



# Function Words

- Prepositions *of, at, in, without, between*
- Pronouns *he, they, anybody, it, one*
- Determiners *the, a, that, my, more, much, either, neither*
- Conjunctions *and, that, when, while, although, or*
- Auxiliary verbs *be (is, am, are), have, got, do*
- Particles *no, not, nor, as*



# Content Words

- Nouns *John, room, answer*
- Adjectives *happy, new, large, grey*
- “Full” verbs *search, grow, hold, have*
- Adverbs *really, completely, very, also, enough*



## **More fine-grained distinction**

- All grammatical morphology is “functional”
  - Bound morphemes:
    - Derivation affixes: -er, -ly, -ment etc.
    - Inflectional affixes:
  - Free morphemes:
    - Articles, prepositions, conjunctions etc.
- Only uninflected stems are content “words”



## Differences between content and function words:

### **Closed vs. open classes**

- The class of function words is *closed*. Languages do not easily add new words to this set.
  - **Closed-class words.**
  - **English has ~300 closed class words.**
- The class of content words is *open*.



## Words invented in 2003 that won categories at the Annual Meeting of the conference American Dialect Society

- Most Unnecessary Word of the Year
  - **BENNIFER**: a blended noun describing the couple of Ben Affleck and Jennifer Lopez
- Most Outrageous
  - **CLITERATI**: a collective noun for feminist or woman-oriented writers or opinion-leaders.
- Least Likely to Succeed:
  - **TOMACCO**: a hybrid of tomato and tobacco
- Most Likely to Succeed:
  - **SARS**: Severe Acute Respiratory Syndrome.
- Most Creative:
  - **FREEGAN**: a person, nominally vegan, who eats only what they can get for nothing
- Most Useful:
  - **FLEXITARIAN**: a vegetarian who occasionally eats meat.
- Word of the Year:
  - **METROSEXUAL**: a fashion-conscious heterosexual male

**POINT: These are all open-class words!**



## Differences between content and function words:

### Phonology

- Content words obey the *minimal word constraint* but function words do not.
  - **Minimal word constraint:**  
**Words cannot consist of a light syllable alone in English.**
- Little function words: I, the, a, it, of, etc...
- No open class words are this little!



## **Differences between content and function words:**

### **Acquisition**

- Function words are acquired later than content words.



## **Differences between content and function words:**

### **Aphasia**

- Damage to Broca's area often leads to agrammatic or telegraphic speech where most of function words have gone missing.

#### **Broca's aphasia (non-fluent aphasia):**

Ah ... Monday ... ah Dad and Paul [patient's name] ... and Dad ... hospital. Two ... ah doctors ..., and ah ... thirty minutes ... and yes ... ah ... hospital. And, er Wednesday ... nine o'clock. And er Thursday, ten o'clock ... doctors. Two doctors ... and ah ... teeth. Yeah, ..., fine.  
(Goodglass, 1976)





## **Differences between content and function words:**

### **Aphasia**

- In English it is possible to utter uninflected word forms (go, run, see) and this what aphasics often do.
- But in some languages you just cannot utter bare stems. What's aphasic speech like in those languages?



# Differences between content and function words: Aphasia in Hebrew

BRAIN AND LANGUAGE 56, 397–425 (1997)  
ARTICLE NO. BL971795

Tense and Agreement in Agrammatic Production:  
Pruning the Syntactic Tree

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## **Differences between content and function words: Aphasia in Hebrew**

