



# Soundful Dickens

THE NARRATIVE FUNCTIONS OF SOUNDS  
IN DICKENS'S FICTIONAL WORLDS

Svenja Guhr & Michaela Mahlberg  
DHd2026, Wien



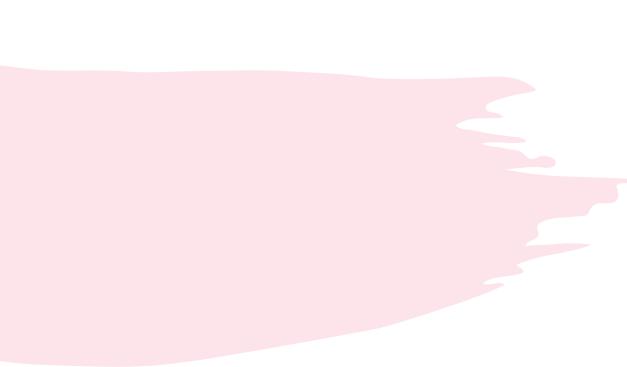
Michaela Mahlberg



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Department für Digital Humanities  
and Social Studies

Svenja Guhr

Berkeley SCHOOL OF INFORMATION



# Talk Outline

- 1. Sound in Literary Fiction**
- 2. Use Case: Sounds in the Dickens Novel Corpus (DNov)**

# 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)

# Sound in Literary Fiction

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(*A Christmas Carol*, C. Dickens)

# Research Questions



- **Methodologically:**  
How can we operationalize sound in literary fiction so that its textual representation can be automatically detected and made measurable for distant reading?
- **Literary Analysis:**  
How can sound annotations help us identify meaningful patterns and structural functions in narrative fiction?

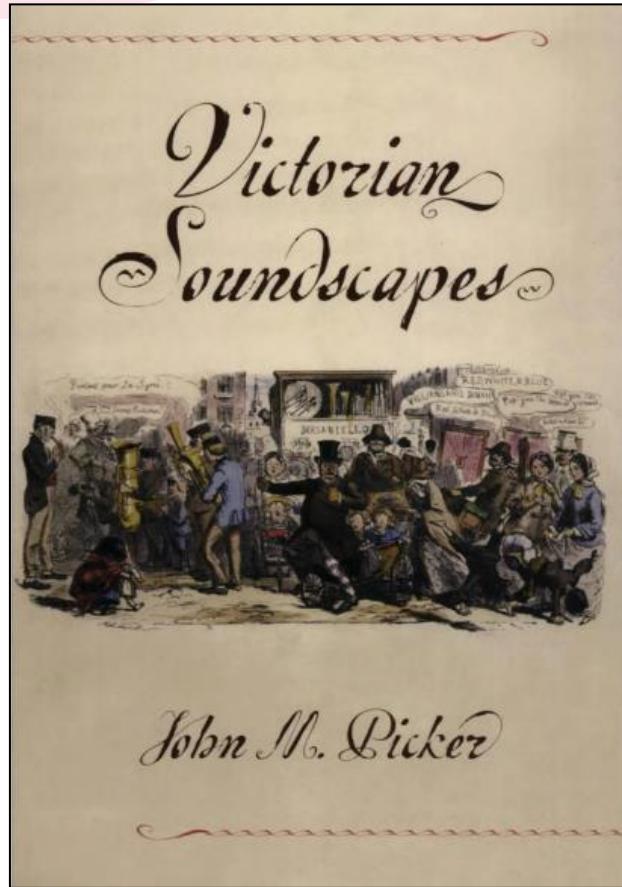
# Sounds in Literary Fiction

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

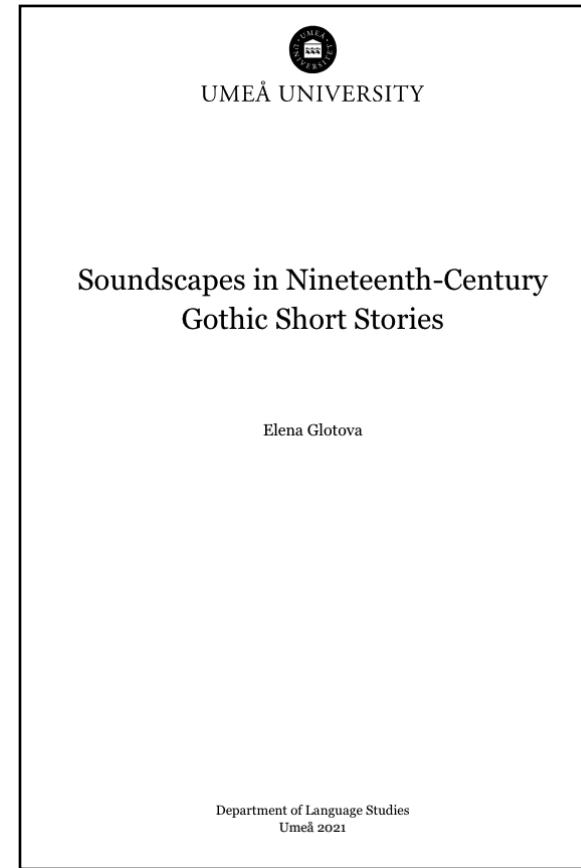
“

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].

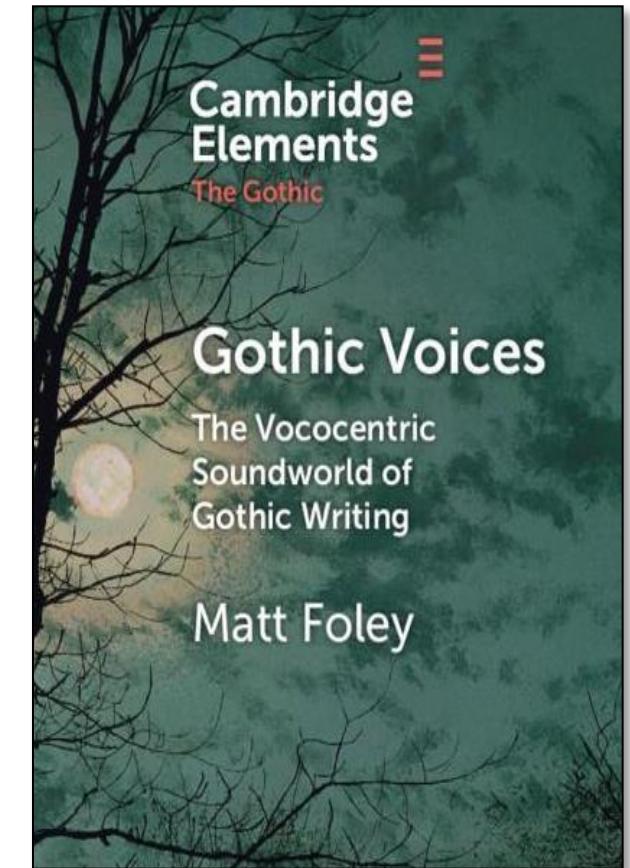
# Research on Sound in Literary Studies



Picker (2003)



Glotova (2021)



Foley (2023)

# Research on Sound in Literary Studies

## Stadt hören

Auditive Wahrnehmung in *Berlin Alexanderplatz* von Alfred Döblin

Hearing the city. Aural perception in *Berlin Alexanderplatz* by Alfred Döblin

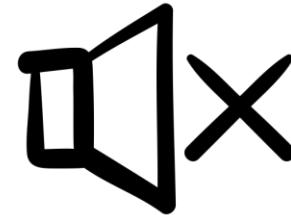
Published: 27 February 2017

Volume 38, pages 51–67, (2008) [Cite this article](#)



Bernhart ([2008]2017)

# Implicit vs. Explicit Sound



The train enters the station.



The train **sound**

The train enters the station.

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# From Sound Word to Sound Event

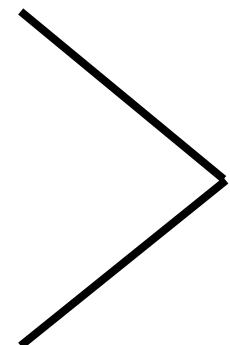
But there was nothing on the back of the door, except the screws and nuts that held the knocker on, so he said, “Pooh, pooh!” and closed it with a bang. The sound resounded through the house like thunder.

# From Sound Word to Sound Event

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.

