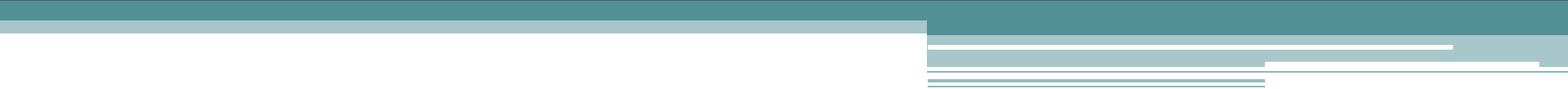# Sounding for Meaning: Using Predictive Modeling and Visual Analysis to Measure Prosody in texts by Gertrude Stein

Tanya Clement, Loretta Auvil, Boris Capitanu, Megan Monroe, and David Tcheng

- Why sound? Why Gertrude Stein? What do Stein scholars do now?
- The tools and methodologies: Meandre and ProseVis
- Readings of poetry and prose by Stein

". . . you see I feel with my eyes and it does not make any difference to me what language I hear, I don't hear a language, I hear tones of voices and rhythms, but with my eyes I see words and sentences . . ."

Stein, Gertrude. The Autobiography of Alice B. Toklas. Vintage Books ed. New York: Vintage Books, 1990: 70. Print.

Orality vs. Aurality

"Orality can be understood as a stylistic or even ideological marker or a reading style . . . By aurality, I mean to emphasize *the sounding of the writing,* and to make a sharp contrast with *orality* and its emphasis on breath, voice, and speech . . .*Aurality precedes orality*, just as language precedes speech."

Bernstein, C. 1998. *Close Listening: Poetry and the Performed Word.* Oxford University Press: 13.
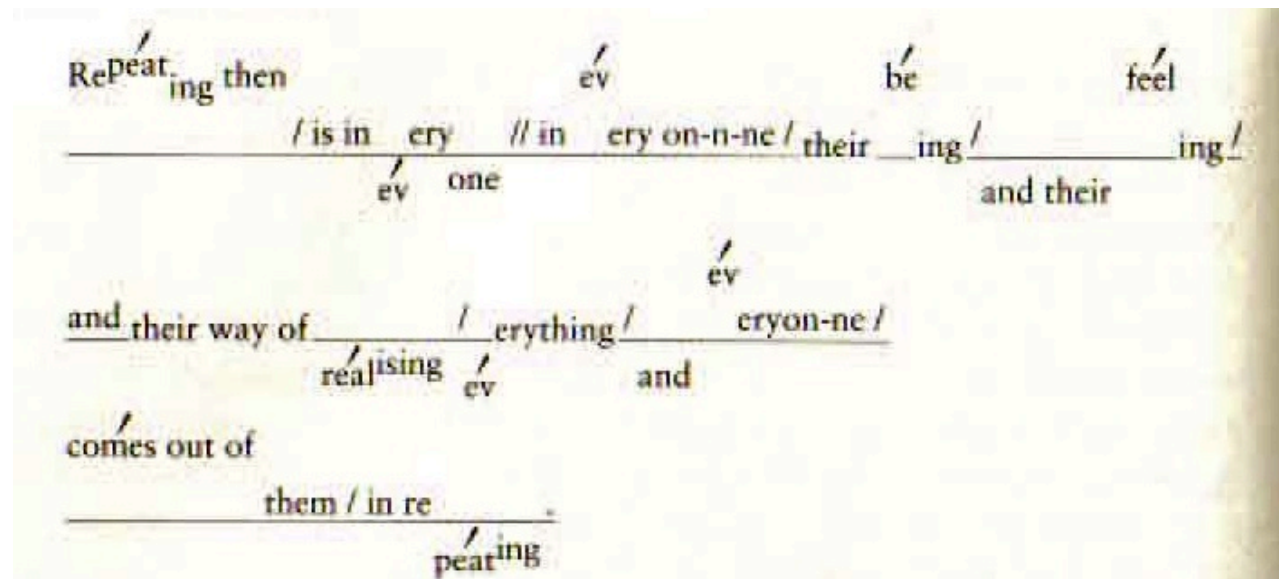
Meyer, Steven. *Irresistible Dictation: Gertrude Stein and the Correlations of Writing and Science*. Stanford, Calif: Stanford University Press, 2001. Print.
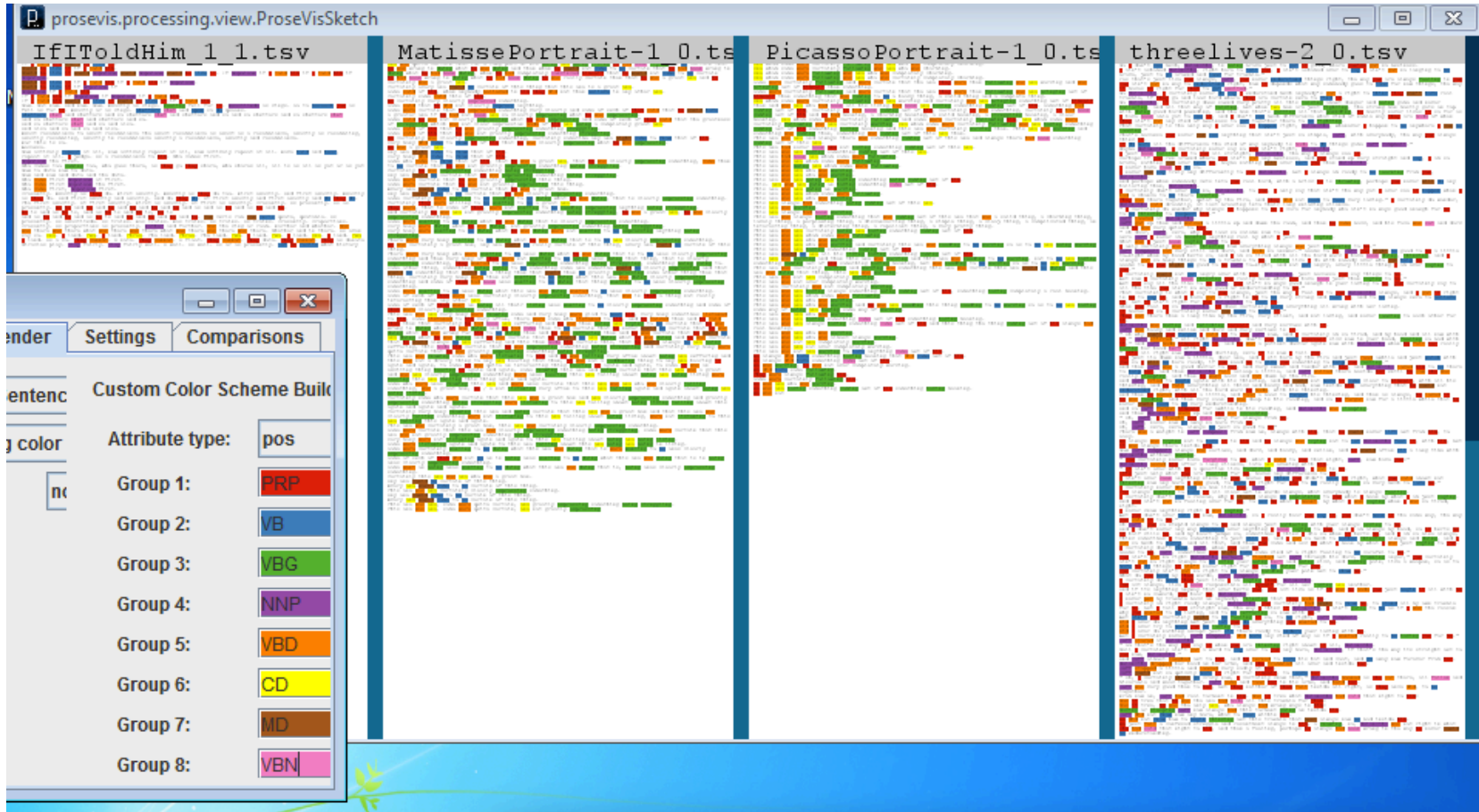
Sentences from "Miss Furr and Miss Skeene" visualized by composer Linda Dusman
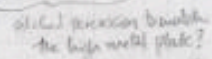
Previous DH Work on Phonetic Symbolic Research

