Definiteness, uniqueness, and maximality in languages with and without articles

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Definiteness with and without articles

Definiteness expressed with articles in a language like English:

(1) a. In the room, the lamp was blinking.
   b. In the room, a lamp was blinking.

Definiteness not morphologically expressed in Czech (a.o.):

(2) V místnosti blikala lampa.
    in room blinked lamp
    ‘In the room, the/a lamp was blinking.’
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Overarching research questions

- What factors other than determiners influence definiteness?
- What type of definiteness do we find with articleless NPs?
Background
Definiteness in articleless languages
Definiteness–word order interaction

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Two generalizations
Corpus study
Discussion

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Predictions and results
Subexperiments
Discussion
Background

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Dayal 2004: Bare NPs ≠ Indefinites!

**Dayal (2004):** Bare NPs denote properties and get shifted to kinds (by $\cap$) or to entities (by $\iota$). Shifting to an existential quantifier ($\exists$) is not an option:

\[
\{\cap, \iota\} > \exists
\]

*(Revised Meaning Preservation; p. 419)*

**Evidence:** (Apparently) Indefinite bare NPs cannot scope freely (always have narrow scope; corroborated by Geist 2010):

\[
(4) \begin{align*}
\text{a. } \textit{Kot} & \; \textit{ne} \; \textit{sidit na stule}. & \neg > \exists \\
\text{cat} & \; \text{NEG} \; \text{sits} \; \text{on} \; \text{stool} \\
\text{‘There isn’t a cat sitting on the stool.’} \\
\text{b. } \textit{Mne} & \; \textit{kažetsja}, \; \textit{čto} \; \textit{v} \; \textit{komnate} \; \textit{myš’}. & \text{seem} > \exists \\
\text{me.DAT} & \; \text{seems} \; \text{that} \; \text{in} \; \text{room} \; \text{mouse} \\
\text{‘It seems to me that there’s a mouse in the room.’}
\end{align*}
\]

*(Dayal 2004:405)*
Dayal 2004: Singulars vs. plurals

**Bare plurals** allow access to kind instantiations, and via Derived Kind Predication (Chierchia 1998) *existential quantification* over these instantiations. **Bare singulars** don’t.

(5) a. **Sobaki** byli vezde.  \[\forall s \exists x [\bigcup \text{DOGS}(x)] \text{ in } s\]  
   dogs were everywhere  
   ‘There were dogs (different groups) everywhere.’

b. **Sobaka** byla vezde.  \[\forall s \exists x [\bigcup \text{DOG}(x)] \text{ in } s\]  
   dog was everywhere  
   ‘The dog/A particular dog (the same one) was everywhere.’  
   (Dayal 2004:406)
Dayal 2004: Indefinite bare singular after all?

Dayal (2004) is aware of the fact that many scholars have claimed that there are genuine (albeit only narrow-scope) indefinite readings of bare singulars in Russian (cf. Geist 2010). Her footnote-style response:

- Possibly incorporation (of properties) in object positions (fn. 10, p. 405).
- Possibly, no projection of uniqueness presupposition of bare singulars (fn. 10, p. 405).
- Indefiniteness intuition $\approx$ Uniqueness but lack of familiarity.

“[...] the claim we can safely make about singular bare nominals is that they can only denote a unique individual per situation, but this does not entail that the entity referred to be familiar.” (Dayal 2004:409; my emphasis)
Heim (2011): Bare NPs are always indefinite (existential), but they can correspond to definites because of the lack of a definite article that would block definite readings (by Maximize Presupposition).

“[Bare NPs in articleless languages] are semantically equivalent to English indefinites, but have a wider range of felicitous uses because they do not compete with definites and therefore do not induce the same implicatures.” (Heim 2011:1006; my emphasis)
Heim 2011: Bare NPs = Indefinite! II

**Definites:** Uniqueness presupposition present & satisfied

(6) The bike was fine after the seat was replaced.
   \[\text{REPLACED}(\exists x \text{SEAT}(x)(s_{\text{bike}))}\]

**Indefinites:** Uniqueness presupposition absent but satisfied (!)

(7) #The bike was fine after after a seat was replaced.
   \[\exists x[\text{SEAT}(x)(s_{\text{bike}}) \land \text{REPLACED}(x)]\]

**Bare NPs:** Uniqueness presupposition absent, but no way to express it anyway \(\rightarrow\) existential semantics covers definite use.

(8) Kolo bylo v pořádku po výměně sedla.
   Bike was in order after change.LOC seat.GEN
   ‘The bike was fine after the seat was replaced.’
   \[\exists x[\text{SEAT}(x)(s_{\text{bike}}) \land \text{REPLACED}(x)]\]
Heim 2011: Problems

Heim’s proposal is not yet worked out and suffers from problems:

- Plenty of evidence that bare NPs in articleless languages don’t behave as indefinites in languages with articles (e.g. Dayal 2004).
- Overgeneration of scope facts.

Still, it can be taken to be the null hypothesis. Plus it makes the clear prediction that uniqueness/maximality presupposition should not be present with bare NPs in articleless languages.
## Summary of predictions

<table>
<thead>
<tr>
<th></th>
<th>Dayal 2004</th>
<th>Heim 2011</th>
</tr>
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<tbody>
<tr>
<td>uniqueness pres. (sg)</td>
<td>present</td>
<td>absent</td>
</tr>
<tr>
<td>maximality pres. (pl)</td>
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**Background**

Definiteness in articleless languages

Definiteness–word order interaction

**Corpus study**

Two generalizations

**Discussion**

**Experiment**

Design

Predictions and results

Subexperiments

**Discussion**
Word order and definiteness

An old observation (Russian)

Definiteness of bare NPs in articleless languages interacts with word order

(9) a. Na stole stojala lampa.
   on table stood lamp
   ‘There was a lamp on the desk.’

b. Lampa stojala na stole.  
   lamp stood on desk
   ‘The lamp was on a/the desk.’

