Lexical activations in picture comparison:
A cross-linguistic approach to the relation between language and thought in the mental lexicon
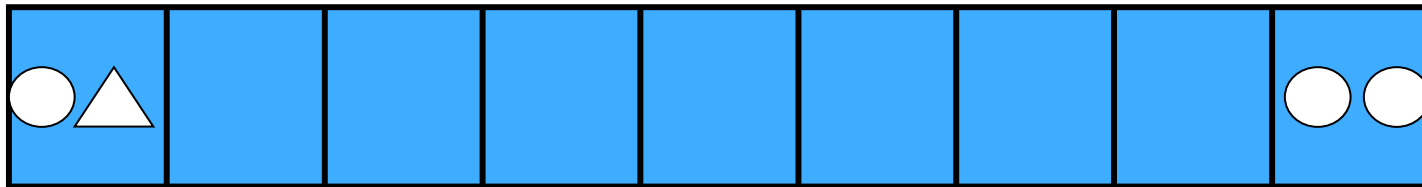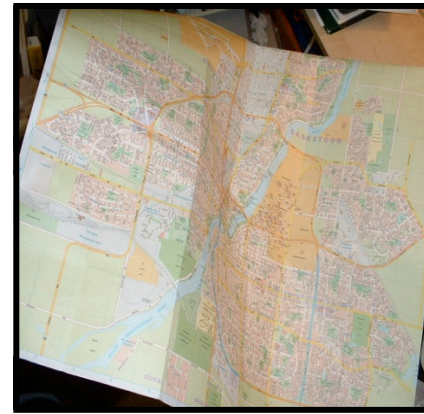
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How Similar Are These ?

Shape ?   Colour ?   Size ?   Phonology ?   Category ?

Research Questions

Does language influence

    how similar we perceive objects to be ?

What lexical properties contribute

    to this perceived similarity ?

Experiment: Picture Comparison

- Participants

    20 native Japanese speakers

    20 native English speakers

- Stimuli

    60 pairs of two pictures with compound names in Japanese

    — 20 pairs shared a head constituent

    sen-ro 線路 'railroad'   me-ro 迷路 'maze'

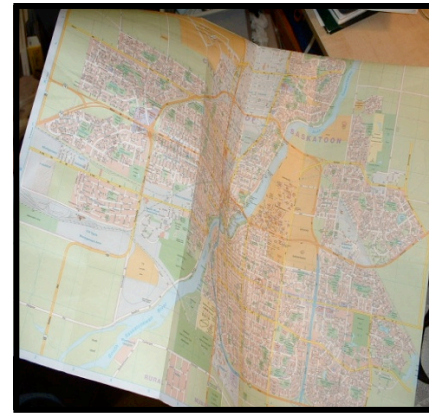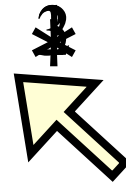   — 20 pairs shared a modifier constituent

    chi-kyu 地球 'the Earth'   chi-zu 地図 'map'

    — 20 pairs shared no constituent

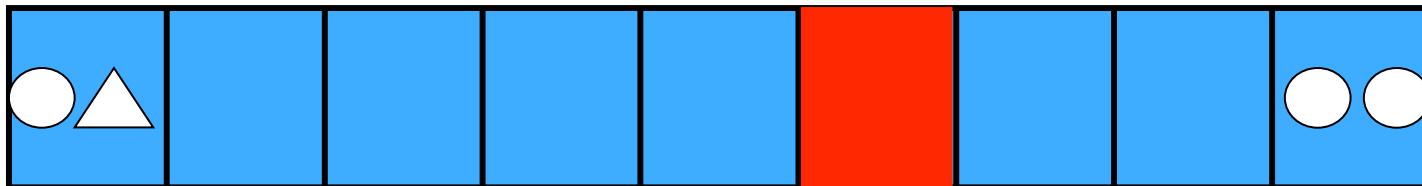   shi-mon 指紋 'fingerprint'   tori-kago 鳥篭 'birdcage'

Experiment: Picture Comparison

chi-kyu 地球 'the Earth'

chi-zu 地図 'map'

Predictions

What kinds of language effects can we expect ?

