Faculty of Humanities

Determiner production
and what it tells us about grammatical impairment

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Overview

1. Determiner production in grammatically impaired speech

2. Determiner production in NBD speech

3. Grammatical impairment in a usage-based theory of grammar

4. Non-fluent aphasia in a polysynthetic language

5. Summary

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Determiner production in grammatically impaired speech

A central characteristic of agrammatism

Grammatical morphemes and words tend to be omitted or substituted; lexical morphemes and words are less affected.
(e.g. Saffran, Berndt & Schwartz, 1989; Menn, Obler & Miceli, 1990)

Articles as a case in point

Agrammatic speakers tend to omit or substitute articles.
(e.g. Månsson & Ahlsén, 2002)

Determiner production in grammatically impaired speech

Two accounts of agrammatism

1. Agrammatic speakers have problems with grammatical items.
   - Dual route accounts (e.g. Rosenberg & al., 1985)
   - Adaptation theory (e.g. Kolk & Heeschen, 1990)

2. Agrammatic speakers have problems with syntax and verbs.
   (Bastiaanse, Jonkers & Moltmaker-Osinga, 1996)

   Determiners are affected to the extent that they relate to verbs, for instance in terms of case assignment.
   (e.g. Bastiaanse, Jonkers, Ruigendijk & Zonneveld 2003)

   Focus has been on grammatical determiners, esp. articles.

   => Agrammatic speakers may have i) problems with both verbs and grammatical items, or ii) problems with verbs that affect only grammatical items.

Determiner production in grammatically impaired speech

Question: Is there an independent effect of the grammatical vs. lexical distinction in agrammatic determiner production?

Study: Production of grammatical and lexical determiners in Broca's aphasia: Danish indefinite articles *en* and *et* (GRAM) with numerals *én* and *ét* ('one'; LEX) in identical surroundings:

(1) a.　*Jeg har **en** grøn firkant.*　(common gender article = grammatical)
　　　 'I have a green square.'

　 b.　*Jeg har **én** grøn firkant.*　(common gender numeral = lexical)
　　　 'I have one green square.'

(2) a.　*Jeg har **et** grønt brev.*　(neuter gender article = grammatical)
　　　 'I have a green letter.'

　 b.　*Jeg har **ét** grønt brev*.　(neuter gender numeral = lexical)
　　　 'I have one green letter.'

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

Determiner production in grammatically impaired speech

(1) a.   *Jeg har* **en** *grøn firkant.*   (common gender article = grammatical)
            'I have a green square.'
   b.   *Jeg har* **én** *grøn firkant.*   (common gender numeral = lexical)
            'I have one green square.'

Both articles and numerals...
- come in two genders
- agree with their head noun for gender
- take the same prenominal NP position
- are spelled the same way

Moreover, the numeral is the diachronic source of the article.

Determiner production in grammatically impaired speech

Articles differ from numerals in terms of...

- stress
- frequency
- **lexical vs. grammatical status:**
  Only numerals can be focalized, addressed and modified.

(3) a. *Jeg har* **præcis en** *grøn firkant.*   (article = grammatical)
          'I have precisely a green square.'

    b. *Jeg har* **præcis én** *grøn firkant.*   (numeral = lexical)
          'I have precisely one green square.'

(4) a. **Jeg har* **mindre end en** *grøn firkant.*   (article = grammatical)
          'I have less than a green square.'

    b. *Jeg har* **mindre end én** *grøn firkant.*   (numeral = lexical)
          'I have one green square.'

Determiner production in grammatically impaired speech

Are both articles and numerals determiners?

(Ruigendijk & Baauw 2007 vs. Hansen & Heltoft 2011)

This doesn't matter:

squinting to German, both can be assumed to assign case.

(4)   *Ich habe ein-en Wagen.*
       'I have one-M.ACC/a-M.ACC car.'

Determiner production in grammatically impaired speech

Predictions

(based on the assumption that grammatical items are problematic)

Omission prediction

Agrammatic speakers omit more grammatical articles than lexical numerals, whereas NBDs omit similar (and very low) numbers of grammatical articles and lexical numerals.

Morphological substitution prediction

Agrammatic speakers produce more morphological substitutions than NBDs, but neither agrammatic speakers nor NBDs produce more morphological substitutions in grammatical articles than in lexical numerals.

(1) a.   *Jeg har* **en** *grøn firkant.*   (common gender article = grammatical)
          'I have a green square.'

    b.   *Jeg har* **én** *grøn firkant.*   (common gender numeral = lexical)
          'I have one green square.'
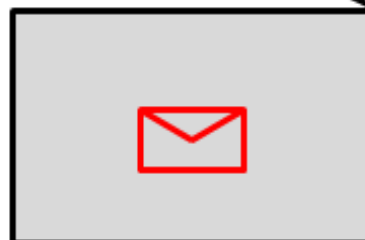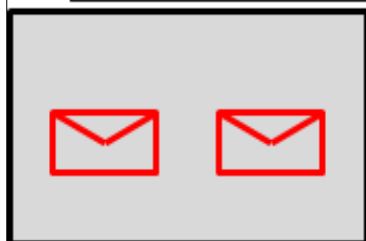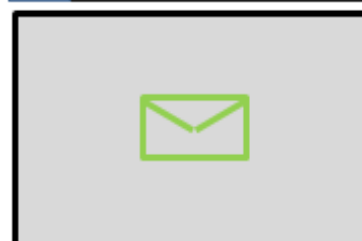
Determiner production in grammatically impaired speech