- **Subject**

- **Agrammatic aphasic with left anterior inferior temporal lobe damage.**



TABLE 1  
An Example of Hebrew Inflectional Paradigm

**TENSE**

**AGREEMENT**

	Past	Present	Future
1st			
mas			
Singular	KaTaVti	KoTeV	eKToV
Plural	KaTaVnu	KoTVim	niKToV
fem			
Singular	KaTaVti	KoTeVet	eKToV
Plural	KaTaVnu	KoTVot	niKToV
2nd			
mas			
Singular	KaTaVta	KoTeV	tiKToV
Plural	KaTaVtem	KoTVim	tiKTeVu
fem			
Singular	KaTaVt	KoTeVet	tiKTeVi
Plural	KaTaVten <sup>a</sup>	KoTVot	tiKToVna <sup>a</sup>
3rd			
mas			
Singular	KaTaV	KoTeV	iKToV
Plural	KaTVu	KoTVim	iKTeVu
fem			
Singular	KaTVa	KoTeVet	tiKToV
Plural	KaTVu	KoTVot	tiKToVna <sup>a</sup>

Note. KTV, write.



**Differences between content and function words:**

**Aphasia in Hebrew**

**TARGET:**

- (1) Yesterday the boy **wrote**  
(etmol ha-yeled *KaTaV*)

**TENSE ERROR:**

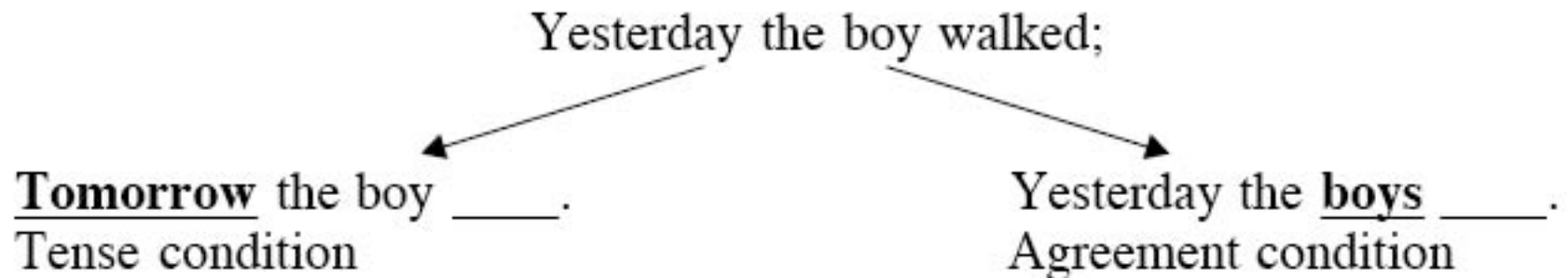
- (2) Yesterday the boy **writes/will write**  
(etmol ha-yeled *KoTeV/yiKToV*)

**AGREEMENT ERROR:**

- (3) Yesterday the boy **wrote-PL/wrote-F/wrote-1st**  
(etmol ha-yeled *KaTVu/ KaTVa/KaTaVti*)

## Differences between content and function words: Aphasia in Hebrew

- Two tasks:
  - **Repetition with articulatory suppression.**
    - The subject heard the target once, then articulated three or four words (reciting from the Hebrew alphabet) and only then repeated the target as accurately as possible.
  - **Sentence Completion.**



