Katrin Dennerlein, Thomas Schmidt, and Christian Wolff

Emotions in Stage Directions in German Drama of the Early Modern Period

Explorations via Computational Emotion Classification

Abstract: We present results about emotions in stage directions in German drama of the early modern period, an epoch, in which drama became the most important literary genre and the major cultural outlet to present emotion concepts in action. To investigate the representation of emotions in stage directions, we apply computational emotion classification of character emotions for a corpus of 245 dramatic texts from the period from 1600 to 1815. We use context-sensitive prediction results of a trained *gbert* model which achieves accuracies of 73 % for the single-label emotion classification of 14 classes (13 emotions types and *no emotion*). We apply the classification on all 439 678 sentences of our corpus and obtain 190 241 sentences classified with an emotion, which we evaluate separately by stage directions (12 268 sentences) and spoken text (177 973 sentences).
We show that the proportion of emotion representation in stage directions increases notably from 1740 onwards and thus clarify earlier qualitative studies that attribute such growth only to the period from 1770 onwards. Furthermore, we analyze which emotions in German drama from 1600 to 1815 are expressed in spoken texts and which are portrayed through acting. Finally, we explore the three most frequent emotions in stage directions ('suffering,' 'joy,' 'being moved') semantically.

1 Research Questions and Related Work

> Pickelhäring schläget Bullabutän an den hals, Bullabutän schläget ihm hergegen die wand um den kopff, sie kriegen einander bey den haaren und zerren sich hurtig auff dem schauplatz herumb, worüber die wand schier gantz in stücken gehet.[1]

1 Andreas Gryphius, Absurda Comica. Oder Herr Peter Squenz, 1657, III ("Pickelhäring hits Bullabutän on the neck, Bullabutän hits him in return with the wall on the head, they catch one another by the hair and quickly drag each other around the scene, over which the wall almost falls to pieces," own translation).

Thomas Schmidt, Christian Wolff, University of Regensburg
Katrin Dennerlein, University of Würzburg

https://doi.org/10.1515/9783111071824-010

Stage directions (SD) provide important additional information to the spoken text (ST) of dramatic texts (meaning the character speeches). They inform about the entrance and exit of characters, place and time as well as the mode of speech, bodily expressions, and characters' emotions as is the case in the example above. In this snippet from Andreas Gryphius' play *Absurda Comica oder Herr Peter Squenz* the characters Pickelhäring and Bullabutän have already insulted each other in the previous speeches. By means of the fight described in the SD, the anger of the two characters is not expressed on another level.

SD are a specific part of the 'side text' or 'secondary text' of a drama (Pfister 1988, p. 15; Ingarden [1931] 1973, pp. 377–396). While the primary text consists of the spoken text, the secondary text comprises, among others, the title of the play, announcements of act and scene, and SD as well as indications of the speakers of speeches. The secondary text fulfills explanatory as well as descriptive and narrative functions for the primary text (Pfister 1988, p. 15). As is the case for the entire secondary text, SD shall be attributed to the implicit author in the course of interpretation.[2] As Suchy rightly points out in her study, SD are thus to be read "as part of a play's fiction" (Suchy 1991, p. 71).[3] They can, for example, make the dialogue text more precise or clarify the disguises of the characters.[4] In addition, SD may be descriptions, reflections, and narrations containing information that is added to the dialogue text.[5]

SD have been investigated both systematically (Issacaroff 1998; Aston and Savona 2013; Aebischer 2003; Pfister 1988, pp. 13–17; Tonger-Erk 2018) and historically. Historical studies have been carried out, for example, on Shakespearian theater (Dustagheer and Woods 2018), French classicist drama (Gallèpe 1998), and Russian drama (Sperantov 1998). A few studies work quantitatively (Gallèpe 1998; Sperantov 1998; Trilcke et al. 2020).

2 According to Booth, the term 'implicit author' refers to the idea that the reader creates of the author as the intentional instance of a fictional text, based on the reading of the text (Booth 1991, 74). It is a text-based construct, which is ontologically different from the real author.

3 In this paper, Suchy provides some systematic and very illuminating thoughts on SD as utterances.

4 Pfister sees SD as a source of information on how to stage a text. He treats them in the context of other pieces of information that give clues about the way in which a text is performed. He suggests distinguishing between SD that refer to the actor and those that refer to the visual or acoustic context of the actor (Pfister 1988, p. 15). The distinction is followed by further explanations about the possibility of assigning staging information in the dialogue text as well (cf. Pfister 1988, p. 15).

5 This is the case even if the dramatic texts are not intended to be performed, cf. the so-called 'reading dramas' (Weber 2018). For different functions of the secondary text cf. Issacaroff (1998) and Tonger-Erk (2018).

For the German drama from 1600 to 1815, which is the subject of this paper, there are predominantly qualitative studies on single periods or genres. Constanze Baum has recently refuted the assumption that SD hardly occurred in Baroque drama (Baum 2018). By drawing on dramatic texts by Jakob Ayrer, Andreas Gryphius, Johann Christian Hallmann, and Christian Weise, she shows that secondary texts can already be found in all genres of drama in the early modern period. She argues that these texts cannot only be read in terms of a reconstruction of historical stage practice, but also fulfill a meaningful function for the communication of events. In his study from the 1960s, Walter Lehr takes a look at the SD of a genre which is highly under-researched in the history of German drama, the so-called 'Alt-Wiener Volkskomödie' (Lehr 1960). For the period from 1710–1760, he states that the indications referring to acting are becoming increasingly rare in SD during the period. From the end of the 1740s onwards, the information on acting is limited to the bare essentials. Lehr sees this as a sign that the acting is improving, so that ever less SD are necessary (Lehr 1960, p. 539). In the context of her study on emotions in drama, Anja Schonlau refers to the importance of SD, the evaluation of which, especially in relation to ST, she also recommends in her model for emotion-related text analysis (cf. Schonlau 2017, pp. 76 f., 131, 146). She argues that the increase in emotion representation in SD in the second half of the eighteenth century shows the rise of character concepts which are more complex in psychological terms (cf. Schonlau 2017). The largest study on SD in German drama examines SD in selected dramatic texts from 1750 to 1800 (from Gotthold Ephraim Lessing, Jakob Michael Reinhold Lenz, Johann Wolfang von Goethe, and Friedrich Schiller as well as from Friederike Caroline Neuber, Christiane Karoline Schlegel and August von Kotzebue) (Detken 2009). Detken, the author of the study, understands SD as written body language. Her thesis holds that acting and SD are initially determined almost exclusively by rhetoric and that they become more oriented towards body language and a natural art of acting around 1770 (cf. Detken 2009, p. 31).

To our knowledge, there is only one quantitative study on SD for German dramas. Trilcke et al. (2020) investigate SD in a corpus of 384 German plays between 1730 and 1930. They examine different aspects like the distribution of the token counts and mean sentence lengths as well as the epification of SD. They also state a steady increase of emotions in SD throughout their period of study. For this purpose, they calculated the percentage of words (adjectives, nouns, verbs) from the semantic field 'GEFUEHL' (emotions) from the lexical-semantic network GermaNet, a semantic word net for German similar to the English-based WordNet.[6]

6 https://www.clarin-d.net/de/germanet-de; https://wordnet.princeton.edu/.

In this paper, we focus on emotions in SD, more precisely characters' emotions in a corpus of 245 texts from the period of 1600–1815. We chose this period because during this time, dramatic texts became a major cultural outlet to present emotion concepts in action. These concepts are developed in several disciplines but are brought to a broader public only by dramatic texts (see Grimm 1980). There are a few publications in traditional literary studies on single emotions like 'fear,' 'envy,' or 'suffering' (Schings 1971; Wiegmann 1987; Schulz 1988; Zeller 2005; Schonlau 2017) and studies on the relationship between the emergence of subgenres and single emotions like 'admiration,' 'pity,' and 'moving' (Schings 1980; Schlott 1996). These studies are based on the evaluation of few dramatic texts. However, we built upon this work by using state-of-the art computational methods to automatically classify emotions in a much larger amount of texts.[7] We accomplished this by training large deep learning based language models with manual emotion annotations.

