Grammatical vs. lexical words:

Converging cross-linguistic evidence

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Overview

1. A usage-based theory of grammatical status
2. Grammaticalization
3. Language processing
4. Grammatical impairmant
5. Conclusion

Overview

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A usage-based theory of grammatical status

Usage-based approaches to grammar

Cognitive Grammar (Langacker, Talmy, Dąbrowska)

Construction Grammar (Fillmore, Goldberg, Croft, Tomasello)

Functional Grammar (Gívón, Bybee, Hengeveld)

A usage-based theory of grammatical status

Usage-based approaches to grammar

Grammar is basically a **social-communicative phenomenon** (vs. innate).

Grammar can only be understood as **shaped by function and usage** (vs. as autonomous).

Grammar is basically **language-specific** (vs. universal), and there is **considerable cross-linguistic variation**.

Grammar is underpinned by **domain-general neurocognitive** structures (vs. domain-specific structures).

A usage-based theory of grammatical status

Claim

The difference between grammatical and lexical items is functional-cognitive

– but not conceptual: a number of concepts can be expressed both by means of grammatical and by means of lexical items…

Boye, K. & P. Harder. 2012. A usage-based theory of grammatical status and grammaticalization. *Language* 88.1. 1-44.

A usage-based theory of grammatical status

Possession

(1) a. *Bob has/owns a car.*
b. *Bob's car*

Number

(2) a. *more than one thief*
b. *thieves*

Illocutionary value

(3) a. *I order you to go away*.
b. *Go away!*

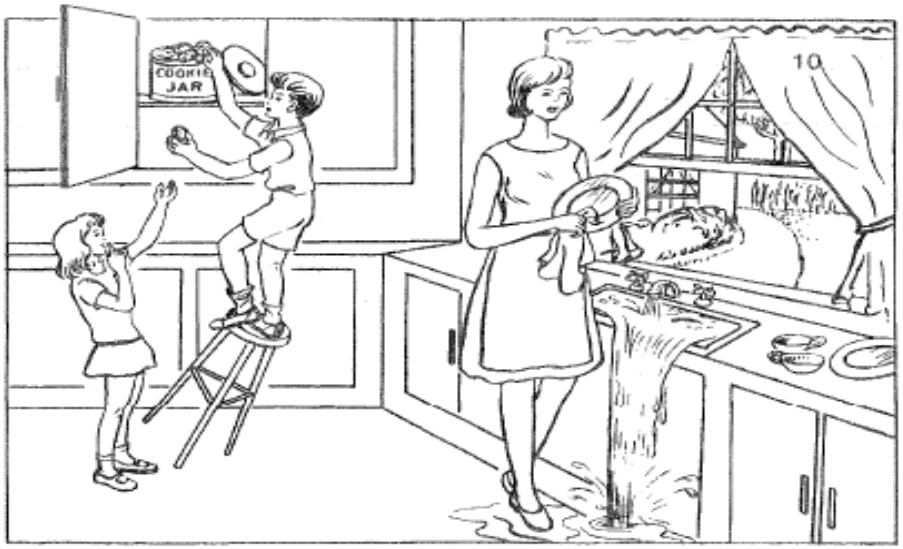
Evidentiality (Lezgian; Haspelmath 1993)

(4) a. *luhuda* 'one says'
b. *-lda* 'hearsay'

A usage-based theory of grammatical status

Basic idea

All complex information requires prioritization.



The grammatical vs. lexical contrast is a **conventionalization** of a contrast that has to do with **prioritization of information**.

A usage-based theory of grammatical status

Definitions

Lexical items (morphemes, words, constructions)
are by convention potentially primary (foreground):

they can, but need not, convey the main point of an utterance.

(1) *Avoid swimming!*
(2) *that woman*
(3) *I believe [they are out of town].*

A usage-based theory of grammatical status

Definitions

Lexical items (morphemes, words, constructions)
are by convention potentially primary (foreground):

they can, but need not, convey the main point of an utterance.

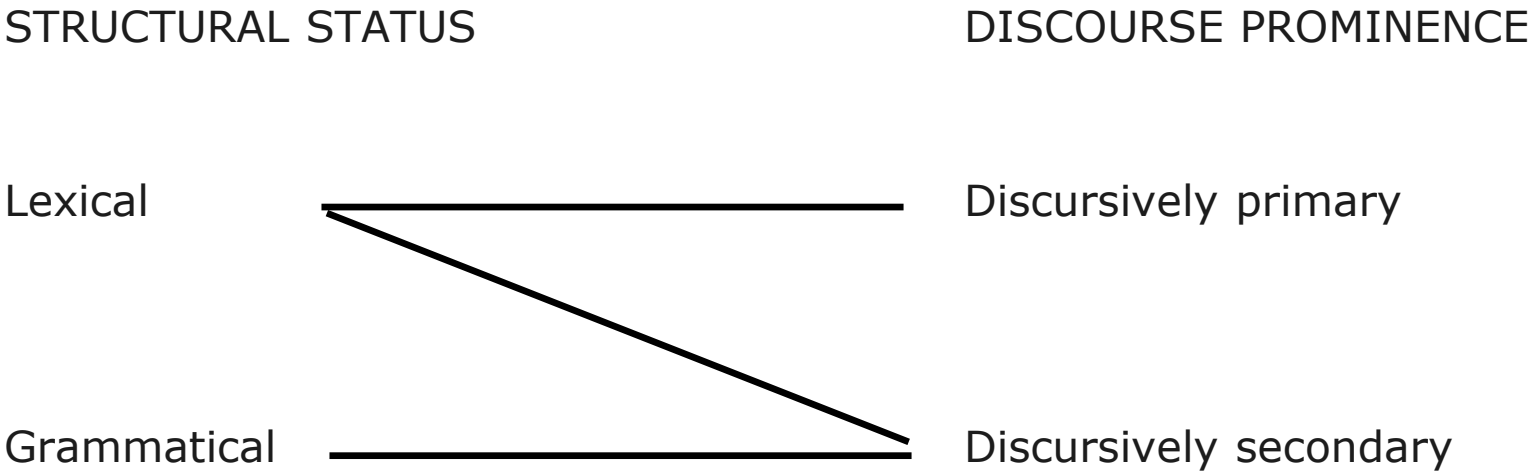
(1) *Avoid swimming!*
(2) *that woman*
(3) *I believe [they are out of town].*

Grammatical items (morphemes, words, constructions)
are by convention secondary (background):

they cannot convey the main point of an utterance (outside corrective contexts, where conventions may be overridden).

A usage-based theory of grammatical status

Grammatical items are conventionalized with one of the two possible discourse-prominence values of lexical items:



A usage-based theory of grammatical status

Functional rationale behind the grammatical vs. lexical contrast

The contrast helps us decide which part of a linguistic message to direct our attention towards.

*The **small dog** has **grabb**ed a **frisbee**.*

A usage-based theory of grammatical status

Function as the basic issue

Grammatical items are secondary by virtue of their function.
Lexical items are potentially primary by virtue of their function.

Lexical function is by convention potentially primary:
- can, but need not, be the main point of an utterance.

Grammatical function is by convention secondary:
- cannot be the main point of an utterance.