## **Sound Words:**

say, bang, sound,  
resound



## **Sound Events:**

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

## **Sound Quality:**

like thunder

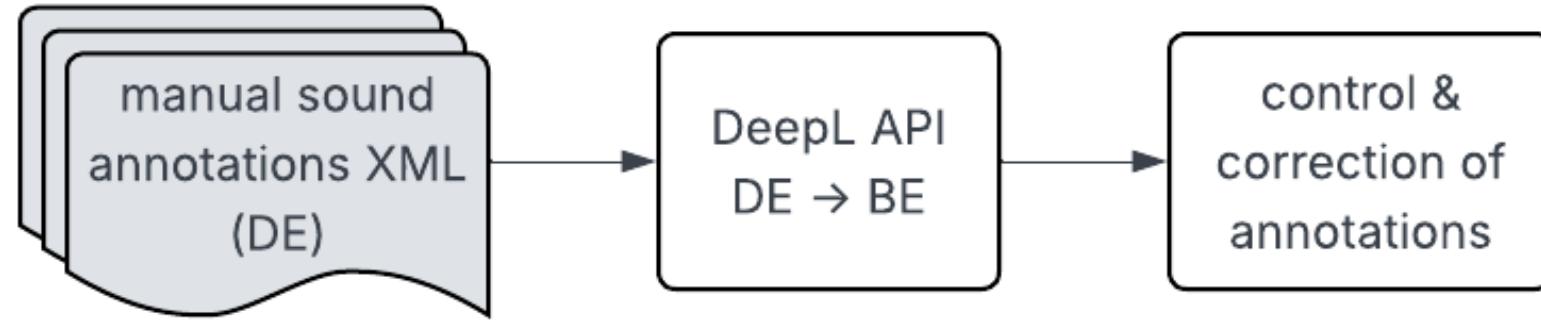
# Manual Annotation

- Annotation in XML TEI:
  - <character\_sound>sound event</character\_sound>
  - <ambient\_sound>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

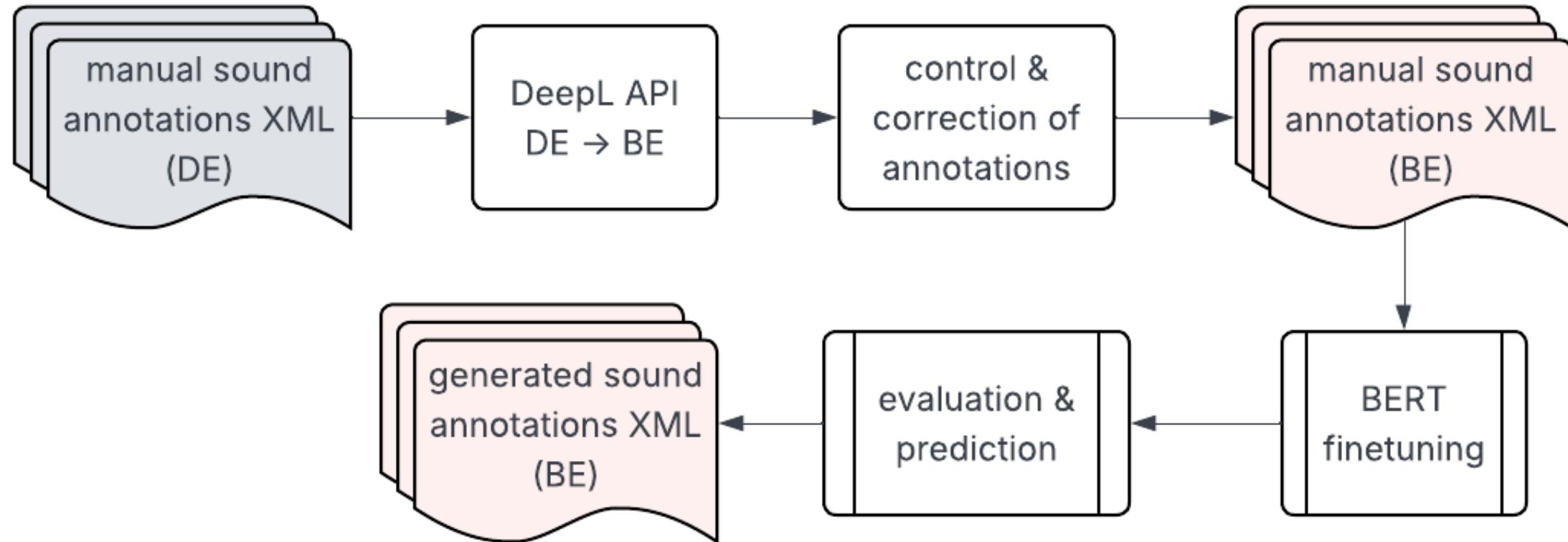
<character\_sound>**he said**</character\_sound>, "Pooh pooh!" and  
<ambient\_sound>**closed it with a bang**</ambient\_sound>.   
<ambient\_sound>**The sound resounded through the house like thunder**</ambient\_sound>.

# Experiment: Can machine translations enrich hand-labeled training data?



Workflow from German-language manual XML annotations to British English automatically generated XML annotations.

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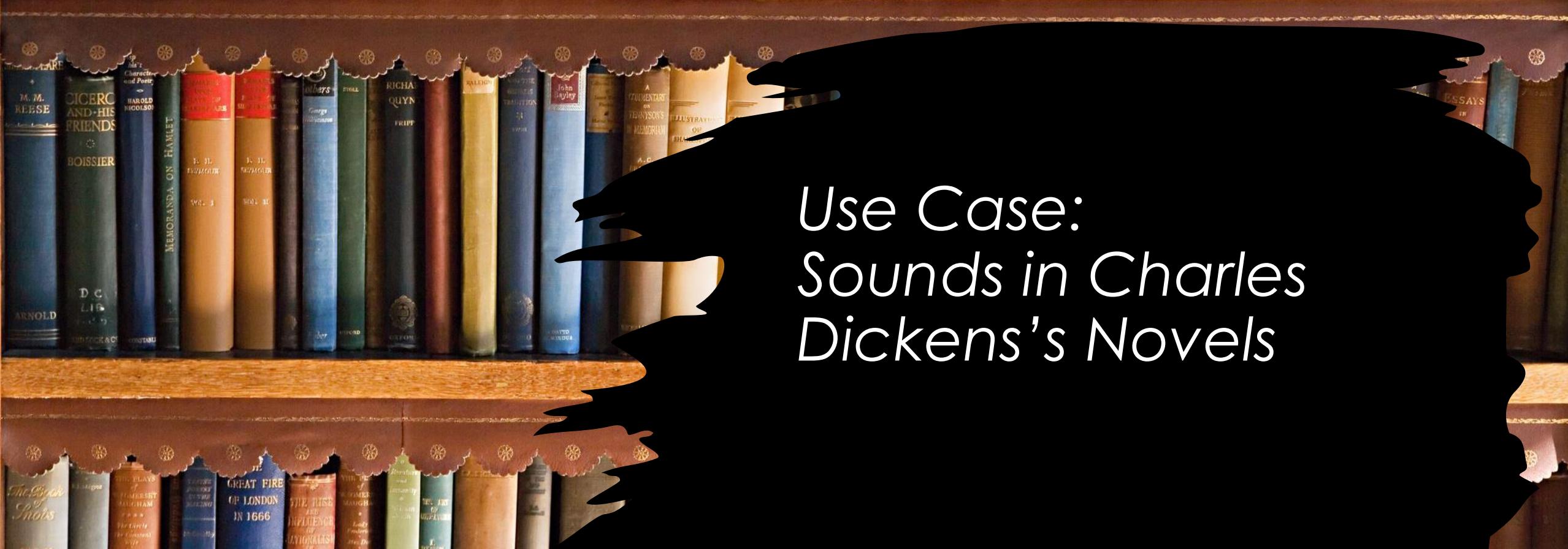
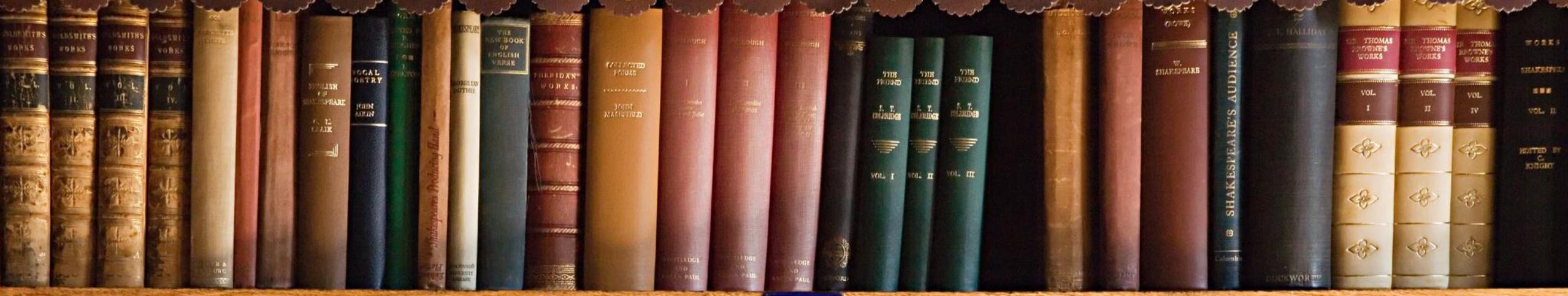


Workflow from German-language manual XML annotations to British English automatically generated XML annotations.