In previous computational research on historical dramatic texts, however, emotion classification was predominantly performed with lexicon-based approaches (working with predefined lists of annotated words). For instance, character relationships and their developments in the plays of Shakespeare with regard to emotions and sentiment have been investigated (Mohammad 2011; Nalisnick and Baird 2013; Yavuz 2021). Schmidt and Burghardt (2018) evaluated sentiment analysis approaches on plays by Gotthold Ephraim Lessing. In the context of this research, small annotated corpora for sentiment analysis were created (Schmidt et al. 2018, 2019). Examining the state of this field shows that most of the research is focused on the analysis of valence or polarity and mostly on individual authors (Mohammad 2011; Nalisnick and Baird 2013; Schmidt and Burghardt 2018). In their survey paper, Kim and Klinger (2019) point out that (1) the majority of the applied methods are indeed lexicon-based, which is regarded as outdated in the Natural Language Processing (NLP) community, and that (2) there is a lack of annotated corpora to perform more advanced ML-based approaches and evaluate the applied methods. The method of emotion classification we describe in the following sections is meant to remedy both desiderata by annotating a large corpus to train and evaluate transformer-based models for emotion classification and applying this to a larger amount of text. With this new method, we can for the first time not only detect explicit, but also implicit emotion representation in this research area.

After explaining our method of emotion data collection, we will address three questions:

7 Cf. for example our paper on the relationship of emotions and genres (Dennerlein et al. 2023).

1. When does the amount of emotion representation in SD in German drama from 1600 to 1815 increase notably?
2. Which emotions in German drama from 1600 to 1815 are expressed in SD, which in ST?
3. Which semantic changes can be observed in the most frequent emotions in SD during the period 1600–1815?

2 Emotion Definition

There are several different terms for affective states in the period of study. To have a term on the meta level to cover all the different concepts like 'Affekt' (affect) 'Gefühl' (feeling), 'Passion' (passion), 'Leidenschaft' (passion) etc., we choose the term 'emotion.' Following Schwarz-Friesel we understand emotions as

> [...] multidimensional, internally represented and subjectively experienced syndrome categories, which can be registered by the individual ego-related and introspectively-mentally as well as physically, whose experiential values are linked to a positive or negative evaluation and which are (can be) realized for others in perceptible expression variants. (Schwarz-Friesel 2007, p. 55, own translation)[8]

As syndromes, emotions are phenomena composed of different symptoms. In the case of emotions, these are both mental and physical and the individual may be aware of them to varying degrees. In addition, emotions are 'multidimensional' because they can be determined by several content-related characteristics. We assume that emotions manifest themselves physically, linguistically, as well as in behavior. Our object of investigation are the intended emotions of the characters in a drama. We do not analyze the emotions that authors or recipients feel[9] but those emotions which are experienced and/or expressed by characters.[10]

8 „[...] mehrdimensionale, intern repräsentierte und subjektiv erfahrbare Syndromkategorien, die sich vom Individuum ichbezogen und introspektiv-geistig sowie körperlich registrieren lassen, deren Erfahrungswerte an eine positive oder negative Bewertung gekoppelt sind und die für andere in wahrnehmbaren Ausdrucksvarianten realisiert werden (können)."

9 See the distinction between production-, reception-, text-, and context-related approaches to emotions in literary studies (Winko 2003).

10 Although fictional characters are not real persons, they are designed as anthropomorphic constructs to which model readers are expected to attribute a consciousness and feelings (cf. Jannidis 2004).

3 Set of Emotions

In NLP, emotion analysis is usually based on the classification systems of psychology (Plutchik 1980; Wood et al. 2018a, 2018b). For our purposes, we focused on the historical setting, and in doing so we selected a set of 13 emotions that only partially coincide with those of today's psychology. In the period under study, there are many different proposals for the systematization of emotions, most of which show a mixture of virtues and affects (short, strong surges of emotion) (Grimm 1980). Especially in philosophy, the proper number and nature of affects has been discussed with great intensity (Zeller 2005, p. 692). In order to be able to capture the change in the weighting of emotions in the period under investigation, it is important to abstract from the historical category systems. The main criterion for the selection of individual emotions was therefore their usefulness for mapping change in literary history, especially in genre differences. For this reason, emotions such as 'compassion' that have become important from a certain point in literary history onward were also included (cf. Schings 1980). The schema consists of the main categories of 'affection,' 'pleasure,' 'anxiety,' 'rejection,' 'suffering/empathy,' 12 subtypes, and one single emotion ('being moved'):[11]

- Emotions of affection / Zuneigung
  - desire / Lust (+)
  - love / Liebe (+)
  - friendship / Freundschaft (+)
  - admiration, reverence / Verehrung, Bewunderung (+)
- Emotions of pleasure / Freude und Glück
  - joy / Freude (+)
  - schadenfreude (+)
- Emotions of anxiety / Angst und Sorge
  - fear / Angst (–)
  - despair / Verzweiflung (–)
- Emotions of rejection / Ablehnung
  - anger / Ärger (–)
  - abhorrence / Abscheu, Wut, Hass (–)
- Emotions of suffering and empathy / Leid
  - suffering / Leid (–)

11 More information on this can be found in our annotation guidelines (Dennerlein et al. 2022c). This annotation scheme was improved and changed several times after testing it during annotation as is common and recommended for the humanities (Reiter 2020).

  - compassion / Mitleid (–)
- being moved / emotionale Bewegtheit (undetermined)

The plus and minus signs refer to the evaluation of the emotions by characters. Plus stands for a positive, minus for a negative evaluation by a character. In the following, we refer to this concept (including being moved) as polarity, the main categories as main emotion classes, and the 12 subtypes as well as the single emotion 'being moved' as sub-emotions.

4 Corpus

The following explorations refer to our corpus of German-language dramatic texts from the period of 1600–1815. It comprises 245 works stemming from the *GerDraCor* corpus (Fischer et al. 2019), from the platform *TextGrid*[12], and *Kasperl* plays from the *Leopoldstädter Theater* in Vienna. These are operettas that had enormous commercial success and were widely distributed throughout the German-speaking area.

In order to be able to detect changes, we consider three different periods for some questions. According to our knowledge of literary history of that period, we chose periods of different length:

- Period I (1600–1730) covers the period roughly from the 30 Years' War up to the beginning of the Enlightenment period.
- Period II (1731–1770) covers the period of the Enlightenment, i.e., Enlightenment and sentimental drama.
- Period III (1771–1815) begins with the revolutionary period of Storm and Stress, covers classical and romantic drama but also chivalric plays and family dramas, and lasts up to 1815. In this last period, the variety of genres is particularly great.

Table 1 gives an overview of the genre distribution in general and for the three time periods. In total, the corpus consists of 120 comedies, 66 tragedies and 54 *Schauspiel* plays. Classification of these genres was done manually based on knowledge of literary history, which was particularly important in the case of non-specific genre designations in the subtitles of the dramas. Table 2 illustrates general corpus statistics of the overall corpus. The corpus consists of 439 678 sentences that amount to almost five million tokens. Indeed, the vast majority of sentences of the

12 https://textgridrep.org.

Tab. 1: Genre distribution for 245 plays of the corpus.

Timespan/Genre	Comedies	Tragedies	Schauspiel	Overall
1600–1730	18	17	4	39
1731–1770	30	12	7	49
1771–1815	72	37	48	157
Overall	120	66	59	245

Tab. 2: General corpus statistics concerning SD and ST of the overall corpus. Avg # tokens refers to the average number of tokens per sentence.

Text type	# Sentences	%	# Tokens	Avg. # tokens
Stage directions (SD)	61 052	14	365 191	5.98
Spoken text (ST)	378 626	86	4 519 292	11.94
Overall	439 678	100	4 884 483	11.11

plays are unsurprisingly ST (86 %). SD are on average much shorter (5.98 tokens) than character speeches (11.11 tokens). Table 3 shows general corpus statistics for the different time periods.