# Differences between content and function words: Aphasia in Hebrew

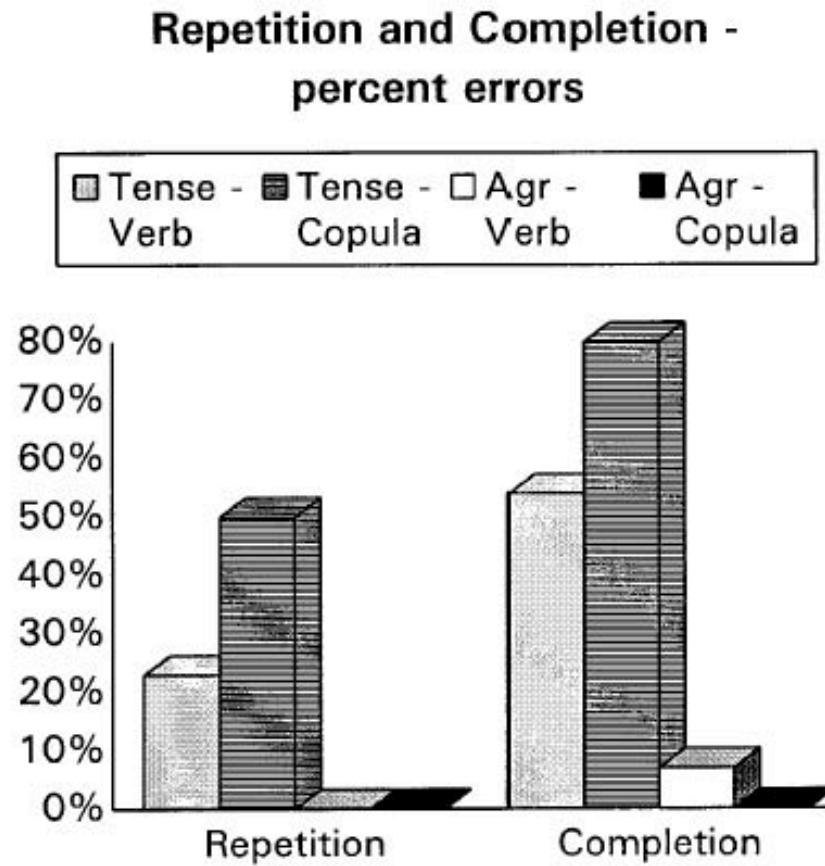


FIG. 1. Repetition and completion errors grouped by inflectional feature, and verb/copula.



## **Differences between content and function words: Aphasia in Hebrew**

“Noticeably, among all of RS’s errors, there were **only four infinitival substitutions for finite verbs**, a finding that may indicate an intact sensitivity to verb finiteness. Moreover, RS **never created a non-word in her inflectional errors**: she always chose one of the members of an inflectional paradigm, and never invented a nonexistent form.”





## **Differences between content and function words:**

### **Laterality**

- In divided visual field studies, left hemisphere advantage for function words only.



## **Differences between content and function words:**

### **ERP's**

- Neville, Mills & Lawson (1992):
  - **N280 component at left anterior sites for closed-class items only.**
  - **Since left and anterior perhaps Broca's...?**



## **Differences between content and function words:**

### **ERP's**

- King and Kutas (1995):
  - **The N280 might not be specific to closed class items. Rather it may be index processing that is common to both open and closed class items but that is varied in latency with word frequency and length.**