Krámský (1972) for Czech; Szwedek (1974b) for Polish
Word order and definiteness
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Krámský (1972) for Czech; Szwedek (1974b) for Polish
Open issues: Which factor exactly? I

(10) a. Na stole stojala lampa.  
     b. Lampa stojala na stole.

def/indef  
def

Most common story:

• Clause-initial ⇝ Topic ⇝ Definite (e.g. Geist 2010)
Open issues: Which factor exactly? I

(10) a. Na stole stojala lampa. def/indef
    b. Lampa stojala na stole. def

Most common story:

• Clause-initial $\Rightarrow$ Topic $\Rightarrow$ Definite (e.g. Geist 2010)

But there are further plausible options:
Open issues: Which factor exactly? 1

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  (à la Diesing 1992)
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- Unaccented $\Rightarrow$ Given $\Rightarrow$ Anaphoric/Definite
  (e.g. Szwedek 1974a, 2011 for Polish)
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(10) a. Na stole stojala lampa. \hspace{1cm} \textit{def/indef}
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Most common story:

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- Subject (position) $\leadsto$ Topic $\leadsto$ Definite
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- Precedes a definite NP (\textit{stole}) $\leadsto$ Definite
  (e.g. Titov 2017 for Russian double objects)
Open issues: What kind of definiteness? I

     b. Lampa stojala na stole.

What kind of definiteness is involved?
Open issues: What kind of definiteness? I

(11) a. Na stole stojala lampa.  \quad \textit{def/indef}
    b. Lampa stojala na stole.  \quad \textit{def}

What kind of definiteness is involved?

- Uniqueness/Maximality
  
  (Frege 1892; Russell 1905; Elbourne 2013)
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- Uniqueness/Maximality
  (Frege 1892; Russell 1905; Elbourne 2013)

- Familiarity (≈ identifiability by speaker & hearer)
  (Christophersen 1939; Heim 1982; Roberts 2003)
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type

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  (Frege 1892; Russell 1905; Elbourne 2013)

• Familiarity (≈ identifiability by speaker & hearer)
  (Christophersen 1939; Heim 1982; Roberts 2003)

• Anaphoricity
  special case of familiarity (Heim 1982; Schwarz 2009)
Open issues: What kind of definiteness? II

What kind of definiteness is involved?

- Dayal (2004), Schwarz (2013), Jenks (to appear), and others on articleless languages:
  - bare NPs $\approx$ uniqueness/maximality
  - demonstrative NPs $\approx$ familiarity/anaphoricity
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- Dayal (2004), Schwarz (2013), Jenks (to appear), and others on articleless languages:
  - bare NPs $\approx$ uniqueness/maximality
  - demonstrative NPs $\approx$ familiarity/anaphoricity
- Indeed, the anaphoric potential of bare NPs (even in initial/unstressed position) is restricted:

(12) V pokoji byli chlapci. #( Ti) Chlapci si četli.
    in room were boys DEM boys REFL read
    ‘There were some boys in the room. The boys were reading.’

(13) V pokoji byli chlapci a dívky. (# Ti) Chlapci si četli...
    in room were boys and girls DEM boys REFL read
    ‘There were some boys and some girls in the room. The boys were reading...’
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→ Definiteness of bare NPs $\approx$ uniqueness?
Motivation for quantitative studies

- Complex empirical matter: We expect interactions of definiteness with
  - surface form (order) and prosody,
  - Information structure (topic, focus, givenness), whereby
  - the above two interact in complex ways too!

- The very concept of definiteness is not an easy one.

- Existing evidence is often episodic and remains ambivalent.

- Intuitions of individuals are not very reliable and informative.
Plan for the talk

1. Corpus study on the definiteness–word order interaction in Czech. Šimík & Burianová (to appear)

2. Experiment on uniqueness/maximality in German and Russian. joint work with Christoph Demian
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   → No effect of position or prosody on uniqueness/maximality in Russian.
   → No uniqueness (sg) whatsoever...

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   - No uniqueness (sg) whatsoever...
   - ...but perhaps some maximality (pl).

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Two different generalizations

(14) a. Na stole stojala lampa. \(def/\text{indef}\)
    b. Lampa stojala na stole. \(def\)

The observed definiteness–word order interaction has been formulated in two different ways:

1. **Relative position** generalization
   Preverbal bare NP \(\rightarrow\) Definite interpretation

2. **Absolute position** generalization
   Clause-initial bare NP \(\rightarrow\) Definite interpretation
Two different generalizations

(14) a. Na stole stojala lampa.  
    b. Lampa stojala na stole.

The observed definiteness–word order interaction has been formulated in two different ways:

1. **Relative position** generalization
   Preverbal bare NP → Definite interpretation
   (Postverbal bare NP → Indefinite interpretation?)

2. **Absolute position** generalization
   Clause-initial bare NP → Definite interpretation
   (Clause-final bare NP → Indefinite interpretation?)

NB: It is more or less common ground that the effect of the preverbal/initial position is categorical, while the effect of the postverbal/final position is not.
Capturing the RELATIVE POSITION generalization

- **Verb as a transition** between
  - the *given/contextually dependent* and
  - the *new/contextually independent* (e.g. Mathesius 1939).

- **G-movement/operator-based approach** (Kučerová 2007): the *given/+presupposed–new/−presupposed* division is tied to the flexible position of the G-operator, which in turn is tied to the position of the verb.