5 Annotation

In the following chapter, we report on the annotation process and the results of the annotation of 17 plays. The annotated corpus was published via GitHub.[13]

Tab. 3: General corpus statistics for the three time periods.

Timespan	# Plays	# Tokens	# Sentences	# SD	# ST
1600–1730	39	793 617	55 966	5337	50 629
1731–1770	49	942 399	83 835	8106	75 729
1771–1815	157	3 148 467	299 877	47 609	252 268
Overall	245	4 884 483	439 678	61 052	378 626

13 https://github.com/lauchblatt/Emotions_in_Drama.

5.1 Annotation Process

The annotation was performed with the CATMA tool (Gius et al. 2020).[14] The annotators, students of German Literary Studies, had an annotation guideline (Dennerlein et al. 2022c) and went through numerous training sessions in pilot annotations (please refer to Schmidt et al. 2021b; Dennerlein et al. 2022a, 2022b for more information about the annotations process). Each of the 17 dramatic texts was annotated independently by two annotators. The task was to annotate, both in ST and in SD, the emotions experienced by a character and/or attributed to them. Multiple and overlapping annotations were explicitly allowed. Both the immediately preceding speeches and the entirety of the work were to be taken into account as the context of the interpretation. The length of the annotated text could be chosen freely, from single words to long text passages (at maximum the entire ST or SD). This procedure of variable annotation settings, which is very rare in NLP (Wood et al. 2018a, 2018b), was chosen in order to do justice to the variability and ambiguity of literary texts.

5.2 Annotated Dramatic Texts

We annotated the following 17 plays from different authors, periods, and genres to give a representative sample of the overall corpus.

- *Catharina von Georgien* by Andreas Gryphius (1657, tragedy)
- *Der Welt Erschröckende Attila* anonymous (after 1682, Schauspiel)
- *Massaniello* by Christian Weise (1683, tragedy)
- *Ein wunderliches Schau-Spiel vom niederländischen Bauer* by Christian Weise (1669, comedy)
- *Die getreue Sclavin Doris* anonymous (1720, Schauspiel)
- *Das Testament* by Luise Adelgunde Victorie Gottsched (1745, comedy)
- *Canut* by Johann Elias Schlegel (1746, tragedy)
- *Die zärtlichen Schwestern* by Christian Fürchtegott Gellert (1747, comedy)
- *Lucie Woodvil* by Johann Gottlieb Benjamin Pfeil (1757, tragedy)
- *Der Freigeist* by Joachim Wilhelm von Brawe (1758, tragedy)
- *Minna von Barnhelm* by Gotthold Ephraim Lessing (1767, comedy)
- *Der Postzug* by Cornelius von Ayrenhoff (1769, comedy)
- *Kabale und Liebe* by Friedrich Schiller (1784, tragedy)
- *Kasperl' der Mandolettikrämer* by Ferninand Eberl (1789, comedy)
- *Menschenhass und Reue* by August von Kotzebue (1790, comedy)

14 https://catma.de.

Tab. 4: Average inter-rater agreement across all plays. Average κ refers to *Cohen's* κ and average % is the pairwise agreement among annotators.

Categorical system	Average κ	Average %
Polarity	0.5	68%
Main class	0.4	62%
Sub-emotion	0.4	58%

- *Wallensteins Lager* by Friedrich von Schiller (1800, tragedy)
- *Faust* by Johann Wolfgang von Goethe (1807, tragedy)

Most of the plays stem from the *GerDraCor* corpus (Fischer et al. 2019), *Catharina von Georgien* from the *TextGrid* repository. The play *Kasperl' der Mandolettikrämer* was acquired from an open web repository[15], *Die getreue Sclavin Doris*, *Der Welt Erschröckende Attila*, and *Ein wunderliches Schau-Spiel vom niederländischen Bauer* from separate editions (Weise 1986; Noe 2007). These plays had to be further prepared for the annotation process.

5.3 Annotation Results

We collected 20 297 emotion annotations overall and calculated the inter-rater agreement on SD and ST level. To cope with varied annotation lengths and overlapping annotations and to calculate agreement metrics, we attribute to each SD and ST (per annotator) the emotion category that is annotated the most (measured in number of tokens). The agreement among the two annotators per play is presented in Table 4 as measured by the average of Cohen's κ values (values for Krippendorff's α are similar). The agreement ranges from values of 0.5 (*polarity*) to 0.4 (*sub-emotions*), which is a moderate level of agreement according to Landis and Koch (1977). These results are in line with similar research on historical and narrative text genres (Alm and Sproat 2005; Sprugnoli et al. 2015; Schmidt et al. 2018, 2019). In our understanding this is due to the ambiguity of literature.

Due to low to mediocre agreement metrics, we removed every annotation upon which the annotators disagreed. Table 5 shows the distribution of annotated text units against non-annotated units. This distribution includes all separated annotations independent of the length, which can range from one word to a maximum length of an entire SD or ST unit. Non-annotated text is treated as an

15 http://lithes.uni-graz.at/maezene/eberl_mandolettikraemer.html.

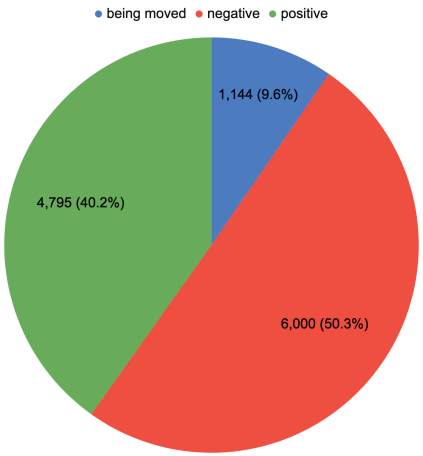


Fig. 1: Distribution of polarity classes among emotion annotations. Percentages are rounded.

Tab. 5: Distribution of annotation vs. no emotion annotation. # refers to the absolute number of separated full annotations (or non-annotations for no emotion), which can range from one word to the entire character speech or stage direction.

Class	#	%
Emotion annotations	11 939	51
No emotion	11 349	49
Overall	23 288	100

annotation with no emotion (a SD or ST that is not annotated is therefore counted as one no emotion annotation). Figure 1 illustrates the annotation distribution for the polarity classes and Table 6 for the main classes and sub-emotions; only the material with emotion annotations was used, excluding the non-annotated material.

We have collected 11 939 annotations after removing disagreements (8358 annotations were removed) and 11 349 no emotion annotations. Table 6 illustrates the emotion distributions among the emotion annotations. The most frequently annotated main class are the *emotions of rejection* (24 %). As for the sub-emotions, the most frequently annotated sub-emotions are 'suffering' (15 %), 'anger' (14 %), 'joy' (14 %), and 'love' (13 %). 'Desire,' 'friendship,' and 'schadenfreude' are the least common ones. The annotators make significant use of the varied annotation spans, ranging from one-word annotations to multiple sentences (mean = 25.15 to-

Tab. 6: Distribution of main classes and sub-emotion categories in annotated plays among emotion annotations (excluding no emotion annotations). The sums for the *main classes* (MC) are listed, followed by the *sub-emotions*. Percentages are rounded.

Emotion category	#	%
MC: emotions of affection	2804	23
desire	71	1
love	1569	13
friendship	240	2
admiration, reverence	924	8
MC: emotions of pleasure	1991	17
joy	1689	14
schadenfreude	302	3
MC: emotions of anxiety	989	8
fear	739	6
despair	250	2
MC: emotions of rejection	2856	24
anger	1621	14
abhorrence	1235	10
MC: emotions of suffering and empathy	2155	18
suffering	1760	15
compassion	395	3
Being moved	1144	10
Overall	11 939	100

kens; max = 578 tokens; Std = 29.41).[16] Most common is an annotation span across 2–3 sentences.[17]

6 Computational Emotion Classification

We define the emotion classification task as a single-label emotion classification on text sequences of varied lengths, in our case the sentences of the plays, since this is the linguistic unit that represents the annotation behavior the most. Our

16 We have analyzed token distributions of the annotations via the *NLTK Punkt* Tokenizer. https://www.nltk.org/_modules/nltk/tokenize/punkt.html.

