Prosody as a window to structural processing in reading

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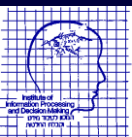
Prosody in speech comprehension

Natural prosody helps listeners to understand *speech* by transforming the serial auditory input into structured patterns that
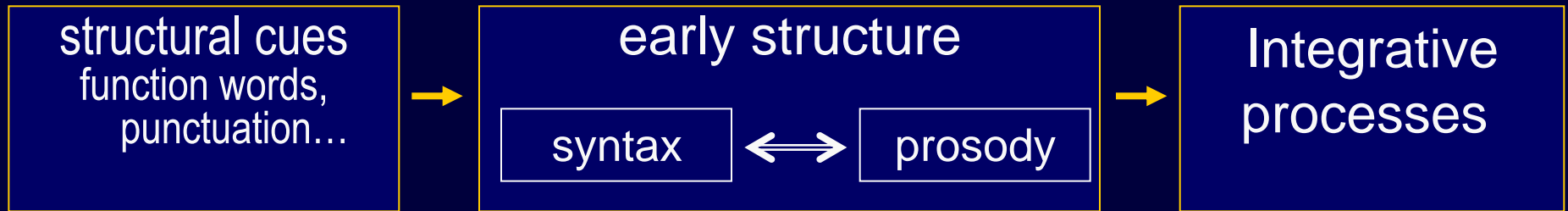
- Convey information about
    - lexical category
    - ordinal position
    - syntactic segmentation
- Help in organizing and maintaining information in working memory

In speech comprehension – prosody is part of the input

In reading it isn't

What is the relationship between prosody and structural processing in reading?

Prosody in reading

structural cues function words, punctuation…	→	early structure	→	Integrative processes

early structure: syntax ⟷ prosody

Structural cues monitored early in text processing are used to construe a structural frame for the unfolding sentence (Koriat & Greenberg, 1994)

Close relationship between reading prosody and sentence structure suggests that reading prosody emerges on the basis of the early structural frame (Goldman-Eisler, 1972; Koriat, Greenberg & Kreiner, 2002).

Experiment 1
Is prosody involved in maintaining and organizing verbal information during reading ?

Immediate recall

Normal sentences

The fat cat with the gray <u>stripes</u> ran quickly to the little kitten that lost its way ...

Nonsense sentences:

The sad gate with the small eyes went carefully to the happy computer that ….