- Marc Plamondon created AnalysePoems to analyze the Representative Poetry Online (RPO) website (http://rpo.library.utoronto.ca)(Plamondon, 2006, 129)
- Pattern-Finder : a tool to examine how the "phonetic/phonological structure of a poem may contribute to its meaning and emotional power" (Smolinsky and Sokoloff , 2006, 339)
- Marc Alexander and Christian Kay's "Digital Approach to Sound Symbolism" *in The Historical Thesaurus of English* (here, now)

The surrogate of sound

We are defining sound as *the pre-speech promise of sound* as it is signified within the structure and syntax of text. This structure and syntax serves as the surrogate of sound's *potential* to be heard and understood.

ProseVis

http://tclement.ischool.utexas.edu/ProseVis

The Software Environment for the Advancement of Scholarly Research
http://seasr.org/

The Andrew G. Mellon Foundation
http://www.mellon.org/

Developing ProseVis: the back(end) story

1. OpenMary (Modular Architecture for Research on speech sYnthesis) (http://mary.dfki.de/)
2. SEASR services to perform clustering and predictive modeling on this pre-processed text (http://seasr.org/)
3. ProseVis (http://tclement.ischool.utexas.edu/ProseVis)

Modular Architecture for Research on speech sYnthesis (MARY)

- Text-to-speech system, developed as a collaborative project of Das Deutsche Forschungszentrum für Künstliche Intelligenz (German Research Center for Artificial Intelligence) Language Technology Lab and the Institute of Phonetics at Saarland University
- Uses CMU [Carnegie Mellon University] Pronouncing Dictionary, North American English and General American
- Produces XML that includes these fields for each word: part_of_speech, accent, phoneme, tone, break_index (phrase, sentence, paragraph) .

MARY's Best Guess

- Part of speech
- Position in the sentence
- Sentence type
- Various aspects of syntactic structure (e.g., verb after a verb or multiple nouns)
- Information structure (e.g., given and inferable information is frequently de-accented)

Becker S., Shröder M., and Barry, W. 2006. "Rule-based Prosody Prediction for German Text-to-Speech Synthesis"