- **Mapping Hypothesis** (Diesing 1992; Slavic: Junghanns & Zybatow 1997; Brun 2001; Späth 2003; Biskup 2011; Mykhaylyk 2011)
  - vP-external material $\rightarrow$ +presuppositional
  - vP-internal material $\rightarrow$ −presuppositional
Capturing the **ABSOLUTE POSITION generalization**

[Clause-initiality/finality]

The most common idea:

- Clause-initiality → Topichood → Definiteness

Hlavsa (1975); Chvany (1983); King (1995)
Capturing the **ABSOLUTE POSITION** generalization II

[Clause-initiality/finality]

Geist’s (2010) more refined view:

**Premises**

(a) Slavic bare NPs can either be definite or indefinite (but cf. Dayal 2004).

(b) If indefinite, then necessarily non-specific (specificity requires overt determiners).

(c) Topics must be specific/referential (Reinhart 1981).

(d) Clause-initial bare NPs are topics.

**Conclusion**

Clause-initial bare NPs cannot be indefinite.
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Research questions

1. Can the word order–definiteness interaction be found in corpus?
2. Do the findings conform to the relative position generalization or the absolute position generalization?
Predictions

The relative position hypothesis

• Preverbal bare NPs are more likely to be definite.

(15) X Y Z VERB A B C

The absolute position hypothesis

• Clause-initial bare NPs are more likely to be definite.

(16) X Y Z VERB A B C
Predictions

The **relative position** hypothesis

- Preverbal bare NPs are more likely to be definite.
  - Postverbal bare NPs are more likely to be indefinite.

(15)  \[X \ Y \ Z \ VERB \ A \ B \ C\]

The **absolute position** hypothesis

- Clause-initial bare NPs are more likely to be definite.

(16)  \[X \ Y \ Z \ VERB \ A \ B \ C\]
Predictions

The RELATIVE POSITION hypothesis

- Preverbal bare NPs are more likely to be definite.
  ?Postverbal bare NPs are more likely to be indefinite.

(15) \[ X \ Y \ Z \ \text{VERB} \ A \ B \ C \]

The ABSOLUTE POSITION hypothesis

- Clause-initial bare NPs are more likely to be definite.
  ?Clause-final bare NPs are more likely to be indefinite.

(16) \[ X \ Y \ Z \ \text{VERB} \ A \ B \ C \]
Previous study on Polish

Czardybon et al. (2014) conclude that

- the RELATIVE POSITION hypothesis is confirmed by the Polish corpus.
Previous study on Polish

Czardybon et al. (2014) conclude that

- the relative position hypothesis is confirmed by the Polish corpus.

Pitfall

- The clause-initial/final position was not isolated → **Confound**.
Previous study on Polish

Czardybon et al. (2014) conclude that

- the RELATIVE POSITION hypothesis is confirmed by the Polish corpus.

Pitfall

- The clause-initial/final position was not isolated → Confound.

Solution

- Testing for clause-initiality/finality:
  \[(17) \boxed{X} \ Y \ Z \ \text{VERB} \ A \ B \ \boxed{C}\]

- Testing for pre-/post-verbality:
  \[(18) \ X \ \boxed{Y \ Z} \ \text{VERB} \ \boxed{A \ B} \ C \ \ \ \ \ \text{NOT!} \ X \ Y \ Z \ \text{VERB} \ A \ B \ C\]
Corpus

Note:

• Original study: Burianová (2016) (MA thesis)
• Present study: Reannotation of the original sample (results largely unaffected)

Corpus

• Český národní korpus (ČNK) (Czech National Corpus)
  https://www.korpus.cz
• Corpus SYN2010: Representative corpus of synchronic written Czech
• Only fiction → relative stylistic homogeneity (close to colloquial Czech); no capacity to include genre as a factor
• translations excluded (avoiding interference)

Sample

→ Final sample of 315 occurrences of bare NPs.
Annotation I

Annotation of core properties:

- Absolute position in the clause: *initial, medial, final*
- Relative position to the main verb: *preverbal, postverbal*
- Definiteness of the NP: *definite, indefinite*

Auxiliary annotation:

- Syntactic function: *subject, object, adverbial*
- Definiteness subtype: *unique, anaphoric* (plus many subtypes)
- Indefiniteness subtype: *presentational, quantified-over* (by Neg, Adv)
- Reference to: *entity, event, temporal interval, . . .*
- Grammatical number: *singular, plural*
- Modification: *none, premodified, postmodified, both*
- Givenness: *given, new*
- Focus: *narrow focus, part of focus, part of background*
Annotation II

Guidelines of annotating position

- What counts is the position of the NP to which the sampled N belongs (not the N itself).
- Functional elements (e.g. complementizers) do not count:
  - that/because/and NP... → initial

Guidelines for annotating definiteness

- Inspect previous context (up to where necessary).
- Is substitution by a determined NP (that NP or some/any NP) possible?
- Is uniqueness satisfied (via contextual bridging, via binding, etc.)?
- Translation to English (used by RŠ).
- Unclear cases (incl. so called weak definites) were excluded.
## Results

<table>
<thead>
<tr>
<th></th>
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<th>Final</th>
<th>Medial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEF</td>
<td>61 (43.4)</td>
<td>85 (109.1)</td>
<td>61 (54.5)</td>
<td>207</td>
</tr>
<tr>
<td>INDEF</td>
<td>5 (22.6)</td>
<td>81 (56.9)</td>
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**How to read the table(s):**

- **Boldface & gray background** = What we actually found.
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**How to read the table(s):**

- **Boldface & gray background** = What we actually found.
- E.g., out of the total 315, **81** bare NPs were **INDEFINITES** in the **FINAL** position.
# Results