Grouped prosody

The fat cat

    with the gray

        stripes ran quickly

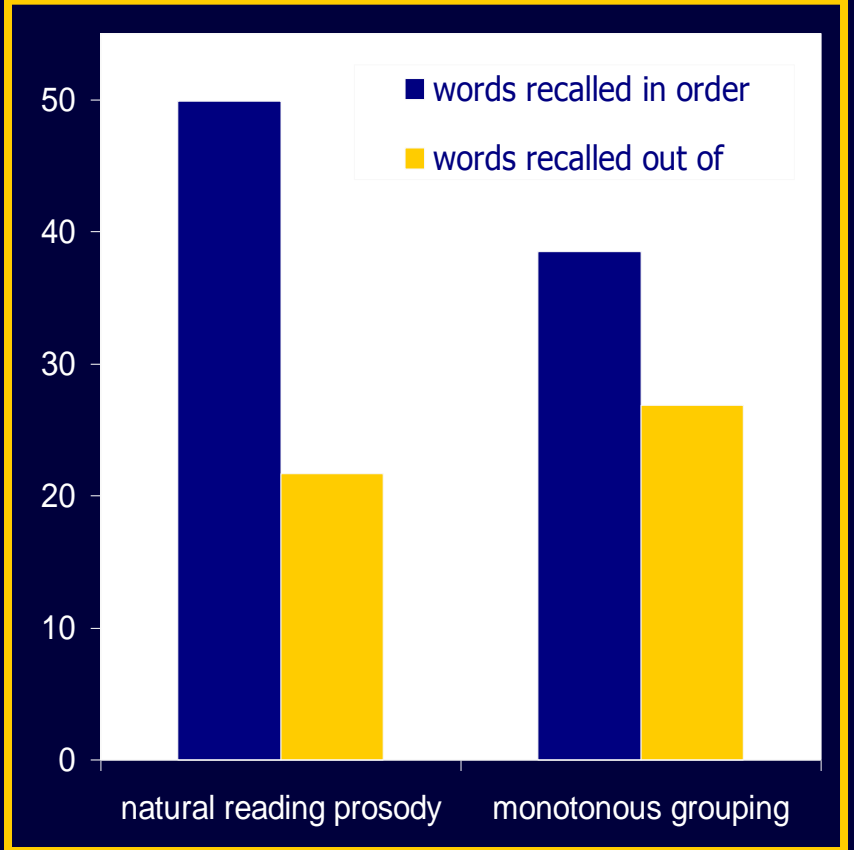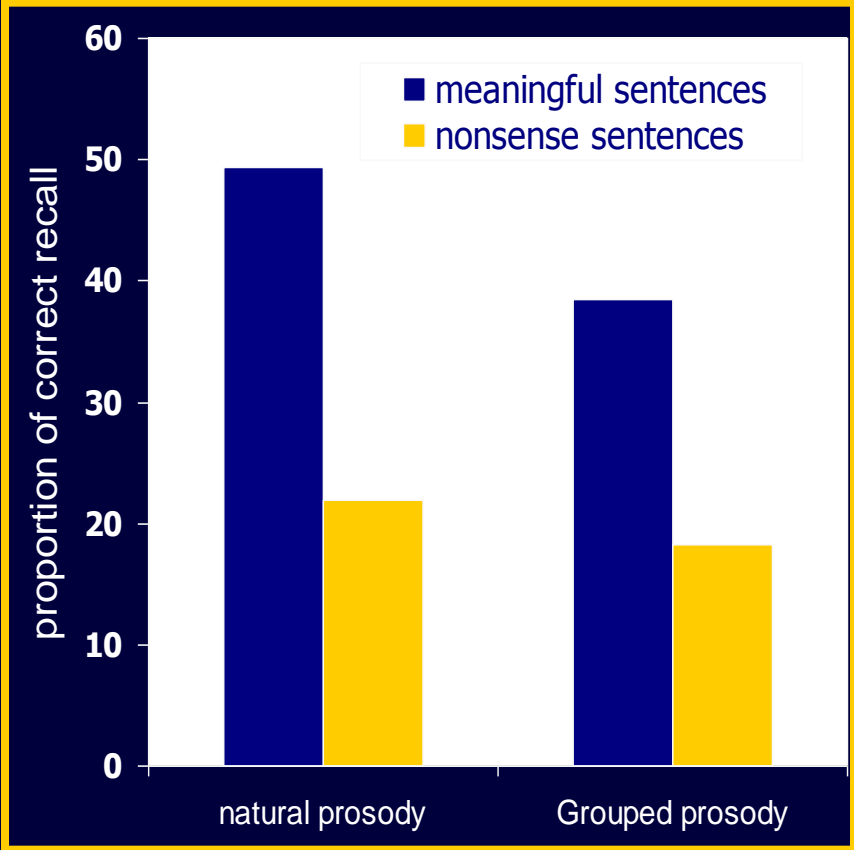   *to the little*

                kitten that lost

                    its way earlier.

- The correspondence between reading prosody and sentence structure helps in maintaining verbal information, in particular word order, in working memory.

- The benefit from this correspondence is shown in meaningful but not in non-sense sentences.

Experiment 2 & 3
Is reading prosody involved in integrative processes during reading ?

Integrative processes

Experiment 2	Experiment 3
Syntactic integration	Semantic integration
Gender and Number Agreement	Semantic congruency
the *models step* proudly on the stage	the models dressed in funny hats step…
the *models steps* proudly on the stage	the models dressed in funny bars step…

Adjacent - Match:
The audience who have been waiting excitedly watch how the *models step* proudly on the stage.
Adjacent - Mismatch:
The audience who have been waiting excitedly watch how the *model step* proudly on the stage.

