

# Automated Analysis of Language Creativity

“There is little that shapes the human experience as profoundly and pervasively as creativity. Creativity drives progress in every human endeavor, from the arts to the sciences, business, and technology.”

*The Philosophy of Creativity, Paul & Kaufman (2017)*

What is creativity?  
How to measure creativity?

## Convergent Thinking

- Give the correct answer to standard questions

## Divergent Thinking

- Generate as many ideas as possible

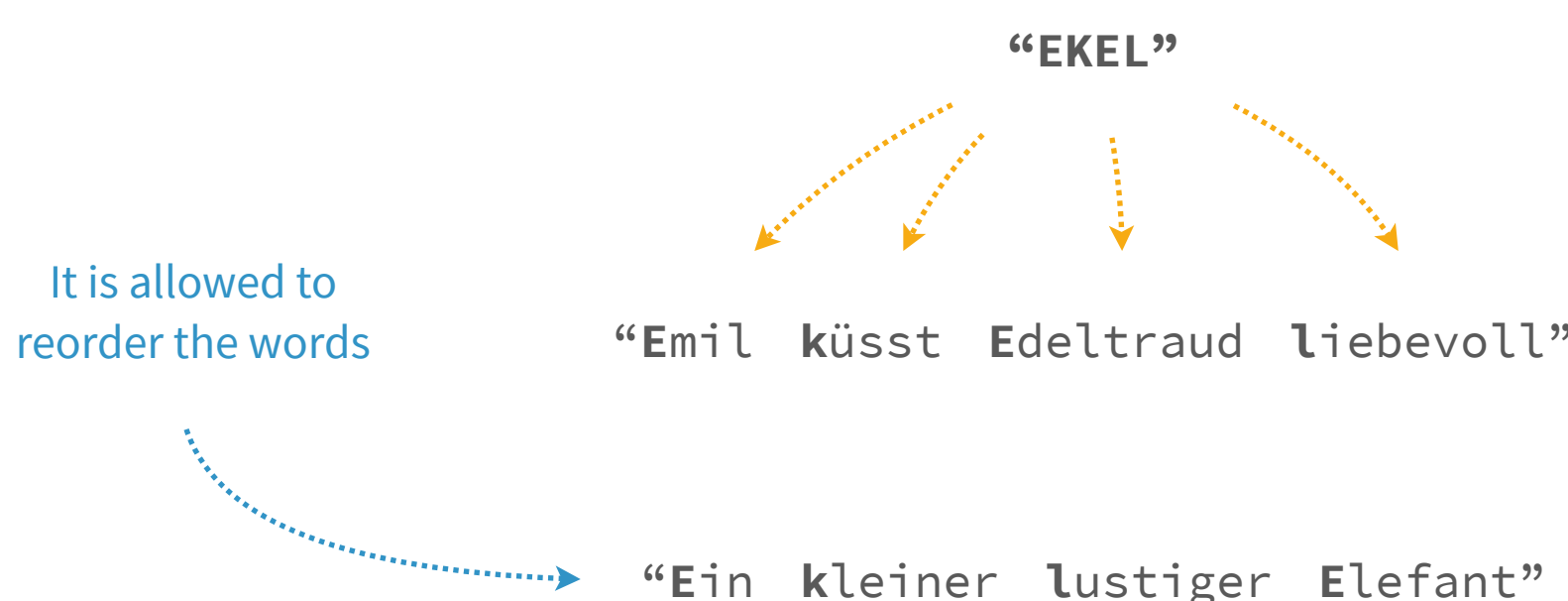
## Creativity

- Comprises two components
  - Novelty
  - Effectiveness

## Language Creativity

- Linguistic features used during divergent thinking tasks correlate with creativity
  - Sophisticated grammar
  - Extended vocabulary
- Phonetic features (e.g., as used in poetry) correlate with language creativity
  - Alliterations
  - Rhymes

Given a four-letter word, build a sentence using words that start with these letters



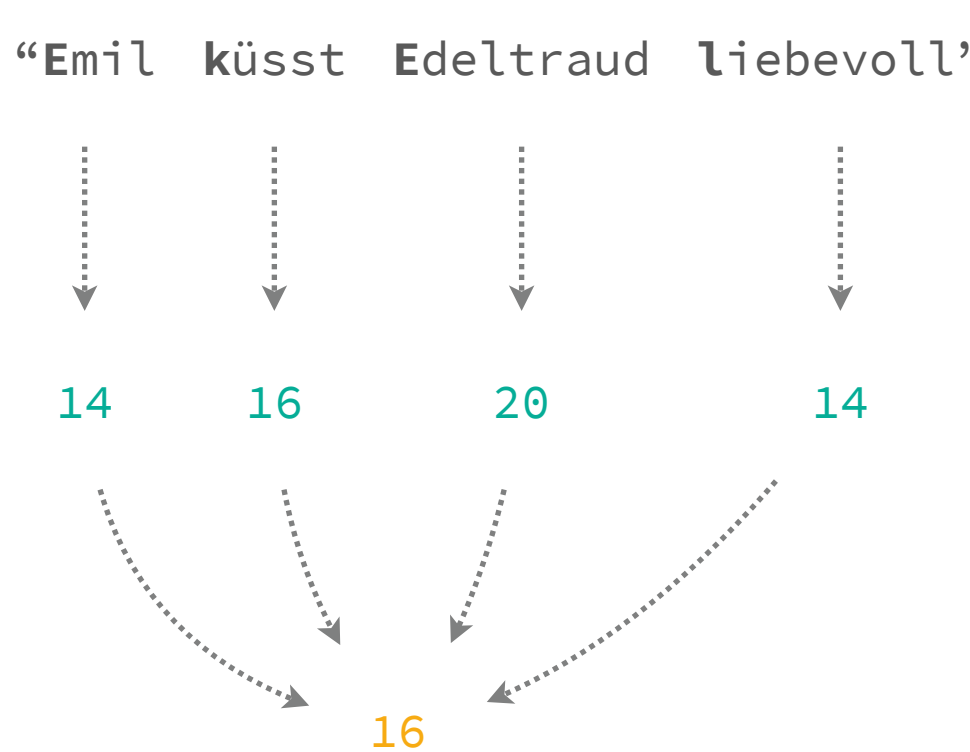
- Manually assessing language creativity has many drawbacks
  - Extremely time-consuming
  - Subconscious biases
  - Inconsistent ratings
- Automatically rate sentences using a custom algorithm

