Initial Exploratory Sentiment Analysis of the Reading Experience Database

Robin Davis

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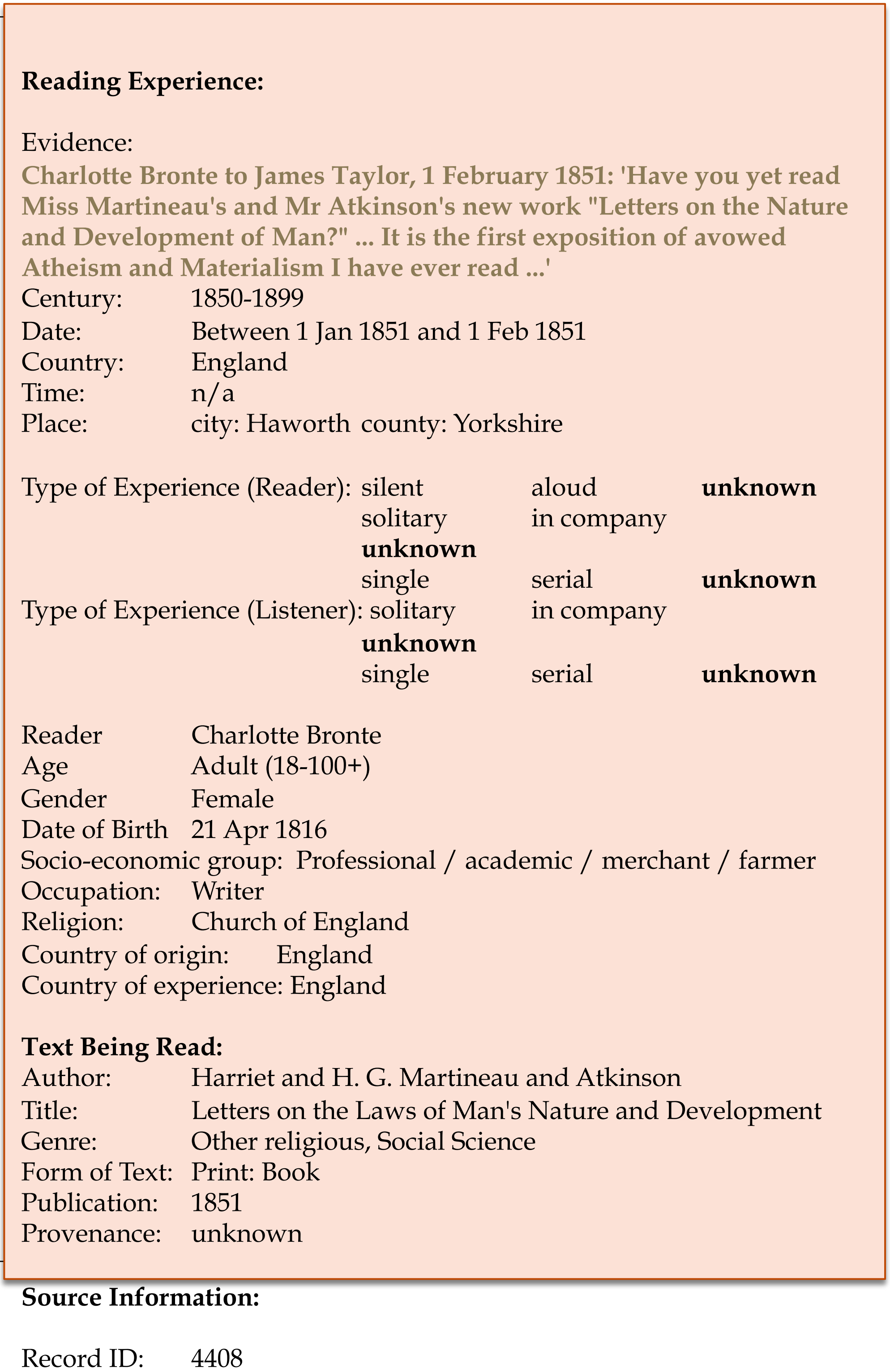
LIS590TX

The data

- UK Open University project
- Collects all reading experiences of British subjects 1450-1945
- http://www.open.ac.uk/Arts/reading/
- 29,000 records
- 125 contributors
- Data kindly provided by Dr. E.G.C. King



Reading Experience:

Evidence:
Charlotte Bronte to James Taylor, 1 February 1851: 'Have you yet read Miss Martineau's and Mr Atkinson's new work "Letters on the Nature and Development of Man?" ... It is the first exposition of avowed Atheism and Materialism I have ever read ...'

