1. Introduction

- Two mechanisms for pronoun interpretation (e.g. Heim, 1982; Reuland, 2001):
  - Discourse-level coreference
  - Semantic-level binding
- Applied to ambiguous VP ellipsis: (1) Bill washed his car, and John did [...], too.
- Variable binding:
  - (1a) “Bill washed Bill’s car, and John washed John’s car, too.”
  - Bill \(\{x \text{ washed } x’s \text{ car} \}\), and John \(\{x \text{ washed } x’s \text{ car} \}\), too.
- Coreference: (assuming overt his vs. Bill, not discourse-salient 3rd party)
  - (1b) “Bill washed Bill’s car, and John washed Bill’s car, too.”
- Bill \(\{x \text{ washed } h_{	ext{Bill}} \text{ car} \}\), and John \(\{x \text{ washed } h_{	ext{Bill}} \text{ car} \}\), too.
- What factors guide resolution of ambiguous elided pronoun in utterances like (1)?
  - Baseline/innate bound variable preference
    - Convergent experimental evidence from studies of children (e.g. Foley et al., 2003; Guo et al., 1996), aphasic patients (e.g. Grodinsky et al., 1993; Vasil et al., 2006), and unimpaired adults (e.g. Frazier & Clinon, 2000; Koorneef et al., 2011).
    - Reuland (2001): operations taking place at semantic level (i.e. variable binding) are less costly than operations at discourse level (i.e. coreference)
  - Lexical semantics of verb and possessed noun
    - Verbal: self/other-directedness (Foley et al., 2003; Guo et al., 1996), implicit causality (Ong & Bravoeane, 2014)
    - Nominal:
      - Animality (Foley et al., 2003; Guo et al., 1996), but with caveats:
        - Examine L1 learners (results may not generalize to adults; task constraints)
        - Compared only part-whole and ownership possession relations (inanimates)
      - Animacy (Dahl & Frarud, 1996), but with caveats:
        - No experimental data, rather subtle judgments
        - Did not examine VP ellipsis specifically
  - Possessives express many types of relations, not just ownership and part-whole
    - O.e. kinship (e.g. her father), other human associations (e.g. his colleague).
  - Many languages: different possessives different morphosyntax (Haspelmath, 2017)
    - Maltese (Haspelmath, 2017): *a/kh* my hand, *i-khek negh’h* my book
    - Suggestive of cognitively distinct classes processed differently?

RESEARCH QUESTIONS:
- Do different possession types modulate interpretational preference?
- How does effect of possession’s animability compare to effect of animacy?

2. Experiment 1

- Tested how four possession relations modulate adults’ bound variable bias
  - Inalienable (e.g. nose, feelings, reputation), [-alienable, animate]
  - Ownership (e.g. bicycle, jacket, newspaper), [+alienable, animate]
  - Animate Relational (e.g. opponent, colleague, roommate), [-alienable(?), +animate]
  - Kinship (e.g. father, daughter, aunt), [+alienable, +animate]
- Two-alternative forced choice, offline, ellipsis interpretation task
  - Target sentences: [Name1] [nonce verb-PST] his/her [noun], and [Name2] did, too.
  - Response choices: (choose the most compatible with interpretation of target)
    - [Name2] [nonce verb-PST] his/her own [noun].
    - [Name2] [nonce verb-PST] [Name1]’s [noun].
- Participants: 48 adult native speakers of American English, recruited through MTurk
- Predictions and hypotheses:
  - Bound variable bias should vary with possession type
  - Animality hypothesis: inanimables result in more BV than aliens
    - Animality hypothesis: inanimables result in more BV than animates
- Results: (glmer used for all comparisons)
  - Inalienable = ownership (p = 0.24)
  - Inanimates > animates (p < 0.001)
  - Animates relational > kinship (p < 0.001)
- Discussion:
  - Animacy hypothesis supported (inanimates > more animates than animates)
  - Possession’s animacy predicts bound variable bias better than animability
  - Replication studies:
    - Different IVs, research question
    - Same DV; substantially similar items
    - Cross-study comparisons:
      - Ownership does not differ from Exp. 1 (p = 0.22)
      - Animates lower than Exp. 1 (p < 0.01), i.e. even more distinct from inanimates
      - Animates relational > kinship (p < 0.01), same as in Exp. 1

3. A Model of Discourse Representation

- We propose a simple model inspired by file change semantics (Heim, 1982)
  - Possessed nouns differ in the [in]dependence of their discourse representations
    - Animacy modulates discourse [in]dependence
      - Animacy (animate > kinship) discourse status [in]dependence more likely
      - Independent discourse status variable binding more likely
      - Possession animacy is significant predictor of which representation is selected
    - But other factors also contribute (e.g. situational knowledge, verbal semantics)
- Results indirectly support earlier hypothesis about role of possession type
  - People have assumptions that certain nouns are more likely to be possessed
  - No evidence that plausibility of possession influences rate of BV interpretation
  - Results indirectly support earlier hypothesis about role of possession type

4. Experiment 2

- What if BV/coresferential preference determined by simple real-world plausibility?
  - E.g. “Bill washed his car, and John did, too.”
    - John is likely to have his own car variable binding
    - John is unlikely to have his own car coresferential
  - Participants (n = 28) rated likelihood of possession by average person for 65 nouns
  - Ratings on 1-to-6 scale
    - 1 “An average person is not likely at all to have at least one ___.”
    - 6 “An average person is extremely likely to have at least one ___.”
  - Included all possessed nouns from Exp. 1 targets

- Results:
  - Tested correlation between nouns’ mean z-scored rating and BV bias in Exp. 1
  - No significant correlation (Pearson’s r = 0.13, p = 0.38)
- Discussion:
  - People have assumptions that certain nouns are more likely to be possessed
  - No evidence that plausibility of possession influences rate of BV interpretation
  - Results indirectly support earlier hypothesis about role of possession type

5. General Discussion

- The possessed noun’s animacy plays a significant role in ambiguity resolution
  - Animacy better explains pattern of results in Exp. 1 and replications
  - Exp. 2 rules out alternative hypothesis that real-world plausibility drives preference
- A simple model accounts for experimental data
  - Possessed nouns differ in the [in]dependence of their discourse representations
    - Independent discourse representation coresferential more likely
    - Dependent discourse representation variable binding more likely
- Future work:
  - Why the difference in BV bias between animate relational and kinship nouns?
  - Kin refersents simply more independent due to cultural prominence/salience?
  - Real-time processing, computational implementation

Animacy and possession type guide interpretation of ambiguous VP ellipsis
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References:


