HEIDELBERG
UNIVERSITY
HOSPITAL

Pratical Presentation

Sentiment Analysis and Trends of Psychology Transcripts

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Major Depressive Disorder

Language

Social relations

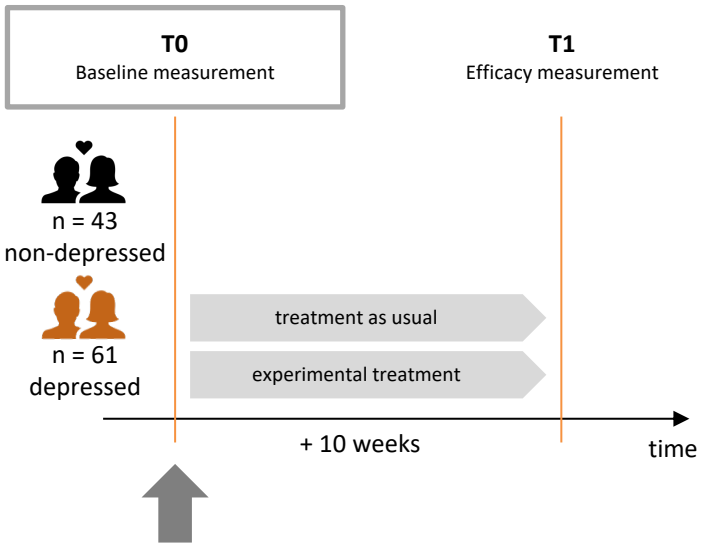

[1]

Measurement?

[1] https://www.irishtimes.com/polopoly_fs/1.4109474.1575902622!/image/image.jpg_gen/derivatives/landscape_620/image.jpg

Data

Measurement process



Setting

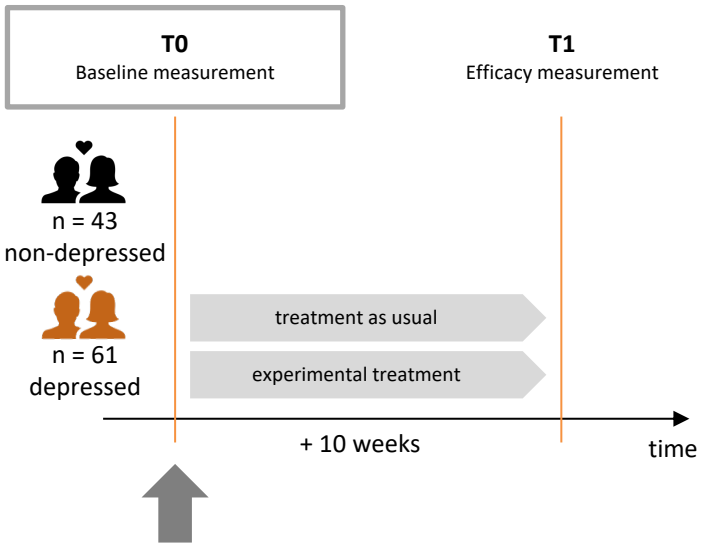
- Non-depressed couples
  → both partners no diagnosed depression
- Depressed couples
  → female partner with diagnosed depression

- Duration: 10 minutes
- Condition: "**Positive** conversation"
- Labels: *Hamilton Depression Rating Scale*

- Statistics:
  number of transcripts = **104**
  number of words = **121,018**
  number of paragraphs = **13,115**

