DH KOLLOQUIUM
TALKS, PROJECT + THESIS PRESENTATIONS

FAU Friedrich-Alexander-Universität
Department für Digital Humanities
and Social Studies

Dr. Svenja Guhr

Literary Soundscapes: Operationalization and Analysis

05/21/2025, 4-6 pm

Slides & Code →

fortext lab

Literary AB

Computational LiteraryStudies

Dr. Svenja Guhr

fortext lab

Computational LiteraryStudies

- B.A. (2016) and M.A. (2019) in Romance Languages with Minors in Law and Computational Linguistics
  - University of Bremen, DE
  - Université de Strasbourg, FR
  - University of Göttingen, DE
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- Ph.D. in Computational Literary Studies / German Studies (2024)
  - supervised by Prof. Dr. Evelyn Gius, TU Darmstadt, DE
  - 2019–2025: Research Associate at *fortext lab*, TU Darmstadt, DE
  - since 2021: Editorial Assistant, *Journal of Computational Literary Studies*
- Visiting Researcher at *Stanford Literary Lab*, USA (since 2022)
- DFG 2207 SPP-CLS Visiting Fellow in the CompAnno Project, University of Cologne, DE (March – June 2025)
- Soon: Bellwether Postdoc at School of Information, UC Berkeley, USA

← Personal Website

Sound in Literary Fiction

Sound in Literary Fiction

“But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so he said, “Pooh, pooh!” and closed it with a bang. The sound resounded through the house like thunder. […]

He tried to say ‘Humbug!’ but stopped at the first syllable. […]

The curtains of his bed were drawn aside, I tell you, by a hand. […]

“Jacob!” he said imploringly. “Old Jacob Marley, tell me more! Speak comfort to me Jacob!” “I have none to give”, the Ghost replied. “It comes from other regions, Ebenezer Scrooge, and is conveyed by other ministers to other kinds of men. Nor can I tell you what I would. […]”

(*A Christmas Carol*, C. Dickens)

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Research Questions

1. How can the literary phenomena ‘sound’ and ‘loudness’ be systematically operationalized for their manual and automatic recognition, classification, and annotation in literary prose?

2. What can we find out about the fictional sounds represented in the Dickens’ Novel Corpus (DNov)?

Talk Outline

1. Theory
2. Operationalization
3. Automation
4. Sound Analysis of *DNov* – 15 Dickens' texts + *A Christmas Carol*

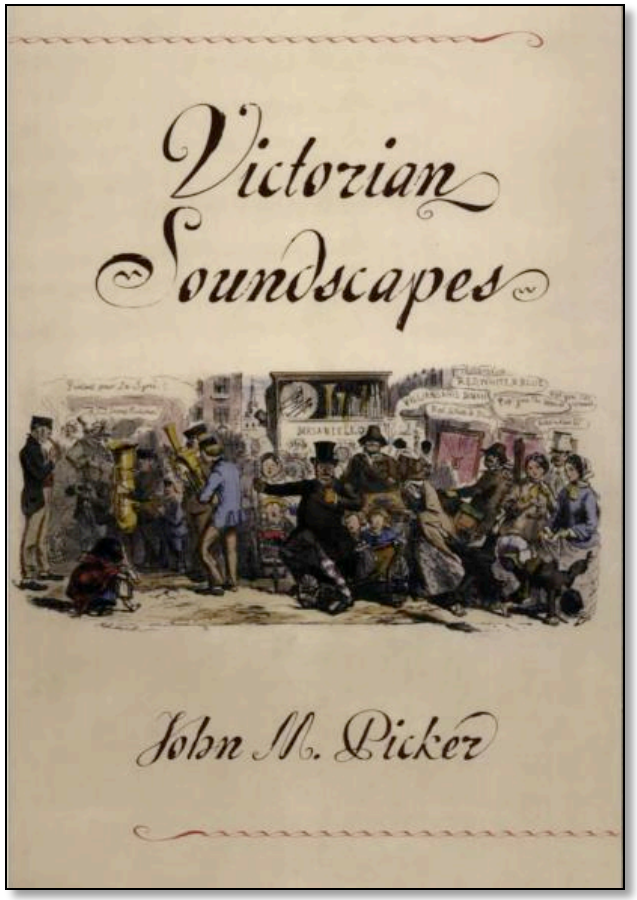
Sounds in Literary Fiction

→ Principle of Minimal Departure (Ryan 1991, 2013: 15)

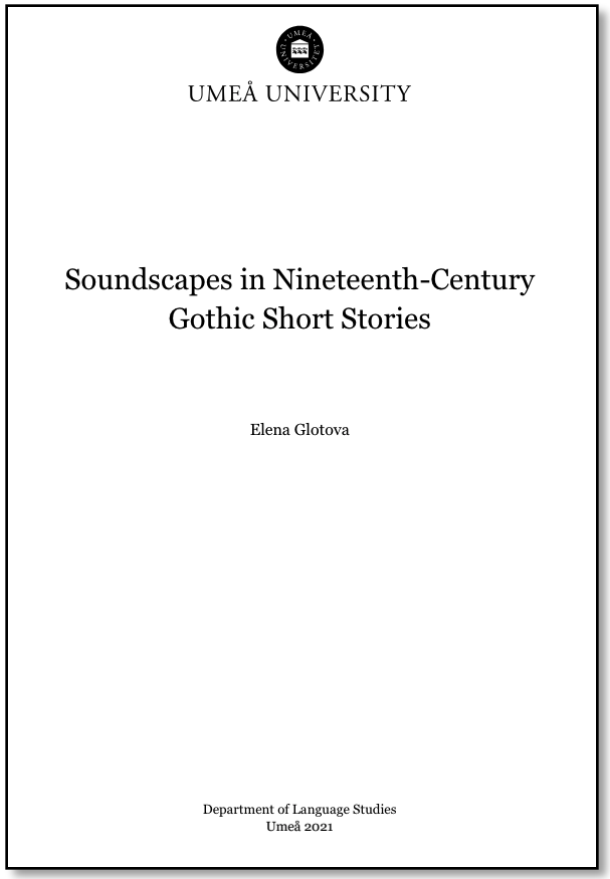
> fictional text [is not limited] to an imitation of reality[,
> but] texts are free to construct fictional worlds that differ from
> [actual worlds] [...] [while] imagin[ing] fictional worlds as the closest
> possible to [actual worlds].