## Differences between content and function words: ERP's

### ■ King and Kutas (1995):

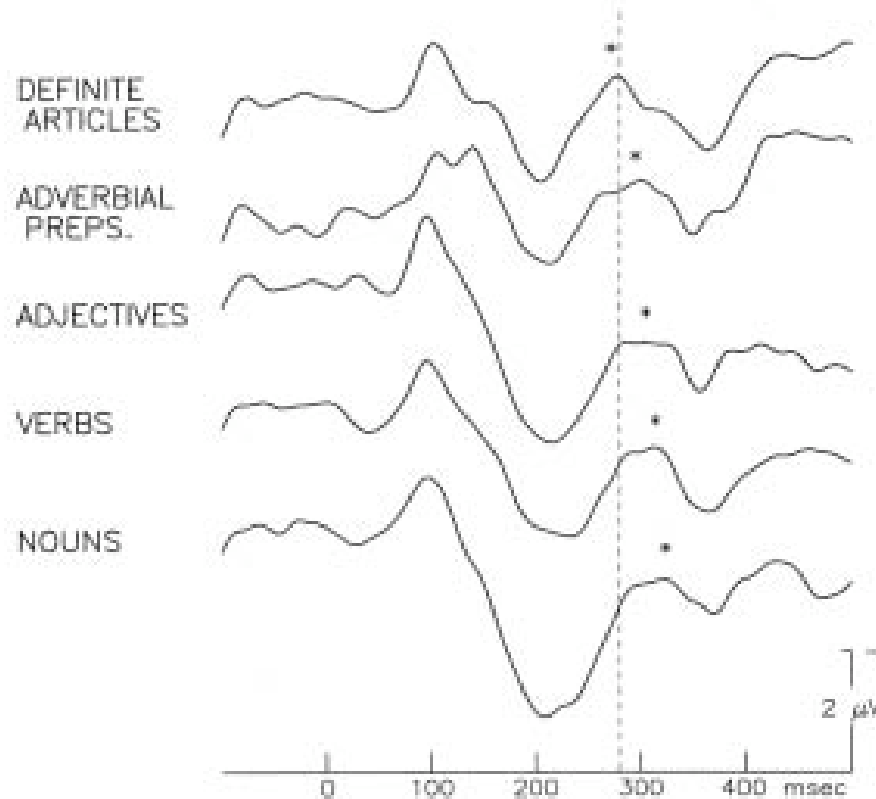


Figure 2. Grand average ERPs (n=24) at the Left Frontal (F7) electrode site for representative word types that are subclasses of the broad Open vs. Closed Class data. Dashed line is at 280 msec; asterisks mark peak latencies for the word types.

