Emotion Recognition based on Psychological Components in Guided Narratives for Emotion Regulation

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Summary

Emotion Recognition

Bostan and Klinger, "An Analysis of Annotated Corpora for Emotion Classification in Text", 2018

Cambria et al., "SenticNet 6: Ensemble Application of Symbolic and Subsymbolic AI for Sentiment Analysis", 2020

Troiano, Oberländer*, and Klinger, "Dimensional Modeling of Emotions in Text with Appraisal Theories: Corpus Creation, Annotation Reliability, and Prediction", 2022

Etienne, Battistelli, and Lecorvé, "A (Psycho-)Linguistically Motivated Scheme for Annotating and Exploring Emotions in a Genre-Diverse Corpus", 2022

Casel, Heindl, and Klinger, "Emotion Recognition under Consideration of the Emotion Component Process Model", 2021

Psychological Components: Appraisal Theory

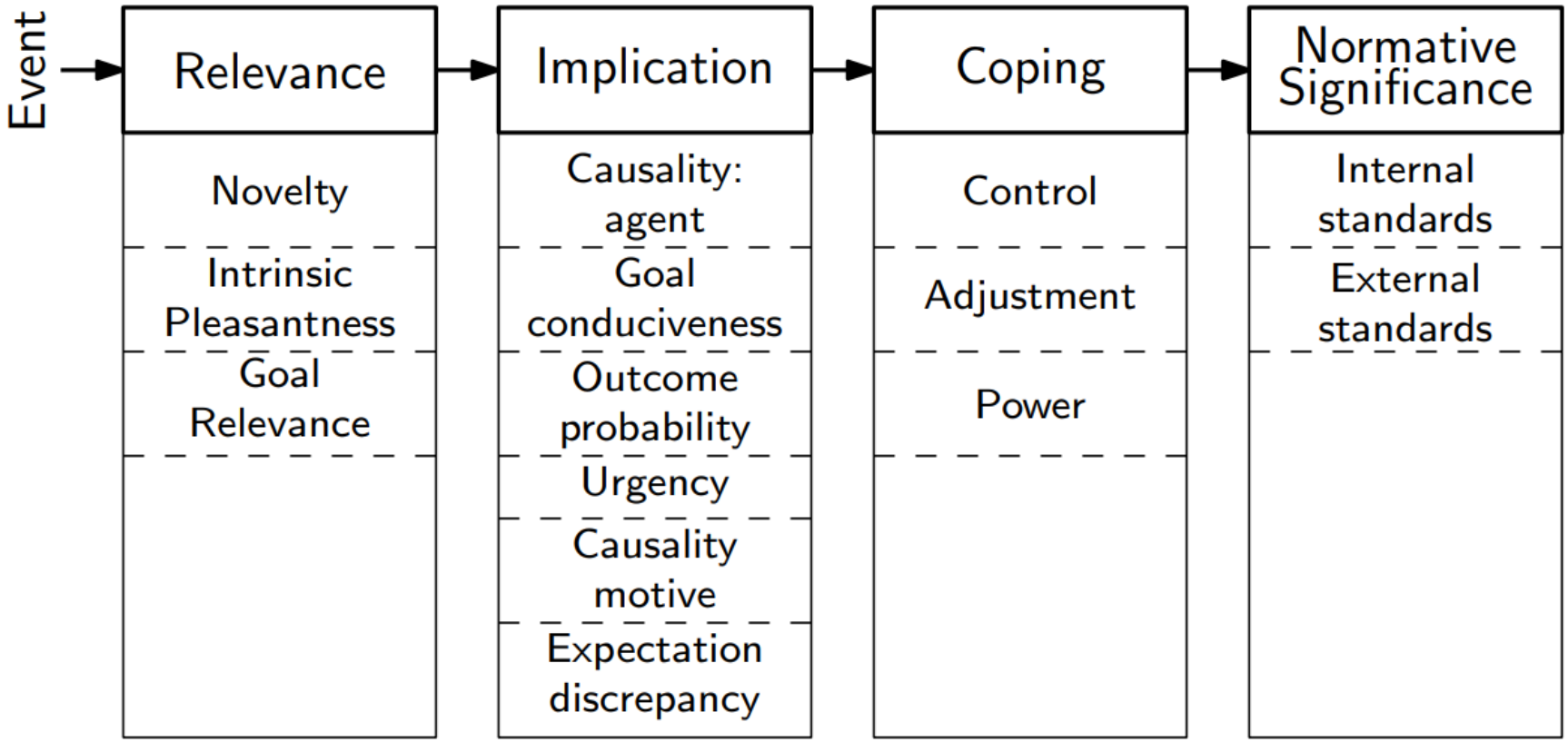


Figure: Sequence of appraisal criteria (Hofmann et al., 2022).

