

Introduction

Word embeddings have been effective in understanding stereotypes and cultural trends, but they haven't been used extensively on corpora prior to the 18th century^{1,2}. **Our research uses word embeddings to analyze words related to consumerism within the Early Modern period when the market economy began to dramatically expand in England.**

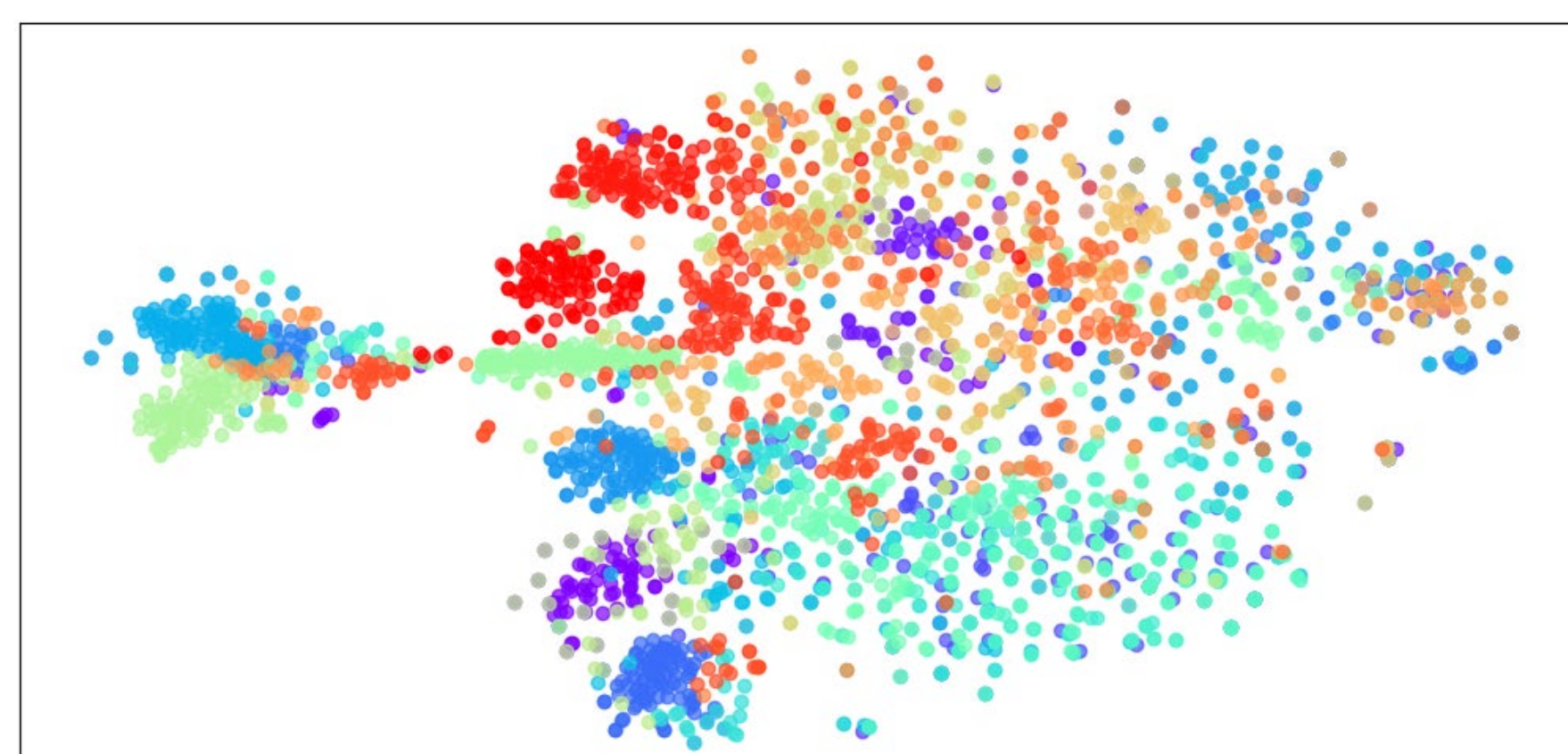
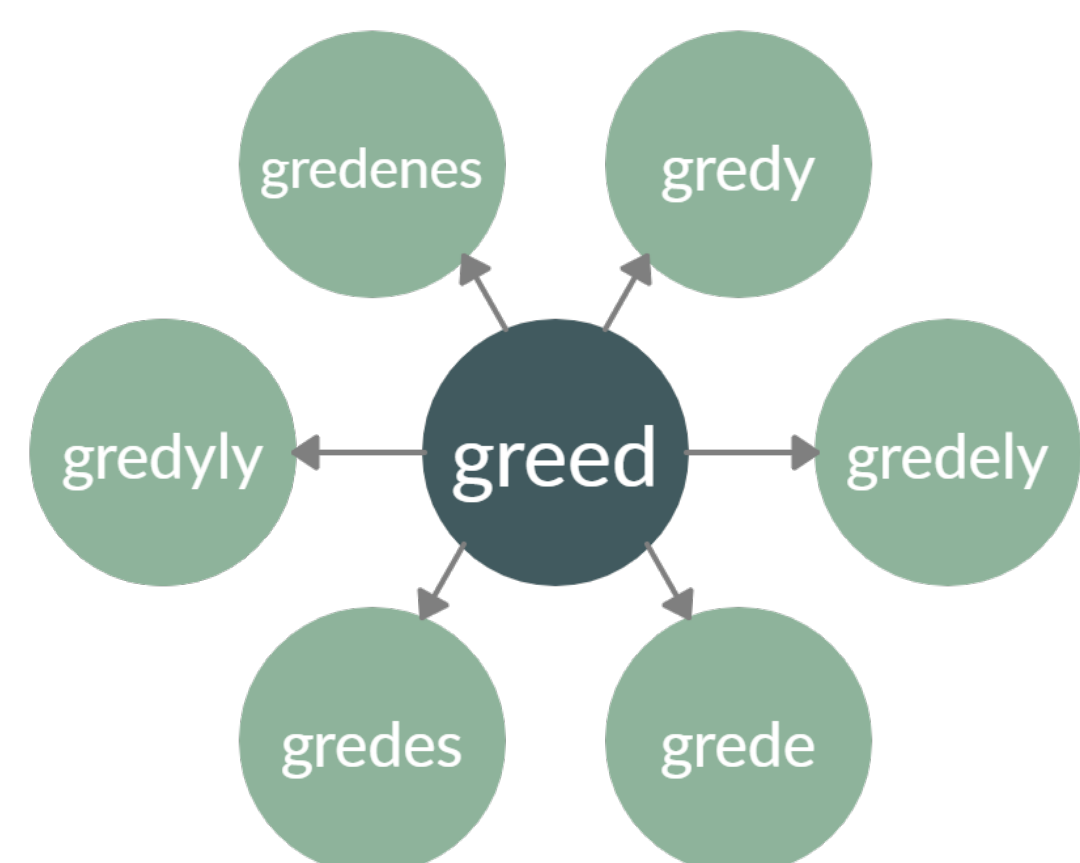