17 Please note that more information about the annotation process and results can be found in previous publications (Schmidt et al. 2021b; Dennerlein et al. 2022c).

emotion scheme consists of all sub-emotions: 13 emotions and one no emotion class, leading to a 14-class setting. The implementation and selection of an emotion classification method was based on previous research (Schmidt et al. 2021a, 2021c) analyzing and comparing various established methods like lexicon-based methods (Schmidt and Burghardt 2018), traditional machine learning approaches, static word embeddings (Bojanowski et al. 2017), and predominantly transformer-based language models like BERT (Devlin et al. 2019), since they are currently regarded as state-of-the-art in the area of emotion classification (Shmueli and Ku 2019; Cao et al. 2020). We experimented with the most established and well-known German language transformer-based models from the platform Hugging Face[18] (Wolf et al. 2020). Since these models are trained primarily on contemporary language, we also included available models that were trained from scratch (e.g., the *German EuropeanaBERT*[19] by Schweter 2020) or further pretrained on historical or narrative language (e.g., a German BERT model by Brunner et al. 2020). We also developed models by further training base models with the texts of our corpus since this sort of domain-adaptive pretraining has been shown to be beneficial in certain special domains (Gururangan et al. 2020).

As training data for the fine tuning, we use all annotations (including non-annotated material as no emotion class) and filter them by removing disagreeing annotations of annotators, which results in the corpus described in Table 6. The best-performing model for the classification tasks is the large German BERT model *gbert-large* by *deepset* (Chan et al. 2020). This model achieves an accuracy of 73 % and weighted f1-score of 72 % for the classification task of 14 classes and up to 86 % when the class system is reduced to polarity. Due to class imbalances in our training data, we apply methods of over- and undersampling to achieve these accuracies. Nevertheless, f1-scores for low-frequency classes are on average lower. Please refer to previous research for more details regarding the technical implementations and experiments (Schmidt et al. 2021a, 2021c, 2022). The model was trained and evaluated on the filtered corpus in a 5x5 stratified setting and fine-tuned to the specific classification task for 4 epochs, a batch size of 32, a learning rate of 4e-5 and the *Adam* optimizer as optimization algorithm with a *Tesla P100* GPU.

We perform the final classification on sentences of the plays. For this, we segmented the SD and ST into sentences, using the *NLTK Punkt* sentence segmentation.[20] The SD and ST were either already annotated for plays of the *GerDraCor*

18 https://huggingface.co.

19 https://huggingface.co/dbmdz/bert-base-german-europeana-cased.

20 https://www.nltk.org/_modules/nltk/tokenize/punkt.html.

or *TextGrid* corpus or added in an additional processing step and manually post-corrected. We chose the sentence as classification text span since it resembles the annotated text spans the most, although both units are not necessarily the same.

7 Emotion Classification Results for the Overall Corpus

Applying the emotion classification on all 439 678 sentences of the corpus results in a total amount of 190 241 sentences classified with an emotion, of which 12 268 are SD and 177 973 are ST.[21] 57 % of all sentences are labeled with no emotion and 43 % with an emotion (see overall in Figure 2). The difference is bigger for SD, for which 80 % of sentences are classified as representing no emotion.

Table 7 shows the emotion classification for sub-emotions and main classes among all sentences that were classified as emotions (that means excluding no emotion classifications). The most frequent main classes are the emotions of 'rejection' (22.5 %) and the emotions of 'suffering and empathy' (20.6 %), while the most frequent sub-emotions are 'suffering' (18.4 %), 'joy' (13.6 %), and the special category 'being moved' (13.3 %). Certain emotions like 'desire' (0.1 %) and 'friendship' (1.4 %) are rarely classified.

Table 8 illustrates the emotion distribution for all emotion classifications on the overall corpus, differentiated between SD and ST. The most striking difference concerns the category 'being moved,' which is more frequently classified in regard to percentage points (10) in SD than in ST. This results in the fact that most emotions are more frequent for ST than SD, with a few exceptions like 'fear.'

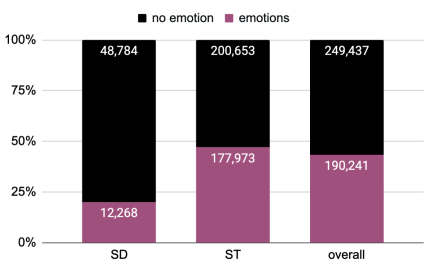


Fig. 2: Distribution of classification results concerning emotion and no emotion classifications among sentences for SD and ST.

21 More data and detailed results for the following results chapters can be found here: https://github.com/lauchblatt/Emotions_in_Drama.

Tab. 7: Distribution of classification results concerning main classes and sub-emotions in the sentences of the overall corpus that are classified as emotions.

Emotion category	# Sentences	%
MC: emotions of affection	37 893	19.92
desire	167	0.09
love	20 575	10.82
friendship	2703	1.42
admiration, reverence	14 448	7.59
MC: emotions of pleasure	28 282	14.87
joy	25 843	13.58
schadenfreude	2439	1.28
MC: emotions of anxiety	16 055	8.44
fear	11 800	6.2
despair	4255	2.24
MC: emotions of rejection	43 446	22.84
anger	24 029	12.63
abhorrence	19 417	10.21
MC: emotions of suffering and empathy	39 206	20.61
suffering	35 020	18.41
compassion	4186	2.2
Being moved	25 359	13.33
Overall	190 241	100

Tab. 8: Distribution of emotion classifications among sentences in SD and ST.

Emotion category	SD (%)	ST (%)
MC: emotions of affection	12.23	20.45
desire	0.17	0.08
love	6.81	11.09
friendship	0.36	1.49
admiration, reverance	4.89	7.78
MC: emotions of pleasure	17.63	14.68
joy	15.89	13.43
schadenfreude	1.74	1.25
MC: emotions of anxiety	10.60	8.29
fear	9.24	5.99
despair	1.35	2.30
MC: emotions of rejection	18.83	23.11
anger	14.38	12.51
abhorrence	4.45	10.60
MC: emotions of suffering and empathy	17.69	20.81
suffering	17.27	18.49
compassion	0.42	2.32
Being moved	23.03	12.66
Overall	100	100

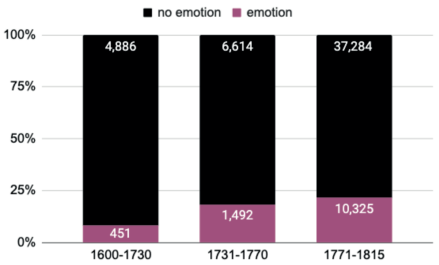


Fig. 3: Distribution of classification results for sentences concerning emotions and no emotions among SD sentences throughout three time periods.

8 Results: Emotions in Stage Directions

In the following, we explore the three major research questions concerning emotions in SD as introduced in the opening chapter.

8.1 When Does the Amount of Emotion Representation in SD in German Drama from 1600 to 1815 Increase Notably?

It can be seen that in the entire corpus (1600–1815), there are much less emotion classifications in SD than in ST: Figure 2 shows that 177 973 of the sentence classifications in ST are of emotions, which results in a share of 46.8 %. In SD the proportion is only 19.9 % (12 268 sentences). The value just reported is in regard to the entire corpus, but the change in this proportion was also measured in the three time periods. The results show an increase of emotions in SD over time: As can be seen in Figure 3, 8.5 % (451) of the SD in period I, 18.4 % (1492) of the SD in period II, and 21.7 % (10 325) of the SD in period III contain emotions.