Psychological Components: Component Process Model

Emotion as the expression of several components that synchronize in reaction to an event (Scherer, 2005)

Example

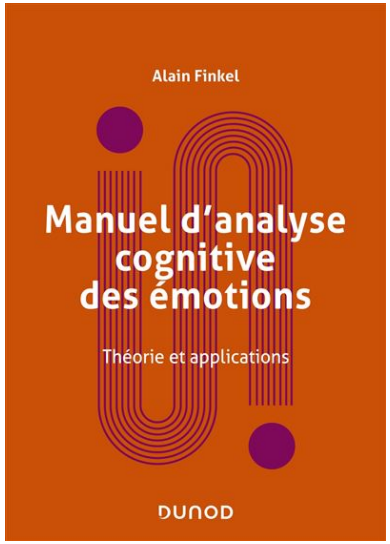
"During an exam, I evaluate my ability to solve an exercise; I think I do not have the skills to solve it and will get a bad mark (*cognitive appraisal*). I panic (*subjective feeling*), I sweat (*physiological response*), my legs shake (*motor expression*), I feel like getting up and running away from the classroom (*action tendency*)."

Casel, Heindl, and Klinger, "Emotion Recognition under Consideration of the Emotion Component Process Model", 2021

Guided Narratives for Emotion Regulation

Cognitive Analysis of Emotion:

- explores emotions with behavioral (*behavior*), physiological (*feeling*), and cognitive (*thinking* and *territory)* components
- helps individuals better regulate their emotions
- uses psychological components to reorganize the narrative of experienced emotional events



Finkel, april 2022

Finkel, *Manuel d'analyse cognitive des émotions: Théorie et applications*, 2022

Cortal et al., "Natural Language Processing for Cognitive Analysis of Emotions", 2022

Guided Narratives for Emotion Regulation

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.

Table: Example of an emotional narrative structured according to emotion components. The writer identified that he was angry.

Guided Narratives for Emotion Regulation: Corpus Statistics

	$\#N$	$\overline{t_N}$	$\#A$	% completion
Total	812	190	3082	61
Emotion	392	216	1568	100

Table: Number of narratives ($\#N$), average number of tokens for narratives ($\overline{t_N}$), number of answers ($\#A$) and completion rate for questionnaires. Statistics for the entire corpus (Total) and the subset for the emotion classification task (Emotion).

Guided Narratives for Emotion Regulation: Corpus Statistics

Component	$\#A$	$\overline{t_A}$	Emotion	%
behavior	802	82	*Anger*	52
feeling	799	27	*Fear*	36
thinking	799	54	*Sadness*	14
territory	682	34	*Joy*	11

(a) Entire corpus (Total).

Component	$\#A$	$\overline{t_A}$	Emotion	%
behavior	392	93	*Anger*	48
feeling	392	26	*Fear*	32
thinking	392	59	*Sadness*	10
territory	392	38	*Joy*	10

(b) Subset of Total (Emotion).

Table: Number of answers ($\#A$), average number of tokens for answers ($\overline{t_A}$) and distribution of emotion classes.

Methods

Traditional machine learning methods (logistic regression, support vector machines, random forests) and language models (CamemBERT)

Emotion Classification: whether an answer (linked to a specific component) expressed *anger*, *fear*, *sadness* or *happiness*.

Component Classification: whether an answer is a *behavior*, a *feeling*, a *thinking*, or a *territory*

Emotion Classification

Examples

(Only *territory*)

"The student attacks my ability to be respected in class." $\rightarrow$ *anger*

(Without *Behavior*)

"My heart is beating fast, and I freeze, waiting to know how to act. I think this student is disrupting my class. The student attacks my ability to be respected in class." $\rightarrow$ *anger*

Emotion Classification: Results

	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

Table: Scores ($\pm$ std) for discrete emotion classification based on components.

Emotion Classification: Discussion

Hypothesis

Strong relationship between emotion expression modes and linguistic realizations of emotion components

Emotion Expression modes (Micheli, 2014)

- *labeled* emotion: "I am upset"
- *displayed* emotion: "Oh !"
- *suggested* emotion: "I think this student is disrupting my class"

Component Classification

Examples

"My heart is beating fast, and I freeze, waiting to know how to act." $\rightarrow$ *feeling*

"I think this student is disrupting my class." $\rightarrow$ *thinking*

"The student attacks my ability to be respected in class." $\rightarrow$ *territory*

Results

Model	Precision	Recall	F_1
Logistic Regression	84.9 (0.3)	84.3 (0.3)	84.4 (0.3)
CamemBERT	**93.2**	**93.0**	**93.1**

Table: Scores ($\pm$ std) for emotion component classification.

Conclusion

- French corpus of 812 emotional narratives (3082 answers) annotated by the writers and structured according to all components
- Each component is useful for classifying discrete emotions; the model with the best performance considers all components
- Differences in how emotion components are expressed (explained by emotion expression modes studied in linguistics?)

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