Theory

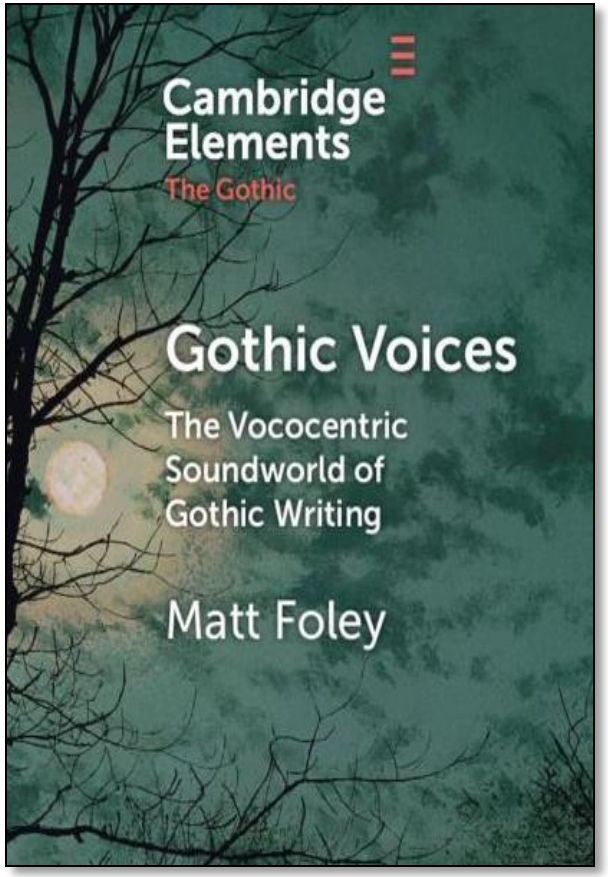
Research on Sound in Literary Studies



Picker (2003)



Glotova (2021)

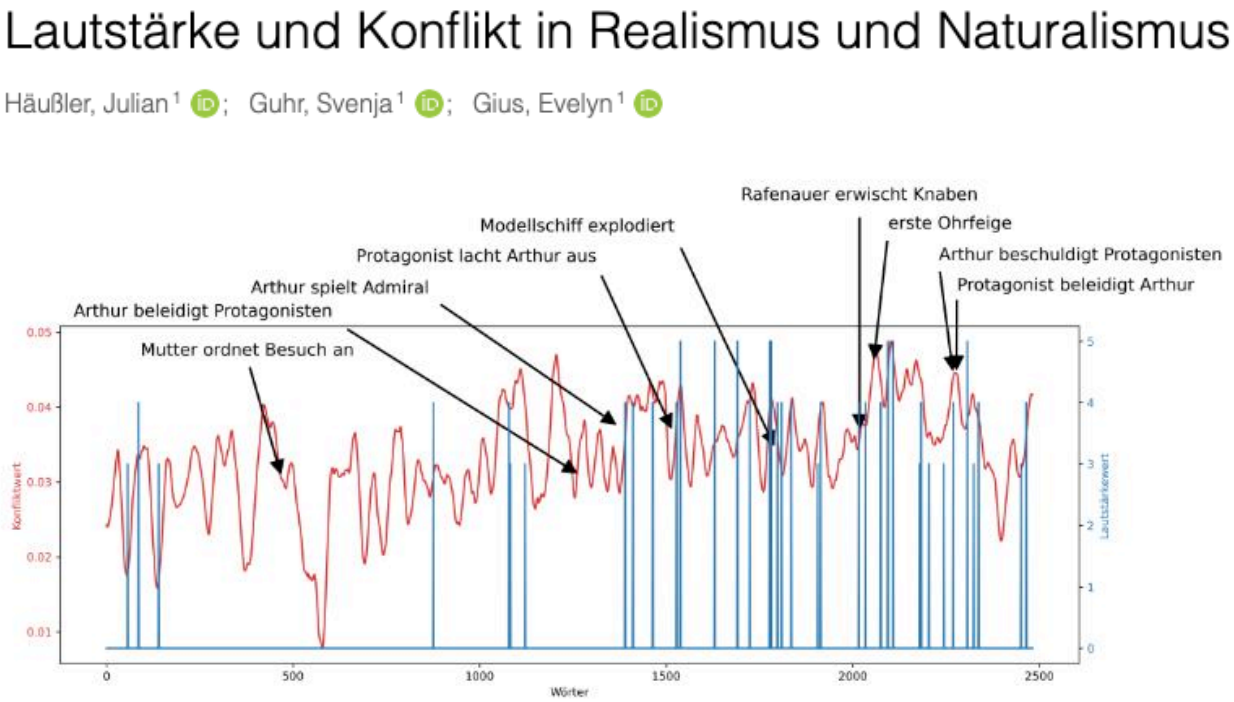


Foley (2023)

Theory → Operationalization

Research on Sound in Literary Studies

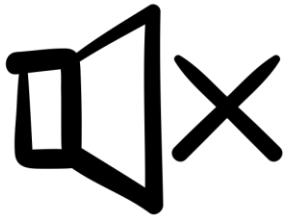
Bernhart ([2008]2017)



Conflict values (cosine smoothing, window size 40) and sound words + loudness values in *The Noble Boy* (L. Thoma)

Häußler/Guhr/Gius (2024)

Implicit vs. Explicit Sound



The train enters the station.

The train rattles into the station.

The train $_{\text{sound}}$**rattles** into the station.

From Sound Word to Sound Event

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so he said, “Pooh, pooh!” and closed it with a bang. The sound resounded through the house like thunder.

From Sound Word to Sound Event

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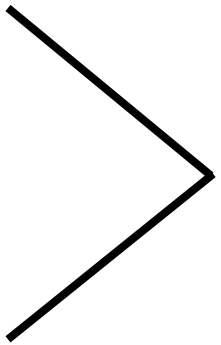
Sound Words:
say, bang, sound, resound

Sound Quality:
like thunder



Sound Events:

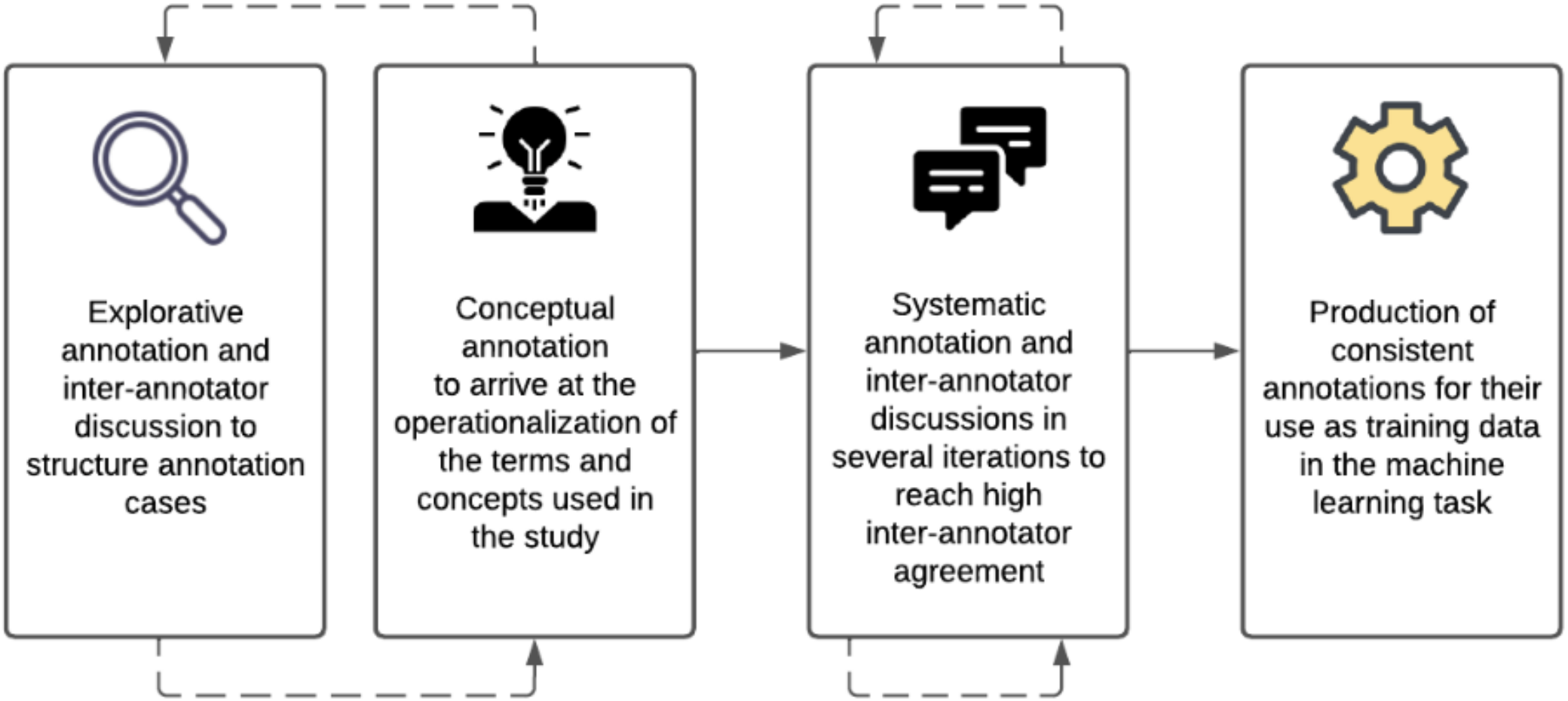
- he said
- closed it with a bang
- The sound resounded through the house like thunder

