Emotions in drama

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Part of priority program SPP 2207 Computational Literary Studies (CLS)

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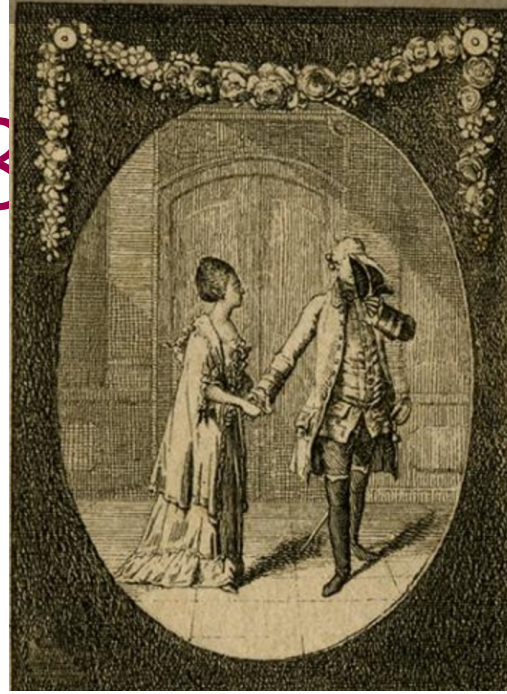
Emotions in German drama 1650-18

Emotions are central

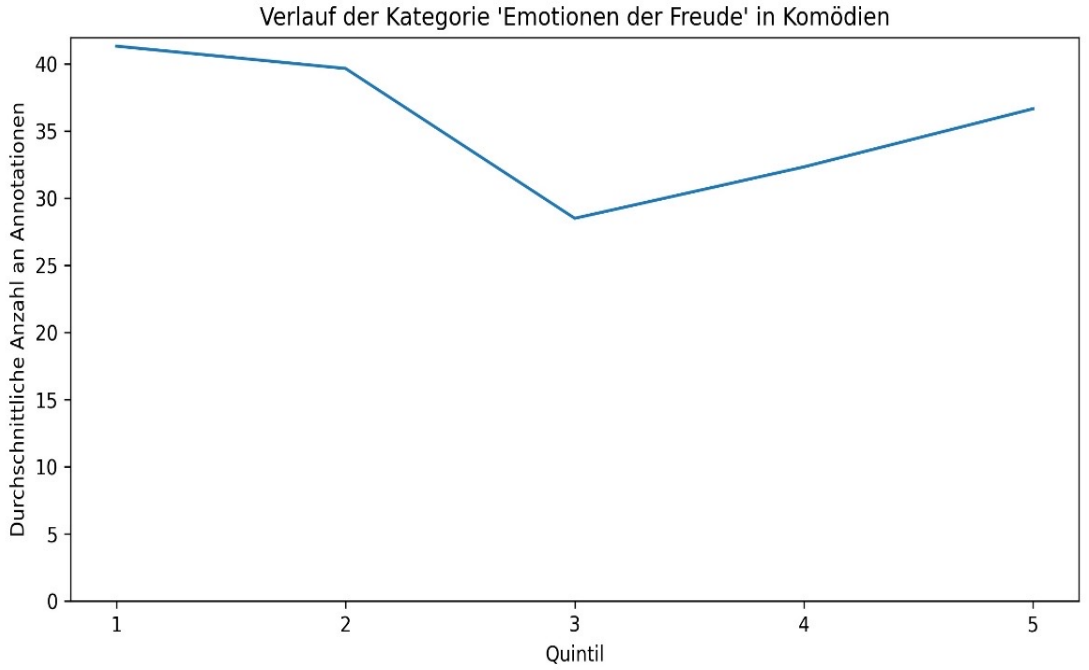
- for dramaturgy
- for the characterization of character types such as the miles gloriosus, the comic figure, the Jew
- for anthropology and social norms
- for the intended effect on the recipient



Daniel Chodowiecki: 12 copper engravings for Lessings „Minna von Barnhelm“ 1770

We are interested in

- Emotion distribution and evaluation specific to sub genres
- How Emotions changes with the plot
- How Emotions are liked to character attributes like gender, family relations, class



We ask theses questions for canonized as well as for non- canonized plays

Emotion

'Emotion' as a generic term for states of mind of characters in a drama of distinguishable quality at a given time. = meta-linguistic use

- Bodily symptoms, action (tendencies), expression,
- may be appraised

Covers more specific historical terms of the period of 1650-1815: *Affekt, Passion, Leidenschaft, Gemütssbewegung*

