Individual Differences in Sentence-Level Processing

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Syuzhet Testing

- *Syuzhet* software package for R (2014)
  - Detects positive and negative sentiment in natural language text
- Human-coded 125,316 sentences from 13 novels
- 12% Negative, 7% Positive, 32% Neutral
- 44% mix of Positive or Negative and Neutral
- 6% polar opposite values (Negative and Positive) → Ambiguous

Pilot Testing

- 22 subjects–scanned with a functional MRI
- Behavioral Task: sentences rated on emotional valence from 1 (most negative) - 5 (most positive)
- 8 runs of 45 sentences (360 total)
- Amazon Mechanical Turks coded sentences as Negative, Positive, Neutral, and Ambiguous
- Demographic, Personality, and Ideological surveys
- Complete data from 18 subjects

Behavioral Data Summary

Valence	Total Missed Sentences	% of missed sentences
Ambiguous	27	41.5%
Negative	19	29.2%
Neutral	12	18.5%
Positive	7	10.8%

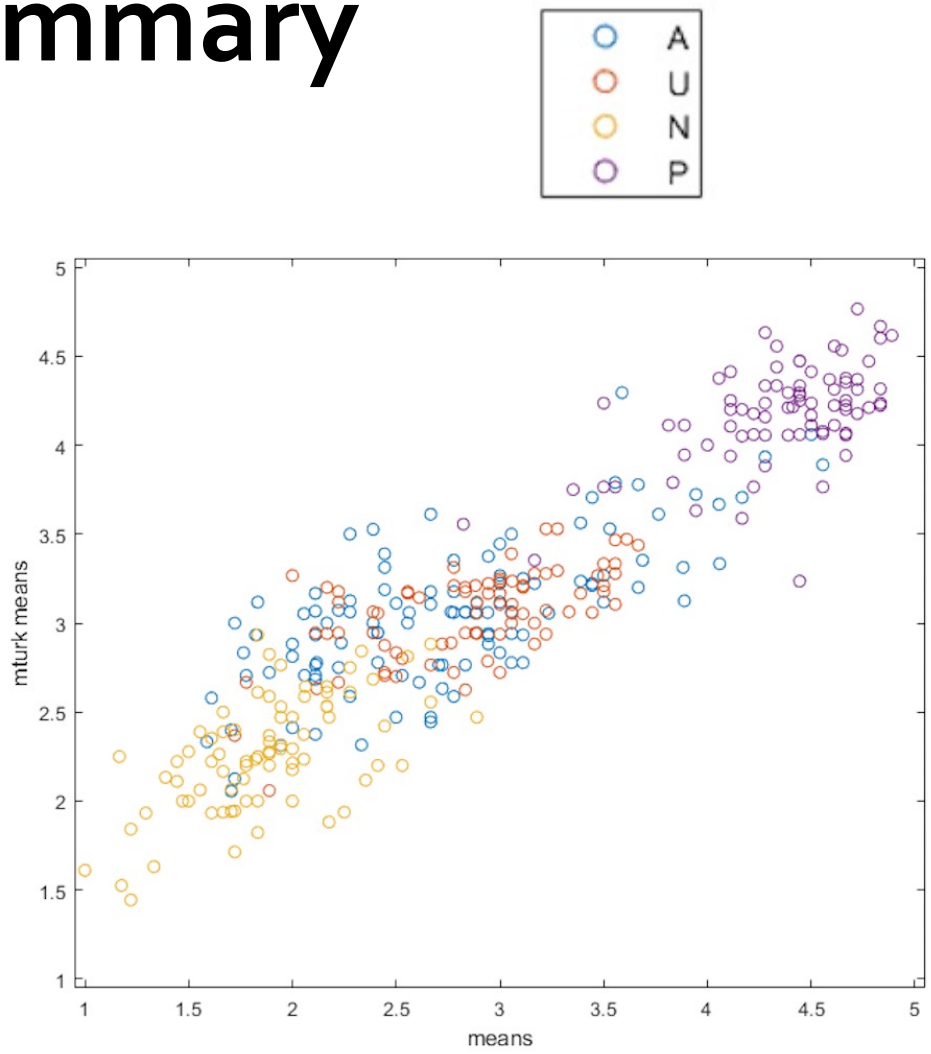
- 65 out of 6580 sentences missed by 1-2 subjects
- 5/65 sentences missed by 2 subjects