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- In brackets: Numbers expected under the null hypothesis (= under random distribution / with no effect of position on definiteness).
- E.g., under the null hypothesis, we’d expect there to be about **57 INDEFINITE** bare NPs in the **FINAL** position.
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- **E.g., under the null hypothesis, we'd expect there to be about 57 INDEFINITE bare NPs in the FINAL position.**

### Basic observation:

- Overall more definites than indefinites (2:1)
- Not surprising: auxiliary search of German corpus suggests 4:1 ratio.
**Results:** **Absolute position** hypothesis confirmed

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**Hypothesis**

- Initial bare NPs more likely to be definite (and final ones more likely to be indefinite).
Results: Absolute position hypothesis confirmed

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Hypothesis

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Results

- Overall: Effect of position on definiteness confirmed 
  \( \chi^2(2) = 38.64, p < .001, n = 315 \).
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### Hypothesis
- Initial bare NPs more likely to be definite (and final ones more likely to be indefinite).

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- More indefinites / fewer definites in final position than expected ($\chi^2(1) = 15.51, p < .001, n = 166$).
- Medial position has no effect on definiteness ($\chi^2(1) = 2.23, p = .14, n = 83$).
Results: **Relative position** hypothesis not confirmed

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Hypothesis

- Preverbal bare NPs more likely to be definite (and postverbal ones more likely to be indefinite).

Results

- Data in the table: The subset of medial (non-initial, non-final) bare NPs.
Results: **Relative position** hypothesis not confirmed

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**Hypothesis**

- Preverbal bare NPs more likely to be definite (and postverbal ones more likely to be indefinite).

**Results**

- Data in the table: The subset of medial (non-initial, non-final) bare NPs.
- Distribution of (in)definites is exactly as expected under the null hypothesis.
- I.e., no effect of relative position on definiteness $\chi^2(1) = 0.0013, p = .97, n = 83$.
The potential confound of subject- vs. objecthood

- More definite subjects than expected under the NH.
- More initial subjects than expected under the NH.
- **Question:** Is it possible that definiteness correlates with subjecthood rather than initiality?
- **Answer:** A sub-analysis reveals that it’s **not** the case (see appendix).
Background
Definiteness in articleless languages
Definiteness–word order interaction

Corpus study
Two generalizations

Discussion

Experiment
Design
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Discussion

**Absolute position hypothesis**

- Bare NP definiteness depends on its **ABSOLUTE POSITION** in the clause.
**Discussion**

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- The strongest effect: Indefinite bare NPs are very hard to find in the clause-initial position.
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- This lends support to the traditional view...  
  - initial $\leadsto$ topic $\leadsto$ definite
Discussion

**Absolute position hypothesis**

- Bare NP definiteness depends on its **absolute position** in the clause.

- The strongest effect: **Indefinite bare NPs are very hard to find in the clause-initial position.**

- This lends support to the traditional view... 
  - initial $\rightarrow$ topic $\rightarrow$ definite

- ...and more particularly to Geist’s (2010) view formulated in terms of “restrictions on indefiniteness”: 
  - initial $\rightarrow$ topic $\rightarrow$ not indefinite
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Absolute position hypothesis

• Bare NP definiteness depends on its ABSOLUTE POSITION in the clause.

• The strongest effect: Indefinite bare NPs are very hard to find in the clause-initial position.

• This lends support to the traditional view... 
  • initial $\leadsto$ topic $\leadsto$ definite

• ...and more particularly to Geist's (2010) view formulated in terms of “restrictions on indefiniteness”: 
  • initial $\leadsto$ topic $\leadsto$ not indefinite

• Caveat: No annotation of topic (cf. Cook & Bildhauer 2013); it remains an open question whether the effect is due to topicality.
Discussion

**Relative position hypothesis**

- Our findings fail to support any specific relation between relative position to the verb.
Discussion

**Relative position hypothesis**

- Our findings fail to support any specific relation between relative position to the verb.

- Two possible interpretations:
  1. The partition (Diesing-style) approach is correct (for Czech), but the overt position of the verb is not informative about the relevant partition (contra the predictions of Kučerová 2007).
  2. The partition approach is incorrect for Czech.
Discussion: Open issue

- The evidence only supports a correlation, not a causal effect of position on definiteness.
- The effect could even be reverse: definiteness could affect position.
Methodological take-home messages

- Do not include initial to preverbal and final to postverbal: It might spoil your data (cf. Czardybon et al. 2014)
- Separate position from syntactic function; they might correlate strongly.
- Be careful to have large enough samples: Initial indefinite bare NPs are hard to find.
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Research questions

1. Articles in German and uniqueness/maximality

Does the definite article in German convey uniqueness/maximality?

(19) a. Der Waggon hat sich abgekoppelt.  
    uniqueness

    b. Ein Waggon hat sich abgekoppelt.  
    no uniqueness

    c. Die Waggons haben sich abgekoppelt.  
    maximality

    d. Waggons haben sich abgekoppelt.  
    no maximality
Research questions

2. Clausal position in Russian and uniqueness/maximality

Does bare NP *clausal position* in Russian have an effect on uniqueness/maximality?

(20) a. 

\textbf{Vagon} otcepilsja. \\
(carriage disconnected) \\
(The/A carriage got disconnected.)

b. Otcepilsja \textbf{vagon}. \\
(disconnected carriage) \\
(The/A carriage got disconnected.)

c. \textbf{Vagon}y otcepilis’. \\
(carriages disconnected) \\
(The) carriages got disconnected.

d. Otcepilis’ \textbf{vagon}y. \\
(disconnected carriages) \\
(The) carriages got disconnected.

uniqueness

no uniqueness

maximality

no maximality
Research question

3. Prosodic prominence and uniqueness/maximality

If position affects uniqueness/maximality, is this an effect of topichood? (Using so called thetic statements; Sasse 1987.)