Reward using words that rhyme

Reward using words with similar or identical sounds



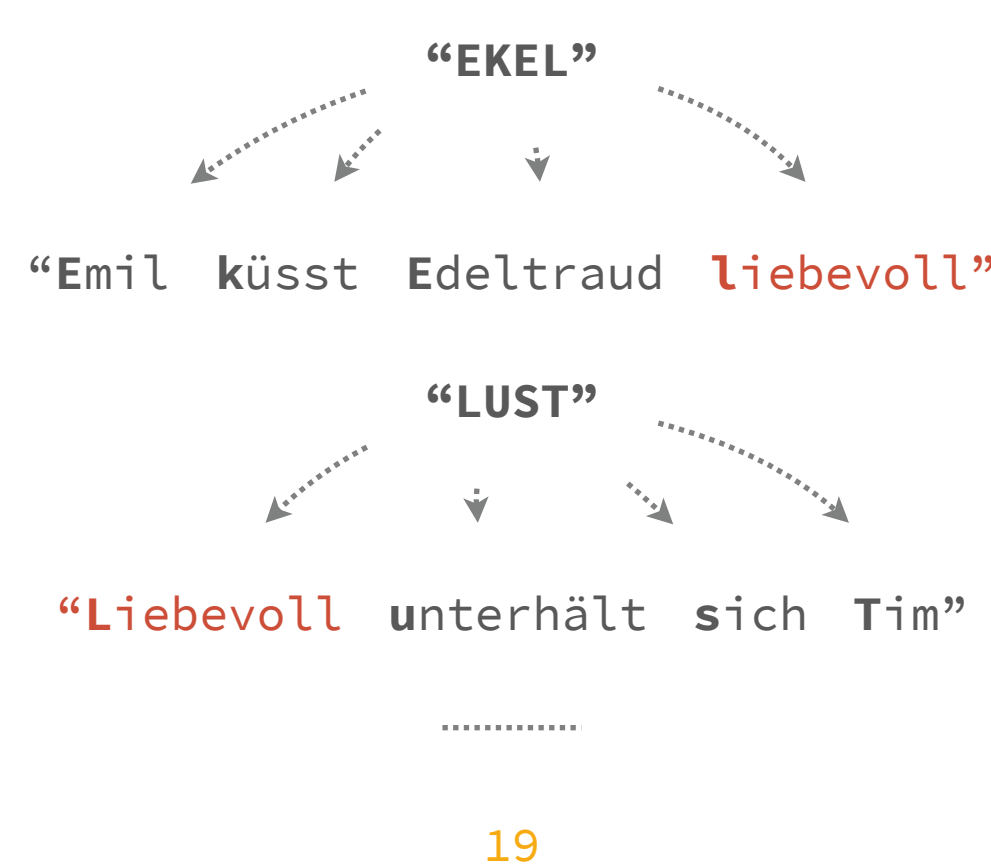
## (1) Word Novelty Score



## (2) Context Novelty Score