This means that in our data, we observe a deviation from Detken's thesis (Detken 2009, p. 31). While Detken is of the opinion that emotions in SD increase considerably from 1770 onwards, our results show that the strongest increase can already be observed between period I and period II. Here, the proportion of period I to period II has more than doubled (from 8.5 % to 18.4 %).

Furthermore, the difference of our approach in contrast to a lexicon-based method becomes quite clear now. While Trilcke et al. (2020) only observe an increase in emotion words of 1.5 % for the period of 1740–1815 with a lexicon-based method,[22] the methodology we use yields an increase of 13.2 % for those SD that contain an explicit or implicit emotion representation (Figure 3).

22 We interpreted their plot of Figure 8 based on the assumption that 1,00 equals 100 %.

Tab. 9: Distribution of classification in sentences classified with an emotion for SD and ST throughout three time periods in percentage.

Timespan	1600–1730		1731–1770		1771–1815	
Class	SD (%)	ST (%)	SD (%)	ST (%)	SD (%)	ST (%)
MC: emotions of affection	11.09	21.9	11.13	20.88	12.44	19.96
desire	0.22	0.15	0	0.03	0.19	0.08
love	4.66	10.18	5.9	11.33	7.03	11.24
friendship	0.67	0.83	0.27	2.04	0.36	1.49
admiration, reverence	5.54	10.74	4.96	7.48	4.85	7.16
MC: emotions of pleasure	22.39	12.45	25.07	13.47	16.35	15.58
joy	19.29	11.13	24.26	12.38	14.53	14.3
Schadenfreude	3.1	1.32	0.8	1.09	1.82	1.28
MC: emotions of anxiety	9.09	7.93	9.18	7.73	10.87	8.55
fear	7.98	6.65	8.78	5.45	9.37	6
despair	1.11	1.28	0.4	2.28	1.5	2.55
MC: emotions of rejection	31.93	23.61	22.92	23.6	17.67	22.85
anger	20.4	10.41	18.1	13.18	13.58	12.81
abhorrence	11.53	13.2	4.83	10.41	4.09	10.03
MC: emo. of suffering & empathy	20.84	27.49	15.35	21.19	17.89	19.08
suffering	20.4	26.1	14.88	18.45	17.48	16.66
compassion	0.44	1.4	0.47	2.74	0.41	2.42
Being moved	4.66	6.63	16.35	13.13	24.79	13.98
Overall	100	100	100	100	100	100

8.2 Which Emotions in German Drama from 1600 to 1815 are Expressed in SD, Which in ST?

We investigated the emotion distribution in SD in comparison with the emotion distribution in ST. The numbers for the entire period can be found in Table 8. There are some emotions with similar proportions in SD and ST, for example 'suffering.' However, there are clear differences for some emotions. 'Abhorrence,' for example, is classified twice as often in ST as in SD, 'friendship' four times, and 'compassion' six times. These emotions seem to be more likely to be expressed by a character's speech. The state of 'being moved,' on the other hand, is classified almost twice as often in SD as in ST. Obviously, authors see the need to state the condition of 'being moved' by additional comments so that recipients and actors can grasp it.

These results will now be differentiated according to the time periods (cf. Table 9). So far, there are no hypotheses in literary studies on the distribution of emotions in the three different time periods. The results of our study can provide

important new insights for literary historical research of this period. However, the results of our investigations can be interpreted well on the basis of historical knowledge about the history of drama. In the following, we will discuss these results by presenting the percentage-wise values of ST and SD as seen in Table 9 in chronological lists.

The values for ST remain at about the same level, while the value of 'schadenfreude' for SD decreases in the middle period and increases again in the last period: SD 3.1 %, 0.8 %, 1.82 % (ST 1.3 %, 1.1 %, 1.3 %). The high value for the first period could be due to the strong presence of comic characters in subplots, with which the authors aim at a comedy of laughs.[23] The last increase could be related to the fact that we have the *Kasperl* plays in the corpus (24 of the 157 plays in period III). In these plays, 'schadenfreude' is expressed through the facial expressions, gestures, and behavior of typical comic characters. Here is an example with a mean landlord: "Wirt: (geht mit verätherischen Grimassen ab)."[24]

For two sub-emotions, we see an almost steady decrease over time in SD. For 'abhorrence,' the values are 11.5 %, 4.8 %, 4.1 % (SD) and 13.2 %, 10.4 %, 10 % (ST). 'Anger' is classified with 20.4 %, 18 %, 13.6 % (SD) and 10.4 %, 13.2 %, 12.8 % (ST). These findings can be explained by the well-known development in drama away from deterrence and admiration towards empathy and moderate ridicule and by the poetics of compassion and friendship in sentimental comedy, which is a very important genre in period II (cf. Pikulik 1966, Glaser 1969).

In the following cases, we observe an increase of the frequency only in ST. On the one hand, 'compassion' is classified with 0.4 %, 0.5 %, 0.4 % (SD) and 1.4 %, 2.7 %, 2.42 % (ST) and 'friendship' with 0.7 %, 0.3 %, 0.4 % (SD) and 0.8 %, 2 %, 1.5 % (ST). The increases for the numbers for these two emotions in ST are probably also due to the poetics of 'compassion' and 'friendship' in sentimental comedy (period II), according to which characters should express these feelings verbally. A result we cannot explain is the decrease of 'despair' in SD in period II: 'despair': SD 1.1 %, 0.4 %, 1.5 % (ST 1.3 %, 2.3 %, 2.6 %). Why is 'despair' represented much more often in ST than in SD in period II? To be able to better explain these differences, one would probably have to distinguish between comic and non-comic occurrences of 'despair.'

23 For the relevance of this character in the history of German comedy, see: Dennerlein (2021).
24 Ferdinand Huber: Der eifersüchtige Schuster, 1791, I,4, "Landlord: (walks off with tell-tale grimaces)," own translation.

Tab. 10: General corpus statistics for SD in the three time periods.

Timespan	# Sentences	# Tokens	Avg. # tokens
1600–1730	5337	34 555	6.47
1731–1770	8106	42 714	5.26
1771–1815	47 609	287 922	6.05

8.3 Semantic Explorations of 'Suffering,' 'Joy,' and 'Being Moved' in SD over Time

In this last section we analyze the semantics of emotions in SD. For this, we only regard the SD proportion of our overall corpus (see Table 10 for corpus statistics). We take the three most frequent emotions in SD, 'suffering,' 'joy,' and 'being moved,' and explore the lexical differences in their representation. For this, we analyzed the most frequent words in the emotion-classified sentences.[25] This method required some preliminary steps: (1) lemmatization, (2) removal of stop words (e.g., articles, pronouns), and (3) removal of character names. For the lemmatization, we use the *Hanover Tagger* (Version 1.1.0)[26] by Wartena (2019). Different inflections of a word are reduced to a base form, which is beneficial for the semantic analysis. For the removal of stop words, we use the German stop words list by the NLTK[27] and extend it with further high frequency words bearing no semantic meaning: we remove character names as identified via the speaker tag in our XML-based corpus from the texts. We also split a speaker name if it contains white space to filter first and last names of characters or similar name combinations. Based on this method, we see the following changes in the language of emotions of the three most frequent sub-emotions in SD.

8.3.1 Suffering (Figure 4)

The most frequent word in emotion representations of 'suffering' in period I is the word 'gehen' ('to walk'), while in periods II and III it is 'weinen' ('to cry'). This shows that from 1730 on, 'suffering' is no longer expressed only by physical restlessness or exits of the characters, but specifically by crying. Looking at the top

25 Additional data like word clouds and frequency lists ca be found in our repository: https://github.com/lauchblatt/Emotions_in_Drama.

26 https://github.com/wartaal/HanTa.

27 https://www.nltk.org.