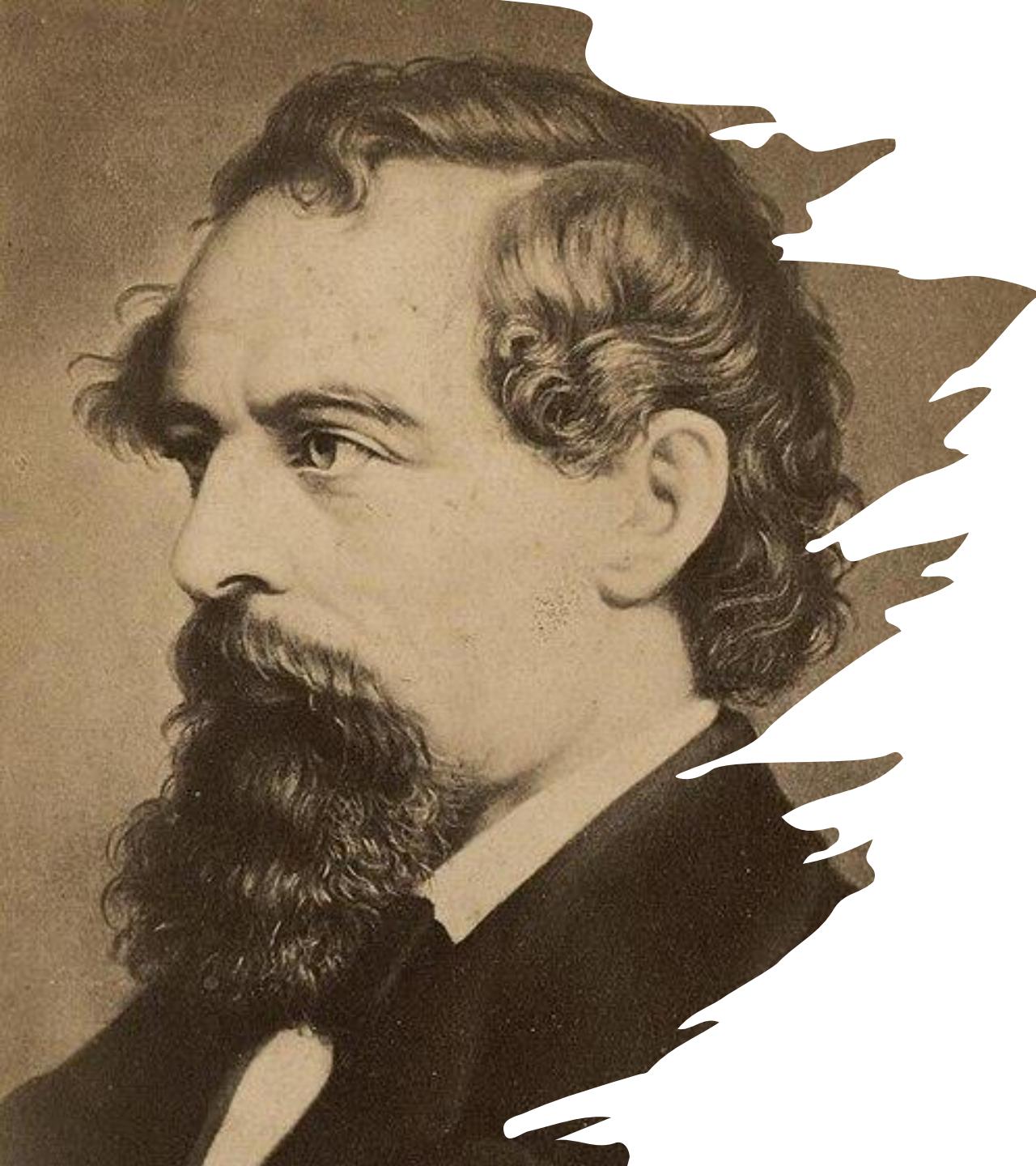
# Evaluation

BE sound event models	texts	words	annotations	E-F1-Score	precision	recall	F1-score
training set with translations	5	50,804	1,046	0.65	0.54	0.62	0.58
training set without translations	3	62,462	1,066	0.62	0.52	0.54	0.53
mixed training set	7	82,999	1,464	0.66	0.55	0.61	0.58

Evaluation results of the three different models calculated in NEISS NTEE (Lemke et al. 2023).



Use Case:  
Sounds in Charles  
Dickens's Novels



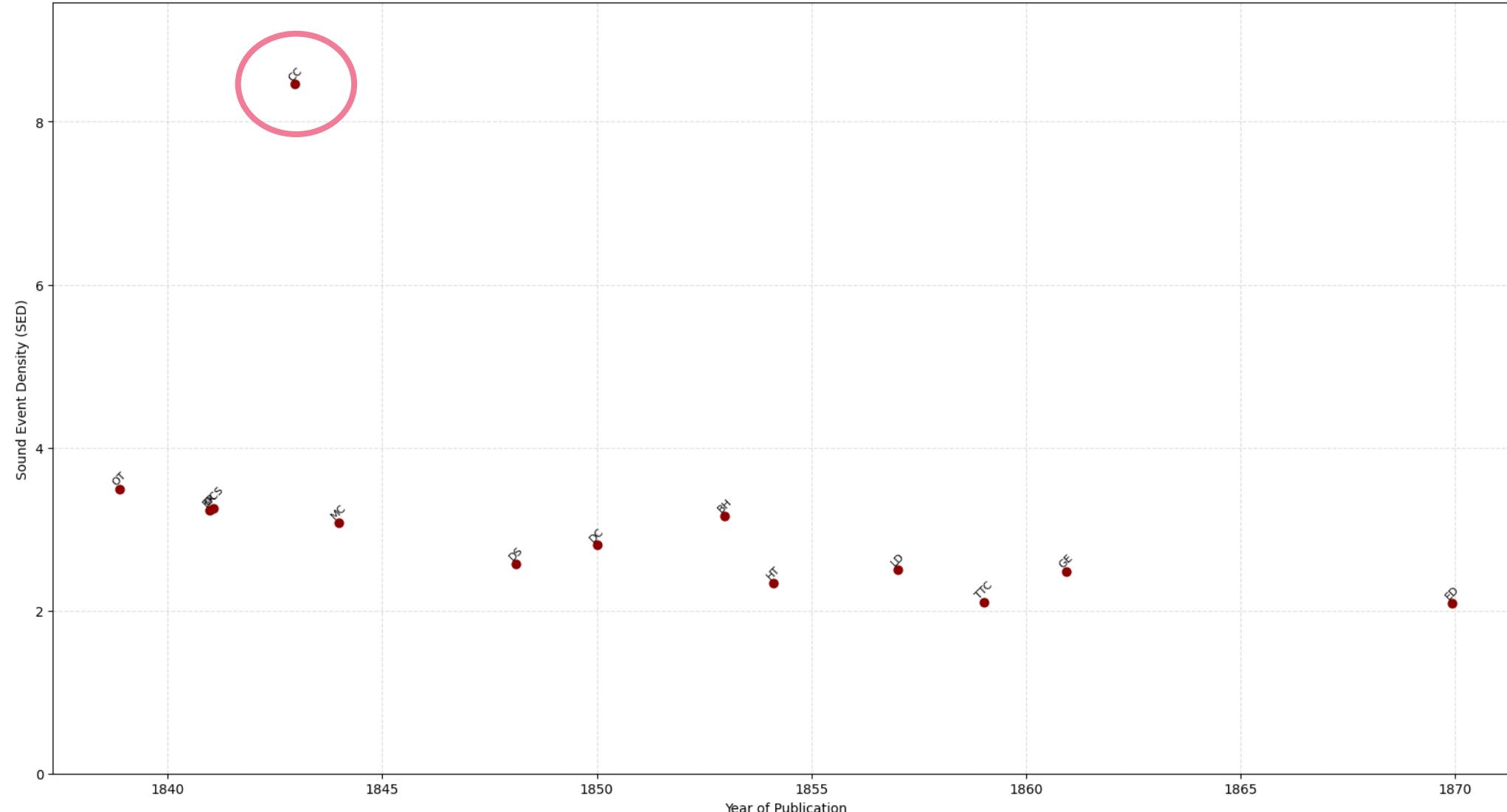
# Analysis of the Charles Dickens Novel Corpus (DNov)

- DNov Corpus: 15 novels by Charles Dickens  
+ novella *A Christmas Carol*
- Published between 1836 – 1870
- 3,835,807 words
- Open Access:  
<https://github.com/mahlberg-lab/corpora>

# Sound Event Density ( $SE_D$ )

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

Sound Event Density per Text by Year



n = 16

# Signal Sounds in A Christmas Carol

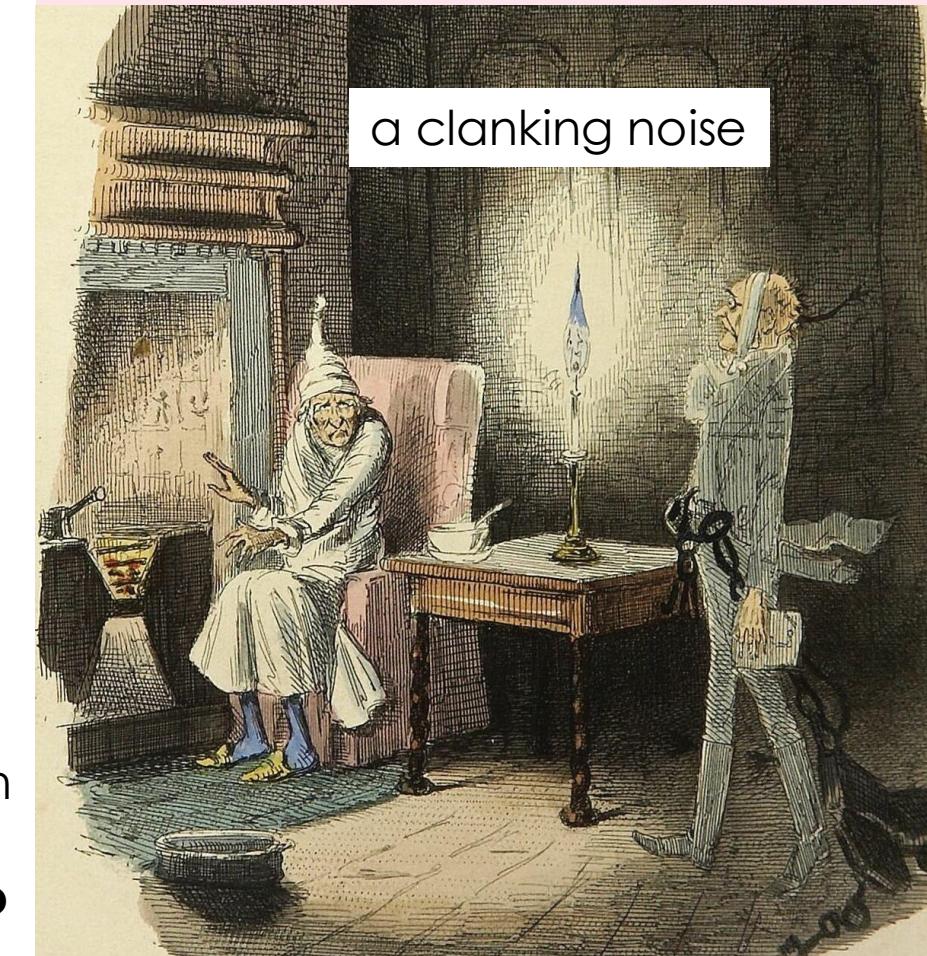
As he threw his head back in the chair, his glance happened to rest upon a bell, a disused bell, that hung in the room, and communicated, for some purpose now forgotten, with a chamber in the highest story of the building.

