

Evidence Against Clause Boundedness and Hierarchical Distance in Subject-Verb Agreement Production

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INTRODUCTION

Mismatch effect: More subject-verb agreement errors when head noun of the subject NP is singular and local noun in modifier is plural (Bock & Miller, 1991).

What factors influence the mismatch effect?

Structural Accounts

Clause Boundedness: Number features of nouns in separate clauses cannot interfere with each other because the planning unit in language production is the clause (Bock & Cutting, 1992).

Hierarchical Distance: Number features of the head noun of the subject NP are passed to the verb; plural features of local nouns occasionally pass incorrectly to the verb, causing errors. Errors are less likely when plural is hierarchically distant from subject NP node (Franck et al., 2002).

Timing of Planning Accounts

Semantic Integration: Elements within an utterance that are conceptually linked are planned with more overlap, allowing their features to interfere with each other (Solomon & Pearlmuter, 2004).

Scope of Planning: Local nouns planned closer in time to the head noun, due to linear proximity and semantic integration, are more likely to interfere with agreement computation (Gillespie & Pearlmuter, 2009).

-Do structural or timing-of-planning properties determine interference effects?

-Are individual clauses planned independently?

-How will testing these accounts inform models of agreement production?

METHOD

Stimuli & Design for Experiments 1 & 2

Phrase: The pizza with the missing slice(s)

Clause: The pizza that had the missing slice(s)

- Semantic integration equated across structure
- Singular head nouns
- Singular vs. plural local nouns
- 24 critical items; 88 fillers (24 plural head)

Experiment 1: Procedure & Participants

- Preambles presented visually, participants read aloud and completed as full sentences.
- 56 participants (56 included in ANOVAs)

Experiment 2: Procedure & Participants

- Preambles presented visually, read silently, repeated aloud after a tone, and completed as full sentences.
- Encouraged deeper processing of preambles.
- 62 participants (55 included in ANOVAs)

PREDICTIONS

Structural Accounts

- Main effect of local noun number
- Local noun number x modifier type interaction:
Phrase mismatch > Clause mismatch

Timing of Planning Accounts

- Main effect of local noun number
- No interaction:
Phrase mismatch = Clause mismatch

RESULTS

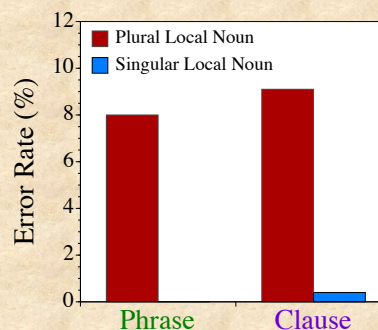
Both Experiments

- Plural > Singular
- No modifier type effect
- No local noun number x modifier type interaction

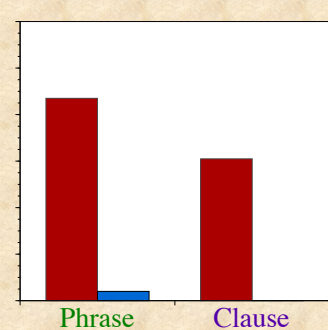
Identical statistical patterns for subject- and item-based analyses (with and without dysfluencies) using:

- ANOVAs on untransformed proportions
- ANOVAs on arcsine-transformed proportions
- empirical logit weighted linear regressions (Barr, 2008)

Experiment 1



Experiment 2



DISCUSSION

Timing of Planning properties determine interference effects.

- No evidence for clause boundedness or hierarchical distance.
- Supports and extends Gillespie & Pearlmuter's (2009) scope of planning account of agreement production:
Plural local nouns planned close in time to the head noun cause interference, regardless of structural properties.

Individual clauses are not planned independently.

- Equal interference effects were observed from elements within and across clauses.

Implications for Models of Agreement Production

Previous studies with clausal modifiers found a clause boundedness effect when length and semantic integration were equated (Bock & Cutting, 1992; Solomon & Pearlmuter, 2004).

Open question: Did something besides structure cause error rate differences? (e.g., content vs. function linking words)

The current studies suggest models of agreement processing do not require a hierarchical component.

Scope of planning approach makes use of the sequential and temporal nature of language production.

Suggestion: Use a measure of a local noun's relative timing of planning to predict mismatch effect sizes.

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