Natural language processing for subjectivity analysis in personal narratives

Gustave Cortal

Introduction

Research question: How to model subjective experience in narratives?

Steps:

- Definition of objectives and scope using cognitive science
- Construction of an emotion dataset
- Training of language models for emotion analysis
- Formalization of style in narratives

Each step lead to a first-author article in an international conference

Definition of objectives and scope using cognitive science

Goal: Identify limitations and research directions

I review psychological theories of emotion and emotion annotation schemes in NLP

What are current **limitations**?

- Different emotion theories lead to divergences in how to annotate them in the text
- Some linguistic and cognitive science theories are not considered
- There is no benchmark that evaluates the richness of the emotional phenomenon

G. Cortal and C. Bonard. Improving Language Models for Emotion Analysis: Insights from Cognitive Science. *CMCL, ACL 2024*.

Definition of objectives and scope using cognitive science

How to integrate psychological theories of emotion?

I use the integrated framework for emotion theories (Scherer, 2022):

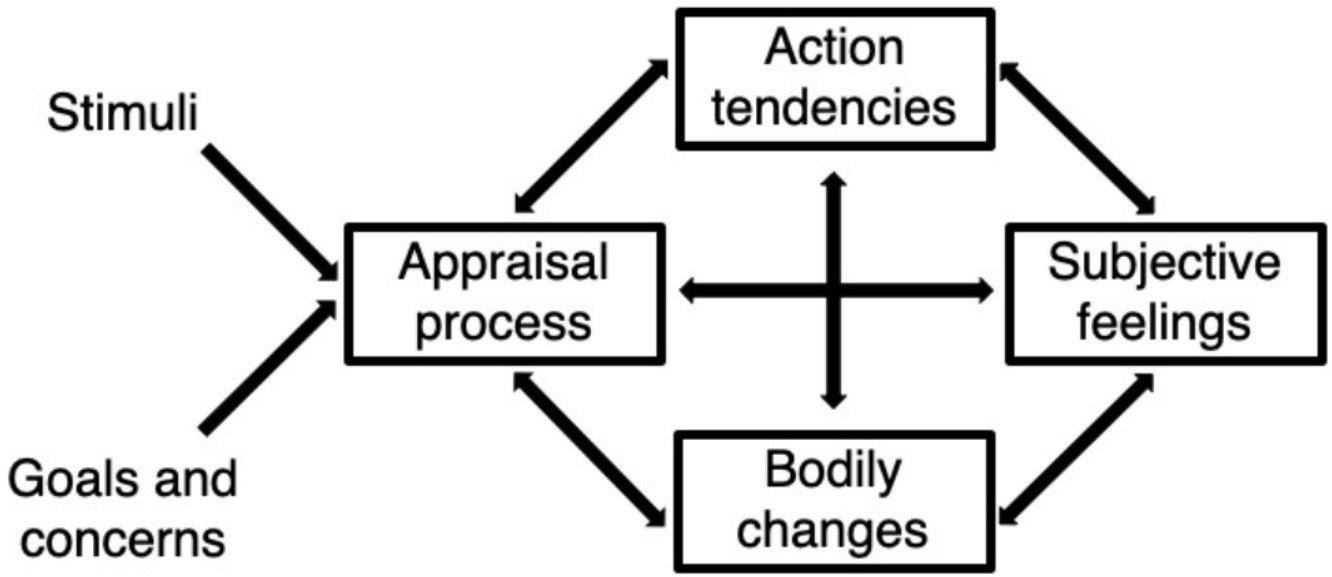


Figure: Emotional episodes are synchronized changes in four components.

Construction of an emotion dataset

Goal: A more comprehensive understanding of emotional events

Component	Answer
BEHAVIOR	I'm giving a lecture on a Friday morning at 8:30. A student goes out and comes back a few moments later with a coffee in his hand.
FEELING	My heart is beating fast, and I freeze, waiting to know how to act.
THINKING	I think this student is disrupting my class.
TERRITORY	The student attacks my ability to be respected in class.

