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

university of groningen

VU VRIJE UNIVERSITEIT AMSTERDAM

NWO

The project

Responsibility Framing Project

University of Groningen:
- **Prof. dr. Malvina Nissim**
- **Dr. Tommaso Caselli**

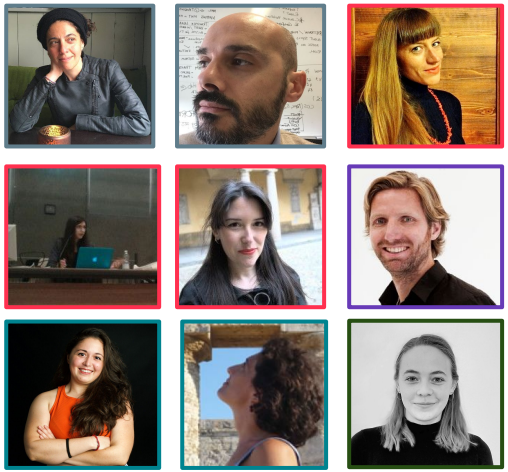
UniPV:
- **Dr. Chiara Zanchi** (femicide framing, migration framing)
- **Sara Gemelli** (MA intern, femicide framing)
- **Serena Coschignano** (PhD intern, migration framing)

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)



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

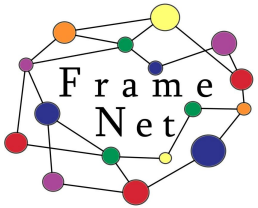
- Perspectives are encoded by **frames*** and **constructions**
- Large-scale **corpus analysis**
- Predicting **text -> perception** and **perception -> text**

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

Frame Semantics

Fillmore 1985

Charles J. Fillmore
1929-2014



CHARLES J. FILLMORE
FRAMES AND THE SEMANTICS OF UNDERSTANDING

Introduction

In this paper [1] 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).

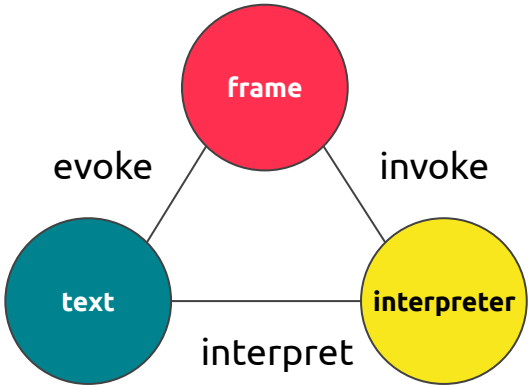
Fillmore 1985

- **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 th
    - 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

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?**

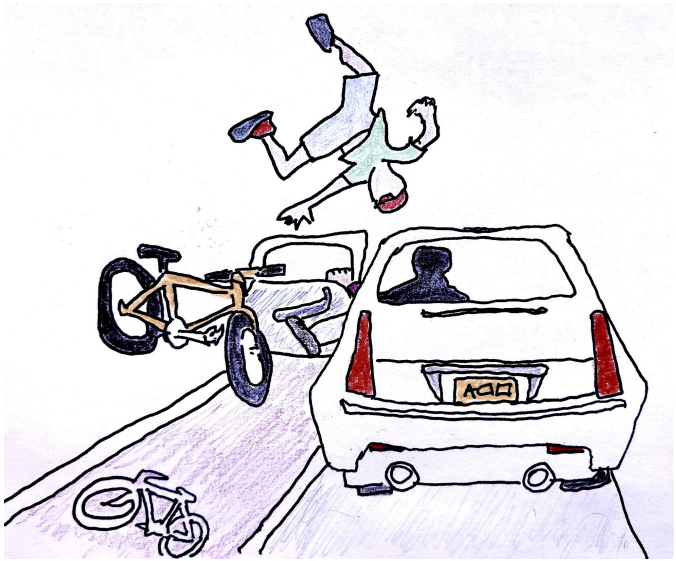
Frames, perspective & critical analysis

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?



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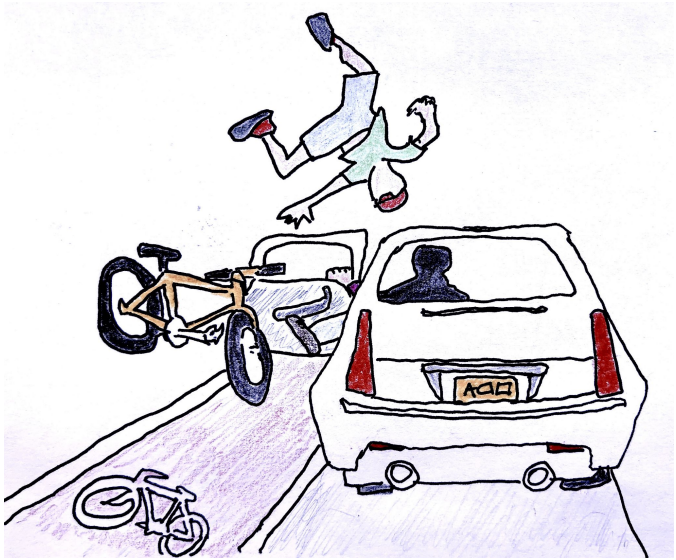
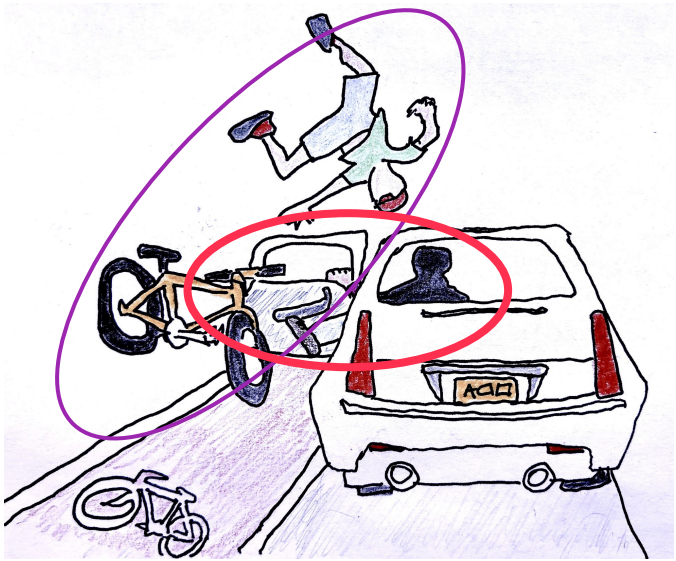


“Car driver opens door and hits cyclist”

What happened here?