(1) ***jump*** is potentially primary due to the potentially primary status of its meaning of 'jump'.
(2) ***-ed*** is secondary due to the secondary status of its meaning 'past'.
(3) ***went*** is potentially primary due to the potentially primary status of its meaning of 'go', but also has a meaning, 'past', with secondary status.

A usage-based theory of grammatical status

Possession

(1) a.	*Bob has/owns a car.*	Potentially primary 'possession'
b.	*Bob's car*	Secondary 'possession'

Number

(2) a.	*more than one thief*	Potentially primary 'plural'
b.	*thieves*	Secondary 'plural'

Illocutionary value

(3) a.	*I order you to go away*.	Potentially primary 'directive'
b.	*Go away!*	Secondary 'directive'

Evidentiality (Lezgian; Haspelmath 1993)

(4) a.	*luhuda* 'one says'	Potentially primary 'hearsay'
b.	*-lda* 'hearsay'	Secondary 'hearsay'

A usage-based theory of grammatical status

The theory captures traditional ideas of what belongs to grammar
(– if it did not, it would not be a theory of grammatical status).

Affixes, articles, auxiliaries are discursively secondary by convention, hence grammatical (at least in SAE-languages).

Schematic constructions are discursively secondary by convention, hence grammatical:

(1) *She is going home.*

(2) *Is she going home?*

A usage-based theory of grammatical status

In some areas, however, the theory departs from tradition

Grammatical vs. lexical pronouns

English: *it* vs. *that*.

French: *je, me* vs. *moi*

Grammatical vs. lexical prepositions:

English: *of* vs. *off*.

Danish: *for* vs. *før*

This (and other aspects of the theory) can be used to test the theory!

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Grammaticalization

What is grammaticalization?

The historical development of grammatical items.

What is grammaticalization in the usage-based theory?

The historical development of items that are by convention secondary.

Main types of grammaticalization

1. ”Delexicalization”: discursively secondary use of lexical items to a degree where the secondary use is conventionally associated with a variant of the originally lexical item.

2. Semanticization, including constructionalization: conventionalization of an originally pragmatic (i.e. context-dependent) secondary meaning.

Grammaticalization

Examples of "delexicalization": lexical > grammatical

(1) *I am **going to** Rome.* > *I am **gonna** leave.*

(2) ***that** man* > ***the** man*

Faroese

(3) *Eg sigi **tað**, hann kemur.* > *eg sigi, **at** hann kemur.*
I say that he comes — I say that he comes
'I say that: he comes'. — 'I say that he comes'.

Afrikaans

(4) ***Ek glo** hy ryk is.* > *hy is **glo** ryk.*
I think he rich is — he is EVID rich.
'I think that he is rich'. — 'He is said (supposed, believed) to be rich'.

Grammaticalization

Competition model of delexicalization

LEXICAL STATE	
that(LEX) man(LEX)	Competition for discourse prominence, and *that* wins the competition (so that *man* is secondary)
<>	Synchronic usage alternation
that(LEX) ***man***(LEX)	Competition for discourse prominence, and *man* wins the competition (so that *that* is secondary)
>	Grammaticalization: conventionalization of *that* as secondary
GRAMMATICAL STATE	
the(GRAM) ***man***(LEX)	Result of grammaticalization: a grammatical descendant of lexical *that* which is by convention secondary.

Grammaticalization

Competition model of delexicalization

LEXICAL STATE

X(LEX) Y(LEX)

<> Synchronic usage alternation

X(LEX) **Y**(LEX)

> Grammaticalization: conventionalization of X as secondary

GRAMMATICAL STATE

X(GRAM) **Y**(LEX)

Grammaticalization consists in loss of conventional prominence.

Grammaticalization

Evidence of prominence loss: grammaticalization of *have*

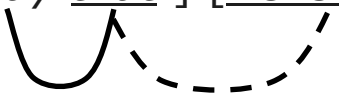
*I **have** the book.*	Possession	
*I **have** the book written down.*	Possession	
*I **have** written the book.*	Resultative	present state as result of anterior action
*I have **written** the book.*	Perfect	anterior action relevant to present state
*I have **written** the book.*	Past (German)	anterior action

e.g. Hengeveld, Kees. 2011. The grammaticalization of tense and aspect. H. Narrog & B. Heine. Eds. *The Oxford handbook of grammaticalization*, pp. 580-594. Oxford: Oxford University Press.

Grammaticalization

Example of semanticization and constructionalization

[*I say* *that*.] [*He is there*.]



Secondary *pragmatic* meaning relation between *say* and *he is there* (mediated by pronominal reference)

>

Grammaticalization: *coding* of secondary meaning relation

[*I say* [*that* *he is there*.]]

Result of grammaticalization: Secondary semantic relation

Grammaticalization consists in conventionalization of non-prominence.

Overview

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Language processing

The usage-based theory is falsifiable

... and can be tested in different ways:

1. Testing theory-dependent hypotheses concerning language processing.

2. Testing theory-dependent classifications of linguistic items as grammatical or lexical – against grammatically impaired speech data.

Language processing

Testing hypotheses concerning language processing

2 central features of grammatical items

1. Grammatical items are **discursively secondary** (background) relative to other items (hosts).

2. Grammatical elements are **dependent** on other items.

Language processing

Testing hypotheses concerning language processing

2 central features of grammatical items

1. Grammatical items are **discursively secondary** (background) relative to other items (hosts).

2. Grammatical elements are **dependent** on other items.

   You cannot say *-s, -ed* or *a* (article) in isolation.

   In contrast, some lexical items can be primary and independent, and thus produced in isolation: *Bicycle!*

Language processing

Testing hypotheses concerning language processing

2 central features of grammatical items

1. Grammatical items are **discursively secondary** (background) relative to other items (hosts).

2. Grammatical elements are **dependent** on other items.

… 2 groups of predictions pertaining to processing

1. Predictions concerning prioritization

2. Predictions concerning dependency

Language processing – perception

Prediction concerning prioritization in language perception

Grammatical items are by convention discursively secondary (background).

=> They attract **less attention** than lexical items in language perception.

Cf. the fact that grammatical items are often reduced phonologically.

Tests

i. Change blindness

ii. Letter detection

Language processing – perception – change blindness

Change blindness basics

Attention is required to notice change (Rensink et al. 1997).

Selective attention is default on foreground information.

Change blindness effects in sentences have been documented (Sturt et al., 2004; Price, 2008; Sanford et al., 2006) (text change paradigm).


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Language processing – perception – change blindness

Experiment details

- 2*2 design: Grammatical status * Focus
- 32 participants
- 2 response types: Change detection and retrieval of changed word
- 4 trials per item, 10 items in total

  Auxiliaries vs. full verbs
  Articles vs. nominals

- Visual presentation, initial practice trials, comprehension questions, randomization, filler trials

Christensen, M.H., N.M. Vinther, K. Boye & L.B. Kristensen. Under review. Grammar is background in sentence processing.