It was with great astonishment, and with a strange, inexplicable dread, that, as he looked, he saw this bell begin to swing.

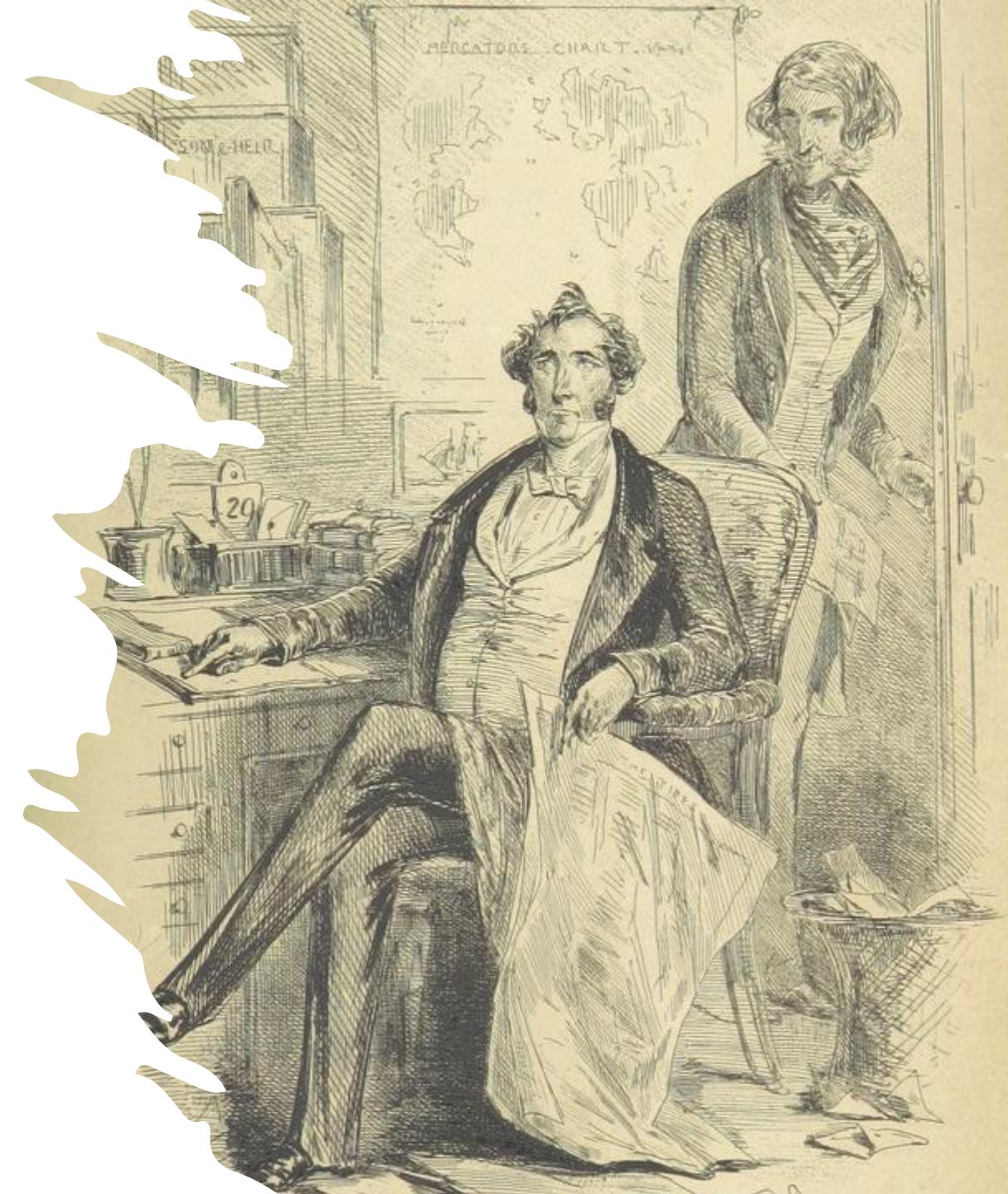
It swung so softly in the outset **that it scarcely made a sound**; **but soon it rang out loudly**, **and so did every bell in the house**.

This might have lasted half a minute, or a minute, but it seemed an hour. The bells ceased as they had begun, together.

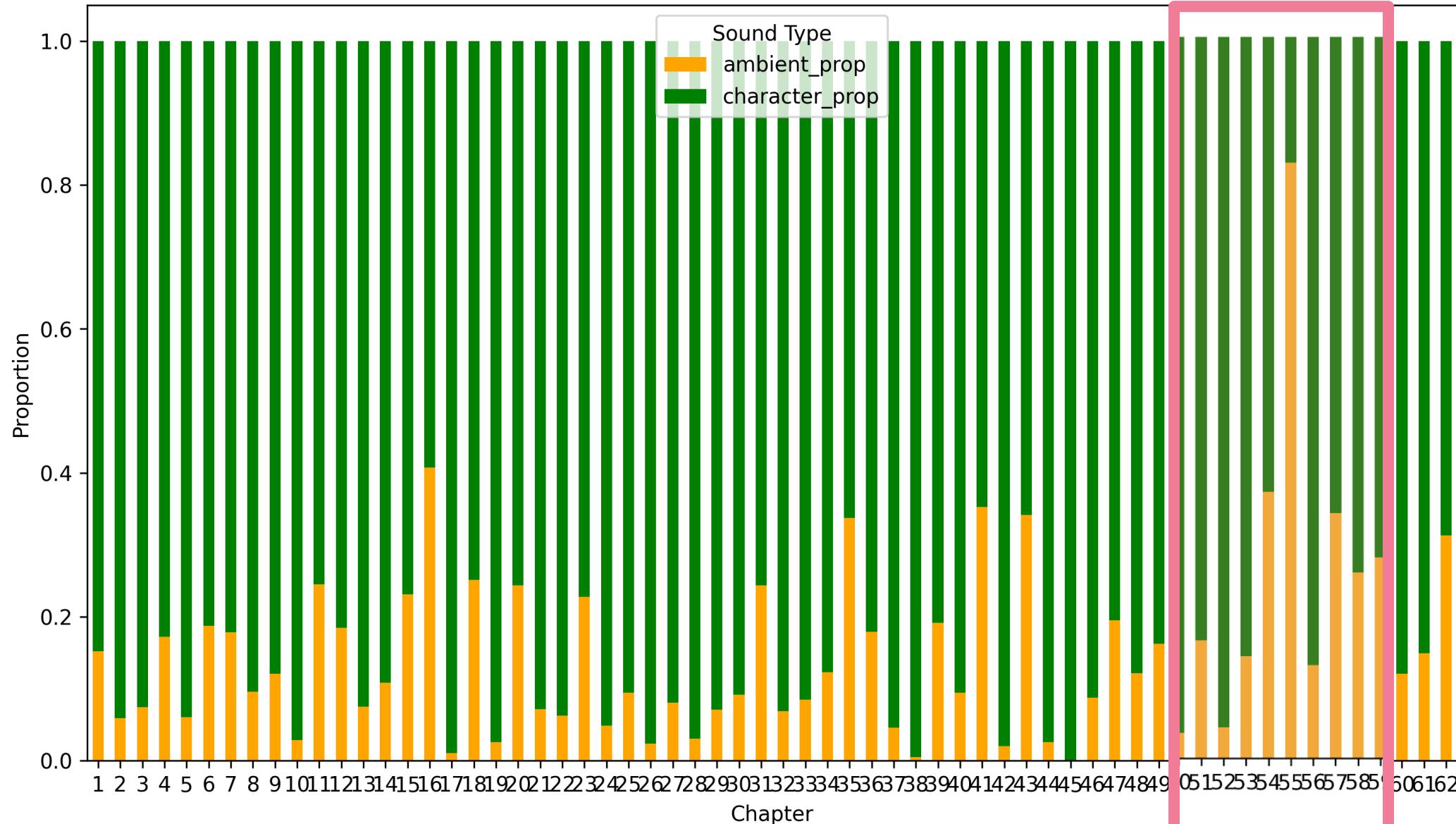
**They were succeeded by a clanking noise, deep down below**; as if some person were dragging a heavy chain over the casks in the wine-merchant's cellar.



