Effect of semantics on Hindi Inflection

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Inflection

- Modification of root word to express different tense, mood, voice, number, gender, etc.
- Root word: देख
- Inflections: दिखा, दिखवा, दिखाइए, देखूँगा
- No single rule
- Aim: Compare different computational models for cognitive processes involved in inflection

Connectionist vs Dual model

- Dual model
  - Regular verbs are inflected by rule (add -ed)
  - Exception verb inflections are stored in lexicon(dictionary).
  - The rule is applied by default but if stored inflected form of verb is retrieved, rule application is blocked.

- Connectionist Model
  - No distinct mechanism for regular and exception verbs
  - Single model trained over phonology and semantics of word.

Hindi causative inflection

Causative Inflection

root word + (आ,वा)(not always applicable !!!)

गिरना Fall	गिराना Cause X to fall	गिरवाना Cause Y to cause X to fall

Regular

कर	करवा
लिख	लिखवा
पढ़	पढ़वा

Exception

फेंक	फिंकवा
जोड़	जुड़वा
फूट	फोड़

Kachru, Yamuna (2006)

Experiment

- Measure reaction times for inflection and see correlation with imageability (semantics).

Regular		Exception	
High	**Low**	**High**	**Low**
चढ़ना	भरना	पीटना	सीखना
गिरना	समझाना	उछलना	छापना
चिपकाना	बढ़ना	रोना	देखना
उड़ना	घटाना	खाना	भेजना
हँसना	पहुंचना	नाचना	माँगना
टपकना	बदलना	नहाना	छोड़ना
भागना	रखना	पीना	बाँटना
चलना	ठहरना	बैठना	कहना
लिखना	बनाना	तोलना	डालना

Results

	High imageablitiy	Low imageability
Regular Verbs	1893.7 ms	2117.88 ms
Exception Verbs	1937 ms	1846.8

Table: Mean Response times (RT)

Conclusion
1. Response time for high imageability words is less for regular verbs. Hence, semantics has some effect and people can recall inflections in less time.
2. RT for exception verb is opposite to expectation. This may be due to less number of subjects. However, difference is very small.
3. Results favor connectionist single-mechanism model.

References

1. "Hindi Wordnet", IIT Bombay. 2008
<http://www.cfilt.iitb.ac.in/wordnet/webhwn/>

2. Butler, R., Patterson, K., & Woollams, A. M. (2012). In search of meaning: Semantic effects on past-tense inflection. The Quarterly Journal of Experimental Psychology, 65(8), 1633-1656.