Fictional Sounds

- Sound events
- With asserted *realis* in the fiction
- Explicitly represented in the narration through sound words (sound-representing content words)
- Carry information about fictional soundscapes
- E.g., ‘voice‘, ‘rattling‘, ‘saying‘, ‘quiet‘
- Extendable by sound qualities such as loudness

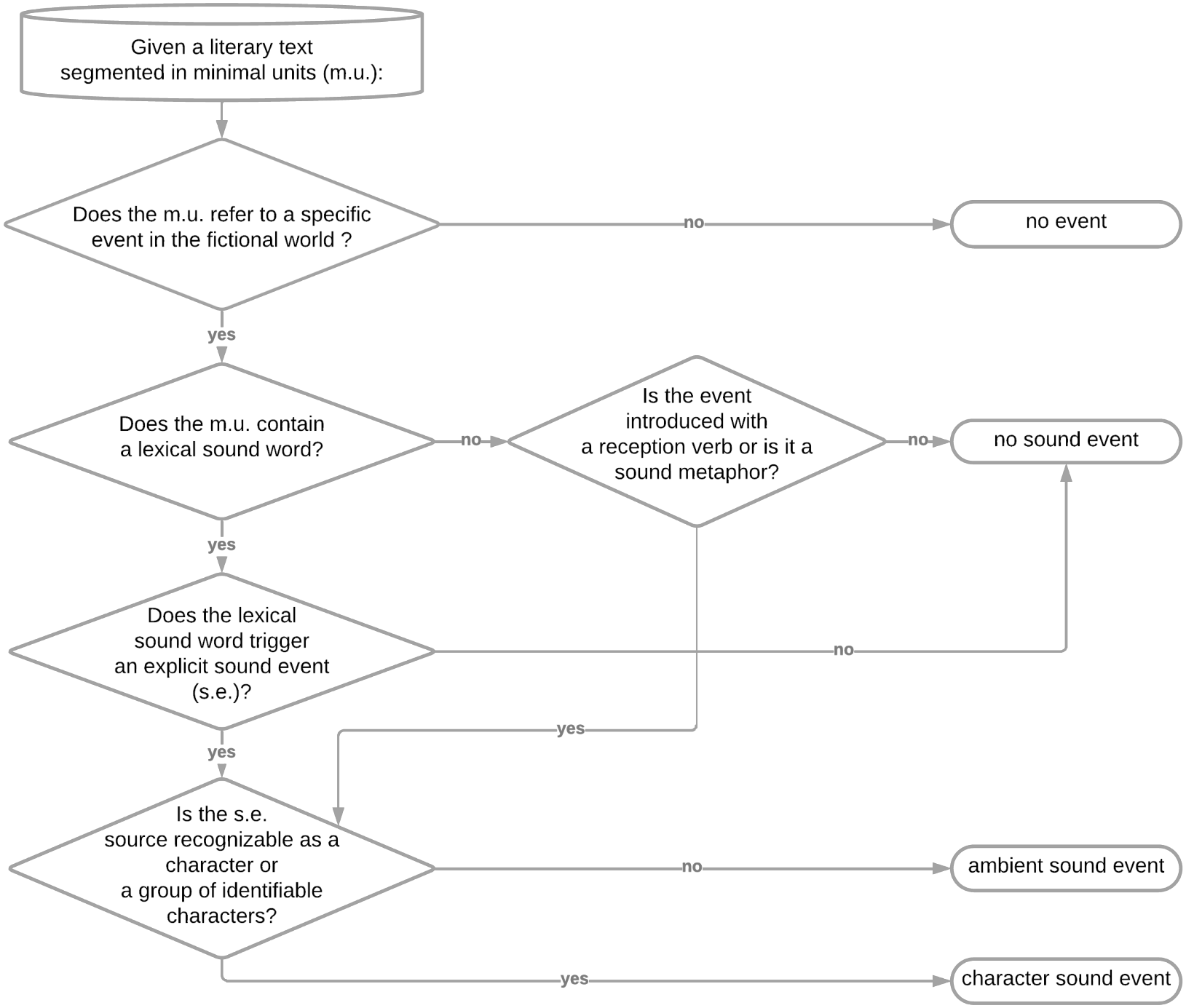
How do we get from the phenomenon to its systematic recognition on the textual surface?

