pia Sommerauer  
*Lexical resources, annotation, pragmatics, Dutch*
  - **RUG Groningen:** Malvina Nissim, Johan Bos, Tommaso Caselli, Gosse Minnema  
*Frame semantic parsing, social applications & perception, Italian*



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# The project

## Responsibility Framing Project

### University of Groningen:

- Prof. dr. Malvina Nissim
- Dr. Tommaso Caselli

### UniPV:

- Dr. Chiara Zanchi (femicide framing, migration framing)
- Sara Gemelli (MA intern, femicide framing)
- Serena Coschignano (PhD intern, migration framing)

### UniTO:

- Prof. dr. Viviana Patti (femicide framing)
- Gaetana Ruggiero (research assistant, femicide framing)

### University of Amsterdam:

- Prof. dr. Marco te Brömmelstroet (traffic framing)

### University College Dublin:

- Marion Bartl (PhD student, femicide framing)

### UniCT:

- Benedetta Muscato (MA intern, femicide framing)



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DI PAVIA



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DEGLI STUDI  
DI TORINO



Università  
di Catania



UNIVERSITEIT VAN AMSTERDAM



# Content warning

- An important part of the project is about **frame semantics applied to societally important topics**
- Two of these topics are **femicides** and **traffic crashes** – both can be distressing and some example sentences involve violence
- Our research aims to **raise awareness and understanding** of these topics in the academic community and beyond

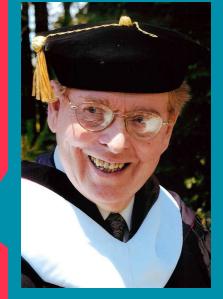
# Project Overview

## Questions

- How are **event perspectives** expressed in language?
- How do perspectives reflect **implicit social biases**?
- Can we **automatically identify and analyze** biased event reporting?

## Our work

- Perspectives are encoded by **frames\*** and **constructions**
- Large-scale **corpus analysis**
- Predicting **text -> perception** and **perception -> text**



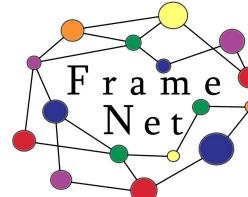
⇒ Fillmore (1985), *Frames and the Semantics of Understanding*

# Frame Semantics

# Fillmore 1985



**Charles J.  
Fillmore**  
1929-2014



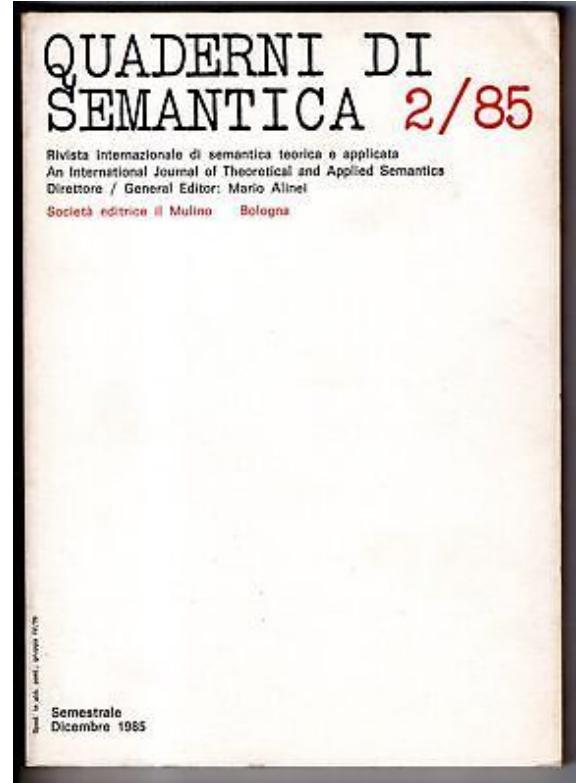
## QUADERNI DI SEMANTICA 2/85

Rivista Internazionale di semantica teorica e applicata  
An International Journal of Theoretical and Applied Semantics  
Direttore / General Editor: Mario Altei  
Società editrice Il Mulino - Bologna

CHARLES J. FILLMORE  
FRAMES AND THE SEMANTICS OF UNDERSTANDING

*Introduction*

In this paper<sup>1</sup> I draw a comparison between semantic theories based on language understanding (broadly conceived) and semantic theories founded on judgments of (relative) truth. For convenience I shall refer to these as the semantics of understanding (U-semantic) and the semantics of truth (T-semantics).

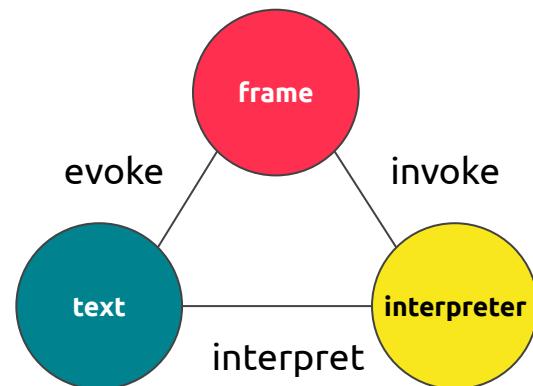


# Fillmore 1985

- **U-semantics (Semantics of Understanding)**
  - "... providing a general account of the relation between linguistic texts, the context in which they are instanced, and the process and products of their interpretation"
    - <> T-semantics (truth-theoretical semantics)
  - Interpretative frames: "the particular organization of knowledge which stands as a prerequisite to understand the meaning of the associated words"
    - Classic examples: *mother, brother, daughter* -> can't understand meaning without concepts of family relations
    - "Frame semantics sees the set of interpretative frames provided by a language as offering alternative 'ways of seeing things' ..." (p. 229)

# Interpretative frames

- An **interpreter** *invokes* a **frame**
  - When trying to interpret a **segment of text**
  - Linking the **content of the text** to **independently known semantic patterns**
  - *"We never open the presents until the morning"* → Christmas
  - *"Uccide la moglie e si spara"* → femicide
- A **text** *evokes* a **frame**
  - Starting from a **specific linguistic form or pattern**
  - **Conventional association** between form and meaning



# Frames and inference

Interpreter processing a text will implicitly ask:

- Why does the language have the **category** which the **form** represents?
  - Needs access to "abstract frame": background information motivating the background
  - Why does English have a word for "mother"?  
⇒ must be some concept that
    - at plays a role in the culture
- Why did the **speaker** select this **form** in this **context**?
  - Depends on **interpretation construction** of the whole text: which frames are already **active in the text world**, how can new frame be **integrated**?
  - Similar to **Gricean implicatures**: infer intended meaning of speaker by comparing different possible forms that they could have chosen
    - BUT: this happens at the **conventional meaning** level, not on the pragmatic level

# Side-note: frame-semantic <> pragmatic inference

- **Frame-semantic inference**

- "My *father* wears a green coat" <>  
"That *man* wears a green coat" <>  
"That *person* wears a green coat"  
⇒ inference: from the different possible choices  
that the speaker had, we can construct an  
interpretation of the scene were gender/family  
relationships play a role or not

- **Pragmatic inference**

- "Yes" <> "His number is +3912345..."  
⇒ inference: based on an **already established conventional meaning** and **cultural norms for communication**, we conclude the that the speaker has certain knowledge or intentions

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HONG KONG BAPTIST UNIVERSITY

*Flouting a Maxim*

Liz, can I have John's number?  
In a case such as this, one might infer that Liz doesn't have the number with her and will supply it later.

Because we do not expect the Maxim to be violated, the apparent violation must be motivated.

Deliberate and apparent violation of maxims is called "flouting".