Century:	1850-1899
Date:	Between 1 Jan 1851 and 1 Feb 1851
Country:	England
Time:	n/a
Place:	city: Haworth county: Yorkshire

Type of Experience (Reader):	silent	aloud	**unknown**
	solitary	in company	
	unknown		
	single	serial	**unknown**
Type of Experience (Listener):	solitary	in company	
	unknown		
	single	serial	**unknown**

Reader	Charlotte Bronte
Age	Adult (18-100+)
Gender	Female
Date of Birth	21 Apr 1816
Socio-economic group:	Professional / academic / merchant / farmer
Occupation:	Writer
Religion:	Church of England
Country of origin:	England
Country of experience:	England

Text Being Read:

Author:	Harriet and H. G. Martineau and Atkinson
Title:	Letters on the Laws of Man's Nature and Development
Genre:	Other religious, Social Science
Form of Text:	Print: Book
Publication:	1851
Provenance:	unknown

Source Information:

Record ID: 4408

Dates of evidences

1900-1945	353
1850-1899	365
1800-1849	1138
1700-1799	357
1600-1699	19
1500-1599	9

Initial objectives

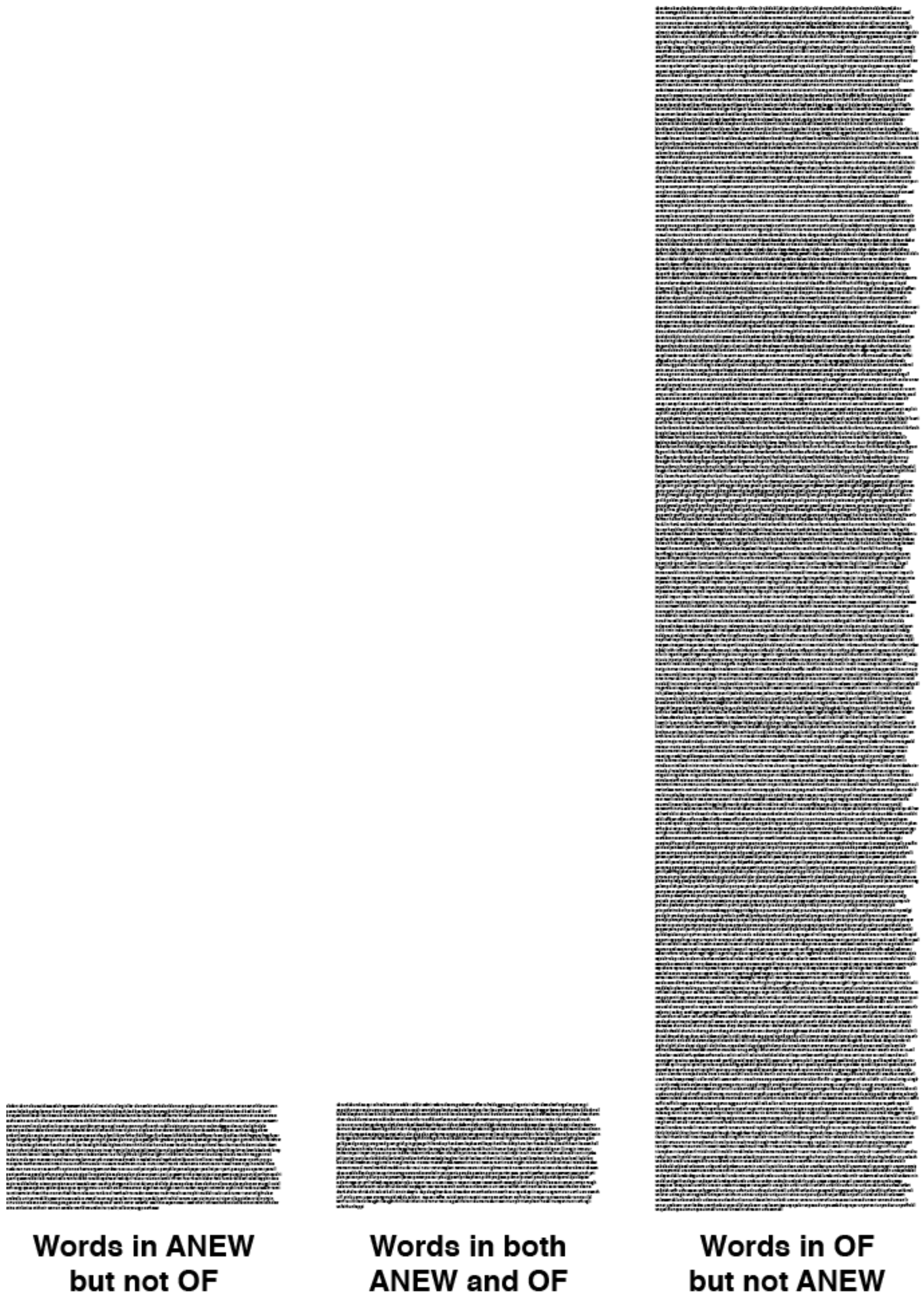
- Ascertain general sentiment level of a given text set, beginning with simple Bag of Words method
- Compare MPQA and ANEW lexicons as sentiment analysis tools

Tools: Python, Natural Language Tool Kit (NLTK), Excel

Lexicons

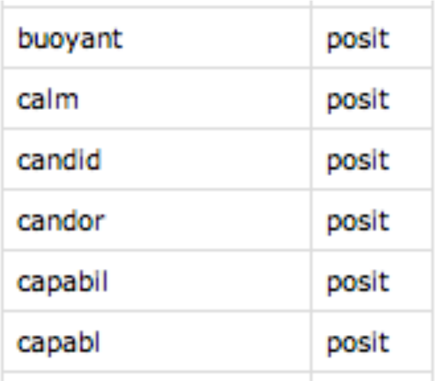
- MPQA Subjectivity Lexicon, aka OpinionFinder
  - Multi-Perspective Question Answering
  - http://www.cs.pitt.edu/mpqa/