Participants

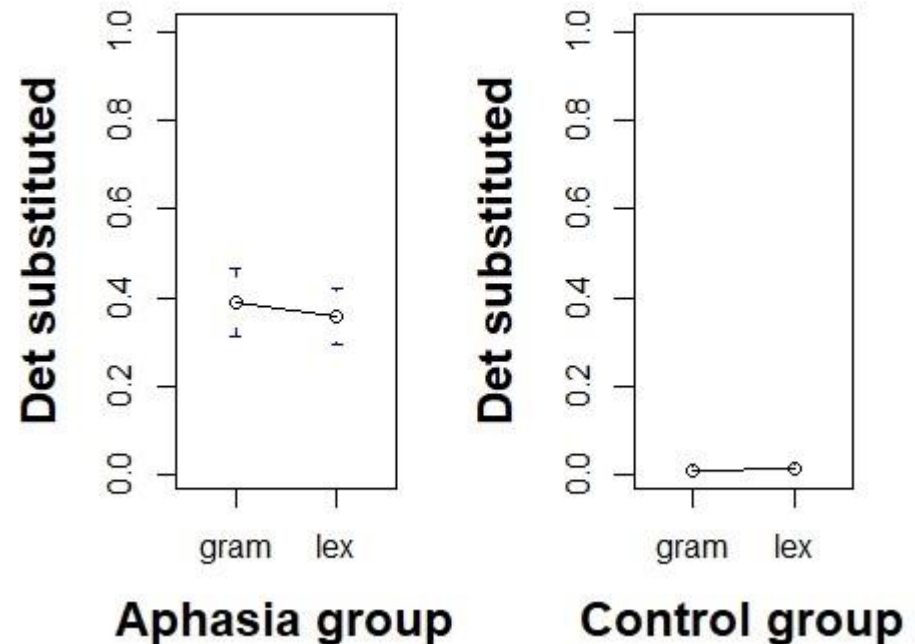| Participant	Gender	Age	Prior profession	Time post-onset	Cause	WAB-AQ
P1	F	73	Nurse	1 year; 2 months	Stroke	55.8
P2	M	67	School teacher	9 months	Stroke	43
P3	M	77	Jeweller	15 years	Stroke	53.2
P4	F	61	Nurse	27 years	Stroke	68.6
P5	M	59	Engineer	20 years	Traumatic	52.6
NBD1	F	71	Pedagogue	-	-	-
NBD2	M	79	School teacher	-	-	-
NBD3	M	62	Manual worker	-	-	-
NBD4	F	62	Secretary	-	-	-

Determiner production in grammatically impaired speech

Results – substitutions

Morphological susbtitution prediction confirmed!

Agrammatic speaker substitute more determiners than the NBDs.

But there is no (significant) difference between grammatical and lexical determiners.
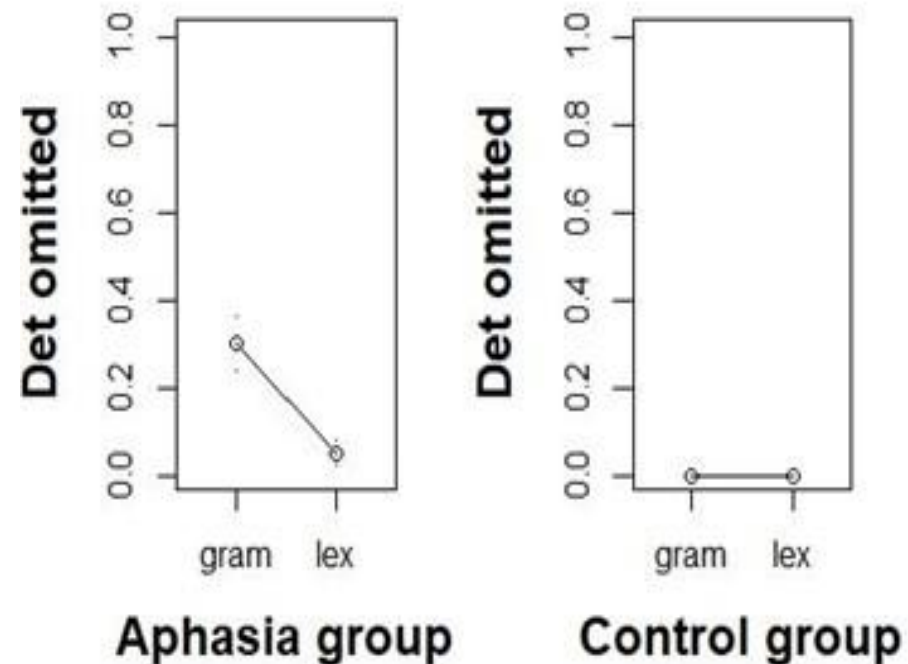

Aphasia group
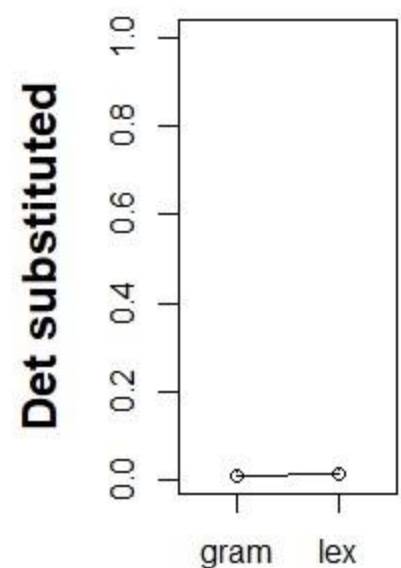
Control group

Determiner production in grammatically impaired speech

Results – omissions

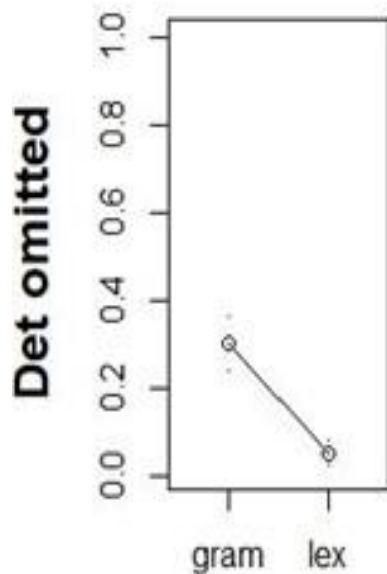Omission prediction confirmed!