Slide 6

# Frames and perspectives

- Physical/geographical perspective



**coast** → "Land Travel" frame  
**shore** → "Sea Travel" frame

## Frames & interpretation:

← Interpretation requires **concepts** (geography, travel) to make sense of the word

⇒ Word **evokes scene** imagined by the reader

**Think of inference:** why would speaker choose one or the other? ⇒ reveals something about the scene that they had in mind

# Frames and perspectives

- Social perspective



*buy* → "Commerce-Buy" frame  
*sell* → "Commerce-Sell" frame

**Frames & interpretation:**  
← Interpretation requires  
**concepts** (transaction,  
participants) to make sense of the  
word

⇒ Word **evokes scene** imagined  
by the reader, takes perspective of  
a specific participant

# Frames, perspective & critical analysis

Going back to inference:

- **Why does a language have a particular category?**
  - What does this say about what concepts "exist" in the culture?
  - **How can we relate this to salient societal issues?**
- **Why select one form/perspective over another?**
  - What does the speaker find important to say?
  - **How can we relate that to the speaker's socio-political views and biases?**

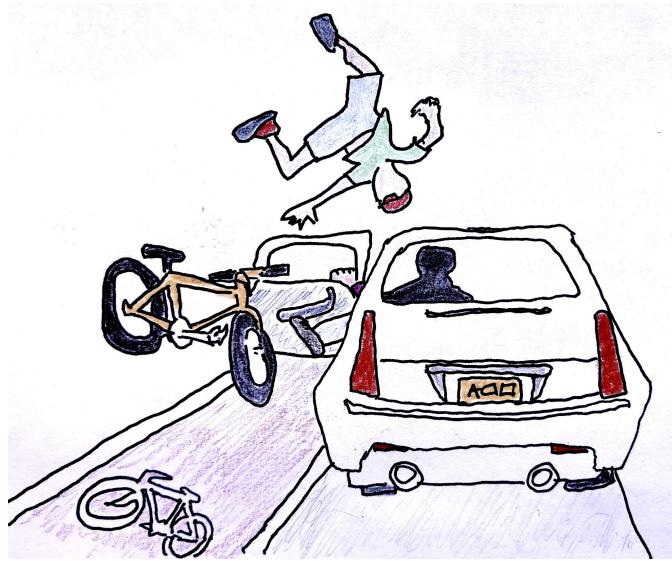
# Frames, perspective & critical analysis

Going back to inference:

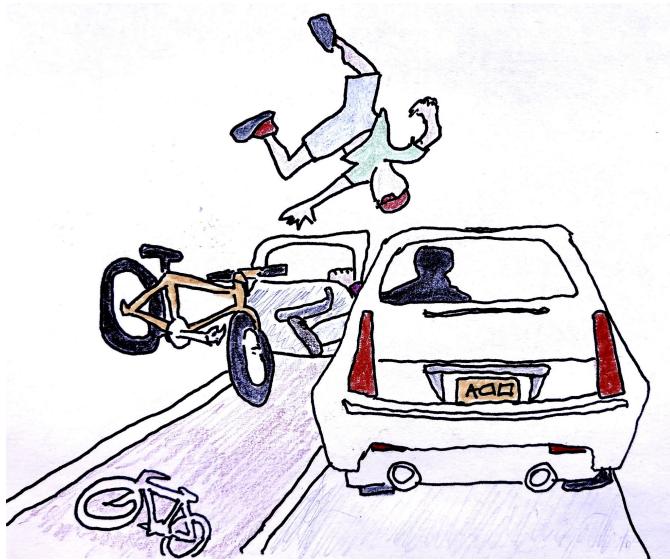
- **Why does a language have a particular category?**
  - What does this say about what concepts "exist" in the culture?
  - **How can we relate this to salient societal issues?**
    - E.g., introduction of *femicide* as a way to draw attention to gender-based violence; introduction of gender-inclusive forms like *tuttə/tuttx*
- **Why select one form/perspective over another?**
  - What does the speaker find important to say?
  - **How can we relate that to the speaker's socio-political views and biases?**

# Perspectives on societal topics

# What happened here?

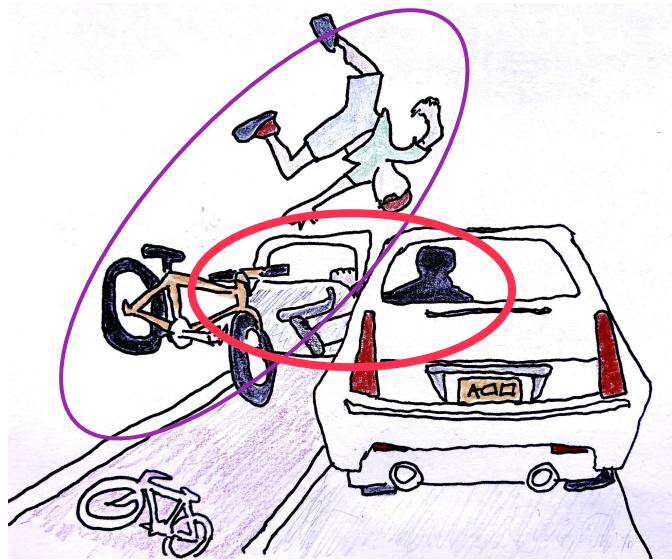


# What happened here?



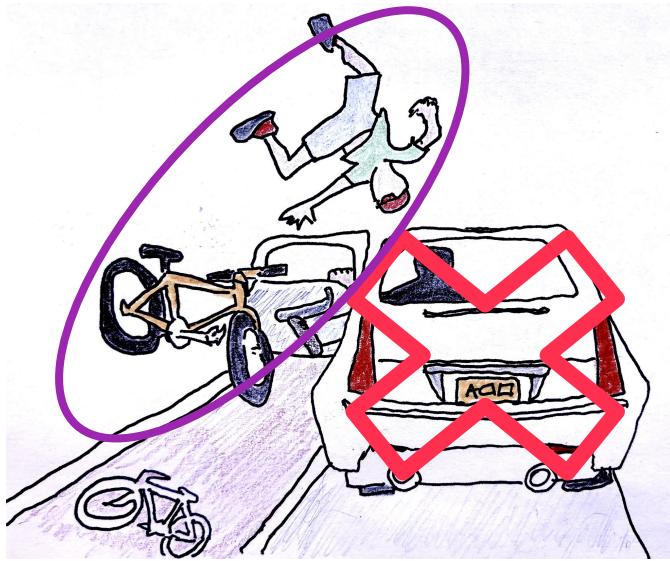
**“Car driver opens door and hits cyclist”**

# What happened here?



**“Car driver opens door and hits cyclist”**

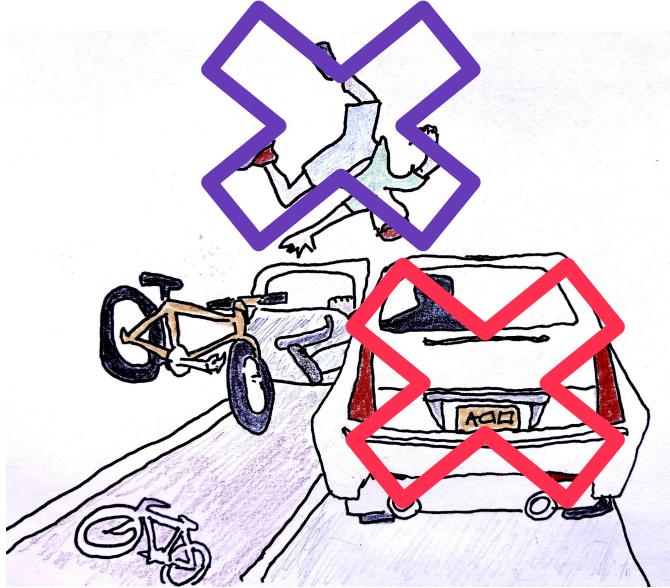
# What happened here?



**“Cyclist injured in accident”**

**“Cyclist slams into door”**

# What happened here?



**“Traffic incident in city center”**

# What happened here?

The screenshot shows a news article from yahoo!news. The header includes the 'yahoo!news' logo and a search bar. Below the header is a navigation menu with links to News, US, Politics, World, COVID-19, Climate Change, Originals, and Health. The main content area features a headline from 'The News-Press' about a Michigan woman who died while bicycling on Fort Myers Beach in a bike lane. The article is attributed to Stacey Henson, Fort Myers News-Press, and was published on January 28, 2022. It is described as a 1-minute read. Social sharing icons for Facebook and Twitter are visible at the bottom.

News US Politics World COVID-19 Climate Change Originals Health

The News-Press

## Michigan woman dies while bicycling on Fort Myers Beach in bike lane

f Stacey Henson, Fort Myers News-Press  
January 28, 2022 · 1 min read

Twitter

# What happened here?

**yahoo!news**

News US Politics World COVID-19 Climate Change Originals Health

The News-Press

## Michigan woman dies while bicycling on Fort Myers Beach in bike lane

f Stacey Henson, Fort Myers News-Press  
January 28, 2022 · 1 min read

Troopers said a 54-year-old Adrian, Michigan, woman was bicycling south along Estero Boulevard near Dakota Street about 9:45 p.m. in the bicycle lane. [Jorge Rivera Jr.](#), 31 of Lehigh Acres was driving an SUV south on Estero Boulevard, hitting the back of the bicycle.