# Sound Event Density in *Dombey & Son*



## Proportion of Ambient vs. Character Sounds per Chapter

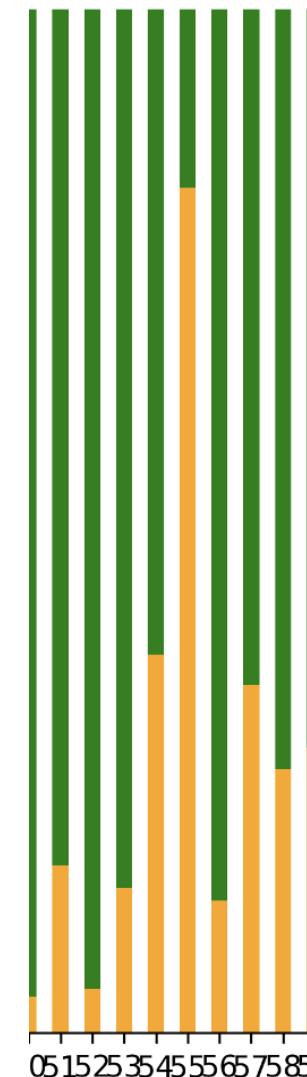


Sound events per chapter in *Dombey and Son* with peak of ambient sounds in chapter 55.

# Chapter 55: Flight and Death of the villain Mr. Carker

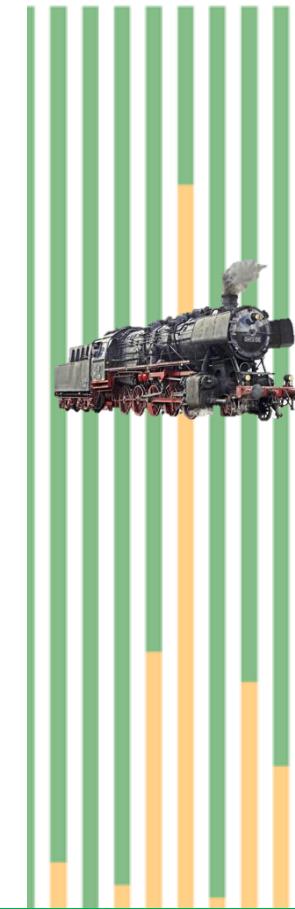
- Key plot element stands out
- Restlessness, eerie soundscape of the journey
- Repetition and ambiguous use of “monotony”
  - “bells and wheels and horses’ feet”

of change upon change, and still the same	monotony of bells	and wheels, and horses' feet, and no rest. (DS
ow, wet weather and dry, and still the same	monotony of bells	and wheels, and horses' feet, and no rest. /DS
rs, coaches, military drums, arcades. Of the	monotony of bells	and wheels and horses' feet being at length DS
he travelled on towards the seacoast, of the	monotony of bells	and wheels, and horses' feet, and no rest. ¶DS
n windows by the roadside; and still the old	monotony of bells	and wheels, and horses' feet, and no rest. (DS
height and hollow, jaded and scared by the	monotony of bells	and wheels, and horses' feet, and no rest. ¶DS
led by the vision of his journey, and the old	monotony of bells	and wheels and horses' feet, until another cDS



# Chapter 55: Flight and Death of the villain Mr. Carker

- Key plot element stands out
- Restlessness, eerie soundscape of the journey
- Repetition and ambiguous use of “monotony”
  - “bells and wheels and horses’ feet”
- Peak in loudness when struck by a train



<ambient\_sound>He heard a shout</ambient\_sound>--another--saw the face change from its vindictive passion to a faint sickness and terror--felt the earth tremble--knew in a moment that the rush was come--<character\_sound>uttered a shriek</character\_sound>--looked round--saw the red eyes, bleared and dim, in the daylight, close upon him--was beaten down, caught up, and whirled away upon a jagged mill, that spun him round and round, and struck him limb from limb, and licked his stream of life up with its fiery heat, and cast his mutilated fragments in the air.

# Conclusion

- Small training set + powerful language model = useful predictions
- But: the more data, the better the model
- Automated translation of data sets offers new opportunities:
  - Reuse of existing other language data sets
- Sound annotations in literary fiction:
  - Structural elements
  - Foregrounding function
  - Key plot elements

# Code and Data

Find corpus, slides, code, further visualisations, and updates on:

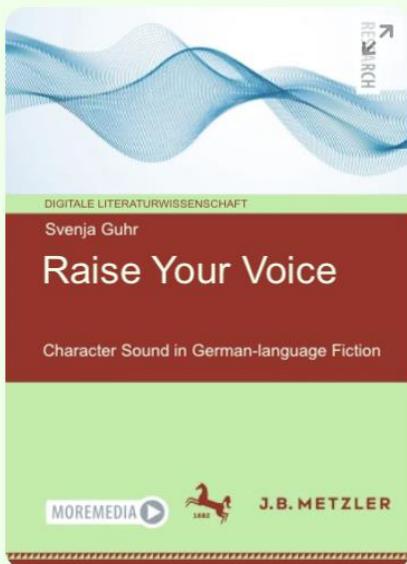


<https://github.com/mahlberg-lab/corpora>

[https://github.com/SvenjaGuhr/Literary Soundscapes](https://github.com/SvenjaGuhr/Literary_Soundscapes)

<https://github.com/SvenjaGuhr/Raise-Your-Voice>

[Home](#) > Book



## Raise Your Voice

Character Sound in German-language Fiction

coming soon

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# References

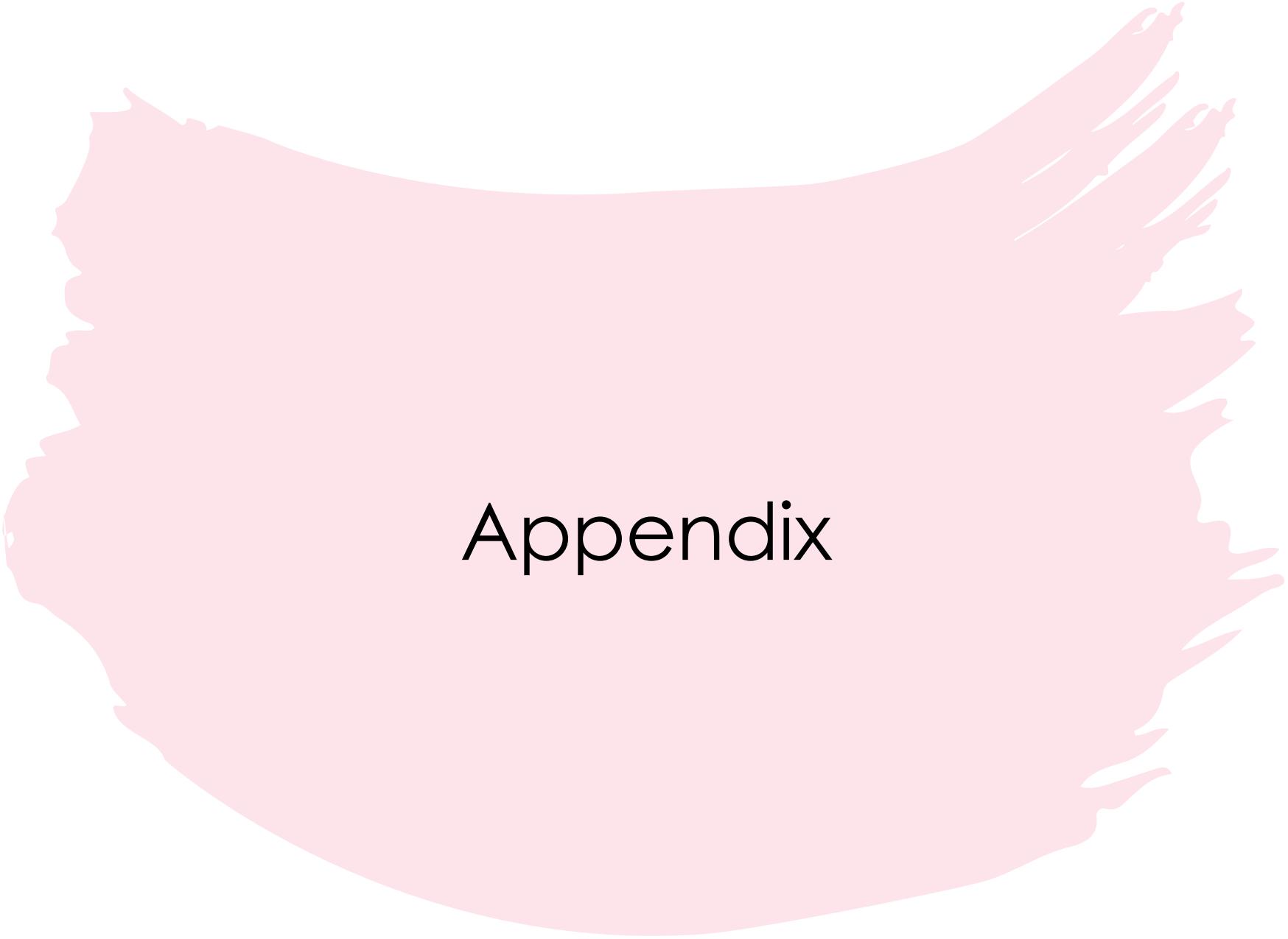
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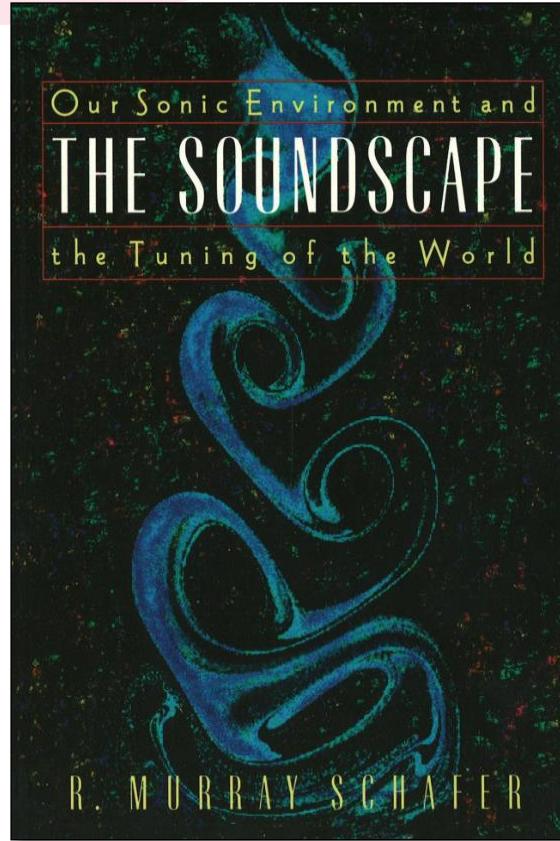