## Differences between content and function words: ERP's

### ■ King and Kutas (1995):

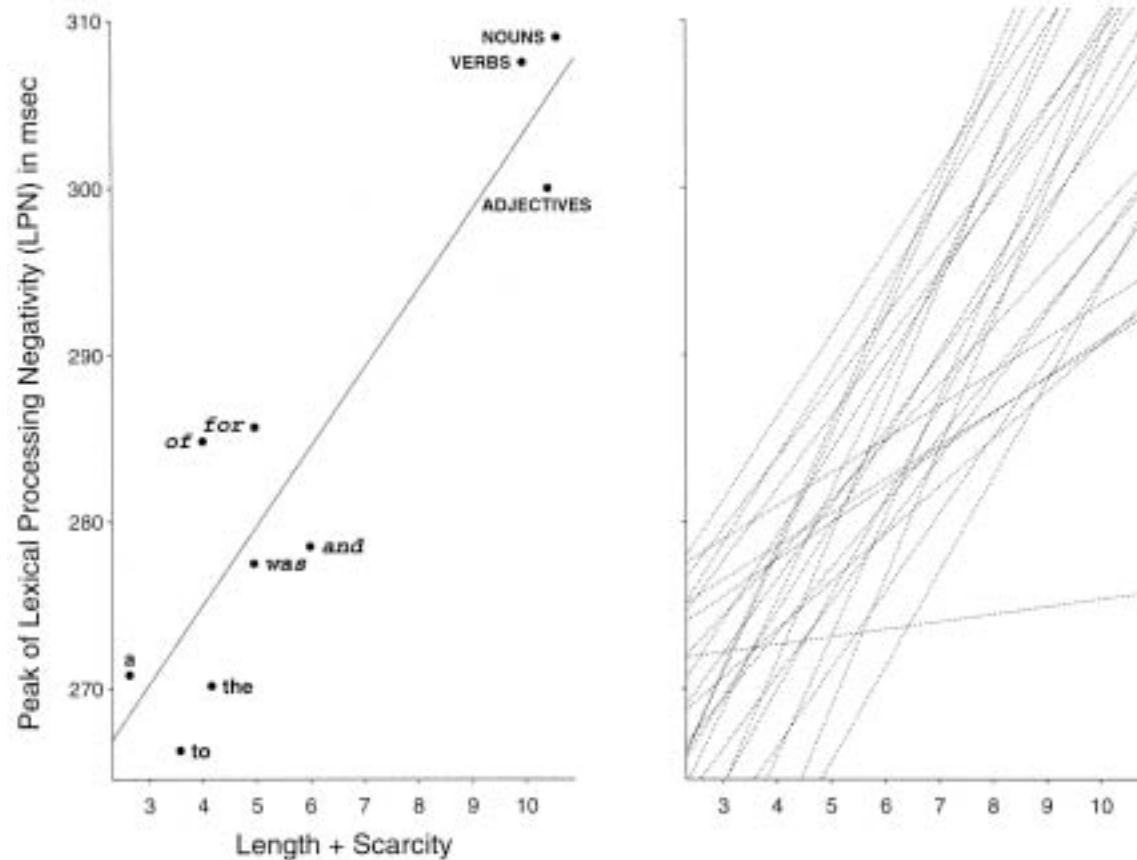


Figure 3. Panel A shows the regression of the Lexical Processing Negativity mean peak latency (in msec.) onto the Length+Scarcity predictor (solid line). Points indicate observations from the 10 lexical types used in the regression, with ALL CAPS used for category labels, oblique lower case used for prototypical category exemplars, and roman lower case used for definitive category exemplars. Panel B shows the superimposed regression lines for all 24 subjects to demonstrate the variability of fits to individual subject data.



## **Differences between content and function words:**

### **ERP's**

- **Brown, Hagoort & ter Keurs (1995):**
  - **Earlier latency for N280 for closed class words. When stimuli were classified by frequency, no latency modulation.**
  - **Explanation: “lexical access of function words more efficient”.**



# (E)LAN

## (early) left anterior negativity

- Elicited various morphosyntactic violation:

- **Agreement violations:**

- Het verwende kind [gooit/gooien] het speelgoed op de grond.

- ‘The spoilt child.sg v.sg/pl the toy on the floor.’

- **Word category violations:**

- Der Freund wurde im *besucht*

- ‘The friend was in-the visited.’

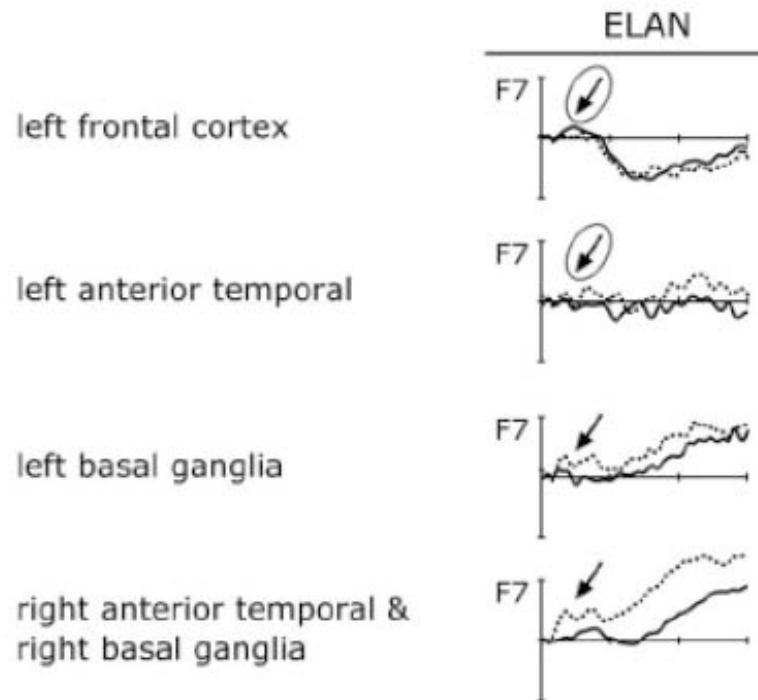
# (E)LAN

## (early) left anterior negativity

### ■ Localization

#### □ By using lesion data:

- left anterior temporal lobe and Broca's area







# **(E)LAN**

## **(early) left anterior negativity**

- Localization

- **By using fMRI (Meyer, Friederici & von Cramon, 2001):**

- Broca's area

- Anterior superior temporal gyrus

# (E)LAN

- Localization
  - **By using MEG (with the above fMRI constraints, Friederici et al 2000)**

