

Production and perception of novel consonant clusters



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1. Introduction

- Some consonant clusters are more difficult to perceive or produce than others
- Sonority sequencing predicts some, but not all, of these difficulties

Research question:

- Can acoustic salience predict and explain production and perception of novel consonant clusters?

2. Materials and methods

Materials

- Selected 16 non-English clusters, based on cluster categories in [3]; see Table 1
- Clusters used as onsets for nonword names of novel creatures and objects
- Two versions of 32 names recorded: 1) full cluster, 2) cluster broken up with [ə]
- Unique illustrations of creatures and objects
- 2 real word competitors in each scene, one with first sound in cluster and one with second
 - One predicted by salience; the other, sonority

Methods

- Visual world paradigm eye-tracking experiment with 4 scenes [4] for each cluster trial (Fig. 3)
- Familiarization: introduce creature and object and have participant say their names
- Eye-tracking trial: wind blows target and three competitors to corners of screen
 - Participant asked where item is; gaze tracked from onset of audio item presentation

Participants

- 22 adults recruited from Seattle area
 - Native English speakers with no significant exposure to languages with target clusters

Rise	dl, dn, tl, gn, dv, tf
Plateau	kt, tk, pt, zv, mn, gd, vz
Fall	ft, vd, zd, lb, it

Table 1. Enumeration of different clusters based on sonority pattern.

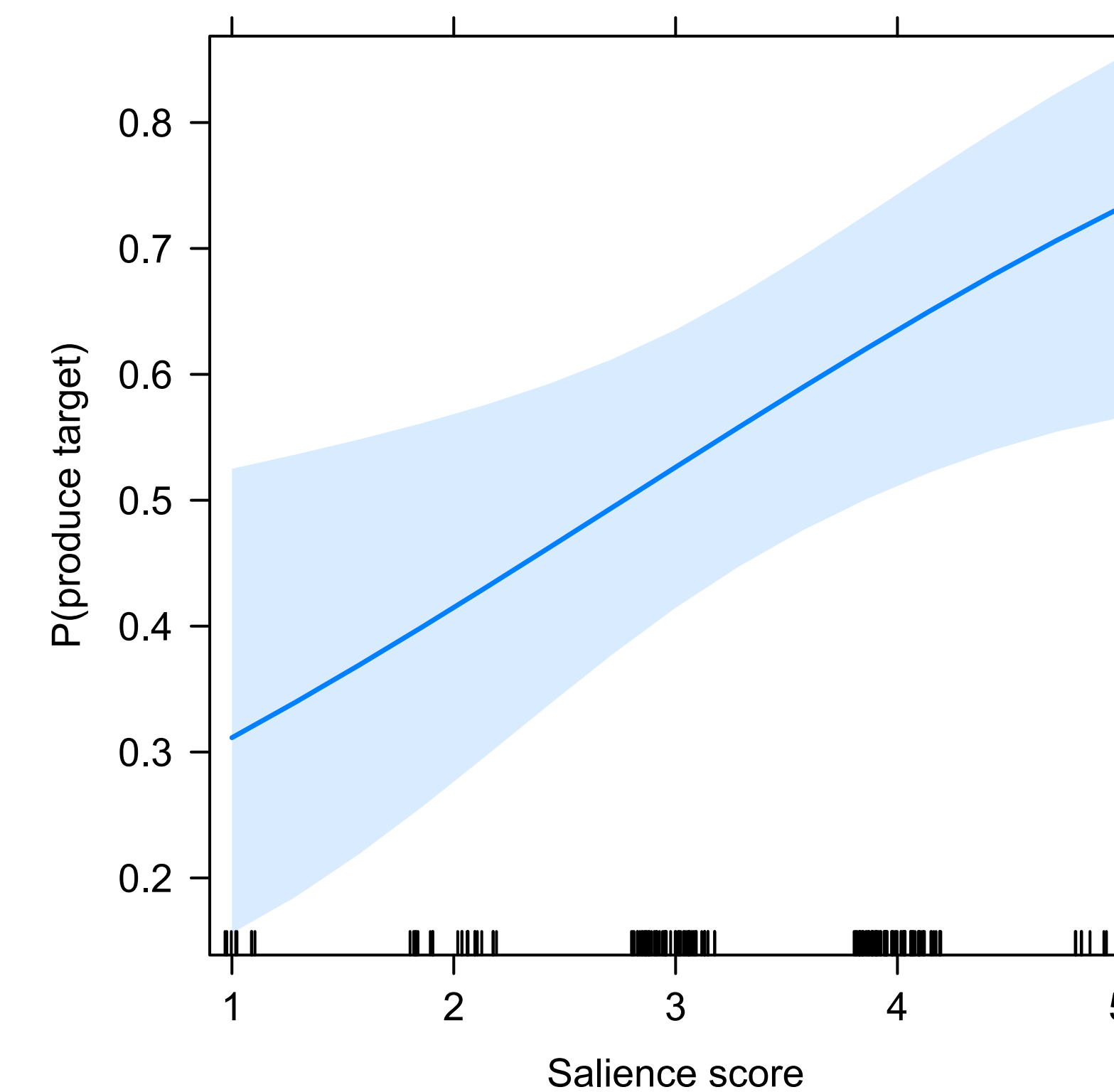


Figure 1. Effect of salience on tendency to epenthesize in production. Participants more likely to produce clusters with higher salience.