Agrammatic speakers omit gram-
matical determiners, but not (to a
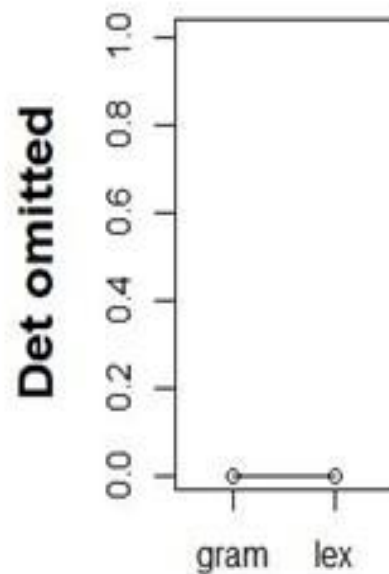significant extent) lexical ones.

Determiner production in grammatically impaired speech
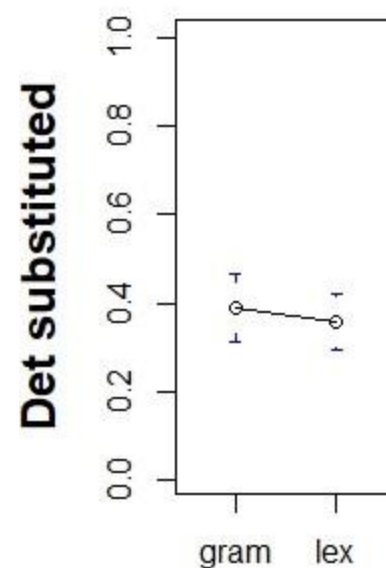
Results – omissions and substitutions

Agrammatic speakers have problems with grammatical items, but not in general with determiners or case assignement.

Determiner production in grammatically impaired speech

What about the link between verb and article problems then?

There does not seem to be a problem with case assignment.

The basic problem may be dependency:

- Both verbs and grammatical items are dependent in the sense that they require combination with resp. arguments and head nouns.

(4) - *What do you have?*
    - **A!*

- In contrast numerals can stand alone:

(4) - *How many do you have?*
    - *One!*

Determiner production in grammatically impaired speech

In grammatically impaired speech, the production of grammatical determiners is associated with difficulties that cannot be accounted for in terms of case or case-assignment difficulties.

Is the production of grammatical determiners difficult also for NBD speakers?

Yes, it seems so!

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Determiner production in NBD speech

Experiment 1

Design
The determiner experiment + fillers

Testpersons
NBDs

Lange, V.M., M. Messerschmidt & K. Boye. 2018.
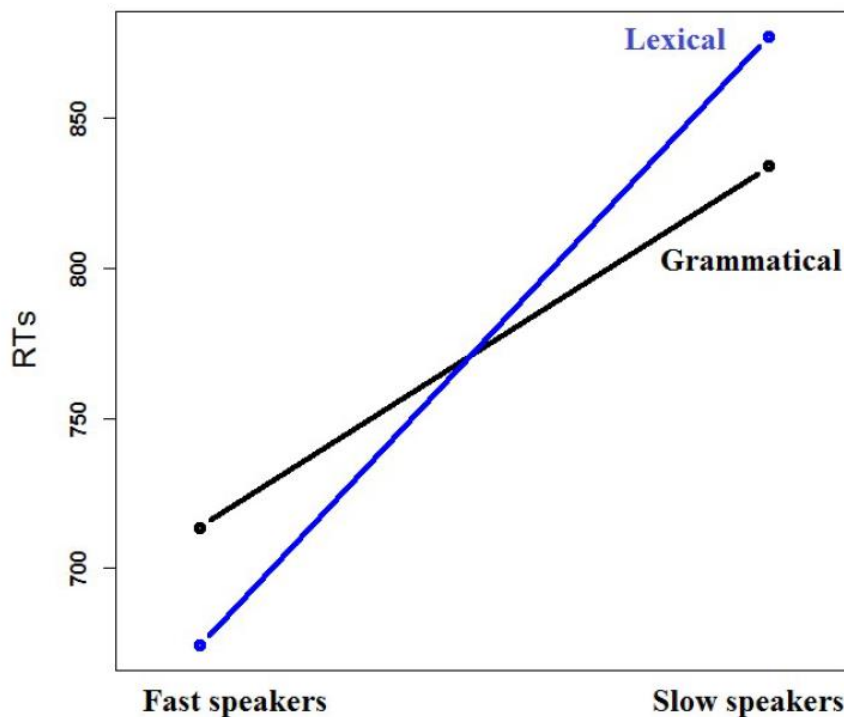Contrasting grammatical and lexical determiners. *Journal of Psycholinguistic Research* 47: 467.

Determiner production in NBD speech

Experiment 1

The fastest speakers (who may be assumed to reflect automatic processing most accurately) show longer reaction times in grammatical determiner pro-duction.

The opposite effect in the slowest speakers may be a frequency effect.

Determiner production in NBD speech

Compare the production of grammatical vs. lexical verbs.