Emotions in dramatic texts

- **Emotions experienced by the characters and attributed to them**
- Emotions in the main text and in stage directions

Set of Emotions

Emotions of affection

- desire / Lust (-)
- love / Liebe (+)
- friendship / Freundschaft(+)
- Admiration / Verehrung bzw. Bewunderung

Emotions of joy

- joy / Freude (+)
- Schadenfreude (+)

Emotions of fear

- fear / Angst (-)
- despair / Verzweiflung (-)

Emotions of

- anger / Ärger (-)
- hate / Abscheu (-)

Emotions of suffering

- suffering / Leid(-)
- pity / Mitleid (-)

emotional movement / emotionale Bewegtheit

Emotions experienced by the characters and attributed to them.

Not: Emotions which a recipient should feel

Polarity

- default (+/-)
- deviating

Deviating polarity

Tellheim: "...deine tückische Schadenfreude"

EULALIA.

Nur diese Nadel sei mir ein Andenken an die Geburt meines Wilhelms.

love
source: expieriencer: Eulalia
target: her son Wilhelm

UNBEKANNTER

beiseite.

Emotional movement
source: attributing instance:
implicit author
target: Unbekannter

Nein, länger halte ich's nicht aus. Er wendet sich zu ihr, sein Ton ist nicht

rauh und nicht sanft, nicht fest und nicht weich, sondern schwankt

zwischen allen

diesen.

Leben Sie wohl!

suffering
source: expierencer:
Unbekannter
target: event (aushalten/)

Universität Regensburg

Emotions in Drama (EmoDrama): Methodenbericht

16. September, 2021

Treffen der WG Sentiment Analysis (Schwerpunktprogramm CLS)

Gliederung

Korpus und Annotation

Annotation: Annotationsverteilung und Agreements

Klassifikationsmethoden

Erste Klassifikationsergebnisse

Mehr Informationen

Schmidt, T., Dennerlein, K., & Wolff, C. (2021). Towards a Corpus of Historical German Plays with Emotion Annotations. In *3rd Conference on Language, Data and Knowledge (LDK 2021)*. Schloss Dagstuhl-Leibniz-Zentrum für Informatik. http://dx.doi.org/10.4230/OASIcs.LDK.2021.9

Link zu Video: https://youtu.be/A5fVGfgd86E

Schmidt, T., Dennerlein, K. & Wolff, C. (2021, submitted). Using Deep Learning for Emotion Analysis of 18th and 19th Century German Plays. In Fabrikation von Erkenntnis: Experimente in den Digital Humanities. Melusina Press. http://dx.doi.org/10.26298/melusina.8f8w-y749-udlf

Schmidt, T., Dennerlein, K. & Wolff, C. (2021,accepted). Emotion Classification in German Plays with Transformer-based Language Models Pretrained on Historical and Contemporary Language. In *Proceedings of the Second Joint SIGHUM Workshop on Computational Linguistics for Cultural Heritage, Social Sciences, Humanities and Literature.*

Korpus

Gesamtkorpus besteht momentan aus ca. 300 Dramen aus der Zeit von 1650-1815 (wird noch erweitert)

Annotiert von 2 Hilfskräften (11 Dramen, 6 weitere Dramen momentan in der Fertigstellung):

Das Testament von Gottsched (1745/comedy)
Canut von Schlegel (1746/tragedy)
Die zärtlichen Schwestern von Gellert (1747/comedy)
Lucie Woodvil von Pfeil (1757/tragedy)
Der Freigeist von Brawe (1758/tragedy)
Minna von Barnhelm von Lessing (1767/comedy)
Der Postzug von Ayrenhoff (1769/comedy)
Kabale und Liebe von Schiller (1784/tragedy)
Kasperl' der Mandolettikrämer von Eberl (1789/tragedy)
Menschenhass und Reue von Kotzebue (1790/comedy)
Faust von Goethe (1807/tragedy)

Annotationsverteilung

Emotion category	absolute	%
MC: Emotions of affection	2,928	22
Desire	52	0
Love	1,725	13
Friendship	345	3
Admiration	776	6
MC: Emotions of joy	1,943	15
Joy	1,619	12
Schadenfreude	324	2
MC: Emotions of fear	1,257	9
Fear	721	5
Despair	536	4
MC: Emotions of hostility	3,028	23
Anger	1,625	12
Hate, Disgust	1,403	11
MC: Emotions of suffering	2,700	20
Suffering	2,069	16
Compassion	631	5
Emotional movement	1,408	11
Overall	13,264	100

Table 1: Distribution of emotion categories. First, the summed results of the *main classes* (MC; marked in bold) are listed followed by the *sub-emotions*. Percentages are rounded.

