

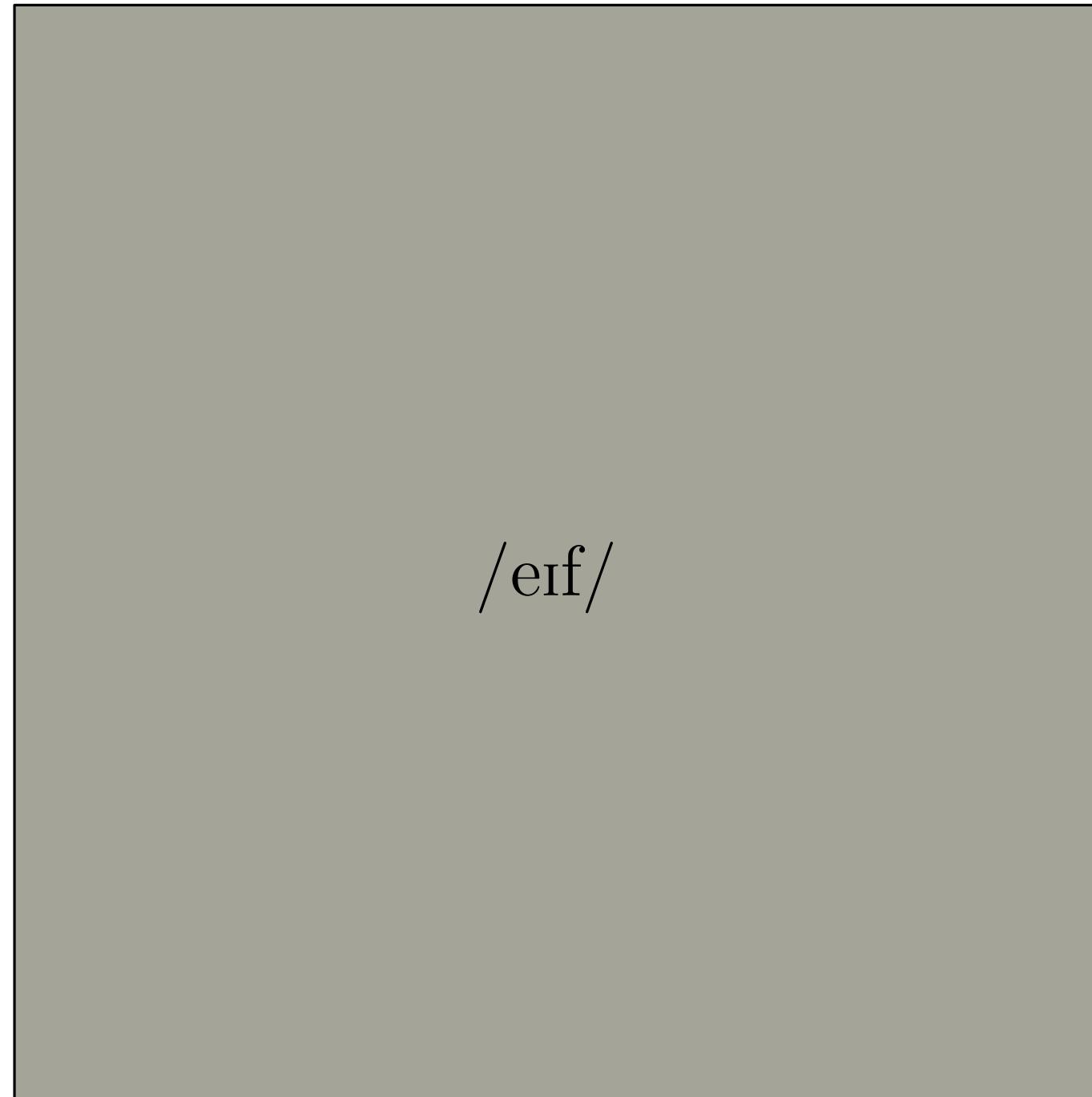
# Phonological network properties of nonwords influence their learnability