● Morphological effects: Sharing constituents♪

● Semantic effects: Sharing aspects of meaning

● Frequency effects: Sharing similar frequency of use

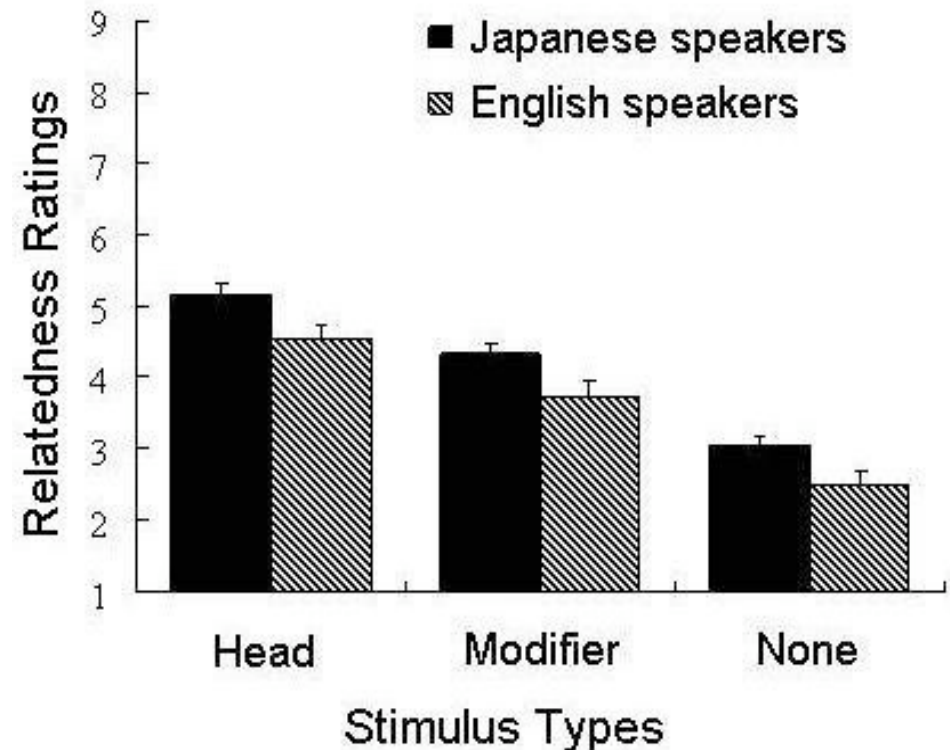● Form effects: Sharing similar length (in letters, phonemes, morae)

Results: Shared Constituency

- Shared constituents allow higher ratings (especially for shared heads)

    sen-ro 線路 'railroad'   me-ro 迷路 'maze'

- This effect is similar for both

    Japanese and English groups.

- Even though English speakers

    do not know Japanese.

- In this case, the head-shared objects

    denote the same basic category.