Mary's Best Guess

```
<s>
    <prosody pitch="+5%" range="+20%">
        <phrase>
            <t g2p_method="lexicon" ph="@" pos="DT">  A</t>
            <t accent="L+H*" g2p_method="lexicon" ph="' k AI n d" pos="NN"> kind</t>
            <t g2p_method="lexicon" ph="' I n" pos="IN">  in</t>
            <t accent="L+H*" g2p_method="lexicon" ph="' g l { s" pos="NN">  glass</t>
            <t g2p_method="lexicon" ph="' { n d" pos="CC">  and</t>
            <t g2p_method="lexicon" ph="@" pos="DT">  a</t>
            <t accent="L+H*" g2p_method="lexicon" ph="' k V - z @ n" pos="NN"> cousin</t>
            <t pos=",">  ,</t>
            <boundary breakindex="4" tone="H-L%"/>
        </phrase>
    </prosody>
    <prosody pitch="+2%" range="+10%">
        <phrase>
            <t g2p_method="lexicon" ph="@" pos="DT">   a</t>
            <t accent="L+H*" g2p_method="lexicon" ph="s - ' p E k - t @ - k @ l" pos="NN">   spectacle</t>
            <t g2p_method="lexicon" ph="' { n d" pos="CC">  and</t>
            <t accent="L+H*" g2p_method="lexicon" ph="' n V - T I N" pos="NN">  nothing</t>
            <t accent="L+H*" g2p_method="lexicon" ph="s - ' t r EI n dZ" pos="JJ">    strange</t>
            [...]
        </phrase>
    </prosody>
</s>
```
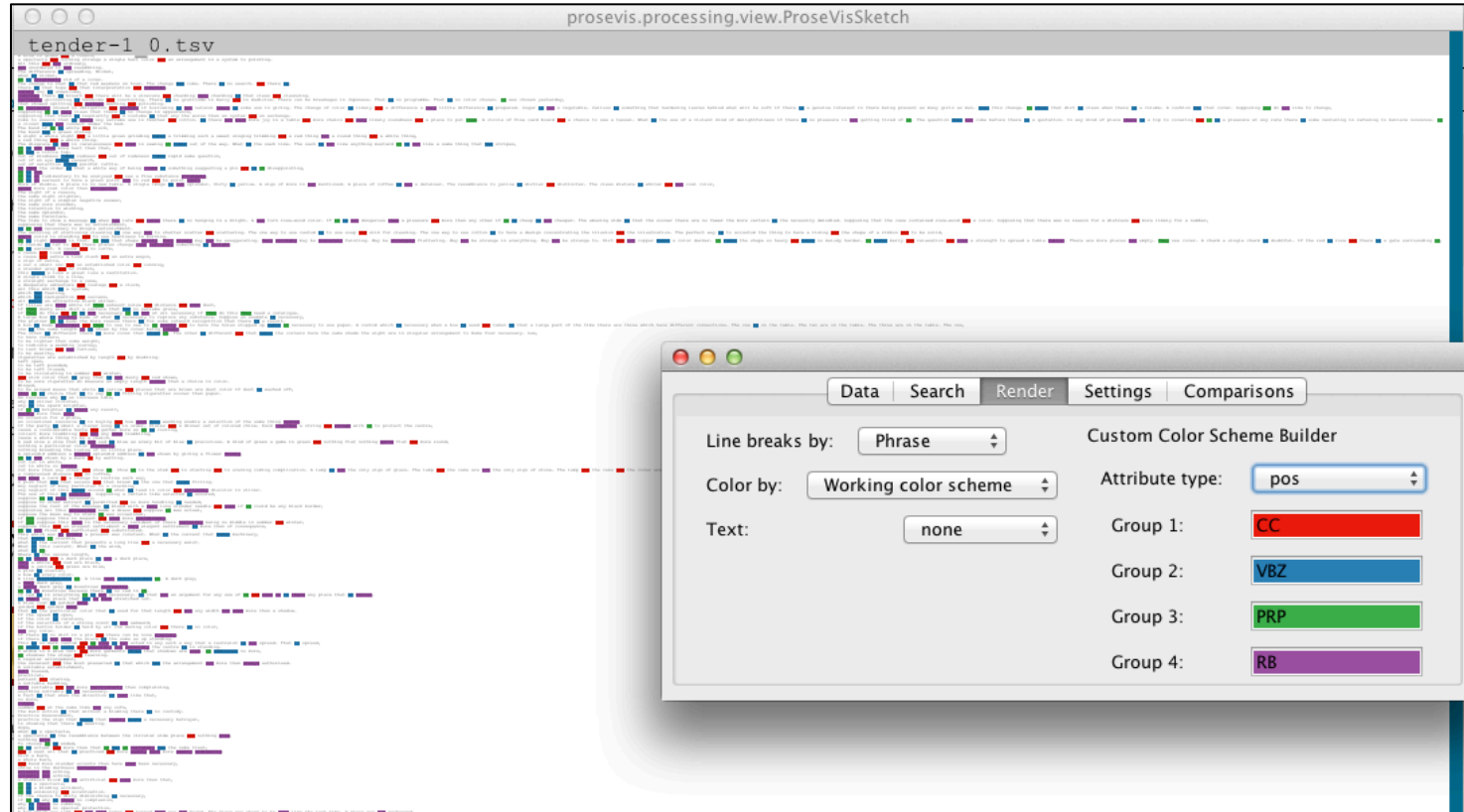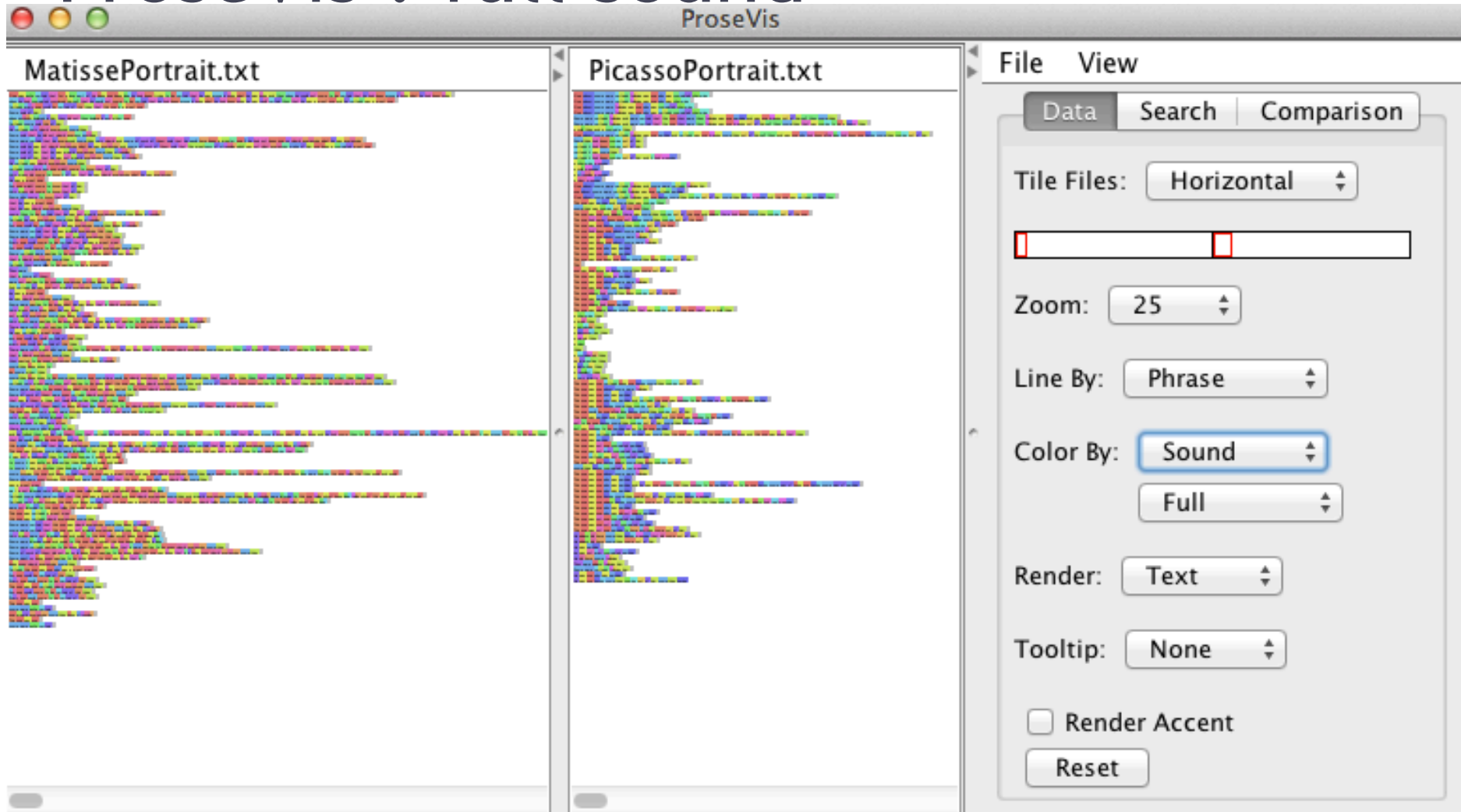
Open Mary's Text-to-speech system (http://mary.dfki.de/)

Seasr's Meandre Data Flow Environment

B	C	D	E	F	G	H	I	J	
ei_section_i	tei_paragrap	sentence_id	phrase_id	word	part_of_spe	accent	phoneme	stress	tone
1	1	1	1	A	DT	NULL	@	0	H-L%
1	1	1	1	kind	NN	L+H*	k AI n d	1	H-L%
1	1	1	1	in	IN	NULL	I n	1	H-L%
1	1	1	1	glass	NN	L+H*	g l { s	1	H-L%
1	1	1	1	and	CC	NULL	{ n d	1	H-L%
1	1	1	1	a	DT	NULL	@	0	H-L%
1	1	1	1	cousin	NN	L+H*	k V	1	H-L%
1	1	1	1	cousin	NN	L+H*	z @ n	0	H-L%
1	1	1	1	,	,	NULL	NULL	NULL	H-L%
1	1	1	2	a	DT	NULL	@	0	L-L%
1	1	1	2	spectacle	NN	L+H*	s	0	L-L%
1	1	1	2	spectacle	NN	L+H*	p E k	1	L-L%
1	1	1	2	spectacle	NN	L+H*	t @	0	L-L%
1	1	1	2	spectacle	NN	L+H*	k @ l	0	L-L%
1	1	1	2	and	CC	NULL	{ n d	1	L-L%
1	1	1	2	nothing	NN	L+H*	n V	1	L-L%
1	1	1	2	nothing	NN	L+H*	T I N	0	L-L%
1	1	1	2	strange	JJ	L+H*	s	0	L-L%
1	1	1	2	strange	JJ	L+H*	t r EI n dZ	1	L-L%