- ANEW
  - Affective Norms for English Words
  - http://csea.phhp.ufl.edu/media/anewmessage.html

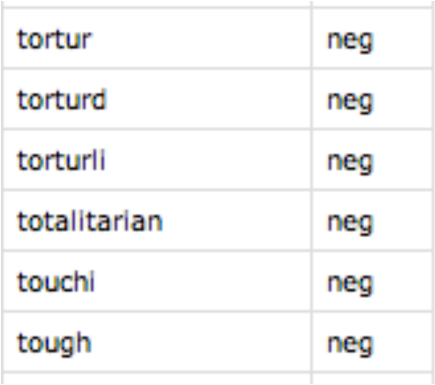

Words in ANEW but not OF
Words in both ANEW and OF
Words in OF but not ANEW

Preparation of lexicons

- Stem with PorterStemmer (NLTK)
- Dedupe stems
- Split into positive and negative word lists
  - For ANEW, split valence mean values into pos and neg



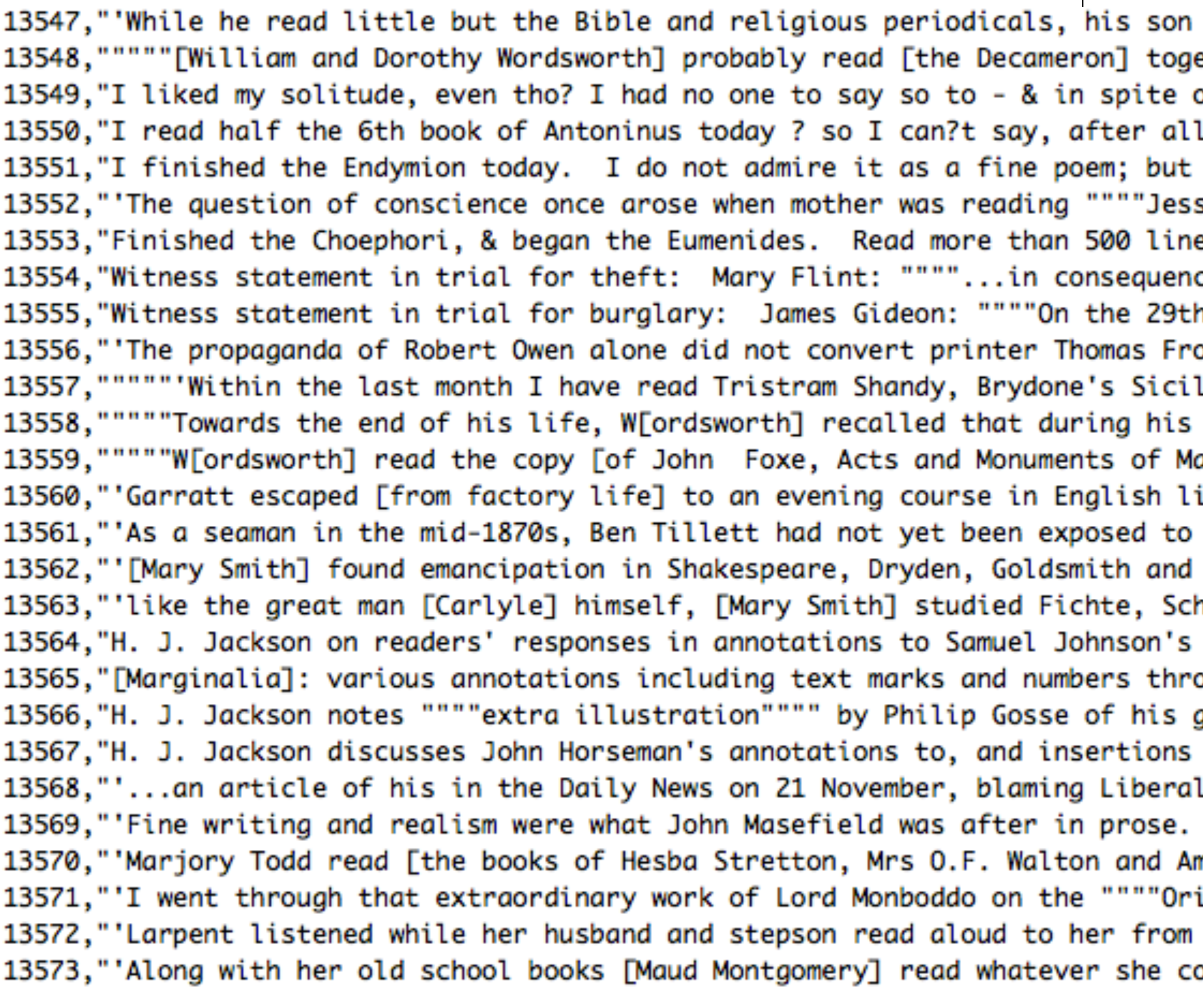
buoyant	posit
calm	posit
candid	posit
candor	posit
capabil	posit
capabl	posit



tortur	neg
torturd	neg
torturli	neg
totalitarian	neg
touchi	neg
tough	neg

Preparation of RED data

- Port deduped evidences from database into CSV
- Give each evidence a unique number
- Remove messy data like “”, [sic], &nbsp;, [italics]
- Split CSV into .txt files with unique number as filename
- Training set: 203 texts
- Full set: 14,073 texts



