Benjamin Krautter and Janis Pagel

# The Schemer in German Drama

## Identification and Quantitative Characterization

**Abstract:** Dramatic characters frequently fill out different role types and act according to traits conventionally attributed to their role. One of these role types is the "schemer," characterized by intervening in a play's main plot and driving forward the plot's main conflicts. In our study, we utilized secondary literature to identify 50 characters as schemers and extracted a wide range of features which are likely to distinguish "schemers" from "non-schemers." Using machine learning, we trained a model to automatically classify characters according to these two classes and performed a number of analyses in order to identify the most contributing features. Our model is able to reliably detect schemers, utilizing features that cover information about stage presence and content of character speech, but exhibits a rather low precision. We show that this can partially be attributed to the heterogeneous nature that characterizes the group of schemers.

## 1 Introduction

When marquess Marinelli casually mentions that Count Appiani will marry Emilia Galotti on this very day, Prince Hettore Gonzago feels completely "lost, and [...] no longer" able to "live," as he ardently "love[s]" and "adore[s]" Emilia (Lessing 1800, p. 11). The dialogue between the Prince and Marinelli in the first act of Gotthold Ephraim Lessing's tragedy *Emilia Galotti* (1772) discloses one page of the play's dramatic conflict and, at the same time, sparks the further action. To prevent the marriage Marinelli proposes to "devise some scheme" and asks the Prince for his permission: "[W]ill you let me act as I please? Will you approve all I do?" (Lessing 1800, p. 13).

In German literary history, Marinelli is considered a typical representative of the evil schemer (cf. Alt 2004; Martens 1995; Asmuth 2016, p. 126). He is described as a slick, unscrupulous, compliant, cynical, and cunning advisor – a character type that was well established in Lessing's days (cf. Martens 1995, pp. 69–70, 78). Lessing's Marinelli, however, does not primarily act as an instigator that incites the Prince's evil desires by pointing him to the apparent limitlessness of his power. According to Alt (2004, p. 8), he instead embodies a dynamic principle with the

**Benjamin Krautter, Janis Pagel,** University of Cologne


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function of organising a silent crime that leaves the originator, i.e., the Prince, in the dark. In the end, his 'scheme' causes a fundamental destabilization of relationships, as it not only separates bride and groom, but also father-in-law and groom, father and mother, mother and daughter, and, lastly, even father and daughter.

Over the course of the early modern period, the role of the schemer has been established as a distinct role type (Rollenfach)[1] in German theater practice (cf. Asmuth 2016, p. 124). The intrigue itself has always been an important element of drama, e.g., regarding Aristotelian concepts such as reversal *(peripeteia)* and recognition *(anagnorisis)*. With the schemer being one of the more central character types to the plot's action, we are, therefore, focusing on automatically identifying and quantitatively analyzing different schemers in German plays from the eighteenth and nineteenth centuries. For our article's undertaking, we can build upon principles that have already been discussed in the field of Computational Literary Studies (CLS) in recent years. Automatically detecting protagonists or main characters in literary texts, for example, has become a more and more reliable task (cf. Moretti 2011; Jannidis et al. 2016; Reiter et al. 2018; Fischer et al. 2019; Krautter and Pagel 2019).

In the 1970s Manfred Pfister (1988, p. 165) proposed a first operationalization to detect the main characters of a play in terms of "[q]uantitative relations of dominance." Pfister intended to distinguish main from secondary characters by using two criteria: namely, "the length of time that a dramatic [character] spends on stage and the extent of its participation in the primary text" (Pfister 1988, p. 165). He stresses, however, that neither do the two criteria he describes have to coincide nor are they perfectly reliable. Moreover, a more precise categorization of the dramatis personae, e.g., according to a character's function, would lack "sophisticated preliminary studies of the 'grammar' of plot," as Pfister (1988, p. 166) has argued.

In our contribution, we will extend existing computational approaches and thus aim at a more subtle differentiation of dramatic characters than Pfister has called for. Doing so, our goal is to automatically detect schemers on the basis of a number of well-established quantitative methods of Natural Language Processing.[2] As schemers are often characterized by their changing roles of acting and observing, it becomes clear that identifying dramatic characters as schemers is a complex and multi-dimensional task. Once a model for classifying individual characters is established, our corpus analytical perspective enables us to analyze

**1** The role types are considered to be a central principle for the structure of European theater practice (cf. Detken and Schonlau 2014, p. 7). For an overview on role types, cf. Harris 1992.

**2** To do this, we draw on related groundwork published in Krautter et al. (2020, 2022).

overarching developments: how does the dramatis personae change with regard to schemers? Can we observe differences in genre or in period?

To this end, we will cursorily outline the characteristics of schemers from a literary studies perspective in a first step (Section 2). In a second step, we set forth our methodological premises in establishing a data set of 50 schemers in total. This data set serves as training data for our machine learning model (3). Following this, we explain our computational operationalization, which over several steps transmits properties of dramatic characters into measurable indicators through methods of quantitative text analysis (4). These indicators serve as features for our machine learning models. In a series of experiments, we attempt to take a closer look at schemers from a quantitative point of view (5.1). We go on to evaluate and compare individual features to provide insights into the conception of schemers in dramatic texts (5.2) and finally discuss our results (6).

## 2 The Schemer in Literary Studies

The schemer is probably one of the more heterogeneous role types in the theater practice of the eighteenth and nineteenth centuries. It is also one of the longest lasting role types (cf. Schonlau 2017, p. 180). Within the role type system, the schemer is part of the so-called character role – a role that is specifically tailored to more complex, dynamic, rounded and individual characters.[3] These character roles serve as an addition to the otherwise rather clearly socially defined characters of the role type system, such as fathers, mothers or lovers. Thus, the system includes characters that partially undermine the basic idea of the system to have roles that are easily transferable from one play to another.[4] Therefore, it seems particularly challenging to identify schemers automatically. The schemer's heterogeneity has been discussed as an inherent element of the intrigue itself. The intrigue is understood as a genuine dramatic principle that makes use of social transformations and social rearrangements to bring about change by stimulating action (cf. von Matt 2006, p. 34). Consequently, the schemer can be described as a character of intervention (cf. Alt 2004, pp. 1, 8). For audience and characters alike, the intrigue presupposes different degrees of awareness (cf. Pfister 1988, pp. 49–

**3** The corresponding entry in the *Allgemeines Theater-Lexikon* from 1839 gives a historical perspective on character roles in German theater plays (cf. Storch 1839, p. 122).