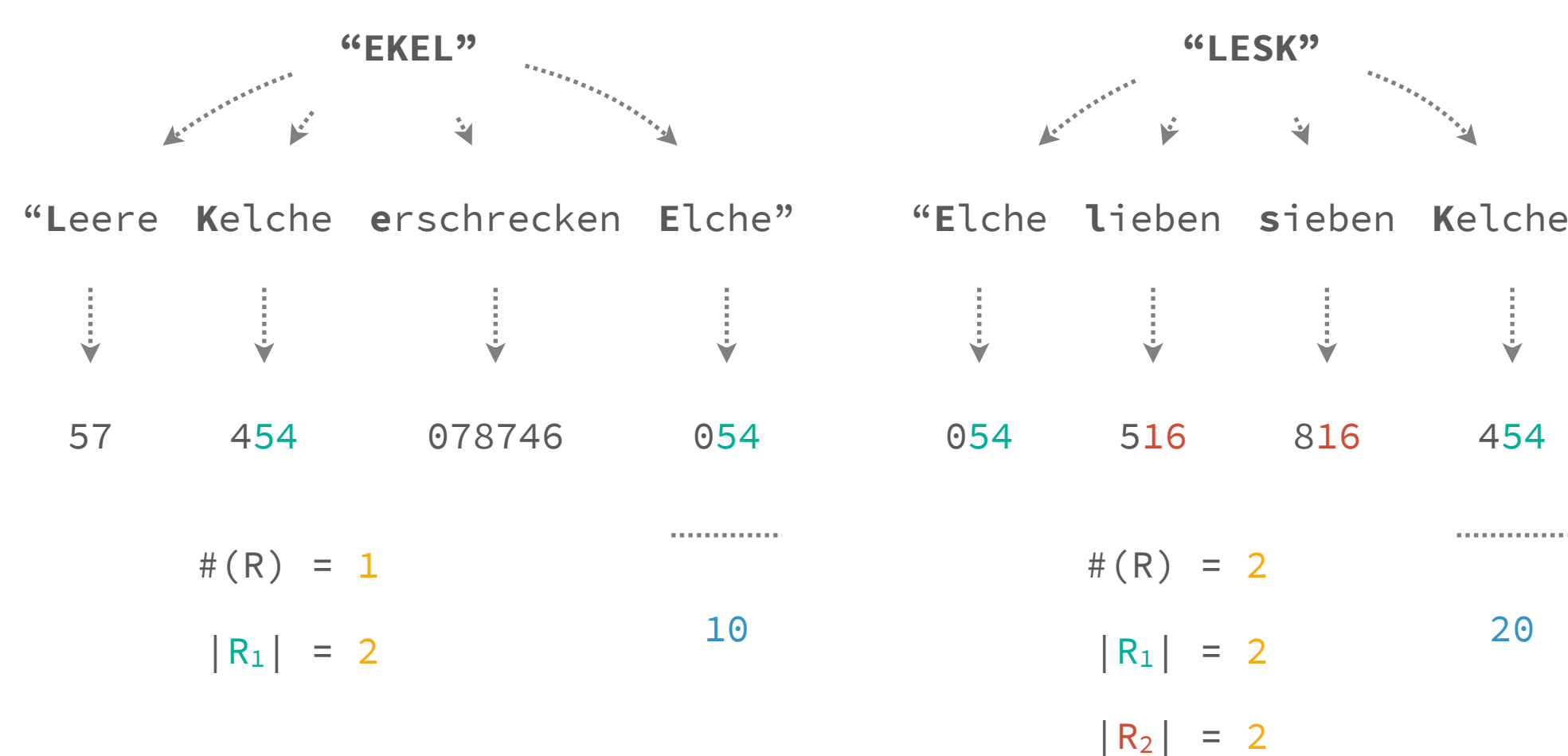
## (3) Participant Similarity Score



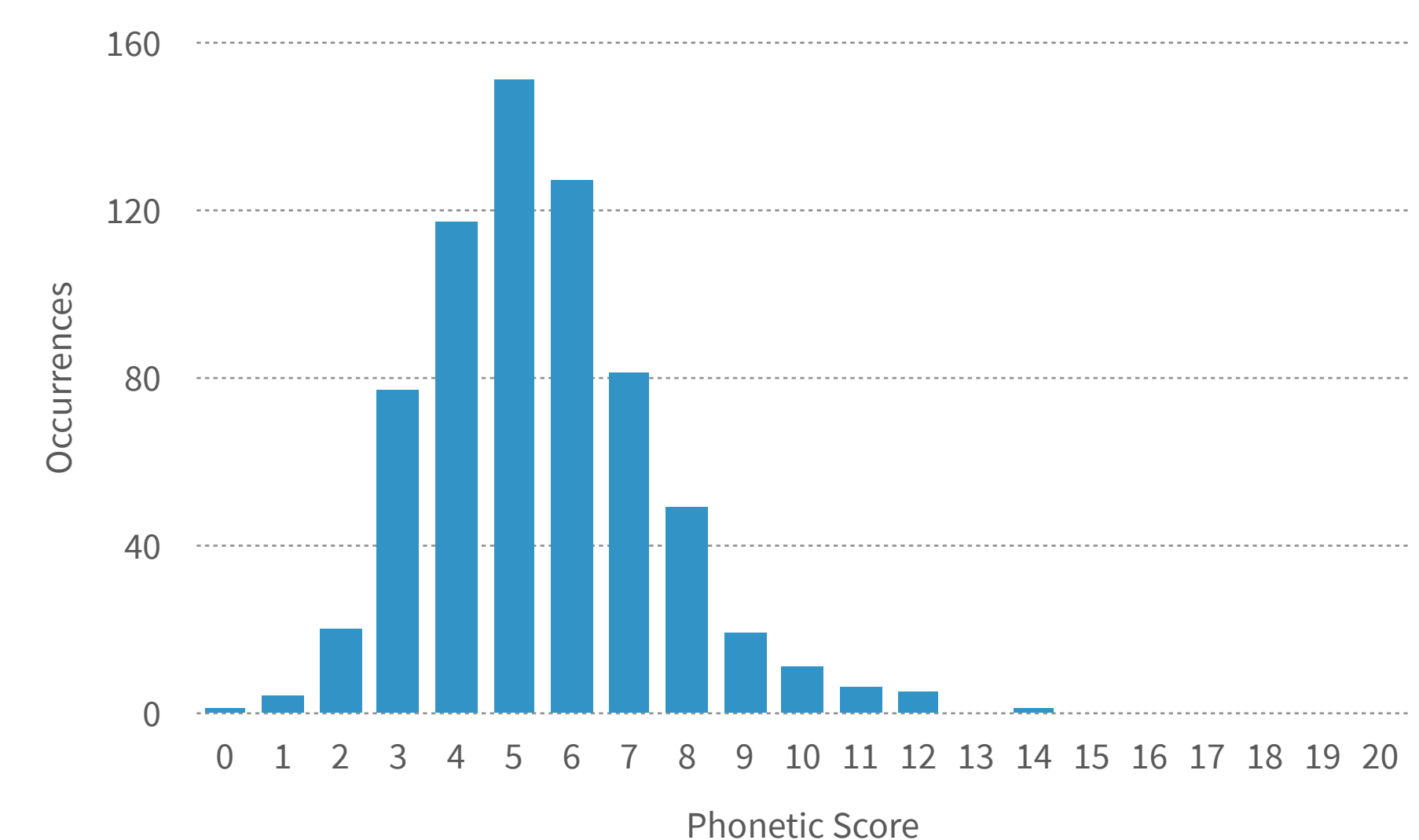