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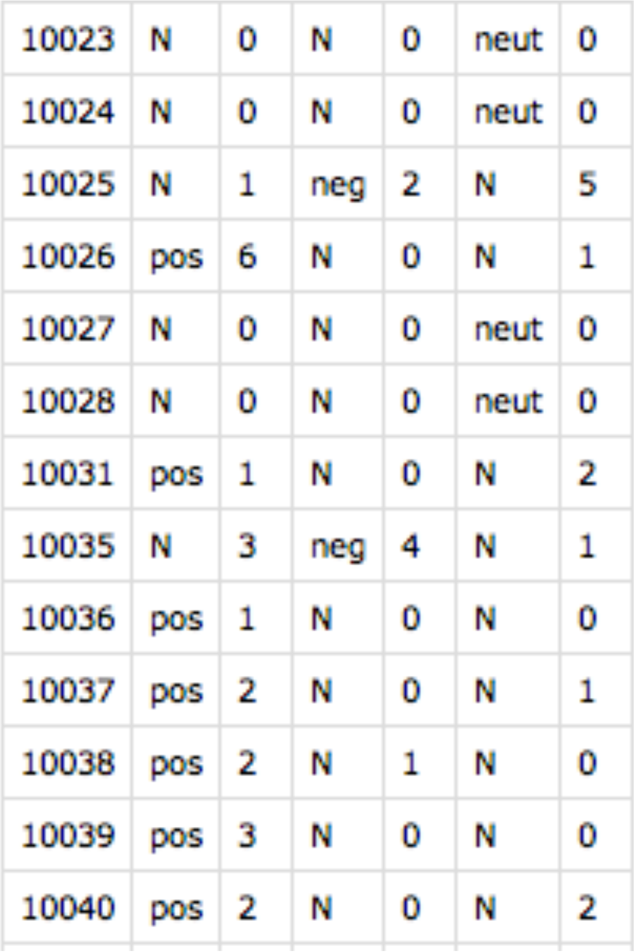
13547,"'While he read little but the Bible and religious periodicals, his son
13548,"""""[William and Dorothy Wordsworth] probably read [the Decameron] toge
13549,"I liked my solitude, even tho? I had no one to say so to - & in spite o
13550,"I read half the 6th book of Antoninus today ? so I can?t say, after all
13551,"I finished the Endymion today.  I do not admire it as a fine poem; but
13552,"'The question of conscience once arose when mother was reading """"Jess
13553,"Finished the Choephori, & began the Eumenides.  Read more than 500 line
13554,"Witness statement in trial for theft:  Mary Flint: """"...in consequenc
13555,"Witness statement in trial for burglary:  James Gideon: """"On the 29th
13556,"'The propaganda of Robert Owen alone did not convert printer Thomas Fro
13557,"""""'Within the last month I have read Tristram Shandy, Brydone's Sicil
13558,"""""Towards the end of his life, W[ordsworth] recalled that during his
13559,"""""W[ordsworth] read the copy [of John  Foxe, Acts and Monuments of Mo
13560,"'Garratt escaped [from factory life] to an evening course in English li
13561,"'As a seaman in the mid-1870s, Ben Tillett had not yet been exposed to
13562,"'[Mary Smith] found emancipation in Shakespeare, Dryden, Goldsmith and
13563,"'like the great man [Carlyle] himself, [Mary Smith] studied Fichte, Sch
13564,"H. J. Jackson on readers' responses in annotations to Samuel Johnson's
13565,"[Marginalia]: various annotations including text marks and numbers thro
13566,"H. J. Jackson notes """"extra illustration"""" by Philip Gosse of his g
13567,"H. J. Jackson discusses John Horseman's annotations to, and insertions
13568,"'...an article of his in the Daily News on 21 November, blaming Liberal
13569,"'Fine writing and realism were what John Masefield was after in prose.
13570,"'Marjory Todd read [the books of Hesba Stretton, Mrs O.F. Walton and An
13571,"'I went through that extraordinary work of Lord Monboddo on the """"Ori
13572,"'Larpent listened while her husband and stepson read aloud to her from
13573,"'Along with her old school books [Maud Montgomery] read whatever she co
```

Steps to evaluate each evidence

```
For file in texts/:
    For word in file:
        Remove adverbs (words ending in –ly)
        Stem word with PorterStemmer
        If previous word is a negation word:
            If word is in ANEW/MPQA-posList:
                        Add word after negation word to NegList
            If word is in ANEW/MPQA-negList:
                        Add word after negation word to PosList
        If previous word is not a negation word:
            If word is in ANEW/MPQA-posList:
                        Add word to PosList
            If word is in ANEW/MPQA-posList:
                        Add word to NegList
```

(Continued)