Task Time Summary

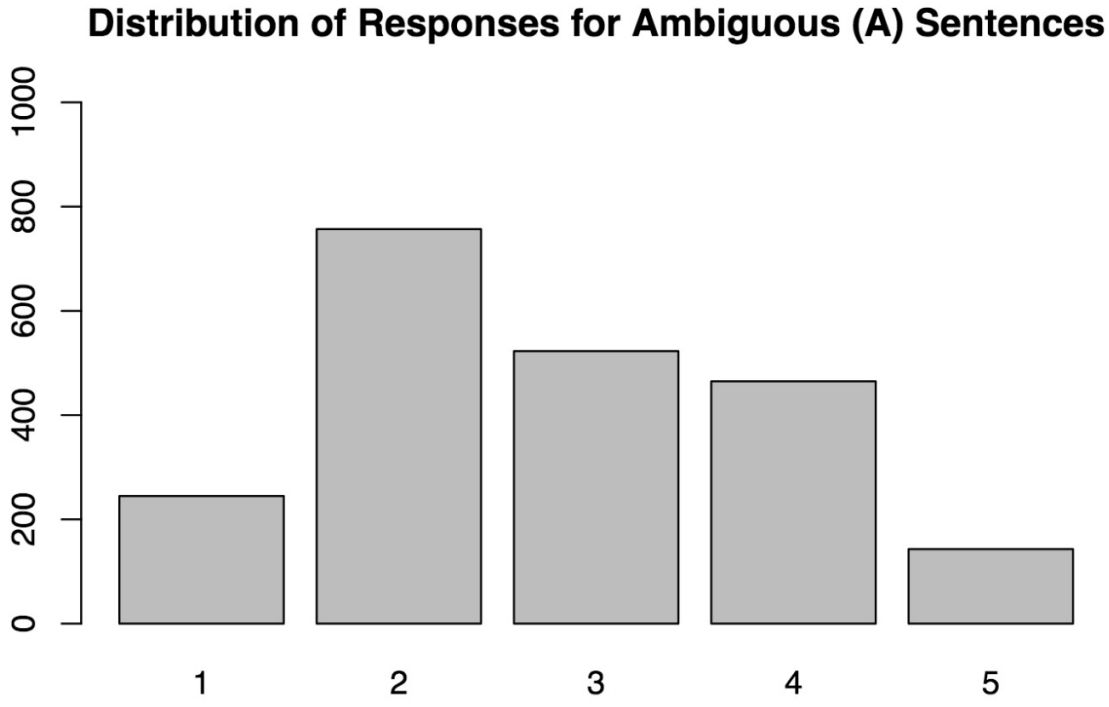
Valence	Mean Time	SD Time	Median Time
Ambiguous	3.954216	1.065778	3.842147
Neutral	3.876213	1.018764	3.752194
Negative	3.645326	1.080517	3.470469
Positive	3.351421	1.089914	3.213497