Language processing – perception – change blindness

	Non-focus	focus
Lexical	Når man afleverer speciale, skal ens censor bedømme det	Når man afleverer speciale, skal også ens censor bedømme det
Grammatical	Når man afleverer speciale, skal en censor bedømme det	Når man afleverer speciale, skal også en censor bedømme det

'When handing in your thesis, (precisely) an/one's external examiner has to asses it'

Når man afleverer speciale,
skal en censor bedømme det

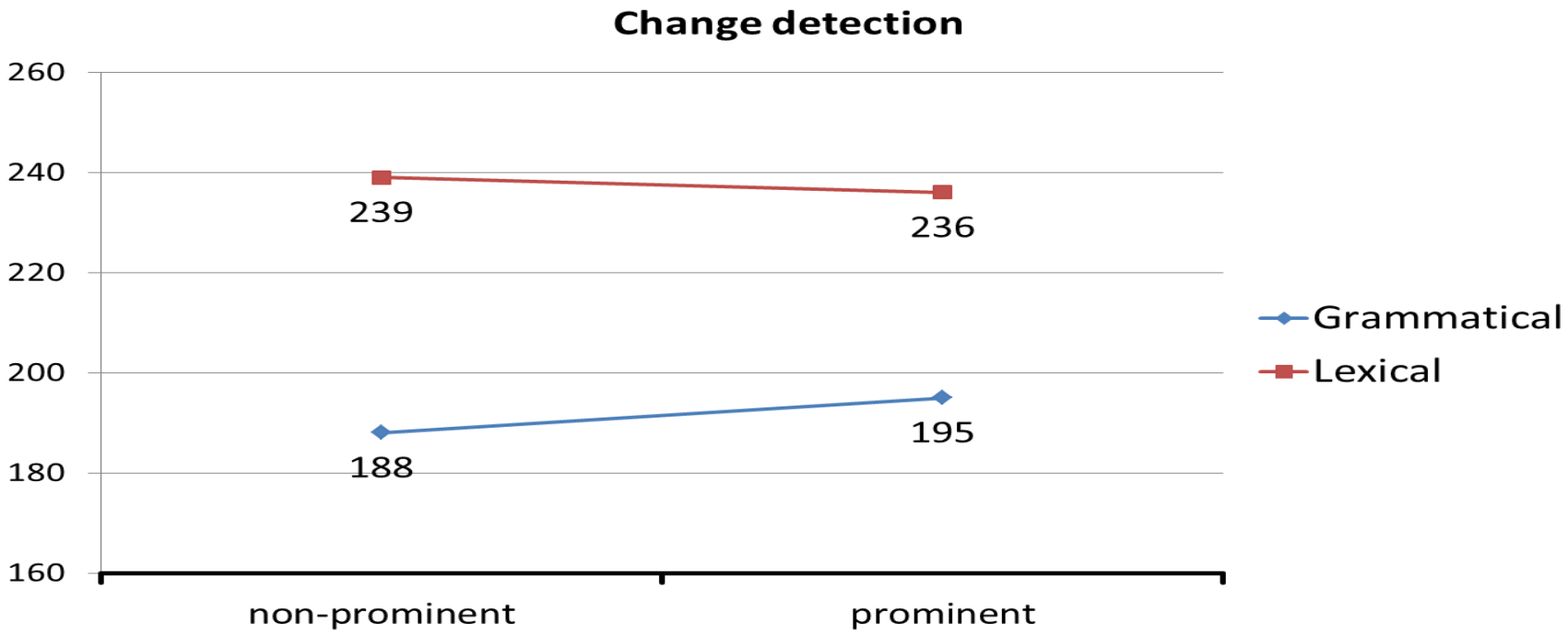
Tast ”1” for ændring ”0” for ens

Når man afleverer speciale, skal censor bedømme det

Tast det oprindelige ord, afslut med ”enter”

Language processing – perception – change blindness

Results

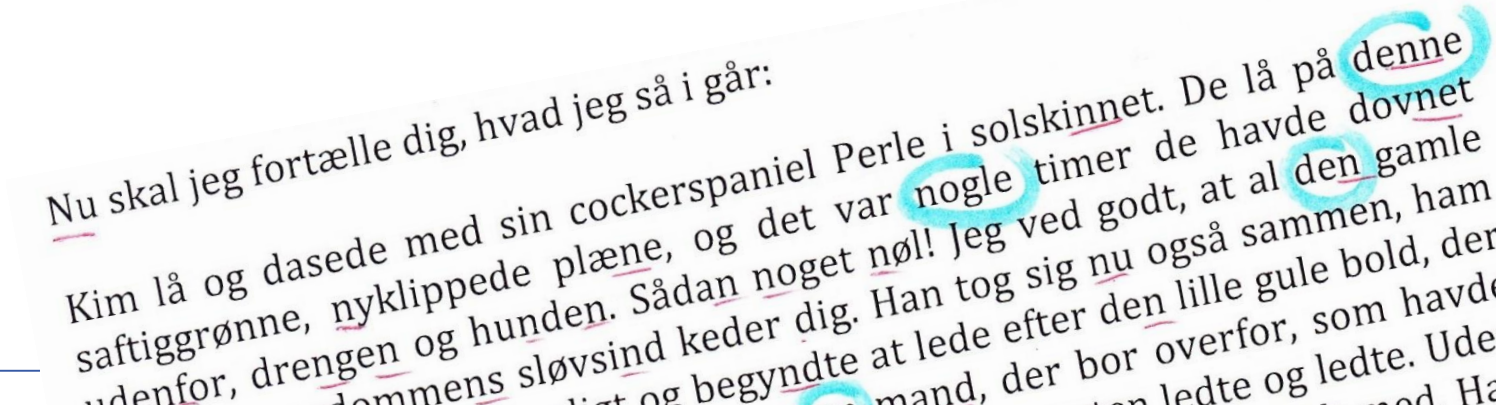


- Significantly (<.001) less change detection for grammatical words than for lexical words
- No significant difference between focus and non-focus
- Possibly an interaction effect

Language processing – perception – letter detection

Letter detection

- *Letter detection* is a method used for testing degree of attention
- *Letter detection* is based on our capacity for identifying letters while we are reading.
- *Letter detection accuracy* is assumed to give an indication of the degree of attention allocated to the parts of a text where target letters are found.



Language processing – perception – letter detection

Design

Tasks

1. Mark all of the occurrences of the letter ”t” or ”n” in the text while you read it
2. Answer comprehension questions

Stimuli

- 16 items + 185 additional targets short texts (480 words)
- Randomization of text versions, non-item sentences served as fillers

Participants

- 84 Danish men and women (mean age 22.6 years; SD 3.2)
- Students of sociology

Vinther, N.M., K. Boye & L.B. Kristensen. 2014. Grammatikken i baggrunden: Opmærksomhed under læsning. *NyS* 47. 99-139.