- 53% negativ, 37% positiv, 11% emotionale Bewegtheit
- Durchschnittliche Länge: 25 Tokens
- Große Varianz: Viele 1-Token-Annotationen bis zu Annotationen mit einer Länge von 500 Token
- 13,264 Annotationen insgesamt

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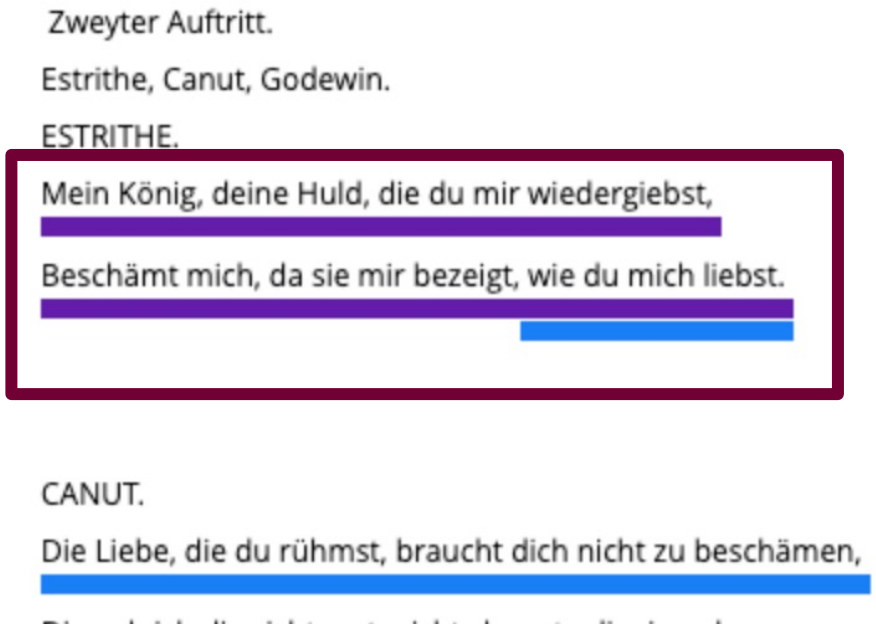
Übereinstimmung


Zweyter Auftritt.

Estrithe, Canut, Godewin.

ESTRITHE.

Mein König, deine Huld, die du mir wiedergiebst,

Beschämt mich, da sie mir bezeigt, wie du mich liebst.

CANUT.

Die Liebe, die du rühmst, braucht dich nicht zu beschämen,

Repliken-basiert bezüglich Mehrheitsannotation:

Lila = Leid
Blau = Liebe
→ Leid

http://dx.doi.org/10.4230/OASIcs.LDK.2021.9

Erste Studie (5 Dramen)

Drama	Valence (κ)	Valence (%)	Class (κ)	Class (%)	Emotion (κ)	Emotion (%)
Faust	0.44	67.853	0.345	59.399	0.342	58.064
Kabale und Liebe	0.382	58.908	0.325	50.313	0.312	47.992
Menschenhass und Reue	0.402	75.28	0.347	72.331	0.347	71.91
Minna von Barnhelm	0.406	74.619	0.377	72.752	0.356	71.23
Kasperl'der Mandolet-tikrämer	0.42	70.83	0.344	65.34	0.312	62.72
Overall	0.41	69.49	0.3476	64.027	0.333	62.383

Table 2 Agreement statistics per play for the overall valence, the main emotion class and the sub emotions respectively for the text unit of speeches. κ refers to Cohen's κ while % is the proportion of agreed upon speeches among all speeches.

Kappa Value Range	Interpretation
0–0.2	Slight
0.2–0.4	Fair
0.4–0.6	Moderate
0.6–0.8	Substantial
0.8–1.00	Almost Perfect

Ranges of Cohen's Kappa values.

http://dx.doi.org/10.4230/OASIcs.LDK.2021.9

Zweite Studie (11 Dramen)

κ = Cohens's κ
% = percentage-wise agreement

- Valence:
  - κ = 0.5
- Main class:
  - κ = 0.4
- Sub-emotion:
  - κ = 0.4

Kappa Value Range	Interpretation
0–0.2	Slight
0.2–0.4	Fair
0.4–0.6	Moderate
0.6–0.8	Substantial
0.8–1.00	Almost Perfect

Ranges of Cohen's Kappa values.