(a) SD (1600–1730) **(b)** SD (1730–1770) **(c)** SD (1770–1815)

Fig. 4: Most frequent words for 'suffering.'

five, we can see a semantic change from descriptive emotion representation to emotion representation through acting which makes the suffering much more concrete, but also greatly increases the demands on the actors:

- While SD indicate in period I that a character is speaking or behaving 'traurig' ('sadly'), SD in period II and III indicate that characters cry and sigh ('weinen,' 'weinend,' 'seufzen'). In Andreas Gryphius' play *Papinianus*, for example, the singing of the spirits leaves the emperor mournful: "Die Geister verschwinden zugleich / der Käyser erwachet und gehet traurig ab."[28]
- Periods II and III refer even more explicitly to body language by using 'Auge' ('eye') and 'Hand' ('hand'): 'Hand' ('hand') appears in period II on position 3, where it remains for period III. 'Auge' ('eye') occurs initially in period III under the top five on position 4. The following SD contains an occurrence of 'eye': "steht in einer trostlosen Stellung, er schweigt, er seufzt, und heftet seine Augen unbeweglich bald auf den Himmel, bald auf den Boden."[29]

8.3.2 Joy (Figure 5)

Concerning the emotion representation of 'joy' in SD, the top five of the most frequently used words in period I show one very specific action, which is singing. In the Christian tragedy *Liberata*, for example, "A singing angel" comes to Liberata, joyful in the face of the divine salvation he promises her in the song that follows.[30] Moreover, the emotionally underspecified movement verb 'gehen' ('to walk') and the descriptive lemmas 'frölich' and 'freudig' can be found in the top five (both

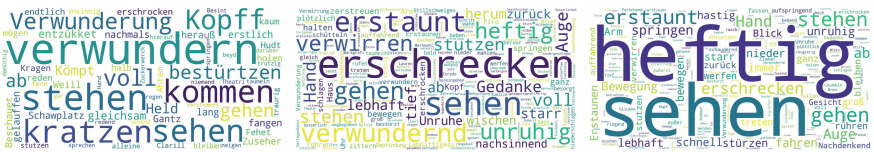
28 Andreas Gryphius, Papinianus, 1659, IV ("The spirits disappear all at once / the emperor awakes and sadly exits," own translation).

29 Christoph Martin Wieland, Klementina von Poretta 1759, III,4 ("stands in a desolate position, he is silent, he sighs, and fixes his eyes without moving sometimes on the sky, sometimes on the ground," own translation).

30 Johann Christian Hallmann, Die unüberwindliche Keuschheit oder Die groszmüthige Prinzeszin Liberata, 1700, III,9.

(a) SD (1600–1730) **(b)** SD (1730–1770) **(c)** SD (1770–1815)

Fig. 5: Most frequent words for 'joy.'



(a) SD (1600–1730) **(b)** SD (1730–1770) **(c)** SD (1770–1815)

Fig. 6: Most frequent words for 'being moved.'

'happy/happily'). In period II and III, laughing and smiling comes to the fore, expressed through the German adverbs 'lachend' and 'lächelnd.' According to the rise of the sentimental drama in the second half of the eighteenth century, 'umarmen' ('to hug') becomes the most frequently used word in the emotion representation of 'joy' in period III. The verb 'springen' ('to jump') appears in the top five for the first time in period III. In these cases, it is not another word for 'dancing,' but denotes a spontaneous movement associated with a sudden strong feeling of joy. In the tragedy *Eid und Pflicht* by Johann Jakob, the rapid change from despair to joy is indicated in the SD by a sudden jump:

> Eduard: [...] aber er röchelt! er stirbt! – – Alle meine Sinne, mein Blut – *Neben ihm niederstürzend.* O um Gotteswillen! Ich werde denn doch sein Mörder! Selbst dadurch, dass ich mich ihm aufopfre, sein Mörder! – – *Wieder aufspringend und froh.* Er regt sich wieder. Es ist noch Leben in ihm. [...][31]

8.3.3 Being Moved (Figure 6)

We use the term 'being moved' in the sense of a strong emotional arousal, which is, however, unspecified in terms of content. The need to include this category

31 Johann Jakob Engel, Eid und Pflicht, 1776, IV, 5 ("but he is gasping! he is dying! – All my senses, my blood – *Falling down beside him.* O for God's sake! I will become his murderer after all! Even by offering myself to him, his murderer! – *Jumping up again and joyfully*. He is moving again. There is still life in him," own translation).

arose in the course of the close reading for the annotation of 17 dramatic texts in all of which this phenomenon frequently appears. In period I, 'being moved' is expressed by the characters stopping in astonishment and scratching their heads ('verwundern,' 'stehen,' 'kratzen,' 'Kopf'), as in the subsequent example: "Peter Squentz: [...]. Hierauf verstummt er und kratzt sich im kopff."[32]

In period II, 'being moved' is expressed more vehemently by using the verb 'erschrecken' and the adjective 'erstaunt' ('to startle,' 'astonished'). In addition, the characters in this period are described as 'unruhig' and 'verwirrt' ('restless,' 'confused'). In period III, an adjective used from the second period onward is now most often used to denote emotional movement: 'heftig' ('violently'). The characters now either stop when they are stunned to see something surprising or walk around when something stirs them up ('erstaunt,' 'sehen,' 'gehen' – 'astonished,' 'to see,' 'to walk'). In the following example the character Eduard's inner turmoil when he is confirmed that his mortally ill father will soon be taken away to prison is illustrated by the following SD: "Eduard: *schnell und heftig.* Ha! – So errieth ich's? So soll er fort?"[33]

9 Conclusion

Our findings may be summarized as follows:

- SD have been depicting significantly more emotion since 1730 already and not only since 1770.
- In some cases, SD follow what we would expect from the drama poetics: decrease of 'abhorrence' and 'anger' in SD (correlated with an increase of 'compassion' and 'friendship' in ST of tragedies).
- In part, they show interesting shifts (the shift of despair into the character speeches), which makes further emotion-related analyses necessary.
- Semantic shifts in the language of emotions in SD point to the development of a much more vivid body language. As we investigated this only for three sub-emotions it would be of great interest to include more sub-emotions. To learn more about the semantics of emotions in SD, it would be instructive to investigate distinctive words of sub-emotions, to examine the combined oc-

32 Absurda Comica oder Herr Peter Squenz, 1757, III ("He then falls silent and scratches his head," own translation).

33 Johann Jakob Engel, Eid und Pflicht, 1776, I, 5 ("Eduard: *quickly and violently.* Ha! – That's what I guessed? Is he supposed to go away like that?," own translation).

currence of lemmata up to multi-word expressions as well as to include the results of part-of-speech tagging in the evaluation.

Funding: We developed these methods in the project "Emotions in Drama." This project was funded by the DFG (German Research Association) as part of the priority program Computational Literary Studies (SPP 2207/1) with two grants (project number 424207618; grants DE 2188/3-1 und WO 835/4-1). https://dfg-spp-cls.github.io/projects_en/2020/01/24/TP-Emotions_in_Drama/.

References

Aebischer, Pascale (2003). "Didascalia and Speech in the Dramatic Text." In: *Journal of Dramatic Theory and Criticism* 17.2, pp. 25–44. URL: https://journals.ku.edu/jdtc/article/view/3471/3347.

Alm, Cecilia Ovesdotter and Richard Sproat (2005). "Emotional Sequencing and Development in Fairy Tales." In: *Proceedings Affective Computing and Intelligent Interaction (ACII 2005)*, pp. 668–674. DOI: 10.1007/11573548_86.

Aston, Elaine and George Savona (2013). *Theatre as Sign System: A Semiotics of Text and Performance*. Routledge.

Baum, Constanze (2018). "Nebentexte als Bedeutungsträger im Drama der Frühen Neuzeit." In: *Zeitschrift für Literaturwissenschaft und Linguistik* 48, pp. 445–461.

Bojanowski, Piotr, Edouard Grave, Armand Joulin, and Tomas Mikolov (2017). "Enriching Word Vectors with Subword Information." In: *Transactions of the Association for Computational Linguistics* 5, pp. 135–146. DOI: 10.1162/tacl_a_00051.

Booth, Wayne C. (1991). *The Rhetoric of Fiction*. 2. ed., repr. Penguin.