- What is at issue here is pre-linguistic

    categorization.
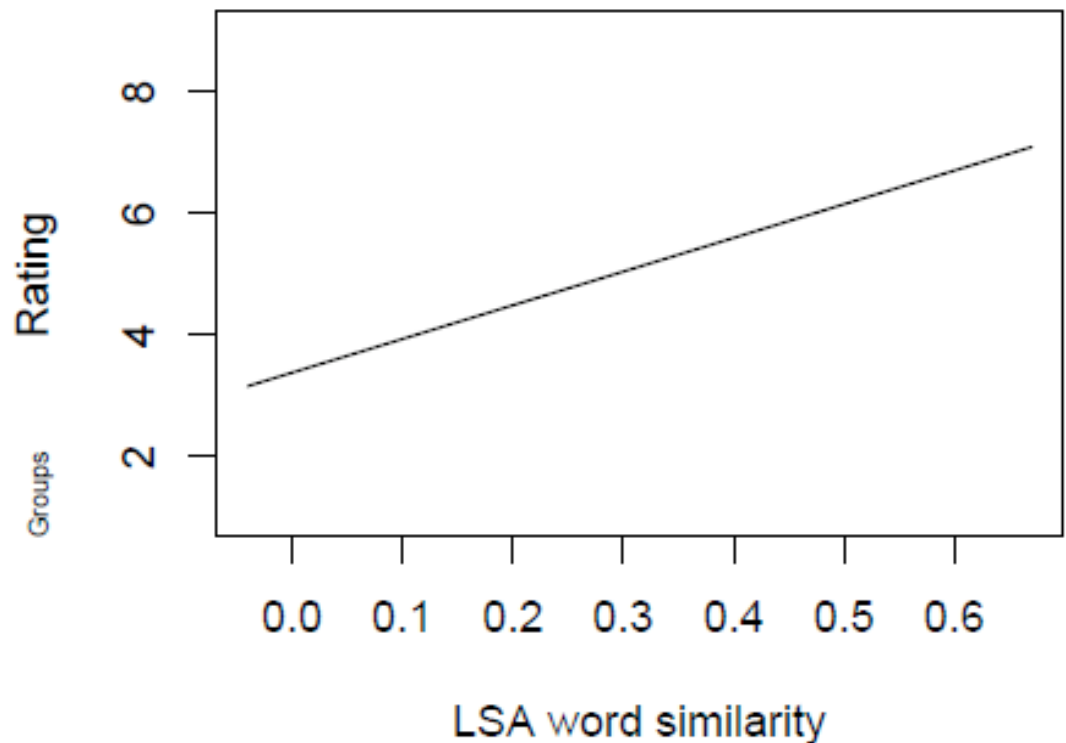
    (language 'following' thought)

Results: Similarity in Meaning

- Intuition: Similarity in meaning might enhance perceived object similarity.

- We measure semantic similarity with LSA scores (vector space semantics).

  e.g. *beetle – caterpillar* (0.67)   *railroad – maze* (0.03)

- LSA word similarity is a strong predictor for both Japanese and English groups.

- Therefore, this predictor is likely to reflect language-general conceptual similarity.
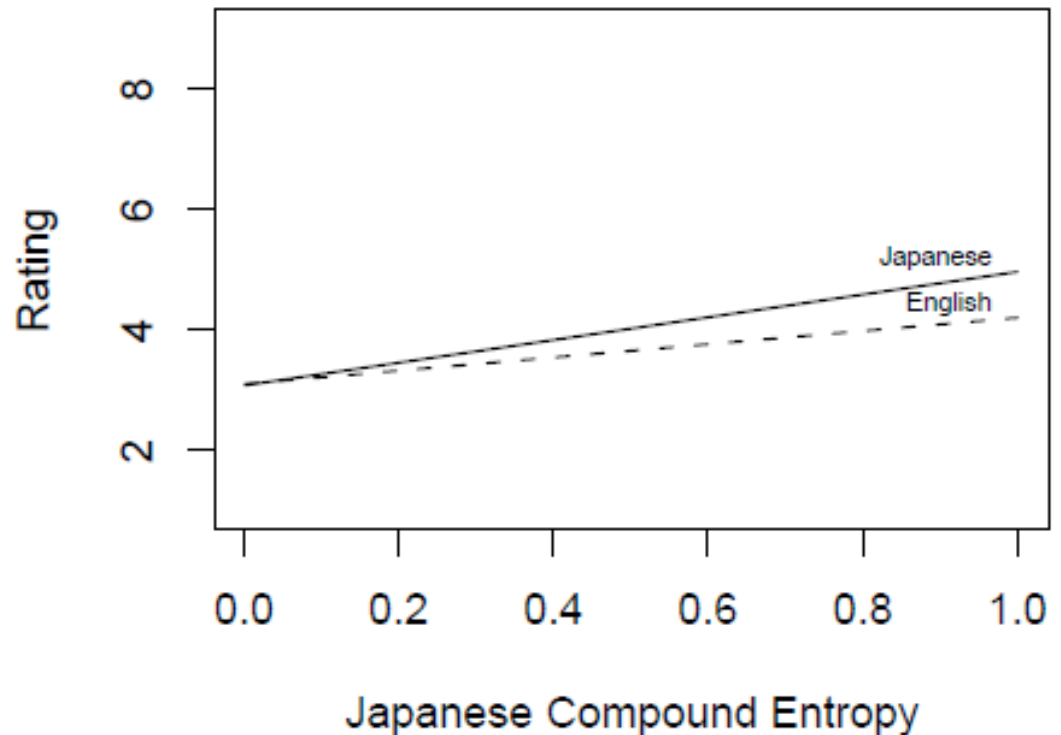
Results: Similarity in Frequency