**Death on video:** [Fatal Lehigh Acres shooting, suspect captured on video](#)

**Lyft driver dies:** [Lyft driver suffers fatal medical episode while driving passenger on I-75 in Lee County](#)

The woman was thrown onto the road, and officials pronounced her dead at the scene, troopers said. They did not release the woman's name.

They arrested Rivera after he also hit a mailbox in the 5400 block, stopping the SUV. He faces charges of negligent homicide while driving drunk.

# What happened here?

The screenshot shows a news article from yahoo/news. The headline reads: "Michigan woman dies while bicycling on Fort Myers Beach in bike lane". Below the headline, it says "Stacey Henson, Fort Myers News-Press" and "January 28, 2022 · 1 min read". There are social media sharing icons for Facebook and Twitter.

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## Alternative headline: "Florida man arrested after driving into cyclist"

- Why mention some event participants but not others?
- What does this say about how we view the event?

# Gender-based violence

- **Femicide:** murder of a woman *because of* her gender role (often by male intimate partner)
- Globally widespread problem, but varying **levels of recognition** in different countries/cultures
  - 2017: **87,000 women intentionally killed**, 90% by men
- Problems with **societal perception**: still widespread belief that victims are to blame
- Italy – interesting because:
  - **Relatively low rate** (in EU), but still very **frequent**: 0.4 women / 100,000 population murdered in 2017
  - **Widespread recognition** as a societal problem – body of previous **research and datasets** to build on
  - Yet, **victim blaming still common**: 57% boys and 39% girls believe women (partially) to blame



anti-femicide mural in  
San Lorenzo, Rome

# Gender-based violence & language

- **Bohner (2001):** use of passive constructions increases likelihood of victim blaming in reports of rape
- **Pinelli & Zanchi (2021):** corpus study of Italian femicide news, agent-backgrounding constructions are very common
- **Meluzzi et al. (2021):** questionnaire study on Italian, passive/nominal constructions shift away responsibility from the perpetrator



- **Can we model this computationally?**  
⇒ Larger-scale corpus studies and real-time automatic detection of agent-backgrounding  
⇒ Better understanding of perception, look at wider set of linguistic phenomena

# The *SocioFillmore* project

Minnema et al., *SocioFillmore*:  
*A Tool for Discovering Perspectives*.  
ACL Demo'22

**SOCIOFILLMORE: A Tool for Discovering Perspectives**

Gosse Minnema<sup>1</sup>, Sara Gemelli<sup>2</sup>, Chiara Zanchi<sup>2</sup>, Tommaso Caselli<sup>1</sup>, Malvina Nissim<sup>1</sup>  
1. University of Groningen, The Netherlands  
2. University of Pavia, Italy  
g.f.minnema@rug.nl

**Abstract**

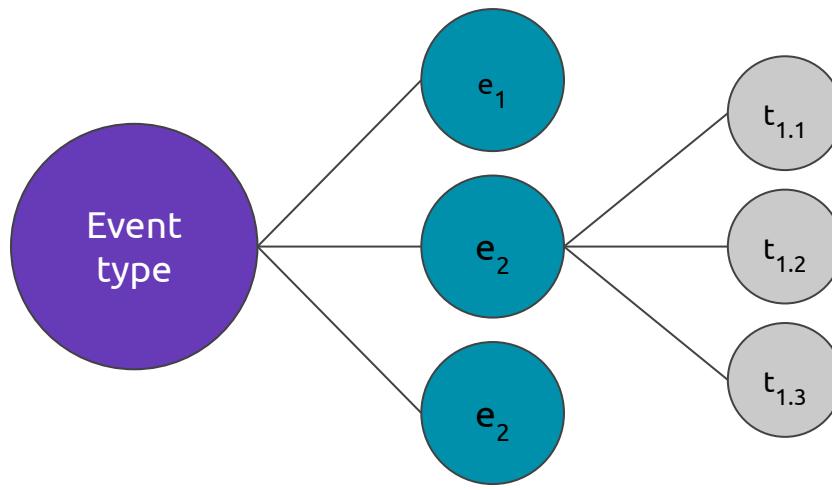
SOCIOFILLMORE is a multilingual tool which helps to bring to fore the *focus* or the *perspective* that a text expresses in depicting an event. Currently, while this tool, we also support enough linguistic components, it is still in development. It is theoretically grounded on frame semantics and cognitive linguistics, and implemented using the LOME frame semantic parser. We describe SOCIOFILLMORE's development and functionalities, show how non-NLP researchers can work with it, and present some example case studies which are already incorporated in the system, together with the kind of analysis that can be visualised.



Figure 1: Analysis by SocioFillmore showing linguistic markers indicating the perspective changes in two descriptions of the same event. Words in boxes indicate triggers of semantic frames in the sentence.

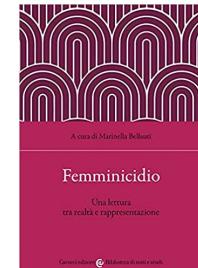
# Step 0: event corpora

- Idea: collect datasets based on the "data-to-text" principle (Vossen et al. 2020)
  - First find concrete instances of a particular event type for which objective metadata (time, location, participants) is available
  - Then find several texts (e.g. news articles) that reference each of these events



# Step 0: event corpora – femicides

- **RAI Corpus:** ~900 femicides, linked to ~2000 news stories
  - Collected by RAI-CRITS research center, in collaboration with UniTO sociologists (Marina Belluati et al.)
- **Corriere 27ora Corpus:** ~900 cases, ~4000 stories
  - updated case-by-case, scraped by us in 2021



Uccise. Da mariti, fidanzati, spasimanti... Ma anche da rapinatori o da uomini semplicemente violenti, o solo per motivi futili. A ciascuna dedichiamo un ricordo che per quanto breve servirà a non dimenticare i loro volti, le loro storie. In queste schede noi le raccontiamo tutte: uccise da qualcosa che gli assassini (e troppo spesso anche loro) si ostinano a chiamare amore, e anche le altre, tutte le altre. Ogni piccolo racconto è una vita perduta.

a cura di Laura Zangarini

# Step 0: event corpora - crashes

- Collection of texts + metadata about road danger / traffic accidents\*  
*\*terminology contested!*
- Societal theme: how does car-dominated society influence reporting?
  - Similar criticisms as with femicide reporting: normalization of (potential) violence, de-agentivizing, implicit victim blaming

Roaddanger.org | Nederland

## Recent crashes

2 January 2022: thecrashes.org has been renamed roaddanger.org.  
11 May 2020: Column Children killed by cars: a choice  
11 mei 2020: Marco's scientific paper about thecrashes.org is live.

[Who is killing who?](#) On this site we collect news reports about traffic crashes. [Participate?](#)

Read also [Van crashes into car. What about the people?](#) (in Dutch)

[Stay informed?](#) (in Dutch)

14 december 2022 | created by Joris van der Bol 14 december 2022

### Automobilist rijdt fietser aan op rotonde, fietser gewond



Groningen – Op de rotonde aan de Vondellaan in de stad heeft woensdagmorgen een aanrijding plaatsgevonden tussen een auto en een fietser. Hierbij is de fietser gewond geraakt. De rotonde was tijdelijk daardoor afgesloten wat zorgde voor flinke drukte rondom de plek. Het slachtoffer werd behandeld in de ambulance en ging mee naar het ziekenhuis.



112groningen.nl | 14 december 2022 | added by Joris van der Bol

Ongeval auto/ fietsers Vondellaan Groningen | 112Groningen, Actueel nieuws over de hulpverleningsdiensten uit Groningen

Groningen – Op de rotonde aan de Vondellaan in de stad heeft woensdagmorgen een aanrijding plaatsgevonden tussen een auto en een fietser. Hierbij is de fietser gewond geraakt. De rotonde was tijdelijk daardoor afgesloten wat zorgde voor flinke drukte rondom de plek. Het slachtoffer werd behandeld ...