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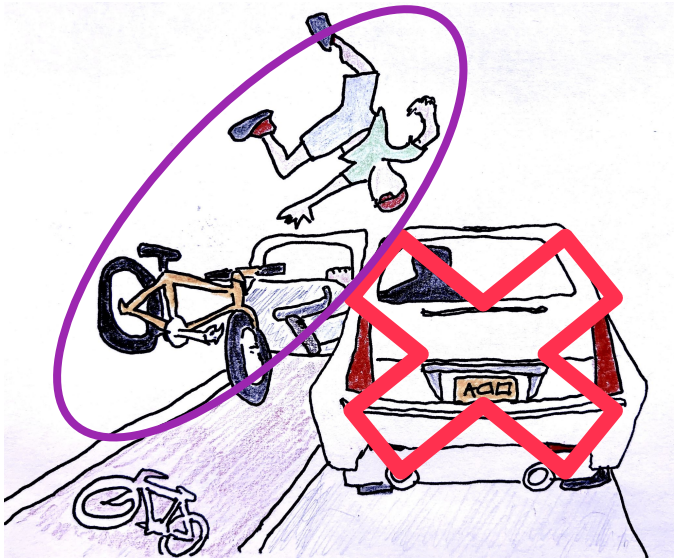
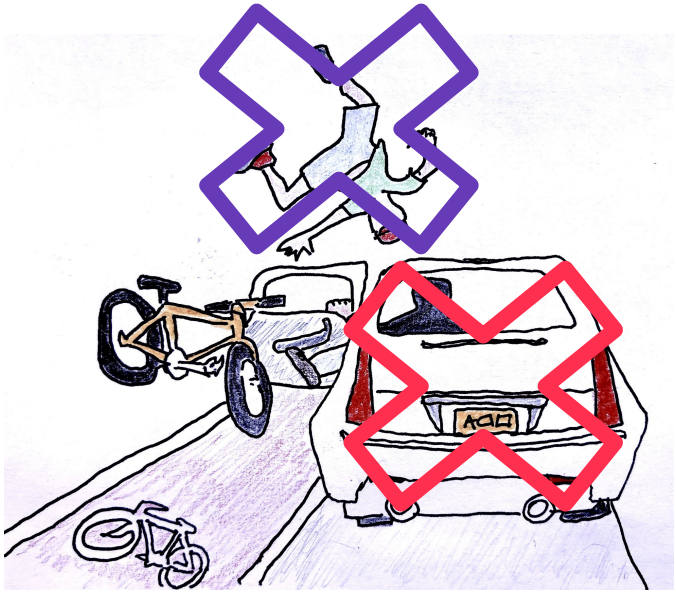


“Cyclist injured in accident”

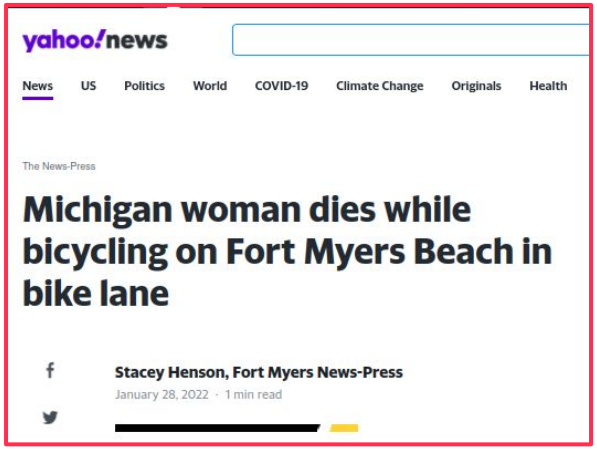
“Cyclist slams into door”

What happened here?



“Traffic incident in city center”

What happened here?



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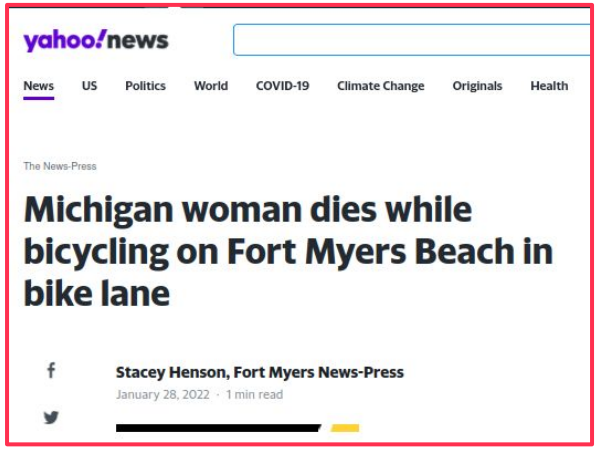

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The News-Press

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

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.

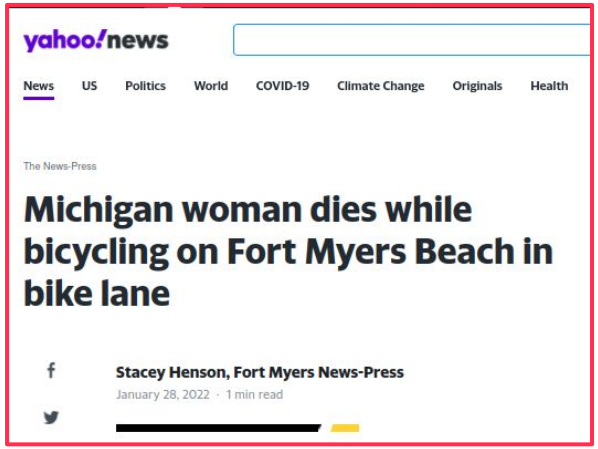
Death on video: Fatal Lehigh Acres shooting, suspect captured on video

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?



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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?

Article source: https://archive.ph/WFD37

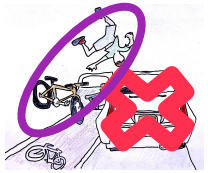
Gender-based violence

- **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

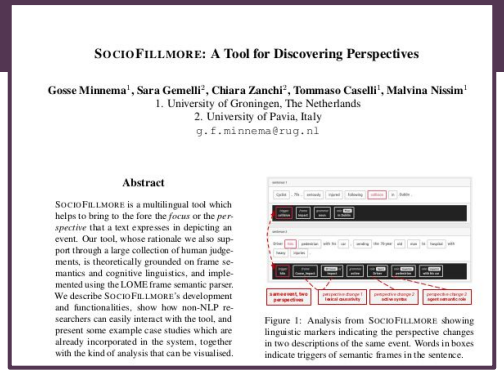
- **Bohner (2001):** use of passive constructions increases likelihood of victim blaming in reports of rape
- **Pinelli & Zanchi (2021):** corpus study of Italian femicide news, agent-backgrounding constructions are very common
- **Meluzzi et al. (2021):** questionnaire study on Italian, passive/nominal 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[1], Sara Gemelli[2], Chiara Zanchi[2], Tommaso Caselli[1], Malvina Nissim[1]
1. University of Groningen, The Netherlands
2. University of Pavia, Italy
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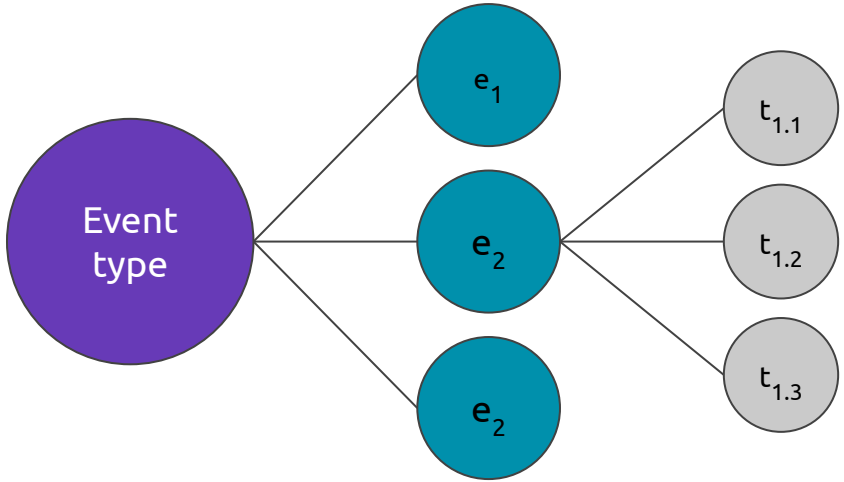
Abstract