Data

Measurement process



Transcript Example

A: Er

B: Sie

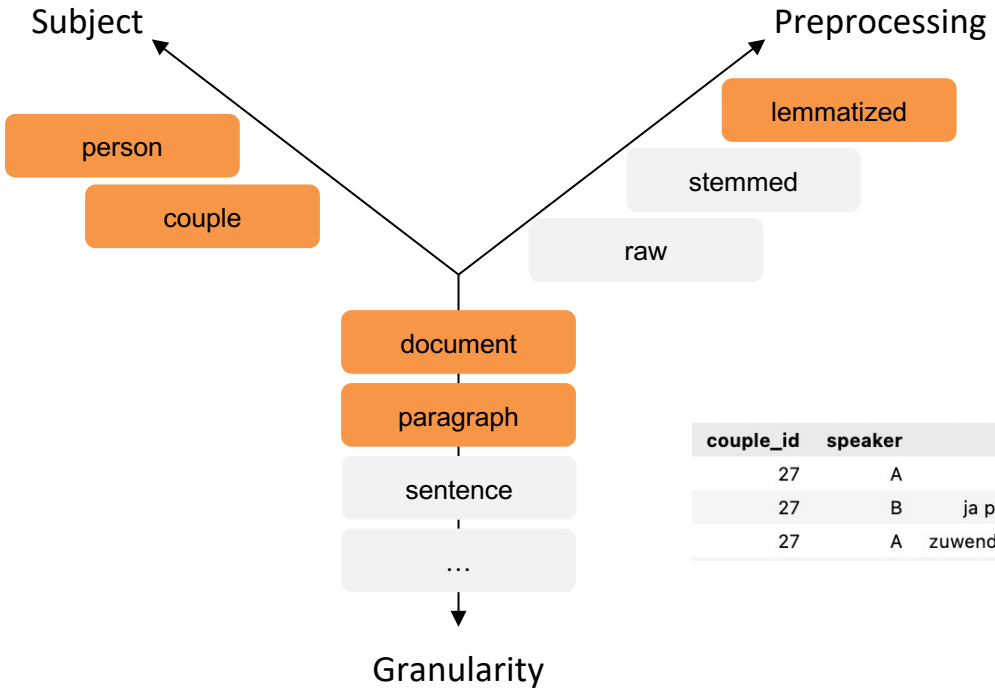
A: Positive Gefühle.

B: Ja, positive Gefühle können bei mir auslösen wenn du mich gut behandelst, fühle ich mich echt toll, wenn du zärtlich mit mir umgehst, zärtlich redest.

A: …

Sentiment Analysis

Dimensions



couple_id	speaker	lemmatized
27	A	positiv gefühle
27	B	ja positiv gefühle können bei mir auslösen wen...
27	A	zuwendung das sein ja zuwendung wir beide wenn...

Sentiment Analysis | LIWC

”Linguistic Inquiry and Word Count”

Description

- **Dictionary** for quantitative sentiment analysis
- Free version of 2001
- **68 categories** related to sentiment
- **58 categories** occuring in transcripts:

['Affect', 'Posemo', 'Assent', 'Preps', 'Space', 'Pronoun', 'I', 'Self', 'Cogmech', 'Discrep', 'You', 'Social', 'Othref', 'Occup', 'School', 'Physcal', 'Body', 'Incl', 'Article', 'Other', 'We', 'Achieve', 'Insight', 'Past', 'Optim', 'Certain', 'Metaph', 'Relig', 'Cause', 'Excl', 'Present', 'Negate', 'Comm', 'Time', 'Future', 'Humans', 'Family', 'Friends', 'Tentat', 'Leisure', 'Home', 'Sleep', 'Motion', 'Money', 'Job', 'Negemo', 'Anx', 'Posfeel', 'Sad', 'Death', 'Music', 'TV', 'Inhib', 'Senses', 'Eating', 'Sexual', 'Up', 'Groom']

Examples

Posemo = positive emotion

['abgesichert', 'abgespielt', 'absolut*', 'aeusserst', 'aktiv*', 'alber*', 'amues*', 'amüs*', 'anbet*', 'angebetet*', 'angehimmelt*‘, 'angelächelt*‘, …]*

Negemo = negative emotion

['abgelehnt’,’ abgemueht’, 'abgemüht*’, ‘abgeneigt*’, 'abgespannt*’, 'abgestumpft*’, ’ablehn*’, 'abneig*’, 'abscheu*’, …’]*