More than 1,000 narratives were collected during emotion regulation sessions

G. Cortal, A. Finkel, P. Paroubek, L. Ye. Emotion Recognition based on Psychological Components in Guided Narratives for Emotion Regulation. *SIGHUM, EACL 2023*.

Training language models for emotion analysis

Goal: Discrete emotion detection based on components

	Logistic Regression			CamemBERT		
Component	Precision	Recall	F_1	Precision	Recall	F_1
All	71.2 (2.6)	69.1 (2.2)	67.8 (2.3)	**85.1**	**84.8**	**84.7**
Without BEHAVIOR	77.4 (2.3)	75.8 (2.4)	74.5 (2.6)	80.3	79.8	79.7
Without FEELING	64.3 (1.9)	61.5 (1.2)	61.3 (2.2)	81.6	79.8	79.9
Without THINKING	70.9 (1.8)	69.1 (2.0)	68.3 (2.2)	79.6	78.5	78.7
Without TERRITORY	64.3 (4.1)	64.5 (2.4)	62.3 (2.8)	78.7	78.5	78.6
Only BEHAVIOR	52.1 (3.5)	54.6 (2.9)	51.7 (2.9)	68.4	67.1	66.6
Only FEELING	69.6 (1.5)	68.9 (2.1)	68.4 (2.0)	67.8	68.4	67.7
Only THINKING	50.1 (3.4)	53.8 (2.3)	50.6 (2.7)	70.5	70.1	70.1
Only TERRITORY	68.2 (1.8)	66.8 (2.2)	66.6 (2.3)	71.4	68.4	68.9

G. Cortal, A. Finkel, P. Paroubek, L. Ye. Emotion Recognition based on Psychological Components in Guided Narratives for Emotion Regulation. *SIGHUM, EACL 2023*.

Training language models for emotion analysis

Need other datasets with narrative structure, emotional content, and available for research

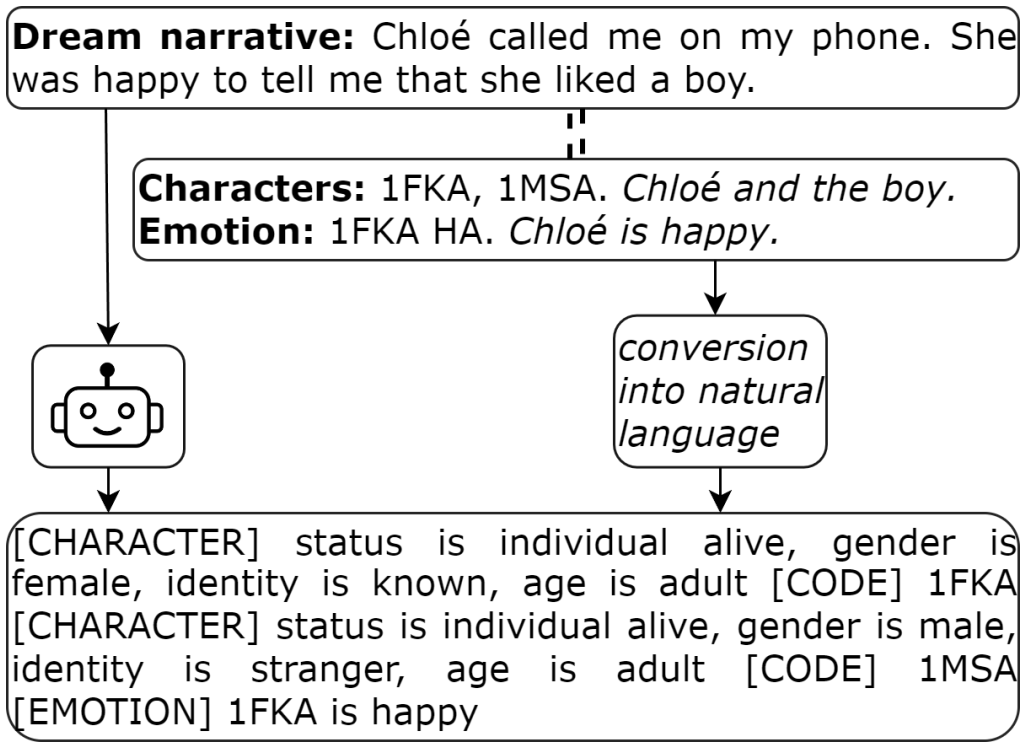
Quantitative dream analysis examines recurring patterns between narrative elements using a database of dream narratives and an annotation scheme (Domhoff, 2004)