SOCIOFILLMORE is a multilingual tool which helps to bring to the fore the *focus* or the *perspective* that a text expresses in depicting an event. Our tool, whose rationale we also support through a large collection of human judgements, 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 easily interact with the tool, 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 from 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.

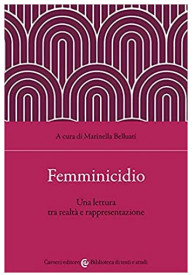
Step 0: event corpora

- Idea: collect datasets based on the 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



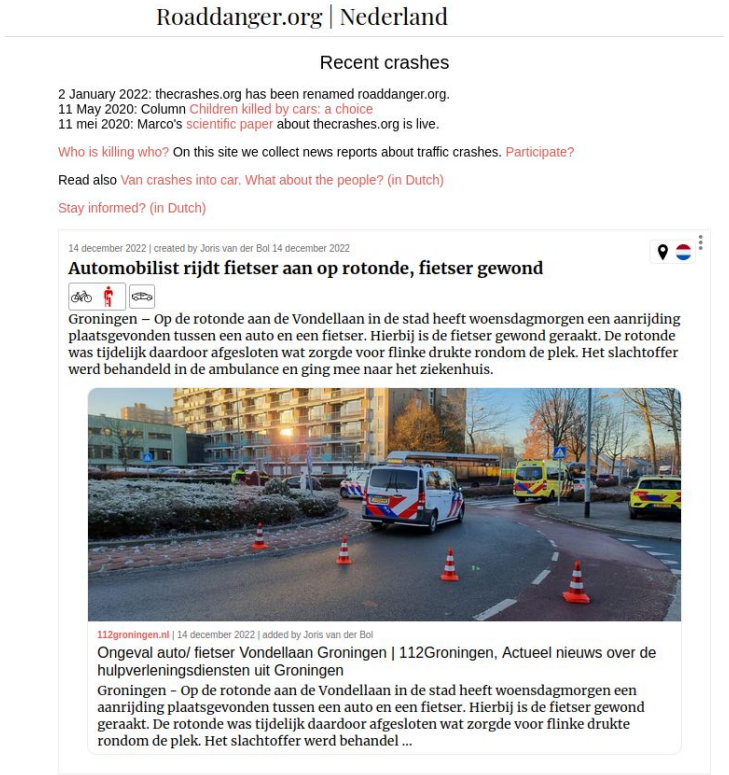
Step 0: event corpora – femicides

- **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



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/ fietser Vondellaan Groningen | 112Groningen, Actueel nieuws over de hulpverleningsdiensten uit Groningen

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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

high focus on perpetrator ⟷ ***low focus on perpetrator***

he **murdered** her (KILLING/active)

her (violent) **death** (DEATH/nominal)

she was **murdered** (KILLING/passive)

a terrible **incident** (EVENT/nominal)

the **murder** (KILLING/nominal)

a family **tragedy** (CATASTROPHE/nominal)

uccide sua moglie (KILLING/active)

his jealousy **killed** her (KILLING/active)

Main NLP pipeline

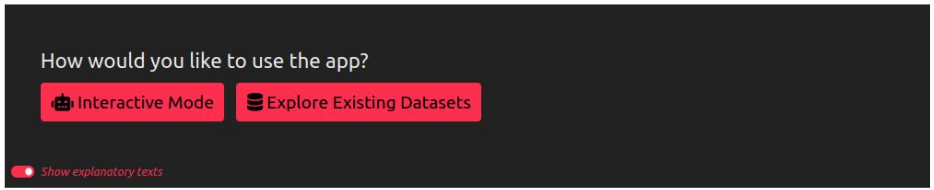
- Frame semantic parsing
  - predicate detection -> frame detection -> role detection (SRL)
  - use pre-trained x-lingual model -> LOME (Xia et al., EACL 2021)
- Syntactic construction detection
  - SpaCy dependency parse
  - Rule-based algorithm for mapping frame + dependencies to construction

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

- investigate x-lingual parsing for 🇮🇹 (& 🇳🇱)
- due to limited quality & quantity of lang-specific training data, 0-shot EN->IT/NL parsing works best

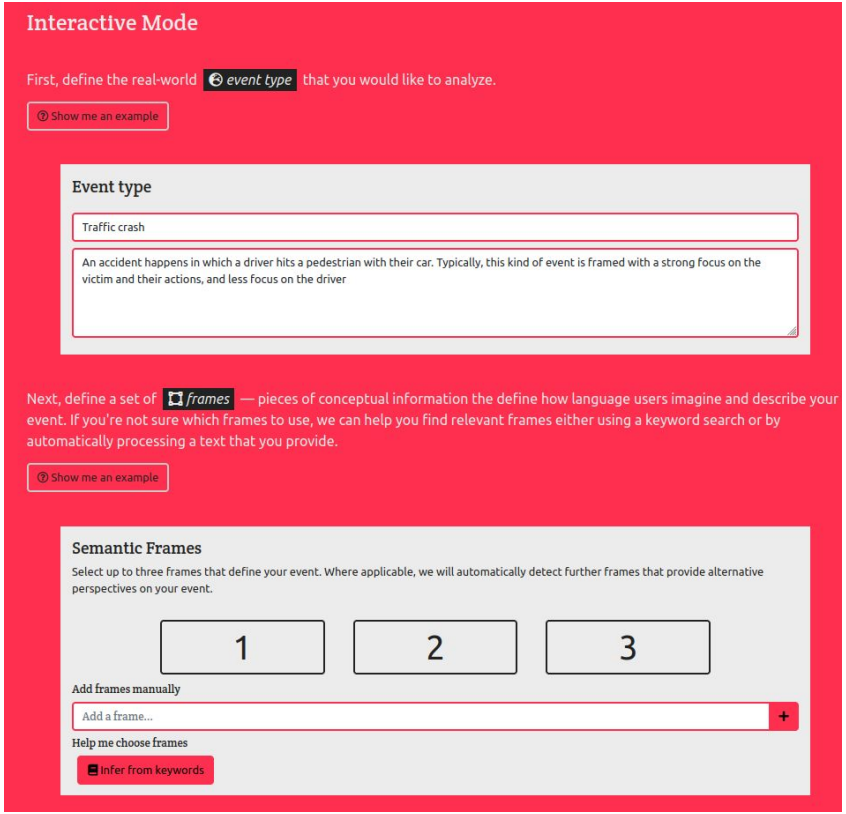
Demo System [demo.let.rug.nl/gossminn/sociofillmore/]