# Step 1: frames & constructions

- Example situation: commercial transaction (*buyer, seller, goods*)



**buyer-oriented**

she **buys** a book (COMMERCE\_BUY/active)

(her) **purchase** (COMMERCE\_BUY/nominal)

she was **sold** a book (COMMERCE\_SELL/passive)

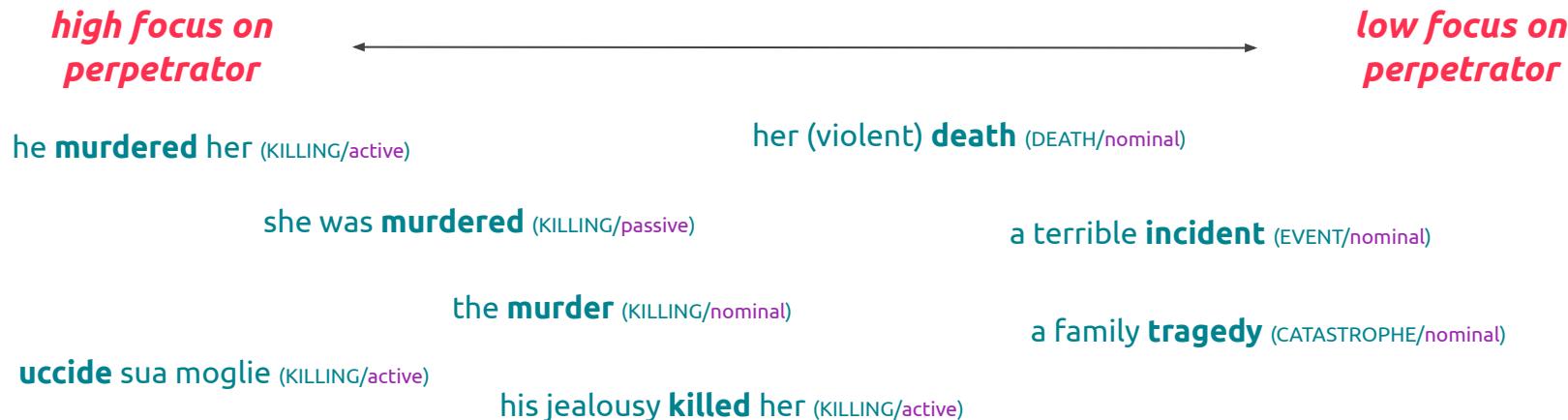
a book was **sold** (COMMERCE\_SELL/passive)

she **sells** a book (COMMERCE\_SELL/active)

**seller-oriented**

# Frames & constructions encode perspective

- Societally important example: femicides / gender-based violence
- Observation (in prev. literature):
  - Media reporting often uses constructions that reduce the perpetrator's role
  - This may normalize the violence / shift responsibility from perpetrator to the victim



# Main NLP pipeline

- Frame semantic parsing
  - predicate detection -> frame detection  
-> role detection (SRL)
  - use pre-trained x-lingual model ->  
LOME (Xia et al., EACL 2021)
- Syntactic construction detection
  - SpaCy dependency parse
  - Rule-based algorithm for mapping frame  
+ dependencies to construction

Minnema et al. (2021) / Minnema et al. (fc.):

- investigate x-lingual parsing for  (& <img alt="Flag of France" data-bbox="595 495 625 525})</li>- due to limited quality & quantity of lang-specific training data, 0-shot EN->IT/NL parsing works best

# Demo System

[[demo.let.rug.nl/gossmann/sociofillmore/](http://demo.let.rug.nl/gossmann/sociofillmore/)]

- Aim: make frame-based analysis accessible to linguists, social scientists, activists, ... without technical background
- Two modes:
  - **Interactive:** for "analytic prototyping" -> helps you select frames, run the pipeline, display results in intuitive way
  - **Explorer:** access pre-annotated event-text datasets

The screenshot shows the SocioFillmore application interface. At the top, there's a red header bar with the title "SocioFillmore" and the subtitle "Computational Frame Semantics for Events in Society". Below the header is a dark grey section containing text about perspective shifts in language. At the bottom of this section is a "Show introduction box" button. The main content area is a light grey box with text about the tool's purpose and how to use it, along with two buttons: "Interactive Mode" and "Explore Existing Datasets".

**SocioFillmore**  
Computational Frame Semantics for Events in Society

When using language, we talk about events differently depending on where we find ourselves in *space*, *time*, *society*, and *ideology*.

Did I **lend** you a book or did you **borrow** a book from me?  Did planes **hit** the WTC or do we remember the **9/11 attacks**?  
 Did a driver **injure** a child or did a cyclist **collide** with a car?  Did a man **murder** a woman or did a tragic **incident** occur?

This NLP tool based on *frame semantics* and *construction grammar* can help visualize *perspective shifts* caused by *backgrounding* of event participants and their *agentytity*.

Show introduction box

How would you like to use the app?

Interactive Mode    Explore Existing Datasets

Show explanatory texts

# Interactive mode

- First step: define event type
- Next: define frames

**Interactive Mode**

First, define the real-world **event type** that you would like to analyze.

[>Show me an example](#)

**Event type**

Traffic crash

An accident happens in which a driver hits a pedestrian with their car. Typically, this kind of event is framed with a strong focus on the victim and their actions, and less focus on the driver

Next, define a set of **frames** — pieces of conceptual information that define how language users imagine and describe your event. If you're not sure which frames to use, we can help you find relevant frames either using a keyword search or by automatically processing a text that you provide.

[>Show me an example](#)

**Semantic Frames**

Select up to three frames that define your event. Where applicable, we will automatically detect further frames that provide alternative perspectives on your event.

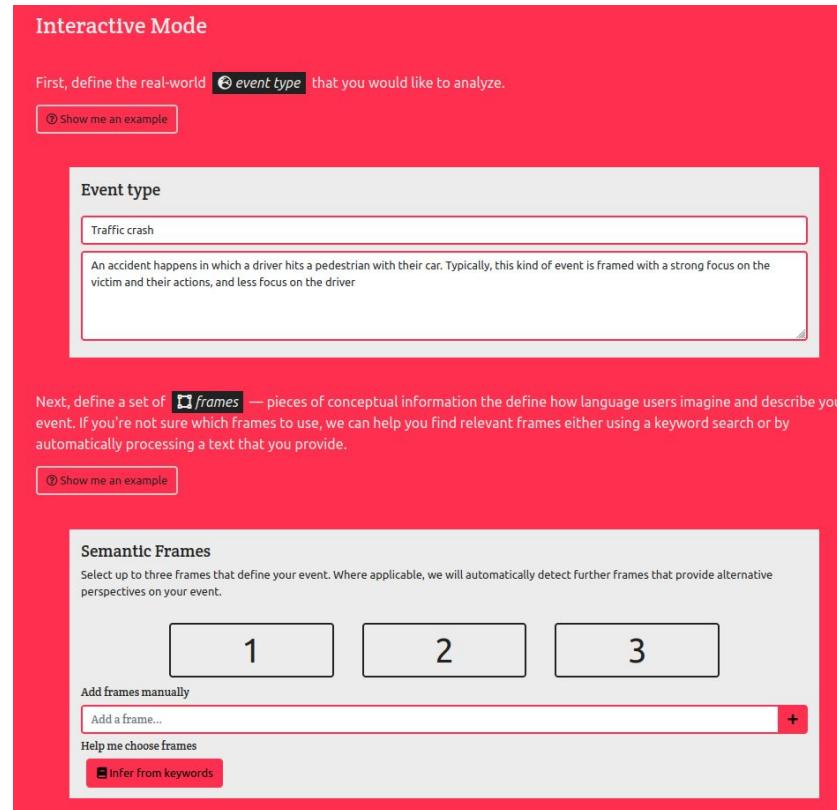
1    2    3

Add frames manually

Add a frame... +

Help me choose frames

Infer from keywords



# Interactive mode

- First step: define event type
- Next: define frames
  - Frame display: show definition, example sentence
  - Auto-detect alternative perspectives using frame-to-frame relations

## Semantic Frames

Select up to three frames that define your event. Where applicable, we will automatically detect further frames that provide alternative perspectives on your event.

1

>Main Perspective

Impact

While in motion, an **Impactor** makes sudden, forcible contact with the **Impactee**, or two **Impactors** both move, mutually making forcible contact. ([read more](#))

*He rapped the desk.*

2

>Main Perspective

Experience\_bodily\_harm

An **Experiencer** is involved in a bodily injury to a **Body\_part**. ([read more](#))

*Oh, you cut yourself?*

3

>Main Perspective

Catastrophe

The words in this frame involve an **Undesirable\_event** which affects the **Patient** negatively. ([read more](#))

*A stormy day will betide*

Causer Perspective

Cause\_Impact

An **Agent** causes an **Impactor** to make sudden, forcible contact with an **Impactee**, or manipulates two (or more) **Impactors** so that they make mutual forcible contact. ([read more](#))

*He rammed his cap down hard*

Switch Main Perspective

Add frames manually

Add a frame...