A sample of the tabular output of *Tender Buttons* by Gertrude Stein created within Meandre

ProseVis : Parts of Speech

http://tclement.ischool.utexas.edu/ProseVis

ProseVis : Parts of Speech

http://tclement.ischool.utexas.edu/ProseVis

ProseVis : Parts of Speech

http://tclement.ischool.utexas.edu/ProseVis
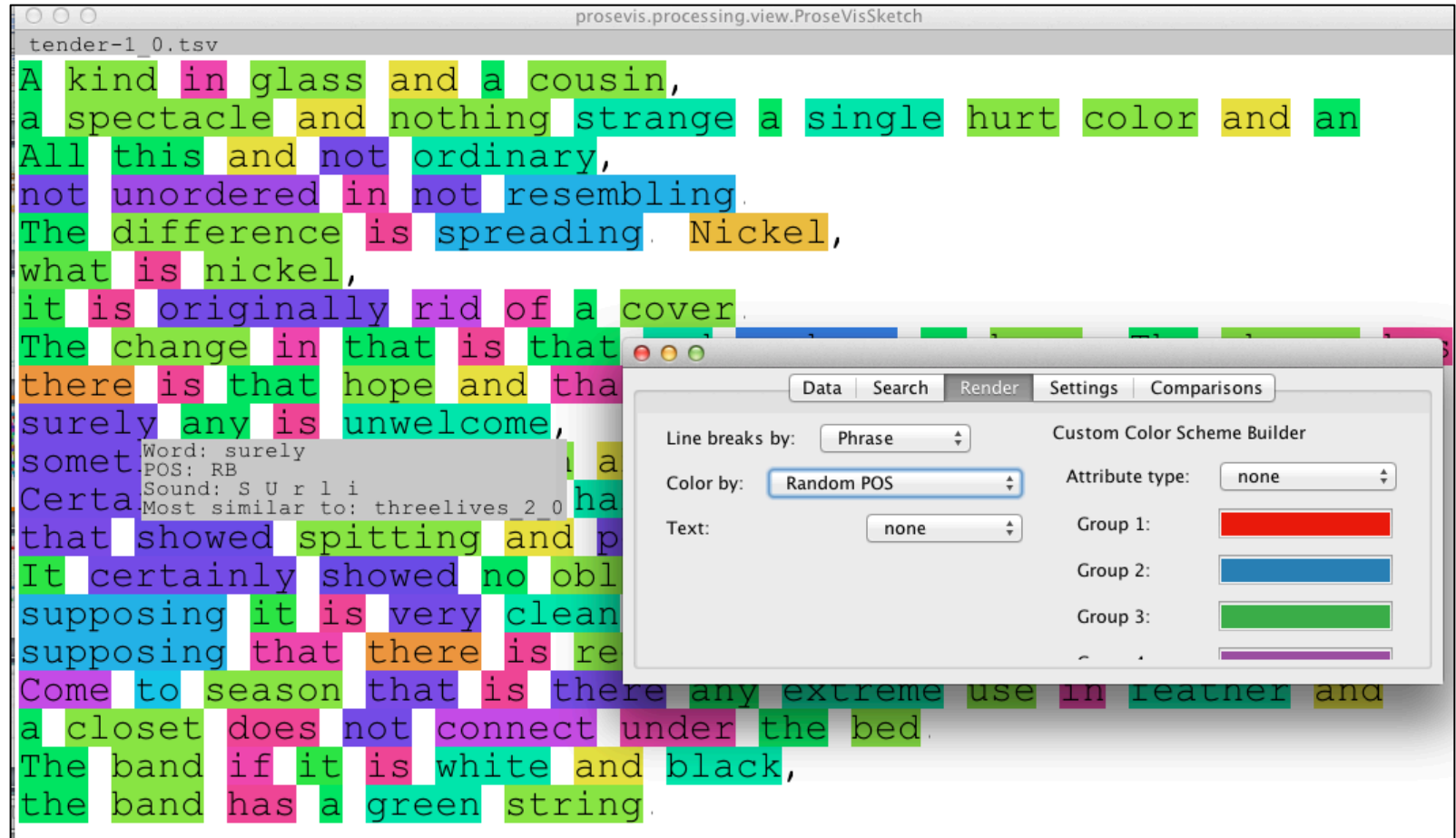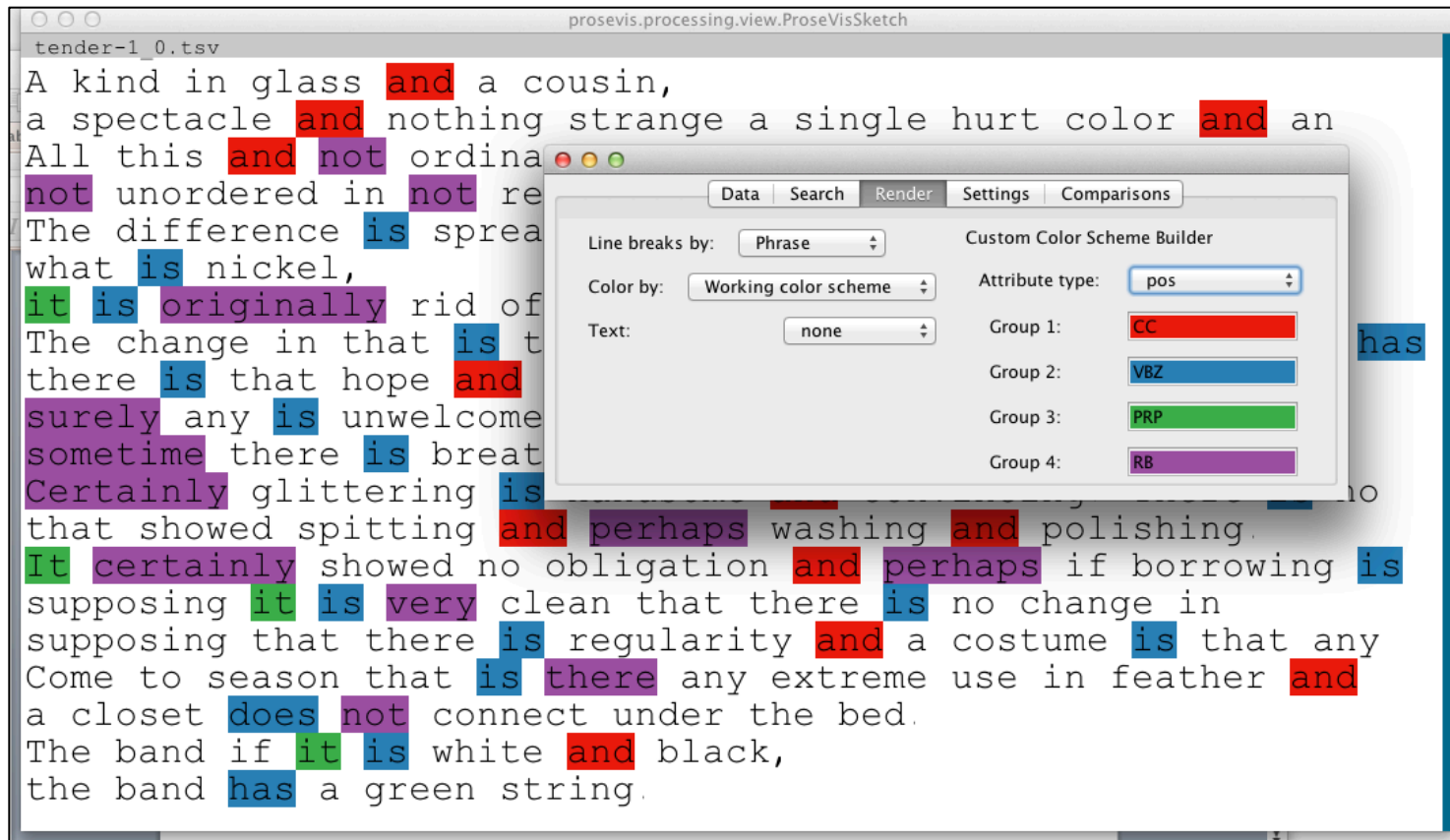
ProseVis : full sound