- 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



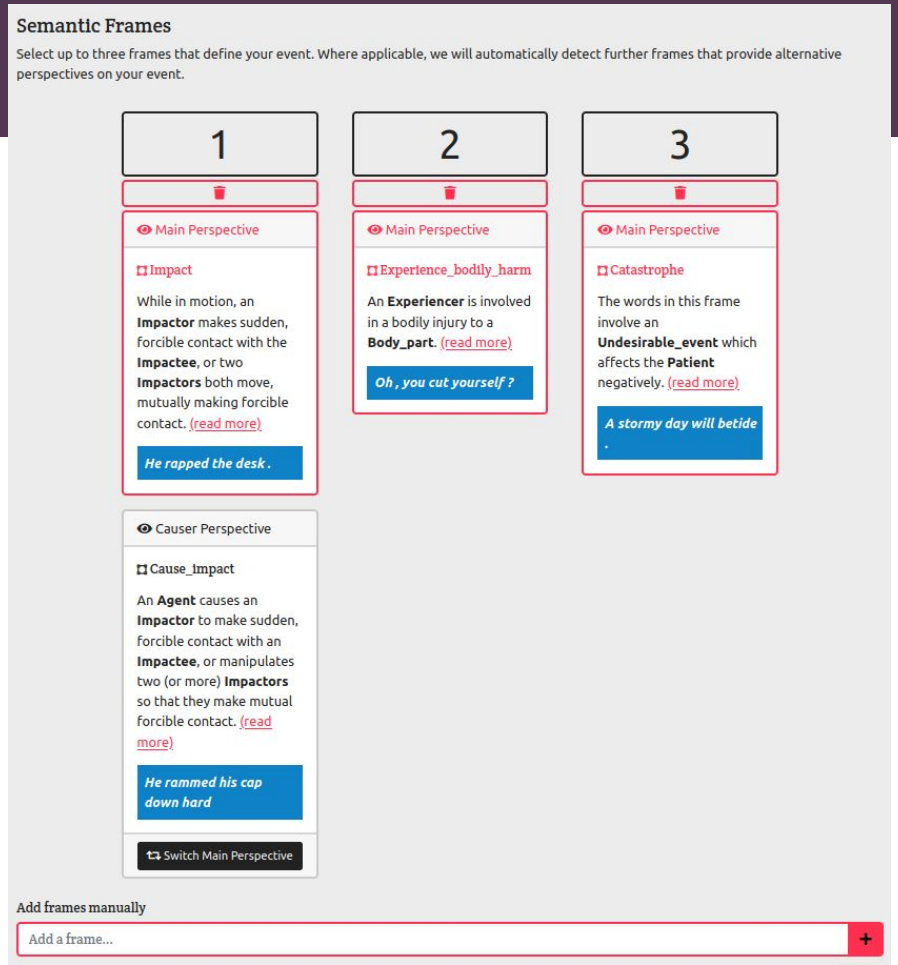
Interactive mode

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



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



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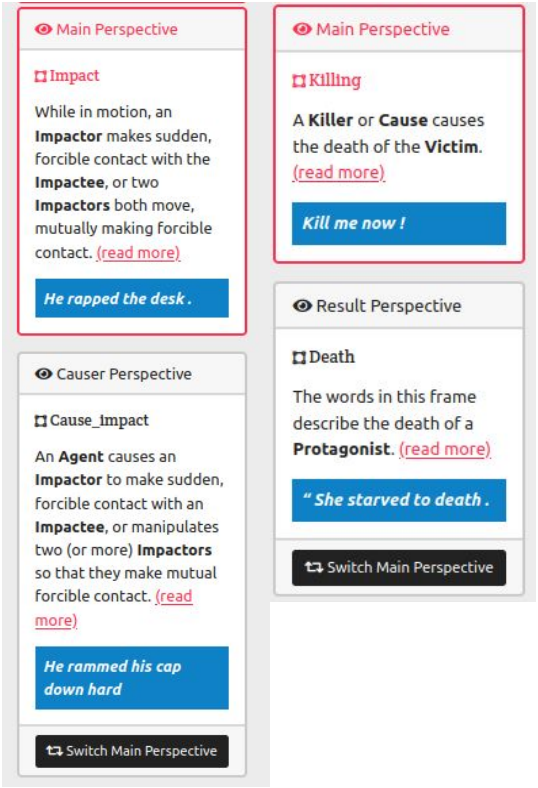