# Interactive mode

- First step: define event type
- Next: define frames
  - Frame display: show definition, example sentence
  - Auto-detect alternative perspectives using frame-to-frame relations

The screenshot displays three panels representing different perspectives:

- Main Perspective:**
  - Impact:** While in motion, an **Impactor** makes sudden, forcible contact with the **Impactee**, or two **Impactors** both move, mutually making forcible contact. ([read more](#))
  - He rapped the desk.**
- Main Perspective:**
  - Killing:** A **Killer** or **Cause** causes the death of the **Victim**. ([read more](#))
  - Kill me now !**
- Result Perspective:**
  - Death:** The words in this frame describe the death of a **Protagonist**. ([read more](#))
  - "She starved to death.**
  - Switch Main Perspective**

# Interactive mode

- First step: define event type
- Next: define frames
  - Frame display: show definition, example sentence
  - Auto-detect alternative perspectives using frame-to-frame relations

Main Perspective

Being\_at\_risk

An **Asset** is in a state where it is exposed to or otherwise liable to be affected by a **Harmful\_event**, which may be metonymically evoked by reference to a **Dangerous\_entity**. ([read more](#))

*It was secure.*

Flipped Perspective

Risky\_situation

A particular **Situation** is likely (or unlikely) to result in a harmful event befalling an **Asset**. ([read more](#))

*But the buildup carries risks.*

Switch Main Perspective

Causer Perspective

Endangering

An **Agent** or **Cause** is responsible for placing a **Valued\_entity** at risk. ([read more](#))

*She was endangering my future , my career and freedom . '*

Flipped Perspective

Run\_risk

A **Protagonist** is described as being exposed to a potentially dangerous situation that may end in a **Bad\_outcome** for him- or herself. ([read more](#))

*They must always be risked.*

Switch Main Perspective

# Interactive mode

- First step: define event type
- Next: define frames
  - Frame display: show definition, example sentence
  - Auto-detect alternative perspectives using frame-to-frame relations
  - Auto-suggest frames based on keywords + embeddings

**Keywords**

heal disease hospital

(Click a keyword to remove it)

Add a keyword... +

**Suggested frames**

Based on your keywords, we suggest the frames listed below.

Frames marked with the eye symbol ("👁") are more likely to yield interesting results because they allow for automatically detecting alternative perspectives on the event.

**Medical\_interaction\_scenario**  
A Patient interacts with one or more Medics (doctors, nurses, and/or EMTs with a responsibility for the Patient's health) so that the Medics can determine the health status of the Patient and maintain or restore the Patient's health as necessary. ([read more](#)) **SELECT**

**Condition\_symptom\_relation**  
A Patient has a Medical\_condition that can be understood by its Symptoms. ([read more](#)) **SELECT**

**Medical\_intervention**  
Procedural or Medicine based Interventions are used on a Patient to attempt to alleviate a Medical\_condition. ([read more](#)) **SELECT**

**Examples**

...The other firefighter was TREATED for injuries he received to his hand... **SELECT**

**Cure**👁  
This frame deals with a Healer treating and curing an Affliction (the injuries, disease, or pain) of the Patient, sometimes also mentioning the use of a particular Treatment or Medication. ([read more](#)) **SELECT**

**Examples**

...If the doctor desires to TREAT the patient, he is often in a strong... **SELECT**

**Medical\_conditions**👁  
Words in this frame name medical conditions or diseases that a patient suffers from, is being treated for, may be cured of, or die of. ([read more](#)) **SELECT**

**Examples**

...elderly, have died of curable DISEASES due to the decade-long U.N. sanctions... **SELECT**

# Interactive mode

- First step: define event type
- Next: define frames
- On-demand text analysis
  - Display instances of **selected frames** (& other frames)
  - Added information:
    - grammatical construction
    - alternative perspective

**Text Analysis**  
Powered by LOME ([Xia et al. EACL 2021](#))

Enter any text in Italian, Dutch, or English.

English

He was at serious risk of being killed. In many ways, the situation was extremely dangerous for him.

GO

sentence 1

He was at serious risk of being killed .

trigger risk frame Being\_at\_risk grammar noun role Asset He role Harmful\_event of being killed

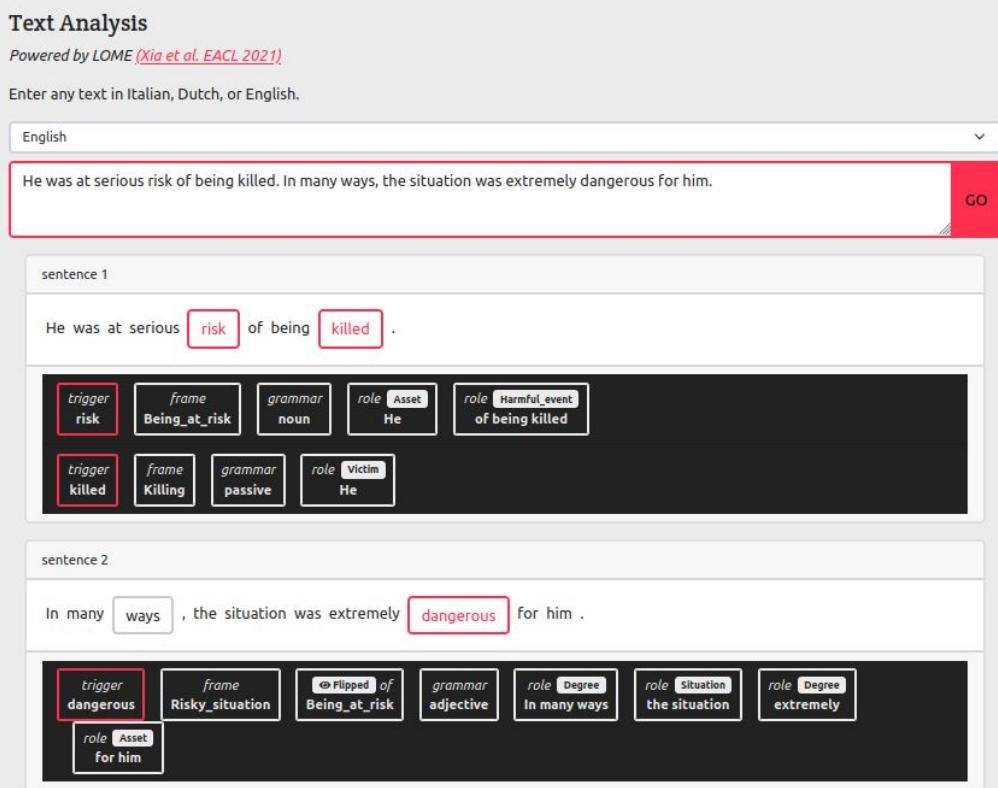
trigger killed frame Killing grammar passive role Victim He

sentence 2

In many ways , the situation was extremely dangerous for him .

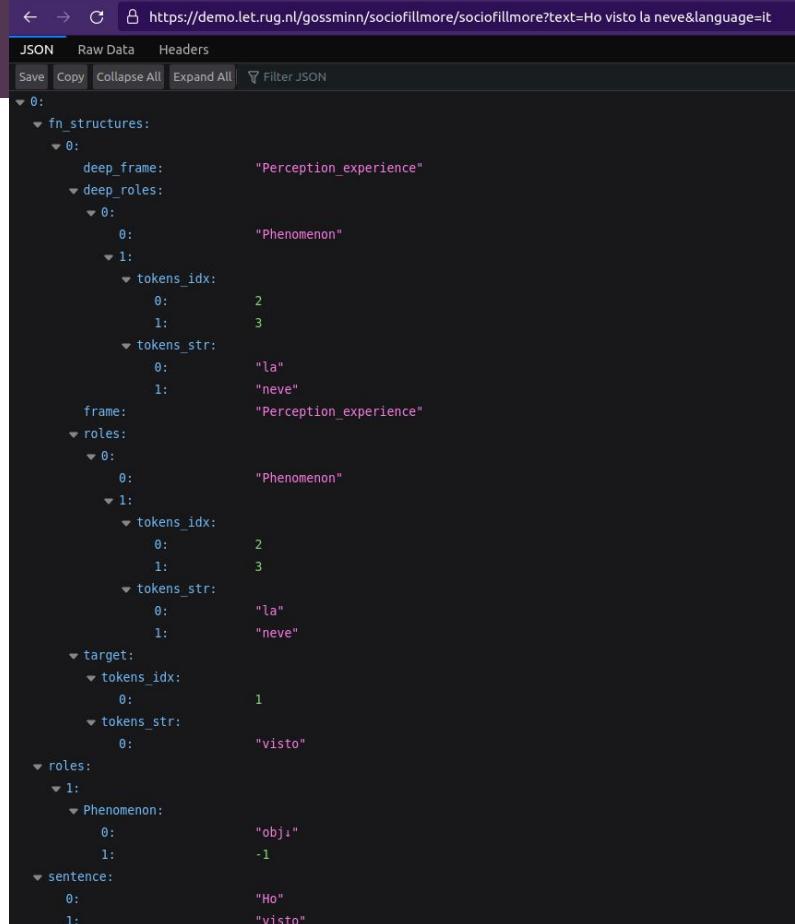
trigger dangerous frame Risky\_situation grammar adjective role Degree In many ways role Situation the situation role Degree extremely