**4** As soon as theater groups started to settle into cities, they had to expand their repertoire of plays to maintain visitor interest. Consequently, the role type system provided certain conventions regarding the different types of roles an actor could play (cf. Harris 1992, pp. 222–225).

57). Typically, the audience in the outer communication system is informed about the plans of the schemer. His victims in the inner communication system, however, do not know about the scheme he is planning, as the schemer's actions are determined by a moment of deception. Accordingly, he can be described as unpredictable, opaque, or ambiguous in his acting (cf. Alt 2004, p. 1).

The intrigue itself is open to a wide variety of manifestations and is also not specific to gender – although the majority of schemers in plays is believed to be male (cf. Schonlau 2017, p. 179). Moreover, in the context of literary history the intrigue is morally indifferent. It can serve good intentions and purposes, but it can just as well trigger the play's catastrophe. Thus, a distinction between destructive and constructive intrigues can be made, which at the same time can delineate different characterizations and strategies of schemers (cf. Matt 2002, 34). While intrigues in satirical comedies oftentimes pretend to respond to a character's mistake, most of the time they are actually directed against the very same character (cf. Steinmetz 1978, p. 42). The tragic intrigue, according to Aristotle's reasoning, demands both surprise and credibility. In this context, the intrigue is essentially not a means of self-empowerment but serves as a tool for destabilization and selection (cf. Alt 2004, p. 3).

One of the most prominent tools of scheming or intriguing machinations is the letter: Peter Pütz describes the letter as a reliable vehicle of intrigue. Firstly, characters can disguise themselves in letters without giving away facial expressions and the sound of their voice. Secondly, a letter can be faked in multiple ways: in relation to the originator, the addressee, and the content. And thirdly, a letter can – unintentionally or intentionally – fall into other hands and, subsequently, be used as means of blackmail (cf. Pütz 1970, p. 82). Looking at the characters, servants can frequently be found as the originators of an intrigue (cf. Eibl 1971, p. 151). Chamberlain Marinelli, for instance, is a prime example of a scheming courtier servant. In addition to generally vicious behavior of schemers, individual passions can serve as a central motivation for intrigue, whether that is envy, hatred, or jealousy (cf. Schonlau 2017, pp. 181–182).

## 3 Methodology and Corpus

In our article, we follow an approach that can be labeled as a top-down-procedure. More precisely, we make use of secondary literature to establish a data set of schemers. We then go on to use this data set as training data to train a machine learning model. As Pichler and Reiter (2022, p. 9) have put it, such "a proceeding is consistent with an established and widely used research practice in data

sciences. It consists of using pre-existing gold standard data, based on some concept(s), as the training data of a machine learning algorithm."[5] In our case, however, the data set, which contains the 'gold standard data,' must be put together first. To do this, we lean on Franco Moretti's original idea of distant reading. In his essay *Conjectures on World Literature* 2000, Moretti envisages distant reading as a second-hand criticism. In Moretti's controversial view, literary history should be dealt with as a "patchwork of other people's research, *without a single direct textual reading*" (Moretti 2000a, p. 57). For his ambitious focus on world literature, he proposes to skip reading primary literature entirely and instead concentrate on secondary literature or the expertise provided by research networks (Moretti 2005, p. 5). This rather polemical suggestion is an attempt to find an appropriate method for analyzing literary history without depending "on its canonical fraction, which is not even one per cent of published literature" (Moretti 2000a, p. 55; cf. Moretti 2000b, p. 226).

Although Moretti's idea is not highly specified from a methodological point of view, it seems to be useful for our approach of identifying and analyzing literary characters as schemers. As the automatic detection of schemers requires a sound data set to train our computational model, we can take advantage of established research to find the respective characters. In order to constitute our data set of schemers in German plays of the eighteenth and nineteenth centuries, we followed Moretti's suggestion: we did second-hand criticism. We used attributions made by other researchers to label a character as schemer. We searched through handbooks, articles, monographs, literary histories, and encyclopedias to find characters that have been referenced as schemers. Table 5 (see appendix) gives an overview of our data set, which consists of 50 characters that were labeled as schemers.[6] The table lists all the characters, the plays they are part of, and a reference to secondary literature. The 50 schemers in our data set come from a total of 38 different plays, which comprise 848 characters. Our data set, however, only contains positive examples of schemers. As plays can incorporate more than one schemer, we cannot rule out that all characters that are not listed in our data are, in fact, not schemers. For the analysis of the 38 plays, we resort to the *German Drama Corpus* (Fischer et al. 2019).

**5** A prominent example of such an approach can be found in Andrew Piper's (2016) article on *Fictionality*.

**6** Since our approach does not call for a consensual categorization of the characters, the established data do not reflect ground truth but instead serve as heuristic.

# 4 Operationalization

To automatically identify schemers in a set of dramatic characters, we first need to operationalize the concept computationally. We understand operationalization as the development of algorithmic routines for the unambiguous detection or measurement of a concept's instantiations in data (cf. Pichler and Reiter 2022, p. 2, 2021, p. 4). This can be done both manually and computationally. As we derive our training data from literary studies' secondary literature, we can do without manually annotating schemers in dramatic texts. Instead, we can focus on our computational operationalization. In literary studies, schemers are oftentimes described according to their function for the plot's action: the schemer, then, is regarded as the character that instigates an intrigue. To automatically identify a schemer as the originator of an intrigue presupposes that we can either computationally find scenes, which include an intrigue, or that all relevant intrigues have been annotated manually. To bypass these requirements, we operationalize schemers indirectly by using several sub-concepts. Most of these sub-concepts, in turn, are not directly measurable, either. Thus, we have to operationalize them first. This incremental process leads to a hierarchical order with directly measurable indicators at the bottom of it.