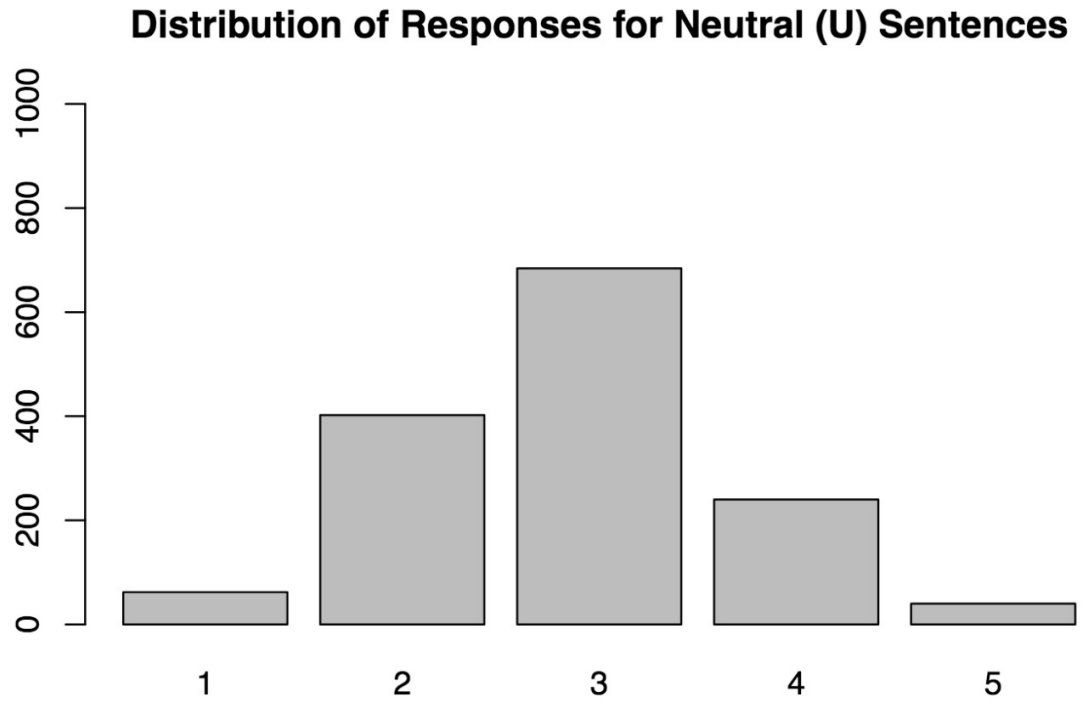
Behavioral Data Summary

Valence	Mean Rating	SD Rating	Median Rating
Positive	4.352407	0.7590397	4
Negative	1.868402	0.8172400	2
Neutral	2.855742	0.8455676	3
Ambiguous	2.767464	1.1167037	3