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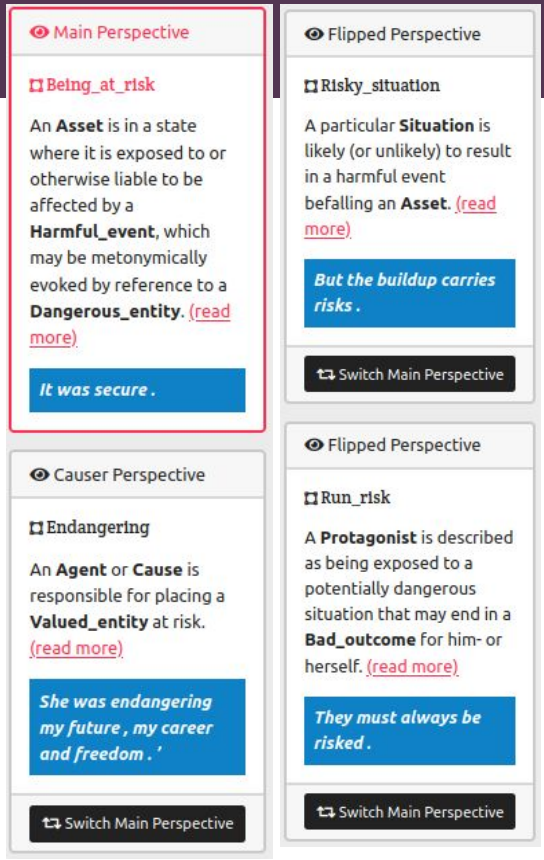
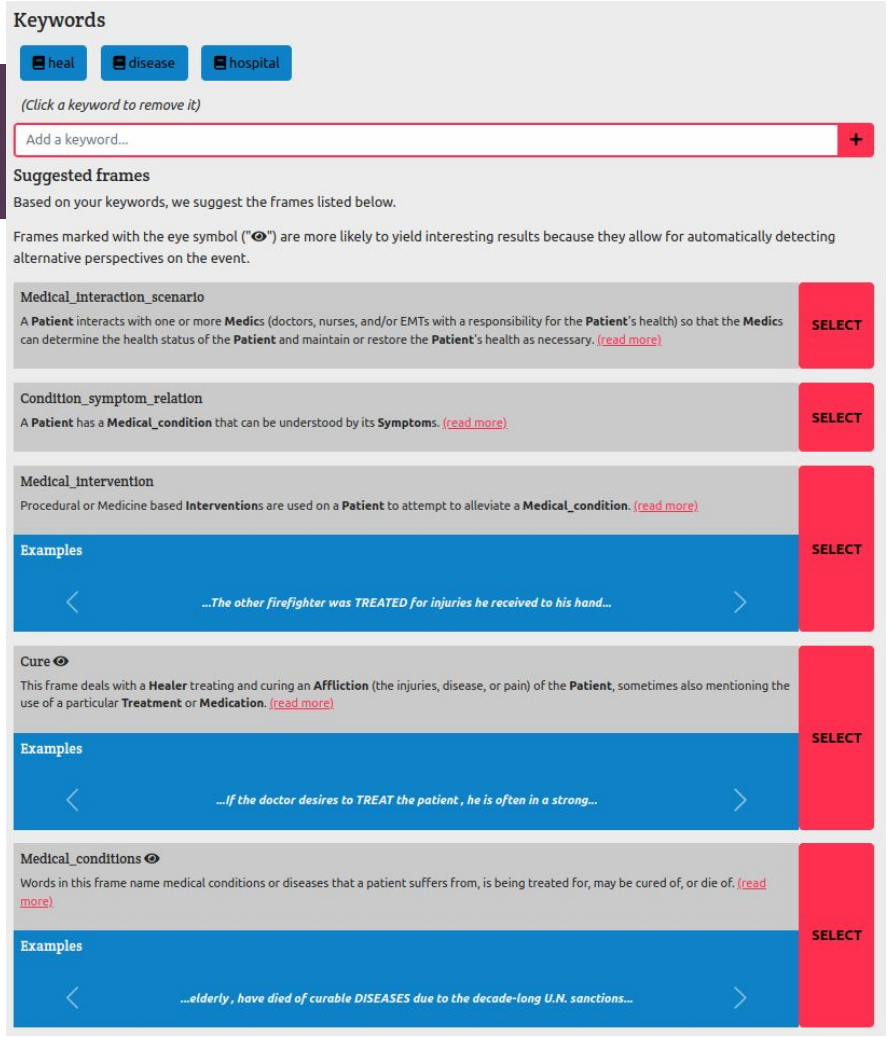


