# Timing of Lexical Activation in Determiner–Adjective–Noun Phrase Production

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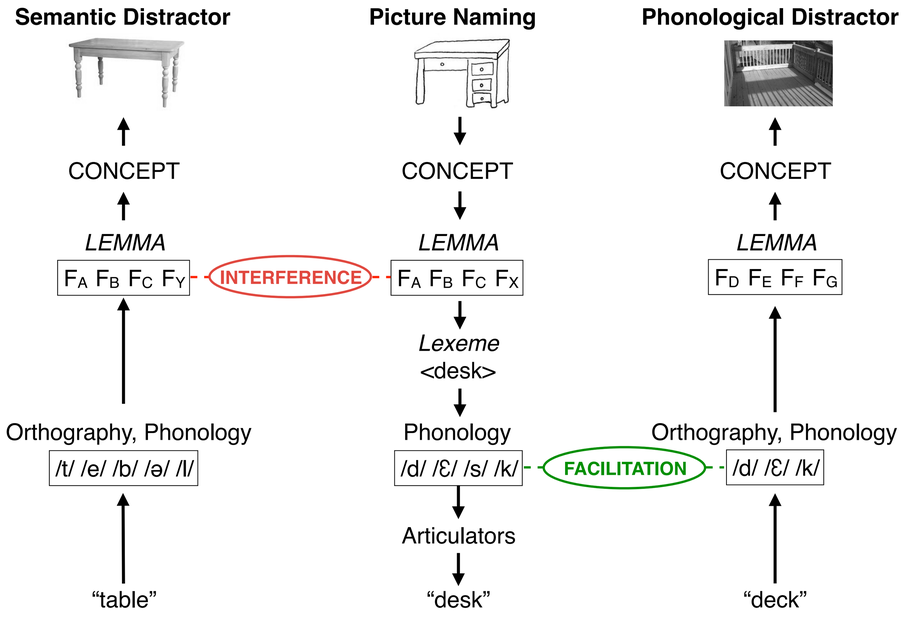
## INTRODUCTION

### How are an NP's content words activated for production?

#### Lexical Activation in Isolated Noun Production

**Schriefers, Meyer, and Levelt (1990), in Dutch**
Picture–word interference paradigm with isolated N expected responses
Pictures of common objects
Semantically related, phonologically related, and unrelated spoken distractor words
Distractors presented at 3 SOAs (time between picture presentation and distractor).




Semantic interference at -150 ms SOA; phonological facilitation at 0 and +150 ms SOAs
**Lemma activation precedes lexeme activation for isolated Ns.**

#### Lexical Activation of Nouns and Adjectives in Noun Phrases

NP to be produced: *the green dress*

| Adj | N | |
|---|---|---|
| | | 2 content words from 2 grammatical categories in lexicon |
| *GREEN* | *DRESS* | 2 *LEMMAs* activated |
| ↓ | ↓ | ↓ |
| /grin/ | /drɛs/ | 2 *lexemes* activated |

**Schriefers (1992, 1993), in Dutch**
Semantically related, identical, and unrelated distractors; no condition related only by phonology
-200, 0, 200, and 450 ms SOAs
Determiner (*de groene jurk*) and no-determiner (*groene jurk*) NP expected responses

**Semantic interference for Ns and Adjs at -200 and 0 ms SOAs**
**- Dependent on experiment, determiner presence, and target–distractor gender congruency**

**Issues**
- Lemma information for Ns and Adjs from separate experiments/separate data sets
- Many target Ns, from multiple categories; but few target Adjs, from a single category
- Semantically related and unrelated N distractors from target set; Adj distractors not targets

### Goal of current experiments: Examine lexical activation in NPs with picture–word interference and a revised design

Picture–word interference paradigm with related and unrelated distractors

N and Adj targets from equal number of categories (2 each); distractors from outside of target set

Noun category: **Shape**
Adjective category: **Color**

Noun category: **Clothing**
Adjective category: **Pattern**

### Current experimental questions

**1) What is the time course of lemma and lexeme activation for Ns and Adjs in NPs?**
Isolated N lemma selection precedes lexeme selection by some amount of time.
Temporal separation of lemma and lexeme retrieval may change in full NP case.

**2) Which content word (N or Adj) is activated first at lemma level? At lexeme level?**
**2 possibilities investigated in current experiments**

**Role driven**
Head of NP selected first.
N selected first, then Adj selected.

**Linear-order driven**
Words selected in production order.
Adj selected first, then N selected.

## GENERAL METHOD

### Materials and Design

#### Picture Stimuli with N and Adj Production Targets

12 line drawings of objects from two N categories: shape and clothing
12 attributes from two Adj categories: color and pattern
144 pictures total: all combinations of Ns and Adjs

#### Distractor Words for Each Target

| | |
|---|---|
| *Semantically related* | One word from same category as target N or Adj |
| *Phonologically related* | One word with same onset and nucleus phonemes as target<br>Some also orthographically related |
| *Unrelated* | One word unrelated to target semantically and in onset or nucleus phonemes |

Length- and frequency-matched within minor category (e.g., shape, color).

| Picture | Grammatical Category | Semantic Category | Label | Distractors: Semantic | Distractors: Phonological | Distractors: Unrelated |
|---|---|---|---|---|---|---|
|  | Noun | Shape | triangle | rhombus | trial | lollipop |
| | Adjective | Color | purple | beige | perfect | tiny |