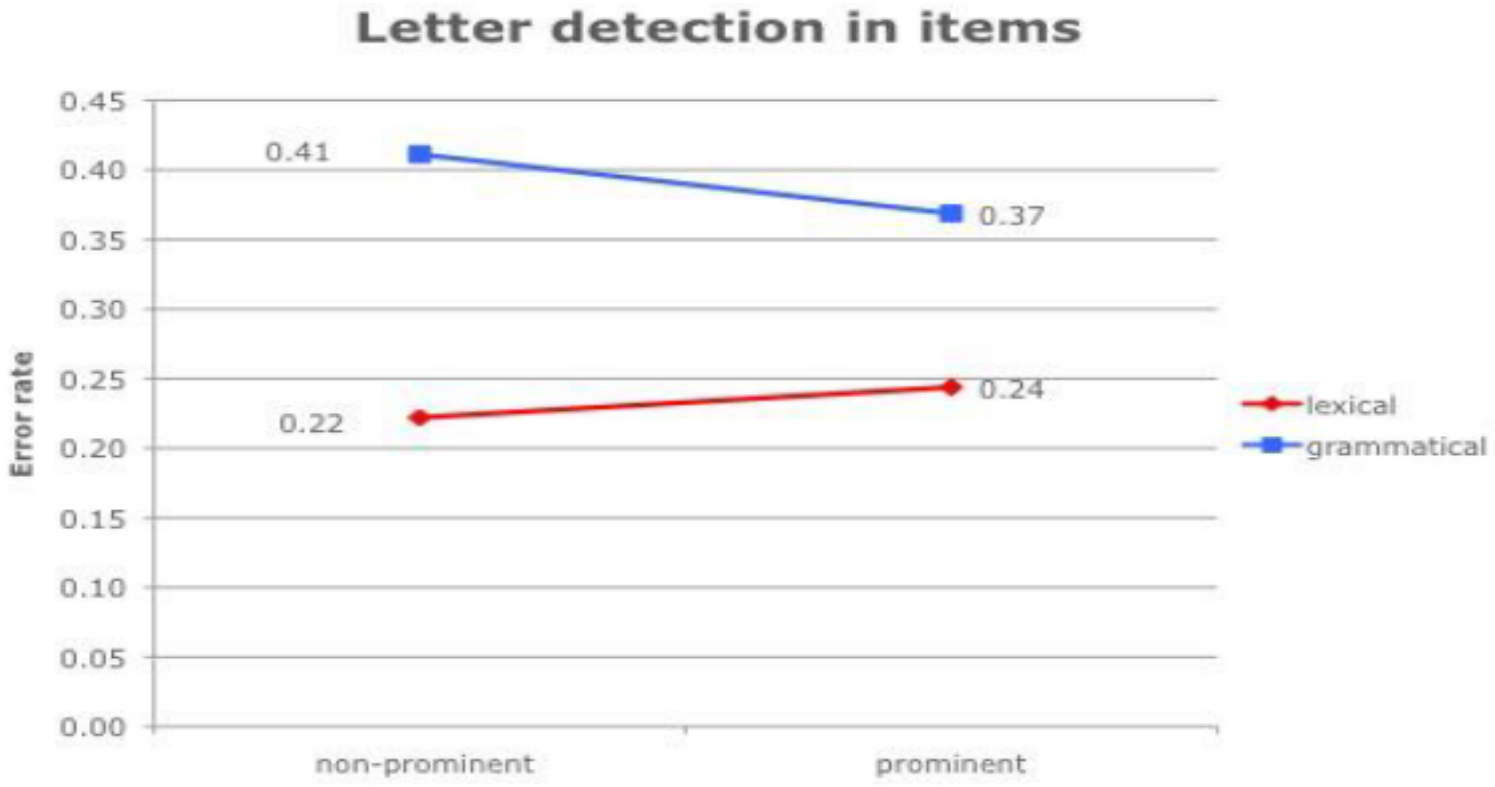
Language processing – perception – letter detection

2*2 factorial design = 4 experimental conditions

	Non-focus	Focus
Lexical	Jeg ved godt, at al denne gamle snak om ungdommens sløvsind keder dig	Jeg ved godt, at især al denne gamle snak om ungdommens sløvsind keder dig
Grammatical	Jeg ved godt, at al den gamle snak om ungdommens sløvsind keder dig	Jeg ved godt, at al især den gamle snak om ungdommens sløvsind keder dig

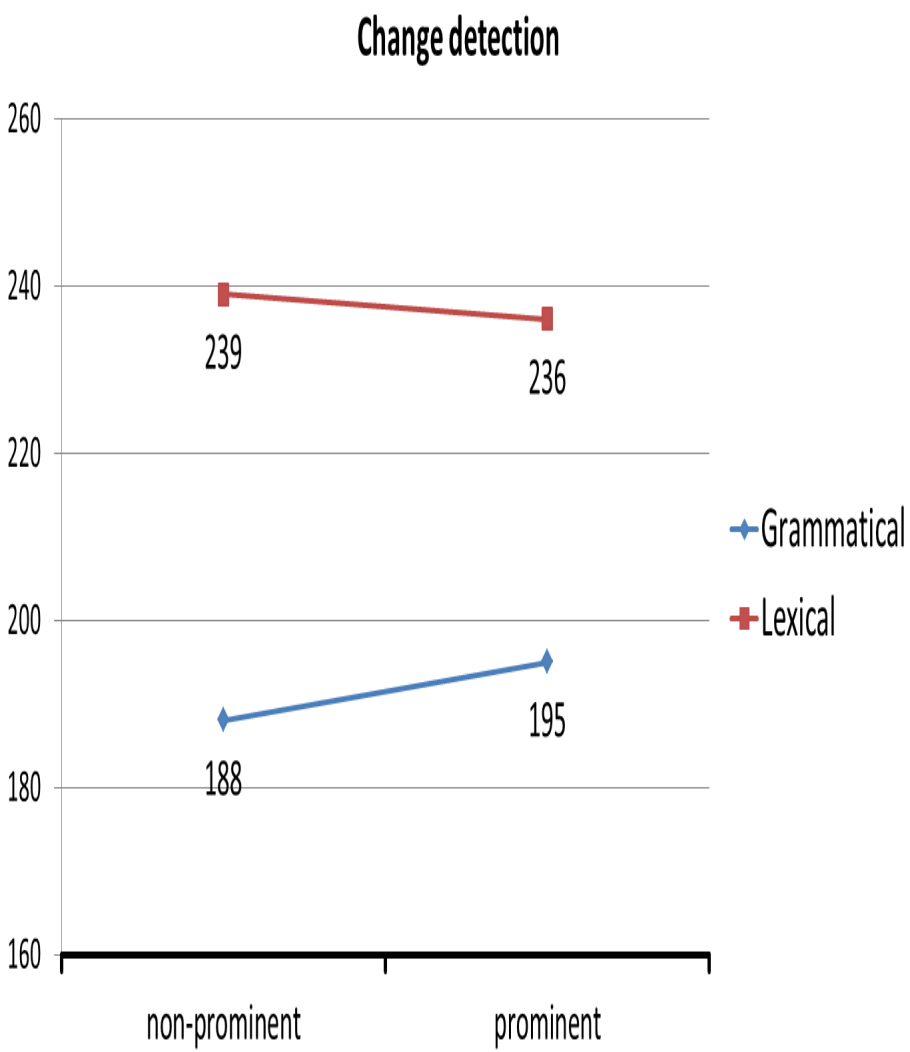
'I know that (especially) all this/the old talk about the laziness of young people is boring you.'