Workflow

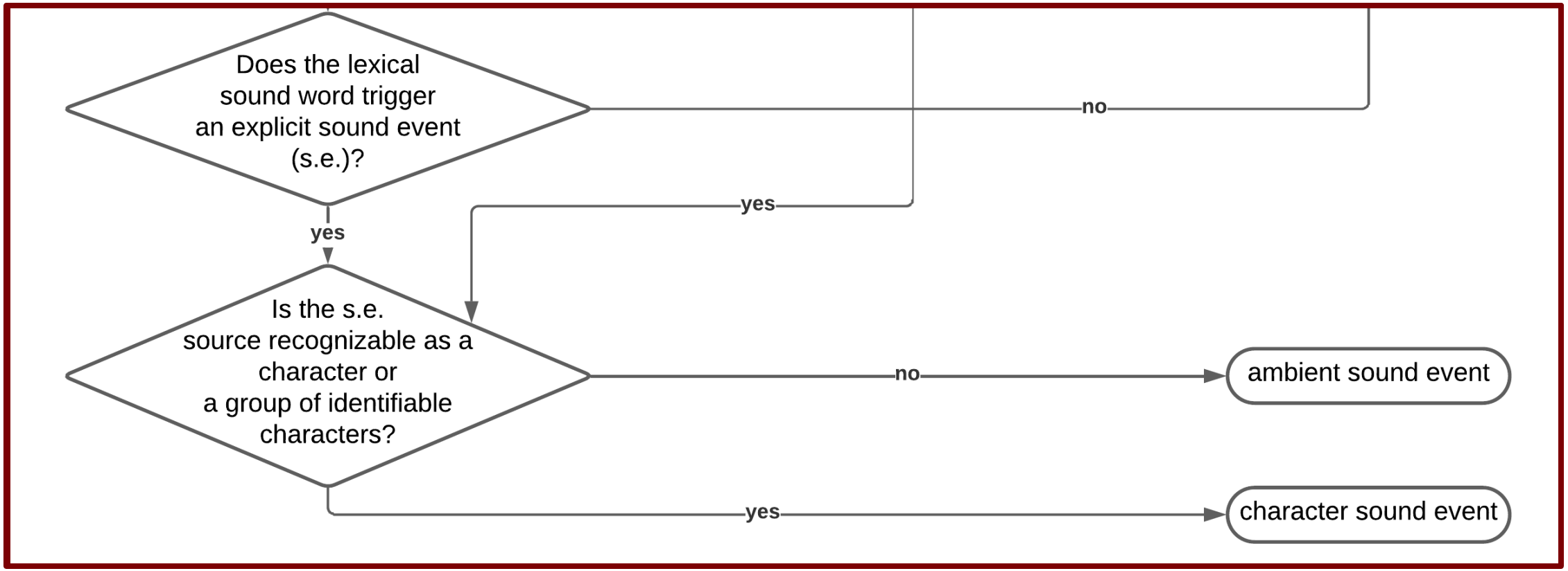

Explorative annotation and inter-annotator discussion to structure annotation cases
Conceptual annotation to arrive at the operationalization of the terms and concepts used in the study
Systematic annotation and inter-annotator discussions in several iterations to reach high inter-annotator agreement
Production of consistent annotations for their use as training data in the machine learning task

Operationalization

Annotation of Sound Events



Annotation of Sound Events



Annotation of Loudness

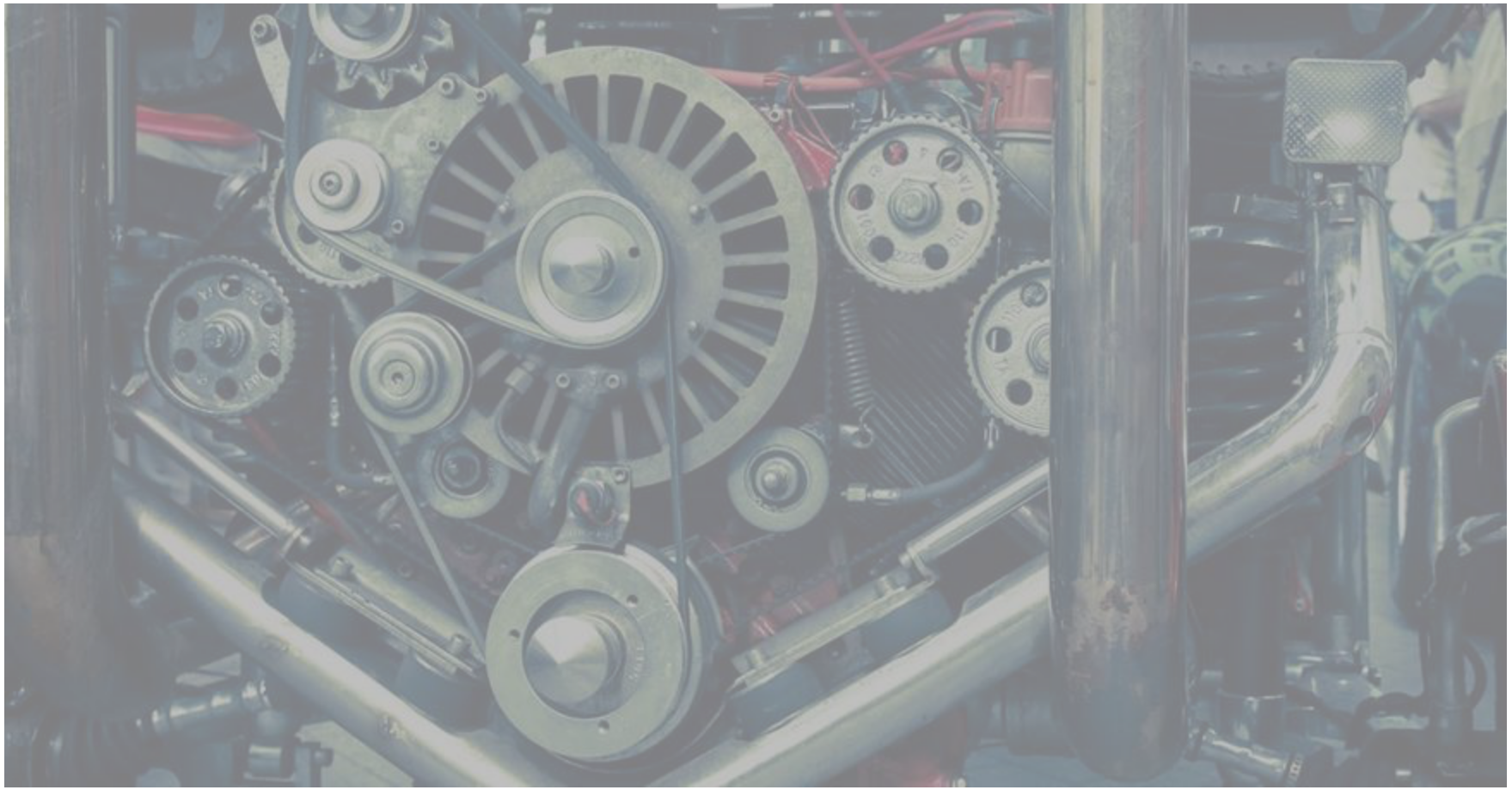
S	explicitly no sound	silence (*Schweigen* and *Stille*)
1	very low sound	falling leaves – breathing
2	low sound	ticking of a clock – whispering
3	medium loud sound	singing of a bird – room level conversations
4	loud sound	loudest human-made sound – barking dog
5	very loud sound	car horn – rocket launch

In Summary…

- Definition of fictional sounds
- Guidelines and decision tree for detecting the sounds
- 65 systematically sound-annotated *theme-d-Prose* texts
- Divided into training (55 texts) and test data (10 texts)

- 5 annotated texts (British English):
  - 1 manually annotated (*A Christmas Carol*),
  - 4 machine-translated texts from the annotated German-language corpus

Two-Step-Automation



Two-Step-Automation

1. Software NEISS TEI Entity Enricher (Zöllner et al. 2021)
   - Based on:
     - Implemented pre-trained BERT-language models
     - Transfer-learning algorithm (Kamath 2019)
   - Finetuning for classification tasks
   - Input: XML-annotated texts

2. Dictionary-matching algorithm for loudness level labeling
   - key-value pairs, i.e. {‘whisper’: 2}

Automation Output

- Annotation in XML TEI:
  - <character_sound loudness="n">sound event</character_sound>
  - <ambient_sound loudness="n">sound event</ambient_sound>

But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so <character_sound loudness="3.0">**he said**</character_sound>, "Pooh pooh!" and <ambient_sound loudness="4.0">**closed it with a bang**</ambient_sound>. <ambient_sound loudness="4.0">**The sound resounded through the house like thunder**</ambient_sound>.