```
If len(PosList) > len(NegList):
    Add file to TotalPosList
If len(NegList) > len(PosList):
    Add file to TotalNegList
Else:
    Add file to TotalNeutList
```



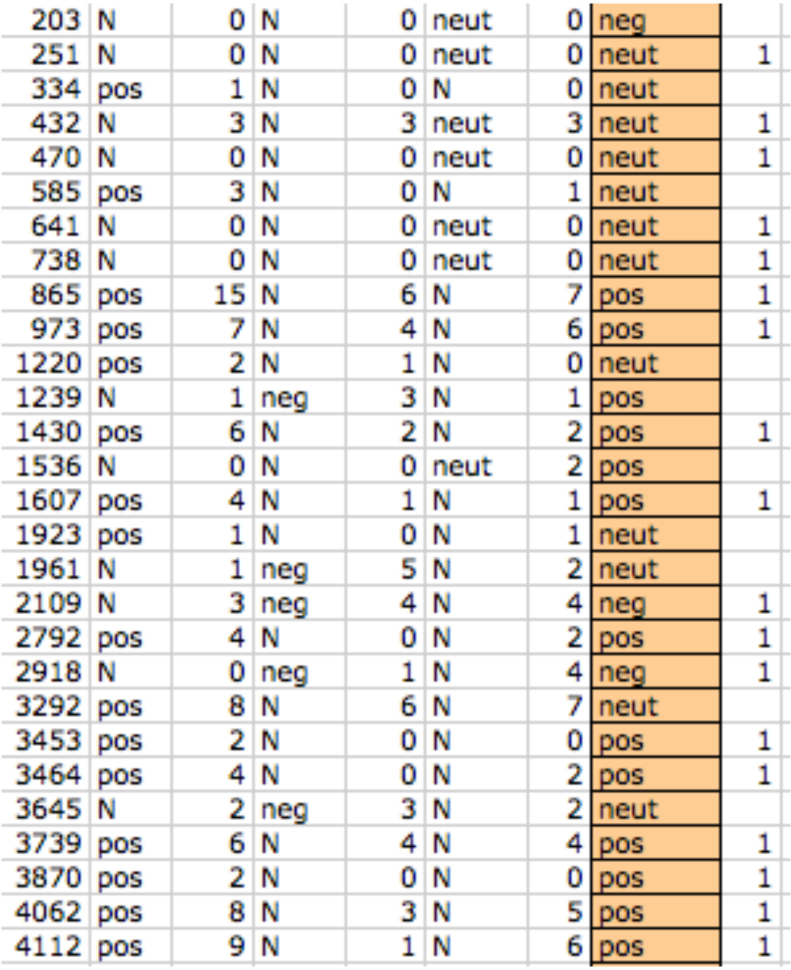
10023	N	0	N	0	neut	0
10024	N	0	N	0	neut	0
10025	N	1	neg	2	N	5
10026	pos	6	N	0	N	1
10027	N	0	N	0	neut	0
10028	N	0	N	0	neut	0
10031	pos	1	N	0	N	2
10035	N	3	neg	4	N	1
10036	pos	1	N	0	N	0
10037	pos	2	N	0	N	1
10038	pos	2	N	1	N	0
10039	pos	3	N	0	N	0
10040	pos	2	N	0	N	2

Evaluation of test set

- First manually assigned each evidence a positive, negative, or neutral tag
- After running through evidences with MPQA and ANEW, compared to gold standard as a whole and as pos / neg / neut

Simple evaluation results

- ANEW:
  - negative = 3/24 = 12.5%
  - neutral = 30/75 = 40%
  - positive = 94/104 = 90.3%