role Asset for him



# API Mode

- For doing your own research: get easy on-demand semantic frames (from LOME) paired with syntactic constructions
- [demo.let.rug.nl/gossminn/sociofillmore/sociofillmore?text=TEXT&language=it](https://demo.let.rug.nl/gossminn/sociofillmore/sociofillmore?text=Ho%20visto%20la%20neve&language=it)



The screenshot shows a JSON viewer interface with the following details:

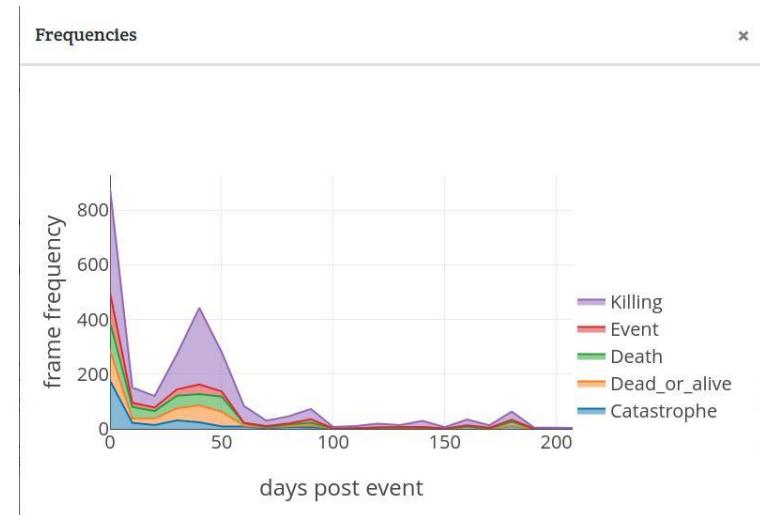
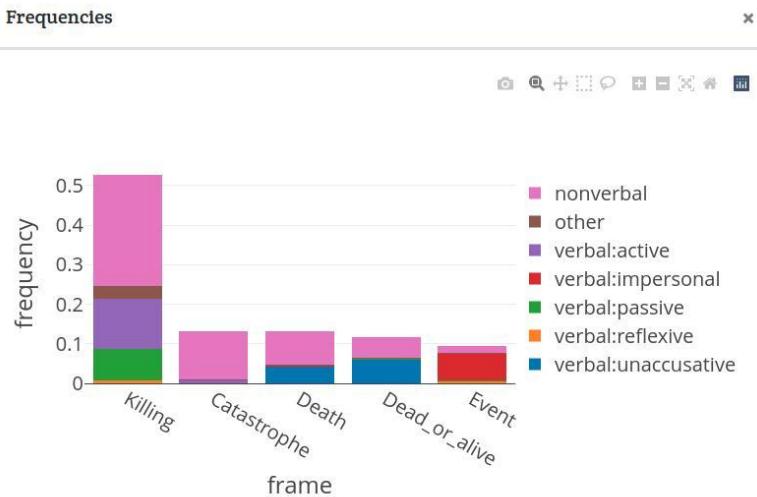
- URL:** https://demo.let.rug.nl/gossminn/sociofillmore/sociofillmore?text=Ho visto la neve&language=it
- JSON Structure:**
  - fn\_structures:** An array containing one object.
    - deep\_frame:** "Perception\_experience"
    - deep\_roles:** An array containing two objects.
      - tokens\_idx:** An array with indices 0 and 1, mapping to values 2 and 3 respectively.
      - tokens\_str:** An array with indices 0 and 1, mapping to values "la" and "neve" respectively.
  - roles:** An array containing two objects, each corresponding to a frame role.
    - tokens\_idx:** An array with indices 0 and 1, mapping to values 2 and 3 respectively.
    - tokens\_str:** An array with indices 0 and 1, mapping to values "la" and "neve" respectively.
  - target:** An object with properties:
    - tokens\_idx:** An array with index 0 mapping to value 1.
    - tokens\_str:** An array with index 0 mapping to value "visto".
  - roles:** An array containing one object.
    - Phenomenon:** An array with indices 0 and 1, mapping to values "obj" and "-1" respectively.
  - sentence:** An array with indices 0 and 1, mapping to values "Ho" and "visto" respectively.

# Dataset Explorer Mode

- Case studies:
  - gender-based violence (Flag of Italy)
  - traffic crashes (Flag of France)
  - migration (Flag of Italy)
- Functionalities:
  - Statistical analysis: frequencies of frames, constructions, semantic roles & more
  - Filter by document-level and event-level attributes
  - Analyze specific documents or search for examples matching specific linguistic criteria

# Dataset Explorer Mode

- Example statistics: frames vs. constructions and frames vs. time



# Dataset Explorer Mode

- Example: get sentences matching linguistic criteria

Analyze Text

Analyze Specific Documents

Use this option to look at specific articles. The list of available articles depends on the filters you selected.

event 405 / doc 29 Analyze

Sample Frames & Constructions

Use this option to find randomly sampled sentences for specific frame-construction combinations. Samples are taken only from the filtered set of events and documents.

Death nonverbal Protagonist nmod ↓ Analyze

Results

Sentence #0 (event 405 / doc 29) text info

Sentence:  
La morte di Eligia , la sorella a Mattino 5 : " Chiediamo giustizia "

Frames of interest:

Death <span style="background-color: #007bff; color: white; padding: 2px 5px;">n nonverbal</span>	Death <span style="background-color: #007bff; color: white; padding: 2px 5px;">n nonverbal</span>
Target: morte Protagonist ( <span style="color: red;">nmod</span> ): di Eligia	

Deep Frames of interest:

Event <span style="background-color: #007bff; color: white; padding: 2px 5px;">n nonverbal</span>
---

Other frames:

Kinship <span style="background-color: #007bff; color: white; padding: 2px 5px;">n nonverbal</span>	Request <span style="background-color: #007bff; color: white; padding: 2px 5px;">refl verbalactive</span>	Verdict <span style="background-color: #007bff; color: white; padding: 2px 5px;">n nonverbal</span>
---	---	---

# Perception prediction

Minnema et al., *Dead or murdered? Predicting Responsibility Perception in Femicide News Reports*. AACL'22

( Best Paper Award)

**Dead or Murdered? Predicting Responsibility Perception in Femicide News Reports**  
Gosse Minnema\*, Sara Gromili\*, Chiara Zanchi\*,  
Tommaso Caelli\*, Malvina Nissim\*

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†University of Pavia, Italy  
g.f.minnema@rug.nl

**Abstract**  
Different linguistic expressions can conceptualize the same event from different viewpoints by emphasizing certain participants over others. The way an event is conceptualized also has social consequences: how do linguistic expressions of gender-based violence (GBV) influence responsibility perception? We build on previous psycholinguistic research in this field and apply it to GBV news reports. A survey of GBV descriptions automatically extracted from a corpus of Italian news papers. We find that the way an event is described has salience of GBV participants with respect to different perspectives. Our best model (fine-tuned BERT) shows solid overall performance, with large differences between the two perspectives. The "dead" view is more prone than the "survived" view to assign blame to the victim. Salient experiments with ridge regression models using different representations show that the "dead" view is more prone to perform similarly to word-based features. Overall, we find that different perspectives lead to large differences in responsibility, and that such perceptions can be modeled automatically. This research has practical applications to raise awareness of the consequences of different perspectives in the general public and in news producers alike.