Evaluation

sound event recognition and classification task

	texts	words	Annot.	E-F1$_{test(b.e.)}$
German$_{19C}$	55	705,623	10,145$_{all}$	0.70$_{28}$
US-Eng$_{20C}$	2	48,900	710$_{char.}$	0.8
UK-Eng$_{19C}$	1+4$_{transl.}$	47,334	1,046 $_{all}$	0.61$_{7}$

Extract of machine-annotated *Edwin Drood*

They all three look towards an old stone gatehouse crossing the Close, with an arched thoroughfare passing beneath it. Through its latticed window, a fire shines out upon the fast-darkening scene, involving in shadow the pendent masses of ivy and creeper covering the building's front.

<ambient_sound loudness="4.0">**As the deep Cathedral-bell strikes the hour**</ambient_sound>, a ripple of wind goes through these at their distance,
<ambient_sound loudness="2.5">**like a ripple of the solemn sound that hums through tomb and tower, broken niche and defaced statue**</ambient_sound>, in the pile close at hand.

'Is Mr. Jasper's nephew with him?' <character_sound loudness="3.0">**the Dean asks**</character_sound>.

'No, sir,' <character_sound loudness="3.0">**replied the Verger**</character_sound>, 'but expected. There's his own solitary shadow betwixt his two windows--the one looking this way, and the one looking down into the High Street--drawing his own curtains now.'

'Well, well,' <character_sound loudness="3.0">**says the Dean**</character_sound>, <character_sound loudness="2.5">**with a sprightly air of breaking up the little conference**</character_sound>,
'I hope Mr. Jasper's heart may not be too much set upon his nephew. Our affections, however laudable, in this transitory world, should never master us; we should guide them, guide them.

I find I am not disagreeably reminded of my dinner, **by hearing my dinner-bell**. Perhaps, Mr. Crisparkle, you will, before going home, look in on Jasper?'

Making Sounds Measurable?

T	text
w	number of words
sw	sound word
se	sound event span
SW_D	sound word density
SE_D	sound event density
T_{se}	number of sound events in a text
T_{pe}	number of possible events in a text

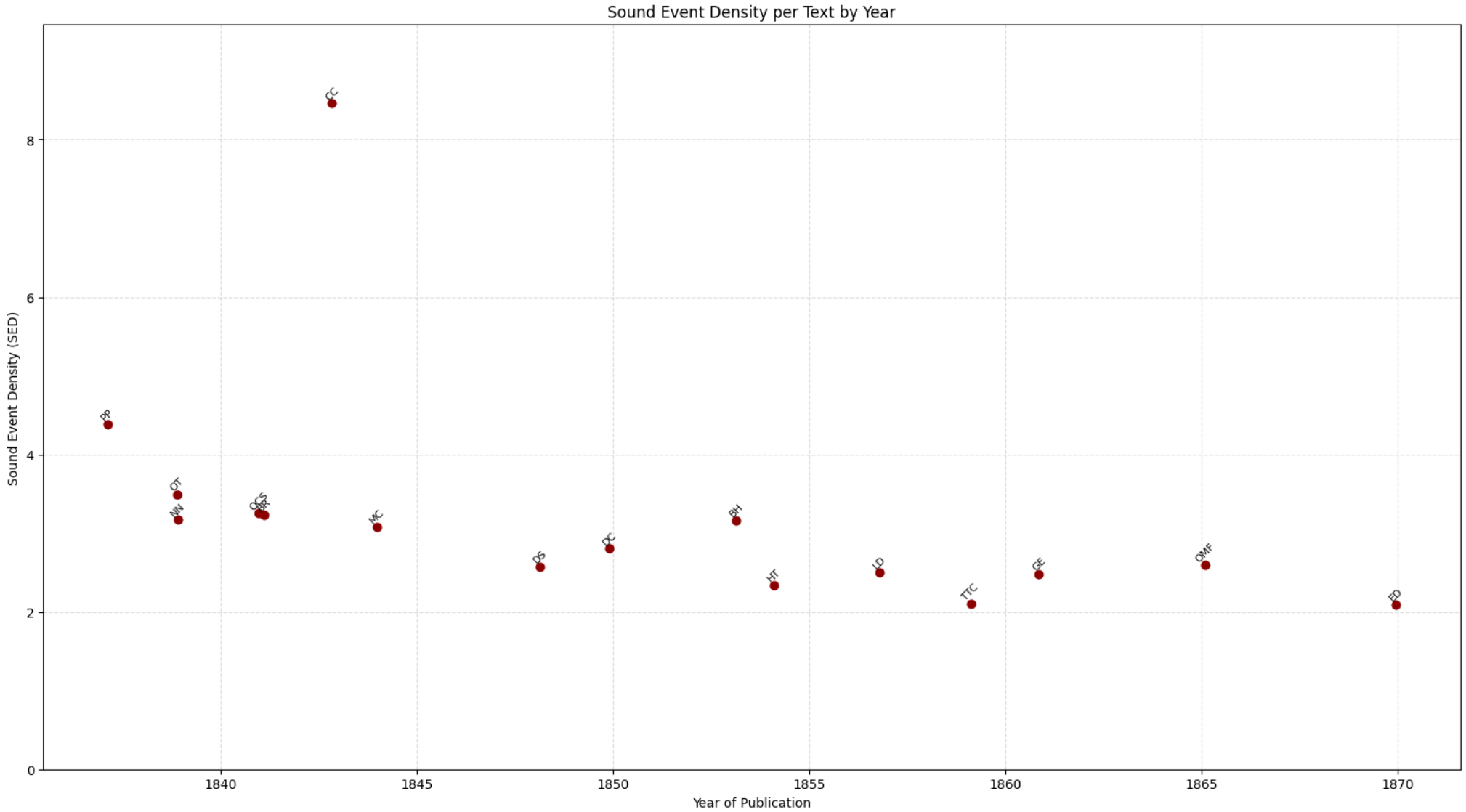
$$SW_D = \frac{sw}{w} \cdot 100$$

$$SE_D = \frac{T_{se}}{T_{pe}} \cdot 100$$

Sound Analysis

SE_D Scores Related to Text Length and Publication Year

(n = 16)



Guhr/Algee-Hewitt (2024). "What's that Scary Sound?" 10.48694/jcls.3583.

Making Sounds Measurable?