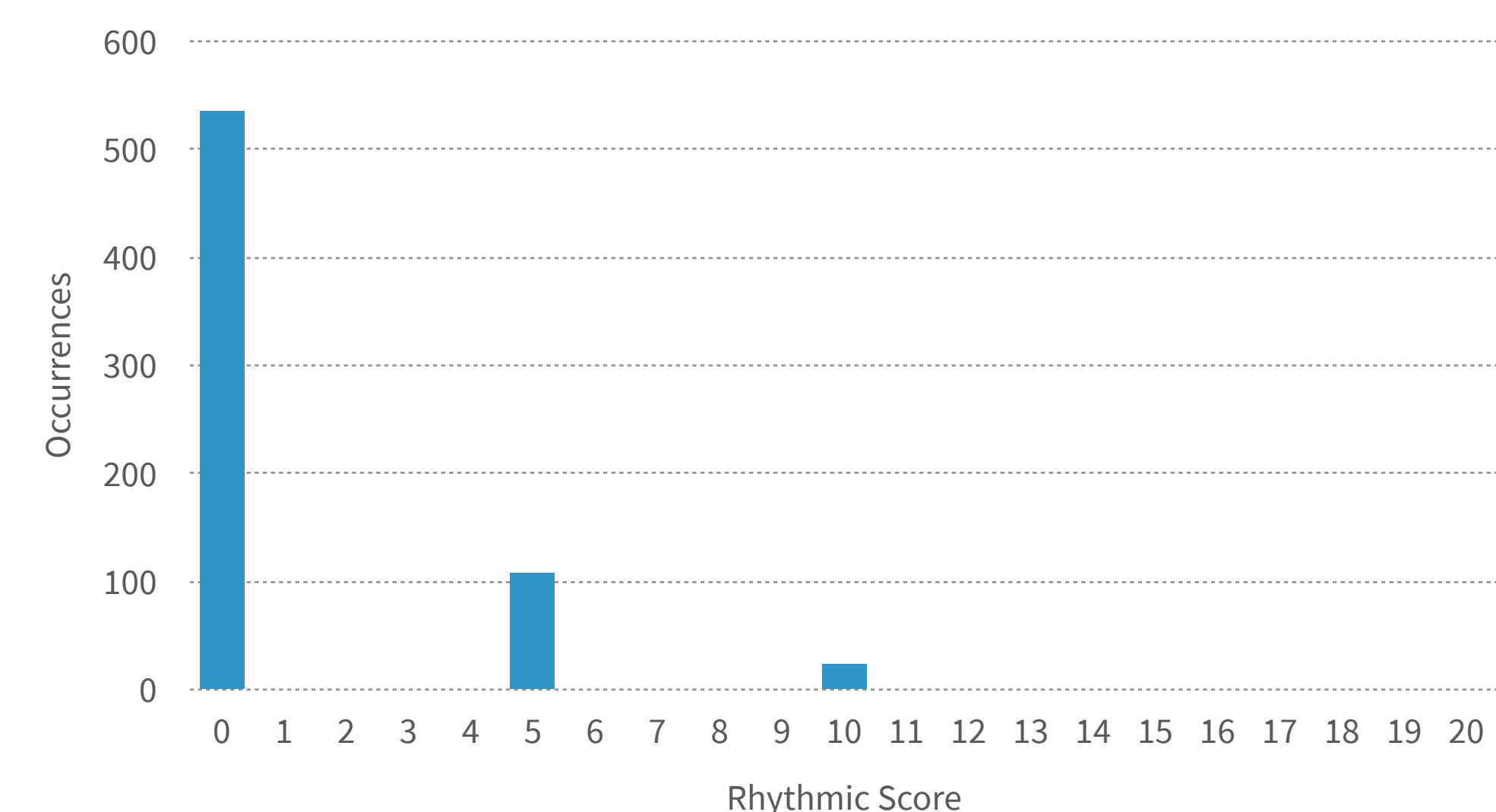
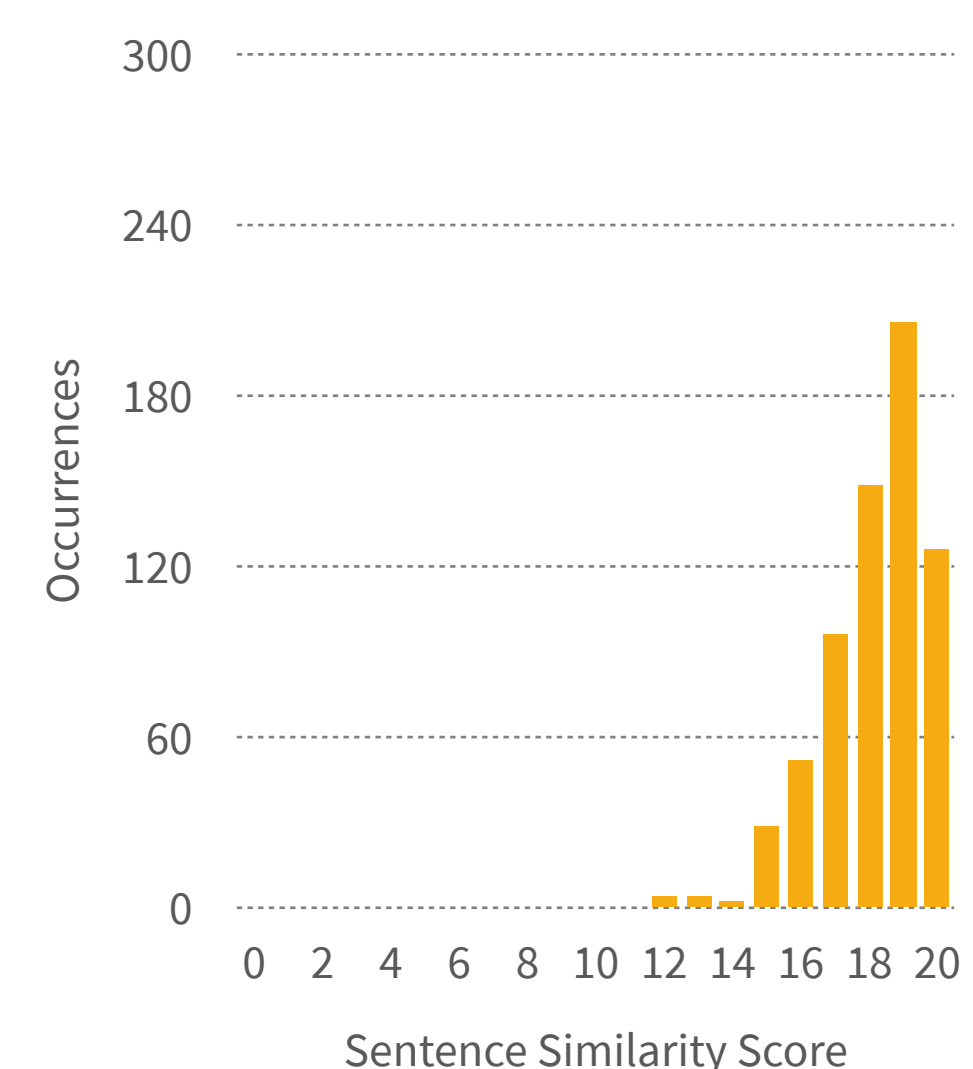