- Intuition: Similarity in frequency affect perceived object similarity.

  e.g.   Similarly high in frequency: John – Peter
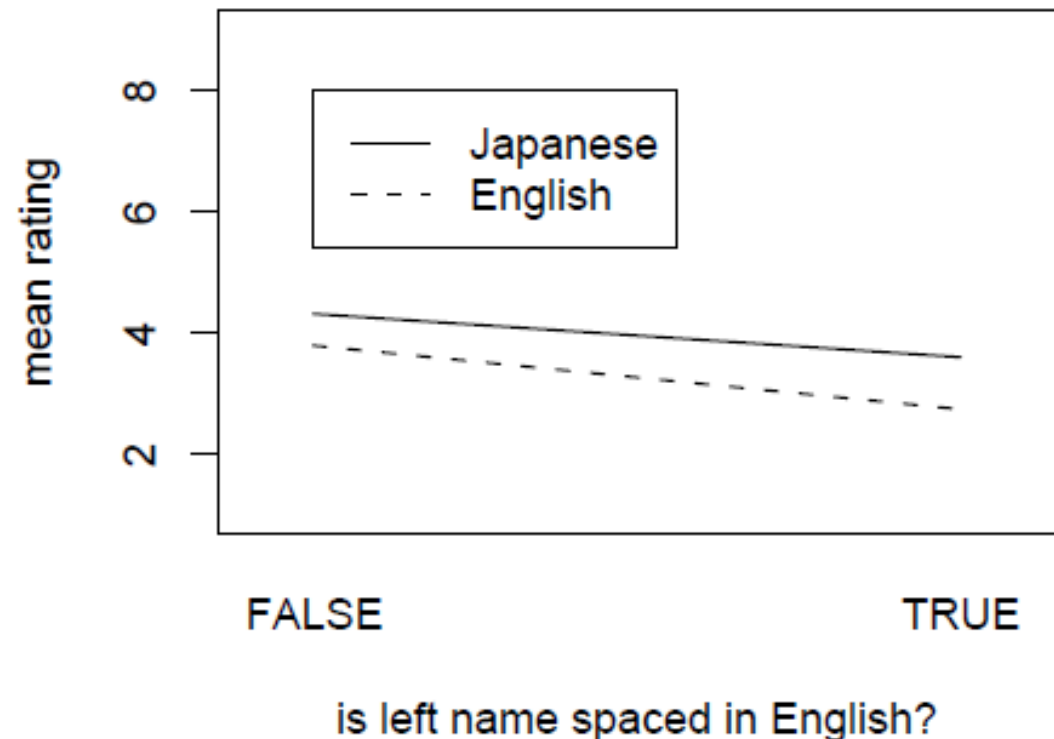
  Similarly low in frequency: Bartholomew – Ebenezer

- We measure similarity in frequency using Shannon's entropy (Shannon, 1948).
- Similarity in frequency was predictive but only for Japanese speakers. (language 'feeding' thought)

Japanese Compound Entropy

Results: Similarity in Orthography

- Intuition: If the names of objects are written similarly, this might increase the similarity ratings.