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Examples

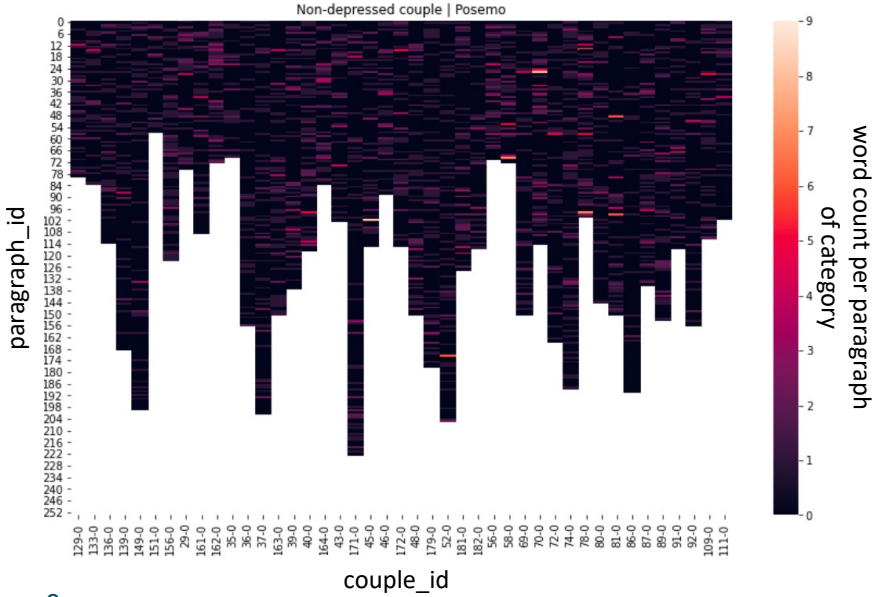
```
1  liwc.parse(['das','leben','ist','schlecht'])
✓ 0.4s
Counter({'Article': 1,
         'Present': 2,
         'Leisure': 1,
         'Home': 1,
         'Affect': 1,
         'Negemo': 1})
```

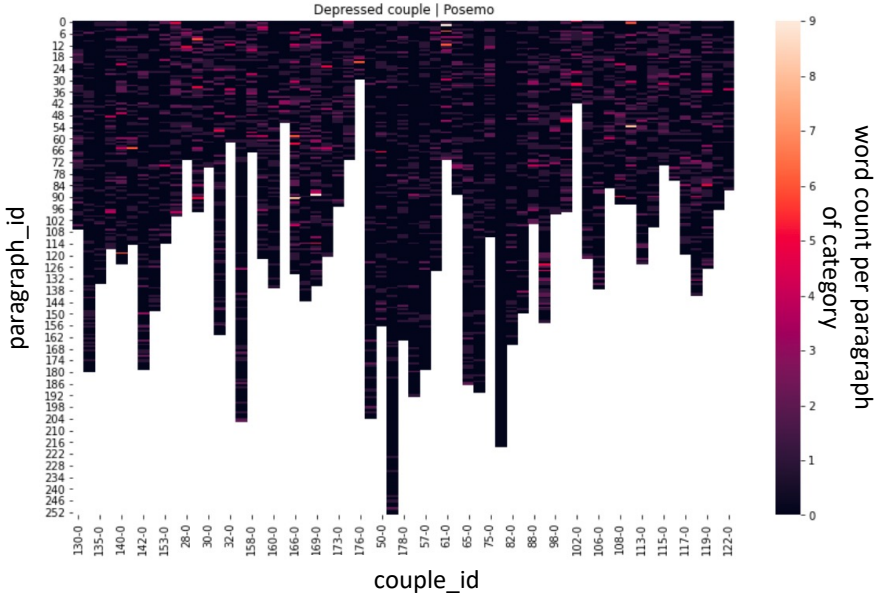
```
1  liwc.parse(['das','leben','ist','schön'])
✓ 0.4s
Counter({'Article': 1,
         'Present': 2,
         'Leisure': 1,
         'Home': 1,
         'Affect': 1,
         'Posemo': 1})
```