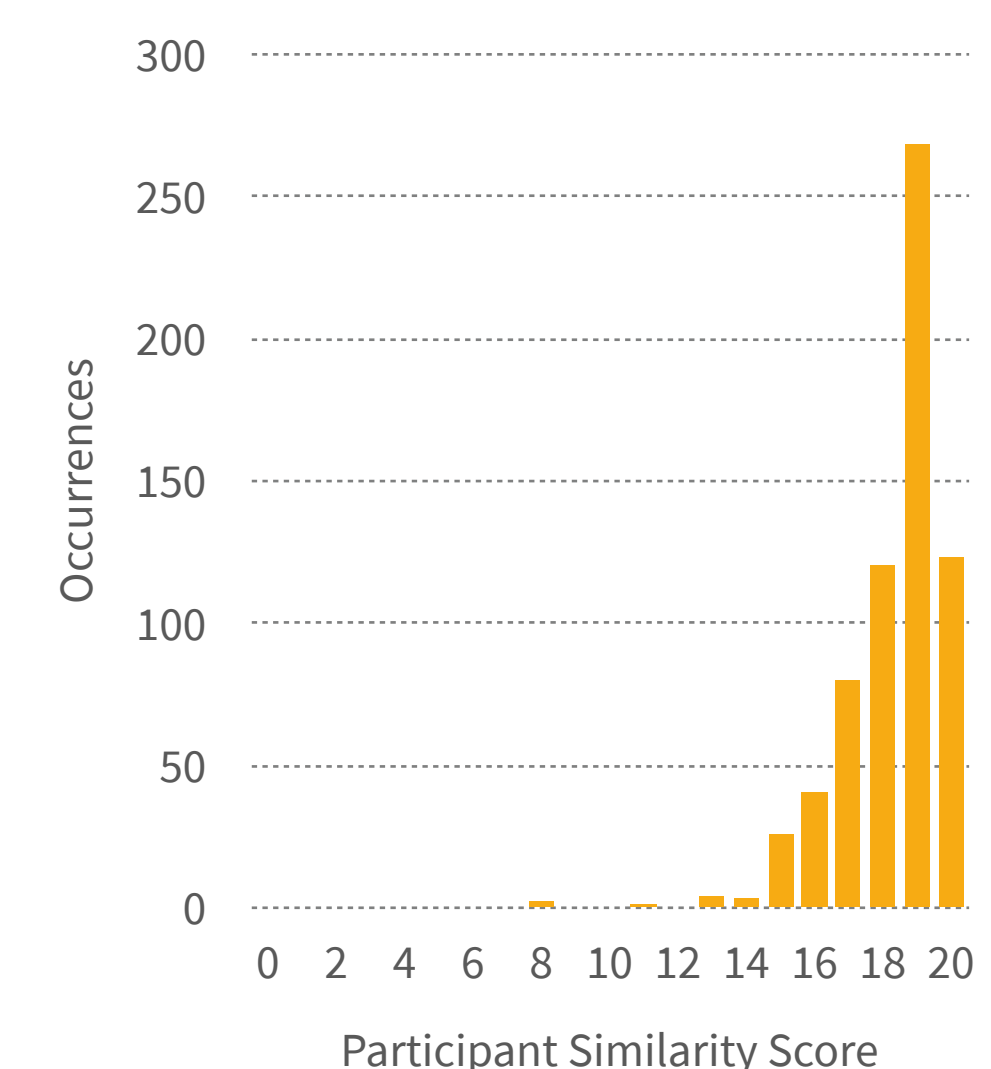
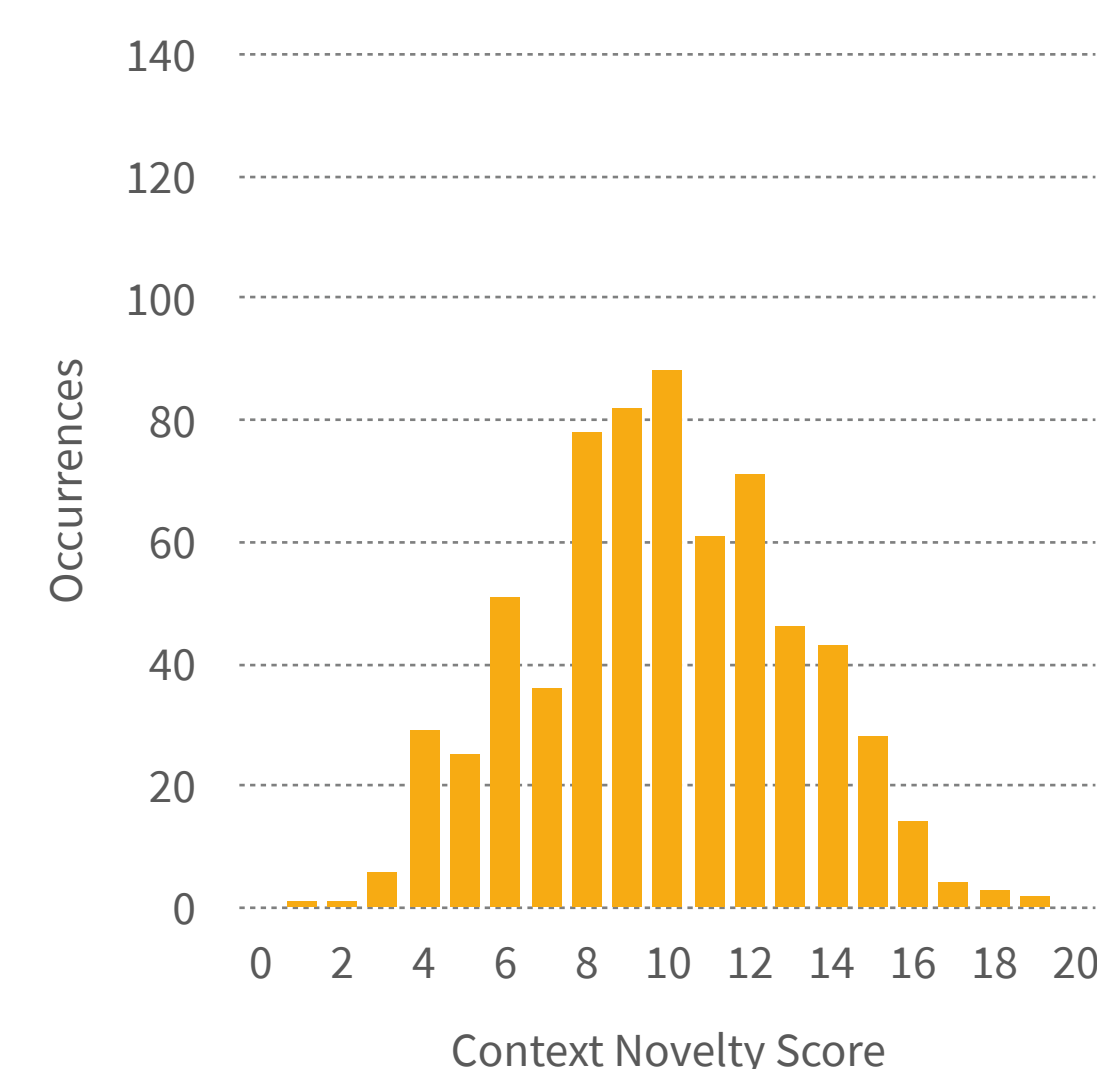