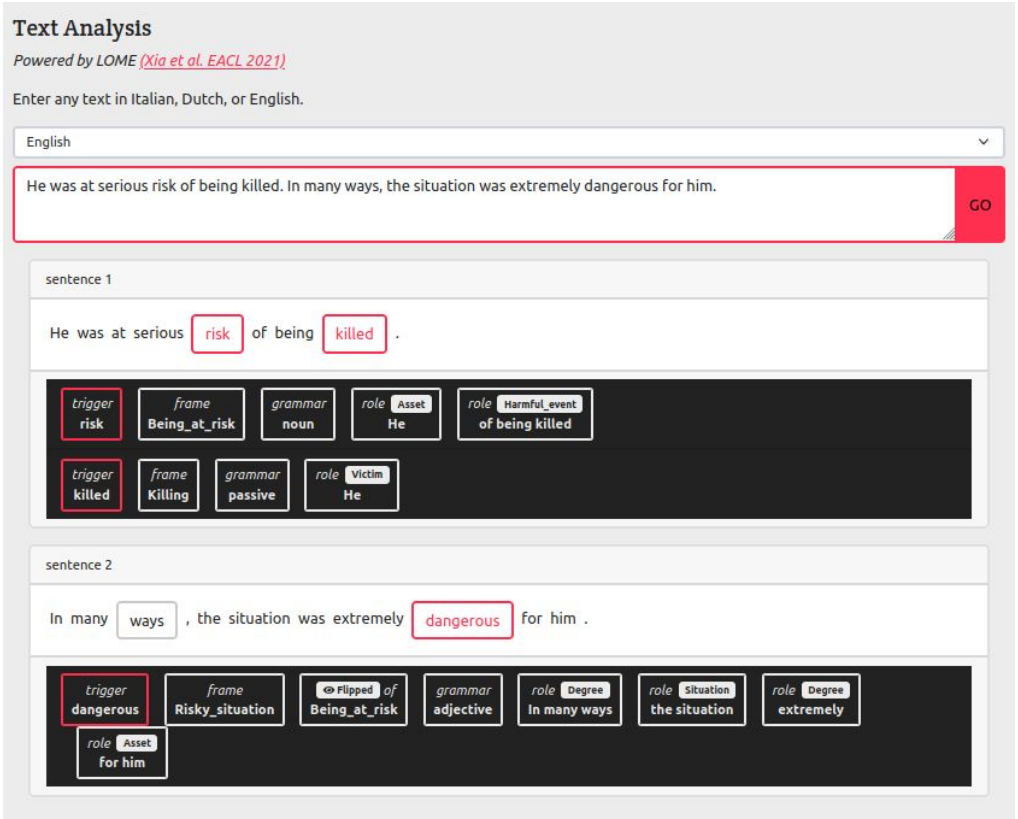
Interactive mode

- 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



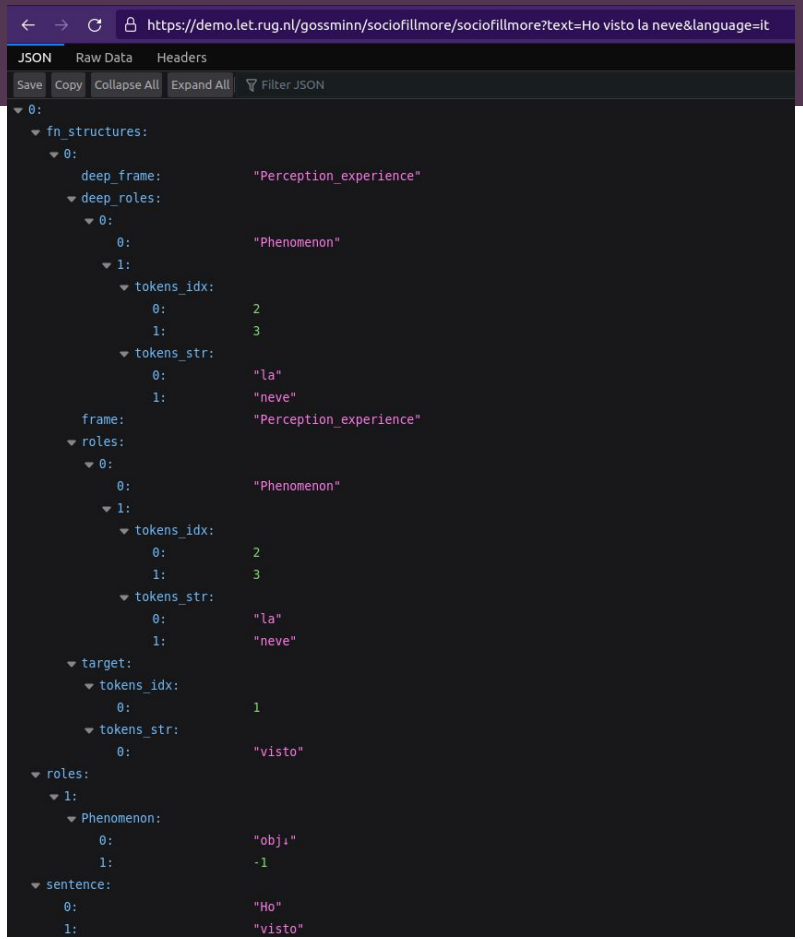
Interactive mode

- 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



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**

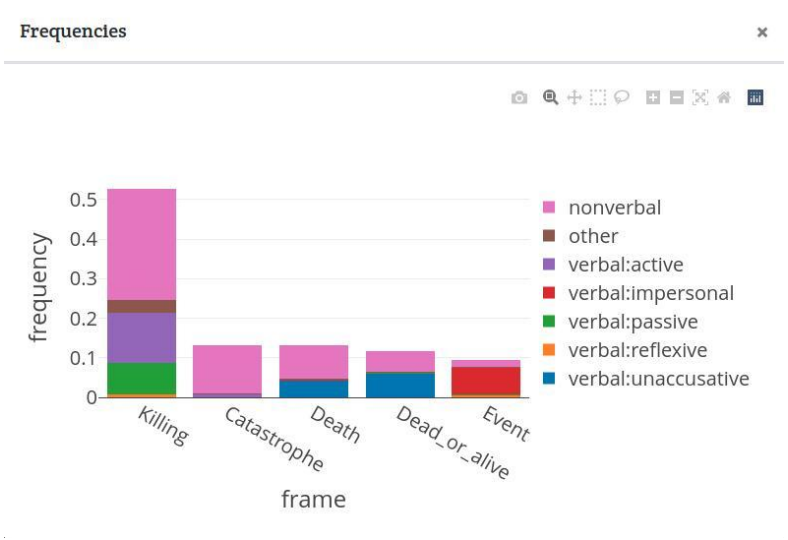


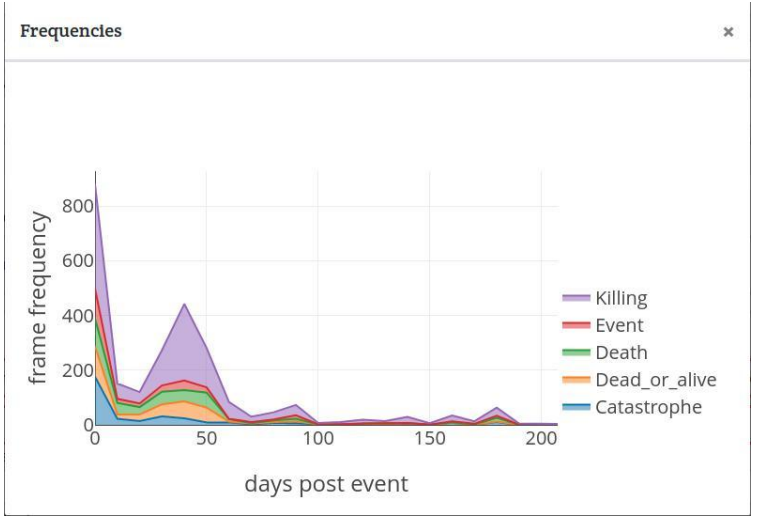
Dataset Explorer Mode

- Case studies:
  - gender-based violence (🇮🇹)
  - traffic crashes (🇳🇱)
  - migration (🇮🇹)
- 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

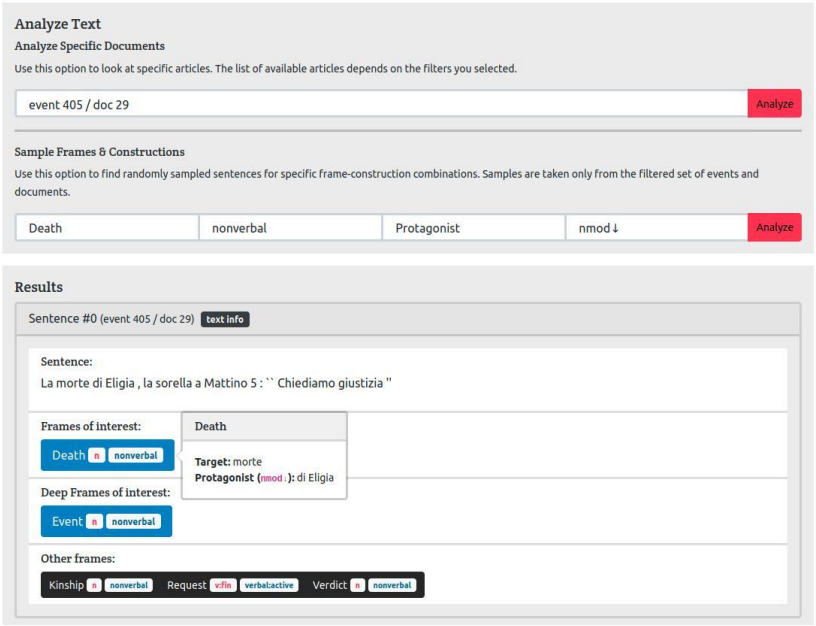
- Example statistics: frames vs. constructions and frames vs. time





Dataset Explorer Mode

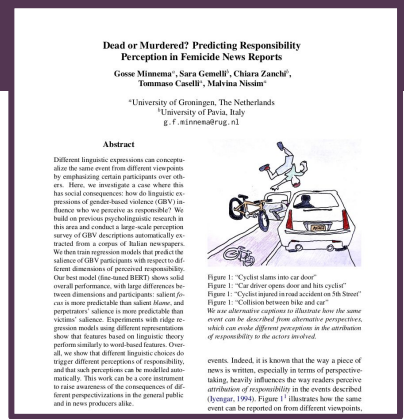
- Example: get sentences matching linguistic criteria



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

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Abstract

Different linguistic expressions can conceptualize the same event from different viewpoints by emphasizing certain participants over others. Here, we investigate a case where this has social consequences: how do linguistic expressions of gender-based violence (GBV) influence who we perceive as responsible? We build on previous psycholinguistic research in this area and conduct a large-scale perception survey of GBV descriptions automatically extracted from a corpus of Italian newspapers. We then train regression models that predict the salience of GBV participants with respect to different dimensions of perceived responsibility. Our best model (fine-tuned BERT) shows solid overall performance, with large differences between dimensions and participants: salient *focus* is more predictable than salient *blame*, and perpetrators' salience is more predictable than victims' salience. Experiments with ridge regression models using different representations show that features based on linguistic theory perform similarly to word-based features. Overall, we show that different linguistic choices do trigger different perceptions of responsibility, and that such perceptions can be modelled automatically. This work can be a core instrument to raise awareness of the consequences of different perspectivizations in the general public and in news producers alike.