# Appendix

# Fictional Sounds

- Sound events (event concept → Gius/Vauth 2021)
- 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

# Research on Sound in Literary Studies



Schafer (1994: 9)

## **keynote sounds, signals, and soundmarks**

- Keynote sound – omnipresent, characteristic, and dominant for a defined space (cars on the highway)
- Signal – foreground sound conveying a message (alarm clock in the morning)
- Soundmark – unique sound for a particular setting, (Big Ben bell in the district of Westminster, London)

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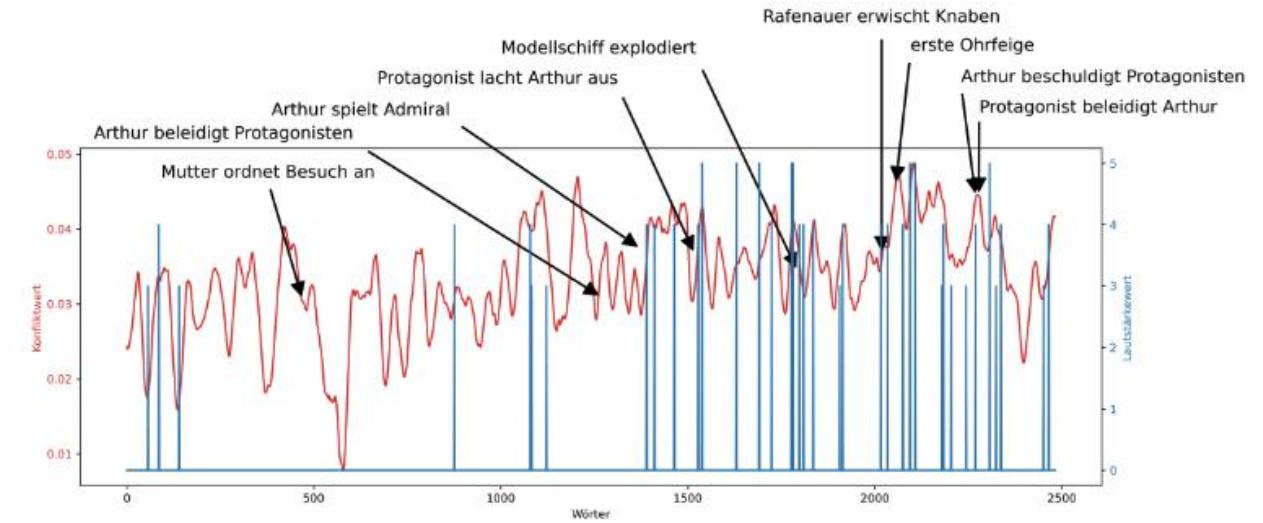
Volume 38, pages 51–67, (2008) [Cite this article](#)



Bernhart ([2008]2017)

## Lautstärke und Konflikt in Realismus und Naturalismus

Häußler, Julian<sup>1</sup> ; Guhr, Svenja<sup>1</sup> ; Gius, Evelyn<sup>1</sup>



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

Häußler/Guhr/Gius (2024)

# 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>.

# 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}

# Experiment: Can machine translations enrich hand-labeled training data?

»Unbegreiflich! Die Sache liegt ja gar nicht in seiner Competenz!« `<character_sound loudness="4">`rief der Gouverneur`</character_sound>`. Auch der Oberst fand die Sache so auffällig als traurig. Er entfernte sich indeß wiederum bald `<character_sound loudness="3">`und der Gouverneur befahl`</character_sound>`, daß man sein Pferd sattele.

"Incomprehensible! The matter is not within his competence!" `<character_sound loudness="4">`cried the governor`</character_sound>`. The colonel, too, found the matter as striking as it was sad. He soon departed again `<character_sound loudness="3">`and the governor ordered`</character_sound>` his horse to be saddled.

Comparison of a German original text extract of Auerbach's *Auf Wache* and its automatically generated British English translation (DeepL API).

# Performance Comparison

## Gold annotations

Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be plainer to her, I kissed her, <character\_sound>thanked her</character\_sound>, <character\_sound>prayed for her</character\_sound>, <character\_sound>asked her for her blessing and forgiveness</character\_sound>, <character\_sound>entreated her</character\_sound> to give me the least sign that she knew or heard me.

## BE\_with\_translations

Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be plainer to her, <character\_sound>I</character\_sound> kissed <character\_sound>her</character\_sound>, <character\_sound>thanked her</character\_sound>, <character\_sound>prayed for her</character\_sound>, <character\_sound>asked her for her blessing and forgiveness</character\_sound>, <character\_sound>entreated her</character\_sound> to give me the least sign that she knew or heard me.

## BE\_no\_translations

Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be plainer to her, I kissed her, <character\_sound>thanked her</character\_sound>, prayed <character\_sound>for her</character\_sound>, <character\_sound>asked her for her blessing and forgiveness</character\_sound>, entreated <character\_sound>her</character\_sound> to give me the least sign that she knew or heard me.

## BE\_mixed\_training\_set

Many and many a time, in the day and in the night, with my head upon the pillow by her that my whispers might be plainer to her, I kissed <character\_sound>her</character\_sound>, <character\_sound>thanked her</character\_sound>, <character\_sound>prayed for her</character\_sound>, <character\_sound>asked her for her blessing and forgiveness</character\_sound>, <character\_sound>entreated her</character\_sound> to give me the least sign that she knew or heard me.

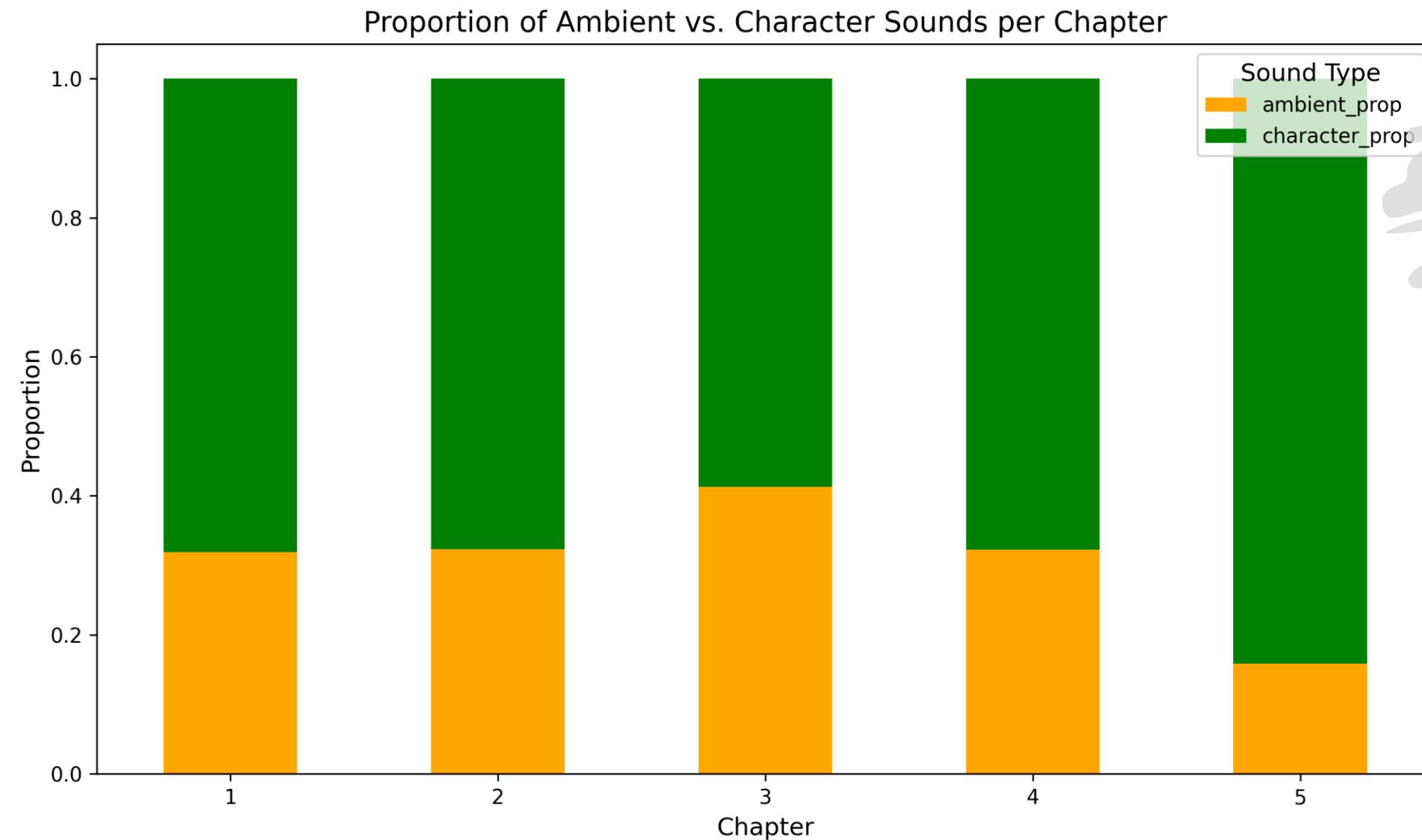
Comparison of the outputs of the three models prior postprocessing of an extract from Dickens's Bleak House.

