On modal meanings of the Czech verb *muset* in constructions with non-agentive verbs

1. Epistemic × ROOT modality and the feature of (non-)agentivity

Despite notable disarray in terminology, there is agreement on distinguishing two major types of modality:[1] modality operating on propositions on one hand, called epistemic m., speaker-oriented m.[2], propositional m.[3], etc., and modality operating on events on the other hand, called ROOT m., agent-oriented m.[4], subject-oriented m.[5], event-oriented m.[6], etc.[7] As regards constructions of modal verbs with infinitives, correlations might be drawn between the referred types of modality (expressed by modal verbs) and the feature of (non-)agentivity (displayed by infinitives): apparently, while epistemic modals can unproblematically be combined with both agentive or non-agentive infinitives, ROOT modals are typically combined only with agentive infinitives.[8]

As far as I know, non-agentive verbs have not been extensively researched yet concerning their (in)ability to combine with ROOT modals. The research I have conducted was corpus-based[9] and qualitative-quantitative in nature and was restricted to constructions of the Czech modal verb *muset* 'must' with various non-agentive infinitives (see below).[10] Inspection of constructions with other modals (possibly also within other languages) is desirable yet I will leave it for future research.

2. Objectives of the research

A) Verification of the basic assumption (via inspection of corpus data) that compared to agentive verbs, non-agentive verbs participate significantly less often in constructions with ROOT modals and significantly more often in constructions with epistemic modals.

If the assumption formulated in A) can be verified then it should also be ascertained:

B) What types of ROOT modality **are not** expressed by the constructions "*muset* + non-agentive infinitive", whereby the ratio is tilted in favour of epistemic modality?

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[1] See e. g. Blaszczyk and Karlík (2017).
[2] Bybee and Perkins et al. (1994).
[3] Palmer (2001).
[4] Bybee and Fleischman (1995).
[5] Bybee and Perkins et al. (1994).
[6] Palmer (2001).
[7] ROOT modality can be split into a number of subtypes, e. g. deontic m., bouletic m., teleological m. The number of types as well as their designations vary across the literature.
[8] See Chartrand (2016:16): "Non-agentive subjects, whether animate or inanimate, indicate an epistemic modal." Hacquard (2010), however, observes that agentive subject is not necessary for the use of a ROOT modal (in such cases, relation to another participant is established).
[9] The research was based on data of the corpus SYN (version 8) of the Czech National Corpus (Křen et al., 2019).
[10] I have chosen the verb *muset* for its sufficient frequency and relatively clear array of senses (compared e. g. to the tangled semantics of the verb *moct* 'can, be able to').

C) What types of ROOT modality **are** expressed by the constructions "*muset* + non-agentive infinitive" and why (on what semantic basis) are such constructions allowed for?

3. Fulfilling the objectives of the research

A) I worked with 15 datasets, each including 100 random occurences of the construction "*muset* + infinitive", the infinitives being of different verbs: of 10 non-agentive verbs (*bolet* 'hurt', *leknout se* 'be frightened', *onemocnět* 'get sick', *pršet* 'rain', *růst* 'grow', *spát* 'sleep', *uzdravit se* 'get well', *zakopnout* 'stumble', *zapomenout* 'forget', *zemřít* 'die') and, for the sake of comparison, also of 5 agentive verbs (*běžet* 'run', *sedět* 'sit', *odejít* 'leave', *pracovat* 'work', *vyskočit* 'jump up'). The results (for the whole of 1500 occurrences)[11] basically corroborated the above-stated assumption: while for agentive verbs "ROOT occurrences" far exceeded "epistemic occurrences" in number, for non-agentive verbs the "epistemic occurrences" had a relatively larger share, with a notable span depending on the verb used. E. g. for *odejít* the ratio was 97:3 (ROOT : epistemic) while for *bolet* it was 25:75.

B) Obviously, instances of **deontic modality** were virtually absent in the datasets, due to the unsatisfied requirement of a volitional stance of the subject towards the event. I will elaborate on the issue in detail in my presentation.

C) When combined with a non-agentive verb, the verb *muset* can operate on the event with respect to a **causal relation** to another event, rendering the former event necessary for satisfying the relation. By the above-stated definition, this use is to be categorised as ROOT modality. Due to space limitations, I will provide a couple of examples in English, assuming the verb *must* / *have to* displays similar behaviour.

1) *It must rain for there to be a rainbow.* (Google)
2) *Just because the weather looks gloomy though, doesn't mean it has to rain on your picture party.* (Google)

It is "pure causality" here (a necessary condition and a "necessary consequence", respectively), independent on social and legal norms (unlike deontic modality); therefore the use of the respective constructions is allowed for. The expression of a necessary condition, however, is restricted to scenarios with not actual events. For this reason necessary conditions are usually not expressed with past forms of *muset*, which, as I will show, typically imply actuality of the event or require epistemic interpretation.[12] I will provide arguments for why the relation of "pure causality" can be considered a "bridge" between the realms of ROOT and epistemic modality.

References:

[11] All the occurrences had to be checked one by one and manually annotated, since modal meanings are not captured within the morphological tagsets of the corpus SYN.

[12] Hacquard (to appear) posits actuality entailments to be triggered by perfective ROOT modals, e. g. in French: *Jean a pu soulever un frigo* (Jean could (PFV) lift a fridge) →
→ *Jean lifted a fridge*. I will show that past forms of the Czech verb *muset*, despite being imperfective, trigger a strong actuality inference which is not too far from an entailment.

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