Aspect and modality

- „grammar-lexis interface”
- process of interaction between aspect and modality
- previous research: focus on relationship between modality and mood or tense
- modality-aspect relation neglected
- unfortunate situation for Slavic languages
  - Slavic languages
    - encode aspect on all verbal forms
    - lexical-derivational character of aspect largely preserved
    - unavoidable + undeniably present makes it particularly suitable for a study of the relationship between aspect and modality

Remarkable hypotheses ...

- general linguistics
  - imperfective aspect prevails in modal constructions (see Trnavac 2006: 1-9 for an overview)
  - imperfective is used to express epistemic modality while perfective aspect renders deontic meanings (Abraham & Leiss 2006)

- Slavic linguistics
  - perfective aspect prevails in modal constructions (Rassudova 1968)
  - imperfective aspect expresses deontic meanings while perfective aspect renders dynamic modality (Šmelev & Zaliznjak 2006, Wiemer ms.)

<table>
<thead>
<tr>
<th>Zdes’ možno perehodit’ ulicu</th>
</tr>
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<td>'you may cross [permissibility] the street here’</td>
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Aspect = ? (Maslov 1958, Rassudova 1968)

- general-factual meaning: event happened or not?
  - Have you read War and Peace?
  - processual meaning: process of event taking place
    - She was sitting by the window and reading a book.
    - repetitive meaning
      - Sometimes I re-read books I really like.

- concrete/specific-factual meaning (=central): particular instance
  - He repeated his question for me.
  - summarizing meaning: series of events presented as one
    - He repeated his question several times.
  - visual-exemplary meaning: illustration on basis of one instance
    - I always repeat my explanation when you do not understand it.

Modality = ?

- Modality defined differently by different researchers
  - follow Nyts (2006) and code the source of necessity, obligation, possibility, permission etc as
    - Epistemic: speaker evaluates likelihood that the SoA expressed in the utterance exists in the outside world
    - Deontic: contains indication of degree of social, moral desirability of SoA expressed in utterance
    - Dynamic: contains ascription of a capacity to controlling participant in SoA
      - Participant inherent = (participant) internal factors eg ability, capacity, need/necessity
      - Participant imposed = (participant) external factors, eg ability, capacity, need/necessity determined by circumstances

A quest for the holy grail

- What
  - Is aspect of infinitive after modal (ad)verbs in Slavic declarative clauses related to modality type
    - Definition of aspect & modality
    - operationalize parameters

- How
  - What kind of data is needed & how can it be analyzed
    - Parallel Slavic corpus
    - Mixed effects logistic regression

- Why
  - Interpret results & link to (cognitive linguistic) theory
1. Concern: avoid results due to differences in corpus structure, unrelated to language/phenomenon studied
   - RUS/PL/BCS parallel corpus: compiled
     - 1m tokens
     - scanned, spell-checked, morpho-syntactically annotated, lemmatized, aligned
     - included in the Regensburg Parallel Corpus (RPC), collection of on-line searchable Slavic (post-war bellettristic) texts
   - highly regarded literary work (≠ Harry Potter): high quality translations in several Slavic languages guaranteed
   - original text is Slavic: avoid “translationese” from Germanic

2. Slavic Parallel Corpus (ii)

<table>
<thead>
<tr>
<th>SPC</th>
<th>Original</th>
<th>Translation</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS</td>
<td>(Russian) Bulgakov. M. 1938. Master i Margarita.</td>
<td>(Polish) Mistrz i Małgorzata (by Irena Lewandowska &amp; Witold Dabrowski)</td>
<td>(Serbian) Majprop i Magraja (by Milan Ćopić)</td>
</tr>
<tr>
<td>PL</td>
<td>(Polish) Lorn, S. 1961. Solari.</td>
<td>(Russian) Covapek (by Dimitrij Brulkin)</td>
<td>(Serbian) Solaris (by Predrag Obučina)</td>
</tr>
</tbody>
</table>

- Aspect:Modifier:Negation

<table>
<thead>
<tr>
<th>RUS</th>
<th>Aspect</th>
<th>Modality</th>
<th>Negation</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>negative</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>impf</td>
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<table>
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<tr>
<th>PL</th>
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<tbody>
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- RUS vs PL vs BCS