Fig. 1. Word Embedding Model for consumerism-related words in 1670-1700. TSNE representation.

Methodology

1. Data Cleaning

- Scrape data from EEBO TCP Phase I.
- Merge spelling variations with some help from the University of Michigan's Middle English Compendium³.



2. Word Embedding Models

- Generate Word2Vec Word Embedding Models⁴. Find cosine similarity between word vectors of interest over time.

$$\cos(\theta) = \frac{x \cdot y}{\|x\| \|y\|}$$

- Validate Models via analogy tests and bootstrapping resampling to evaluate accuracy and consistency.

$$\vec{Queen} - \vec{King} + \vec{Man} = \vec{Woman}$$

- Create artificial "cultural axes" to track words' semantic relationships with gender, race, and social class.

$$\vec{W} = \frac{(\vec{Queen} - \vec{King}) + (\vec{Woman} - \vec{Man}) + \dots}{N}$$

Birth of 'Economic' Consumption

Consume transforms from a "medical" to an "economic" idea in the beginning of the 17th century. Consumption is seen as increasingly "luxurious", and its association with "disease" continuously decreases.

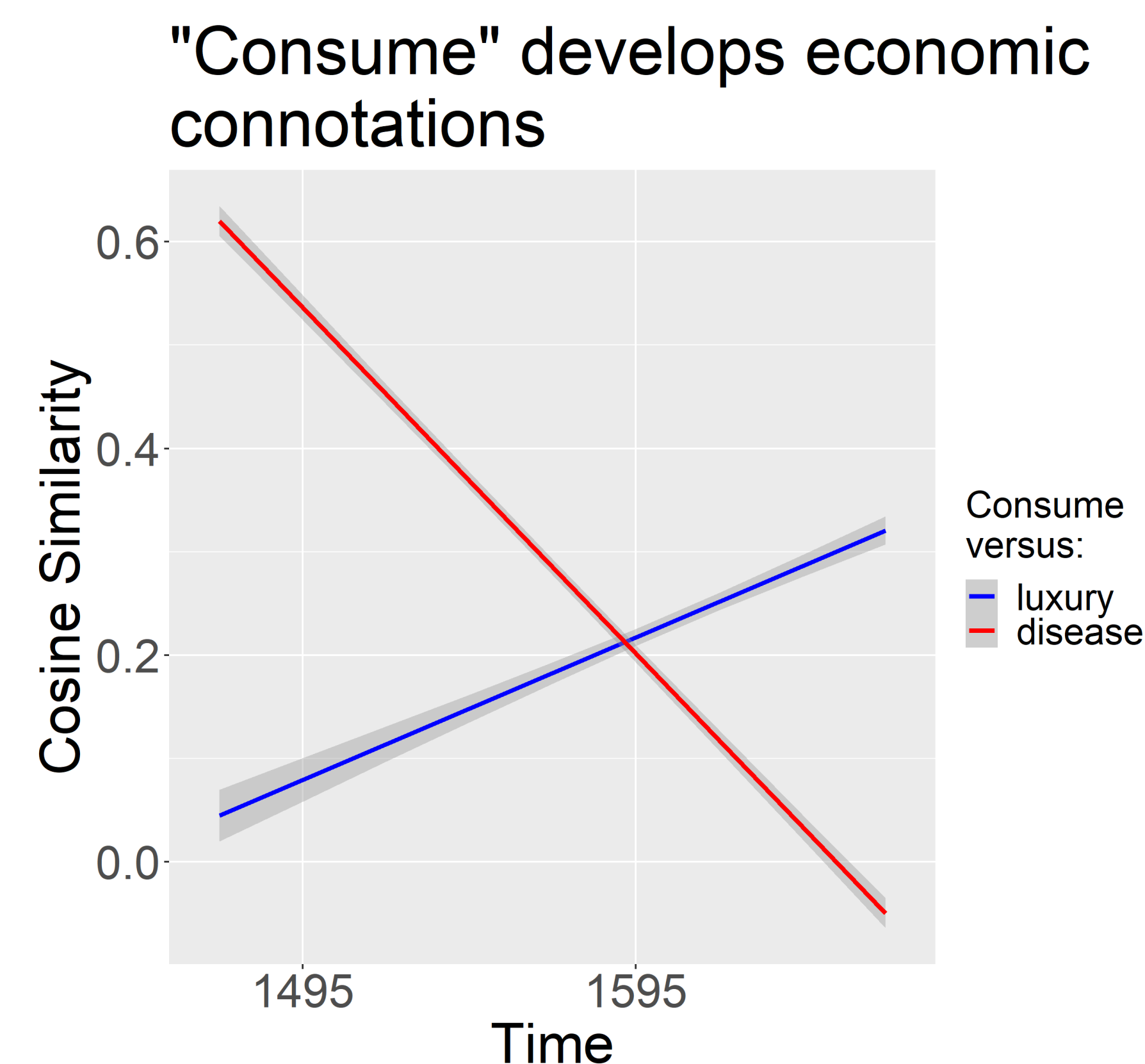


Fig. 2. Consumption transforms from a "medical" to an "economic" idea around the beginning of the 17th century supporting Withington's argument.⁵

Intersectional Axis Insights

Antisemitism is often expressed in terms of gender and ideas often related to consumerism.

- Jewish-signifying words become more related to masculinity and less to consumption** during 1495-1544.
- There is a sudden spike in the relationship between Jewish-signifying words and words related to consumption** from 1645-1700, overlapping with the resettlement of Jews in England.