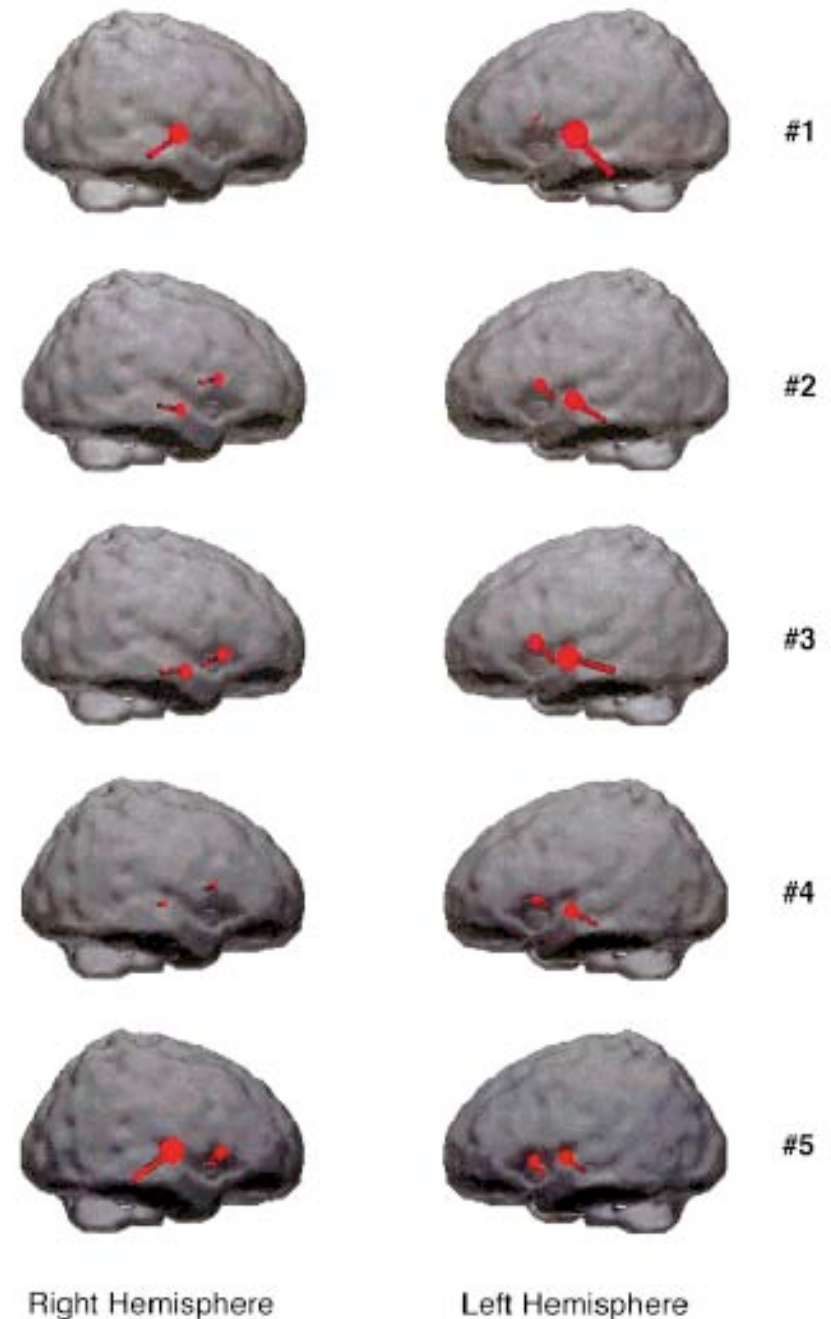


Figure 5.  
Dipole localization results for all the five subjects. The dipoles are overlaid with the corresponding hemisphere.