"Matisse"   "Picasso"

ProseVis : beginning sound

"Matisse"   "Picasso"

ProseVis : vowel sound

"Matisse"   "Picasso"

ProseVis : end sound

"Matisse"   "Picasso"

ProseVis: So?

"Matisse"
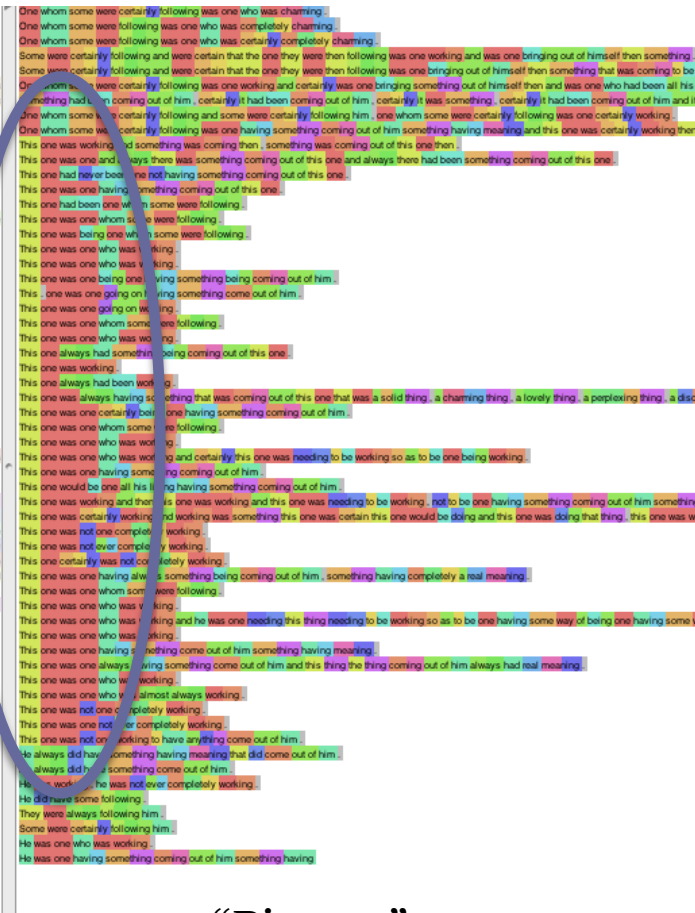
"Picasso"
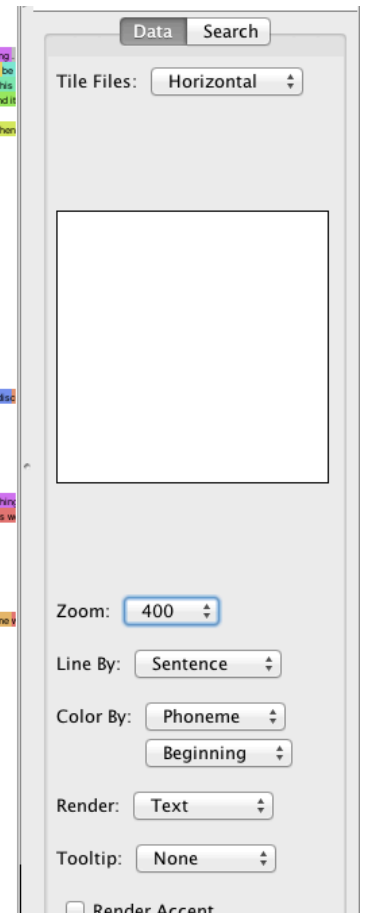
From Matisse: "Some certainly were wanting to be needing to be doing what he was doing, that is clearly expressing something . . ."
From Picasso: "This one was one . . ."

- *Matisse Portrait*: Any one could come to be certain of this thing. Every one would come to be certain of this thing. This *one was one*, some were quite certain, one greatly expressing something being struggling. This *one was one*, some were quite certain, one not greatly expressing something being struggling.
- *Picasso*: They were always following him. Some *were certainly following him*. He was one who was working. He was one having something coming out of him something having meaning. He *was not ever completely working*.