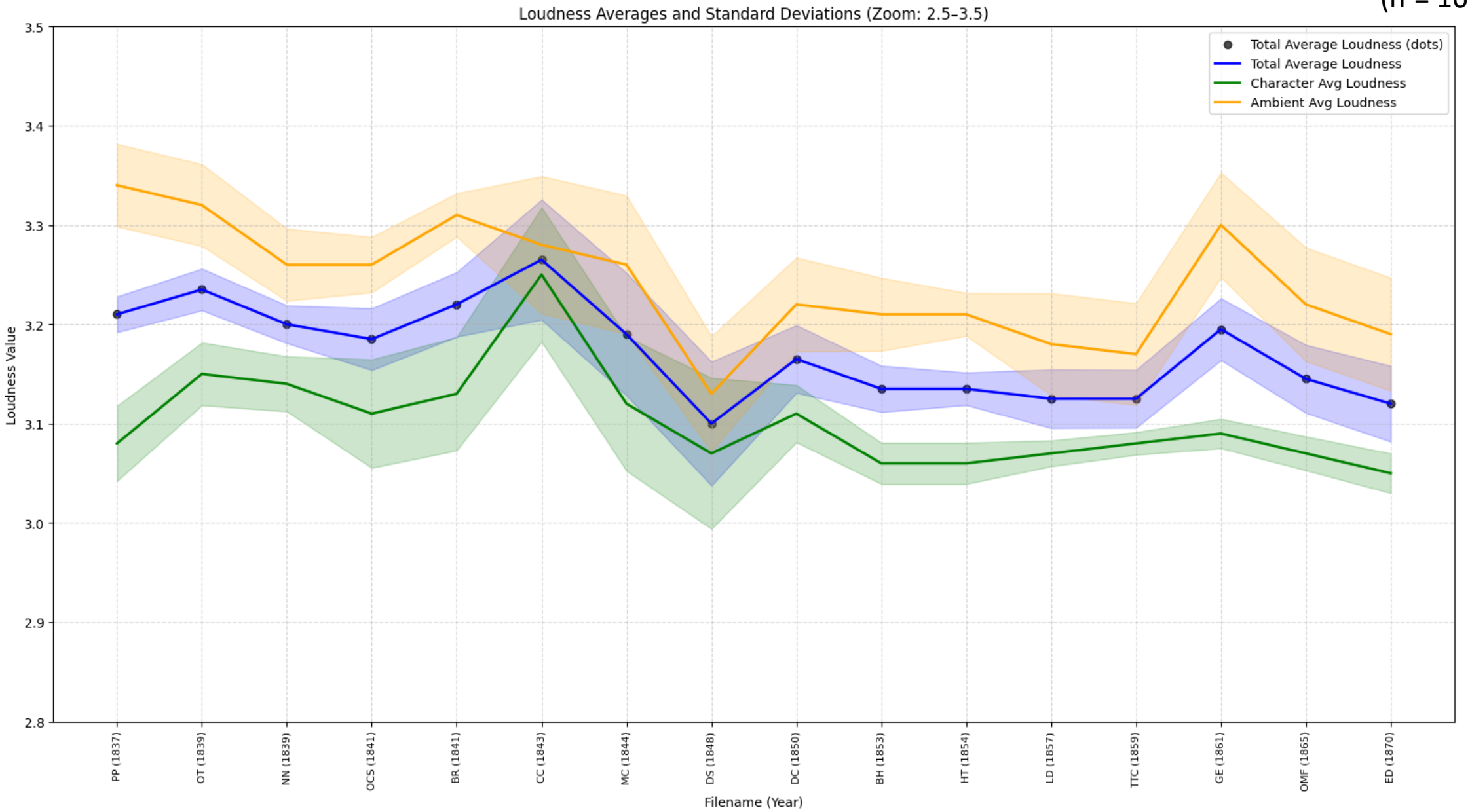
l	loudness level value
l_{sw}	loudness level value of a sound word
l_{se}	loudness level value of a sound event
SW_l	number of loudness level labeled sound words
SE_l	number of loudness level labeled sound events
T_{SE_l}	number of loudness level labeled sound event spans in a text
$\overline{T_l}$	a text's average loudness level
$\overline{T_{l_C}}$	a text's average loudness level of character sounds
$\overline{T_{l_A}}$	a text's average loudness level of ambient sounds

$$\overline{T_l} = \frac{\sum l_{se}}{SE_l}$$

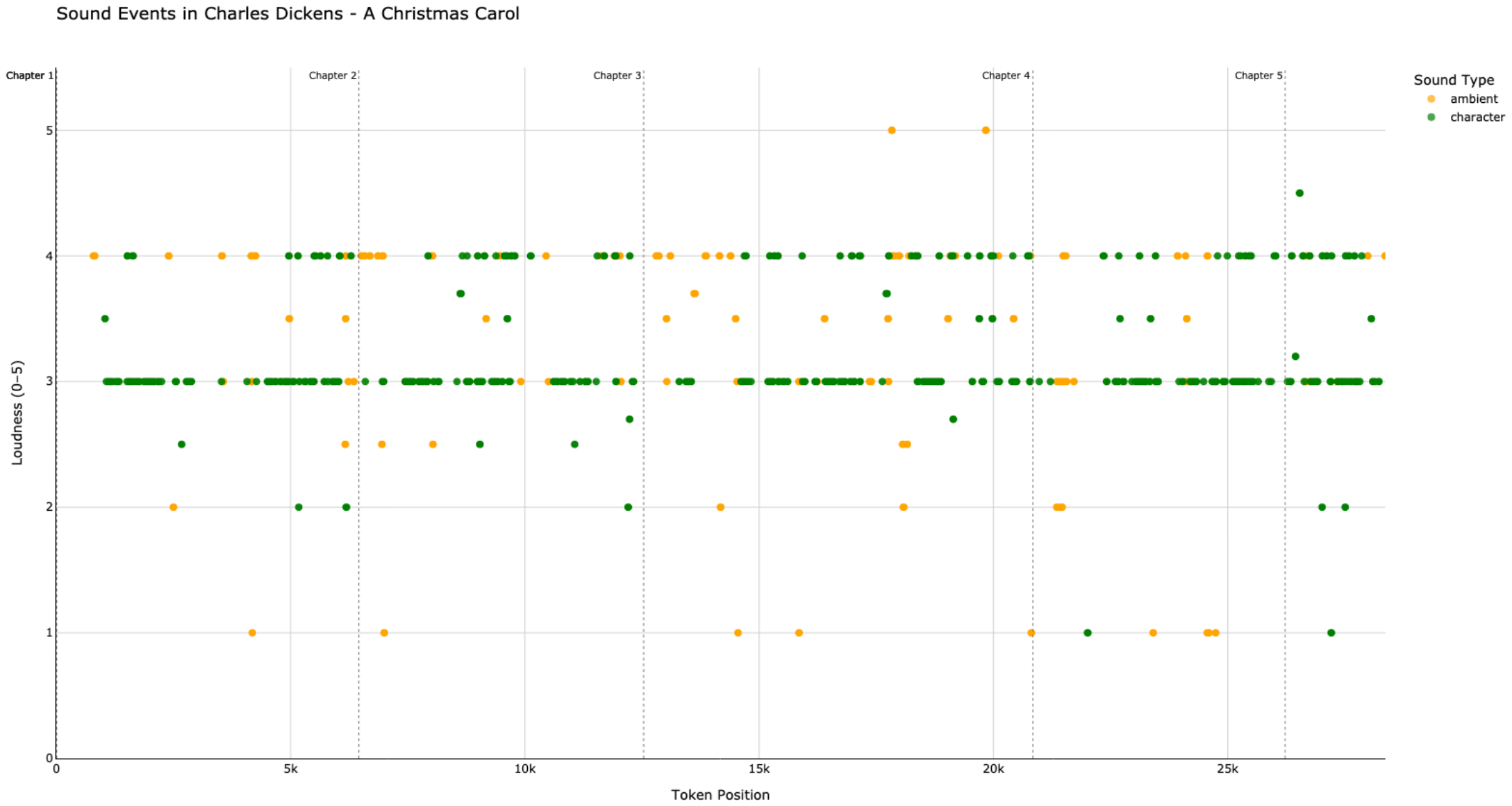
Loudness Averages and Standard Dev.