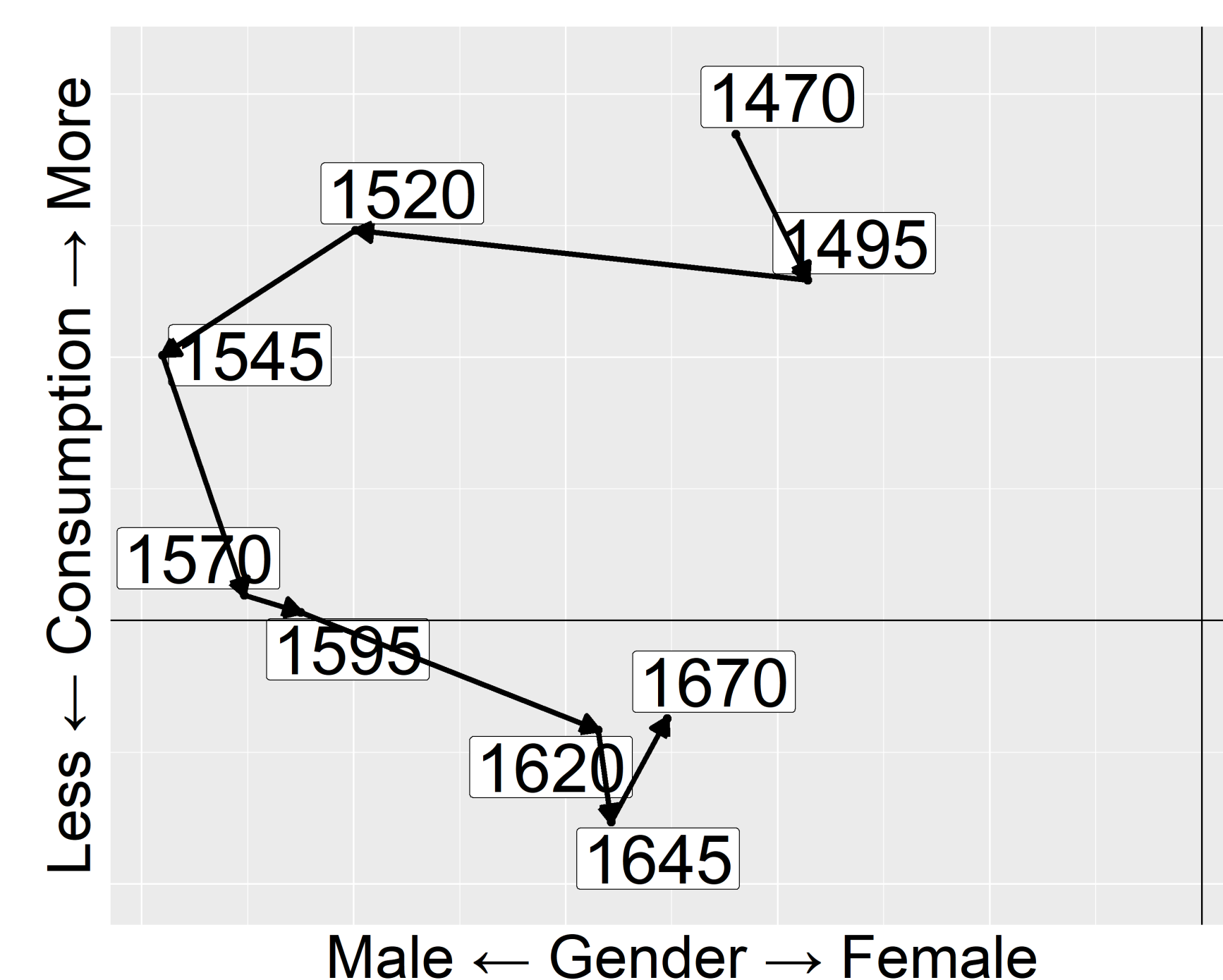


Fig. 4. Jewish-signifying words mapped in context of consumption-related and gender-related lexicon over time.

Gender Axis Insights

- "Consume," "consumption," and "greed" are mostly neutral overall but become more gynocentric over time**, possibly suggesting that women during this period are increasingly being seen as primary consumers in comparison to men.
- The word "possession" remains consistently androcentric over time**, possibly due to dominantly male land-ownership.