Rory Turnbull

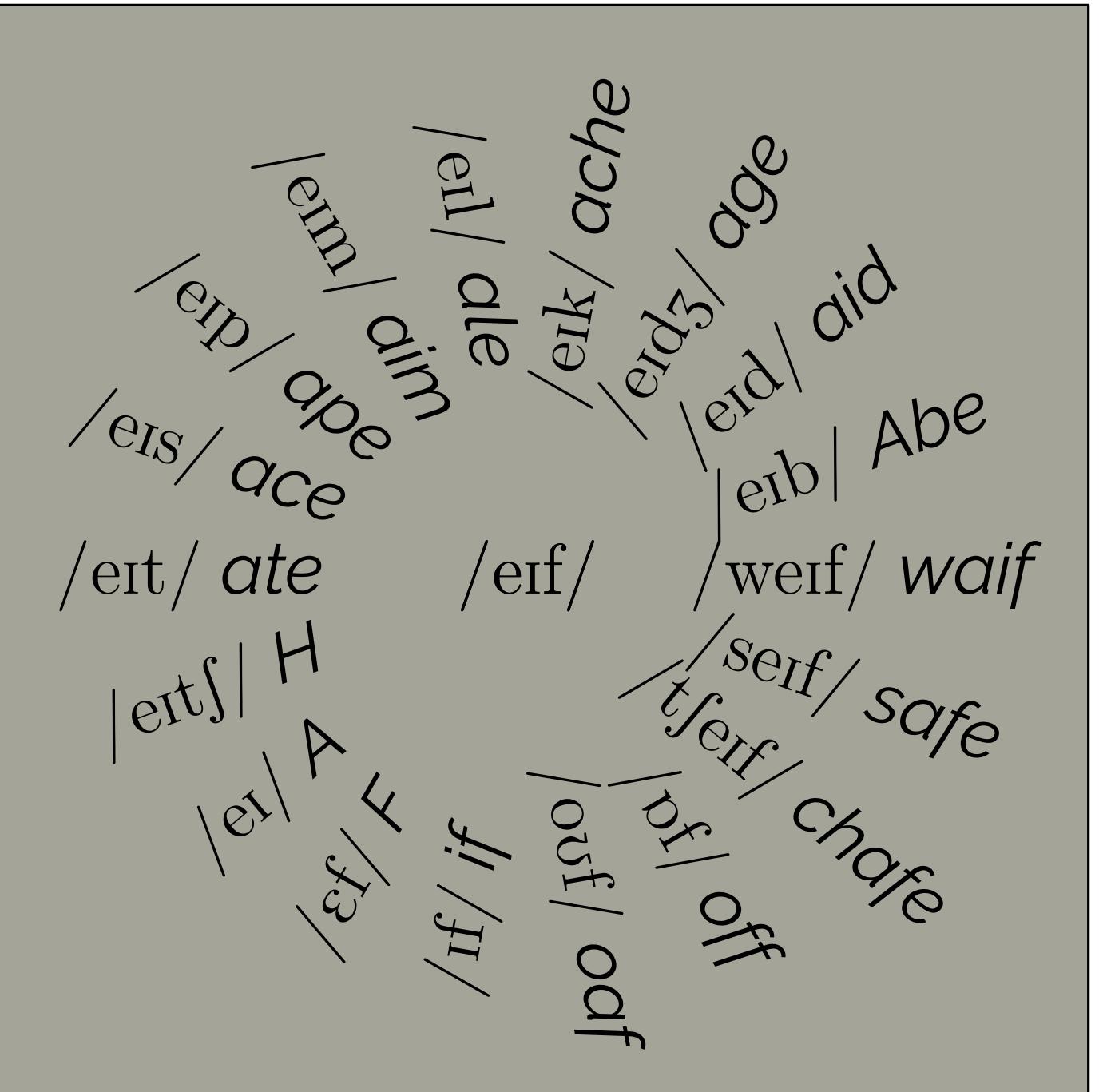


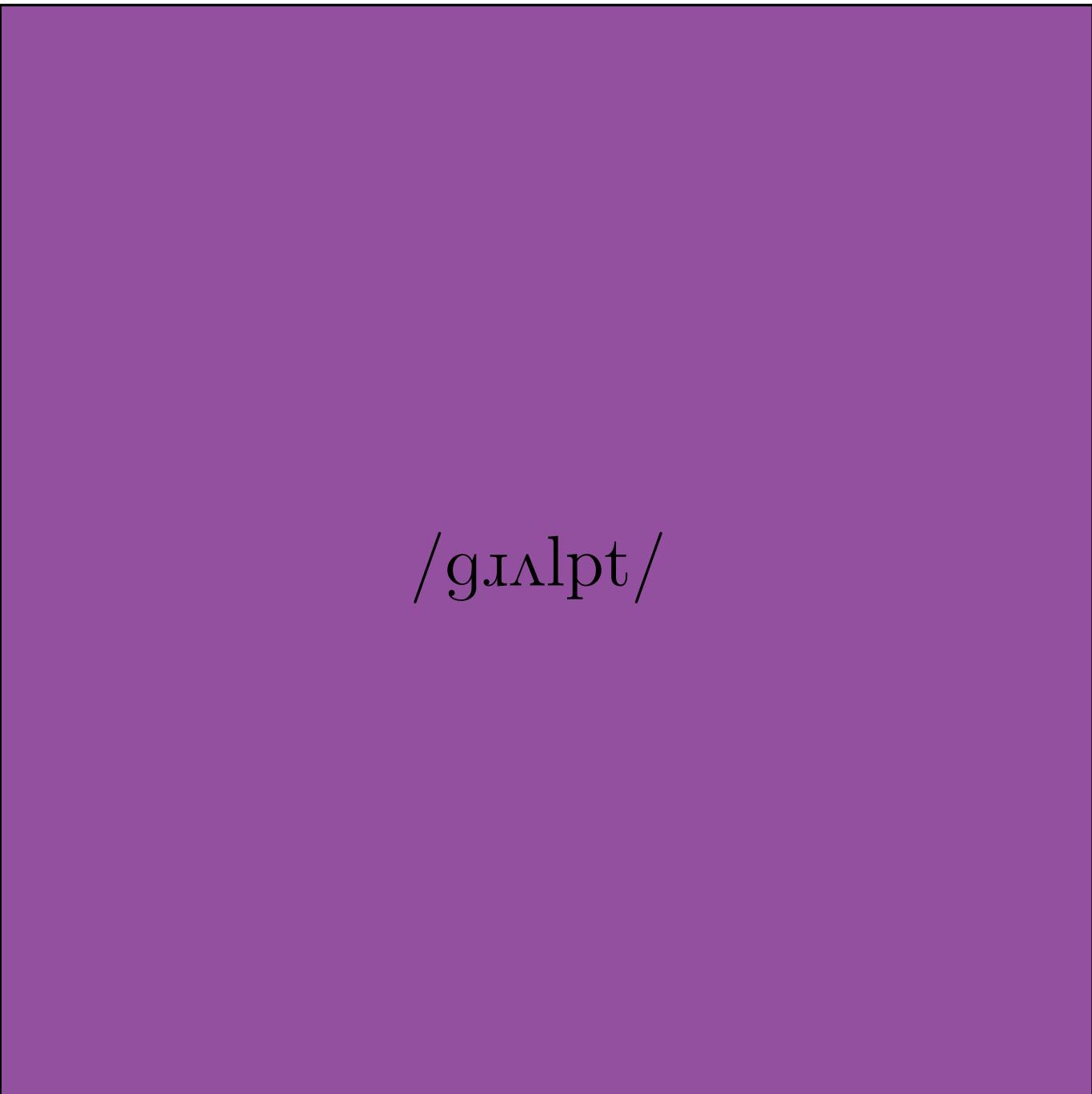
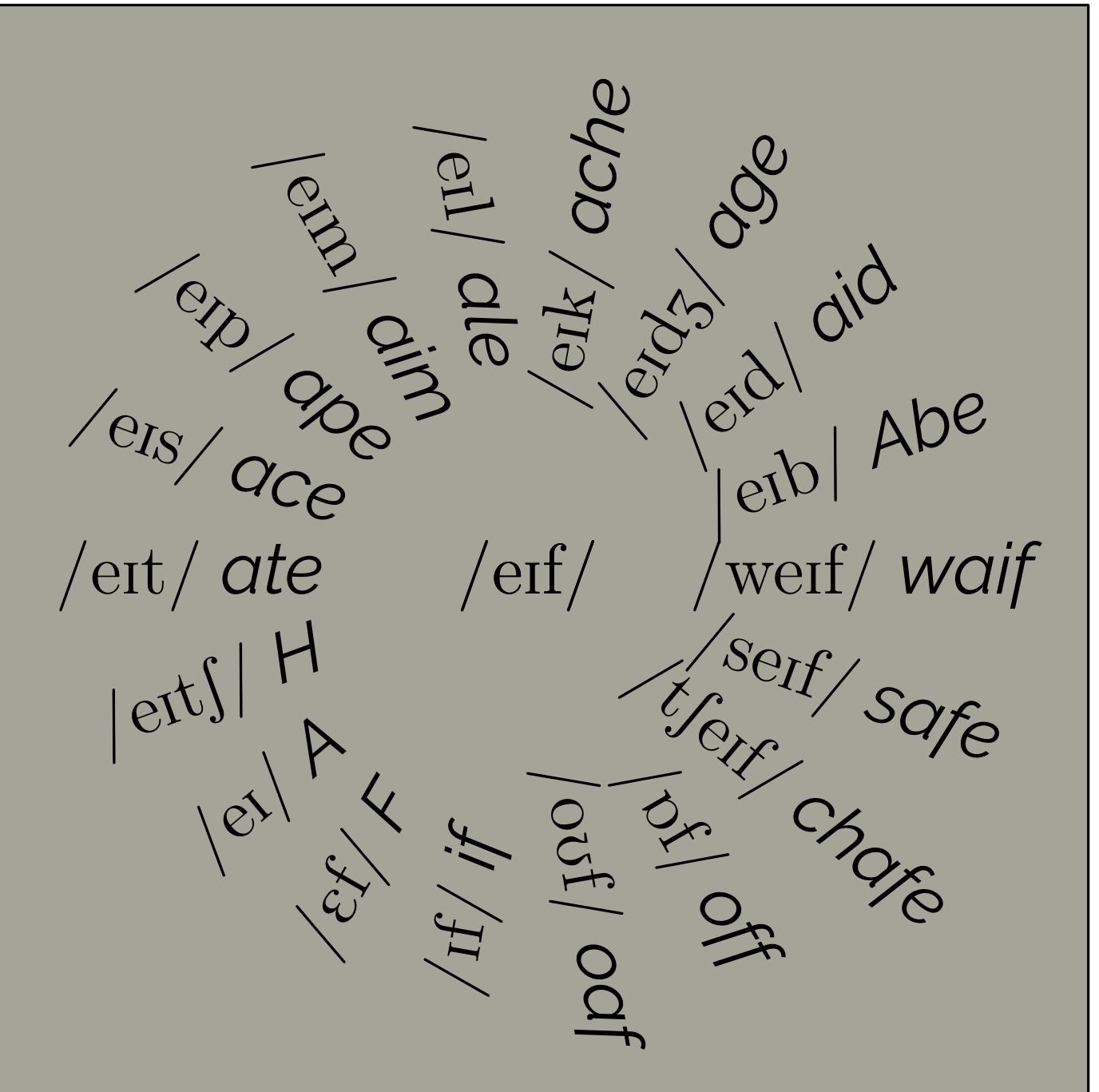