Contrast between...

homonymous	**auxiliaries (GRAM) vs.**	**full verbs (LEX) ...**
	She has stolen a bike	*She has a stolen bike*
... in identical settings		
	So have I	*So have I*

Two verb forms contrasted, for which frequency differences are not univocal: *have* ('have') and *få* ('get').

Michel Lange, V., 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.

Determiner production in NBD speech
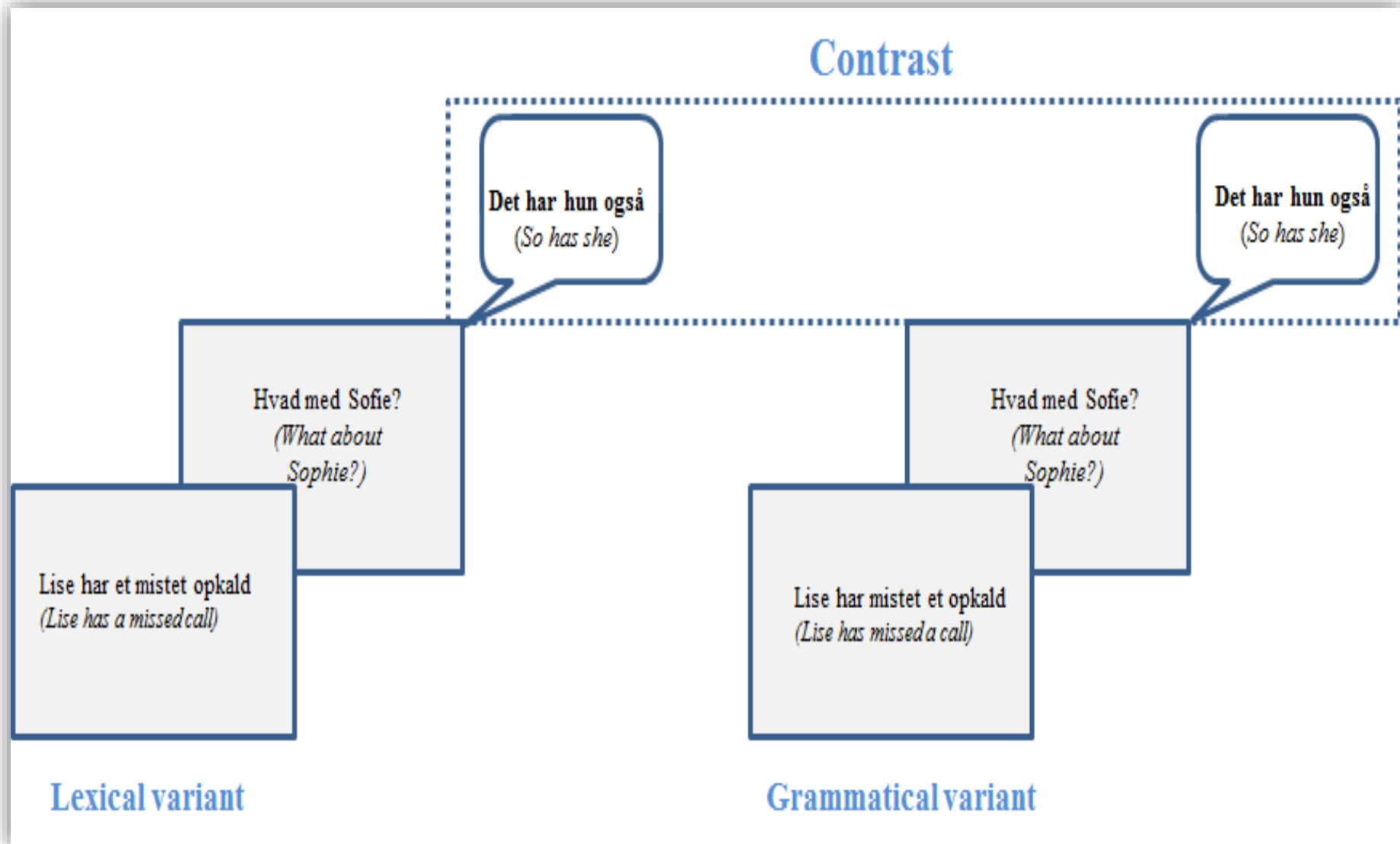
Determiner production in NBD speech
Main results
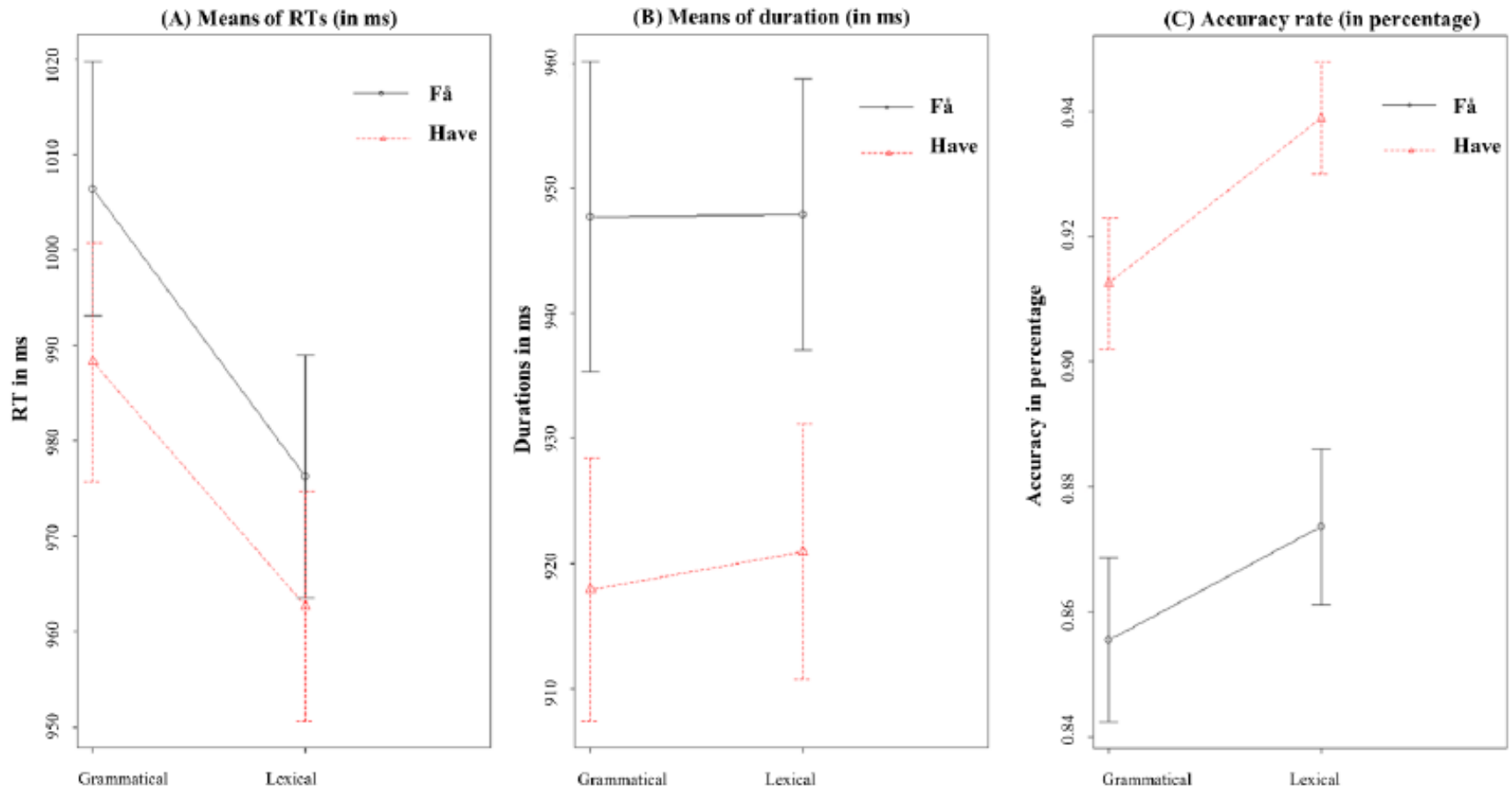
Fig 3. Means. Means of reactions times (A) in ms, durations (B) in ms, (and standard error of the mean in milliseconds) and accuracy in percentage (C) respectively for the verbs "får" and "har" for each condition (grammatical and lexical).