Figure 1: "Cyclist slams into car door"
Figure 1: "Car driver opens door and hits cyclist"
Figure 1: "Cyclist injured in road accident on 5th Street"
Figure 1: "Collision between bike and car"
We use alternative captions to illustrate how 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 written, especially in terms of perspective-taking, heavily influences the way readers perceive *attribution of responsibility* in the events described (Iyengar, 1994). Figure 1[1] illustrates how the same event can be reported on from different viewpoints,

Frames & perception

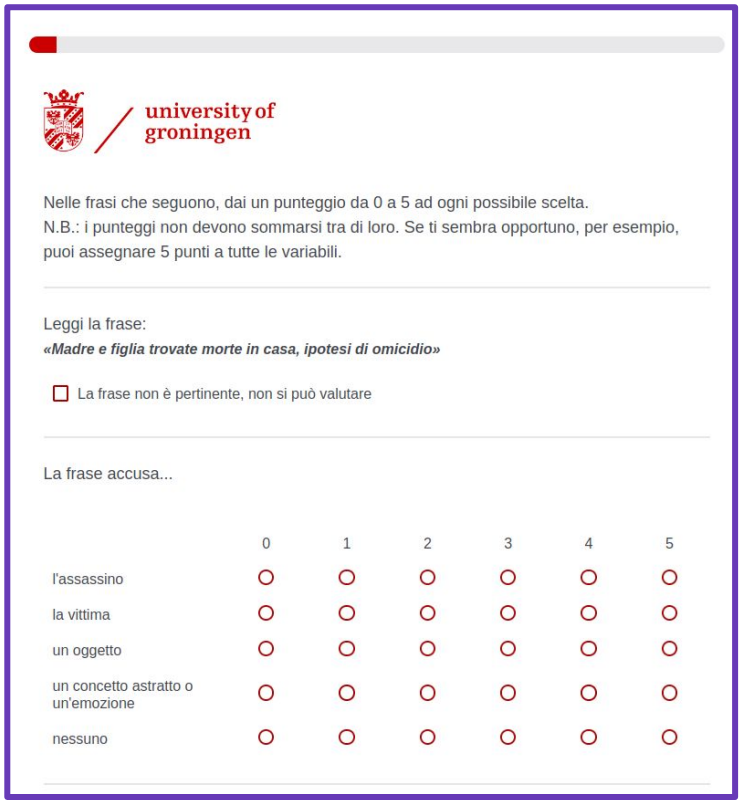
- **Select** semantic frames that lexically encode the murder
  (he *murdered* her, she was found *dead*,
  a family *tragedy*, the *incident*)
- **Extract** sentences that contain instances of these frames
- **Collect** perception judgements from human participants

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
	ascribed to the murderer		
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 ≥10 judgements per sentence per dimension



university of groningen

Nelle frasi che seguono, dai un punteggio da 0 a 5 ad ogni possibile scelta.
N.B.: i punteggi non devono sommarsi tra di loro. Se ti sembra opportuno, per esempio, puoi assegnare 5 punti a tutte le variabili.

Leggi la frase:
«Madre e figlia trovate morte in casa, ipotesi di omicidio»

☐ La frase non è pertinente, non si può valutare

La frase accusa...

	0	1	2	3	4	5
l'assassino	○	○	○	○	○	○
la vittima	○	○	○	○	○	○
un oggetto	○	○	○	○	○	○
un concetto astratto o un'emozione	○	○	○	○	○	○
nessuno	○	○	○	○	○	○

Perception results: overview

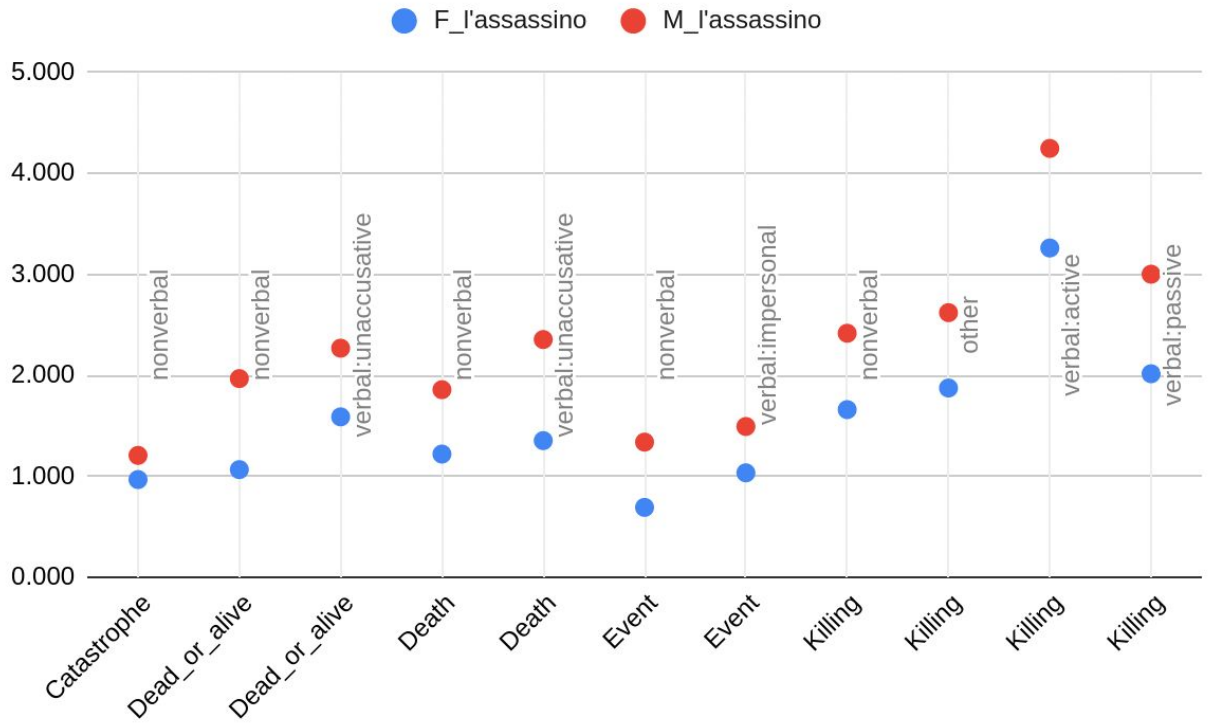
	participant scores	all mean	all std	female mean	female std	male mean	male std
blame	*murderer*	2.35	1.89	2.07	1.80	2.75	2.01
	victim	0.49	0.92	0.44	0.92	0.55	0.92
	object	0.46	1.01	0.44	1.02	0.50	0.99
	concept	0.82	1.30	0.83	1.33	0.79	1.25
	no-one	1.36	1.74	1.49	1.76	1.19	1.71
cause	*human*	3.51	1.68	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

