**INTRODUCTION**

Semantic Integration (Solomon & Pearlmutter, 2004)
Degree of conceptual relatedness between to-be-planned utterance elements
- Semantically related (related in meaning) vs. Semantically integrated
  - the *ketchup* and the *mustard*
  - the *bracelet* made of *silver*

Pearlmutter & Solomon (2007)
Exchange-error elicitation experiments
Picture stimuli varied in Integration and Description Preference (determined by prior norming).

Test phase:
- Picture appeared.
- Linking word appeared below, with a 2000 ms SOA.
- Ss described pictures using noun labels and link.

- Picture → Message → Relationships between words → Ordered slots

### PHRASE VS. WORD ERRORS

Pearlmutter & Solomon’s error rates:
Integration affects exchange error rates.
- Errors more likely for *Integrated* than for *Unintegrated*.

Integration affects timing of planning of utterance elements (cf. Gillespie, Pearlmutter, & Shattuck-Hufnagel, 2010):

- **Integrated**
  - Constituents planned close in time.
- **Unintegrated**
  - Constituents planned far apart in time.

**Pearlmutter & Solomon's exchange errors: Phrase or word exchanges?**

- Intended response: the *spot* on the *apple*
- Phrase exchange: the *apple* on the *spot*
- Word exchange: the *spot* on the *apple*

Stimuli that elicit differentiable phrase and word errors needed:
Colorized versions of Pearlmutter & Solomon’s picture stimuli

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**INCREMENTAL VS. COMPETITIVE GRAMMATICAL ENCODING**

Pearlmutter & Solomon’s production latencies examined incremental vs. competitive processing in grammatical encoding.
- Two utterance types, based on number of word orders that convey message:
  - Unconstrained Order
  - Two possible word orders
  - Constrained Order
  - Prefered and Unpreferred cases

At any one point in utterance planning, processing can be incremental or competitive (V. Ferreira, 1996)

- **Incremental**
  - First available noun placed in first noun slot.
  - Determines the rest of the utterance’s structure.
  - Speeds Flexible relative to Preferred and Unpreferred.
- **Competitive**
  - Multiple orders compete for selection.
  - Slows Flexible relative to Preferred and Unpreferred.

**Pearlmutter & Solomon’s production latencies suggest incremental processing:**
- Flexible & Preferred < Unpreferred.

**Experiment 2 Phrase and Word Errors**

### EXPERIMENTS 1 & 2

**Does semantic integration affect full noun phrase or individual lexical item planning?**

**Are complex noun phrases planned incrementally or competitively?**

**Stimuli**
- 36 pictures featuring an object and attribute, or two common related objects.
- Varied in integration level and description preference:
  - 18 *Integrated* pictures
    - the *green spot* on the *blue apple*
    - the *blue apple* with the *green spot*
  - 18 *Unintegrated* pictures
    - the *red shelf* above the *green sink*
    - the *green sink* below the *red shelf*

**Procedure**
- Two familiarization phases
  - Grayscale version of each picture presented with noun labels.
  - Ss instructed to focus on learn labeled parts of picture.

- **Test phase**
  - Colored version of each picture appeared.
  - Linking word appeared below, with a 2000 ms SOA.
  - Ss described pictures using noun labels, color words, and link.

- **Experiment 1**
  - As Experiment 1, but grayscale picture appeared first.
  - Grayscale picture replaced by colored version after SOA.

### RESULTS

**Error Rates**
- Majority of errors were phrase exchanges: Fully planned NPs exchanged.
- Analyzable amount of word errors elicited in Experiment 2 only:
  - Greater separation between planning of noun and planning of adjective

**Production Latencies**
- Correct responses only; latencies ≤ 3000 ms excluded.

**Integ > Unint for phrase and word errors**
- Integration affects ordering of full phrases and individual lexical items.

**REFERENCES & ACKNOWLEDGMENTS**

**CONCLUSIONS**

Semantic integration influences planning of full phrases and individual lexical items.

- Strong support for incremental processing in complex noun phrases
- Flexibility eased production, not compatible with competitive model.

- Additional context words did not introduce competition.
- No evidence for competition when planning Det-Adj-N NPs
- Incrementality maintained in Experiment 2, even with some separation between planning of adjective and planning of noun.

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