Determiner production in NBD speech

Experiment 2
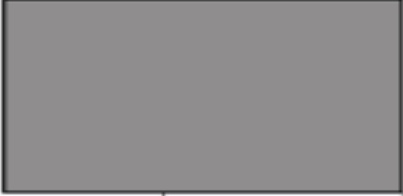
Design

The determiner experiment + fillers + digit span task

Ishkhanyan, B., K. Boye & J. Mogensen. 2018. The meeting point: Where language production and working memory share resources. *Journal of Psycholinguistic Research*.

Determiner production in NBD speech

Results

Production of grammatical articles is associated with less accuracy than production of lexical numerals.

Table 1 RTs, accuracy and WM scores for all conditions

	RT ± SE (ms)	Accuracy ± SE (%)	WM score ± SE
Grammatical			
Monosyllabic	965 ± 16	90 ± 1.3	16.6 ± 0.8
Bisyllabic	1010 ± 19	90 ± 1.4	18.2 ± 0.9
Lexical			
Monosyllabic	857 ± 15	96 ± 3.5	17.6 ± 0.9
Bisyllabic	1037 ± 21	97 ± 0.8	19.4 ± 0.6

RT mean reaction time, *SE* standard error, *WM* working memory

Table 2 The summary of results (*RT* reaction time, *WM* working memory)

	RT			Accuracy			WM		
	b	*t*	*p*	*b*	*z*	*p*	*b*	*t*	*p*
Syllables	61	3.1	0.007	0.06	0.25	0.81	1.7	3.1	0.004
Condition	5.7	0.3	0.71	1.6	6.2	<0.001	0.5	0.98	0.33
Load	−26	−3.6	<0.001	−0.09	−0.9	0.36			

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Grammatical impairment
in a usage-based theory of grammar

The usage-based theory:
Two central properties of grammatical items

Grammatical items are...

1. **discursively secondary** and ancillary in relation to other items (hosts).

2. **dependent** on other items (hosts) due to their secondary status.

In contrast, lexical items can be primary and independent: *Car!*

Grammatical impairment
in a usage-based theory of grammar

2 central features of grammatical items...

1. **discursively secondary** and ancillary in relation to other items (hosts).

2. **structurally dependent** on other items (hosts) due to their secondary status.

... 2 possible ways of accounting for grammatical impairment

1. **Prioritization account:** Grammatical impairment can be attributed to the prioritization of grammatical items under (important) lexical ones.

2. **Structural dependence account:** Grammatical impairment can be attributed to the structural dependence of grammatical items.

Grammatical impairment
in a usage-based theory of grammar

Structural dependence account

Grammatical impairment is the result of a deficit pertaining to the capacity for combining simple elements into complex wholes.

A deficit in this combinatorial capacity would lead to the omission of grammatical items (and structure-presupposing lexical ones, such as verbs), since they are dependent on and thus require combination with other items.

This account goes naturally with neurolinguistic theories of Broca's area as involved in concatenation, sequencing or "unification" of elements.