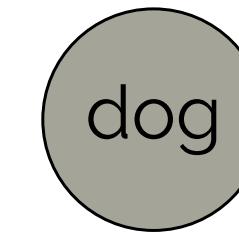


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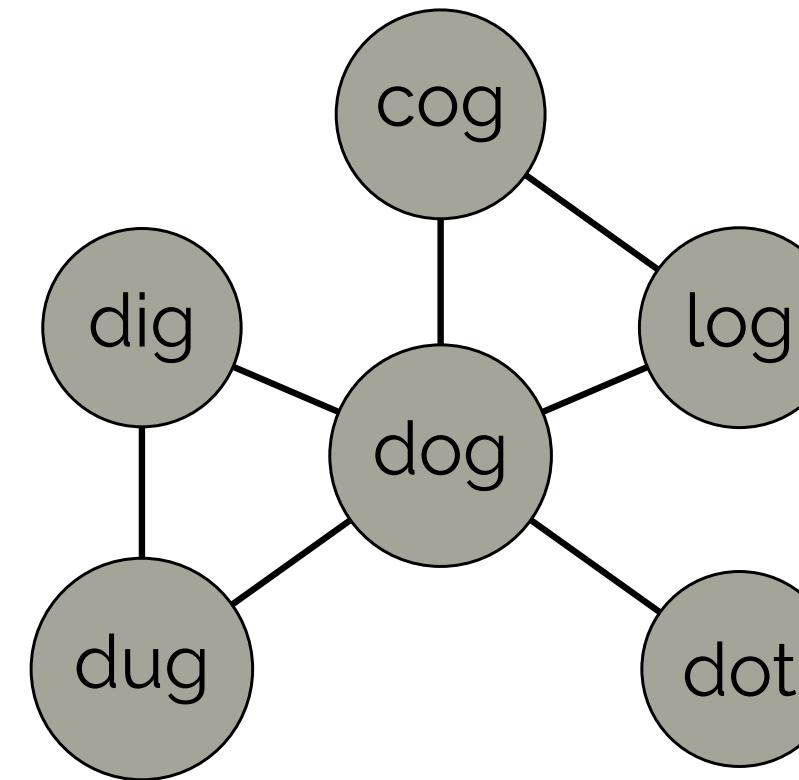