Distant - Match:
The audience watch with a smile how the *models* dressed in a funny hat *step* proudly …
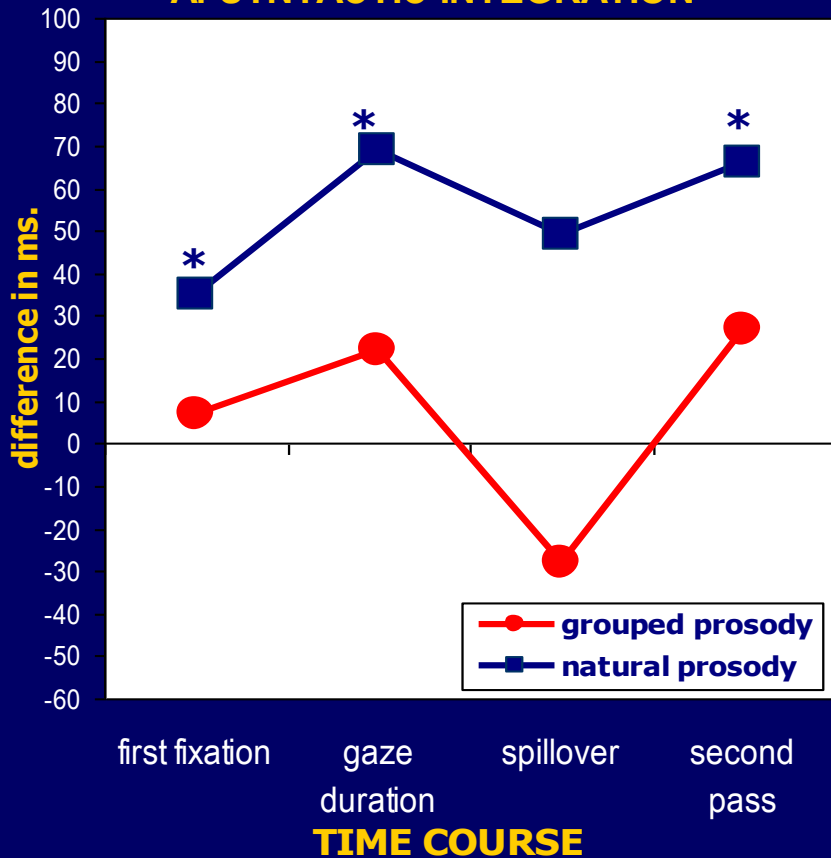Distant - Mismatch:
The audience watch with a smile how the *model* dressed in a funny hat *step* proudly …
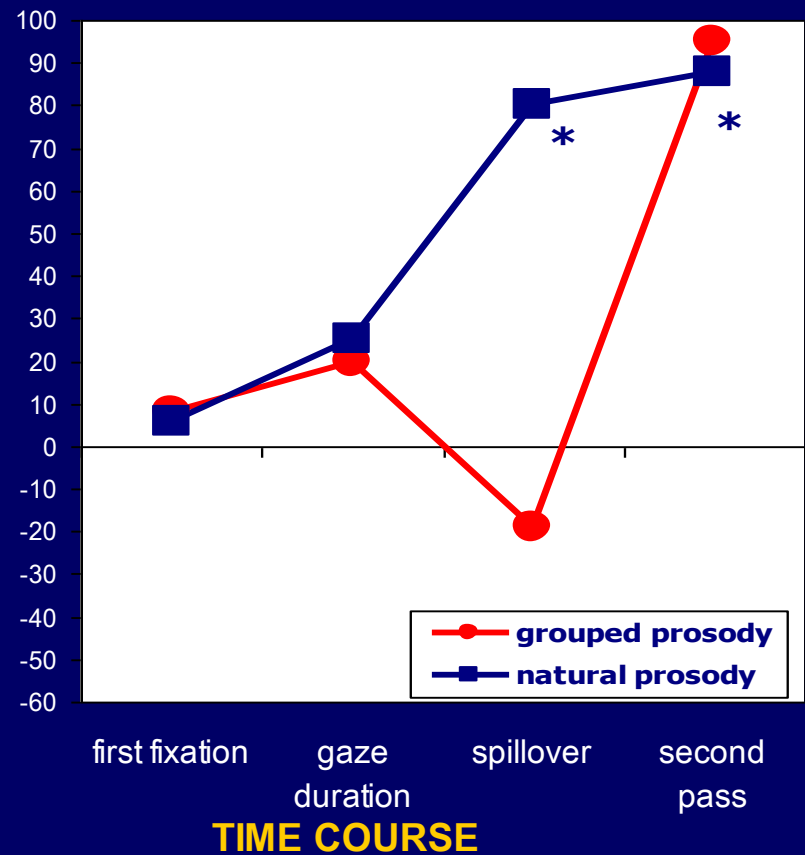
Semantic integration