  - total: 62.6% correct
- MPQA
  - negative 10/24 = 41.7%
  - neutral 28/75 = 36.3%
  - positive 85/104 = 80.8%
  - overall = 60.6% correct



203	N	0	N	0	neut	0	neg	
251	N	0	N	0	neut	0	neut	1
334	pos	1	N	0	N	0	neut	
432	N	3	N	3	neut	3	neut	1
470	N	0	N	0	neut	0	neut	1
585	pos	3	N	0	N	1	neut	
641	N	0	N	0	neut	0	neut	1
738	N	0	N	0	neut	0	neut	1
865	pos	15	N	6	N	7	pos	1
973	pos	7	N	4	N	6	pos	1
1220	pos	2	N	1	N	0	neut	
1239	N	1	neg	3	N	1	pos	
1430	pos	6	N	2	N	2	pos	1
1536	N	0	N	0	neut	2	pos	
1607	pos	4	N	1	N	1	pos	1
1923	pos	1	N	0	N	1	neut	
1961	N	1	neg	5	N	2	neut	
2109	N	3	neg	4	N	4	neg	1
2792	pos	4	N	0	N	2	pos	1
2918	N	0	neg	1	N	4	neg	1
3292	pos	8	N	6	N	7	neut	
3453	pos	2	N	0	N	0	pos	1
3464	pos	4	N	0	N	2	pos	1
3645	N	2	neg	3	N	2	neut	
3739	pos	6	N	4	N	4	pos	1
3870	pos	2	N	0	N	0	pos	1