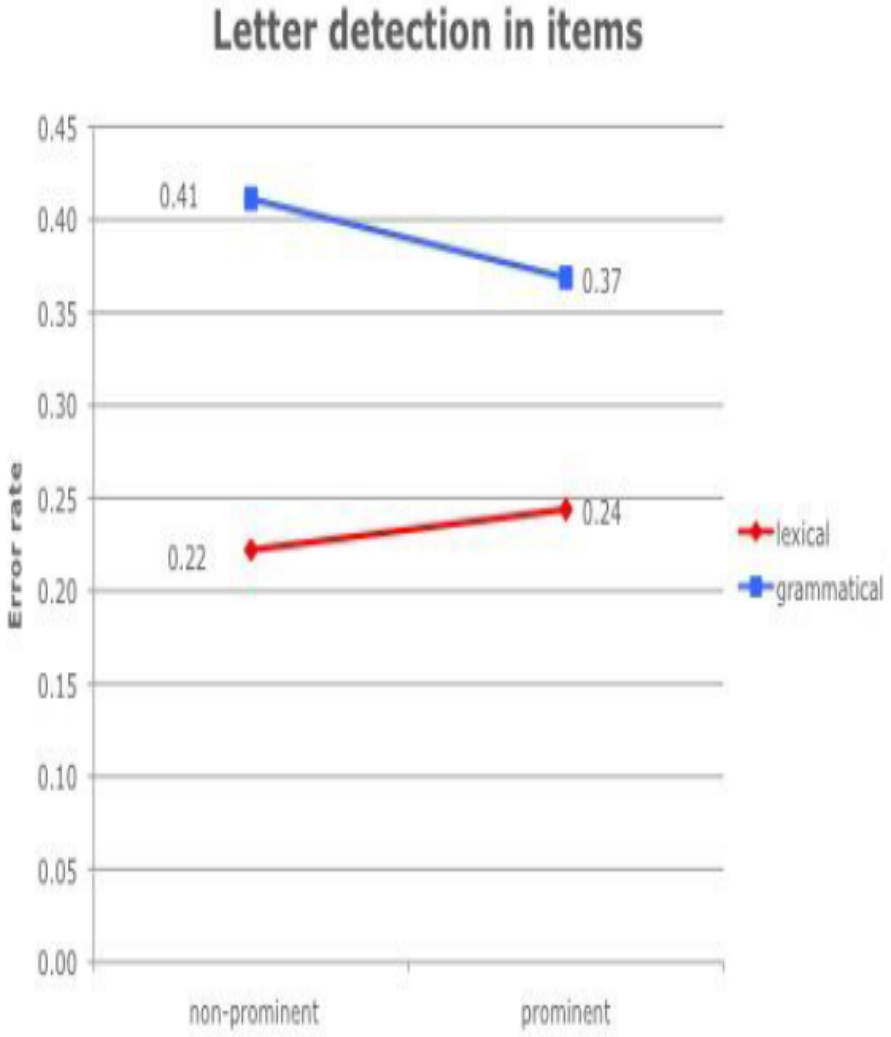
Language processing – perception – letter detection



- Significantly (< .0001) more detection errors for gram. than for lex. items – as well as for grammatical compared to lexical items overall (< .0001).
- No significant difference between focalized and non-focalized items.
- Possibly an interaction effect.

Language processing – perception – SUMMARY





Language processing – production

Prediction concerning dependency

Grammatical elements are **dependent** on other elements.

=> Grammatical items are generally **planned later** and associated with **longer reaction times** than lexical items in language production.

=> The production of grammatical items is **more complex** than the production of lexical ones, and therefore **associated with more errors** (everything else being equal).

Cf. the fact that established models of language production assume later planning of grammatical items (e.g. Garrett 1975; Bock 1987).

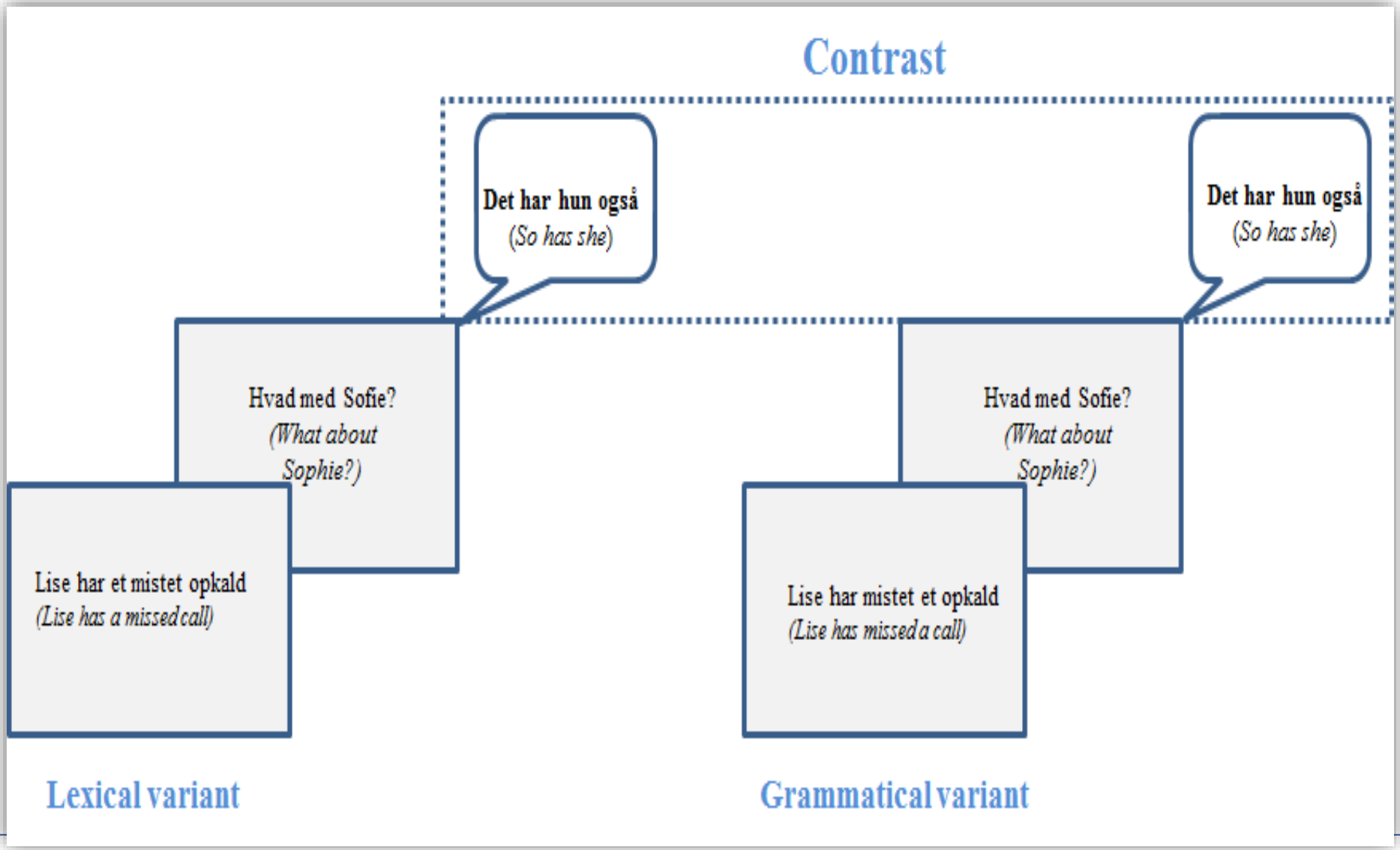
Language processing – production

Experiment 1

Homonymous	**auxiliaries (GRAM)**	**vs.**	**full verbs (LEX)**
	Marie has stolen a bike		*Marie has a stolen bike*
in identical settings			
	So has Louise		*So has Louise*

Lange, V.M., M. Messerschmidt, P. Harder, H.R. Siebner & K. Boye. 2017. Planning and production of grammatical and lexical verbs in multi-word messages. *PLoS ONE* 12.11.