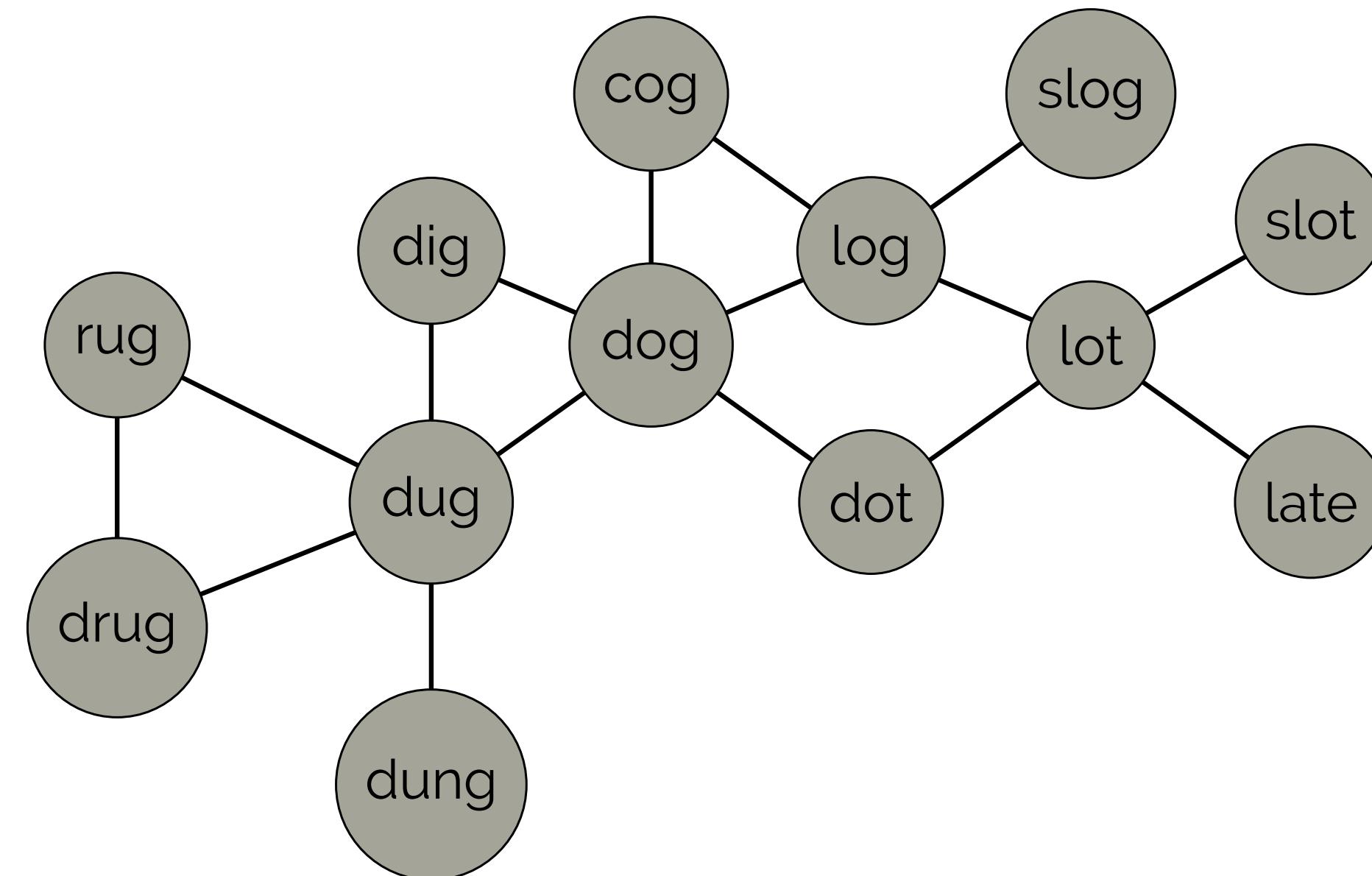
# Phonological networks



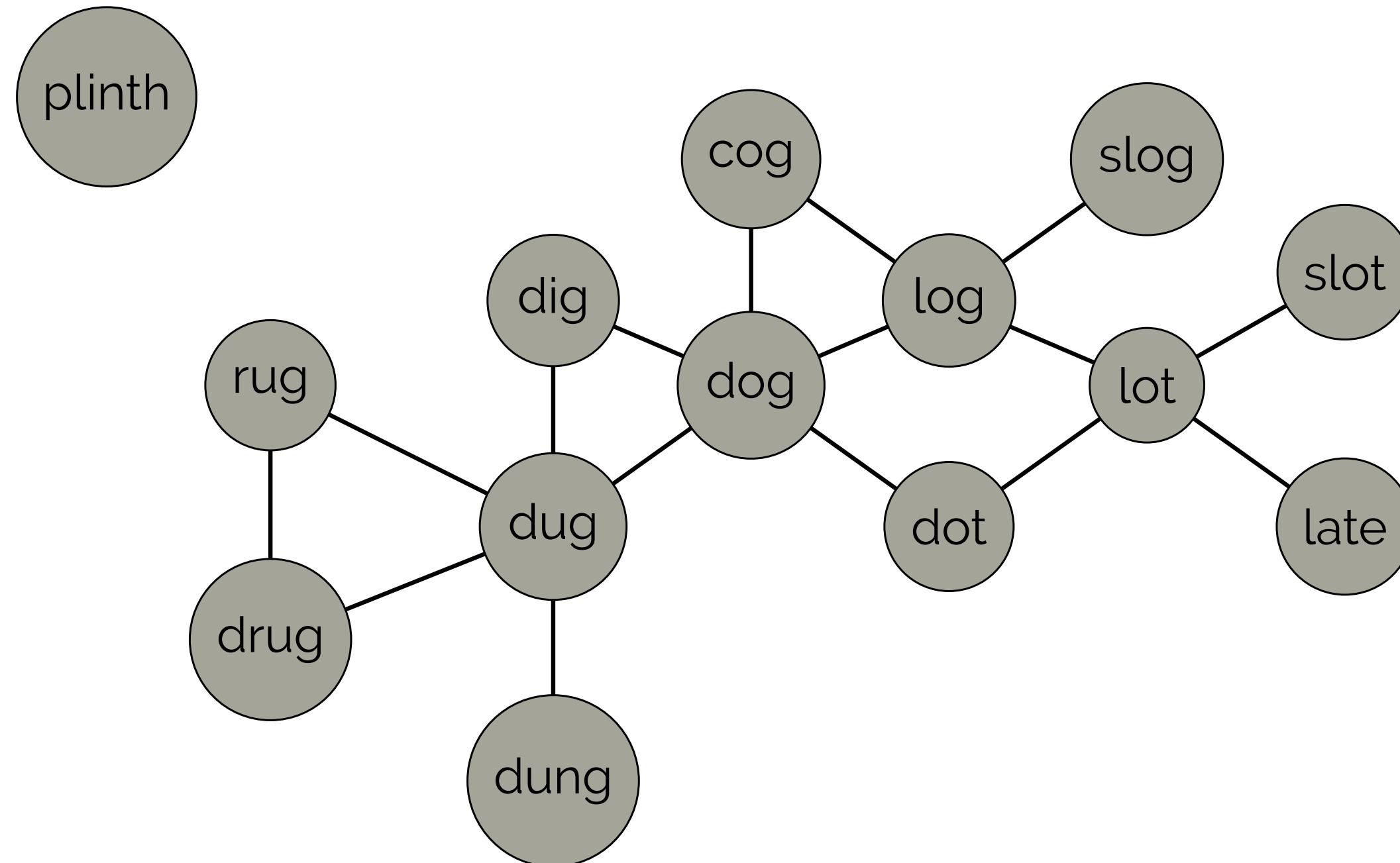
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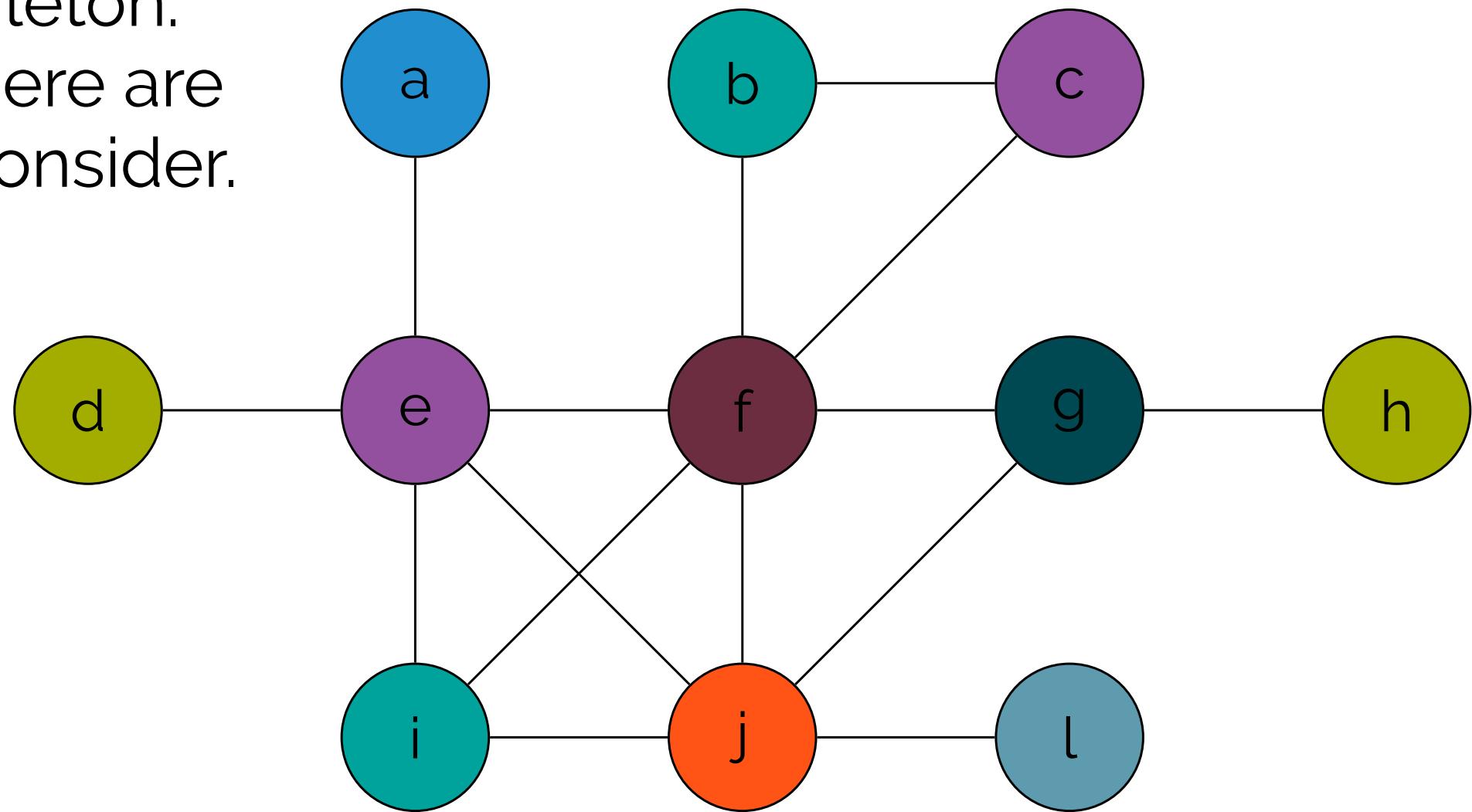
# Nonword Stimuli