So? Parts of Speech
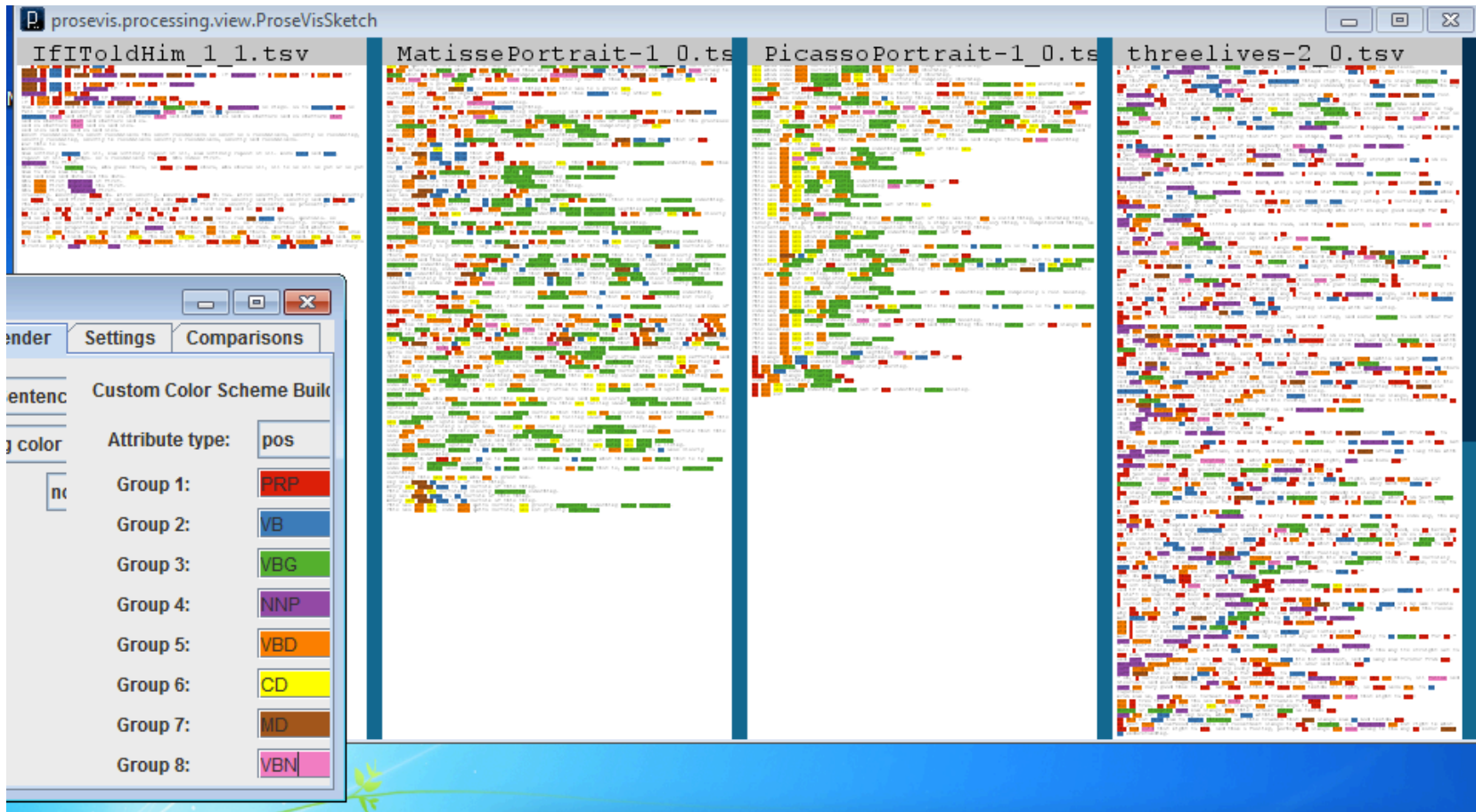
"If I Told Him," "Matisse," "Picasso," and *Three Lives*, POS by sentence

Predictive Modeling: So?

Toklas, of course, collected recipes, and she later published two cookbooks, *The Alice B. Toklas Cookbook* (1954) and *Aromas and Flavors of Past and Present* (1958). Through Toklas then, at least, Stein was familiar with the genre of the cookbook or recipe collection and would appropriately "adopt" and parody that genre in writing of their growing intimacy. Significantly, Toklas's name as "alas" appears repeatedly in "Cooking" as well as elsewhere in *Tender Buttons* (Hadas 69).

Murphy, Margueritte S. "Familiar Strangers': The Household Words of Gertrude Stein's 'Tender Buttons." *Contemporary Literature* 32.3 (1991): 383-402. 391.

So? Predictive modeling

- *Three Lives*
- *Picasso Portrait*
- *Odyssey*
- *Iliad*
- *The Making Of Americans*
- *Tender Buttons*
- *Matisse Portrait*
- *New England Cook Book*
- *Ulysses*

Based on:
part of speech,
accent, stress,
tone, and
break index

Process of data transformation through modeling.

"Confusion Matrix"

"Alas"

Tender Buttons

Tender Buttons   *New England Cook Book*

Tender Buttons

ROASTBEEF ;
MUTTON ;
BREAKFAST ;
SUGAR ;
CRANBERRIES ;
MILK ;
EGGS ;
APPLE ;
TAILS ;
LUNCH ;
CUPS ;
RHUBARB ;
SINGLE ;
FISH ;
CAKE ;
CUSTARD ;
POTATOES ;
ASPARAGUS ;
BUTTER ;
END OF SUMMER ;
SAUSAGES ;
CELERY ;
VEAL ;
VEGETABLE ;
COOKING ;
CHICKEN ;
PASTRY ;
CREAM ;
CUCUMBER ;
DINNER ;
DINING ;
EATING ;
SALAD ;
SAUCE ;
SALMON ;
ORANGE ;
COCOA ;
AND CLEAR SOUP AND ORANGES AND OATMEAL ;
SALAD DRESSING AND AN ARTICHOKE ;
_a CENTRE IN _a TABLE .
In the inside there is sleeping ,
in the outside there is reddening .

Data | Search | Comparison

☑ Three Lives
☐ Picasso Portrait
☐ Odyssey
☐ Illiad
☑ The Making of Americans
☐ Tender Buttons
☑ Matisse Portrait
☑ New England Cook Book

Update

Tender Buttons

this means clearly that the chance to exercise is a social success .
So then the sound is not obtrusive .
Suppose it is obtrusive suppose it is .
What is certainly the desertion is not a reduced description ,
a description is not a birthday .
Lovely snipe and tender turn ,
excellent vapor and slender butter ,
all the splinter and the trunk ,
all the poisonous darkening drunk ,
all the joy in weak success ,
all the joyful tenderness ,
all the section and the tea ,
all the stouter symmetry .
Around the size that is small ,
inside the stern that is the middle ,
besides the remains that are praying ,
inside the between that is turning ,
all the region is measuring and melting is exaggerating .
Rectangular ribbon does not mean that there is no eruption it means that if there is no place to
Kindness is not earnest ,
it is not assiduous it is not revered .
Room to comb chickens and feathers and ripe purple ,
room to curve single plates and large sets and second silver ,
room to send everything away ,
room to save heat and distemper ,
room to search a light that is simpler ,
all room has no shadow .
There is no use there is no use at all in smell ,
in taste ,
in teeth ,
in toast ,
in anything ,
there is no use at all and the respect is mutual .
Why should that which is uneven ,
that which is resumed ,
that which is tolerable why should all this resemble a smell ,
a thing is there ,
it whistles ,
it is not narrower ,
why is there no obligation to stay away and yet courage ,
courage is everywhere and the best remains to stay .