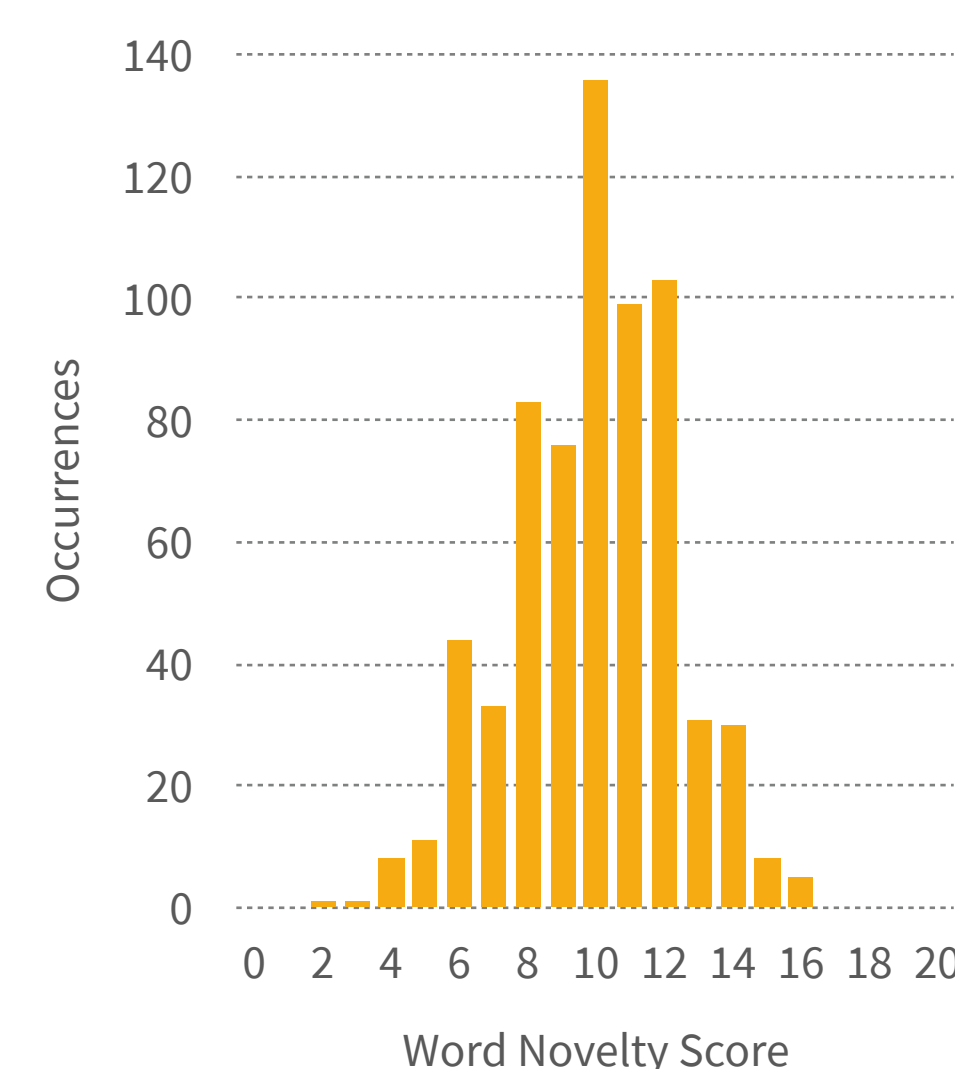
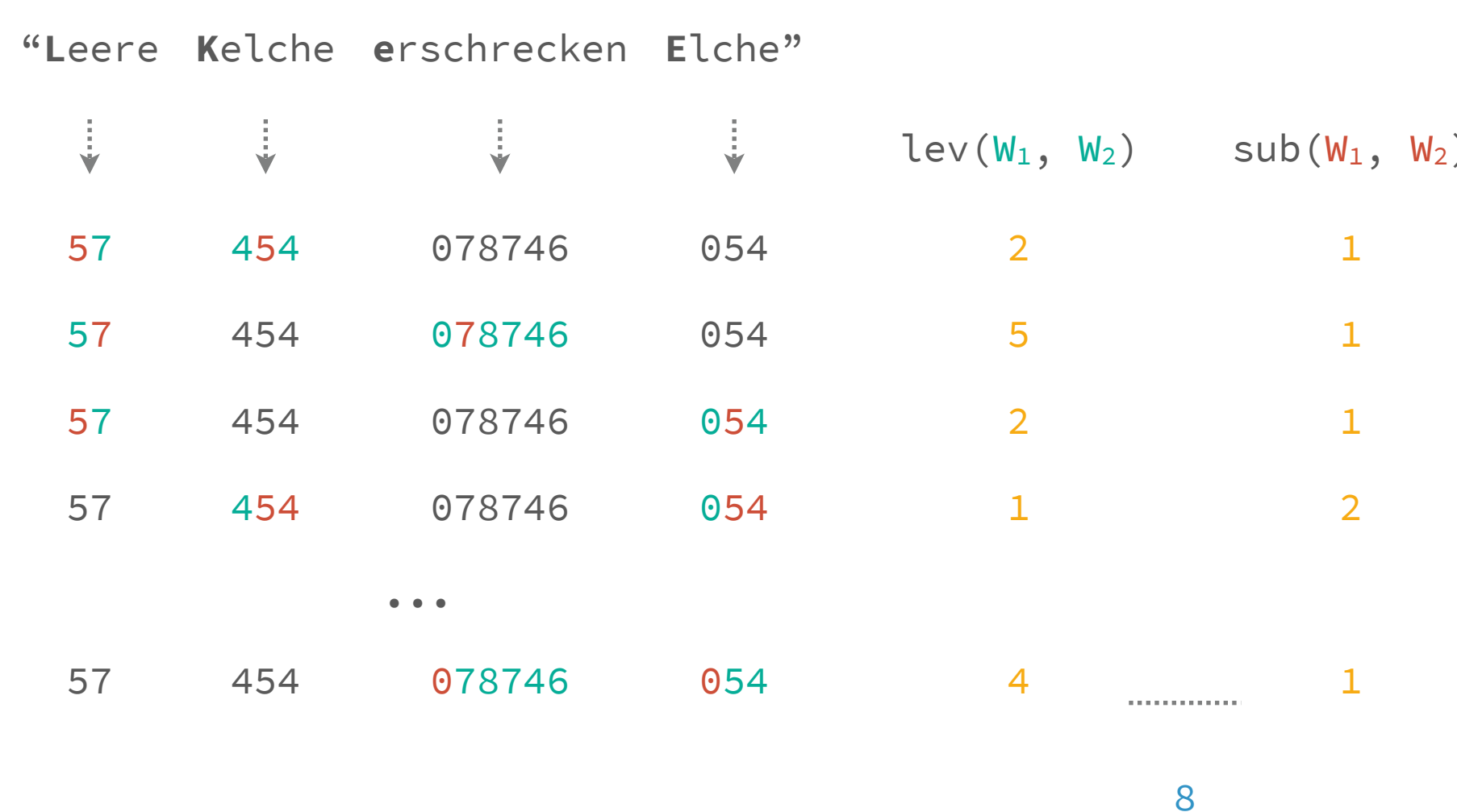
## (4) Sentence Similarity Score