Grammatical impairment in a usage-based theory of grammar

Prioritization account

Complements accounts of agrammatism as a result of capacity limitations:
-    limitations to parsing-work space (Caplan & Hildebrandt 1988).
-    combinatorial slow-down (Kolk 1995).

Problem: Missing link between capacity limitations and grammar

-    Why would such capacity limitations affect grammatical items and not (to the same extent) lexical ones?*

    * We assume that the relevant capacity limitation is specific to non-fluent, including agramatic aphasia, rather than a general "resource reduction" (Caplan 2012) also found in fluent aphasia.

Caplan, D. 2012. Resource reduction accounts of syntactically based comprehension disorders. In *Perspectives on Agrammatism*, ed. by R. Bastiaanse & C. K. Thompson. New York: Psychology Press. 34-48.

Caplan, D. & N. Hildebrandt (1988). *Disorders of syntactic comprehension*. Cambridge, MA: MIT Press.

Kolk, H. (1995). A time-based approach to agrammatic production. *Brain and Language* 50. 282-303.

Grammatical impairment
in a usage-based theory of grammar

The usage-based theory as the missing link

Grammatical impairment can be understood as a result of a compensation for capacity limitations in terms of prioritization:

Grammatically impaired persons do not have the resources to produce full-fledged linguistic strings and compensate for this by giving lexical items top priority, while **dispensing with the less important grammatical ones** (cf. Ferreira 2003 on "good enough processing").

(1)   *Bob has always hated running*.
(2)   *Bob hate run*.
(3)   *Always hate run*.
(4)   **has ed ning*.

Ferreira, F. (2003). The misinterpretation of noncanonical sentences. *Cognitive Psychology* 47. 164-203.

Grammatical impairment
in a usage-based theory of grammar

<u>Expected findings of interest</u>

Structural dependence account: Impairment is associated with... deficits pertaining to verb production, as verbs like grammatical items presuppose combination.

Prioritization account: Impairment is associated with...
1. the omission of lexical elements that are somehow demanding to produce – e.g. elements referring to the past (Bastiaanse 2013), anaphoric pronouns.
2. the omission not only of grammatical elements, but also discursively secondary (= background) lexical ones.

Bastiaanse, R. 2013. Why reference to the past is difficult for agrammatic speakers. *Clinical Linguistics & Phonetics* 27.4. 244–263.

Grammatical impairment
in a usage-based theory of grammar

Determiner production revisited

2 accounts of difficulties in grammatically impaired and NBD speech

1. Grammatical determiners (articles) are **structurally dependent**, and producing them involves **combination**, which is demanding, and the neurocognitive basis of which may be damaged. This would explain...

   - omissions and substitutions of grammatical determiners in agrammatic speech.

   - grammatical errors under increased working memory load, and increased RTs in NBD speech.

Grammatical impairment
in a usage-based theory of grammar

Determiner production revisited

2 accounts of difficulties in grammatically impaired and NBD speech

2. Grammatical determiners (articles) are **discursively secondary**, and their production has low priority – especially under capacity limitations. This would explain…

- omissions and substitutions of grammatical determiners in agrammatic speech

  – cf. the fact that the lexical determiner *én/ét* conveys a central point in the elicited phrases, in contrast to the article *en/et*.

- grammatical errors under increased working memory load,
  but not (straightforwardly, at least) increased RTs in NBD speech.

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5. Summary

Non-fluent aphasia in a polysynthetic language

Greenland and West Greenlandic (WG)

Around 50,000 inhabitants

Around 44,000 in West Greenland

WG = major dialect/langúage

Not all inhabitants speak Greenlandic

Many speakers of Greenlandic live in Denmark

Non-fluent aphasia in a polysynthetic language

WG: a non-endangered polysynthetic language

As a polysynthetic language WG has an extreme morphological complexity:

>Abundance of "affixes"
>>(many translating into e.g. English verbs or adjectives)
>
>Verbs and arguments in one word
>Utterances and sentences frequently consist of one word only
>Recursive morphology: V > NP > V > NP…
>Many frozen expressions (e.g. affix combinations)

(1)   *An-neru-ler-sin-neqar-sinnaa-sori-nngik-kaluar-pakka*
       be.big-more-begin-cause-passive-can-think.that-not-however-IND.1.SG/3.PL
       'I don't think they can be made any bigger however.'

Non-fluent aphasia in a polysynthetic language

The importance of polysynthetic languages

Polysynthetic languages are central to understanding…
- verbs and argument structure
- the relationship between syntax and morphology: Is WG morphology "internal syntax"?
- the distinction between lexical and grammatical items: Are polysynthetic affixes grammatical morphemes or incorporated lexical ones?

Aphasia in polysynthetic languages

Aphasiological studies will provide central information on these topics.
But no aphasiological study exists of WG or any other polysynthetic language.

Non-fluent aphasia in a polysynthetic language

The importance of polysynthetic languages

Polysynthetic languages are central to understanding…
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Aphasia in polysynthetic languages

Aphasiological studies will provide central information on these topics.
But no aphasiological study exists of WG or any other polysynthetic language.

PWAs speaking polynthetic languages often receive very limited speech therapy, if any at all!

Non-fluent aphasia in a polysynthetic language

Study of 5 WG speakers with non-fluent aphasia and 5 controls

How does non-fluent aphasia manifest itself in WG?

How can we account for the manifestations?

Nedergaard, J.S.K., S. Martínez-Ferreiro, M.D. Fortescue & K. Boye. To appear. Non-fluent aphasia in a polysynthetic language: Five case studies. *Aphasiology*.