the *models step*
the *models steps*

dressed in funny hats step
dressed in funny bars step

A. SYNTACTIC INTEGRATION

B. SEMANTIC INTEGRATION

* Difference between incongruent and congruent target verb is significant *p*<.05

Conclusions

Good correspondence between reading prosody and sentence structure contributes to :

- Maintaining and organizing verbal information in working memory while text processing is carried out.

- Fast and Incremental integration of individual words into syntactic and semantic representations.

Prosody in reading
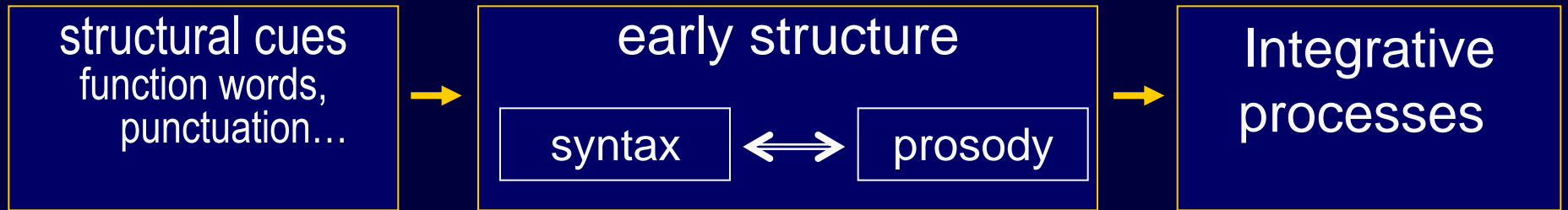
structural cues function words, punctuation…	→	early structure syntax ⟷ prosody	→	Integrative processes

Structural cues monitored early in text processing are used to construe a structural frame for the unfolding sentence (Koriat & Greenberg, 1994)

Close relationship between reading prosody and sentence structure suggests that reading prosody emerges on the basis of the early structural frame (Goldman-Eisler, 1972; Koriat, Greenberg & Kreiner, 2002).