(21) a. **Vagon** OTCEPILSJA.
carriage disconnected
‘The/A carriage got disconnected.’

b. **VAGON** otcepilsja.
carriage disconnected
‘The/A carriage got disconnected.’

c. **Vagony** OTCEPILIS’.
carriages disconnected
‘(The) carriages got disconnected.’

d. **VAGONY** otcepilis’.
carriages disconnected
‘(The) carriages got disconnected.’
Research questions

4. Grammatical number and uniqueness/maximality

Do bare singulars give rise to uniqueness (as opposed to plurals and maximality)? (Testing Dayal 2004.)

(22)  a. **Vagon** otcepilsja.
    carriage disconnected
    ‘The/A carriage got disconnected.’

    b. Otcepilsja **vagon**.
    disconnected carriage
    ‘The/A carriage got disconnected.’

    c. **Vagony** otcepilis’.
    carriages disconnected
    ‘(The) carriages got disconnected.’

    d. Otcepilis’ **vagony**.
    disconnected carriages
    ‘(The) carriages got disconnected.’
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Design

- Auditory stimuli
- *Covered Box* paradigm: One of two pictures uncovered → correct one?

  (variant of picture-matching task suitable for not-at-issue meaning testing; e.g. Romoli et al. 2011; Schwarz et al. 2015)

- Pictures differed in whether uniqueness/maximality is satisfied or not.
- Dependent variables: Picture choice and reaction time.
- Expectations:
  - uniqueness/maximality not satisfied → more choice of covered picture
  - **German:** uniqueness/maximality encoded by articles
  - **Russian:** uniqueness/maximality encoded by word order, prosody, or number
Design: German

German

- Factor DEFINITENESS with levels def vs. indef (within items)
- Factor PICTURE-TYPE with levels ±unique/maximal (within items)
- 4 conditions in total
- Items balanced for: number (sg vs. pl), prosodic prominence (S prom., PRED prom)

Example of an item

(23) Die Lokomotive musste anhalten.
    the locomotive had.to stop

a. Der Waggon hat sich abgekoppelt.
   the carriage has REFL disconnected

b. Ein Waggon hat sich abgekoppelt.
   a carriage has REFL disconnected

c. Die Waggons haben sich abgekoppelt.
   the carriages have REFL disconnected

d. Waggons haben sich abgekoppelt.
   carriages have REFL disconnected
Design: Russian

Russian

- **Factor** WORD ORDER with levels s pred vs. pred s (within items)
- **Factor** PROSODIC PROMINENCE with levels s-prom vs. pred-prom (within items)
- **Factor** NUMBER with levels sg vs. pl (within items)
- **Factor** PICTURE TYPE with levels ±unique/maximal (within items)
- Full crossing impossible (pred s & pred-prom not acceptable given the context)
- 6 conditions in total

**Example of an item**

(24) Lokomotiv dolžen byl ostanovit’sja.
locomotive necessary was stop

a. Vagon OTCEPILSJA.
carriage disconnected

b. VAGON otcepilsja.
carriage disconnected

c. Otcepilsja VAGON.
disconnected carriage

d. ...
Design: Pictures

+unique/maximal  −unique/maximal

sg

pl
Design: Procedure

1. Participant listens to stimulus (context+target), looking at two covered pictures.
Design: Procedure

2. One of the two pictures gets disclosed and the participant is asked to say which one s/he believes to be the one capturing the meaning of the target sentence.
Design: Procedure

3. Participant makes her/his choice by pressing left or right arrow. The chosen picture is framed. If the covered one is chosen, it does **not** get disclosed. Experiment continues after pressing SPACEBAR.
Design: Overall

- 24 items of the MAIN experiment
- 48 fillers (divided into subexperiments)
- The items and conditions were distributed to lists according to the Latin square design and their order was pseudo-randomized.
- 36 participants for German (planned: 48), 48 participants for Russian
- The experiment was carried out in computer pools under the supervision of an administrator.
- Participants received 5EUR/300RUB for their participation.
- Statistics: Generalized linear mixed model fit by maximum likelihood (\texttt{glmer}-function of the \texttt{lme4}-package; R Core Team 2017).
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German: Definiteness Prediction

**Hypothesis:** definite $\rightarrow$ +unique/maximal

[Diagram showing definiteness prediction for German with conditions: def+u/m, def-u/m, idef+u/m, idef-u/m]
German: Definiteness Results

**Hypothesis:** definite \(\rightarrow\) +unique/maximal **confirmed**

Int. DEFINITENESS*PICTURE TYPE significant \((z = 3.853, p < .001)\)
**Russian: Order Prediction**

**Hypothesis:** initial $\rightarrow$ +unique/maximal
**Russian: Order Result**

**Hypothesis:** initial → +unique/maximal **not confirmed**

![Graph showing the effect of picture type on Y = picture match: green=FALSE grey=TRUE](image)

**Int. ORDER*PICTURE TYPE not significant** \( (z = .837, p = .4) \)

**Effect of PICTURE TYPE significant** \( (z = 2.757, p = .006) \)
Russian: Topic Prediction

**Hypothesis:** unaccented $\rightarrow$ +unique/maximal
**Russian: Topic Result**

**Hypothesis:** unaccented $\rightarrow$ +unique/maximal not confirmed

**RUSSIAN MAIN** - 3. Topic (prosody) unaccented S (sPRED) vs. accented S (Spred)

Int. PROSODY*PICTURE TYPE not significant ($z = .747, p = .5$)

Effect of PICTURE TYPE significant ($z = 3.528, p < .001$)
Russian: Number Prediction