Sound Analysis

(n = 16)

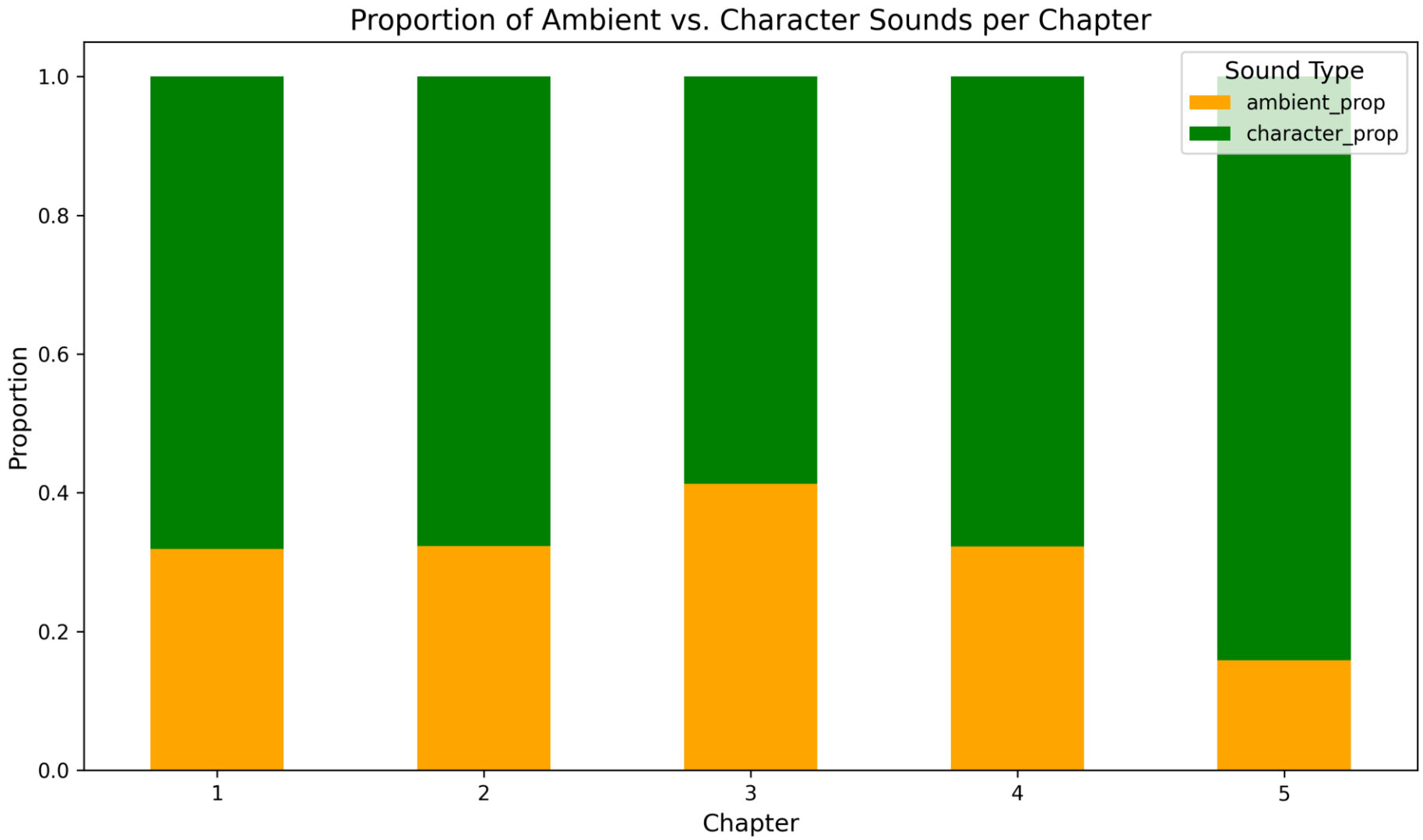


Sound and Loudness in *A Christmas Carol*

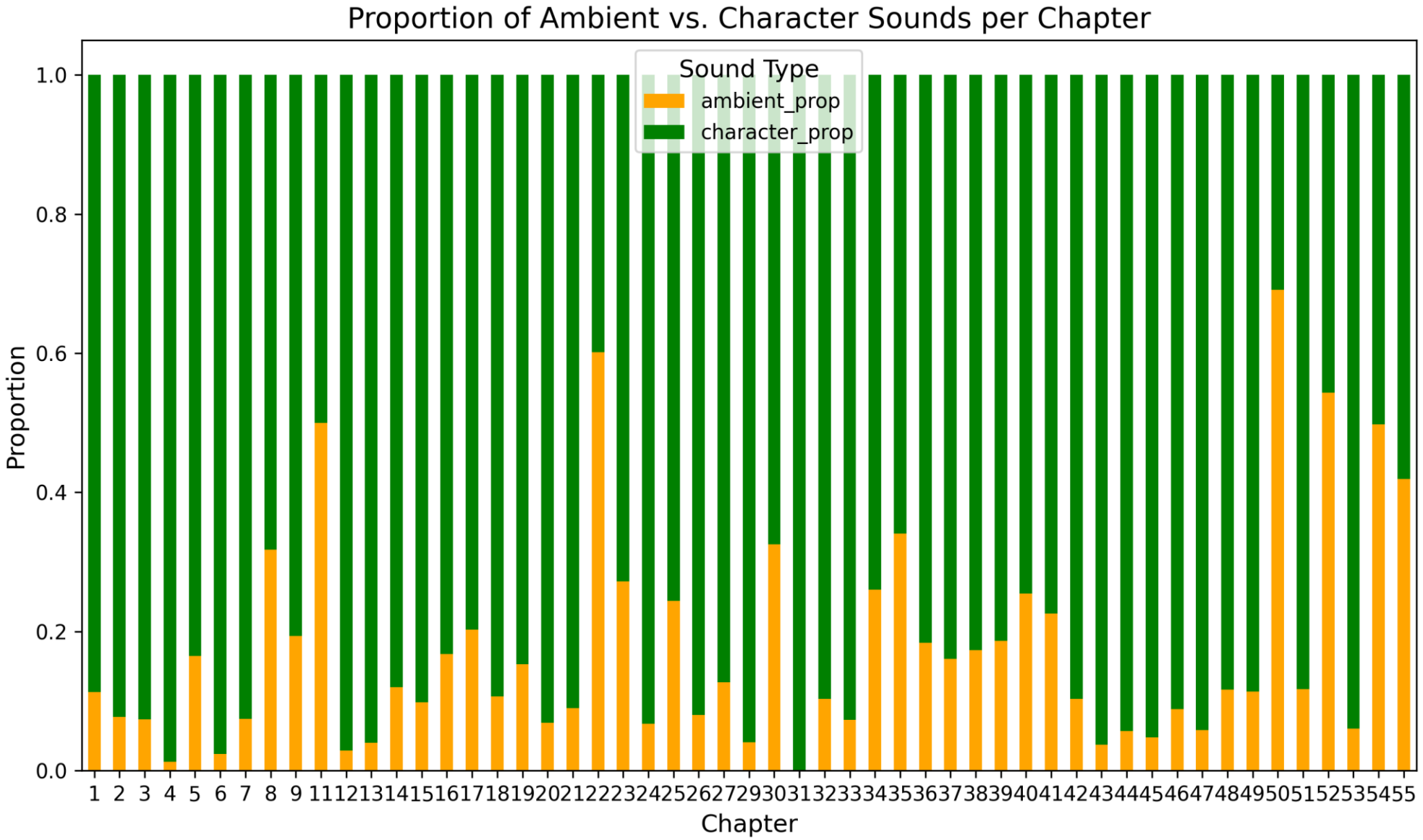


interactive

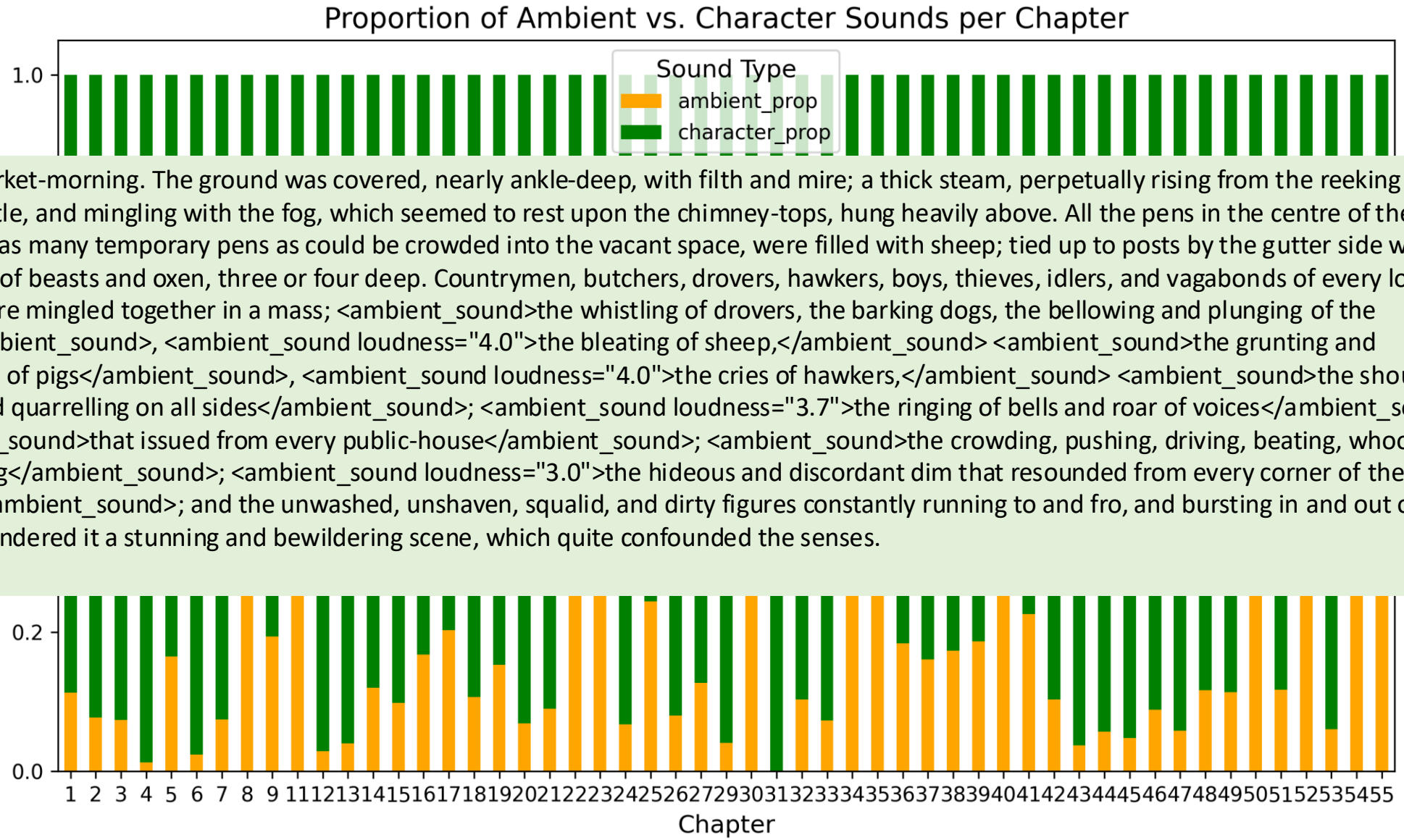
Sound Class Proportion in *A Christmas Carol*



Sound Class Proportion in *Oliver Twist*



Sound Class Proportion in *Oliver Twist*



It was market-morning. The ground was covered, nearly ankle-deep, with filth and mire; a thick steam, perpetually rising from the reeking bodies of the cattle, and mingling with the fog, which seemed to rest upon the chimney-tops, hung heavily above. All the pens in the centre of the large area, and as many temporary pens as could be crowded into the vacant space, were filled with sheep; tied up to posts by the gutter side were long lines of beasts and oxen, three or four deep. Countrymen, butchers, drovers, hawkers, boys, thieves, idlers, and vagabonds of every low grade, were mingled together in a mass; <ambient_sound>the whistling of drovers, the barking dogs, the bellowing and plunging of the oxen</ambient_sound>, <ambient_sound loudness="4.0">the bleating of sheep,</ambient_sound> <ambient_sound>the grunting and squeaking of pigs</ambient_sound>, <ambient_sound loudness="4.0">the cries of hawkers,</ambient_sound> <ambient_sound>the shouts, oaths, and quarrelling on all sides</ambient_sound>; <ambient_sound loudness="3.7">the ringing of bells and roar of voices</ambient_sound>, <ambient_sound>that issued from every public-house</ambient_sound>; <ambient_sound>the crowding, pushing, driving, beating, whooping and yelling</ambient_sound>; <ambient_sound