Brunner, Annelen, Ngoc Duyen Tanja Tu, Lukas Weimer, and Fotis Jannidis (2020). "To BERT or not to BERT — Comparing Contextual Embeddings in a Deep Learning Architecture for the Automatic Recognition of four Types of Speech, Thought and Writing Representation." In: *Proceedings of the 5th Swiss Text Analytics Conference (SwissText) & 16th Conference on Natural Language Processing (KONVENS)*. URL: https://ceur-ws.org/Vol-2624/paper5.pdf.

Cao, Lihong, Sancheng Peng, Pengfei Yin, Yongmei Zhou, Aimin Yang, and Xinguang Li (2020). "A Survey of Emotion Analysis in Text Based on Deep Learning." In: *2020 IEEE 8th International Conference on Smart City and Informatization (iSCI)*, pp. 81–88. DOI: 10.1109/iSCI50694.2020.00020.

Chan, Branden, Stefan Schweter, and Timo Möller (2020). "German's Next Language Model." In: *Proceedings of the 28th International Conference on Computational Linguistics*, pp. 6788–6796. DOI: 10.18653/v1/2020.coling-main.598.

Dennerlein, Katrin (2021). *Materialien und Medien der Komödiengeschichte. Zur Praxeologie der Werkzirkulation zwischen Hamburg und Wien von 1678–1806*. De Gruyter.

Dennerlein, Katrin, Thomas Schmidt, and Christian Wolff (2022a). "Emotion Courses in German Historical Comedies and Tragedies." In: *Book of Abstracts, Digital Humanities 2022 (DH2022). Responding to Asian Diversity*, pp. 193–197. URL: https://dh2022.dhii.asia/dh2022bookofabsts.pdf.

Dennerlein, Katrin, Thomas Schmidt, and Christian Wolff (2022b). "Emotionen im kulturellen Gedächtnis bewahren." In: *DHd 2022 Kulturen des digitalen Gedächtnisses. 8. Tagung des Verbands "Digital Humanities im deutschsprachigen Raum" (DHd 2022)*, pp. 93–98. DOI: 10.5281/zenodo.6327957.

Dennerlein, Katrin, Thomas Schmidt, and Christian Wolff (2022c). *Figurenemotionen in deutschsprachigen Dramen annotieren*. Annotation guidelines. DOI: 10.5281/zenodo.6228151.

Dennerlein, Katrin, Thomas Schmidt, and Christian Wolff (2023). "Computational emotion classification for genre corpora of German tragedies and comedies from 17th to early 19th century." In: *Digital Scholarship in the Humanities*, pp. 1–16. DOI: 10.1093/llc/fqad046.

Detken, Anke (2009). *Im Nebenraum des Textes: Regiebemerkungen in Dramen des 18. Jahrhunderts*. De Gruyter. DOI: 10.1515/9783110230031.

Devlin, Jacob, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova (2019). "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding." In: *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers)*, pp. 4171–4186. DOI: 10.18653/v1/N19-1423.

Dustagheer, Sarah and Gillian Woods (2018). *Stage Directions and Shakespearean Theatre*. Bloomsbury.

Fischer, Frank, Ingo Börner, Mathias Göbel, Angelika Hechtl, Christopher Kittel, Carsten Milling, and Peer Trilcke (2019). "Programmable Corpora: Introducing DraCor, an Infrastructure for the Research on European Drama." In: *Book of Abstracts. Digital Humanities 2019: "Complexities"*. DOI: 10.5281/zenodo.4284002.

Gallèpe, Thierry (1998). *Didascalies: les mots de la mise en scène*. L'Harmattan.

Gius, Evelyn, Jan Christoph Meister, Marco Petris, Malte Meister, Christian Bruck, Janina Jacke, Mareike Schuhmacher, Marie Flüh, and Jan Horstmann (2020). *CATMA*. DOI: 10.5281/zenodo.4353618.

Glaser, Horst Albert (1969). *Das bürgerliche Rührstück. Analekten zum Zusammenhang von Sentimentalität mit Autorität in der trivialen Dramatik Schröders, Ifflands, Kotzebues und anderer Autoren am Ende des achtzehnten Jahrhunderts*. J.B. Metzler.

Grimm, Hartmut (1980). "Affekt." In: *Ästhetische Grundbegriffe*. Ed. by Karlheinz Barck, Martin Fontius, Dieter Schlenstedt, Steinwachs Burkhart, and Friedrich Wolfzettel. Vol. 1, pp. 16–49.

Gururangan, Suchin, Ana Marasović, Swabha Swayamdipta, Kyle Lo, Iz Beltagy, Doug Downey, and Noah A. Smith (2020). "Don't Stop Pretraining: Adapt Language Models to Domains and Tasks." In: *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, pp. 8342–8360. DOI: 10.18653/v1/2020.acl-main.740.

Ingarden, Roman [1931] (1973). *The Literary Work of Art: An Investigation of the Borderlines of Ontology, Logic and Theory of Literature. With an Appendix on the Functions of Language in the Theatre.* Northwestern University Press.

Issacaroff, Michael (1998). "Stage Codes." In: *Performing Texts*. Ed. by Michael Issacaroff and Robin F. Jones. University of Pennsylvania Press, pp. 59–74.

Jannidis, Fotis (2004). *Figur und Person. Beitrag zu einer historischen Narratologie.* De Gruyter.

Kim, Evgeny and Roman Klinger (2019). "A Survey on Sentiment and Emotion Analysis for Computational Literary Studies." In: *Zeitschrift für digitale Geisteswissenschaften*. DOI: 10.17175/2019_008.

Landis, J. Richard and Gary G. Koch (1977). "The Measurement of Observer Agreement for Categorical Data." In: *Biometrics* 33.1, pp. 159–174.

Lehr, Walter (1960). "Die szenischen Bemerkungen in den Dramen des Altwiener Volkstheaters bis 1752." PhD thesis. University of Vienna.

Mohammad, Saif (2011). "From Once Upon a Time to Happily Ever After: Tracking Emotions in Novels and Fairy Tales." In: *Proceedings of the 5th ACL-HLT Workshop on Language Technology for Cultural Heritage, Social Sciences, and Humanities*, pp. 105–114.

Nalisnick, Eric T. and Henry S. Baird (2013). "Character-to-Character Sentiment Analysis in Shakespeare's Plays." In: *Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*, pp. 479–483. URL: https://www.aclweb.org/anthology/P13-2085.

Noe, Alfred (2007). "Italienische Spieltexte: Aus unveröffentlichten Handschriften." In: *Spieltexte der Wanderbühne*. Ed. by Manfred Brauneck and Alfred Noe. Vol. V, 1+2. De Gruyter.

Pfister, Manfred (1988). *The Theory and Analysis of Drama*. Cambridge University Press.

Pikulik, Lothar (1966). *Bürgerliches Trauerspiel und Empfindsamkeit*. Böhlau.

Plutchik, Robert (1980). *Emotion, a Psychoevolutionary Synthesis*. Harper & Row.

Reiter, Nils (2020). "Anleitung zur Erstellung von Annotationsrichtlinien." In: *Reflektierte algorithmische Textanalyse: Interdisziplinäre(s) Arbeiten in der CRETA-Werkstatt*. Ed. by Nils Reiter, Axel Pichler, and Jonas Kuhn. De Gruyter, pp. 193–202. DOI: 10.1515/9783110693973-009.

Schings, Hans-Jürgen (1971). "Consolatio Tragoediae. Zur Theorie des barocken Trauerspiels." In: *Deutsche Dramentheorien* 1, pp. 1–44.

Schings, Hans-Jürgen (1980). *Der mitleidigste Mensch ist der beste Mensch: Poetik des Mitleids von Lessing bis Büchner*. C. H. Beck.

Schlott, Michael (1996). "Albert Meier, Dramaturgie der Bewunderung. Untersuchungen zur politisch-klassizistischen Tragödie des 18. Jahrhunderts." In: *Arbitrium* 14.3, pp. 334–339. DOI: 10.1515/arbi.1996.14.3.334.