- 821 extractions, starting from RUS
  - RUS: 314 ex (out of 380), 4 modal predicative adverbials
  - PL: 240 ex (out of 299), 12 translational equivalents
  - BCS: 267 ex (out of 304), 7 translational equivalents

- “out of”: only examples with ins that exist in both impf and pf aspect considered
- Identify aspectual preference of deontic and dynamic modality in positive and negative sentences
- Hypotheses: both deontic modality and negative contexts favour impf aspect

- Tagging system

<table>
<thead>
<tr>
<th>Language</th>
<th>RUS vs PL vs BCS</th>
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</thead>
<tbody>
<tr>
<td>Novel</td>
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<tr>
<td>Writer/translator</td>
<td>3/6</td>
</tr>
<tr>
<td>Modal word</td>
<td>RUS možno/nelzja, nado, nužno</td>
</tr>
<tr>
<td>Aspect Infinitive</td>
<td>imperfective vs perfective</td>
</tr>
<tr>
<td>Aspectual range infinitive</td>
<td>impf_pf, impf_only, pf_only</td>
</tr>
<tr>
<td>Modality type</td>
<td>dynamic vs deontic</td>
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<tr>
<td>Polarity</td>
<td>positive vs negated</td>
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</table>

- RUS

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<th>Negation</th>
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<tbody>
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<td>impf</td>
<td>negative</td>
</tr>
<tr>
<td>pf</td>
<td>22</td>
</tr>
<tr>
<td>dynamic</td>
<td>51</td>
</tr>
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</table>

- PL

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<tr>
<td>pf</td>
<td>19</td>
</tr>
<tr>
<td>dynamic</td>
<td>35</td>
</tr>
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</table>
Mixed effects logistic regression

- examples from 3 novels/writers on limited number of modal predicative adverbials: repeated measurements per subject/item → observations are not independent
- uneven number of observations per novel/writer and modal predicative adverbial
  - mixed effects logistic regression (lmer in R 2.5.0)
    - different models fit, compared using ANOVA
      - best performing model
        - random effects: novel, modal word (interest in general population)
        - fixed effects: modality type, polarity (interest in particular levels)

Interim results (and a new question)

In declarative sentences with a modal predicative adverbial:
- PI is used in the bulk of modal expressions
- Compared to the impf there is
  - significantly less chance of finding a pf inf when deontic modality is expressed
  - significantly more chance of finding a pf inf when the modal (ad)verb is positive
- modality type seems a good predictor, but is it good enough overall?
### A cognitive motivation

- RUS aspectual system focused on definiteness in time
  - impf = qualitative temporal indefiniteness, lack of assignability to a single, unique point in time
- fits with “general timeless applicability” of deontic modality
  - impf dominates in habituals, performatives, instructions
- PL and BCS transitional groups: display impf/deontic pattern to lesser extent
  - expected: higher similarity of PL to RUS (Eastern group) & more differences between BCS and RUS (Western group)
  - ! reverse situation found: BCS more similar to RUS

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### PL needs better model

- more examples [240 → 400]
- fewer modal expressions [12 → 7, można, móc, musieć, mieć, należy, powinien, trzeba]
- more properties [5 → 8]
  - Lexical meaning modal expression
  - possibility, permissibility, necessity, obligation, ability, volition, ...
  - Applicability SoA
    - general vs specific: event is generally possible/permitted/obligatory/etc or restricted in any way?
  - Degree of control over infinitive event
    - high, medium, low

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### PL [240 ex, 12 exp] & PL extended [400 ex, 9 exp]

- a modal adverb followed by a perfective infinitive is used less often to express deontic modality (estimate = 2.1838, std. error = 0.4639, p = 1.5e-06)
- a modal adverb followed by a perfective infinitive is more likely to be used when the modal statement is positive (estimate = 0.7439, std. error = 0.3908, p = 0.005308)
- Estimated scale [0.991989]
- C index of concordance [0.7405442] = 1% down from 75%
- Somer’s D [0.4810883]

- a modal adverb followed by a perfective infinitive is more often to express dynamic modality (estimate = 1.0474, std. error = 0.4041, p = 0.00955)
- a modal adverb is more likely to be followed by an imperfective infinitive when a generalization is expressed (estimate = 3.6962, std. error = 0.3603, p < 2e-16)
- Estimated scale [0.9748724]
- C index of concordance [0.9016152] = 18% up from 72%
- Somer’s D [0.8032304]