- 47 nonword stimuli
- UK English phonotactics

|        |        |        |        |       |
|--------|--------|--------|--------|-------|
| bvsp   | bju:f  | bju:p  | bju:ʃ  |       |
| bju:ʒ  | bjuə   | bræb   | bræmpt | bræv  |
| ði:d   | ði:pt  | dru:dʒ | eif    | fʒ:tʃ |
| flɔ:tʃ | fru:m  | fwa:θ  | gju:ʃ  | glæg  |
| glaib  | gleim  | grʌlpt | hju:f  | hu:ls |
| jʒ:ft  | klɒm   | krɪnθ  | kwɛmpt | pʒ:b  |
| plesp  | pwi:θ  | skwais | skwɒf  | slædʒ |
| sləug  | smid   | spli:ʃ | splənd | stʌg  |
| swɒsk  | ʃnæm   | spi:g  | traʊd  | vju:t |
| zɛft   | θrɒmps | θwæʃt  |        |       |

# Stimulus properties

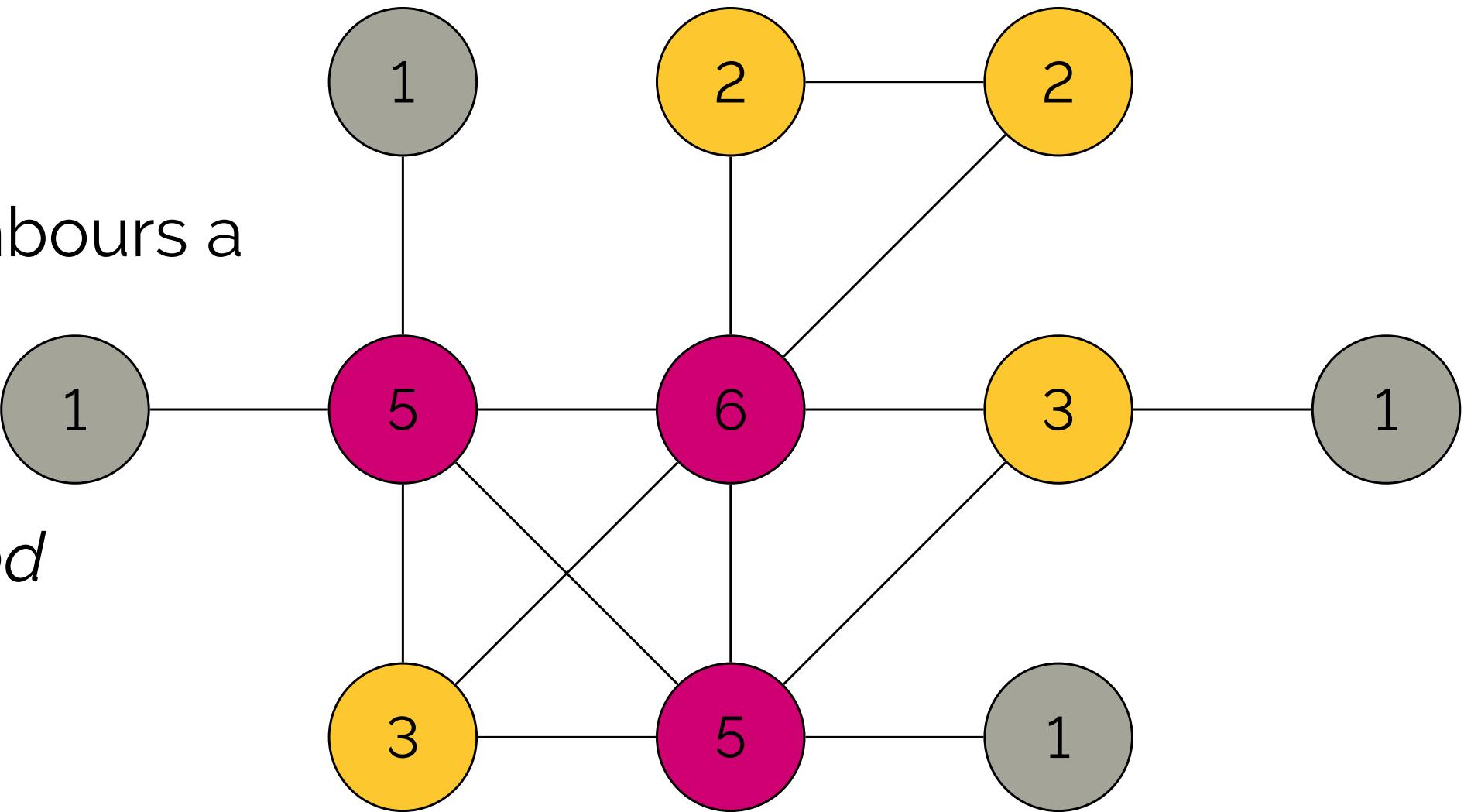
- Singleton versus non-singleton.
- Among non-singletons, there are other properties we can consider.