Schmidt, Thomas and Manuel Burghardt (2018). "An Evaluation of Lexicon-based Sentiment Analysis Techniques for the Plays of Gotthold Ephraim Lessing." In: *Proceedings of the Second Joint SIGHUM Workshop on Computational Linguistics for Cultural Heritage, Social Sciences, Humanities and Literature*, pp. 139–149. URL: https://www.aclweb.org/anthology/W18-4516.

Schmidt, Thomas, Manuel Burghardt, and Katrin Dennerlein (2018). "Sentiment Annotation of Historic German Plays: An Empirical Study on Annotation Behavior." In: *Proceedings of the Workshop on Annotation in Digital Humanities 2018 (annDH 2018)*, pp. 47–52. URL: https://ceur-ws.org/Vol-2155/schmidt.pdf.

Schmidt, Thomas, Manuel Burghardt, Katrin Dennerlein, and Christian Wolff (2019). "Sentiment Annotation for Lessing's Plays: Towards a Language Resource for Sentiment Analysis on German Literary Texts." In: *2nd Conference on Language, Data and Knowledge (LDK 2019)*, pp. 45–50.

Schmidt, Thomas, Katrin Dennerlein, and Christian Wolff (2021a). "Emotion Classification in German Plays with Transformer-based Language Models Pretrained on Historical and Contemporary Language." In: *Proceedings of the 5th Joint SIGHUM Workshop on Computational Linguistics for Cultural Heritage, Social Sciences, Humanities and Literature*, pp. 67–79. DOI: 10.18653/v1/2021.latechclfl-1.8.

Schmidt, Thomas, Katrin Dennerlein, and Christian Wolff (2021b). "Towards a Corpus of Historical German Plays with Emotion Annotations." In: *3rd Conference on Language, Data and Knowledge (LDK 2021)*. Vol. 93, 9:1–9:11. DOI: 10.4230/OASIcs.LDK.2021.9.

Schmidt, Thomas, Katrin Dennerlein, and Christian Wolff (2021c). "Using Deep Learning for Emotion Analysis of 18th and 19th Century German Plays." In: *Fabrikation von Erkenntnis: Experimente in den Digital Humanities*. Ed. by Manuel Burghardt, Lisa Dieckmann, Timo Steyer, Peer Trilcke, Niels-Oliver Walkowski, Joëlle Weis, and Ulrike Wuttke. Melusina Press, p. 34. DOI: 10.26298/melusina.8f8w-y749-udlf.

Schmidt, Thomas, Katrin Dennerlein, and Christian Wolff (2022). "Evaluation computergestützter Verfahren der Emotionsklassifikation für deutschsprachige Dramen um 1800." In: *DHd 2022 Kulturen des digitalen Gedächtnisses. 8. Tagung des Verbands "Digital Humanities im deutschsprachigen Raum" (DHd 2022)*. DOI: 10.5281/zenodo.6328169.

Schonlau, Anja (2017). *Emotionen im Dramentext: eine methodische Grundlegung mit exemplarischer Analyse zu Neid und Intrige 1750-1800*. De Gruyter.

Schulz, Georg-Michael (1988). *Tugend, Gewalt und Tod: das Trauerspiel der Aufklärung und die Dramaturgie des Pathetischen und des Erhabenen*. De Gruyter. DOI: 10.1515/9783111384795.

Schwarz-Friesel, Monika (2007). *Sprache und Emotion*. Francke.

Schweter, Stefan (2020). *Europeana BERT and ELECTRA models*. DOI: 10.5281/zenodo.4275044.

Shmueli, Boaz and Lun-Wei Ku (2019). *SocialNLP EmotionX 2019 Challenge Overview: Predicting Emotions in Spoken Dialogues and Chats*. Preprint. DOI: 10.48550/arXiv.1909.07734.

Sperantov, V. V. (1998). "Poetika remarki v russkoy tragedii XVIII – nachala XIX vv. (K tipologii literaturnykh napravleniy) [The Poetics of Stage Directions in Russian Tragedy of the Eighteenth and Early Nineteenth Centuries (On the Typology of Literary Movements)]." In: *Philologica* 5.11/13, pp. 9–48. URL: https://rvb.ru/philologica/05/05sperantov.htm.

Sprugnoli, Rachele, Sara Tonelli, Alessandro Marchetti, and Giovanni Moretti (2015). "Towards sentiment analysis for historical texts." In: *Digital Scholarship in the Humanities* 31, pp. 762–772. DOI: 10.1093/llc/fqv027.

Suchy Patricia, A. (1991). "When Worlds Collide: The Stage Direction as Utterance." In: *Journal of Dramatic Theory and Criticism* 6.1, pp. 69–82.

Tonger-Erk, Lily (2018). "Das Drama als intermedialer Text. Eine systematische Skizze zur Funktion des Nebentextes." In: *Zeitschrift für Literaturwissenschaft und Linguistik* 48, pp. 421–444.

Trilcke, Peer, Christopher Kittel, Nils Reiter, Daria Maximova, and Frank Fischer (2020). "Opening the Stage. A Quantitative Look at Stage Directions in German Drama." In: *Digital Humanities 2020*. URL: https://dh2020.adho.org/wp-content/uploads/2020/07/337_OpeningtheStageAQuantitativeLookatStageDirectionsinGermanDrama.html.

Wartena, Christian (2019). "A Probabilistic Morphology Model for German Lemmatization." In: *Proceedings of the 15th Conference on Natural Language Processing (KONVENS 2019)*, pp. 40–49. DOI: 10.25968/opus-1527.

Weber, Alexander, ed. (2018). *Zur Druckgeschichte und Intermedialität frühneuzeitlicher Dramen*. Lit.

Weise, Christian (1986). *Sämtliche Werke*. Ed. by Hans-Gert Roloff and Gerd-Hermann Susen. De Gruyter, pp. 231–390.

Wiegmann, Hermann, ed. (1987). *Die ästhetische Leidenschaft: Texte zur Affektenlehre im 17. und 18. Jahrhundert*. Olms.

Winko, Simone (2003). *Kodierte Gefühle: Zu einer Poetik der Emotionen in lyrischen und poetologischen Texten um 1900*. Erich Schmidt Verlag.

Wolf, Thomas, Lysandre Debut, Victor Sanh, Julien Chaumond, Clement Delangue, Anthony Moi, Pierric Cistac, Tim Rault, Rémi Louf, Morgan Funtowicz, Joe Davison, Sam Shleifer, Patrick von Platen, Clara Ma, Yacine Jernite, Julien Plu, Canwen Xu, Teven Le Scao, Sylvain Gugger, Mariama Drame, Quentin Lhoest, and Alexander M. Rush (2020). *HuggingFace's Transformers: State-of-the-art Natural Language Processing*. Preprint. DOI: 10.48550/arXiv.1910.03771.

Wood, Ian, John McCrae, Vladimir Andryushechkin, and Paul Buitelaar (2018a). "A Comparison of Emotion Annotation Approaches for Text." In: *Information* 9.5, p. 117. DOI: 10.3390/info9050117.

Wood, Ian, John P. McCrae, Vladimir Andryushechkin, and Paul Buitelaar (2018b). "A Comparison Of Emotion Annotation Schemes And A New Annotated Data Set." In: *Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC 2018)*. URL: https://www.aclweb.org/anthology/L18-1192.

Yavuz, Mehmet Can (2021). "Analyses of Character Emotions in Dramatic Works by Using EmoLex Unigrams." In: *Proceedings of the Seventh Italian Conference on Computational Linguistics, CLiC-it'20*.

Zeller, Rosemarie (2005). "Tragödientheorie, Tragödienpraxis und Leidenschaften." In: *Passion, Affekt und Leidenschaft in der Frühen Neuzeit*. Ed. by Johann Anselm Steiger. Vol. 2. Harrassowitz, pp. 691–704.