Figure 1 gives an overview of our operationalization hierarchy. To detect schemers, we employ six sub-concepts to distinguish between different dramatic characters: 'sentiment,' 'aboutness,' 'interaction,' 'stage presence,' 'action' and 'character speech stylistics.'[7] These sub-concepts are further divided into different methods that measure or identify instances of further constricted sub-concepts. Looking at the 'interaction' of characters, for instance, we employ network analysis to create co-presence networks. For every character in our corpus of plays we calculate network metrics such as *degree* or *betweenness centrality*. Indirect operationalizations must always be undertaken with regard to the operationalizability of the sub-concepts. For this, both pragmatic and theoretical aspects are relevant. Consequently, our operationalization of schemers is a compromise between ambition and feasibility. A concept like interaction is obviously not limited to the co-presence of characters. In our case, the edges that are connecting the nodes represent that "two characters are listed as speakers within a given segment of a text (usually a 'scene')" (Trilcke et al. 2015, p. 1). Operationalized in this way, the co-presence of two characters is only one aspect of 'interaction.' It is an approx-

7 Some of the concepts mentioned are influenced by insights from critical discourse analysis, e.g., regarding so-called turn-length and turn-taking or the importance of topics (cf. Bennison 1998, pp. 70–75).

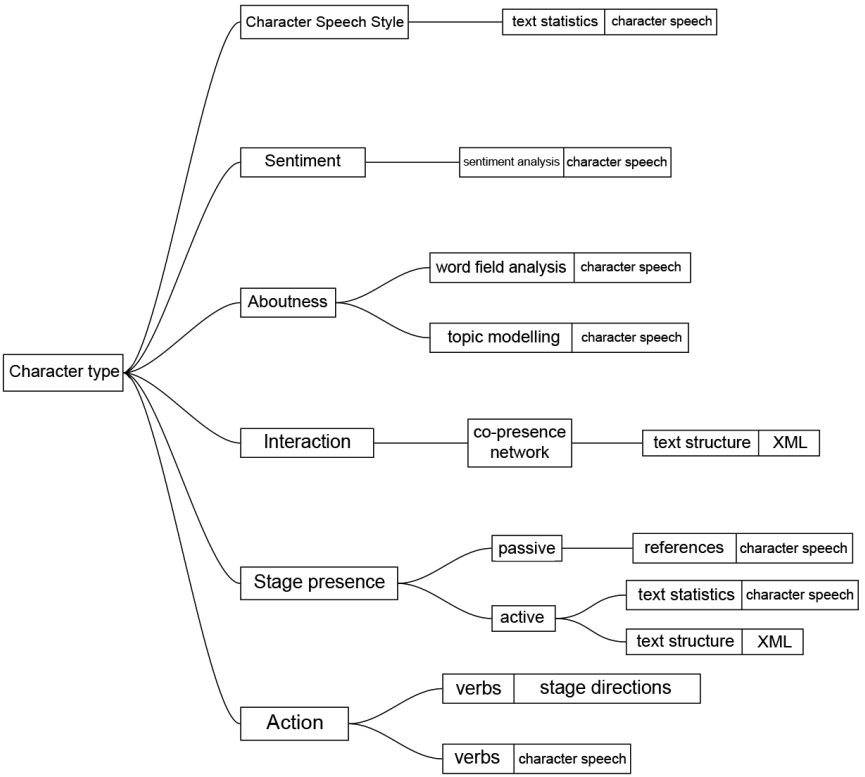


**Fig. 1:** Computational operationalization of dramatic character types.

imation of the concept of 'interaction.' At the same time, the sub-concepts we employ cannot always be separated sharply. To give an example: the stage presence of dramatic characters obviously has some overlap with the co-presence of characters. There are further questions at the lower end of the operationalization hierarchy to which this article can only give cursory answers. To give an example: The detection of references in (literary) texts, which computational linguistics has been dealing with for many years under the notion of coreference resolution, is far from a trivial problem (cf. Pagel and Reiter 2021; Schröder et al. 2021).

In the following, we explain the indicators, which we subsequently employ as 'features' in our machine learning model, from a technical perspective.

## 4.1 Features

The features can be divided into several groups based on the methods that are used: 'text statistics,' 'network metrics,' 'stage presence,' 'word fields,' 'topics,' 'action verbs,' 'sentiment,' and 'priors.' In the following, we describe these features and their implementation in our model in greater detail.

### 4.1.1 Text Statistics

We use several features that describe certain statistics about the character speech:
- *tokens*: the number of tokens a character utters. This feature is normalized by the total number of tokens in a play.
- *utterances*: the number of utterances of a character. An utterance is a span of text that a character speaks before and/or after another character is speaking.
- *utteranceLengthMean*: the mean length of an utterance measured in tokens.
- *utteranceLengthSd*: the standard deviation of a character's utterances.
- *TTR*: the type-token-ratio of a character, which is the number of types divided by the number of tokens in a certain span of text. We opted for a segment length of 200 tokens and averaged the result.

### 4.1.2 Network Metrics

We create networks by treating characters as nodes and the co-presence of characters in a scene as edges between the nodes (cf. Marcus 1973; Trilcke 2013). We calculate several metrics on these co-presence networks, namely:[8]
- *degree* centrality
- *weighted degree* centrality
- *betweenness* centrality
- *closeness* centrality
- *eigenvector* centrality

### 4.1.3 Stage Presence

We measure the presence of characters on the stage in four different ways:

**8** For a detailed discussion and overview of these metrics, see Wasserman and Faust (1994).

- *active* presence: the number of scenes in which a character is present on stage, divided by the total number of the play's scenes.
- *passive* presence: the number of scenes in which a character is mentioned by name, but not present on stage, divided by the total number of the play's scenes.
- *firstBegin*: the first time a character utters a word, measured in character offsets.
- *lastEnd*: the last time a character utters a word, measured in character offsets.