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Erstes Experiment (5 Dramen)

Annotationen ohne weitere Verarbeitung, also Textsequenzen variabler Länge

6500 Annotationen

4 Klassifikationstasks:

- Polarität: positiv/negativ (2 Klassen)
- Polarität-dreifach: positiv/negativ/emotionale Bewegtheit (3)
- Hauptklassen (6)
- Sub-Emotionen (13)

http://dx.doi.org/10.26298/melusina.8f8w-y749-udlf

Baselines

Lexikon-basierte Sentiment Analysis (nur für Polarität):

- SentiWS
- SentiWS optimiert

Traditionelles Machine Learning:

- BOW und Multinomial Naive Bayes
- BOW und SVM

fastText WordEmbedding mit GRU-RNN

http://dx.doi.org/10.26298/melusina.8f8w-y749-udlf

Transformer-basierte Modelle (kontemporäre Sprache)

MODEL-IDENTIFIER	ARCHITECTURE	HUGGING FACE-LINK	PRETRAINED TEXT	RELATED PAPER (IF AVAILABLE) AND PROVIDER
bert-base-german-cased	*BERT*	Link	Wikipedia, legal texts, news (~ 12 GB)	Deepset
dbmdz-bert-base-german-cased	*BERT*	Link	Wikipedia, books, subtitles, crawled web data, news texts (~ 16 GB)	MDZ Digital Library
electra-base-german-uncased	*ELECTRA*	Link	Wikipedia, Subtitles, News (~ 73 GB)	German-NLP-Group
gbert-large	*BERT*	Link	Crawled web data, Wikipedia, subtitles, book, legal texts (~ 161 GB)	Deepset (Chan et al., 2020)
gelectra-large	*ELECTRA*	Link	Crawled web data, Wikipedia, subtitles, book, legal texts (~ 161 GB)	Deepset (Chan et al., 2020)

Table 3: Overview of the evaluated transformer-based models pretrained on contemporary language.

http://dx.doi.org/10.26298/melusina.8f8w-y749-udlf

Transformer-basierte Modelle (mit historischer Sprache)

MODEL-IDENTIFIER	ARCHITECTURE	HUGGING FACE-LINK	PRETRAINED TEXT	RELATED PAPER (IF AVAILABLE) AND PROVIDER
bert-base-german-europeana-cased	*BERT* (trained from scratch)	Link	*Europeana* newspaper (51 GB)	MDZ Digital Library (Schweter 2020)
electra-base-german-europeana-cased-discriminator	*ELECTRA* (trained from scratch)	Link	Europeana newspaper (51 GB)	MDZ Digital Library (Schweter 2020)
literary-german-bert	*BERT* (further pretrained)	Link	based on bert-basegerman-dbmdz-cased further pretrained with the Corpus of German-Language-Fiction (mostly prose texts) (~ 1 GB)	Severin Simmler
bert-base-historical-german-rw-cased	*BERT* (trained from scratch)	Link	fairy tales, historical newspapers, magazine articles, narrative texts, texts of Projekt Guutenberg	Brunner et al. 2020a

Table 4: Overview of the evaluated transformer-based models pretrained or further pretrained on historical German language.

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Eigenes „Nachtraining“

bert-base-german-cased nachtrainiert mit
GerDracor + Kasperl-Dramen (1. Experiment /5 Dramen)

bert-base-german-europeana-cased nachtrainiert mit
GerDracor/TextGrid und weiteren Dramen

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1. Experiment (5 Dramen)

METHOD	ACC	F1-W
random baseline	.500	-
majority baseline	.612	-
lb-sentiws	.445	.448
lb-sentiws-optimized	.588	.592
bow-mnb	.742	.740
bow-svm	.685	.635
fasttext	.714	.703
bert-base-german-cased	.804	.792
dbmdz-bert-base-german-cased	.804	.791
electra-base-german-uncased	.776	.762
gbert-large	**.821**	**.820**
gelectra-large	**.825**	**.824**
bert-base-german-europeana-cased	.798	.797
electra-base-german-europeana-cased-discriminator	.808	.808
literary-german-bert	.799	.798
bert-base-historical-german-rw-cased	**.813**	**.813**
bert-base-german-cased-main-corpus	.796	.794
bert-base-german-cased-annotated-texts	.809	.809