**Hypothesis:** Singular → +unique
Russian: Number Result

Hypothesis: singular → +unique not confirmed

Int. NUMBER*PICTURE TYPE significant ($z = 2.768, p = .006$) but in the unpredicted direction!
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## Subexperiments

The fillers were composed of a number of subexperiments:

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<td>8</td>
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<tr>
<td>BOTH</td>
<td>6</td>
<td>Determiner presupposition, similar manipulation to MAIN</td>
</tr>
<tr>
<td>EXH</td>
<td>16</td>
<td>Pragmatic exhaustivity effects</td>
</tr>
<tr>
<td>ALSO</td>
<td>4</td>
<td>Particle additive presupposition (contradiction)</td>
</tr>
<tr>
<td>ONLY</td>
<td>4</td>
<td>Particle exhaustive assertion (contradiction)</td>
</tr>
</tbody>
</table>

...
SCAL subexperiment: Item

     ‘At the end of my zoo visit, I went around the zebra enclosure.’

a. Alle blickten in meine Richtung.
   all looked in my direction

b. Einige blickten in meine Richtung.
   some looked in my direction
SCAL subexperiment: German Result

Very clear effect of scalar implicature.
SCAL subexperiment: Russian Result

Very clear effect of scalar implicature.
BOTH subexperiment: Item

Determiner-induced presupposition contradiction (‘both’ vs. ‘two’)

(26) Das Weibchen flog zu ihrem Nachwuchs zurück.
‘The female bird flew back to its offspring.’

a. **Beide Jungvögel** waren im Nest.
   both chicks were in the nest

b. **Zwei Jungvögel** waren im Nest.
   two chicks were in the nest
BOTH subexperiment: German Result

Very clear effect of scalar implicature.
BOTH subexperiment: Russian Result

Very clear effect of scalar implicature.
EXH subexperiment: German item

**German** (def vs. idef)

(27) Wir hatten vor Kuchen zu backen.
‘We planned to bake a cake.’

a. **Die Nüsse** lagen in einer Schale bereit.  
   the nuts lay in a bowl ready

b. In einer Schale lagen **die Nüsse** bereit.  
   [def pl final]

c. **Nüsse** lagen in einer Schale bereit.  
   nuts lay in a bowl ready

[idef pl initial]

d. In einer Schale lagen **Nüsse** bereit.  
   [idef pl final]
EXH subexperiment: Russian item

**Russian** (bare vs. indefinite determiner)

(28) My xoteli ispeč’ pirog.
    we wanted bake.INF cake

a. **Orexi** ležali v čaše.
    nuts lay in bowl

b. V čaše ležali **orexi**.

c. **Kakie-to orexi** ležali v čaše.
    some nuts lay in bowl

d. V čaše ležali **kakie-to orexi**.

[bare pl initial]
[bare pl final]
[idef pl initial]
[idef pl final]
EXH subexperiment: results German

A visible main effect of PICTURE TYPE ($z = 8.670, p < .001$).
EXH subexperiment: results Russian

A visible main effect of PICTURE TYPE ($z = 6.710$, $p < .001$).
Background
Definiteness in articleless languages
Definiteness–word order interaction

Corpus study
Two generalizations
Corpus study
Discussion

Experiment
Design
Predictions and results
Subexperiments
Discussion
Discussion: Summary of results

German

• Effect of definite article on uniqueness/maximality **confirmed** (MAIN).
• Still, the effect was smaller than the one of other presupposition triggers (BOTH, ALSO).
• Scalar implicature very clearly drawn (SCAL).
• Exhaustive interpretation visible with both definites and indefinites (EXH).

Russian

• Effect of word order on uniqueness/maximality **not confirmed** (MAIN).
• Effect of prosody (topic) on uniqueness/maximality **not confirmed** (MAIN).
• Effect of number on uniqueness/maximality found, but in the opposite direction than what predicted by Dayal (2004). Singulants behave in line with the null hypothesis (Heim 2011) (MAIN).
• Very clear effect of presupposition triggers (BOTH, ALSO).
• Scalar implicature very clearly drawn (SCAL).
• Exhaustive interpretation visible with both definites and indefinites (EXH).
Discussion: Effect sizes (informal)

German

Presuppositions $\approx$ Scalar implicatures

$\rightarrow$ Uniqueness/Maximality $\approx$ Pragmatic Exhaustivity

$\rightarrow$ Are uniqueness and maximality overrated?

Russian

Presuppositions $\approx$ Scalar implicatures

$\rightarrow$ Maximality $\approx$ Pragmatic Exhaustivity

$\rightarrow$ Uniqueness
Discussion: Speculations

- We’ve got very similar pilot results for Czech as we got here for Russian → no accident.
- There’s a sense in which bare plurals (as opposed to singulars) behave as definite, although completely independently of position or prosody. Effect size is comparable to the effect of pragmatic exhaustivity (but: the same in German!).
- This might suggest that plural morphology is having an unexpected semantic effect, comparable to the one of definite articles. Why?
- Possible view of the results: Presuppositions are only lexically/morphologically triggered, never by word order or prosody.
- Open questions:
  - What accounts for our intuition that bare NPs are definite in initial position? It is not uniqueness/maximality…
  - Is there any role of the asymmetry between comprehension (experiment) vs. production (corpus)?
Thank you!