# 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

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

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



Proportion of ambient vs character sounds per chapter in *A Christmas Carol*.

# Ambiguity – Smooth Transition between *realis* and *irrealis* (Carker's delusions)

A troubled vision, then, of bridges, quays, interminable streets; of wine-shops, water-carriers, great crowds of people, soldiers, coaches, military drums, arcades.

<ambient\_sound> of the monotony of bells</ambient\_sound> and <ambient\_sound>wheels</ambient\_sound> and <ambient\_sound>horses' feet being at length lost in the universal din and uproar</ambient\_sound>. <ambient\_sound>of the gradual subsidence of that noise</ambient\_sound> as he passed out in another carriage by a different barrier from that by which he had entered.

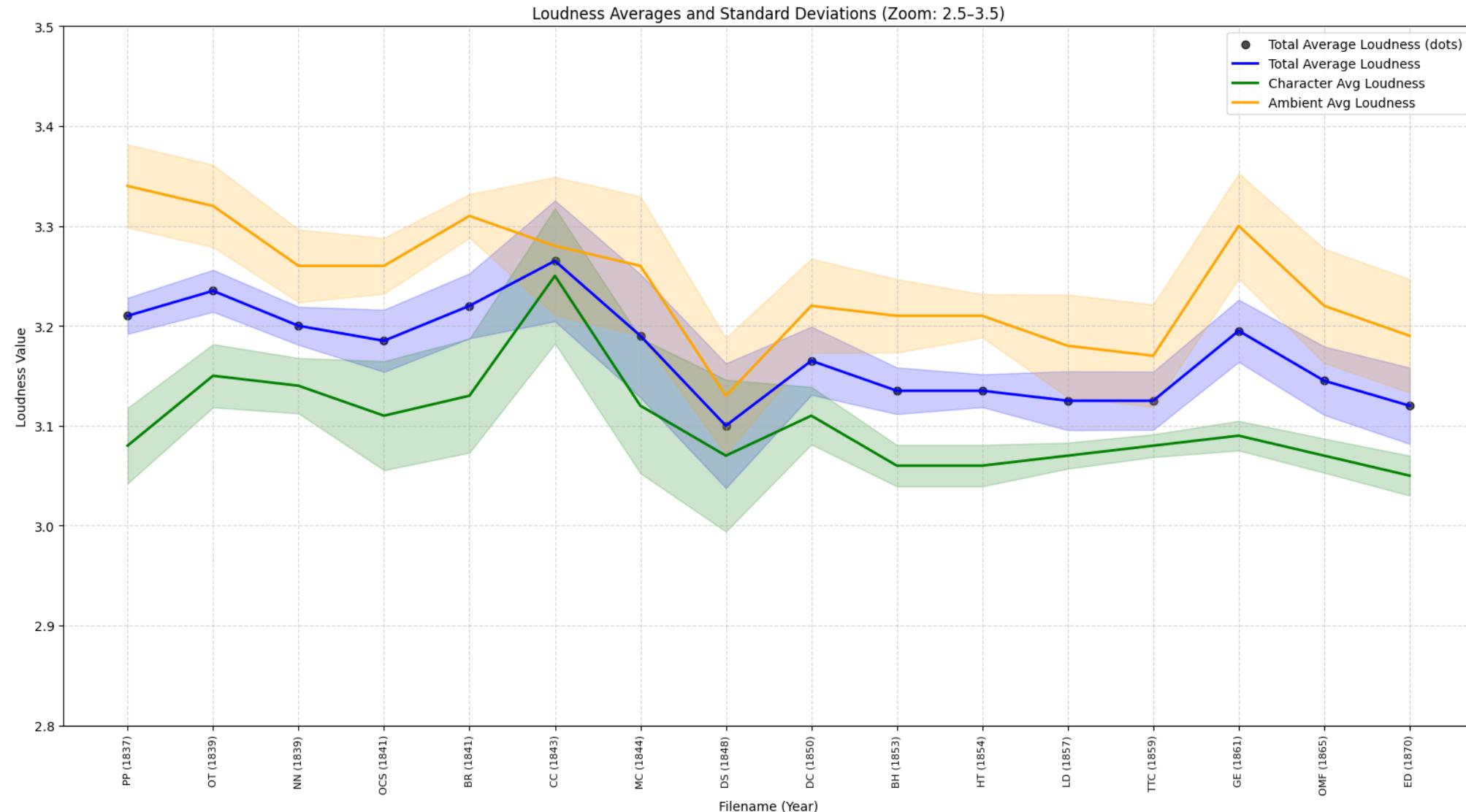
of long roads again, and dead of night, and feeble lights in windows by the roadside; and still the old monotony of bells and wheels, and horses' feet, and no rest. of dawn, and daybreak, and the rising of the sun.

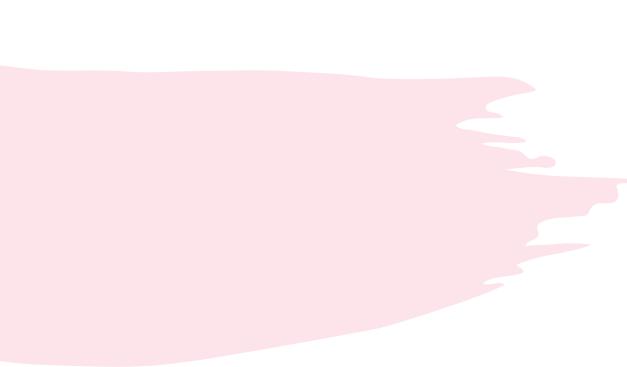
It was constantly before him all at once. She stood there, with her dark disdainful eyes again upon him; and he was riding on nevertheless, through town and country, light and darkness, wet weather and dry, over road and pavement, hill and valley, height and hollow, jaded and scared by the monotony of bells and wheels, and horses' feet, and no rest. 'What day is this?' <character\_sound>he asked of the waiter</character\_sound>, who was making preparations for his dinner. 'Day, Sir?' 'Is it Wednesday?' 'Wednesday, Sir? No, Sir. Thursday, Sir.' 'I forgot. How goes the time? My watch is unwound.'

# Making Loudness 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	$\overline{T}_l = \frac{\sum l_{se}}{SE_l}$
$SE_l$	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	