loudness="3.0">the hideous and discordant dim that resounded from every corner of the market</ambient_sound>; and the unwashed, unshaven, squalid, and dirty figures constantly running to and fro, and bursting in and out of the throng; rendered it a stunning and bewildering scene, which quite confounded the senses.

Conclusion and Outlook

- Rich potential of fictional sound analysis for scalable reading
- Approach adaptable to further languages – annotations needed
- Annotation augmentation through machine-translation – promising
- What kind of sound annotation is interesting for your research?

- Next steps?
  - Add space annotations to the xml files and visualizations using the “Domestic Space Tagger”

see: Guhr et al.: “Making BERT Feel at Home. Modelling Domestic Space in 19th-Century British and Irish Fiction” at CCLS 2025 in Krakow

  - Further classification of sound types: What kind of sounds are depicted in domestic space or other?
  - And still ongoing: What about suspense and the detection of important plot elements?

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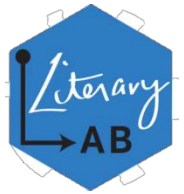
Excited for Sound in Fiction?

Find slides, code, further visualizations, and updates on:

https://github.com/SvenjaGuhr/Literary_Soundscapes
https://github.com/SvenjaGuhr/Raise-Your-Voice

Monograph publication planned for summer/fall 2025:
Raise Your Voice – Character Sound in German-Language Fiction
Springer/Metzler Series: Digitale Literaturwissenschaft

fortext lab



Computational
LITERARYSTUDIES

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