The annotation process is complex and costly

How to automate the annotation process?

Training language models for emotion analysis

Goal: Character and emotion detection in dream narratives



G. Cortal. Sequence-to-Sequence Language Models for Character and Emotion Detection in Dream Narratives. *LREC-COLING 2024*.

Training language models for emotion analysis

LaMini-Flan-T5 finetuned on 1823 dream narratives

Model	Status	Gender	Identity	Age	Character	Emotion
BASELINE	82.87	78.02	76.17	86.21	64.74	75.13
$\text{NO}_{\text{SEMANTICS}}$	71.37	56.54*	61.0	90.51	41.79*	75.79
NO_{NAMES}	80.66*	74.32**	74.2	83.95*	60.93**	73.04*
$\text{SIZE}_{\text{SMALL}}$	78.35**	72.13**	70.25**	81.66**	56.79**	70.15**
$\text{SIZE}_{\text{LARGE}}$	84.51*	80.3**	78.63**	87.29	67.63**	74.71
$\text{FIRST}_{\text{GROUP}}$	82.33	77.71	74.86	85.61	63.71	71.94
$\text{FIRST}_{\text{INDIVIDUAL}}$	80.59**	76.14	74.22*	83.87**	62.67	67.32
$\text{FIRST}_{\text{EMOTION}}$	83.92	78.74	77.06	87.63	64.97	72.03
$\text{CONVERSION}_{\text{COMMA}}$	84.02**	79.84**	77.67**	87.08*	66.69**	73.68
$\text{CONVERSION}_{\text{MARKER}}$	82.39	78.45	76.53	86.09	65.44	74.36
STABLEBELUGA_1	43.95**	39.76**	31.25**	56.16**	15.65**	-
STABLEBELUGA_3	52.44**	46.49**	38.46**	63.88**	21.06**	-
STABLEBELUGA_5	55.89**	46.29**	42.61**	63.73**	24.86**	-
CROSS-VALIDATION	86.28	81.9	79.51	89.52	68.64	76.18

G. Cortal. Sequence-to-Sequence Language Models for Character and Emotion Detection in Dream Narratives. *LREC-COLING 2024*.

Formalization of style in narratives

How subjective experience is communicated?

Goal: Formalize style as patterns of linguistic choices that encode subjective experience

Clause	**Process (code)**	**Participants**
I wake in a dark room	Action (**a**)	Actor
I feel a cold wind	Mental (**m**)	Senser, Phenomenon
I tell myself to move	Verbal (**v**)	Sayer, Recipient

Sequence: *amv* | **Substrings:** {am, mv}

Table: Illustrative pipeline. Each narrative is mapped to a symbolic sequence using an alphabet based on extracted features