Data | Search | Comparison

☑ Three Lives
☐ Picasso Portrait
☐ Odyssey
☐ Illiad
☑ The Making of Americans
☐ Tender Buttons
☑ Matisse Portrait
☑ New England Cook Book

Update
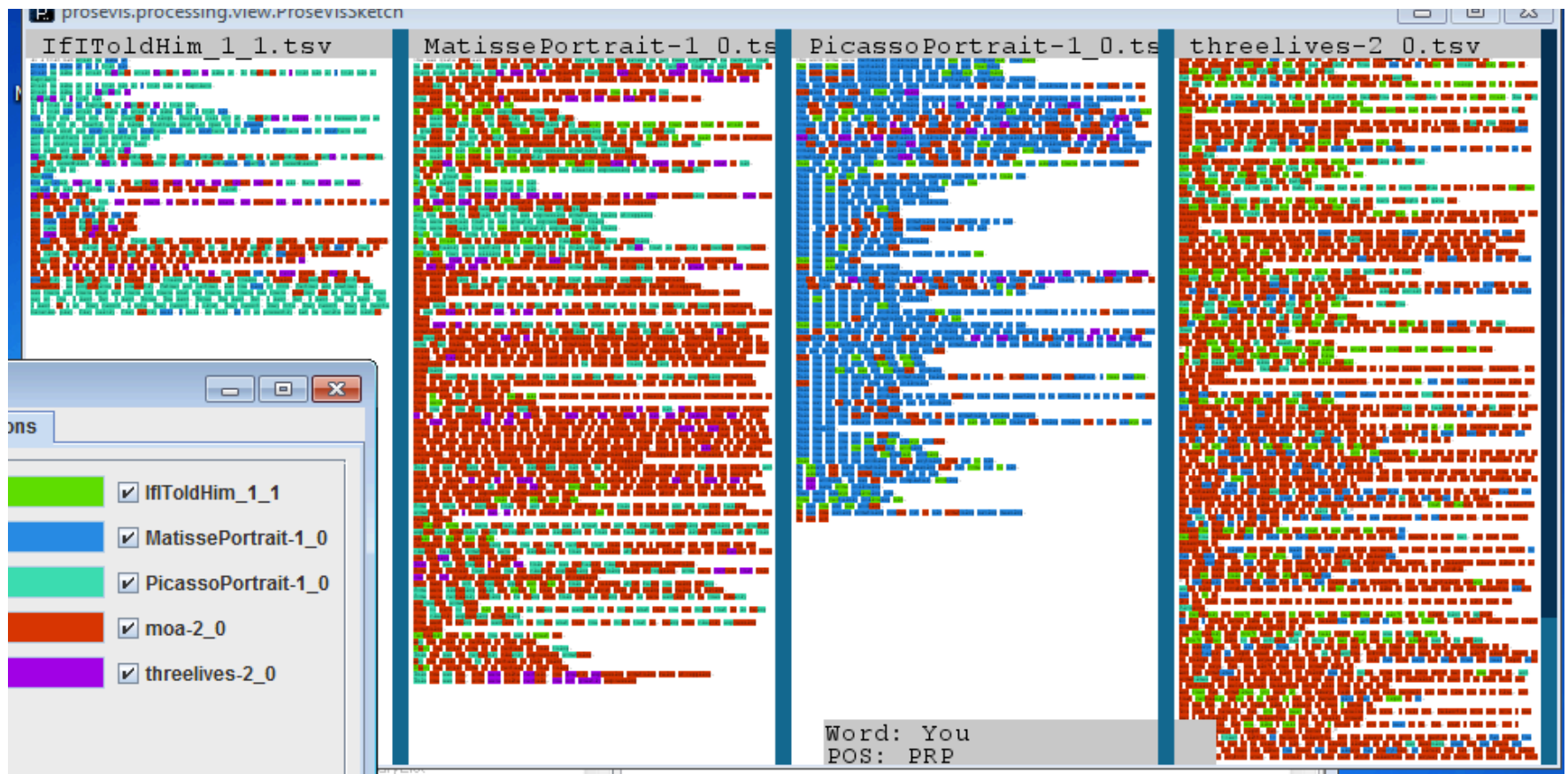
"If I Told Him," "Matisse," "Picasso," and *Three Lives*, Comparison Data by sentence
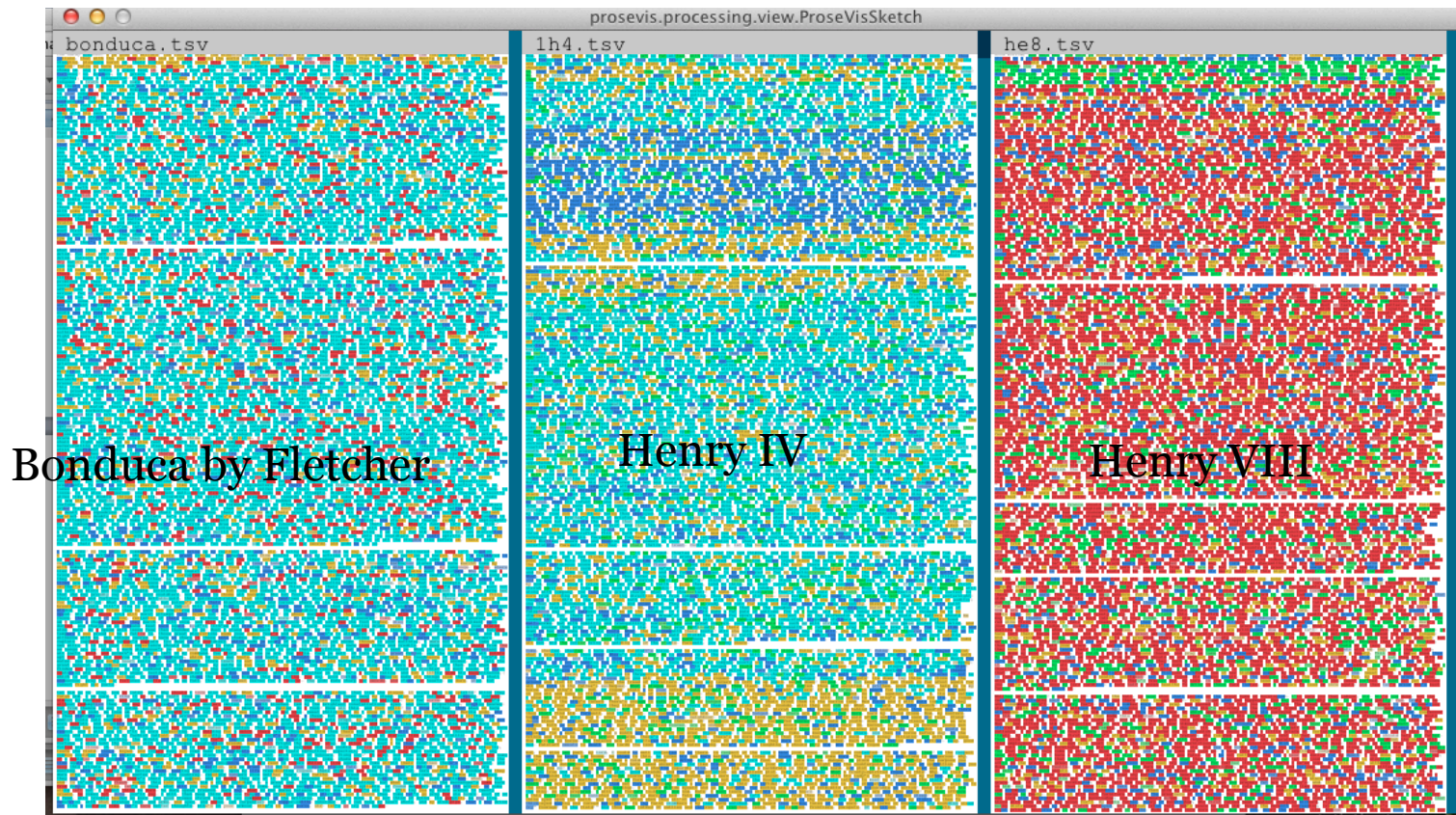
"Bonduca" by Fletcher; Henry IV, Part One, Henry VIII compared w/HVI, p1-3
(red=HIV, yellow=HVIp2, lblue=HVIII, dblue=HVIp1, green = bonduca)