### 4.1.4 Word Fields

To infer the semantics of the character speech, we use seven different word fields (WF) that cover the areas of *family* (Familie), *war* (Krieg), *love* (Liebe), *politics* (Politik), *reason* (Ratio), *religion* (Religion) and *economy* (Wirtschaft).[9] A word field contains lemmatized entries for terms of a certain domain that we consider relevant for the time span we analyze (roughly 1730–1850). For each character, we count the number of times the lemma of a spoken token is found in one of the word lists. It is then divided by the total number of tokens spoken by a character. The word lists were created manually in an iterative process (cf. Willand and Reiter 2017). We started by examining a few plays, where we identified important domains and associated words. We then gradually enriched the word lists by looking at further plays and dictionaries, e.g., Dornseiff, a dictionary for German vocabulary that is based on thematic groups.[10]

### 4.1.5 Topics

In addition to the manually created word fields, the character speech may contain further topics, which we attempt to capture using topic modeling (cf. Blei et al. 2003). For this purpose, we make use of Latent Dirichlet Allocation (LDA) with Gibbs sampling. We use the *German Drama Corpus* (Fischer et al. 2019) as input and divide the individual plays into segments of 1000 tokens each. We only consider those tokens that have been identified as 'noun,' 'verb,' 'adjective,' or 'ad-

**9** The word lists are publicly available: https://github.com/quadrama/metadata/tree/master/fields.

**10** Reiter and Willand (2022) conducted an evaluation study in which they compare the performance of word fields and topic modeling for a series of experiments that focus on character speech in dramatic texts.

**Tab. 1:** List of the top 12 lemmas in *T19*, both the original German words and an English translation.

| | Topic 19 |
|---|---|
| **Lemma** | **English Translation** |
| zar | tsar (male) |
| kirche | church |
| heilig | holy |
| zarin | tsar (female) |
| meister | master |
| Sir | sir |
| plötzlich | suddenly |
| rein | pure |
| kreuz | cross |
| nackt | naked |
| ewig | eternal |
| berühmt | famous |

verb.' Proper nouns are also removed. The number of topics is set to 20, resulting in the topics *T1–T20*. The pre-processing and the parameters have been refined over a couple of studies (cf. Reiter et al. 2018; Krautter and Pagel 2019; Krautter et al. 2020) and we have trained various models with different numbers of topics. After manual inspection, we chose a model with 20 topics as it provided a good compromise between covering a broad range of different topics and – at the same time – providing clearly distinguishable and interpretable topics. Table 1 shows the top 12 lemmas for *T19* as an example. As can be seen *T19* mostly consists of lemmas related to religion and authority. As a feature value, each character is given the posterior probability of a topic, i.e., the probability of a character to utter tokens of a given topic. The posterior probability of a character is determined on the basis of all of his utterances.

### 4.1.6 Verbs of Action

Both word fields and topics should, to some extent, reflect the content or the aboutness of the characters' speech and thus indirectly allow us to draw conclusions about a character's function for the plot of the play. Another feature that attempts to quantify the function of characters within the plot is the distribution of verbs in both the primary and the secondary text of the plays. To utilize this feature, we extract the ten most frequent verbs in the character speech and the stage directions for each character in our corpus of plays while not considering modal and

**Tab. 2:** Most frequent verbs in character speech and stage directions.

| Action verbs in utterances (utt.) | | Action verbs in stage directions (sd.) | |
|---|---|---|---|
| **Verb** | **Frequency** | **Verb** | **Frequency** |
| sagen (to say) | 2088 | gehen (to go) | 762 |
| lassen (to let) | 1892 | treten (to tread) | 490 |
| sehen (to see) | 1634 | stehen (to stand) | 335 |
| machen (to make) | 1623 | sehen (to see) | 291 |
| kommen (to come) | 1614 | kommen (to come) | 263 |
| geben (to give) | 1280 | nehmen (to take) | 196 |
| gehen (to go) | 1178 | fallen (to fall) | 183 |
| tun (to do) | 1037 | setzen (to sit) | 176 |
| wissen (to know) | 824 | geben (to give) | 142 |
| hören (to hear) | 751 | werfen (to throw) | 132 |

auxiliary verbs. The frequency of uttered verbs is determined for each character and divided by the total number of tokens a character speaks. Table 2 shows a list of the most frequent verbs in the 33 plays we analyze. The list distinguishes between character speech (utt.) and staged directions (sd.) in descending order of frequency.

### 4.1.7 Sentiment

To calculate the sentiment of a character's utterances, we make use of a static list of words with positive and negative connotations from the German SentiWS corpus (Remus et al. 2010). The list contains lemmatized entries sorted by part-of-speech as well as weights and possible inflectional forms. Similarly to the procedure for the word fields, we match the automatically lemmatized tokens spoken by a character with both lists and sum all weights when a match occurs. The two resulting final values (positive and negative) are then divided by the number of tokens spoken by a character to ensure comparability. This results in the two features, a positive *(posRatio)* and a negative *(negRatio)* ratio.

### 4.1.8 Priors

A prior is in our case an information that is linked to the play and its creation rather than to individual characters of the play. These priors, nevertheless, can

serve as criteria to group plays and thus contextualize properties of characters. We use two priors:

- *decade*: for every character, we store the decade in which the play was written or performed.
- *prose*/lines: a boolean value that stores whether the play is (mainly) written in prose or in lines. This is done automatically by containing the number of specific TEI-encoded tags in the source files of the *German Drama Corpus*: a majority of <l> and <lg> tags (line and line group) determines the play to be in lines, a majority of <p> tags (paragraph) determines the play to be written in prose.

### 4.2 Feature Overview

In order to look at the impact of different types of information, we group these features according to our operationalization presented earlier. Table 3 gives an overview of all features and the group they belong to.

## 5 Experiments

We use the features from section 4.1 as input to train a machine learning model. For the model, we opt for the Random Forest (RF) algorithm (Ho 1995). This model is trained by using the extracted features to predict whether a character is likely to be classified as 'schemer' or not.