4062	pos	8	N	3	N	5	pos	1
4112	pos	9	N	1	N	6	pos	1

Sentiment for full set

ANEW:

- neutral: 4,676
- negative: 983
- positive: 8,160

Words:

- negative: 7,158
- positive: 28,087

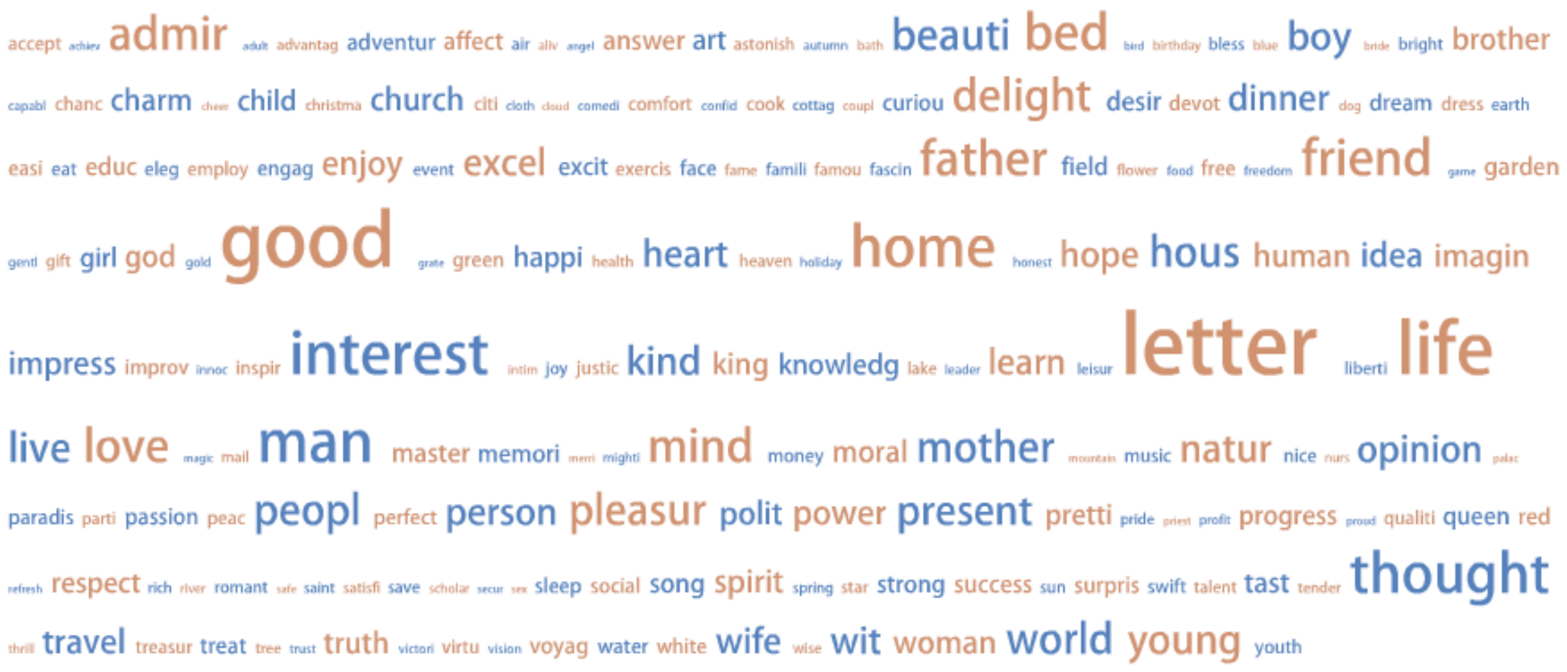
MPQA:

- neutral: 4,147
- negative: 2,655
- positive: 7,017

Words:

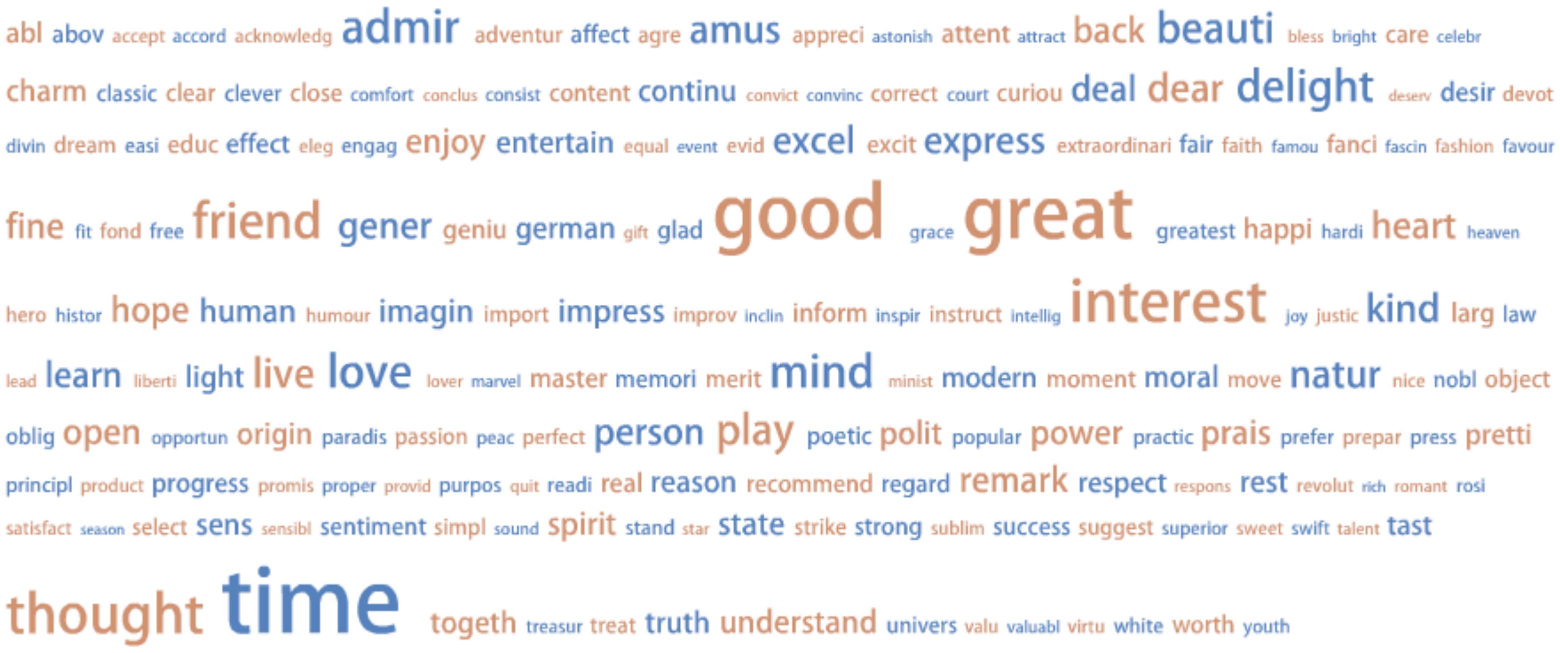
- negative: 26,715
- positive: 45,212

ANEW common positives

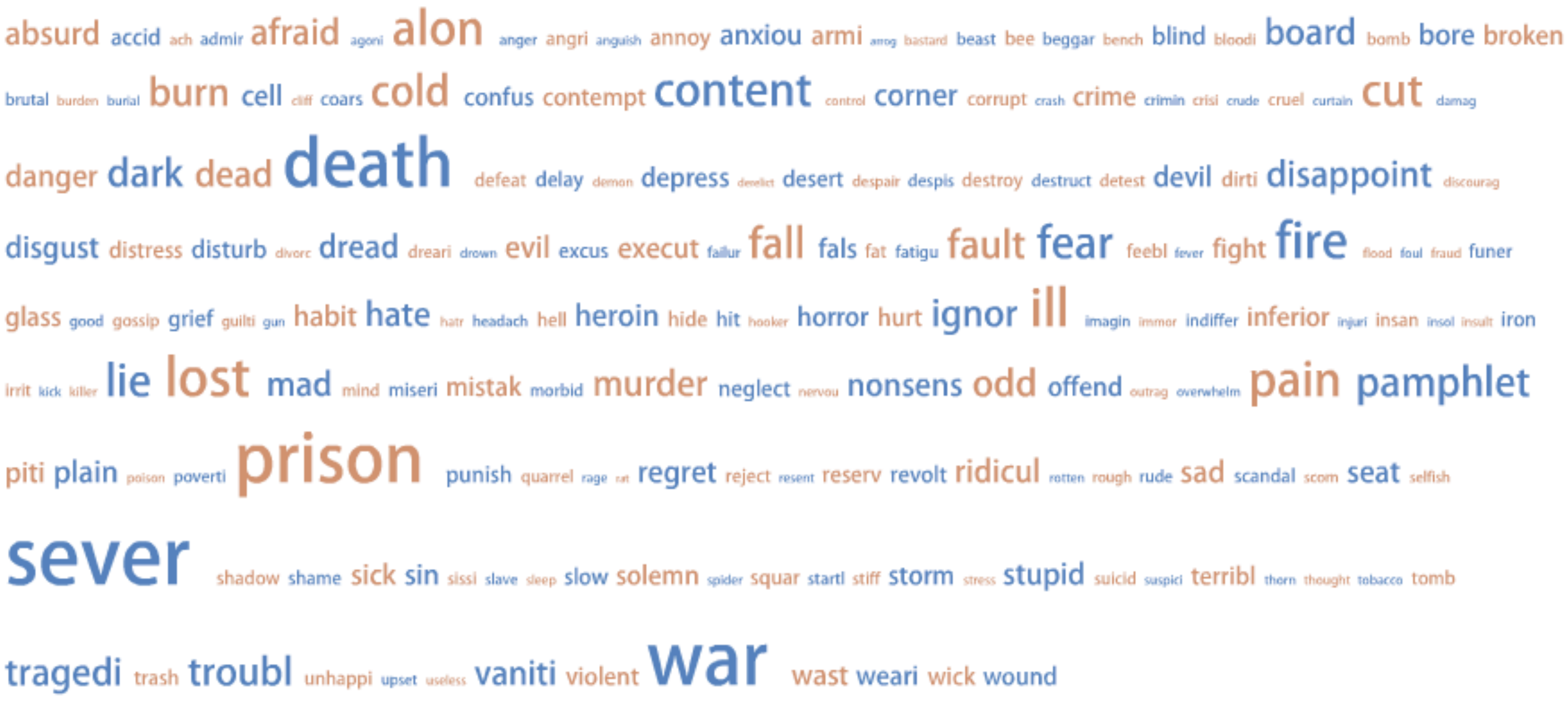


Many Eyes

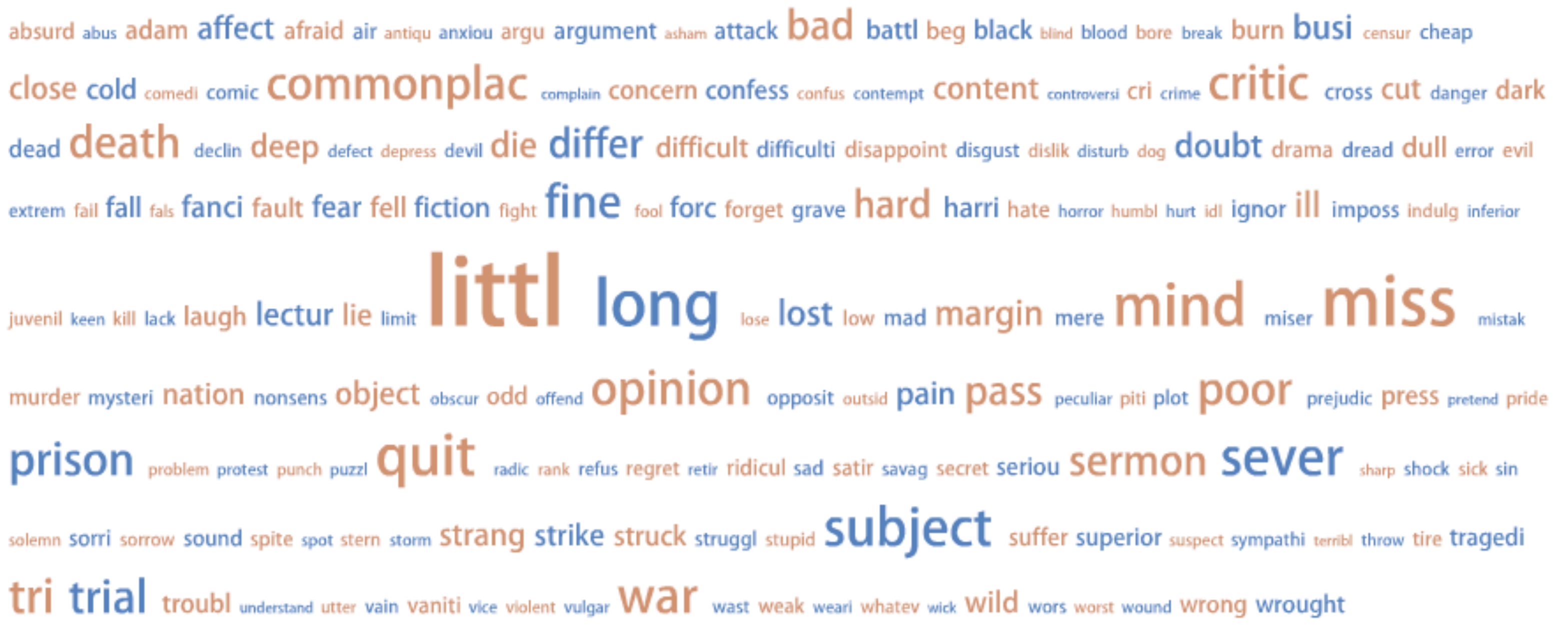
MPQA common positives



ANEW common negatives



MPQA common negatives



Next steps

- Refine lexicons (or choose/create new one)
  - What counts as positive sentiment? Frequent readings? Belief in its truth? Enjoyment?
  - What counts as negative sentiment? What if a good book makes you feel sad?
  - Include British spellings (e.g., disfavour)
- Refine system
  - Classifier evaluation
  - Better distinguish negative sentiment
  - Phrase-level analysis and relevance identification
    - Set focus to areas in text that are around the title of the work, if multiple works are mentioned
  - Consider intensity in addition to polarity
    - adverbial intensification
    - i found ----miss---- sara hutchinson read coleridg christabel to johnni wordsworth she wa ----tire---- i read the greater part of it he wa ----excess---- ++++interest++++ especi with the first part

Next next step

- Perform analysis on subsets of data
  - E.g.: what is the historical opinion of Shakespeare’s works?
    - For 292 Shakespeare records:
      - 164 positive (56.1%)
      - 41 negative (14.0%)
      - 87 neutral (29.8%)