Language processing – production

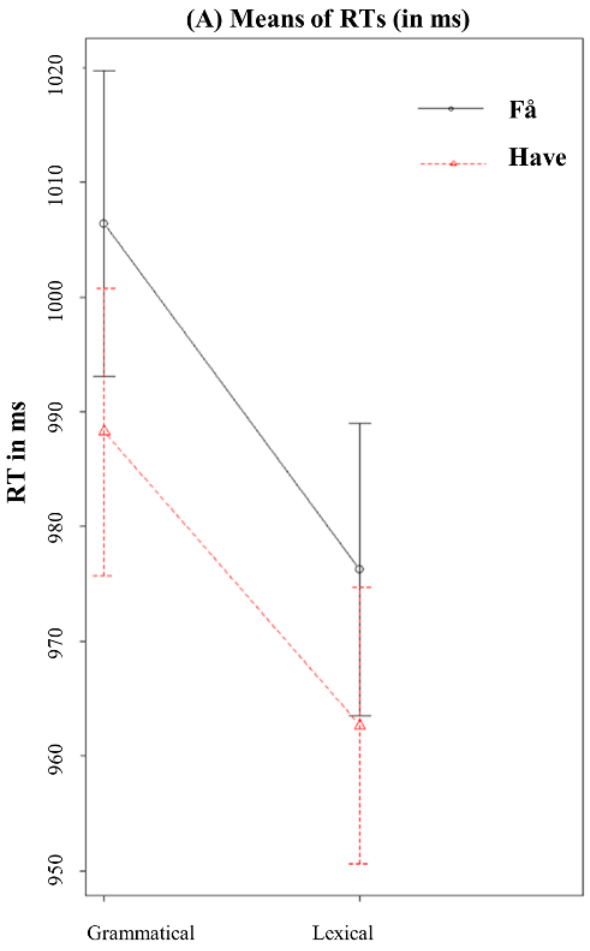


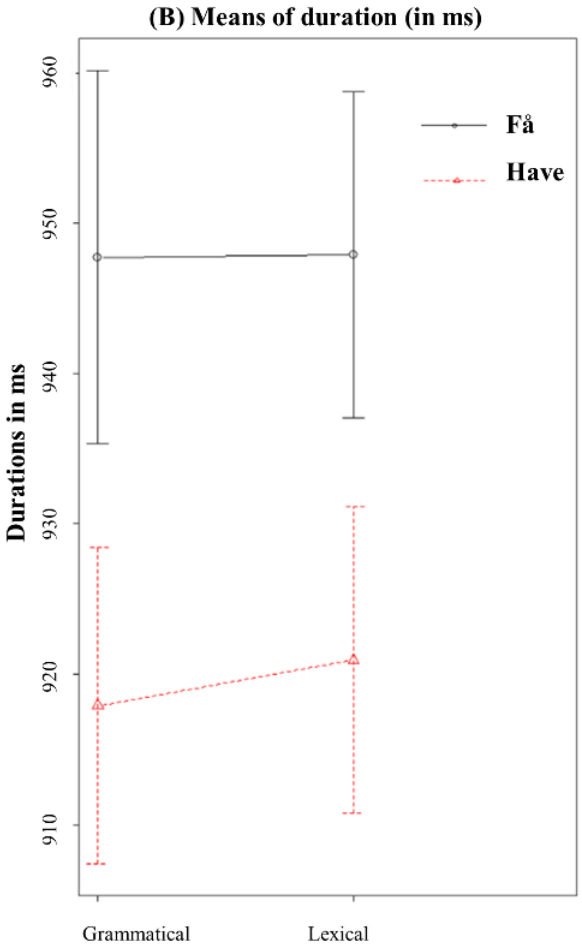
Language processing – production

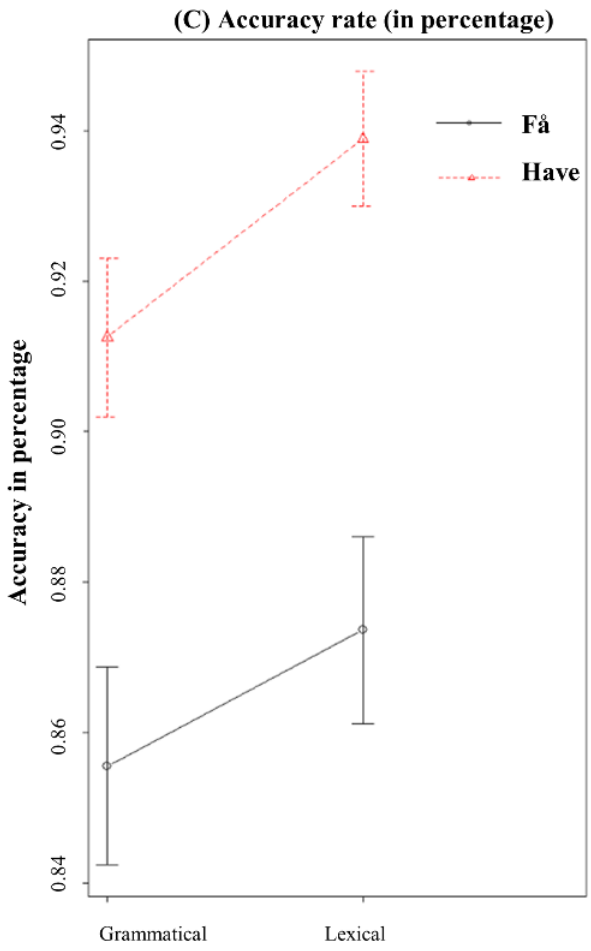
Experiment details

- 24 participants, 12 females, mean age: 27 years
- Measurements: response time (until voice onset), duration, error rate (among other things).

Language processing – production







Language processing - SUMMARY

Perception

Grammatical items attract less attention than lexical ones.

Production

Grammatical items are more demanding than lexical ones.

Interpretation

Grammar comes with a cost for language producers, but helps perceivers prioritize information and thus save ressources.

Overview

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Grammatical impairment

Grammatically impaired speech is a testing ground for theories of grammatical status

An adequate theory makes correct predictions about grammatically impaired speech.

Testing the usage-based theory

1. Classification of items as lexical or grammatical based on theoretically anchored criteria:

   focalizability, addressability, modifiability, dependency.

2. Prediction that items classified as grammatical are more severely affected than items classified as lexical in grammatically impaired speech.

3. Testing these predictions.

Grammatical impairment

Language- and word-class general diagnostic criteria of grammatical status

Since **lexical** expressions are potentially primary, they can be treated or marked as such:

- They **can be focalized**.
- They **can be addressed** in subsequent discourse.
- They **can** straightforwardly **be elaborated through modification**.
- They can be used **without a host expression**.

Since **grammatical** expressions are secondary by convention, they cannot be treated or marked as discursively primary (outside corrective contexts, where conventions are overridden):

- They **cannot be focalized**.
- They **cannot be addressed** in subsequent discourse.
- They are **bad candidates for elaboration through modification**.
- They **require a host expression**.