# Stimulus properties

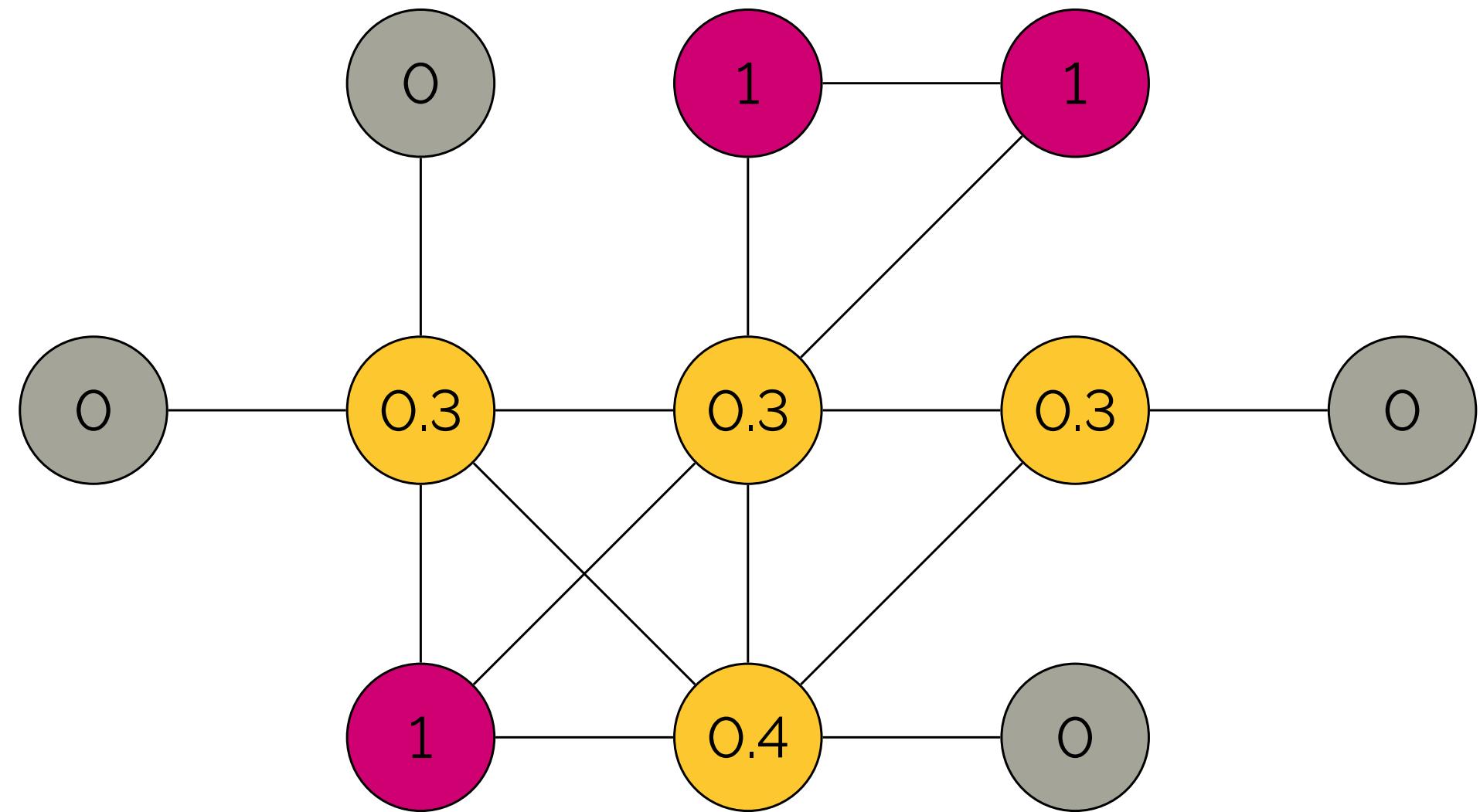
**Degree:** the number of neighbours a word has.

(Also known as *neighbourhood density*)