Figure 1: "Cyclist slams into car door"  
Figure 1: "Driver opens door and hits cyclist"  
Figure 1: "Cyclist slams into car door and cyclist is hit by a car"  
Figure 1: "Collision between bike and car"  
Figure 1: "Collision between cyclist and car"  
Figure 1: "Cyclist slams into car door and cyclist is hit by a car" and "Collision between bike and car" – the same event can be described from alternative perspectives, which can evoke different perceptions in the attribution of responsibility to the actors involved.

events. Indeed, it is known that the way a piece of news is worded influences the way readers perceive attributes of responsibility in the events described (Hymur, 1998). Figure 1<sup>1</sup> illustrates how the same event can be reported on from different viewpoints.

# Frames & perception

- **Select** semantic frames that lexically encode the murder  
(he *murdered* her, she was found *dead*, a family *tragedy*, the *incident*)
- **Extract** sentences that contain instances of these frames
- **Collect** perception judgements from human participants

1. FOCUS: does the sentence *focus* on the agent or on something else?
2. CAUSE: does the sentence describe the event as being *caused* primarily by a human or by something else?
3. BLAME: does the sentence attribute *blame* to the agent or to something else?

Example	FOCUS	CAUSE	BLAME
	<i>ascribed to the murderer</i>		
Her fiancé brutally murdered her	+	+	+
Blinded by jealousy, he killed her	+	+	±
Her husband's jealousy killed her	+	-	±
Her blind love for him became fatal	±	-	-
A tragic incident occurred in Rome	-	-	-

# Questionnaire study

- **Collect** perception judgements from human participants
    - Online **questionnaire study**, distributed to **university students** across Italy
    - **240 participants** (64% women, 36% men, <1% non-binary; mean age 23.4)
    - Ratings for **400 sentences**, with  $\geq 10$  judgements per sentence per dimension

# Perception results: overview

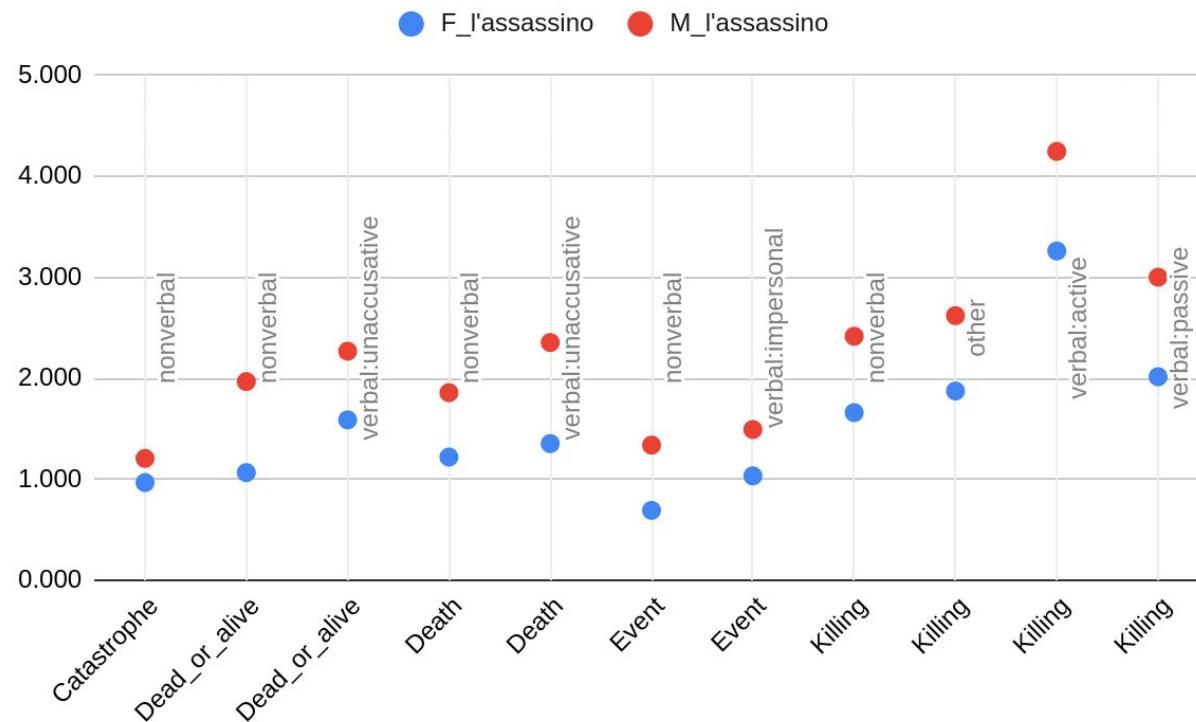
	participant	all		female		male	
		scores	mean	std	mean	std	mean
blame	murderer	2.35	1.89	2.07	1.80	2.75	2.01
	victim	0.49	0.92	0.44	0.92	0.55	0.92
	object	0.46	1.01	0.44	1.02	0.50	0.99
	concept	0.82	1.30	0.83	1.33	0.79	1.25
	no-one	1.36	1.74	1.49	1.76	1.19	1.71
cause	human	3.51	1.68	3.54	1.67	3.48	1.69
	object	1.37	1.85	1.36	1.84	1.40	1.91
	concept	0.86	1.32	0.88	1.31	0.76	1.34
	no-one	1.59	1.59	1.58	1.59	1.61	1.58
focus	murderer	2.26	1.94	2.23	1.91	2.30	1.97
	victim	2.85	1.60	2.68	1.59	3.07	1.61
	object	1.35	1.65	1.33	1.65	1.39	1.65
	concept	1.65	1.65	1.56	1.69	1.76	1.59

Table 3: Summary of perception scores per question and attribute

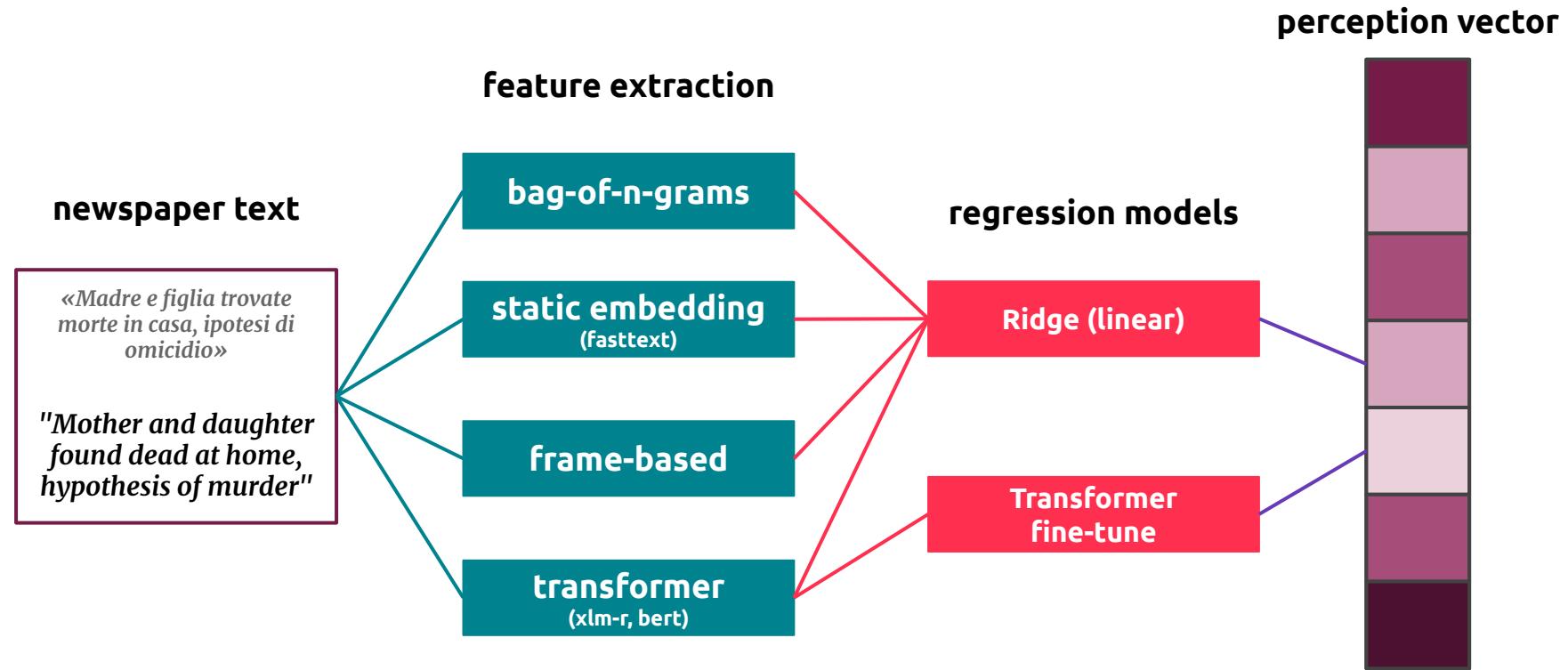
frame/construction	murderer**	victim**	object	concept / emotion*
CATASTROPHE				
nonverbal	1.319	2.713	0.760	2.190
DEAD_OR_ALIVE				
nonverbal	1.195	3.387	1.386	1.993
intransitive	1.983	3.529	1.566	1.539
DEATH				
nonverbal	0.967	3.247	1.507	1.914
intransitive	1.867	3.921	1.690	1.286
EVENT				
nonverbal	1.431	1.503	1.186	2.339
impersonal	1.169	2.201	1.309	1.949
KILLING				
nonverbal	2.007	2.387	1.032	1.673
other	2.410	2.345	1.198	1.663
active	3.897	2.659	1.570	1.651
passive	1.947	3.425	1.491	1.315