Grammatical impairment

Theory-specific classifications of grammatical words

	Grammatical verbs	**Lexical verbs**
Danish	evidential *skulle* 'shall'	modal *kunne* 'can'
Dutch	*hebben* 'have' + PTCP	*hebben* 'have' + NP

	Grammatical pronouns	**Lexical pronouns**
English	*it*	*that*
French	*me* 'me'	*moi* 'me'
Spanish	*te* 'you'	*ti* 'you'
Danish	*man* 'one'	*han* 'he'

	Gram. prepositions	**Lex. prepositions**
English	*of*	*off*
Spanish	*a* 'to'	*en* 'in'
Danish	*for* 'for'	*før* 'before'

Grammatical impairment

Example 1 (pronouns): *it* (GRAM) *vs. that* (LEX)

Only *that* can be focalized.

(1) a. *She hates exactly that*.
b. ?*She hates exactly it*.

Example 2 (prepositions): Danish *for* (GRAM) vs. *før* (LEX)

Only *før* can be modified.

(2) a. *De dansede umiddelbart før præsidenten*.
'They danced immediately before the president'.
b. **De dansede umiddelbart for præsidenten*.
'They danced immediately for the president'.

Example 3 (verbs): perfect *have* (GRAM) vs. possessive *have* (LEX)

Only possessive *have* can be focalized by means of *do*.

(3) a. *I do have a stolen bicycle*.
b. **I do have stolen a bicycle*.

Grammatical impairment

Central prediction

In grammatically impaired speech, words classified as grammatical are substituted and omitted more often than words classified as lexical – when compared to non-brain-damaged speech.

A number of studies confirm this prediction

Verbs:	Danish, Dutch, English
Pronouns:	Danish, French, Spanish
Prepositions:	Danish

Grammatical impairment – verbs

Dutch

Comparison of 18 speakers diagnosed with agrammatism
10 speakers diagnosed with fluent aphasia
non-brain-damaged control subjects.

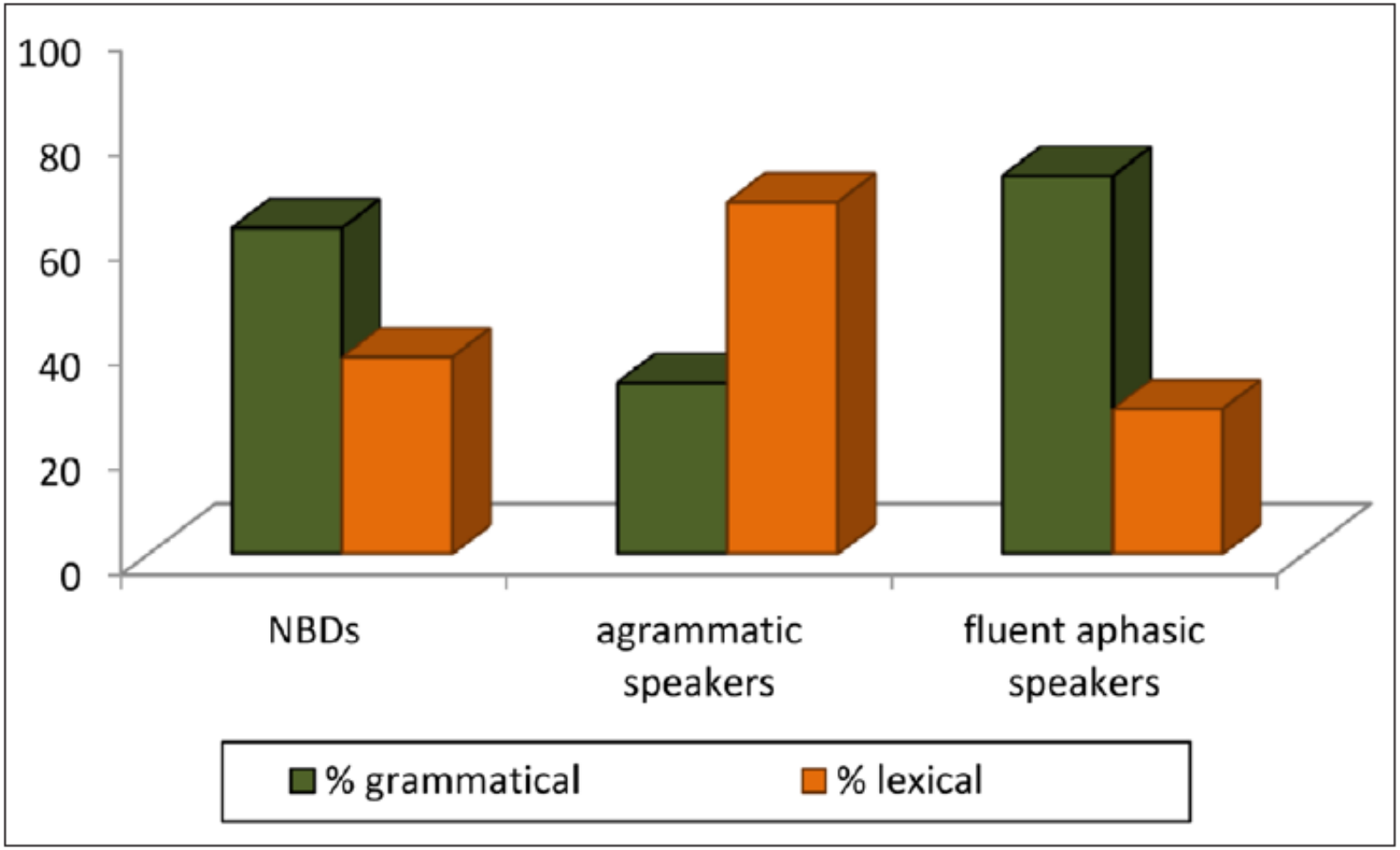
Comparison of grammatical and lexical variants of identical verb forms.

Grammatical verbs include:
hebben: 'have' + participle
modal verbs + infinitive

Lexical verbs include:
hebben: 'have' + NP
modal verbs + NP

Boye, K. & Bastiaanse, R. (2018) Grammatical versus lexical words in theory and aphasia: Integrating linguistics and neurolinguistics. *Glossa*.

Grammatical impairment – verbs



Grammatical impairment – verbs

English: Grammatical (including perfect) vs. lexical *have*

Participants
25 persons with non-fluent aphasia
123 patients with fluent aphasia
74 NBDs

Results confirm the Dutch pattern for persons with non-fluent aphasia.

Instances of *have*	Non-fluent (n = 25)	Fluent (n = 123)	NBDs (n = 74)
Grammatical	21	375	776
Lexical	77	1114	1074
% of instances of *have*			
Grammatical	21.43	25.18	41.95
Lexical	78.57	74.82	58.05

Jørgensen et al., in prep.

Grammatical impairment – verbs

Danish: Grammatical (including perfect) vs. lexical *have*

Participants
1 person with non-fluent aphasia
1 NBD

Results confirm the Dutch pattern for persons with non-fluent aphasia.

	PWA		NBD	
	Nº	**%**	**Nº**	**%**
Grammatical verbs	17	8.1%	91	36.7%
Lexical verbs	192	91.9%	157	63.3%

Messerschmidt, M., K. Boye, M.M. Overmark, S.T. Kristensen & P. Harder. 2018. Sondringen mellem grammatiske og leksikalske præpositioner. NFG 25. 89-106.

