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Modelling aspectual choice in Polish modal constructions.

Introduction

Much effort has been put into clarifying the relation between modality and other verbal properties, in particular mood and tense. Until recently the relation between modality and aspect received much less attention, however. For Slavic languages this situation is particularly unfortunate as Slavic languages mark the imperfective versus perfective distinction on all verbal forms, so there is no avoiding aspectual choice. Moreover, the hypothesis that directed much of the research, i.e. that imperfective aspect prevails in modal constructions or that the imperfective is used to express epistemic or alethic modality whereas perfective aspect renders deontic meanings, does not seem to hold for Slavic data: it has long been recognized that, if anything, the perfective would be used more frequently in modal constructions in general (cf. Rassudova 1968, Forsyth 1970) and the imperfective aspect would be preferred in deontic contexts (Padučeva 2006, Šmelev & Zalizniak 2006, Wiemer ms.).

An exploratory comparative study of Russian, Polish and Serbian

An exploratory cognitive linguistic, corpus-based, quantitative study was carried out to identify the aspectual preferences of dynamic (participant inherent vs participant imposed) and deontic modality (Nuyts 2006) in positive and negative declarative sentences of the type exemplified in (1) and (2).

- (Russian)
- (1) *Zdes' možno perechodit' ulicu*
Here._{ADV} possible/permissible._{PREDADV} cross-impf.inf street._{ACC.F.SG}
'You can cross [permissibility] the street here'
- (2) *Zdes' možno perejti ulicu*
Here._{ADV} possible/permissible._{PREDADV} cross-impf.inf street._{ACC.F.SG}
'You can cross [possibility] the street here'

Starting point for the comparative study was the situation in Russian that provides *možno/nel'zja* to express (in-)ability, (im)possibility and (non-)permissibility and *nužno* and *nado* to express necessity and obligation. On the basis of data extracted from a 1 million word parallel Slavic corpus compiled specifically for this study (see Table 1), Polish and Serbian translational equivalents were identified (12 for Polish, 7 for Serbian) to facilitate a direct comparison with the findings for Russian. In all, the 983 retrieved instances are tagged for language, novel, author/translator, modal word, aspectual range of the infinitive (impf only, pf only, biaspectual, impf_pf), aspect of the infinitive (impf vs pf), modality type (dynamic vs deontic) and polarity (positive vs negative).

Table 1. Corpus contents

Original	Translation	Translation
(Russian) Bulgakov, M. 1938. <i>Master i Margarita</i> .	(Polish) Mistrz i Małgorzata (by Irena Lewandowska & Witold Dąbrowski)	(Serbian) Majstor и Маргарита (by Milan Čopić)
(Polish) Lem, S. 1961. <i>Solaris</i>	(Russian) Солярис (by Dmitrij Bruškin)	(Serbian) Solaris (by Predrag Obućina)
(Serbian) Pavić, M. 1984. <i>Hazariskij Rečnik</i> .	(Polish) Słownik chazarski (by Elżbieta Kwaśniewska & Danuta Cirić-Straszyńska)	(Russian) Хазарский словарь (by Larisa Savel'evaja)

Given the make-up of the corpus, the observations cannot be considered independent, hence mixed effects modelling (with Novel and Modal Word as random effects) using lmer (Baayen 2008: ch. 7) was carried out on the 830 instances that contain an infinitive that exists in both imperfective and perfective, i.e. allow aspectual choice. The results of the best performing model are summarized in Table (2).

A model with language and modal word as random effects and modality type plus polarity as fixed effects revealed that, in all three Slavic languages studied, 1) in general, perfective infinitives were used significantly more frequently in modal declarative sentences built around a modal word followed by an infinitive than imperfective infinitives; 2) it is significantly less likely to find a modal adverb followed by an perfective infinitive when deontic modality is expressed than it is to find an imperfective infinitive; 3) it is significantly more likely to find a perfective infinitive when the modal statement is positive than it is to find an imperfective infinitive.

Table 2. Comparing models across languages

Russian	Polish	Serbian
a modal adverb followed by a perfective infinitive is used to express deontic modality [estimate = -5.4567, p= 6.95e-11]	a modal adverb followed by a perfective infinitive is used to express deontic modality [estimate = -2.1838, p= 1.5e-06]	a modal adverb followed by a perfective infinitive is used to express deontic modality [estimate = -2.8217, p= 3.53e-09]
a modal adverb followed by a perfective infinitive is found when the modal statement is positive [estimate = 3.8689, p= 0.000807]	a modal adverb followed by a perfective infinitive is found when the modal statement is positive [estimate = 0.7439, p= 0.05308]	a modal adverb followed by a perfective infinitive is found when the modal statement is positive [estimate = 1.3420, p=0.000362]
Estimated scale [0.9864484]	Estimated scale [0.991989]	Estimated scale [0.980616]
C index of concordance [0.8670398]	C index of concordance [0.7405442]	C index of concordance [0.8037842]
Somer's D [0.7340796]	Somer's D [0.4810883]	Somer's D [0.6075684]