Sentiment Analysis | LIWC

Qualitative Analysis | **Heatmaps**

Posemo

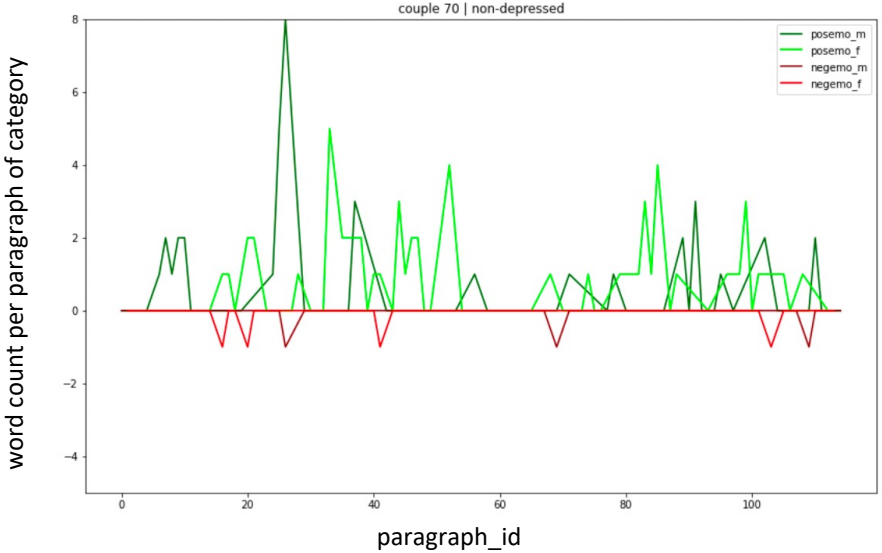


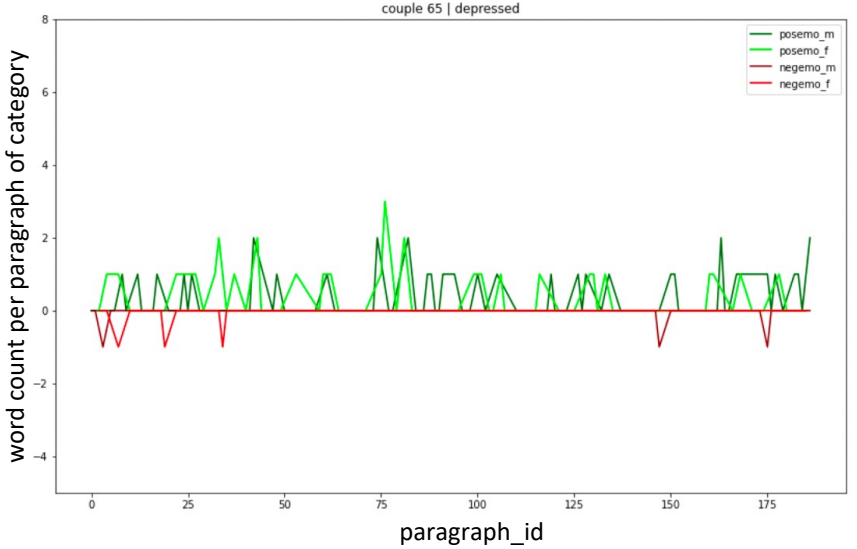


Sentiment Analysis | LIWC

Qualitative Analysis | **Interaction**

Posemo | Negemo

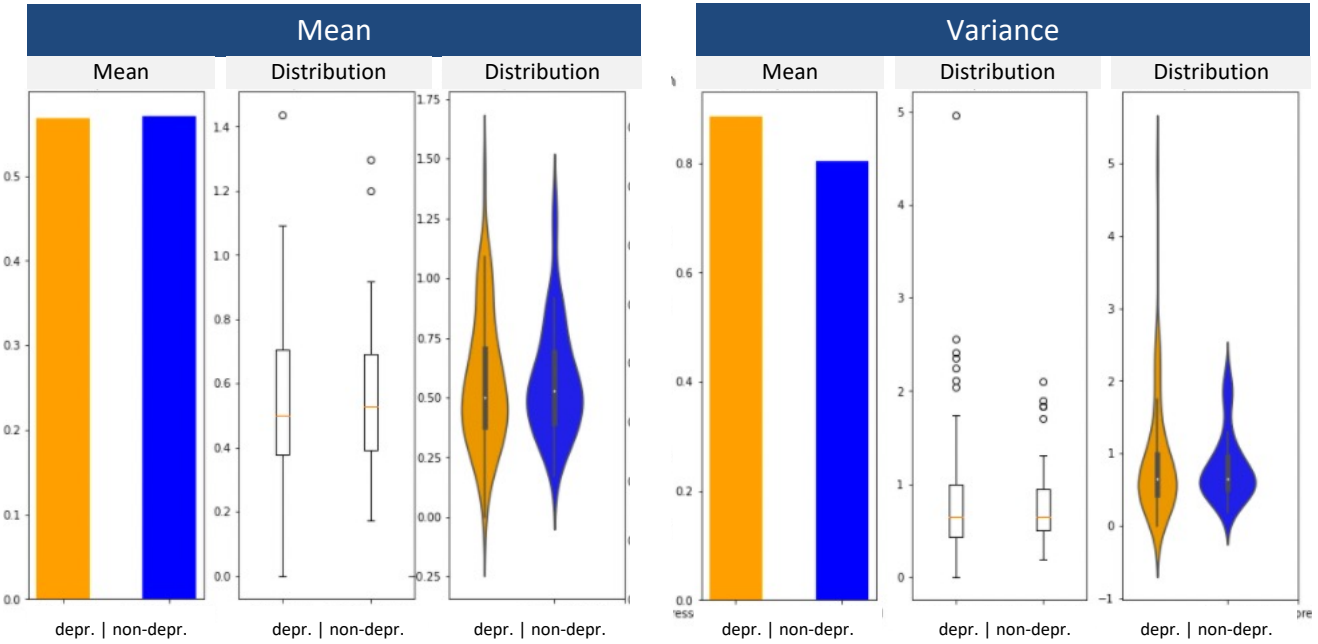




Qualitative Sentiment Analysis

Linguistic Inquiry and Word Count | **Interaction**

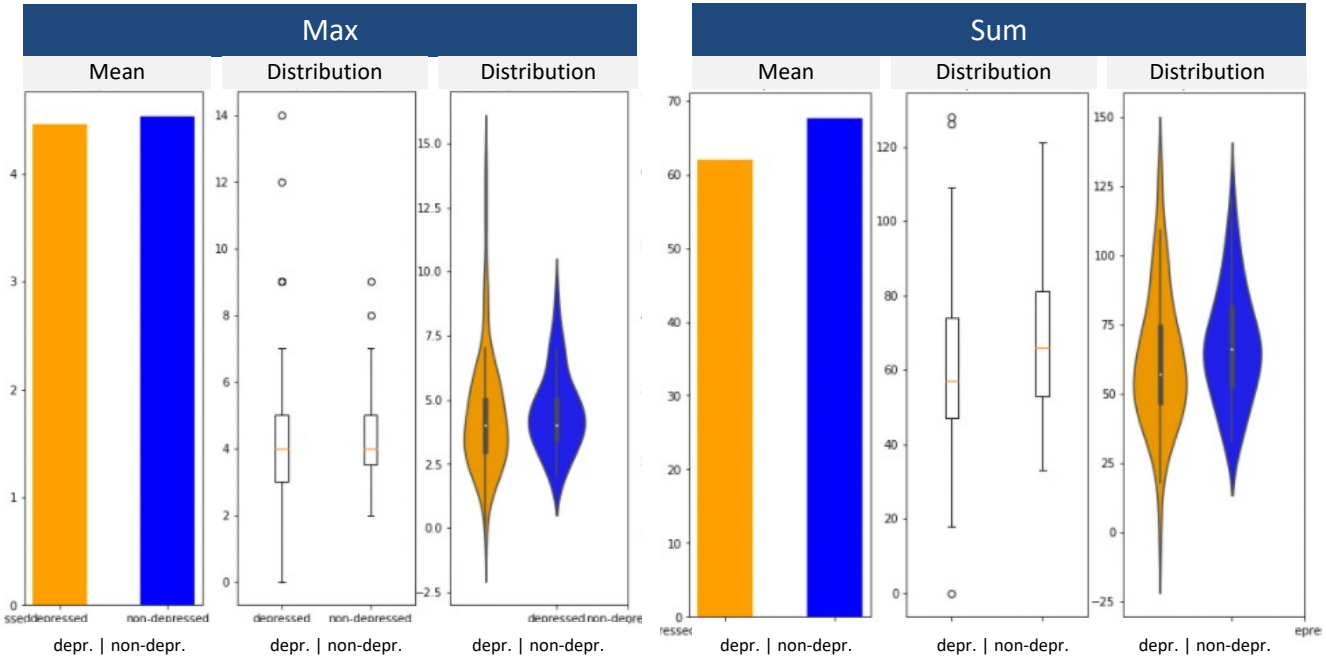
Posemo



Qualitative Sentiment Analysis

Linguistic Inquiry and Word Count | **Interaction**

Posemo



Qualitative Sentiment Analysis

Linguistic Inquiry and Word Count

Paragraph level

Results

- No clear qual. pattern found in LIWC **within document distribution** (e.g. highest values at the beginning)
- No clear pattern found in **partner interaction** of posemo and negemo
- **Similar mean and median** for most of the LIWC categories
- **Higher variance** in depressed group in most LIWC categories, more extreme values on both ends of the spectrum and more outliers
- Higher max and sum for positive emotion in non-depressed couples

Classification Results with Random Forrest

10-fold crossvalidation with 10 repeats

	Mean	Std
F1	0.81	0.10
Accuracy	0.76	0.11

Classification Results

Results

Feature matrices for different features including:

- Basic statistics
- LIWC on document level
- LIWC on paragraph level