Non-fluent aphasia in a polysynthetic language

Aphasia patients

Participant ID	A1	A2	A3	A4	A5
Gender	F	F	M	F	F
Age	62	69	68	66	84
Time post onset (TPO)	7 months	6 months	8 months	4 months + lacunar infarctions two days prior to the interview	5 years, 0 months
Occupation	Nursing home, social services	Laboratory assistant	Teacher, politician	Nursery teacher	Factory work, cleaning, sewing, knitting
Education level	Primary	Primary	Vocational	Vocational	Primary
Birthplace	Qaqortoq (S)	Maniitsoq (W)	Qeqertarssuaq (W)	Qullissat (W)	Qerrortusooq (W)
Languages	Monolingual	Late bilingual	Bilingual	Early bilingual, lost Danish after stroke	Monolingual
Handedness	R	Ambi	Ambi	R	R
Lesion type	Left medial-infarction (CT)	Left (on the basis of weak right side)	Left parietal infarction (CT)	Bilateral infarction. Basal ganglia. Largest in frontal left (CT)	Left subacute infarction, medial left large edema (CT)
Aphasia type	Expressive	No information	Expressive + anomia	Expressive	No information
Other cognitive issues	None	Memory (potential dementia)	None	Memory	None

General background information for aphasia patients (F = Female, M = Male, W = West, S = South, N = North, Ambi = Ambidextrous, R = Right).

Non-fluent aphasia in a polysynthetic language

Aphasia patients

Diagnostic and therapeutic limitations

1. No standardised diagnostic protocol is applied. The classification "expressive" and/or "impressive" aphasia is established by clinical consensus between non-specialist medical professionals and in collaboration with the families.
2. No aphasia type was defined for A2 and A5 at the time of testing.
3. Moreover, none of the patients had received specialised Speech and Language Therapy as there are no trained professionals currently working in Greenland.

We did not detect lexical impairments, so we assume that all five participants with aphasia were non-fluent.

Non-fluent aphasia in a polysynthetic language

Data

Semi-spontaneous speech data, including

- picture description ("Cookie Theft"),
- picture narrative ("Broken Window"),
- personal narrative

Data were collected via personal interviews with the exception of A1 and A5 who were interviewed via telephone because of time and transport constraints.

Non-fluent aphasia in a polysynthetic language

Analyses

1. Standard production parameters

2. Production of verbal modifiers, nominal modifiers, nominalisers, verbalisers

3. Production of "external syntax"

4. Production of "omissions" and other errors (including substitutions)

Non-fluent aphasia in a polysynthetic language

Results: 1. Standard production parameters

All PWAs produced significantly fewer words per utterance than the control group,

PWAs did not differ significantly with regard to speech rate, morphemes per word, or morphemes per utterance.

	Words/ utterance	Morphemes/ utterance	Morphemes/ second	Morphemes/ word
A1	2.78	4.22	0.95	1.52
A2	1.80	3.97	0.81	2.20
A3	3.16	5.87	1.02	1.86
A4	1.90	3.97	0.82	2.04
A5	2.18	4.11	0.67	1.89
Mean	2.37	4.43	0.85	1.90
SD	0.59	0.81	0.14	0.25
C1	4.91	11.32	1.87	2.29
C2	5.01	9.59	1.57	1.95
C3	4.38	10.36	1.47	2.34
C4	5.82	12.41	1.89	2.14
C5	4.08	6.94	1.19	1.72
Mean	**4.84**	**10.12**	**1.60**	**2.09**
SD	0.67	2.07	0.29	0.26

Non-fluent aphasia in a polysynthetic language

Results: 2. Production of verbal modifiers, nominal modifiers, nominalisers, verbalisers

No significant difference between PWAs and the control group:

Regardless of whether types and tokens were counted per task or across all tasks, participants with aphasia did not show lower variation than controls.

	% nominal modifiers of morphemes	% verbal modifiers of morphemes
A1	1.32	5.26
A2	0.00	9.56
A3	0.49	9.56
A4	0.51	13.33
A5	0.87	16.52
Mean	**0.64**	**10.85**
SD	0.49	4.27
C1	2.64	10.82
C2	1.53	8.67
C3	0.41	18.70
C4	0.80	13.20
C5	0.00	4.55
Mean	**1.08**	**11.19**
SD	1.04	5.27

Non-fluent aphasia in a polysynthetic language

Results: 3. Production of "external syntax"

To explore external syntax, we examined…

1. Subordination
2. Valence-change
3. Transitivity.

None of the PWAs differed significantly from the control group on these three parameters.

Non-fluent aphasia in a polysynthetic language

However, it is worth noting that for all PWAs, the proportion of subordinate verbs (except for A5), proportion of verbs that included a valence-change (antipassive, passive, causative, and applicative), and proportion of transitive verbs (except for A3) were below the average produced by the control group.

	% subordinate verbs	% valence-changed verbs	% transitive verbs
A1	35.29	0.00	5.88
A2	30.00	6.67	10.00
A3	38.64	5.68	29.55
A4	23.08	10.26	10.26
A5	50.00	11.54	15.38
Mean	35.40	6.83	14.21
SD	10.06	4.53	9.21
C1	42.19	23.44	12.50
C2	38.24	17.65	44.12
C3	46.51	18.60	20.93
C4	33.33	9.52	38.10
C5	50.00	13.64	18.18
Mean	**42.05**	**16.57**	**26.76**
SD	6.59	5.26	13.61

Non-fluent aphasia in a polysynthetic language

Results: 4. Production of "omissions" and other errors

Neither PWAs nor control participants made a significant amount of errors.