Thanks to my co-authors Christoph Demian (experiment) and Markéta Burianová (corpus) and to experiment organizers or administrators: Fabienne Salfner (Berlin) and Maria Nagornaya (Moscow). Previous versions of this talk were also presented at FASL 26 (Urbana-Champaign, IL), research seminars in the Slavic Department in Berlin, an SFB colloquium at the University of Cologne, an SFB colloquium at the University of Tübingen, a colloquium at the Charles University in Prague, in a guest lecture series at the University of Stuttgart, and at a workshop in Barcelona (Pompeu Fabra) at the occasion of Veronika King’s PhD defence. For comments and stimulating questions I’m grateful to Petr Biskup, Ellen Brandner, Jan Chromý, Berit Gehrke, Ljudmila Geist, Stephanie Harves, Daniel Hole, Tania Ionin, Katja Jasinskaja, Veronika King, Denisa Lenertová, Roland Meyer, Natalia Slioussar, Petra Schumacher, Luka Szucsich, and Barbara Tomaszewicz.

Funding: German Research Foundation (Project Definiteness in articleless Slavic languages).
References I


References II


Sample

Creating the sample of bare NPs:

<table>
<thead>
<tr>
<th>Action</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search for N</td>
<td>(good) book (about France), that/some book, John</td>
</tr>
<tr>
<td>Filter out proper names</td>
<td>(good) book (about France), that/some book, John</td>
</tr>
<tr>
<td>Filter out determined N</td>
<td>(good) book (about France), that/some book, John</td>
</tr>
</tbody>
</table>

→ 2.37 million tokens (0.16 i.p.m) → Random sample of **800 occurrences**

We further removed the following manually (partly during annotation):

- the rest of determined NPs,
- NPs that were parts of idioms or collocations,
- NP fragments or appositions,
- attributive NPs,
- predicative NPs,
- kind-denoting NPs,
- cases where definiteness was too hard to decide on.

→ Final sample of **315 occurrences**.
Annotation: Examples

(29) [...] z prostoru přechodové komory [...] Rozesmáli si a začali tleskat, když se ekolog vysoukal z komory. ‘[...] from the transition chamber [...] They started laughing and clapping when the ecologist got out from the chamber.’

- AbsPos: final | RelPos: postverbal | Def: definite
- SynFunc: Adv | Def-Type: anaphoric (ident) | Ref.to: entity | Num: sg | Mod: none | Given: given | Focus: part-of
Annotation: Examples

(29) [...] z prostoru přechodové komory [...] Rozesmáli si a from space transition chamber started.laughing:3PL REFL and začali tleskat, když se ekolog vysokal z <komory>. started clapping when REFL ecologist got.out from chamber ‘[...] from the transition chamber [...] They started laughing and clapping when the ecologist got out from the chamber.’

• AbsPos: final | RelPos: postverbal | Def: definite
• SynFunc: Adv | Def-Type: anaphoric (ident) | Ref.to: entity | Num: sg | Mod: none | Given: given | Focus: part-of

(30) Přišel jsem na nový <druh> atomové bomby. came AUX:1SG on new kind atomic bomb ‘I invented a new kind of atomic bomb.’

• AbsPos: final | RelPos: postverbal | Def: indefinite
• SynFunc: Obj | Indef-Type: presentational | Ref.to: entity | Num: sg | Mod: pre+post | Given: new | Focus: part-of
Methodological shortcomings

- Data stem from the MA research of M. Burianová → limited resources.
- Annotation done only by 2 people (authors), to whom the purpose of the study was known.
- Annotation first done by MB and then reviewed and revised by RŠ.
- Interannotator agreement not measured.
Potential confound of syntactic function?

Shape of the problem:

- We see an effect of absolute position on definiteness, but...
Potential confound of syntactic function?

Shape of the problem:

• We see an effect of absolute position on definiteness, but...
• we also see that
  • subjects are more likely to be definite (and objects to be indefinite) and
Potential confound of syntactic function?

Shape of the problem:

- We see an effect of absolute position on definiteness, but...
- we also see that
  - subjects are more likely to be definite (and objects to be indefinite) and
  - subjects are more likely to be initial (and objects to be final).
Potential confound of syntactic function?

Shape of the problem:

- We see an effect of absolute position on definiteness, but...
- we also see that
  - subjects are more likely to be definite (and objects to be indefinite) and
  - subjects are more likely to be initial (and objects to be final).

→ Could the observed position effect in fact be a syntactic function effect?

## Syntactic function X Definiteness

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>OBJECT</th>
<th>OTHER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEF</td>
<td>65 (51.3)</td>
<td>68 (83.5)</td>
<td>74 (72.3)</td>
</tr>
<tr>
<td>INDEF</td>
<td>13 (26.7)</td>
<td>59 (43.5)</td>
<td>36 (37.7)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>78</td>
<td>127</td>
<td>110</td>
</tr>
</tbody>
</table>

### Results

- More definite / fewer indefinite subjects than expected \(\chi^2(1) = 10.75, p = .001, n = 78\);
- More indefinite / fewer definite objects than expected \(\chi^2(1) = 8.35, p = .004, n = 127\).
## Syntactic function X Absolute position

<table>
<thead>
<tr>
<th></th>
<th>SUBJECT</th>
<th>OBJECT</th>
<th>OTHER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL</td>
<td>41 (16.3)</td>
<td>9 (26.6)</td>
<td>16 (23.0)</td>
<td>66</td>
</tr>
<tr>
<td>FINAL</td>
<td>20 (41.1)</td>
<td>90 (66.9)</td>
<td>56 (58.0)</td>
<td>166</td>
</tr>
<tr>
<td>MEDIAL</td>
<td>17 (20.6)</td>
<td>28 (33.5)</td>
<td>38 (29.0)</td>
<td>83</td>
</tr>
<tr>
<td>TOTAL</td>
<td>78</td>
<td>127</td>
<td>110</td>
<td>315</td>
</tr>
</tbody>
</table>

### Results

- More initial / fewer final subjects than expected ($\chi^2(1) = 36.72, p < .001, n = 61$);

- more final / fewer initial objects than expected ($\chi^2(1) = 22.63, p < .001, n = 99$).
Teasing apart the effect of position and syntactic function

Method: Look at the following data subsets

- **Subjects** only
- **Objects** only
- **Final NPs** only
- **Initial NPs** only
Teasing apart the effect of position and syntactic function

Method: Look at the following data subsets
If the position effect is real, then...