- **Latent Semantic Analysis**
- **Latent Dirichlet Allocation**
- **GermanSentimentBert**[1]

Evaluation with different classifiers:

- Linear Regression, Logistic Regression, Random Forrest Classifier

→ Best results with **Random Forrest Classifier**
→ Best results using **all features**
→ **High variance for different splits**, therefore cross-validations with repeats to quantify variance

Classification Results with Random Forrest

10-fold crossvalidation with 10 repeats

	Mean	Std
F1	0.82	0.08
Accuracy	0.75	0.11

[1] https://huggingface.co/oliverguhr/german-sentiment-bert

Classification Results

Results

Feature matrices for different features including:

- Basic statistics
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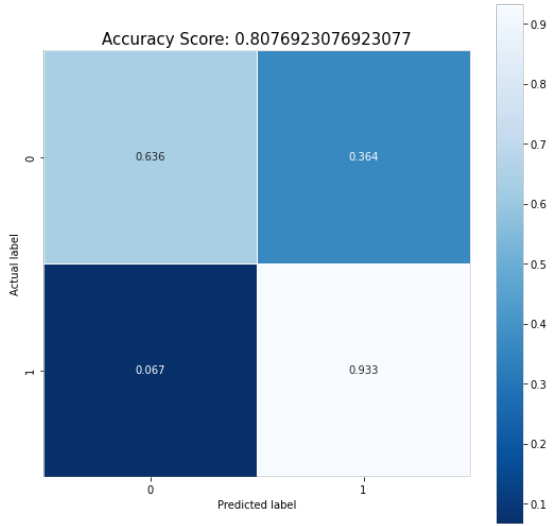

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Summary

Results

Results

1. **A robust binary classification** only based on the transcripts is challenging
2. **Conversational setting** (“positive conversation”) might be not suited for transcript-based classification
3. **Framework for qualitative and quantitative conversation analysis** is helpful and might be useful also for other psychological research questions

Limitations

- LIWC is not able to **capture emotional nuances**

Summary

A: Sie
B: Er

B: Was willst du zusammen machen?

A: **Ich möchte endlich den Philosophen weg (lacht)**

B: Positives?

A: …

Results

based on the transcripts is **not** possible
conversation") might be not suited for transcript-based classification
es are not able to conduct a **positively framed conversation** as good
ot hold
uantitative and quantitative conversation analysis which might be
useful also for other psychological research questions

Limitations

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LIWC

```
liwc.parse(word_tokenize('ich mögen endlich der philosophen weg'))
```

```
Counter({'Pronoun': 1, 'I': 1,
'Self': 1, 'Affect': 1, 'Posemo': 1,
'Time': 1, 'Article': 1, 'Space': 1,
'Excl': 1})
```

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'Time': 1, 'Article': 1, 'Space': 1,
'Excl': 1})
```

BERT

```
model.predict_sentiment(['ich mögen endlich der philosophen weg'])
```

```
['neutral']
```

Summary

Results

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3. **Framework for qualitative and quantitative conversation analysis** is helpful and might be useful also for other psychological research questions

Limitations

- LIWC is not able to **capture emotional nuances**
- **Small sample size** (large feature space p, little sample size)
- **Limited transcript quality, manual transcription process** is error-prone

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