PWAs made a total of eight errors:

2 concerned a missing habitual aspect marker

2 concerned transitive inflectional endings

2 concerned argument-verb agreement

1 was incorrect mood

1 was a lexical selection error

Aside from the lexical selection error, all these errors seem to occur in the relationship between verbs and their dependents, especially when the relationship was not straightforward.

Non-fluent aphasia in a polysynthetic language

Example 1 of errors

Data from participant A1 provide an example of an omission of an obligatory habitual aspect maker in (1). Both verbs should have a habitual aspect in coordinated clauses like these. Thus, the second verb, *ajerpoq*, should have been *ajertarpoq*.

(1) *ilaanni*	*iluarsisarpoq*				*ilaanni*	*ajerpoq*	
ilaanni	iluar	-si	-sar	-poq	ilaanni	ajer	-poq
sometimes is good	become	HAB.IND	IND.3.SG	sometimes be bad	IND.3.SG

"Sometimes it becomes good, sometimes it is bad."

Example 2 of errors

Data from participant A5 provide an example of an inflectional error regarding complex argument-verb agreement. In (3) below, the static verb required locative case instead of terminalis case:

(3) *taqqavaniinnerpunga*				*Sanamut*	
taqqava	-niin	-ner	-punga	Sana	-mut
there (south)	be in location	I wonder	IND.1.SG	Sana	TRM

"I was probably down south. To Sana."

Non-fluent aphasia in a polysynthetic language

Other synthetic languages: agglutinating languages

The findings for WG are reminiscent of findings for the agglutinating languages Finnish (Niemi, Laine, Hänninen & Koivuselkä-Sallinen 1990), Japanese (Sasanuma, Kamio & Kubotas 1990) and Turkish (Slobin 1990):
- Very few errors (substitutions or omissions)
- Short and simple syntactic strings
- Slow pace

Recent studies with Turkish speakers with agrammatism have shown that tense morphology and evidentiality are susceptible of impairment (Bastiaanse et al. 2011; Yarbay-Duman and Bastiaanse 2009; Arslan et al. 2014).

However, this does not challenge the generalization that in synthetic (agglutinating and polysynthetic) languages individuals with non-fluent aphasia do not seem to have morphological problems to the degree consistently found in more analytic languages such as English.

Non-fluent aphasia in a polysynthetic language

Are the WG speakers grammatically impaired at all?

Our findings are consonant with the crosslinguistic definition of agrammatism given in Menn & Obler (1990: 3):

> "For cross-language studies, the definition of agrammatism must be framed in a fashion which is independent of the morphological and syntactic devices that any particular language may use. As a working basis, we take the features of slow rate and short sentence and phrase length as definitional; we also look for some 'limited use' of syntactic and morphological devices".

Non-fluent aphasia in a polysynthetic language

How to account for non-fluent aphasia in WG?

Non-fluent aphasia in a polysynthetic language

How to account for non-fluent aphasia in WG?

1. Partial evidence for a verb-based account

On the one hand, all but one of the errors in the current study occurred with the relationship between verbs and their dependents.

On the other hand, our individuals with aphasia did not produce fewer verbs than the control group.

Non-fluent aphasia in a polysynthetic language

How to account for non-fluent aphasia in WG?

2. Partial evidence for an account based on syntax

The **preservation of inflectional morphology** can be accounted for on the assumption that non-fluent aphasia is due to a syntactic rather than a morphological deficit (e.g. Niemi et al. 1990; Grodzinsky 1990):

> Also PWAs speaking analytic produce existing words rather than bare roots or stems.

> WG roots are bound, and there are no uninflected word forms (such as the English infinitive) with which inflected words can be substituted.

The **preservation of derivational morphology** cannot be accounted for this way, however:

> WG derivational affixes are not obligatory and thus not required in order to produce a word.

Non-fluent aphasia in a polysynthetic language

How to account for non-fluent aphasia in WG?

3. Evidence for a usage-based account

Grammatical impairment affects items and constructions that are secondary and dependent.

Derivational morphology is preserved to the extend that it is communicatively important (cf. Slobin 1991)

– i.e. to the extend that it consists of potentially primary, i.e. lexical, material accounted; cf. the fact that many WG affixes translate into lexical material in English.

Inflectional morphology is preserved because

– PWAs produce existing words,
– WG roots are bound, and there are no uninflected word forms with which inflected words can be substituted.

Overview

1. Determiner production in grammatically impaired speech

2. Determiner production in NBD speech

3. Grammatical impairment in a usage-based theory of grammar

4. Non-fluent aphasia in a polysynthetic language

5. **Summary**

Summary

Determiner studies

No evidence for a role of case or case-assignment in determiner production

Agrammatic speakers have **no problems with lexical determiners.**

Evidence for a role of the lexical-grammatical contrast

NBD speech: Increased RTs and decreased accuracy in gram. condition .

Agrammatic speech: Omissions of grammatical determiners and substitutions of determiners.

TMS: Increased RTs in BA 44 stimulation, and compensatory reduction of grammatical determiners.

Summary

<u>A usage-based account of grammatical impairment</u>

Grammatical vs. lexical items

Grammatical items are **secondary** and **dependent** on a host item.
Lexical items are potentially primary and can be independent.

Grammar is difficult and not communicatively crucial

Due to the extra dependence, grammatical items are harder to produce than lexical ones.

However, production of grammatical items can be given low priority without fatal communicative consequences, because grammatical items are discursively secondary.

Summary

If grammar is difficult and not communicatively crucial, why do we have it?

1. 'Not communicatively crucial' is not the same as 'useless'.

2. The speaker's extra investment in the production of grammatical items allows the hearer to

      a. give information that the hearer would otherwise have to infer,

      b. prioritize the parts of complex linguistic messages.