Before training the model, we perform two preprocessing steps: Since highly correlated features contribute redundant information, all features are first checked for correlation in a pairwise manner. For pairs with a Pearson correlation coefficient larger than 0.7, the feature that correlates most strongly with all others is removed. Furthermore, since our data is unevenly distributed – there are many more negative than positive instances of schemers –, we use SMOTE (Chawla et al. 2002) to dynamically generate new training samples. Starting from nearest neighbors in the feature values, SMOTE generates artificial data points. This way, SMOTE helps to minimize imbalances in classes.

We use 10-fold-cross validation in all the following experiments to split the data into ten different folds. In each fold, we create a different division of the data into 80 % training and 20 % test data, so that in the end all data points are used once as test data. We pass the resulting training data to the RF algorithm and obtain ten different models based on each set of training data. We apply each model

**Tab. 3:** Overview of all features and their groups.

| Group | Feature |
|---|---|
| Character speech stylistics | TTR<br>utteranceLengthMean<br>utteranceLengthSd |
| Stage presence | actives<br>passives<br>firstBegin<br>lastEnd<br>tokens<br>utterances |
| Interaction | degree<br>weightedDegree<br>betweenness<br>closeness<br>eigenvector |
| Aboutness | Word fields (love, family, war, reason, religion, economy, politics)<br>Topic model (T1-20) |
| Sentiment | posRatio<br>negRatio |
| Action | utt.geben, utt.gehen, utt.hören, utt.kommen, utt.lassen, utt.machen, utt.sagen, utt.sehen, utt.tun, utt.wissen<br>sd.fallen, sd.geben, sd.gehen, sd.kommen, sd.nehmen, sd.sehen, sd.setzen, sd.stehen, sd.treten, sd.werfen |
| Priors | decade<br>prose/lines |

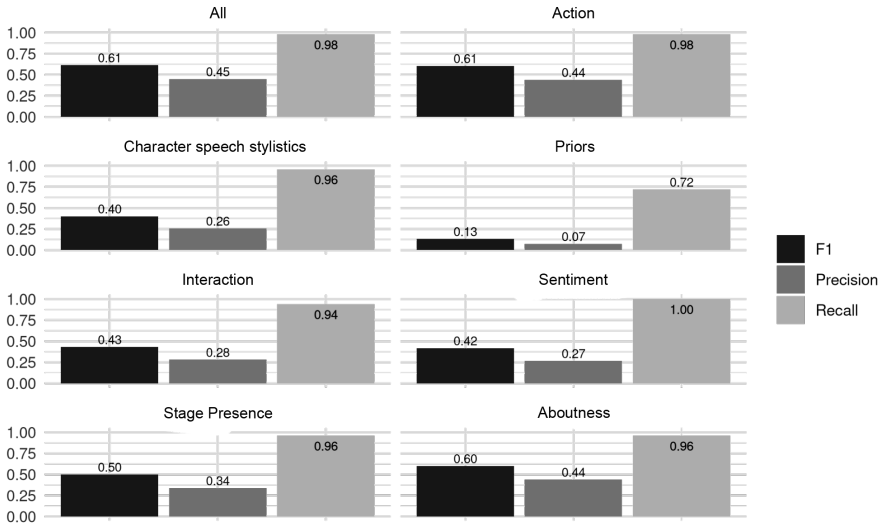


**Fig. 2:** Classification results for classifying "schemer" vs. "non-schemer" for different models.

to its respective test set and obtain a final test result by taking the average of all ten models. To evaluate the model, we use Precision, Recall, and F1-Score as metrics.

## 5.1 Classification Results

Figure 2 shows the results of the classification. The full model 'All,' which contains all features in combination, achieves the highest F1 score (0.61). It is followed by the models that focus on individual sub-concepts: 'Action' (0.61), 'Topics' (0.60), and 'StagePresence' (0.50). While the recall is consistently high for all models, the values for precision are rather low. This suggests that the models are indeed capable of correctly identifying characters as schemers but also detect many characters as schemers that are not identified as such in our gold data.[11]

**11** We also performed preliminary experiments using transformer models, namely HuggingFace's German BERT (https://huggingface.co/bert-base-german-cased) and ELECTRA (https://huggingface.co/german-nlp-group/electra-base-german-uncased) models, by extracting all utterances and associated stage directions for each character and fine-tuning the two models on the resulting texts. However, we found the results not satisfactory, as the models achieved an overall F1-score of 0.48 for BERT and 0.49 for ELECTRA.

## 5.2 Error Analysis and Model Interpretability

In order to better understand the classification results, we look at several aspects of the classification process. Firstly, we look at the feature (or variable) importance, which quantifies how 'important' a feature was for the model in order to make a classification decision. Figure 3 shows all features of the model 'All' and their respective feature importance. The most important features are 'tokens,' 'T19,' 'utterances,' 'T15,' 'T18,' 'T14,' 'T17,' 'T5,' 'T20,' 'T3,' 'religion,' and so on. The feature importance seems to correspond to the classification results, as 'Aboutness' was the highest-performing sub-concept. Interestingly – and also in correspondence with the classification results –, the calculated network metrics, which we used to operationalize the sub-concept 'interaction,' have only limited importance for the classification decision. Looking at the schemer from a theoretical point of view, this is rather surprising, as the interaction with other characters would seem to be an important criterion to establish the intrigue. As Peter-André Alt has argued, the schemer represents various forms of intervention that fundamentally alter contexts of communication and interaction (cf. Alt 2004, p. 1).

We can also look at these features in terms of their value distribution with regard to the classification results. This can be seen in Table 4. TP stands for 'true positive,' meaning that the character is recognized as a schemer in literary studies' research and was also correctly classified as schemer by our model; TN stands for 'true negative,' a character was correctly classified as 'non-schemer'; and FP stands for 'false positive,' a character is incorrectly classified as schemer. A false negative (FN) only occurs once and can therefore not be used for a value distribution analysis.