Consumption-related words and their gender contexts

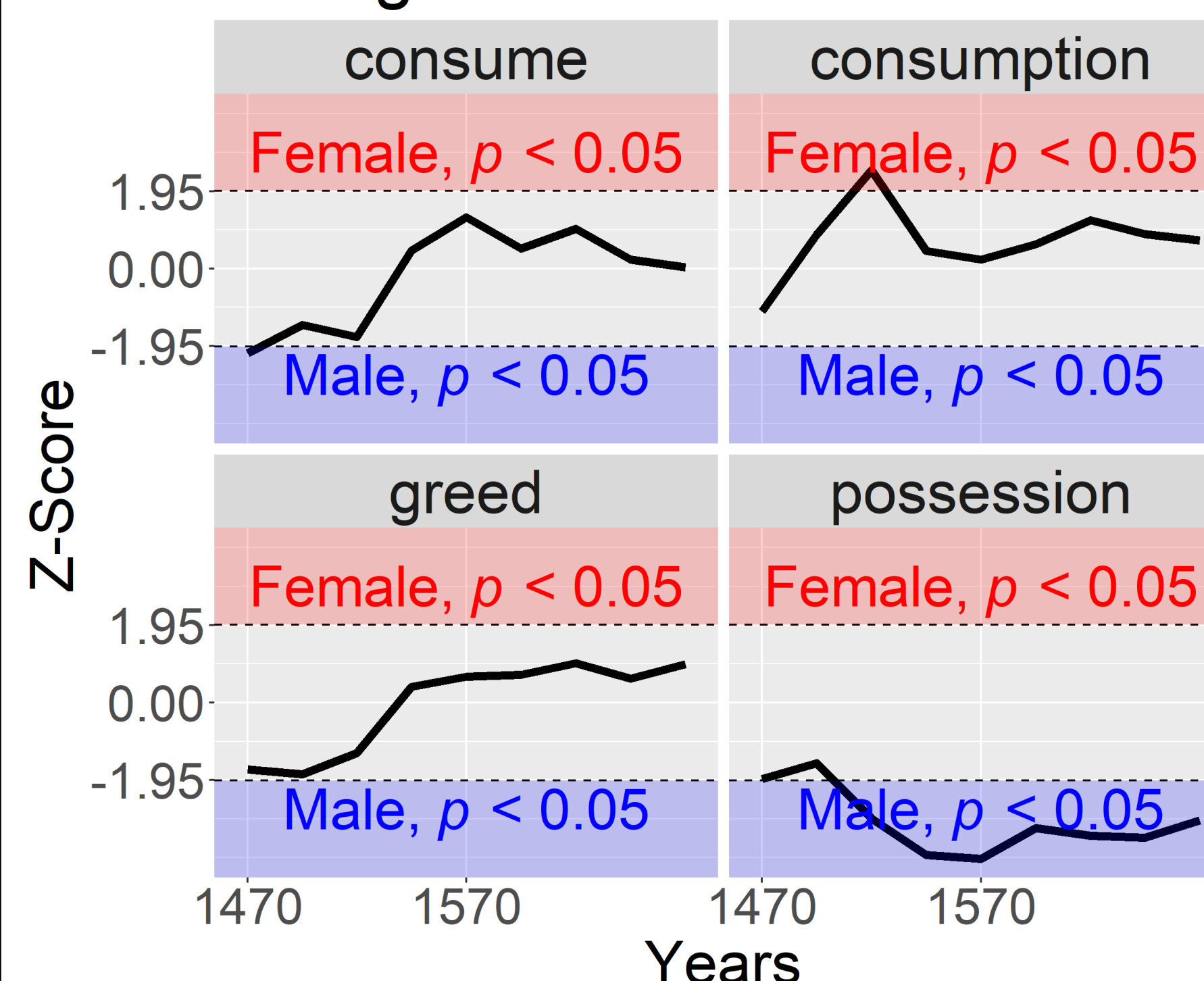


Fig. 3. Comparison of consumption-related words over time to gender culture vector.

Z-Score values are calculated from relative cosine similarity.

Next Steps

- Expand** our analysis to EEBO TCP II, a set of 30,000+ more texts being released on Jan 1, 2021.
- Enhance** our word embedding's accuracy by improving our text-cleaning process, increasing bootstrap resample sizes, and possibly using stop words to reduce clutter.
- Compare** the efficacy of different Word Embedding structures, like GloVe, BERT, and fastText

References & Acknowledgements

Find our code, references, and more visualizations at:
<https://github.com/albertyusun/For-the-Love-of-Greed>

This work was supported by funding from the Data+ program at the Duke Rhodes Information Initiative. Many thanks to Dr. Nikhil Garg at Stanford for help with word embedding models; Paul Bendich and Greg Herschlag at Data+ for research assistance; and Mark Delong for setting up a computer through the Duke Research Computer Clusters for our research.