Three Lives: Stories of The Good Anna, Melanctha and The Gentle Lena (1903) Compared to Oral Histories from Documenting the American South

First-Person Narratives, Documenting the American South

- Journal of Margaret Ann Morris Grimball, 1810-1881
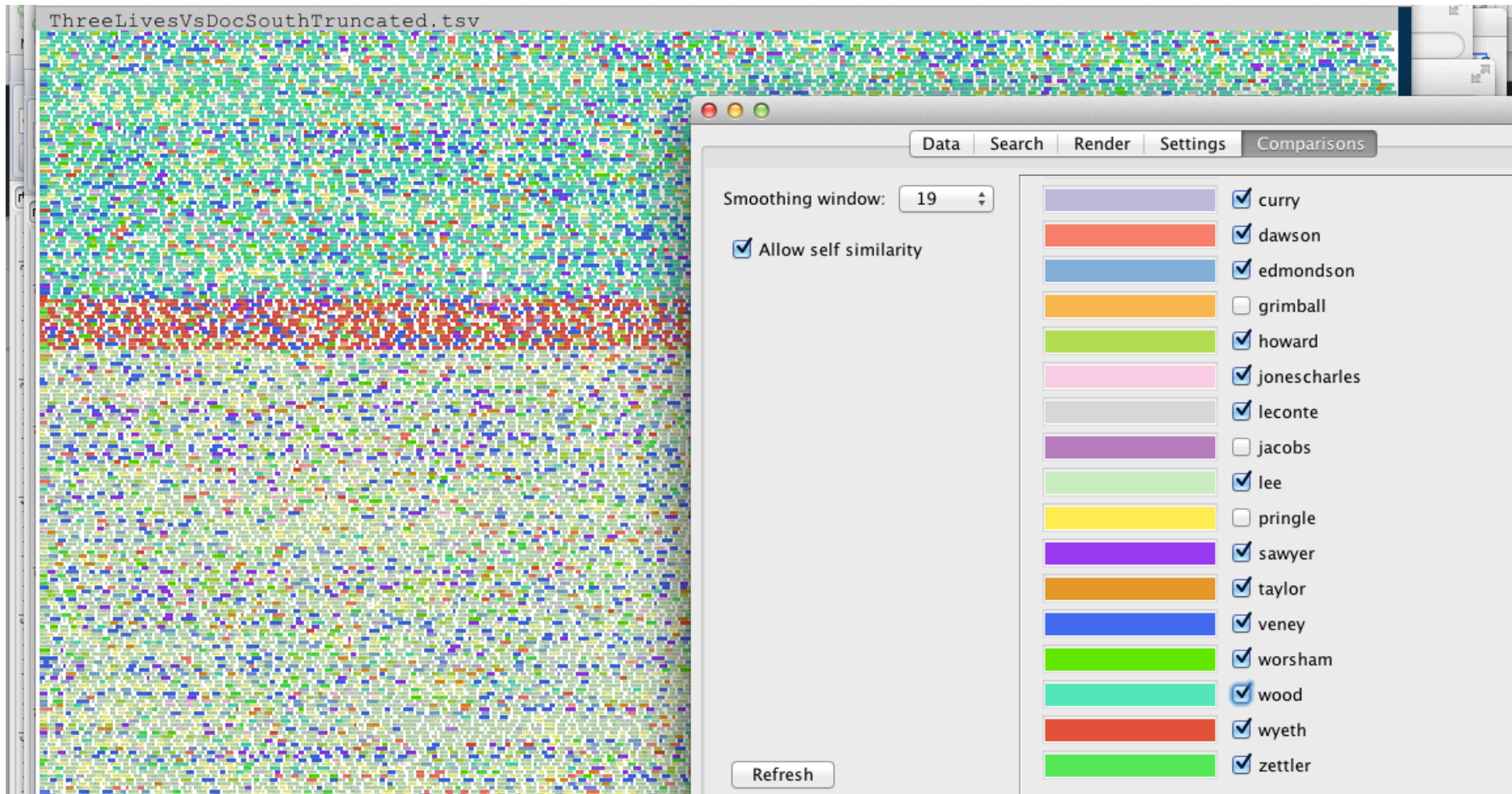- Pringle, Elizabeth Waties Allston, 1845-1921 *A Woman Rice Planter*
- Jacobs, Harriet A. (Harriet Ann), 1813-1897
- *Incidents in the Life of a Slave Girl. Written by Herself*: Electronic Edition. Wood, Henry, Mrs., 1814-1887
- *East Lynne, or, The Earl's Daughter*. Laura Elizabeth Lee Battle Forget Me Nots of the Civil War
- Wyeth, John A. (John Allan), 1845-1922 *With Sabre and Scalpel; the Autobiography of a Soldier and Surgeon*

Conclusions

"I began to wonder at about this time just what one saw when one looked at anything really looked at anything. Did one see sound, and what was the relation between color and sound, did it make itself by description by a word that meant it or did it make itself by a word in itself."

Stein, G. "Portraits and Repetition." *Lectures in America.* London: Virago (1988): 165-206: 191.

Thank you!

To the Andrew Mellon Foundation.

With thanks to Christopher Wiley.

Questions?

tclement@ischool.utexas.edu

http://tclement.ischool.utexas.edu/ProseVis