- If objects' name has internal space (e.g. *apple pie*), then ratings decrease for both left and right pictures.

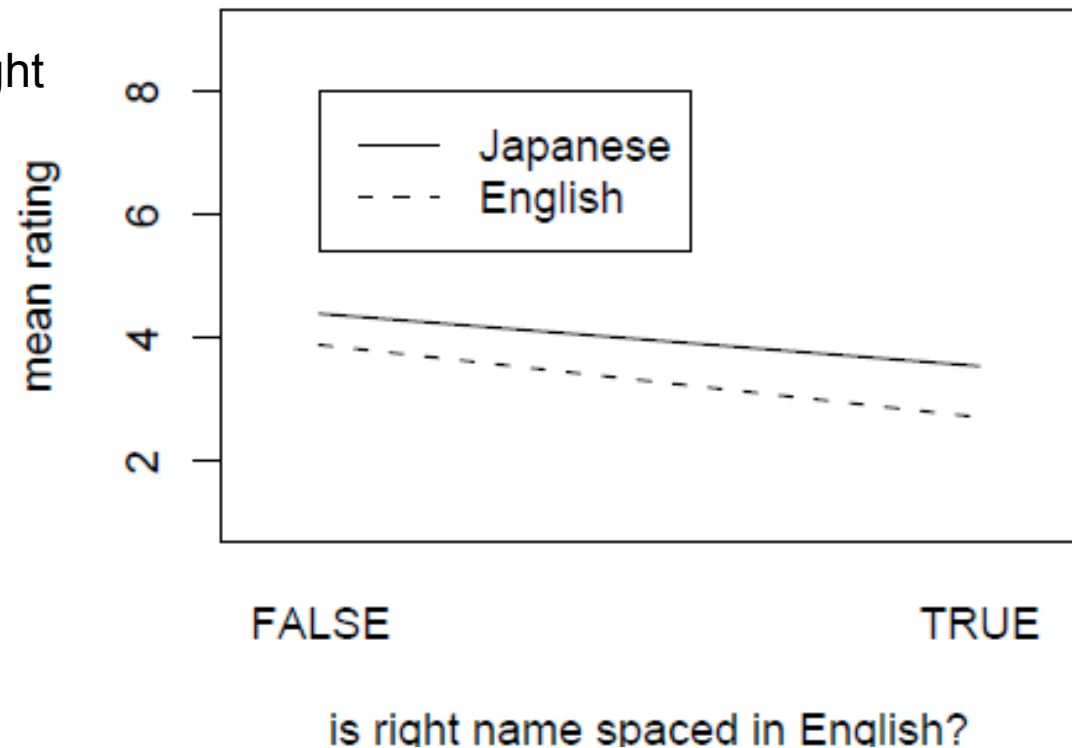# Results: Similarity in Orthography

- This spacing effect was present for both Japanese and English speakers.

- Moving away from the basic category is detrimental for perceived similarity:

    (de Jong et al, 2002)

    => language 'following' thought

- The effect is stronger for

    English speakers.

    => language 'feeding'

    thought.

is right name spaced in English?

Result Summary

Language 'following' thought: large effects

1) Effects of shared constituency
   reflecting cross-language categorization affordance.
2) Effects of similarity in meaning (language-general conceptual similarity.
3) Effects of spacing, reflecting basic versus non-basic category status.

Language 'feeding' thought: small effects

4) The greater effects of complex names with spacing in the language
   using complex names (English).
5) The uniformity of two-kanji compound names in Japanese affords
   similarity effects in terms of frequency.

Conclusion

Our result suggests that language has small effects on perceived object similarity.

(but it remains to be shown that this result generalizes
 beyond the specifics of the picture comparison paradigm).

Thank You

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