For all three of the represented features, the results of the value distribution analysis confirm that the schemer not only tends to be a heterogeneous role type, but that this heterogeneity is also perceivable when looking at the schemers' character speech. The standard deviation – especially regarding the features 'tokens' and 'utterances' – is rather high, which complicates the automatic detection. Table 4 shows that the mean values for TP and FP are quite similar. This leads to two central questions: are the sub-concepts and, consequently, the features we have chosen to operationalize character types suited to identify schemers? Or are the schemers in our gold standard, which we derived from literary studies research, too heterogeneous in terms of their quantitative properties to categorize them as a group of similar characters?

To further investigate these questions, we perform a Principal Component Analysis (PCA). A PCA compresses the multi-dimensional features into two dimensions while preserving the most important properties of all features. This allows

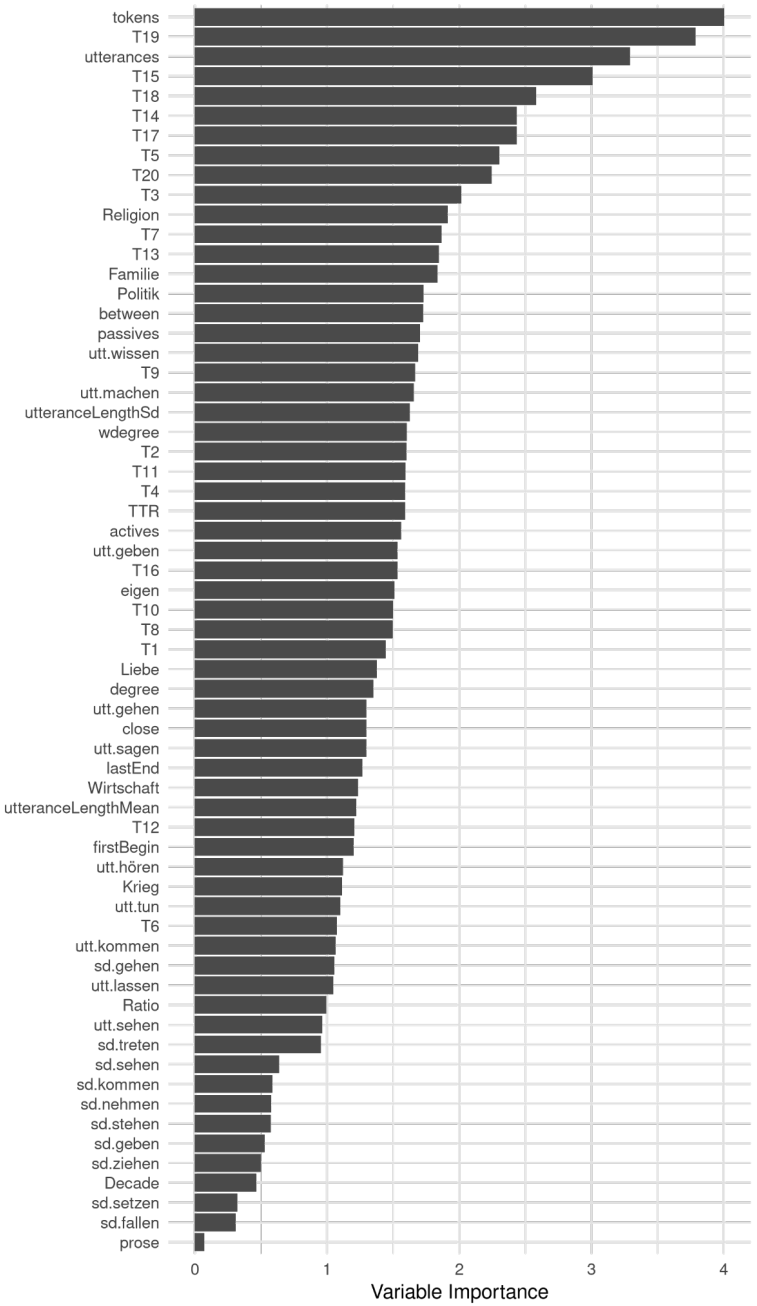


**Fig. 3:** Feature importance of model "All."

**Tab. 4:** Mean, max, and min value and standard deviation (Sd) for three top-performing features. The values are calculated based on the evaluation outcome: true positive (TP), true negative (TN) and false positive (FP).

| Feature | Outcome | Mean | Min | Max | Sd |
|---|---|---|---|---|---|
| tokens | TP | 0.133 | 0.015 | 0.411 | 0.09 |
| | TN | 0.025 | 0.000 066 | 0.396 | 0.05 |
| | FP | 0.126 | 0.0255 | 0.366 | 0.081 |
| utterances | TP | 128.69 | 11.00 | 364.00 | 83.53 |
| | TN | 27.66 | 1.00 | 509.00 | 49.55 |
| | FP | 121.87 | 38.00 | 341.00 | 72.02 |
| religion | TP | 0.000 018 | 0.00 | 0.000 065 | 0.000 014 |
| | TN | 0.000 028 | 0.00 | 0.000 94 | 0.000 087 |
| | FP | 0.000 022 | 0.000 002 5 | 0.000 071 | 0.000 015 |

to plot classes into a two-dimensional space while still showing a representation that resembles the totality of all features.

The PCA in Figure 4 demonstrates that schemers seem to have a rather close relation with regard to PC1 but are spread apart pretty far in relation to PC2. However, there seems to be a closer core group of schemers that is located in between the values 3.5 to -3.5 (PC2) and 1.25 to 3.75 (PC1). To give these observations more context, we also look at a PCA in which the false positives (FP) from our classification results are highlighted by color. This allows us to inspect whether characters that prompted the model to falsely classify them as schemers are closely located to schemers from our gold standard data. As we can see from the data in Figure 5, this seems to be the case. From this we can derive that the predictions of our model seem to be reasonable in view of the different character properties.