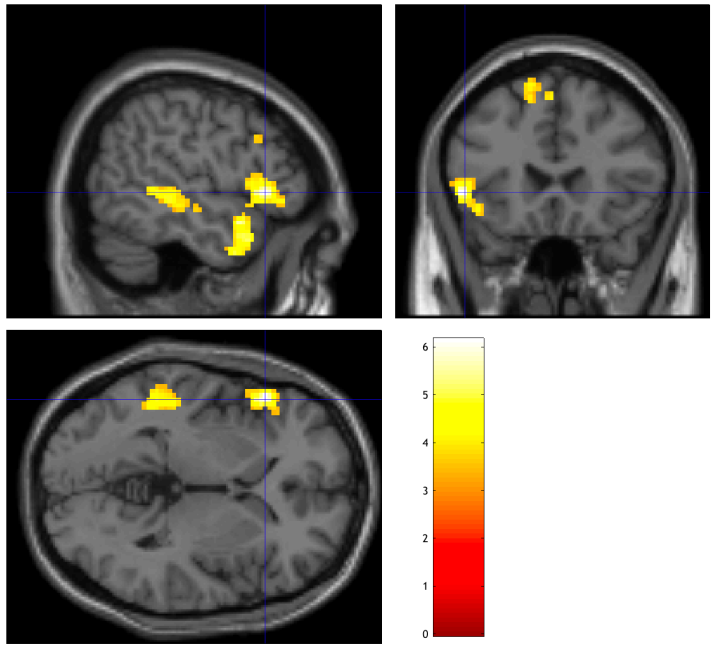
Ambiguous vs. Neutral Sentences



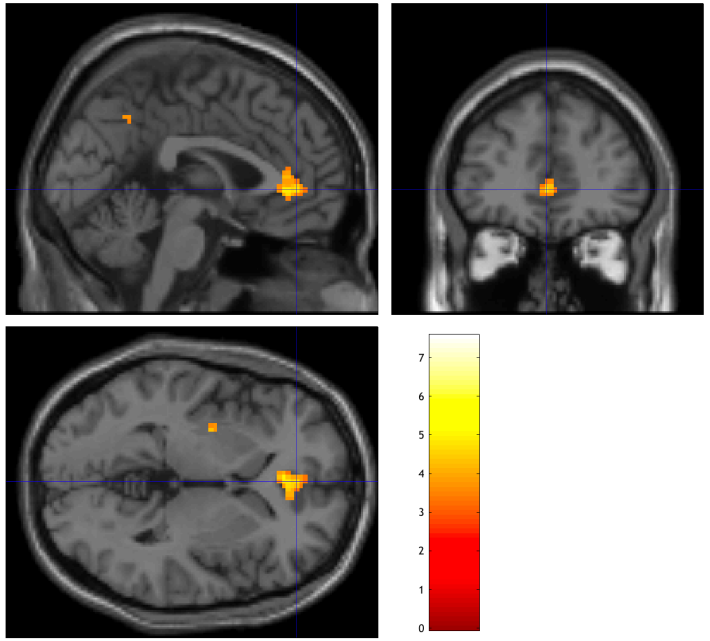


fMRI Results

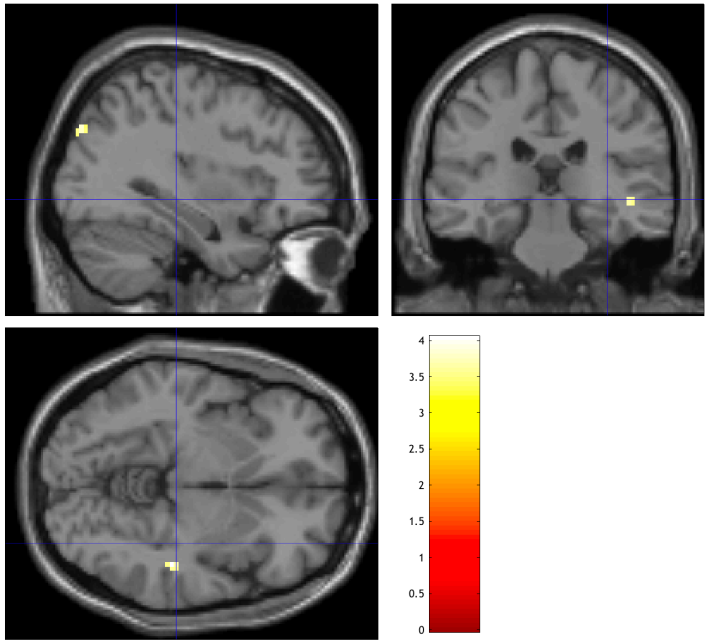
Ambiguous vs. Neutral



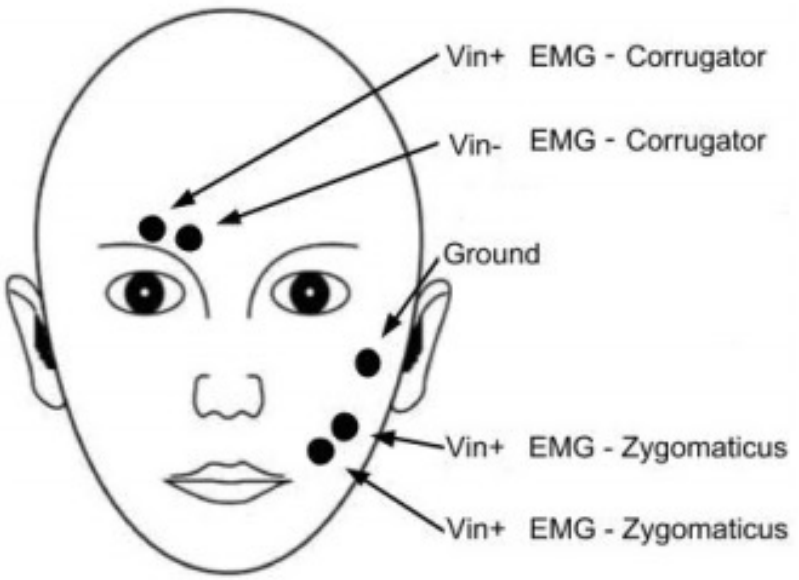
Positive vs. Negative



Negative vs. Positive



Facial Electromyography (fEMG)



- Measures positive and negative response to stimuli
- Electrodes attached to corrugator supercilii muscle
- Relaxed and inexpensive
- Subject could read full narrative
- More concretely verify *Syuzhet*

Thank you!