G. Cortal and A. Finkel. Formalizing Style in Personal Narratives. *EMNLP 2025*.

Formalization of style in narratives

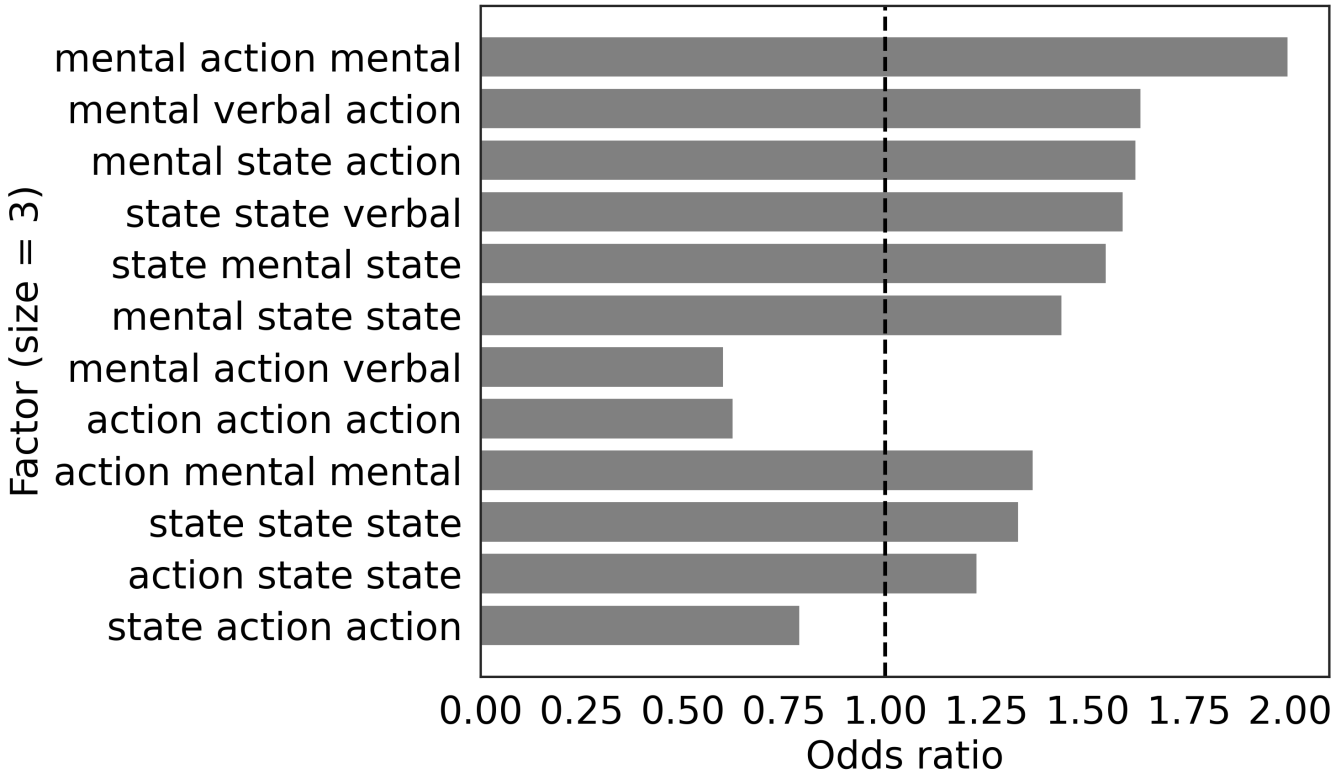


Figure: Top substring odds ratio between the blind series and the norm. Based on 381 sequences from 15 blind dreamers

G. Cortal and A. Finkel. Formalizing Style in Personal Narratives. *EMNLP 2025*.

Conclusion

Research question: How to model subjective experience in narratives?

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My research models are publicly hosted on Hugging Face and were trained using the Jean Zay supercomputer

Appendix

- *Fine-grained mental health topic modeling in different populations using large language models* (PhD internship, to be submitted for Nature Mental Health)
- Piaget, a language model for psychological and philosophical reasoning, 2025.
- N. Richet, S. Belharbi, H. Aslam, M. Schadt, M. González-González, **G. Cortal**, A. Koerich, M. Pedersoli, A. Finkel, S. Bacon, E. Granger. Textualized and Feature-based Models for Compound Multimodal Emotion Recognition in the Wild. *ABAW, ECCV 2024*.