METHOD	ACC	F1-W
random baseline	.333	-
majority baseline	.541	-
bow-mnb	.659	.633
bow-svm	.603	.524
fasttext	.647	.616
bert-base-german-cased	.711	.707
dbmdz-bert-base-german-cased	.716	.714
electra-base-german-uncased	.690	.682
gbert-large	**.740**	**.735**
gelectra-large	**.748**	**.746**
bert-base-german-europeana-cased	.718	.714
electra-base-german-europeana-cased-discriminator	.722	.717
literary-german-bert	.718	.716
bert-base-historical-german-rw-cased	**.723**	**.719**
bert-base-german-cased-main-corpus	.714	.695
bert-base-german-cased-annotated-texts	.709	.705

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1. Experiment (5 Dramen)

METHOD	ACC	F1-W
random baseline	.167	-
majority baseline	.333	-
bow-mnb	.451	.409
bow-svm	.392	.304
fasttext	.404	.343
bert-base-german-cased	.512	.508
dbmdz-bert-base-german-cased	.517	.511
electra-base-german-uncased	.474	.449
gbert-large	**.545**	**.539**
gelectra-large	**.564**	**.558**
bert-base-german-europeana-cased	**.528**	**.518**
electra-base-german-europeana-cased-discriminator	.525	.509
bert-base-historical-german-rw-cased	.524	.519
bert-base-german-cased-main-corpus	.492	.458
bert-base-german-cased-annotated-texts	.505	.500

METHOD	ACC	F1-W
random baseline	.077	-
majority baseline	.151	-
bow-mnb	.348	.298
bow-svm	.284	.248
fasttext	.289	.241
bert-base-german-cased	.428	.417
dbmdz-bert-base-german-cased	.430	.417
electra-base-german-uncased	.358	.320
gbert-large	**.467**	**.461**
gelectra-large	**.460**	**.436**
bert-base-german-europeana-cased	.420	.400
electra-base-german-europeana-cased-discriminator	.416	.373
bert-base-historical-german-rw-cased	**.444**	**.436**
bert-base-german-cased-main-corpus	.379	.326
bert-base-german-cased-annotated-texts	.425	.415

http://dx.doi.org/10.26298/melusina.8f8w-y749-udlf

2. Experiment (11 Dramen)

Verschiedene Korpusinstanzen:

Alle Annotationen (leichte Verbesserung

Filterung aller Disagreements (Filtered Corpus → deutliche Verbesserung)

Repliken-basiertes Korpus basierend auf Mehrheitsentscheidungen (deutliche Verschlechterung)

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Method	acc (pol)	F1 (pol)	acc (t-p)	F1 (t-p)	acc (m-c)	F1 (m-c)	acc (s-e)	F1 (s-e)
random baseline	0.50	-	0.33	-	0.17	-	0.08	-
majority baseline	0.60	-	0.55	-	0.25	-	0.15	-
bow-svm	0.77	0.75	0.70	0.66	0.53	0.51	0.41	0.38
bow-bayes	0.83	0.83	0.76	0.74	0.59	0.56	0.46	0.41
bert-base	0.88	0.88	0.83	0.83	0.70	0.70	0.61	0.60
bert-europeana	0.88	0.88	0.83	0.83	0.71	0.70	0.60	0.59
electra-europeana´	0.89	0.89	0.83	0.83	0.70	0.69	0.56	0.53
bert-historical-rw	0.88	0.88	0.83	0.83	0.72	0.72	0.63	0.63
gbert-large	0.89	0.89	0.84	0.84	**0.75**	0.75	**0.66**	0.66
gelectra-large	**0.90**	0.90	**0.85**	0.85	0.74	0.74	0.64	0.63
bert-europeana-further-pretrained	0.83	0.83	0.76	0.74	0.45	0.38	0.29	0.23

Table 4: Evaluation results for the *filtered corpus*. F1-scores are weighted F1. pol=*polarity*, t-p=*triple polarity*, m-c=*main class*, s-e=*sub-emotion*. Best result per classification is marked in bold for accuracies.

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Diskussion

Lösung zum Umgang mit Disagreement vorteilhaft (Konsens)

Große Modelle trainiert auf Alltagssprache momentan am besten

TODO:

Viel Varianz in der Gestaltung noch möglich (Textlänge, Heuristiken, Nicht-Emotion, etc.)

Nachtraining auf größeren und historisch passenderen Texten (Ressourcen)

Hauptklassen und Sub-Emotionen benötigen optimierten Umgang mit Klassenungleichgewicht und unterrepräsentierten Klassen

Source/Target

Vielen Dank für Ihre Aufmerksamkeit!