Table 4: Mean perception scores for “the main focus is on X”. “\*” = differences between frame-construction pairs are significant at  $\alpha = 0.05$ , “\*\*” = significant at  $\alpha = 0.001$  (Kruskal-Wallis non-parametric H-test). Cells with a value  $> 2.5$  are highlighted in green.

# Perception results: gender differences



# Perception prediction



# Perception prediction

	Ridge / Bag-of-words	Ridge / Bag-of-frames	Transformer / BERT-IT
R <sup>2</sup> : average (all attributes)	0.20	0.20	0.44
R <sup>2</sup> : "blame on murderer"	0.49	0.30	0.56
R <sup>2</sup> : "blame on victim"	-0.05	-0.03	0.17

Some attributes well-predicted, even by weaker models;  
others hard to predict even by the best models

	model	attribute	absolute	linear	logistic	Random Forest	Decision Tree	LR	Normal	linear	logistic	Random Forest	Decision Tree	LR	absolute
RMSE			0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
COS	average	average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	murderer	murderer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	concept	concept	0.00	0.05	0.11	0.08	0.02	0.02	0.08	0.25	0.27	0.35	0.26	0.12	0.29
	actor	actor	-0.02	0.32	0.18	0.25	0.24	0.25	0.28	0.28	0.29	0.35	0.48	0.34	0.25
	blame	blame	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	object	object	-0.02	0.32	0.18	0.25	0.24	0.25	0.28	0.28	0.29	0.35	0.48	0.34	0.25
	actor-blame	actor-blame	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	concept-blame	concept-blame	-0.01	0.11	0.07	0.08	0.09	0.12	0.07	0.16	0.06	0.39	0.31	0.04	0.17
	actor-object	actor-object	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	concept-object	concept-object	0.00	0.13	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.43	0.46	0.08	0.23
	actor-concept	actor-concept	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	actor-object	actor-object	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	concept-object	concept-object	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5: Regression results overview. RMSE, Cosine Similarity, and F1 scores

See our paper for full results

# Perception prediction

	Ridge / <b>Bag-of-words</b>	Ridge / <b>Bag-of-frames</b>	Ridge / <b>FastText</b>	Transformer / <b>BERT-IT</b> <b>(full)</b>	Transformer / <b>BERT-IT</b> <b>(distilled)</b>	Transformer / <b>mBERT</b> <b>(full)</b>
<b>R<sup>2</sup>: average (all attributes)</b>	<b>0.20</b>	<b>0.20</b>	<b>0.19</b>	<b>0.44</b>	<b>0.45</b>	<b>0.38</b>

Transformer models perform best overall, monolingual > multilingual

model feature	absolute loss	Spearman R	$\beta_1$	Ridge				Transformer				BERT-IT				mBERT			
				$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$	$\beta_8$	$\beta_9$	$\beta_{10}$	$\beta_{11}$	$\beta_{12}$	$\beta_{13}$	$\beta_{14}$	$\beta_{15}$	$\beta_{16}$	
COS	-0.02	0.00	0.04	0.04	0.02	0.06	0.06	0.05	0.04	0.03	0.07	0.09	0.05	0.04	0.06	0.05	0.06	0.04	
average	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
mean	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
object	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
color	-0.02	0.02	0.18	0.25	0.24	0.02	0.28	0.37	0.28	0.29	0.27	0.35	0.04	0.34	0.27	0.35	0.34	0.27	
shape	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
size	-0.02	0.02	0.18	0.25	0.24	0.02	0.28	0.37	0.28	0.29	0.27	0.35	0.04	0.34	0.27	0.35	0.34	0.27	
location	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
time	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
case	-0.01	0.11	0.07	0.08	0.09	0.02	0.11	0.07	0.08	0.09	0.11	0.04	0.10	0.08	0.11	0.04	0.10	0.08	
concept	-0.01	0.11	0.07	0.08	0.09	0.02	0.11	0.07	0.08	0.09	0.11	0.04	0.10	0.08	0.11	0.04	0.10	0.08	
value	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
object	-0.01	0.11	0.07	0.08	0.09	0.02	0.11	0.07	0.08	0.09	0.11	0.04	0.10	0.08	0.11	0.04	0.10	0.08	
color	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
shape	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
size	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
location	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
time	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Table 5: Regression results overview. RMSE, Cosine Similarity, and R<sup>2</sup> scores

See our paper for full results

# Perception prediction

	Transformer / <b>BERT-IT (full)</b>
R <sup>2</sup> : "focus on murderer"	0.66
R <sup>2</sup> : "focus on victim"	0.59
R <sup>2</sup> : "focus on concept"	0.63
R <sup>2</sup> : "focus on object"	0.46

"Focus" question: most **consistent** results for best models

Table 5: Regression results overview: RMSE, Cosine Similarity, and  $R^2$  scores.

See our paper for full results

# Model interpretation

## Feature analysis:

- Weight analysis (ridge) vs. integrated gradients (BERT)
- Some consistency in most informative words: "killing" or "relationship" words contribute to more blame
- "Eventive" words contribute to less blame

feature	blame: murderer		bertino	
	ridge/bow	attr	ridge/f1+	attr
	feature	attr	feature	attr
+1 ex ['ex' (ex-partner)]	0.38	rol:Killing:Killer	0.21	killer ['killer']
+2 uccide ['he/she/it kills']	0.33	ex ['ex' (ex-partner)]	0.15	uccide ['he/she/it kills']
+3 moglie ['wife']	0.31	frm:Pers_rel	0.14	assassino ['murderer']
+4 uccise ['killed' (ptc, f.pl.)]	0.24	frm:Killing	0.13	ex ['ex' (ex-partner)]
+5 assassino ['murderer']	0.22	cx:Pers_rel++nvrb	0.13	fidanzato ['boyfriend']
-5 sono ['I am' / 'they are']	-0.14	rol:Event:Event	-0.06	una ['a' (f.)]
-4 della ['of the' (+f.noun)]	-0.15	sono ['I am' / 'they are']	-0.06	.
-3 -	-0.16	frm:Event	-0.08	sono ['I am' / 'they are']
-2 accaduto ['happened']	-0.17	della ['of the' (+f.noun)]	-0.08	trovata ['found' (ptc, f.sg.)]
-1 .	-0.35	.	-0.13	morta ['dead' (f.sg.)]

# Conclusions & next steps

- **Frames & constructions** are useful for modeling responsibility perception
- **Regression models** are reasonably successful at predicting perception:
  - Some questions (focus) **easier** than others (blame)
  - Some attributes require **richer representations** than others
- **Next steps:**
  - Expand to **more domains** and **languages**
  - Investigate **inter-participant differences** in perception
  - Reverse the problem: **style transfer** – rewrite changing the perception

# Thank you!

- Code & data: [gitlab.com/sociofillmore/perceived-perspective-prediction](https://gitlab.com/sociofillmore/perceived-perspective-prediction)
  - Get in touch: [g.f.minnema@rug.nl](mailto:g.f.minnema@rug.nl) / [www.gossminn.eu](http://www.gossminn.eu)