### Interim results (and a new question)

- 2 factors important in predictive statistical model of aspect realization in modal contexts
  - Modality type and Applicability SoA
  - z [“the bigger the better”]: Appl SoA does better
    - [2.592 Mod Type vs 10.260 Appl SoA]

? Is this also the case for RUS (and BCS)?
- extended dataset for RUS: 516 examples for 7 modal expressions
- added parameters: cf PL
- Settings model: cf PL

### RUS [314 ex, 4 exp] & RUS extended [516 ex, 7 exp]

- a modal adverb followed by a perfective infinitive is used less often to express deontic modality (estimate = 0.8367, std. error = 0.8367, p = 6.95e-11)
  - when the modal statement is positive (estimate = 3.8689, std. error = 1.1548, p = 0.000307)
- Estimated scale [0.9864484]
- C index of concordance [0.8670359] = 8% up from 75%
- Somer’s D [0.7340796]

- a modal adverb followed by a perfective infinitive is more often used to express dynamic modality (estimate = 2.2110, std. error = 0.3852, z = 7.121, p = 1.12e-09)
- a modal adverb is more likely to be followed by an imperfective infinitive when a generalization is expressed (estimate = 3.8510, std. error = 0.2342, z = 16.44, p < 2e-16)
  - Estimated scale [0.9703032]
  - C index of concordance [0.9040329] = 15.9% up from 70.5%
- Somer’s D [0.8802696]

### Conclusion (i)

- in a predictive statistical model of aspect realization in modal contexts
  - 2 factors important, i.e. applicability SoA, modality type
  - applicability SoA performs better
  - expected on cognitive linguistic theoretical basis
  - radial network for category meaning
  - network = prototypical meaning plus meanings extending prototypical meaning to different extent
  - aspect: many language-particular extensions, including extensions in other domains such as tense and modality (cf. Boogaert & Janssen 2007)
### Conclusion (ii): aspect in modal contexts

- **“grammatical” aspectual meaning:**
  - generalizing vs specifying
  - *“general (applicability)” is extension of “general-factual” meaning, i.e. does must/can/should sth happen or not?*
  - *“specific (applicability)” is extension of “concrete/specific-factual” meaning, i.e. particular instance*
  - extension of basic grammatical aspectual meaning
  - cognitively simple(r) semantic extension-from-prototype procedure within domain
  - high(er) correlation with aspectual choice

### Conclusion (iii): aspect in relation to modality

- **“lexical” modal meaning:**
  - deontic modality regulates existence everywhere, always, for everyone
  - meaning resembles prototypical meaning of “imperfect(ive)” situation, i.e. (always) ongoing (somewhere), (always) repeated (by someone) ...
  - dynamic modality is linked to participant/circumstances
  - meaning resembles prototypical meaning of “perfect(ive)” situation, i.e. one-for-all, one-off, ...
  - comparison between (meaning) aspect and (meaning) modality
  - cognitively more complex mapping procedure between abstract domains

### Conclusion (iv): cognitive motivations

- **Cognitive linguistic models for aspect**
  - Dickey 2000 [RUS]
    - Russian aspectual system focused on definiteness in time → imperfective expresses “qualitative temporal indefiniteness”, i.e. lack of assignability to a single, unique point in time → fits well with “timeless applicability” of deontic modality
  - Janda 2004 [RUS]
    - situations are things: imperfective is a fluid substance, that lacks form, can be anywhere and fill up any space etc. → fits well with “general applicability” of deontic modality

### Theoretical implications

- 2 factors important, both consistent with major constraints on aspectual form, directly or indirectly
  - prove that hypothesis needs reversing for Slavic
    - Imperfective/deontic, perfective/dynamic
  - reveal new (cognitively simpler) variable “SoA applicability”
  - outperforms even reversed hypothesis
  - polarity superfluous in declarative sentences
  - results suggest that relation between aspect and modality is mediated by resemblance of meaning modality types to meaning aspectual types
  - indirect mapping instead of direct extension
  - language (group) dependent → no “universal” motivation