# 6 Discussion

Our classification results and our subsequent analyses have shown that automatically identifying schemers in German plays is a demanding task that confronts us with several difficulties at once. Firstly, creating or annotating a gold standard data set of schemers is not straightforward. Instead of manually reading and annotating the different plays and characters, we opted for an approach that resorts to second-hand criticism. While this brings the advantage of bypassing the time-consuming development of annotation guidelines and the effort of applying these guidelines to dramatic texts, it comes at the cost of – at least potentially – less con-

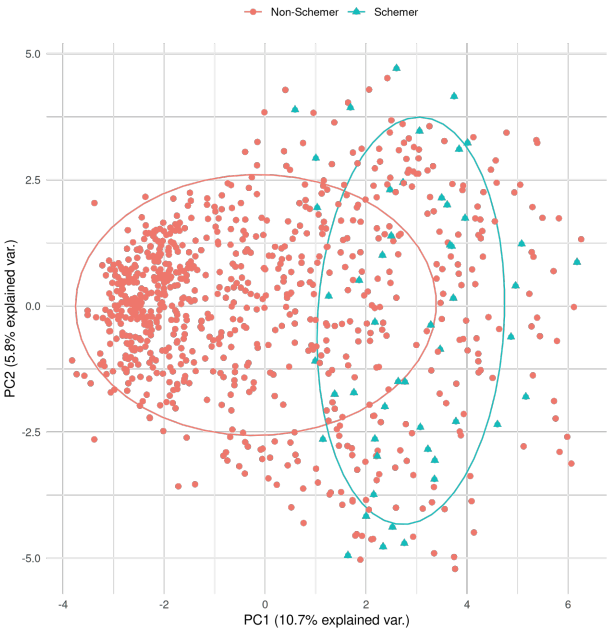


**Fig. 4:** PCA comparing schemers and non-schemers.

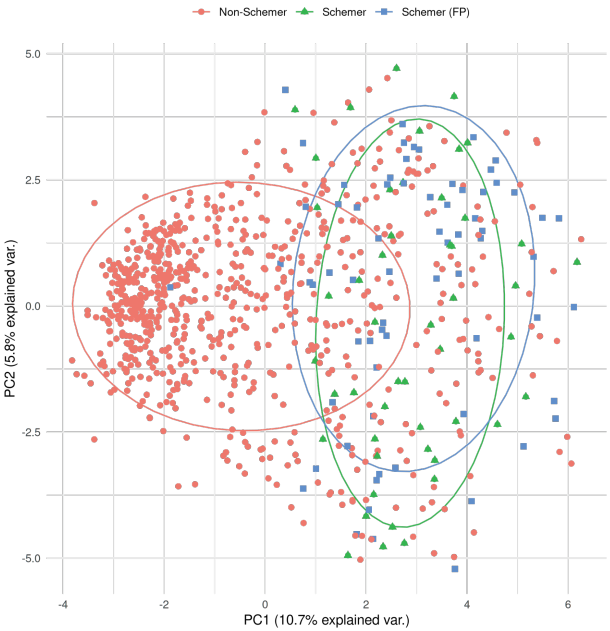


**Fig. 5:** PCA comparing schemers and non-schemers and false positives (FP).

sistency. It is safe to say that various literary scholars might weigh or apply criteria in different ways to categorize characters as schemers. This might add further inconsistencies to a class of already heterogeneous characters. Secondly, characters that are perceived as schemers can also be part of other groups of characters. They might as well be a father, a lover, or a servant. Consequently, some of their properties would then overlap with other characters that are not perceived as schemers. Thirdly, our indirect operationalization of character types focuses on several sub-concepts that are not specific to schemers. Instead of using an individually tailored feature set to delimit schemers from other characters, we aimed at creating a more general set of sub-concepts that can also be used to identify other character types (cf. Krautter et al 2020). We expected that – from a bird's-eye view – a synthesis of these sub-concepts could grasp abstract patterns in the schemers' character speech, in their form of interaction with other characters, or in their presence on stage that would distinguish them quantitatively from other characters.

Our analyses have shown that our model is able to accurately identify the characters taken from our gold standard data as schemers. However, the model has its difficulties in delimiting the class of schemers from other characters. As Figures 4 and 5 and Table 4 have shown the source of these difficulties is probably down to a combination of reasons. On the one hand, the class of schemers, as it is designed by our approach of using secondary literature to create a gold standard, might be too heterogeneous to delimit it accurately from all other characters. On the other hand, the features we use to operationalize character types might be too general and not distinct enough for schemers. We are therefore planning to adjust our experiments in the future according to these findings in at least two ways. We will try a different approach to creating the gold standard dataset that starts from prototypical schemers such as Lessing's Marinelli to then gradually expand the data set. Furthermore, we would like to supplement our feature set, e.g., by creating a word field that is specifically tailored to schemers.

# 7 Conclusion

In our study, we presented annotations for 38 plays, classifying characters into 'schemers' and 'non-schemers.' We based our annotation decisions on secondary literature, utilizing the results of research that has done in-depth analyses on the plays in question. Using the *German Drama Corpus* as a basis, we extracted several features from the characters' speech and from the stage directions. The features, in turn, were used to train a machine learning model that learned to classify characters into being a schemer or not being a schemer. The results of this classi-

fication show that while the model is already able to correctly identify characters as schemers (high recall), it requires better features or an improved dataset to reliably delimit schemers (true positives) from other characters (false positives) in the dataset (low precision). Features that capture information about stage presence and the content of character speech proved to be most useful to the model. In its current state – with a rather low precision – our model can be used as a heuristic to find promising candidates for schemers. These instances, however, would then have to be inspected manually to use them for further analysis.