"…syntactic analysis and prosody assignment can be interleaved, with prosodic processing following along in the wake of low-level syntactic processing, and feeding later syntactic decisions"
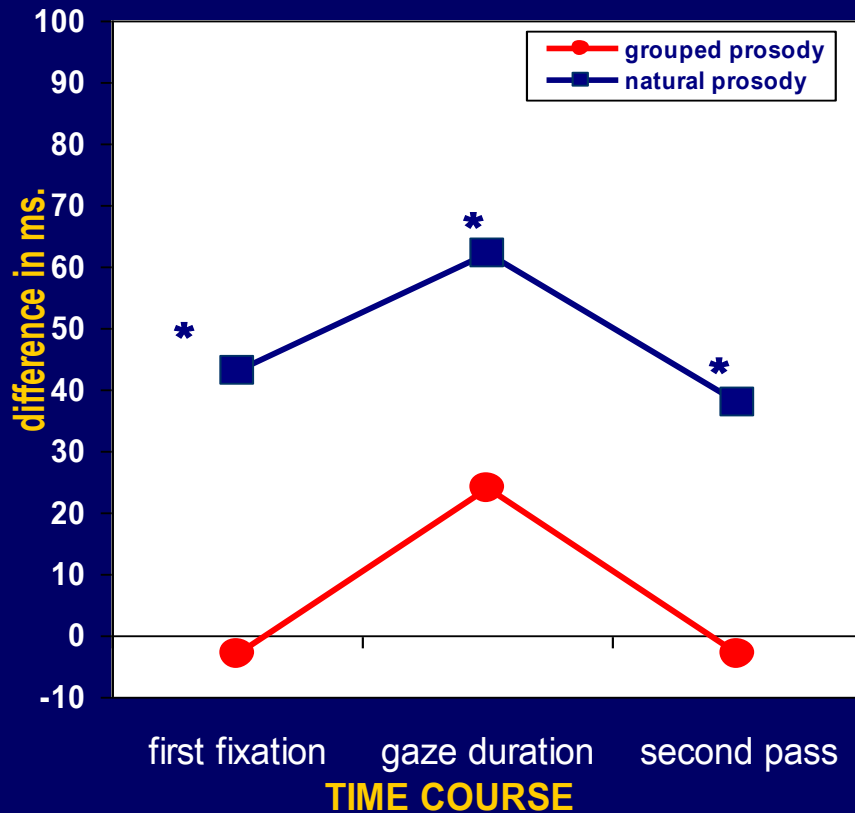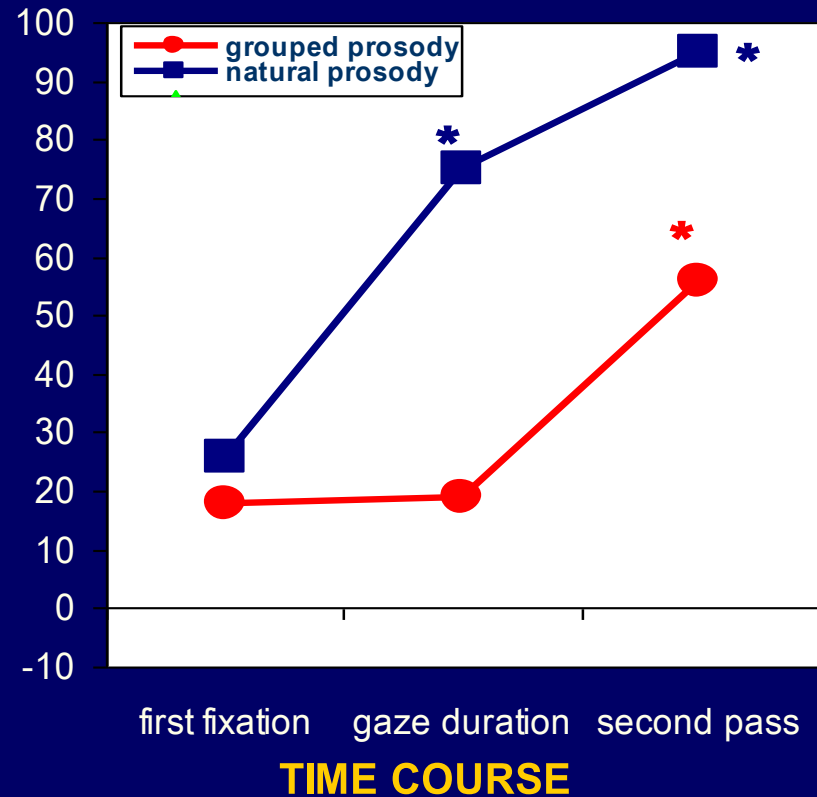
(Fodor, 2002)

Thanks

Syntactic integration

the *models … step*
the *models ... steps*

the *models step*
the *models steps*

VERB DISTANT

VERB ADJACENT

difference in ms.

TIME COURSE

* Difference between matching and mismatching target verb is significant *p*<.05