Grammatical impairment – verbs

French: Grammatical (including perfect) vs. lexical

Participants

4 persons with non-fluent aphasia

4 patients with fluent aphasia

7 NBDs

Results do NOT confirm the Dutch pattern.

Instances of *avoir*	Non-fluent (n = 4)	Fluent (n = 4)	NBDs (n = 7)
Grammatical	25	81	138
Lexical	12	29	99
% of instances of *avoir*			
Grammatical	67.57	73.64	58.23
Lexical	32.43	26.36	41.77

Explanation: *Passé composé* is a standard expression of past tense, and is used in past-tense narratives.

Jørgensen et al., in prep.

Grammatical impairment – pronouns

French

Speech data from 6 French persons diagnosed with agrammatism.

Comparable data from 9 non-brain-damaged controls.

Grammatical pronouns include:
"weak" pers. pronouns like *je*, but also pronouns like *y*.

Lexical pronouns include
"strong" pers. pronouns like *moi,* but also pronouns like *le mien.*

GPI = Grammatical Pronouns Index = gram. / total pronouns

Ishkhanyan, B., H. Sahraoui, P. Harder, J. Mogensen & K. Boye. 2017. Grammatical and lexical pronoun dissociation in French speakers with agrammatic aphasia: A usage-based account and REF-based hypothesis. *Journal of Neurolinguistics* 44. 1-16.

Grammatical impairment – French pronouns

Raw results

	Age	**Gender**	**Post-onset** (years; months)	**Fluency** (WPM)	**GPI**
BR	52	M	6;7	25	0,05
MC	44	M	4;0	44	0,42
PB	41	M	9;1	**66**	**0,90**
PC	51	M	1;3	30	0,74
SB	56	M	4;6	38	0,68
TH	74	F	2;8	**68**	**0,87**
Controls	**30 - 61**			**153**	**Mean = 0.91, SD = 0.02**

Grammatical impairment – pronouns

Danish

5 speech samples from 1 Danish pwa.

Comparable speech samples from 19 controls.

Billedbeskrivelse Kontrolgruppe Case	Grammatiske 64 1	Pronominer i alt 270 65	Kontingens-tabel 64, 206, 1, 64	P-værdi, højresidet ***3,04 · 10^{-06}
Fri tale Kontrolgruppe Case	Grammatiske 27 2	Pronominer i alt 238 219	Kontingens-tabel 27, 211, 2, 217	P-værdi, højresidet ***1,19 · 10^{-6}
Billedbeskrivelse Kontrolgruppe Case	Leksikalske 196 63	Pronominer i alt 270 65	Kontingens-tabel 196, 74, 63, 2	P-værdi, venstresidet ***4,17 · 10^{-06}
Fri tale Kontrolgruppe Case	Leksikalske 202 215	Pronominer i alt 238 219	Kontingens-tabel 202, 36, 215, 4	P-værdi, venstresidet ***1,75 · 10^{-07}

Grammatical impairment – prepositions

Danish

Participants

1 person with non-fluent aphasia

1 NBD

Results

	PWA		NBD	
	Nº	**%**	**Nº**	**%**
Grammatical prepositions	46	42.6%	104	53.6%
Lexical prepositions	62	57.4%	90	46.4%

Messerschmidt, M., K. Boye, M.M. Overmark, S.T. Kristensen & P. Harder. 2018. Sondringen mellem grammatiske og leksikalske præpositioner. NFG 25. 89-106.

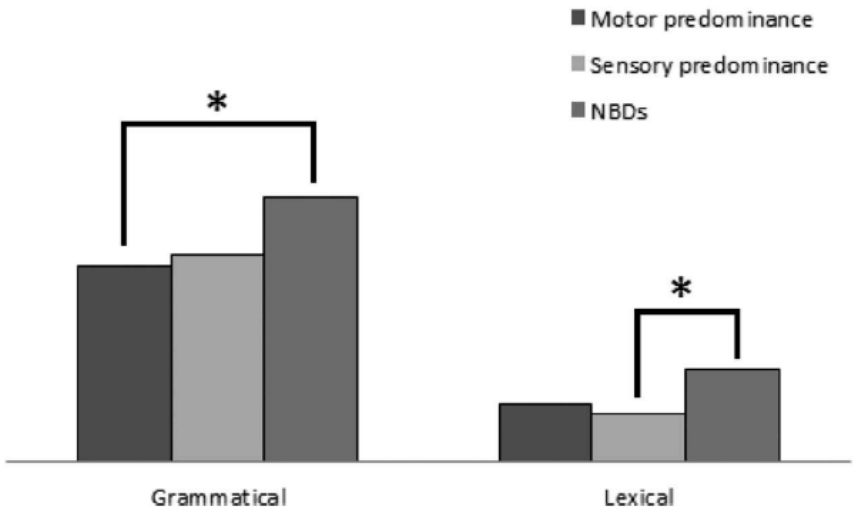
Grammatical impairment – prepositions

Spanish

Participants: persons with mixed and transcortical aphasias
6 PWAs with motor predominance (2 transcortical, 4 mixed)
3 persons with sensory predominance fluent aphasias (all mixed)
15 NBDs

Results
Grammatical prepositions are selectively impaired in aphasia with motor predominance.

Lexical prepositions are selectively impaired in aphasia with sensory pred.



Martínez-Ferreiro, S., B. Ishkhanyan, V. Rosell-Clarí & K. Boye. 2019. Prepositions and pronouns in connected discourse of individuals with aphasia. *Clinical Linguistics & Phonetics* 33.6. 497-517.

Grammatical impairment – prepositions

Spanish

Participants: persons with mixed and transcortical aphasias

6 PWAs with motor predominance (2 transcortical, 4 mixed)

3 persons with sensory predominance fluent aphasias (all mixed)

15 NBDs

Results

The difference is clearer for prepositions than for verbs and pronouns.

Martínez-Ferreiro, S., B. Ishkhanyan, V. Rosell-Clarí & K. Boye. 2017. Grammatical verbs in Spanish-speaking individuals with aphasia. *Studies in Language and Mind* 2. 175-209.

Martínez-Ferreiro, S., B. Ishkhanyan, V. Rosell-Clarí & K. Boye. 2019. Prepositions and pronouns in connected discourse of individuals with aphasia. *Clinical Linguistics & Phonetics* 33.6. 497-517.

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Martínez-Ferreiro, S., B. Ishkhanyan, V. Rosell-Clarí & K. Boye. 2019. "Prepositions and pronouns in connected discourse of individuals with aphasia". Clinical Linguistics & Phonetics 33.6. 497-517.

Overview

1. A usage-based theory of grammatical status
2. Grammaticalization
3. Language processing
4. Grammatical impairment
5. **Conclusion**

Conclusion

According to the usage-based theory, **grammar is a prioritization mechanism** with two central properties:

1. Grammatical items are **discursively secondary** (background).
2. Grammatical items are **dependent** on other items (host items).

This theory is a unified and empirically supported account of

- **grammaticalization**.
- characteristic features of the **perception** of grammatical items.
- characteristic features of the **production** of grammatical items.
- characteristic features of **grammatically impaired speech**.

Central references

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Nielsen, S.R., K. Boye, R. Bastiaanse & V.M. Lange. 2019. The production of grammatical and lexical determiners in Broca's aphasia. *Language, Cognition and Neuroscience*.