- **Subjects only**
  - More initial definites than expected.
  - More final indefinites than expected.

- **Objects only**

- **Final NPs only**

- **Initial NPs only**
Teasing apart the effect of position and syntactic function

Method: Look at the following data subsets
If the position effect is real, then...

- **Subjects only**
  - More initial definites than expected.
  - More final indefinites than expected.

- **Objects only**
  - More initial definites than expected.
  - More final indefinites than expected.

- **Final NPs only**

- **Initial NPs only**
Teasing apart the effect of position and syntactic function

Method: Look at the following data subsets
If the syntactic function effect is real, then...

- **Subjects** only
  - More initial definites than expected.
  - More final indefinites than expected.

- **Objects** only
  - More initial definites than expected.
  - More final indefinites than expected.

- **Final NPs** only
  - More definite subjects than expected.
  - More indefinite objects than expected.

- **Initial NPs** only
Teasing apart the effect of position and syntactic function

Method: Look at the following data subsets
If the syntactic function effect is real, then...

- **Subjects only**
  - More initial definites than expected.
  - More final indefinites than expected.
- **Objects only**
  - More initial definites than expected.
  - More final indefinites than expected.
- **Final NPs only**
  - More definite subjects than expected.
  - More indefinite objects than expected.
- **Initial NPs only**
  - More definite subjects than expected.
  - More indefinite objects than expected.
Teasing apart the effect of position and syntactic function

Testing for position: Subjects only, Objects only

<table>
<thead>
<tr>
<th>Subjects</th>
<th>INITIAL</th>
<th>FINAL</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEF</td>
<td>40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>INDEF</td>
<td>1</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>TOTAL</td>
<td>41</td>
<td>20</td>
<td>61</td>
</tr>
</tbody>
</table>

- Overall: Effect of position confirmed ($\chi^2(1) = 20.57, p < .001, n = 61$).
- More definites / fewer indefinites in initial position than expected ($\chi^2(1) = 6.75, p = .009, n = 41$).
- More indefinites / fewer definites in final position than expected ($\chi^2(1) = 13.83, p < .001, n = 20$).

<table>
<thead>
<tr>
<th>Objects</th>
<th>INITIAL</th>
<th>FINAL</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEF</td>
<td>8</td>
<td>42</td>
<td>50</td>
</tr>
<tr>
<td>INDEF</td>
<td>1</td>
<td>48</td>
<td>49</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9</td>
<td>90</td>
<td>99</td>
</tr>
</tbody>
</table>

- Overall: Effect of position confirmed ($\chi^2(1) = 5.84, p = .016, n = 99$).
- More definites / fewer indefinites in initial position than expected ($\chi^2(1) = 5.31, p = .021, n = 9$).
- No definiteness effect of the final position (but a slight numerical tendency in the expected direction).
- ($\chi^2(1) = .53, p = .47, n = 90$).
Teasing apart the effect of position and syntactic function

Testing for syntactic function: Initial NPs only, Final NPs only

<table>
<thead>
<tr>
<th></th>
<th>Subject</th>
<th>Object</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial NPs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Def</td>
<td>40</td>
<td>8</td>
<td>48</td>
</tr>
<tr>
<td>(39.4)</td>
<td>(8.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indef</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(1.6)</td>
<td>(0.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>9</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Subject</th>
<th>Object</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Final NPs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Def</td>
<td>10</td>
<td>42</td>
<td>52</td>
</tr>
<tr>
<td>(9.5)</td>
<td>(42.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indef</td>
<td>10</td>
<td>48</td>
<td>58</td>
</tr>
<tr>
<td>(10.5)</td>
<td>(47.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>90</td>
<td>110</td>
</tr>
</tbody>
</table>

- Numbers too low for any statistics to be applicable. (Expected values must be around 5 at the lowest.)
- Yet, numerically, the numbers correspond to the null hypothesis (in the sense of there being no effect of syntactic function on definiteness).

- Overall: No effect of syntactic value on definiteness found. \( \chi^2(1) = .07, p = .79, n = 110 \).
- Subjecthood has no effect on definiteness. \( \chi^2(1) = .06, p = .81, n = 20 \).
- Objecthood has no effect on definiteness. \( \chi^2(1) = .01, p = .91, n = 90 \).
Design: Role of context

The context was designed in such a way that it introduced no expectations as to how many referents of the target NP there are.

(31) Die Lokomotive musste anhalten.
   a. There are no carriages. possible and plausible
   b. There is a single carriage. possible and plausible
   c. There are multiple carriages. possible and plausible

The definite article alone is the source of uniqueness/maximality expectations. Effectively, the participants always had to accommodate the uniqueness/maximality presupposition and that this happened with relative ease. We assume that this presupposition has been accommodated by the time of picture appearance.
Design: Form of target utterance

The target utterances were designed in such a way that they allowed the prosodic manipulation leading to a thetic statement. They were (i) all new, (ii) involved an intransitive predicate, expressing (iii) an achievement or (iv) a state (often result of achievement):

(32) Lokomotiv dolžen byl ostanovit’sja.
    locomotive necessary was stop

    a. Vagon OTCEPILSJA.
        carriage disconnected

    b. VAGON otcepilsja.
        carriage disconnected

    c. Otcepilsja VAGON.
        disconnected carriage