#### SOAs

*3 negative SOAs* -200 ms, -150 ms, -50 ms
*3 positive SOAs* 100 ms, 200 ms, 250 ms

**Each picture appeared in 36 conditions, counterbalanced across 36 lists.**
- Distractor type (semantic, phonological, unrelated)
- Target type (N and Adj; grammatical category of word targeted by distractor)
- SOA (6 levels)

#### Reaction time (RT) measured.

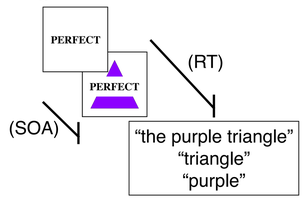
- Production latency between onset of picture and participant's response

### Procedure

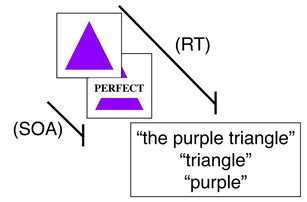
**Familiarization phase**
Phase 1: Grayscale versions of each object presented with noun label below.
Phase 2: Each color and pattern presented in 2-inch square with adjective label below.

**Test Phase**

***Negative SOAs***




***Positive SOAs***

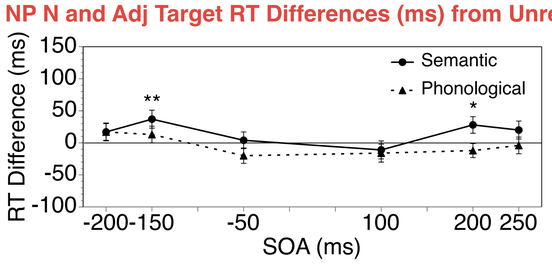



## EXPERIMENT 1

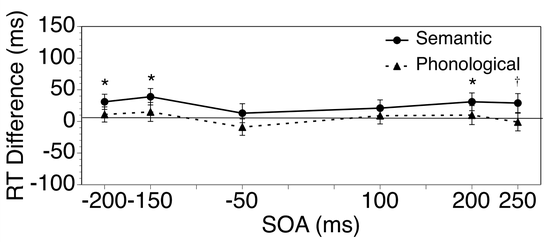
222 Ss run; 200 analyzed thus far.

**Procedure**
Familiarization Phases 1 and 2
Test Phase responses: Det–Adj–N (e.g., *the purple triangle*)

**NP N and Adj Target RT Differences (ms) from Unrel Condition**




Semantic interference at -150 and 200 ms SOAs



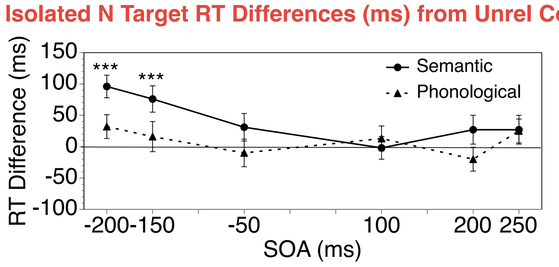

Semantic interference at -200, -150, and 200 ms SOAs; marginal at 250 ms SOA
Interference begins earlier for Adjs; Adj and N interference overlap.
No phonological facilitation

## EXPERIMENT 2

119 Ss run; 109 analyzed thus far.

**Procedure**
Familiarization Phase 1 (training for N labels)
Test Phase responses: N labels (e.g., *triangle*)

**Isolated N Target RT Differences (ms) from Unrel Condition**



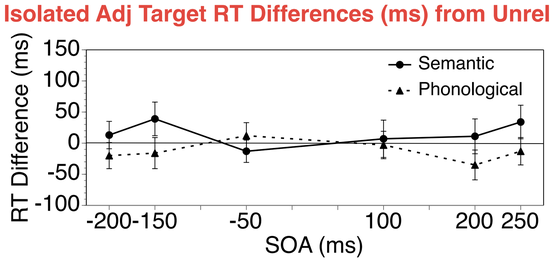

Semantic interference at -200 and -150 ms SOAs
Isolated N interference earlier than in NPs.
No phonological facilitation

## EXPERIMENT 3

132 Ss run; 124 analyzed thus far.

**Procedure**
Familiarization Phase 2 (training for Adj labels)
Test Phase responses: Adj labels (e.g., *purple*)

**Isolated Adj Target RT Differences (ms) from Unrel Condition**




No significant interference or facilitation

## CONCLUSIONS

In Det–Adj–N NPs, N and Adj lemmas activated close together in time.
- Adj lemma activation preceded N lemma activation.
- Activation order appears to be linear-order driven.
- Alternative explanation: Attribute may be more salient initially, pointing to conceptual reason for activation order.

Both N and Adj lemmas in NPs show pattern of reactivation at later SOAs.
- Most likely an effect of the task
- Processing of same-category word may result in conscious reassessment of response.

Semantic interference for Ns at similar SOAs to those in Schriefers (1992, 1993) and Schriefers et al. (1990).

In the N case, effects of semantically related distractors are greater for content words in isolation than in NPs.

## REFERENCES

Schriefers, H. (1992). Lexical access in the production of noun phrases. *Cognition, 45*, 33-54.
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