

# Word Embeddings



# The SAT/TOEFL Synonym Task

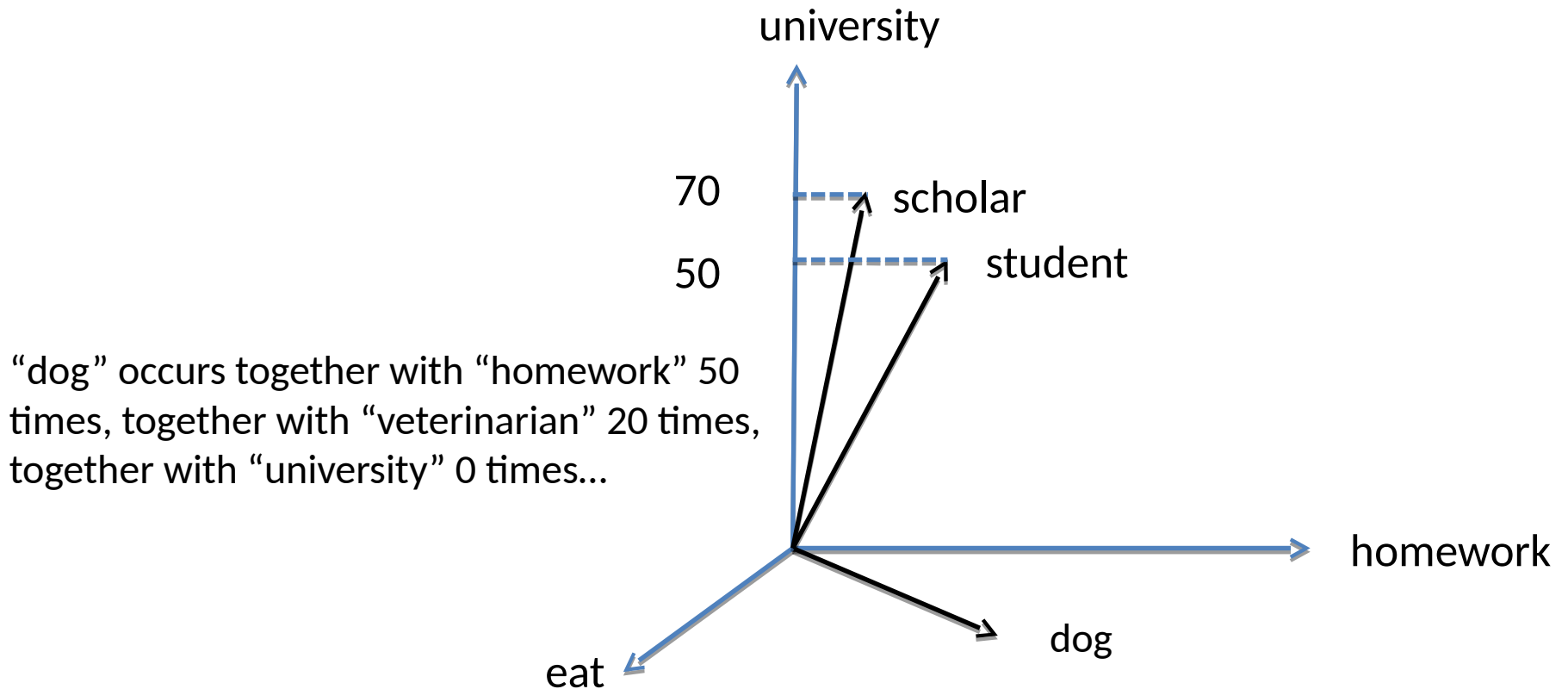
- “Choose the word which best expresses the meaning of the given word”
  - Nifty
    - a) Thrifty
    - b) Caffeinated
    - c) Groovy
    - d) Shifty

# How Related Are Two Words?

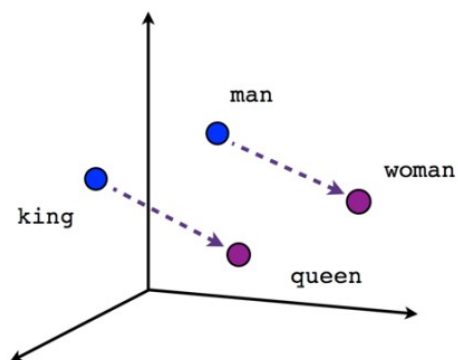
- The Distributional Hypothesis in Linguistics: *words are related if they appear in similar contexts*
- Idea: compute *descriptors* of words by processing novels from Project Gutenberg, and recording how often the word *w* occurs in the same sentence as every other word
  - “dog” occurs together with “homework” 50 times, together with “veterinarian” 20 times, together with “school” 5 times...
  - A good (and common) exercise for using dictionaries/associative arrays!
  - Words are similar if their descriptors are similar

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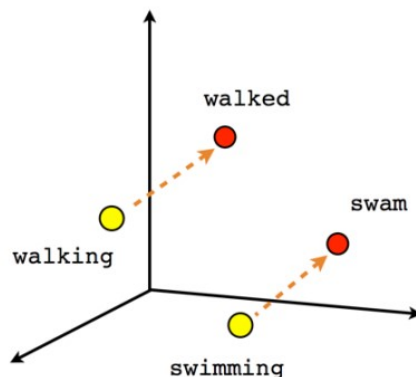
- We can represent words as vectors in n-dimensional space!



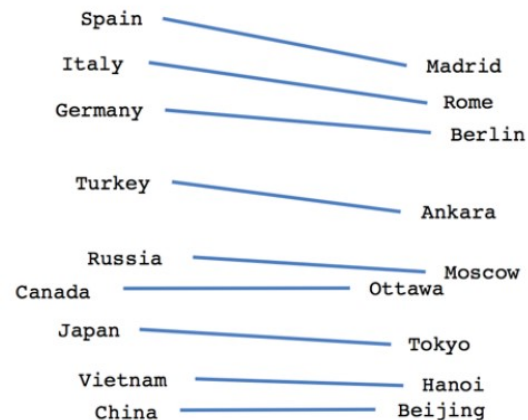
# Word Embeddings: Word2Vec



Male-Female



Verb tense



Country-Capital

- Word2Vec is a more sophisticated word embedding scheme than what we're doing here
- With Word2Vec, we can get things like  $v_{king} = v_{queen} + (v_{man} - v_{woman})$ 
  - No explicit encoding: we just use the Distributional Hypothesis again!