## (5) Rhythmic Score



## (6) Phonetic Score



## (1) Word Novelty Score

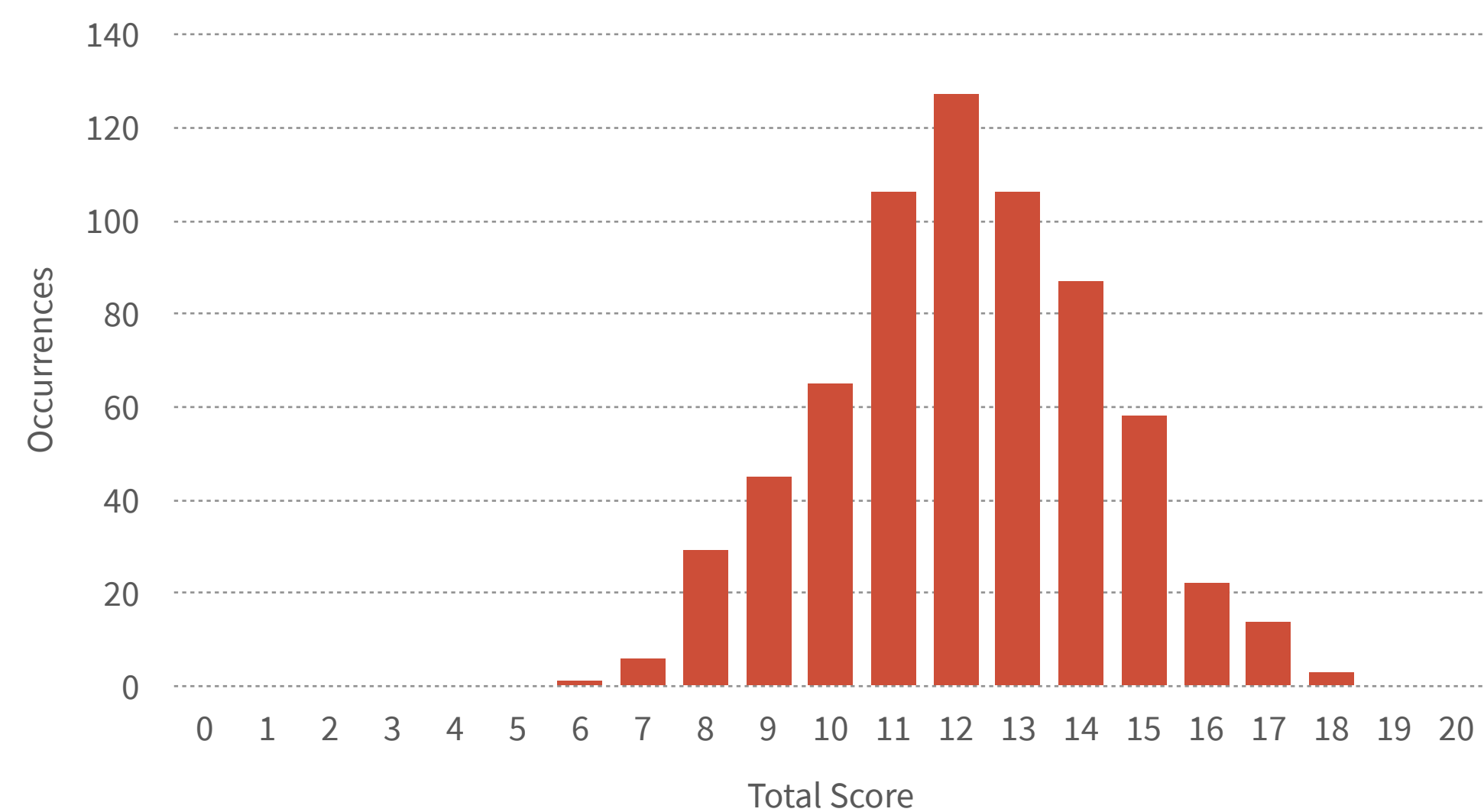
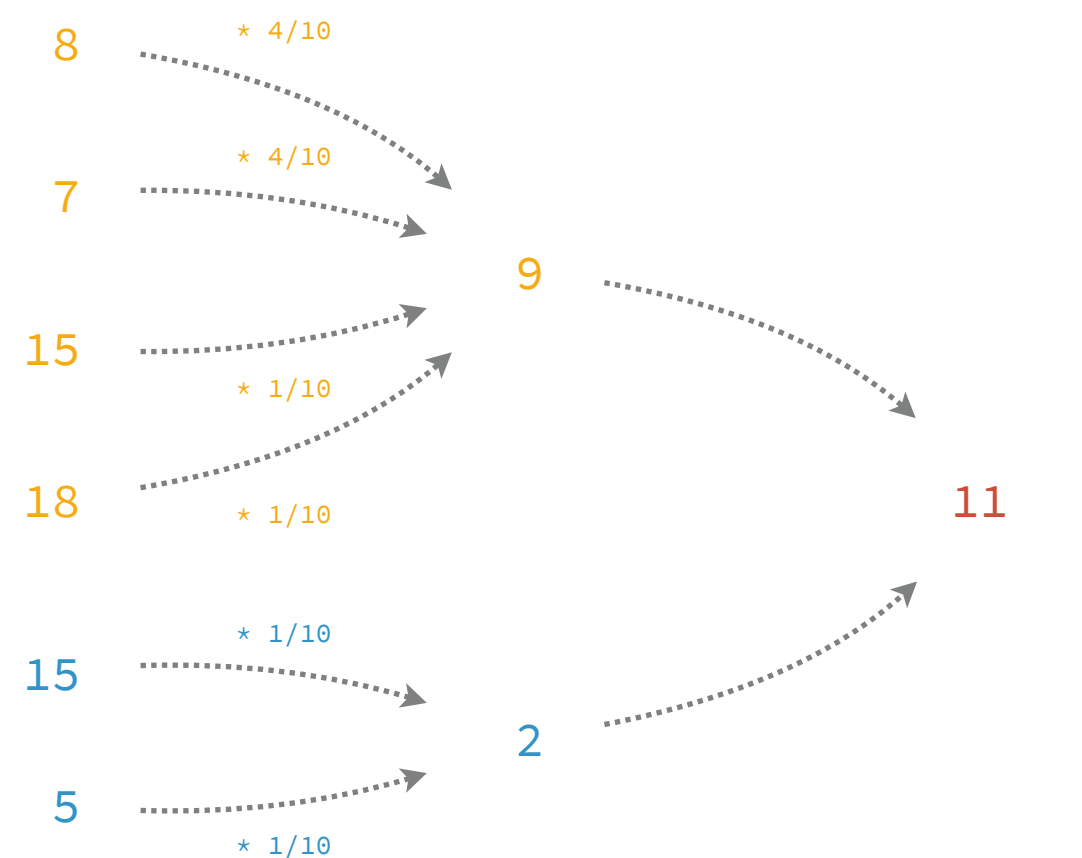
## (2) Context Novelty Score

## (3) Participant Similarity Score

## (4) Sentence Similarity Score

## (5) Rhythmic Score

## (6) Phonetic Score



## Key Features

- Fully automatic analysis of language creativity
- Six creativity scores with customizable weightings
- Two languages (German and English)
- Well documented open-source code
- [https://github.com/odanivan/language\\_creativity](https://github.com/odanivan/language_creativity)

Get in touch and contribute

## Known Limitations

- Word stress (i.e., the proper emphasis of certain syllables) is not considered

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