Although both modality and polarity show up as significant predictors of the choice of a particular aspect for the infinitive in all three languages, the model fits Russian best. This outcome is expected on Dickey's (2000) division of the Slavic aspectual world: with the Russian aspectual system focused on definiteness in time, the imperfective expresses "qualitative temporal indefiniteness", i.e. lack of assignability to a single, unique point in time, which fits well with the "general timeless applicability" of deontic modality. Polish and Serbian being transitional zones between the Eastern and Western systems, they likewise display the pattern observed for Russian, albeit to a lesser extent. Polish, although predicted to be more similar to Russian than Serbian, seems to deviate in particular from the expected aspectual pattern: Somer's D reveals

only a medium rank correlation between predicted probabilities and observed responses while the obtained C index of concordance remains below the 0.8 threshold, generally required to recognize the predictive power of a model; this performance is particularly poor given that the percentage of correctly predicted cases would be about 75%, merely by selecting perfective infinitives in all cases, and not including any predictor variables (Johnson 2008: 254-255). Yet, regarding the perfective as the “default” aspect for modal contexts would be highly unusual: in Slavic languages, perfective aspect is the marked member of the opposition, and marked members would typically be expected to occur less frequently and in fewer contexts than their unmarked counterpart (Forsyth 1970: 6-8).

A model for Polish – and other Slavic languages?

In order to arrive at an adequate model of aspect assignment in modal constructions in Polish, the corpus sample used was increased (from 240 to 400 examples) while at the same time the number of modal predicative adverbs was decreased (from 12 to 7). Moreover, 4 additional properties were taken into account. These properties relate to the semantics of the modal word (the modality type expressed, i.e., possibility vs permissibility vs necessity vs obligation vs ability vs volition vs prediction), and of the aspect of the infinitive (the aspectual type rendered, i.e., generalizing vs specifying use and activity focused vs result focused) as well as to the degree of control (high, medium, low) the subject has over the infinitive action.

A new mixed effects logistic regression model (again with Novel and Modal Word as random effects) was fit to the corpus data in order to reveal the variable or set of variables that has the highest predictive power for aspect assignment in modal constructions. The results of the best performing model are summarized in Table (3).

Table 3. A new model for Polish.

Polish (old)	Polish (new)
it is significantly less likely to find a modal adverb followed by an perfective infinitive when deontic modality is expressed [estimate = -2.1838, p= 1.5e-06]	it is significantly more likely to find a modal adverb followed by a perfective infinitive when dynamic modality is expressed [estimate = 1.0474, p= 0.00955]
it is marginally significantly more likely to find a perfective infinitive when the modal statement is positive [estimate = 0.7439, p= 0.05308]	it is significantly more likely to find a modal adverb followed by an imperfective infinitive when a generalization is expressed [estimate = 3.6962, p= < 2e-16]
Estimated scale [0.991989]	Estimated scale [0.9748724]
C index of concordance [0.7405442]	C index of concordance [0.9016152]
Somer’s D [0.4810883]	Somer’s D [0.8032304]

Although type of modality remains a significant contributor to aspectual choice, the fact whether the option, permission, order etc. has been given to carry out an action only once (aka specifying use) or multiple times (aka generalizing use) outperforms the type of modality in predicting the choice of aspect for the infinitive.

Theoretical implications

This study revealed that quantitative corpus-linguistic methodologies capable of honoring the multifaceted nature of the phenomenon under investigation might

necessitate rejecting theoretically motivated models in favor of cognitively simple(r) models. The initial outcome suggested that the “lexical” meaning of modality (dynamic vs deontic) as well as polarity (positive vs negative) predict aspectual choice in modal constructions quite well, at least for Russian and to a lesser extent Serbian. This finding reverses the claims made in the general linguistic literature while confirming the corrections proposed by Slavic linguists. Yet, an in-depth study of Polish revealed that other variables might be better at predicting aspectual choice: the “grammatical” meaning of aspect as captured by the parameter specific vs generalizing outperforms the “lexical” meaning of modality when it comes to predicting aspectual choice, and makes polarity superfluous.

On a cognitive linguistic approach, this outcome comes as no surprise. A cognitive approach to aspect assumes that the semantics of aspectual categories is organized around a prototype with many language-particular extensions, including extensions in other domains such as tense and modality. In this case, the “grammatical” meaning of aspect extends flawlessly into the “lexical” meaning of modality. Dynamic modality is concerned with a particular situation or a participant in that situation, hence quite similar to the prototypical interpretation of perfectly coded events as having summarizing properties and as presenting situations as one-off events or as events with specific settings. Deontic modality, on the other hand, regulates existence for everyone, always and everywhere, hence expresses a meaning that is similar to the prototypical interpretation of the imperfective as encoding statements of fact, as events with focus on the process or as repeated events. Further research will show whether the same relation between aspect and modality holds in other Slavic languages and theoretical models of aspect/modality interaction should be adapted accordingly.

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