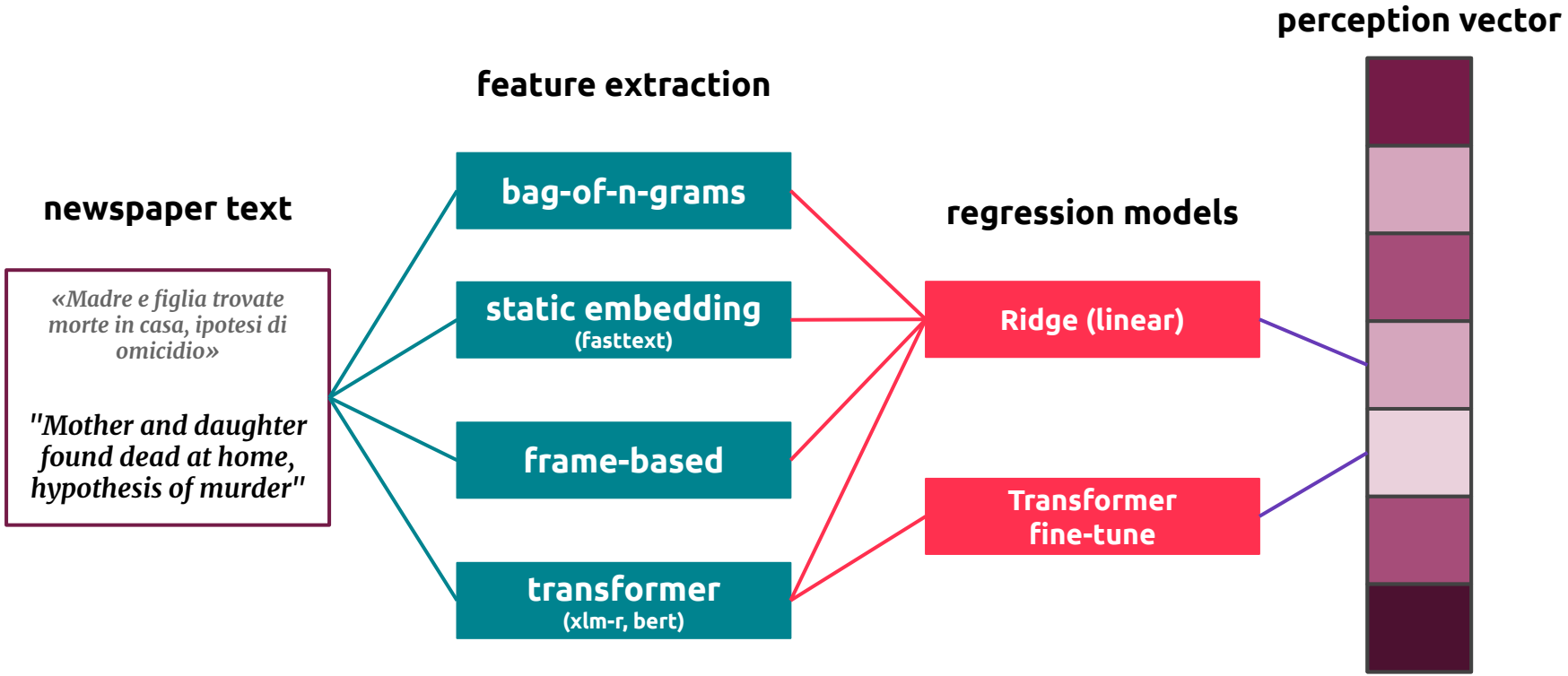
frame/construction	murderer**	victim**	object	concept / emotion*
CATASTROPHE				
nonverbal	1.319	2.713	0.760	2.190
DEAD_OR_ALIVE				
nonverbal	1.195	3.387	1.386	1.993
intransitive	1.983	3.529	1.566	1.539
DEATH				
nonverbal	0.967	3.247	1.507	1.914
intransitive	1.867	3.921	1.690	1.286
EVENT				
nonverbal	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^2: **average** (all attributes)	0.20	0.20	0.44
R^2: **"blame on murderer"**	0.49	0.30	0.56
R^2: **"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

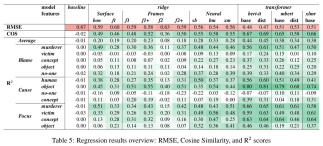


Table 5: Regression results overview: RMSE, Cosine Similarity, and R^2 scores

See our paper for full results

Perception prediction

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

Transformer models perform best overall, monolingual > multilingual

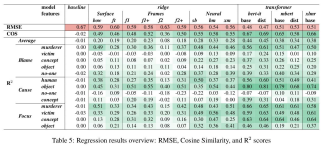


Table 5: Regression results overview: RMSE, Cosine Similarity, and R^2 scores

See our paper for full results

Perception prediction

	Transformer / **BERT-IT (full)**
R^2: **"focus on murderer"**	0.66
R^2: **"focus on victim"**	0.59
R^2: **"focus on concept"**	0.63
R^2: **"focus on object"**	0.46

"Focus" question: most consistent results for best models

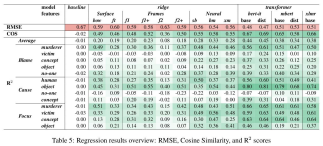


Table 5: Regression results overview: RMSE, Cosine Similarity, and R^2 scores

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

blame: murderer

	ridge/bow		ridge/f1+		bertino	
	feature	*attr*	*feature*	*attr*	*feature*	*attr*
+1	ex *['ex' (ex-partner)]*	0.38	rol:Killing:Killer	0.21	killer *['killer']*	0.79
+2	uccide *['he/she/it kills']*	0.33	ex *['ex' (ex-partner)]*	0.15	uccide *['he/she/it kills']*	0.75
+3	moglie *['wife']*	0.31	frm:Pers_rel	0.14	assassino *['murderer']*	0.71
+4	uccise *['killed' (ptc, f.pl.)]*	0.24	frm:Killing	0.13	ex *['ex' (ex-partner)]*	0.62
+5	assassino *['murderer']*	0.22	cx:Pers_rel++nvrb	0.13	fidanzato *['boyfriend']*	0.51
-5	sono *['I am' / 'they are']*	-0.14	rol:Event:Event	-0.06	una *['a' (f.)]*	-0.14
-4	della *['of the' (+ f.noun)]*	-0.15	sono *['I am' / 'they are']*	-0.06	.	-0.14
-3	-	-0.16	frm:Event	-0.08	sono *['I am' / 'they are']*	-0.15
-2	accaduto *['happened']*	-0.17	della *['of the' (+ f.noun)]*	-0.08	trovata *['found' (ptc, f.sg.)]*	-0.20
-1	.	-0.35	.	-0.13	morta *['dead' (f.sg.)]*	-0.21

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
- Get in touch: g.f.minnema@rug.nl / www.gossminn.eu