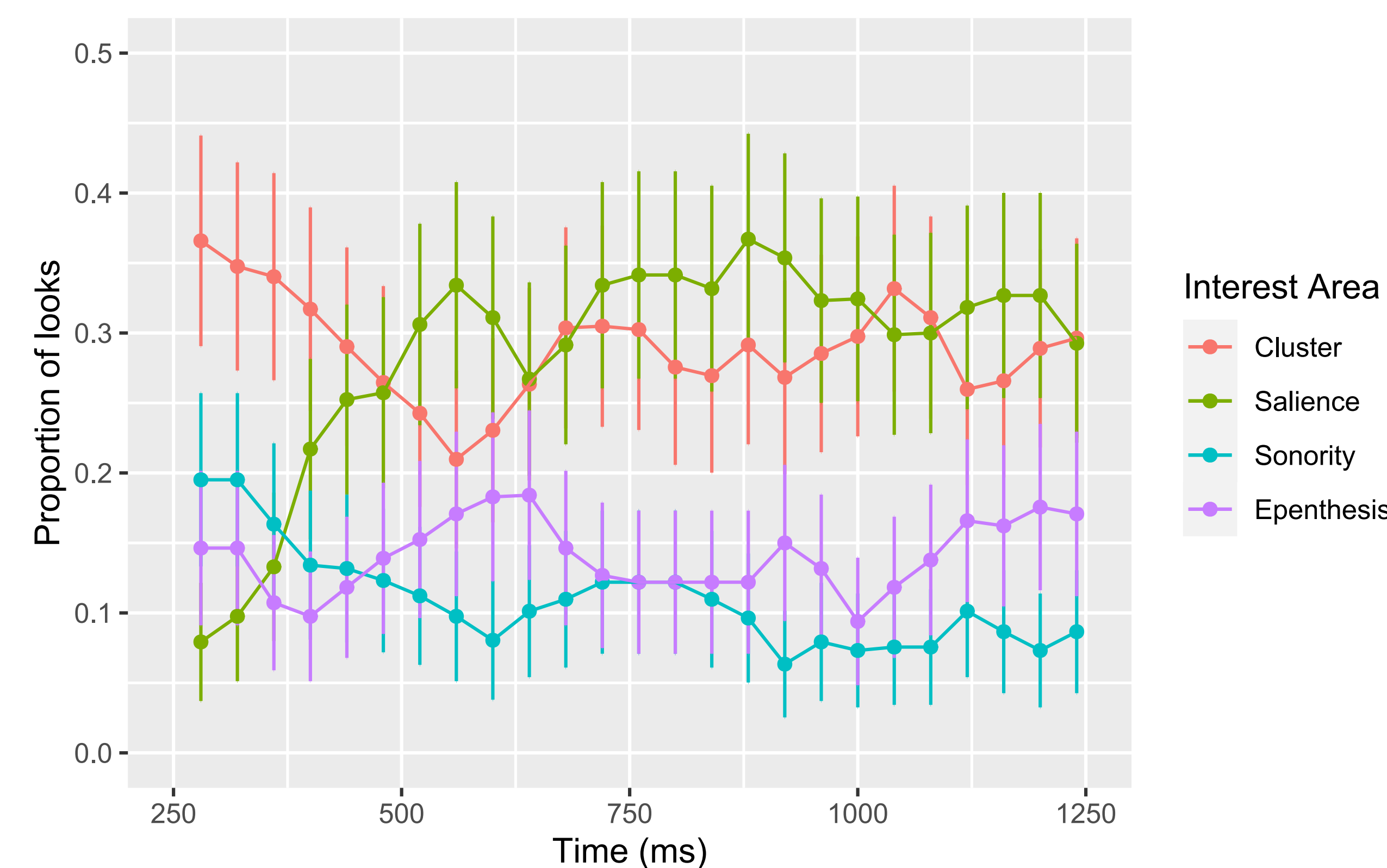


Figure 2. Time-course effects of gaze when asked to find the item with the cluster onset. Proportion is calculated as the grand mean across subjects.



Figure 3. Gaze tracking trial for perception analysis. The narrated prompted is presented in text in the middle. Note that no text is present in the actual experiment.

3. Production results

- Logistic mixed-effects regression of producing the target cluster when prompted
- Random intercept for subject
- At higher salience levels, more likely to produce target cluster

4. Perception results

- Calculated grand mean of subjects' proportion of look time at each option when asked to find item beginning with cluster (Fig. 2)
- Tendency to look at target or competitor predicted by salience
- Confidence intervals overlap between cluster and salience predictions
- Acoustic salience better predicts perception than sonority sequence violations

5. Discussion

- Acoustic salience matches behavior better than sonority sequencing
- Salience has potential to explain behavior too, on top of just describing it

Acknowledgements: We would like to thank Akira Omaki, Amelia Stockdill, Bella Alexander, David Huang, Ella De Falco, Emily Rogers, Ivory Huang, Ivy Guo, Jordan T. Zaugg, Julia Herschensohn, Maddy Seymour, Maho Takahashi, Naomi Tachikawa-Shapiro, Sam Crowder-Storme, Yadi Peng, and Zoey Zhou for their varied assistance on this project. We would also like to thank the UW Phonetics Lab for their feedback on this poster.

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1pSC16, 184th meeting of the Acoustical Society of America (Chicago, IL) May 2023