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# Appendix

**Tab. 5:** List of schemers in our data set.

| Schemer | Play | Author | Reference |
|---|---|---|---|
| Pharnaces | Der sterbende Cato (1731) | J. Chr. Gottsched | Memmolo 1995, pp. 128–129, Kiss 2010, p. 518. |
| Ulfo | Canut (1746) | J. E. Schlegel | Memmolo 1995, p. 132 |
| Siegmund | Die zärtlichen Schwestern (1747) | Chr. F. Gellert | Saße 1994, p. 107 |
| Henley | Der Freigeist (1758) | J. W. v. Brawe | Memmolo 1995, p. 143, Schonlau 2017, p. 233 |
| Northumberland | Lady Johanna Gray (1758) | Chr. M. Wieland | Knorr 1951, p. 75. |
| Lisette | Der junge Gelehrte (1748) | G. E. Lessing | Memmolo 1995, p. 204 |
| Hilaria | Der Misogyn (1755) | G. E. Lessing | Grimm 2020 |
| Marwood | Miß Sara Sampson (1755) | G. E. Lessing | Schonlau 2017, p. 226 |
| Franziska | Minna von Barnhelm | G. E. Lessing | Asmuth 2016, pp. 125–126 |
| Orsina | Emilia Galotti (1772) | G. E. Lessing | Grzesiuk 2004, pp. 72–73 |
| Marinelli | Emilia Galotti (1772) | G. E. Lessing | Alt 2004, pp. 7–8; Grzesiuk 2004, pp. 72–73 |
| Hasenpoth | Die Kindermörderin (1776) | H. L. Wagner | Alt 2004, p. 9; Pütz 1970, p. 82 |
| Guido | Julius von Tarent (1776) | J. A. Leisewitz | Schonlau 2017, pp. 286–287 |
| Mary | Die Soldaten (1776) | J. M. R. Lenz | Stephan 2015, pp. 251–252 |
| Haudy | Die Soldaten (1776) | J. M. R. Lenz | Stephan 2015, pp. 251–252 |
| Weislingen | Götz von Berlichingen (1773) | J. W. Goethe | Schonlau 2017, p. 258 |
| Adelheid | Götz von Berlichingen (1773) | J. W. Goethe | Alt 2004, p. 15; Memmolo 1995, pp. 213–214, Schonlau 2017, p. 179 |
| Carlos | Clavigo (1774) | J. W. Goethe | Alt 2004, pp. 17–19 |
| Alba | Egmont (1788) | J. W. Goethe | Memmolo 1995, p. 226 |
| Amtmann | Die Jäger (1785) | A. W. Iffland | Detken and Schonlau 2014, p. 22 |
| Geheimerath | Der Spieler (1796) | A. W. Iffland | KLL 2020 |

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| Schemer | Play | Author | Reference(s) |
|---|---|---|---|
| Guelfo | Die Zwillinge (1776) | F. M. Klinger | Schonlau 2017, p. 314 |
| Drullo | Die neue Arria (1776) | F. M. Klinger | Hering 1966, p. 86 |
| Franz von Moor | Die Räuber (1781) | F. Schiller | Alt 2004, p. 22; Memmolo 1995, pp. 282–290 |
| Fiesko | Die Verschwörung des Fiesko zu Genua (1782) | F. Schiller | Memmolo 1995, pp. 295–299, von Matt 2006, p. 327 |
| Muley Hassan (Mohr) | Die Verschwörung des Fiesko zu Genua (1782) | F. Schiller | von Matt 2006, pp. 325–327 |
| Wurm | Kabale und Liebe (1784) | F. Schiller | Alt 2004, p. 23; Sautermeister 2020a; Memmolo 1995, p. 276 |
| Marquis von Posa | Don Karlos (1787) | F. Schiller | von Matt 2006, p. 202; Gess 2016, p. 213 |
| Prinzessin Eboli | Don Karlos (1787) | F. Schiller | Schonlau 2017, p. 331, Müller-Seidel 1990, p. 435 |
| Domingo | Don Karlos (1787) | F. Schiller | Schonlau 2017, p. 331 |
| Herzog Alba | Don Karlos (1787) | F. Schiller | Schonlau 2017, p. 331, Müller-Seidel 1990, p. 435 |
| Octavio | Die Piccolomini (1799) | F. Schiller | Sautermeister 2020b; Wittkowski 1990, p. 380 |
| Gräfin Terzky | Die Piccolomini (1799) | F. Schiller | Alt 2004, p. 15 |
| Octavio | Wallensteins Tod (1799) | F. Schiller | Sautermeister 2020b; Wittkowski 1990, p. 380 |
| Gräfin Terzky | Wallensteins Tod (1799) | F. Schiller | Alt 2004, p. 15 |
| Leicester | Maria Stuart (1800) | F. Schiller | Vonhoff 2011, p. 161; von Matt 2006, pp. 328, 380 |
| Mortimer | Maria Stuart (1800) | F. Schiller | von Matt 2006, p. 328 |
| Gertrude | Die Familie Schroffenstein (1803) | H. Kleist | Alt 2004, p. 16 |
| Hermann | Die Hermannsschlacht (1808) | H. Kleist | Drews et al. 2020; Horn 2011, p. 80 |
| Adam | Der zerbrochne Krug (1808) | H. Kleist | Schneider 2009, pp. 35–37; Steglich 2017, p. 166 |
| Kunigunde | Das Käthchen von Heilbronn (1810) | H. Kleist | Alt 2004, p. 16; Drux 2005, pp. 109–110 |
| Ratcliff | William Ratcliff (1823) | H. Heine | Brandt-Schwarze 1996, pp. 86–87 |
| Der Teufel | Scherz, Satire, Ironie und tiefere Bedeutung (1827) | Chr. D. Grabbe | Kopp 2016, p. 21 |
| Berdoa | Herzog Theodor von Gothland (1827) | Chr. D. Grabbe | Roselli 2013, 39 and 43; Kopp 2016, p. 15 |
| Arboga | Herzog Theodor von Gothland (1827) | Chr. D. Grabbe | Meier 2018, p. 33 |
| Don Juan | Don Juan und Faust (1829) | Chr. D. Grabbe | Löffelmann 2015, p. 83 |
| Unruh | Bürgerlich und Romantisch (1835) | E. v. Bauernfeld | Linhardt 2008, p. 20 |

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| Schemer | Play | Author | Reference(s) |
|---|---|---|---|
| Hutzibutz | Das Haus der Temperamente (1837) | J. Nestroy | Pape 2011, p. 144 |
| Schlankel | Das Haus der Temperamente (1837) | J. Nestroy | Pape 2011, p. 144 |
| Santinelli | Monaldeschi (1841) | H. Laube | Brandt-Schwarze 1996, p. 91 |