# Loudness Averages and Standard Dev.

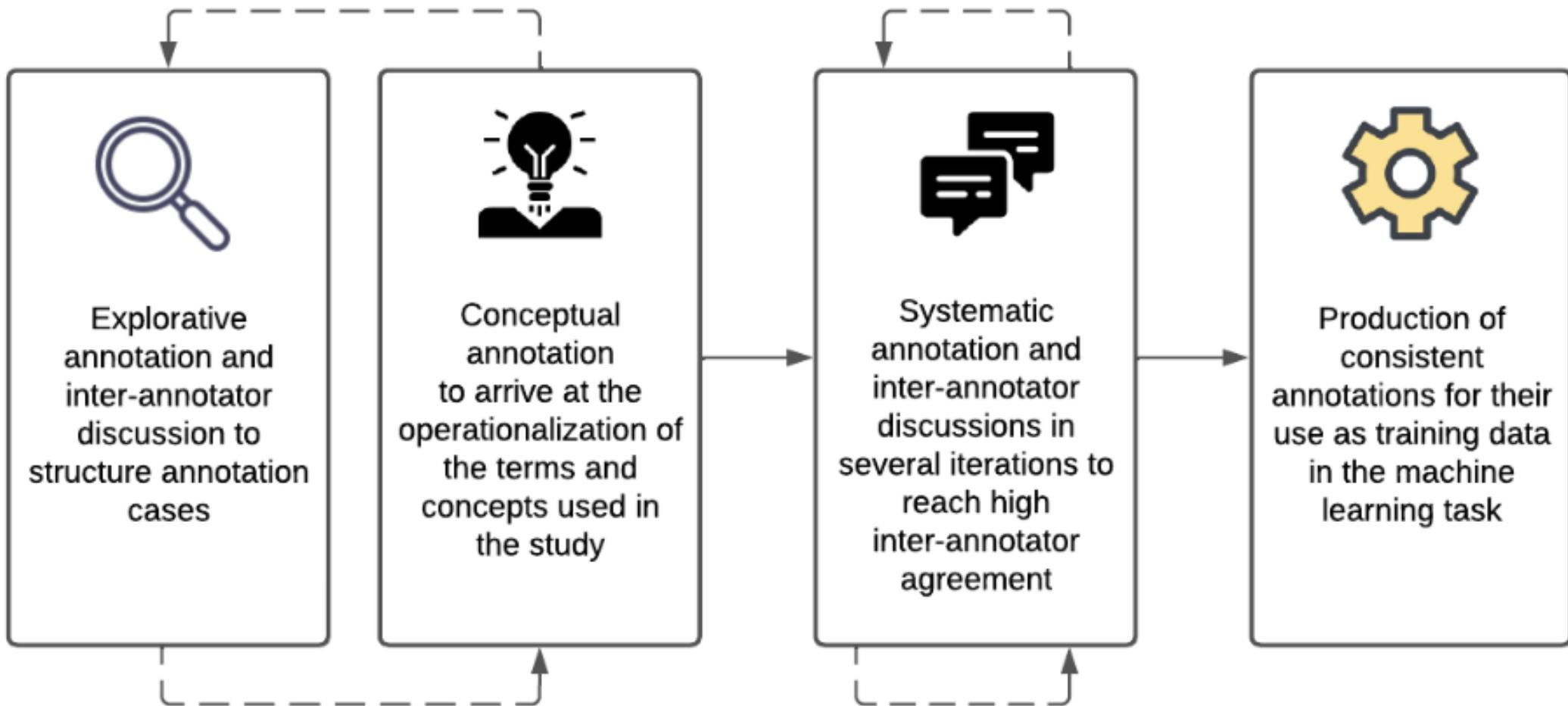




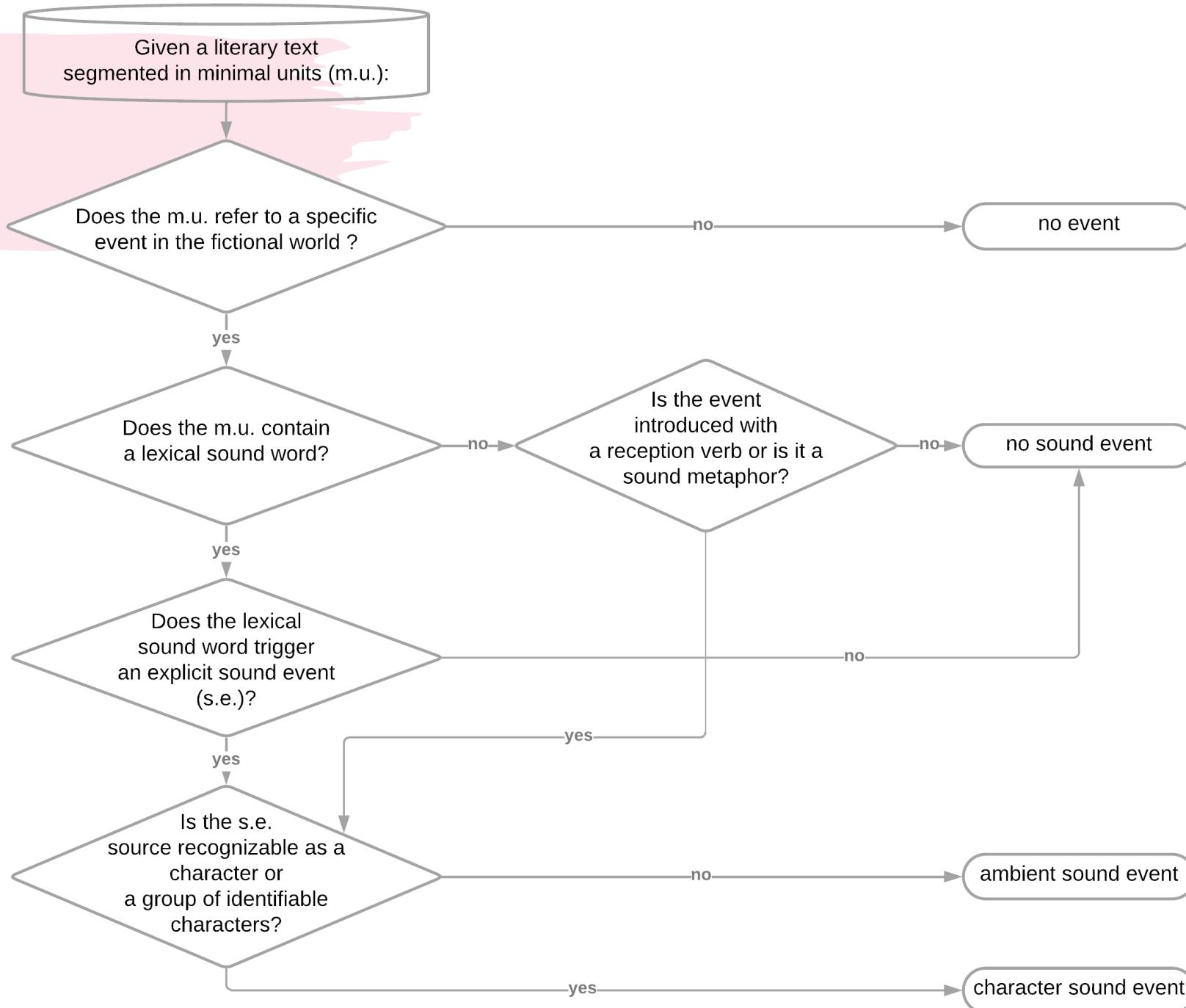
# Talk Outline

- 1. Sound in Literary Fiction**
  - Theoretical Background
  - Operationalisation
  - Automation
  - Measuring Sounds?
- 2. Sounds in the Dickens Novel Corpus (DNov)**
  - Proportion of Ambient and Character Sounds
  - Sound as Elements for Structure and Foregrounding

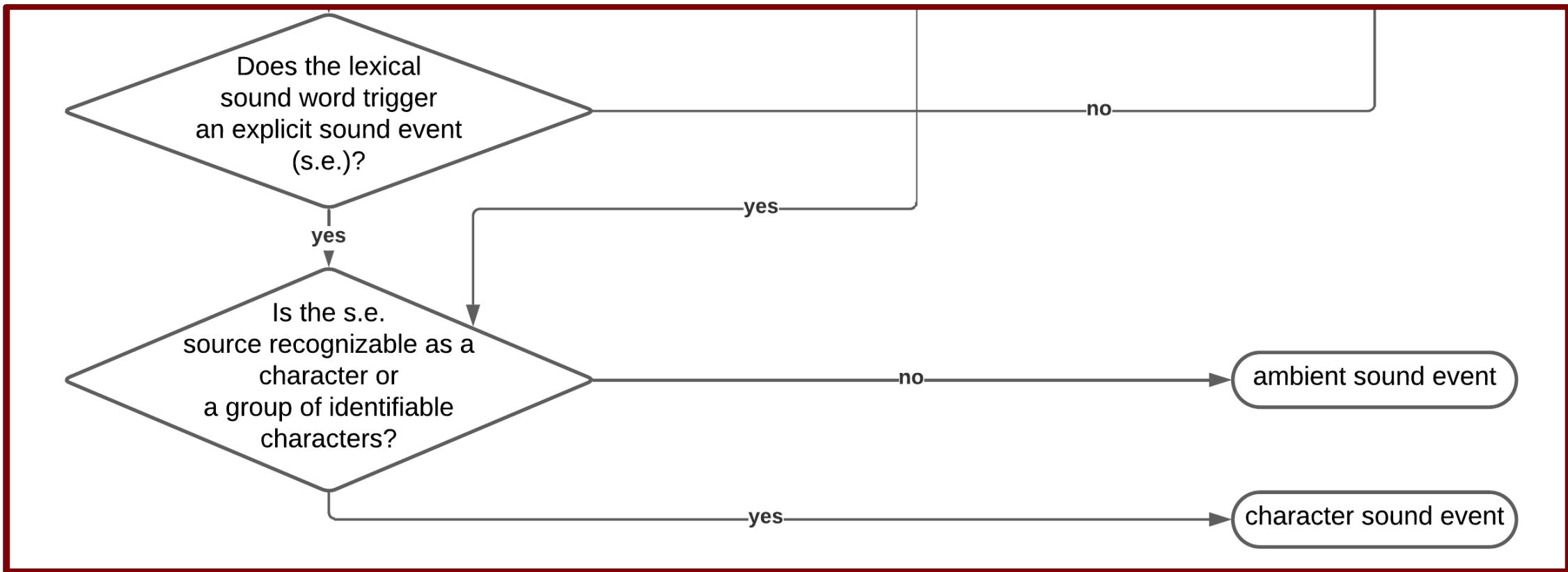
# Workflow



# Annotation of Sound Events



# Annotation of Sound Events



# Annotation of Loudness

S	explicitly no sound	silence ( <i>Schweigen</i> and <i>Stille</i> )
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

# Manual Annotation

- 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>.

# In Summary...

- Definition of fictional sounds
- Guidelines and decision tree for detecting the sounds
- 65 sound-annotated German *theme-d-Prose* texts
  - Divided into training (55 texts) and test data (10 texts)
- 7 sound-annotated texts in British English:
  - 3 manually annotated British 19C texts
  - 4 machine-translated texts from the annotated German-language corpus (19C)