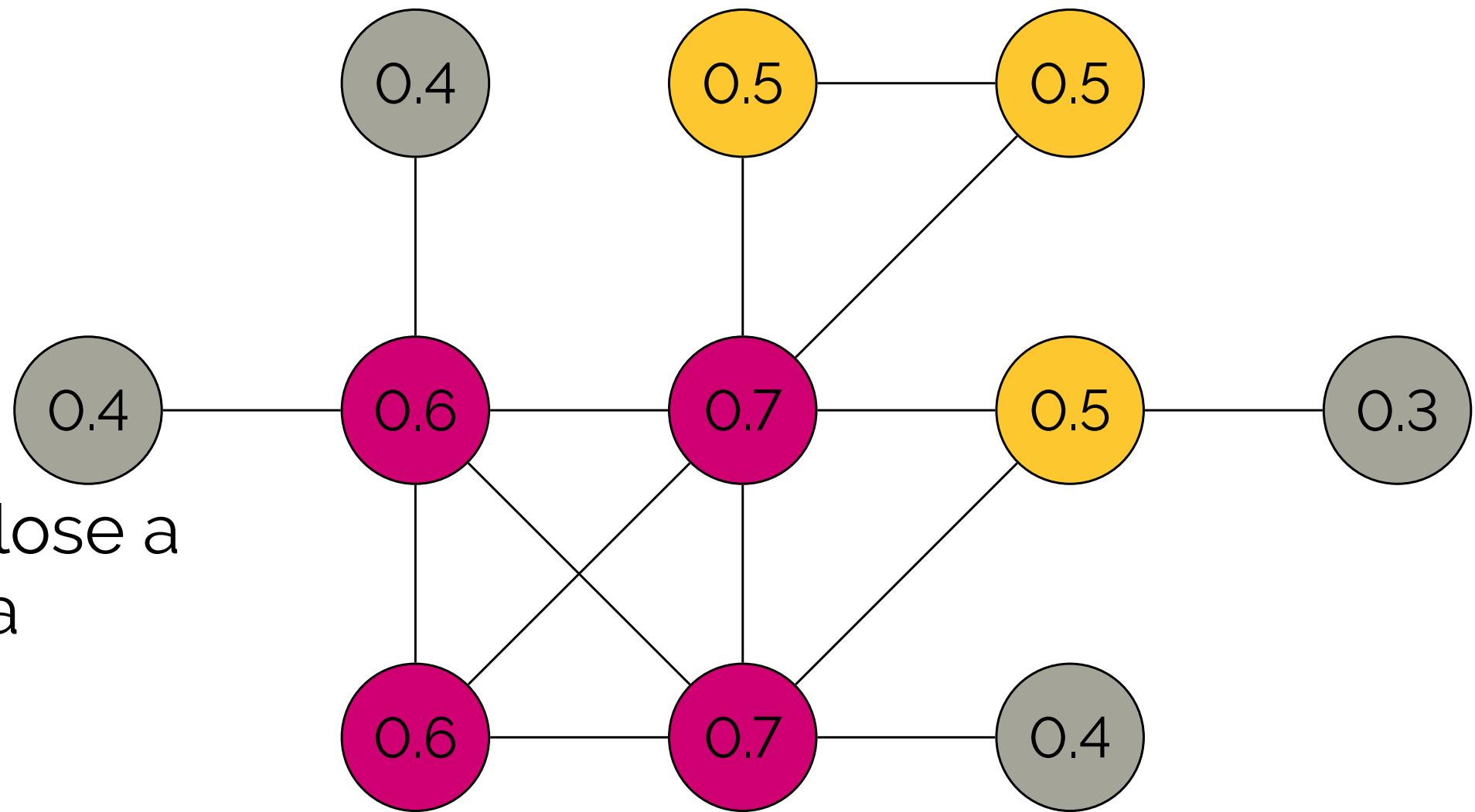


# Stimulus properties

**Clustering coefficient:**  
what proportion of a word's neighbours are neighbours of each other

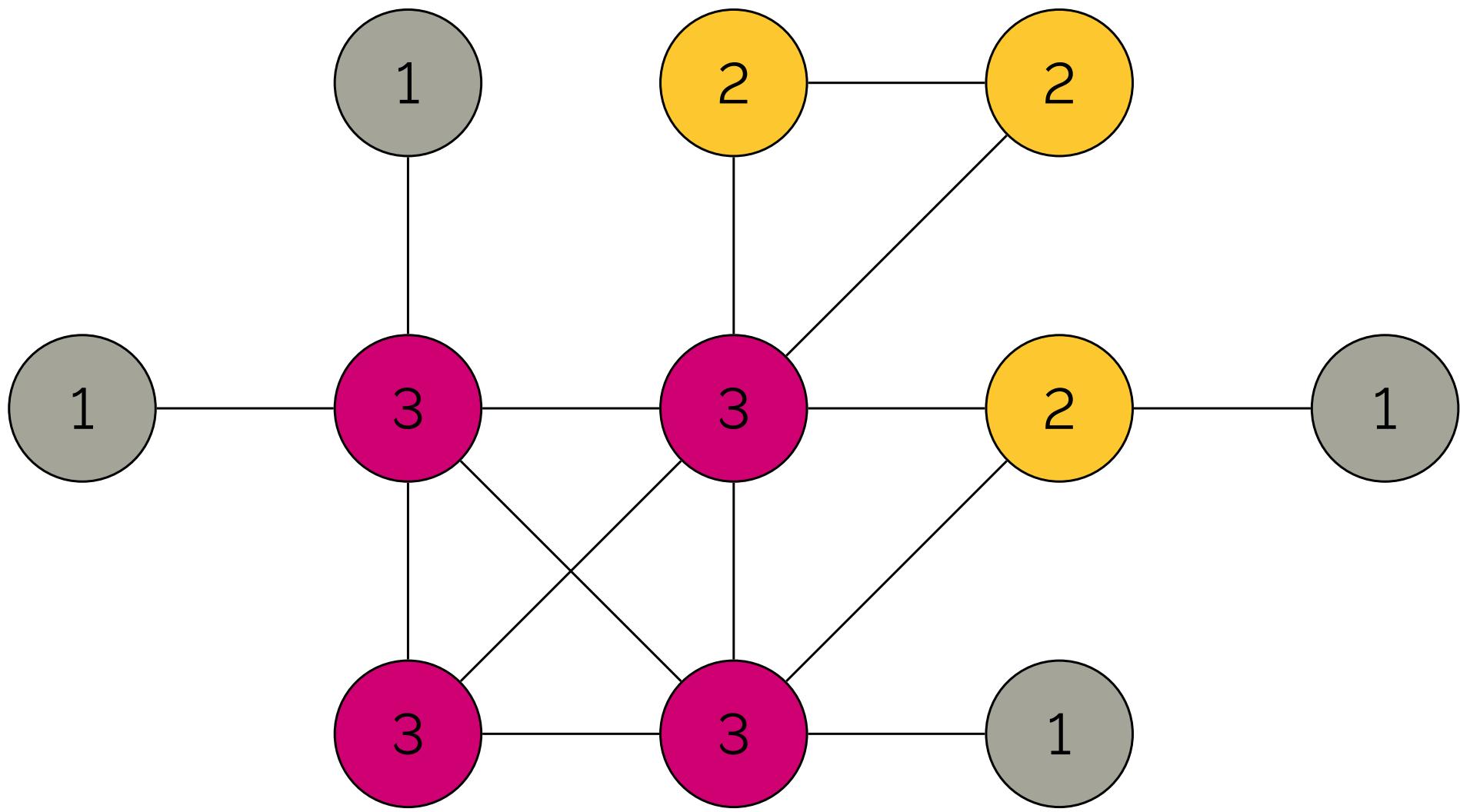


# Stimulus properties



**Closeness centrality:** how close a word is to all other words in a network

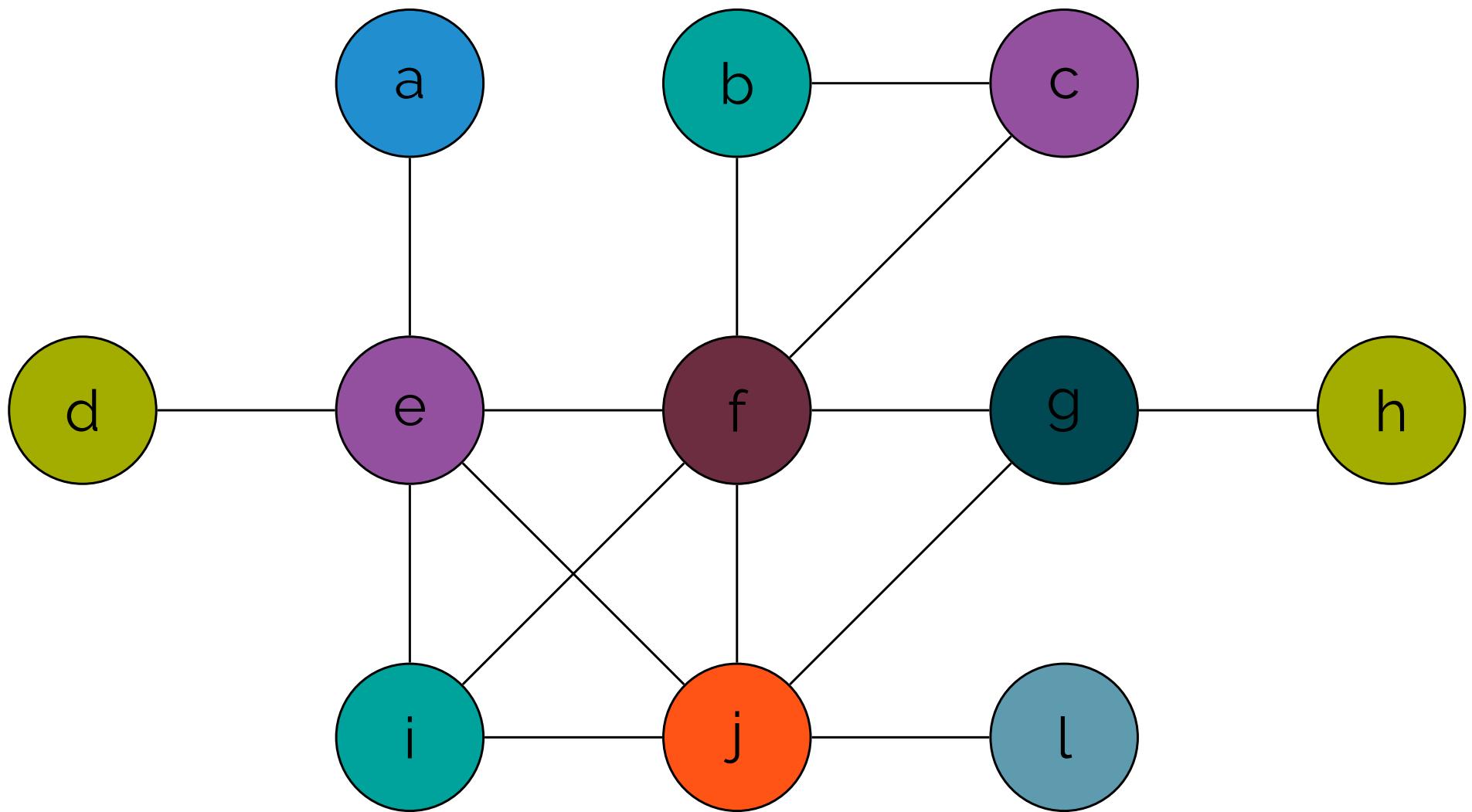
# Stimulus properties



**Coreness:** how central to a network a word is

# Stimulus properties

- **Factor 1:** coreness and degree of the nonword stimulus and the mean degree of its neighbours
- **Factor 2:** closeness centrality of both the nonword stimulus and its neighbours



# Methodology

## Exposure phase:

- Visual presentation of novel item.
- Auditory presentation of item's name.
- Eight word-item pairs presented four times each in random order.

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## Overall:

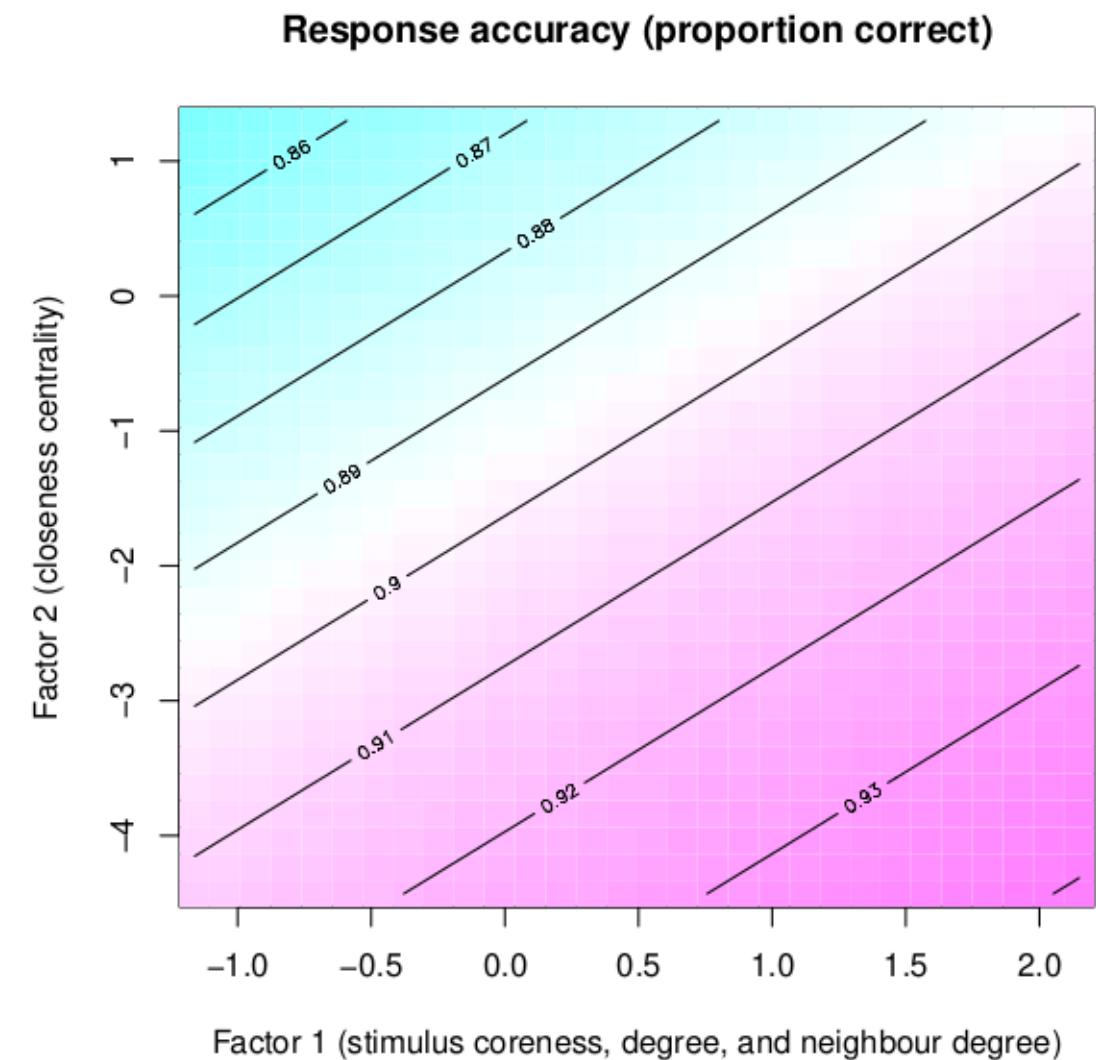
- Six blocks in total
- Forty-eight (six times eight) item-word pairs presented in total
- 198 participants, all speakers of UK English
- Record **accuracy** and **reaction time**

# Results

- Singleton vs. non-singleton: no relevant effects
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- No evidence that singleton words are easier or harder to learn than non-singleton words
- Words with higher degree / coreness with higher-degree neighbours were responded to **faster and more accurately** than words with lower values
- Words with high closeness centrality and high-centrality neighbours were responded to **faster** than words with lower values



# Conclusions

- Learnability is influenced by how a novel word fits into the existing lexicon
- Potential implications for L1 and L2 word learning
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## Next steps

- More carefully controlled stimuli
- Naming and recall tasks – both production and perception
- Longer time periods between exposure and test

# Thank you

With gratitude to the Newcastle University Phonetics & Phonology Research Group for feedback and support