

# Tense Morphology and Temporal Processing in Agrammatic Aphasia: Implications for Czech

Original Study

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Submitted: 12.10.2025. Accepted: 15.05.2026.

**Abstract** This article examines the production of tense morphology and temporal reference in agrammatic aphasia, with a particular focus on Czech agrammatic language. Drawing on cross-linguistic findings and Czech-specific work, it discusses why speakers of a highly inflectional language such as Czech tend to substitute, rather than omit, bound tense morphemes. The paper reviews major theoretical accounts of agrammatism and derives predictions for tense errors in Czech. Special attention is paid to the PAST Discourse Linking Hypothesis (PADILIH), which links past time reference to discourse-level processing demands, and to alternative views that attribute tense deficits to structural or morphophonological constraints. Existing Czech data are reassessed in this broader framework, highlighting both their compatibility with several competing accounts and their current limitations. The article argues that Czech constitutes a promising, but understudied testing ground for testing these approaches and outlines possible experimental directions for future research of Czech agrammatic aphasia.

**Key words:** aphasia, agrammatism, PADILIH, past tense, verbal morphology, language impairment

## INTRODUCTION

One of the main symptoms of non-fluent aphasia is so-called agrammatism, which is characterized by impaired morphological and syntactic processing, telegraphic speech, and simplified structures (Kemmerer 2015). Patients with agrammatism have systematic difficulties in the production of inflectional morphology. Early theories concerned with agrammatism described this symptom as a complete loss of grammar (grammatical competence), but more recent research shows that the grammar deficit is rather selective (Blumstein 2022). Recent data show that many aspects of morphology and syntax remain rather intact, while others show consistent patterns of impairment across languages (Bastiaanse, Jonkers 2012; Blumstein 2022).

One of the most recurrent cross-linguistic findings is the impairment of the production of tense and agreement morphemes. Findings show that patients with

agrammatism struggle with the production of morphologically complex verb forms, especially forms that make some tense (or time) distinction (Faroqi-Shah, Friedman 2015; Cordonier et al. 2024). It also seems that the nature of the errors varies across languages, depending on the morphological typology of the specific language (Lehečková 2001), and in some cases also on the task demands (Cordonier et al. 2024).

The present article has two main aims. First, it offers an overview of these competing frameworks as they relate to tense morphology, and second, it reassesses existing Czech findings on tense production in aphasia in light of these theories, arguing that current data are compatible with several accounts and therefore do not license strong confirmation claims for any single hypothesis. The article treats Czech as a promising testing ground and outlines possible experimental designs that could contribute to examine discourse-linking demands,

morphological and syntactic structure, and morphological complexity to tense impairments in Czech agrammatic aphasia.

### MORPHEME SUBSTITUTION IN AGRAMMATIC APHASIA

When there is a bound morpheme, i.e., a morpheme attached obligatorily to another word, agrammatic patients have a choice to either completely omit or to substitute the bound morpheme. An example could be inflection in verbs, which is used for conjugation, or inflection in nouns, which expresses declension. Thus, instead of producing the progressive form *reading*, the patient produces the infinitival form *read* (Kemmerer 2015). Blumstein (2022) emphasizes that usually patients go for omission of free-standing closed-class morphemes and substitution of bound morphemes, and that it is subject to variability, as she perceives the grammatical rules not to be lost *completely* – as she argues, one can, in fact, hear an agrammatic patient to utter *the dog*, i.e., with the use of a closed-class free-standing morpheme, which contradicts the idea that grammar is completely intact.

It is important to comment further on the tendency to omit or substitute morphemes; Lehečková (2001), who examined Czech aphasic speakers, argues that the symptoms are heavily influenced by the type of language. In isolating and agglutinative languages, patients can omit both free- and bound morphemes, whereas in inflectional languages, such as Czech, agrammatic patients cannot omit a bound morpheme, as that would lead to the production of a non-word. Thus, agrammatic patients in highly inflectional languages do not omit bound morphemes, only substitute them for others. This notion is in accordance with Grodzinsky (1990), who argues that agrammatic patients substitute a morpheme only in cases where omission would lead to an ungrammatical word, e.g., in English it is possible to omit the morpheme for third person singular present tense *-s*, such as in *He read-0<sup>1</sup>*, because even without the morpheme marking the present tense, the word still carries a meaning. In contrast, Grodzinsky exemplifies that the Russian word *sumka*, meaning *bag*, has seven inflectional cases, but the stem *sumk* without any inflectional marking results in a non-word. In this case, the agrammatic patients do not omit but substitute the target inflection with another, which supports Lehečková's findings in Czech, and illustrates how language typology constraints omission vs. substitution.

To summarize, it is believed that although omission and substitution of grammatical morphemes in agrammatic aphasia are frequent, it is directly linked to language typology; if a language allows the speaker to produce a word that is grammatical without any inflectional morpheme, the agrammatic patients omit morphemes. However, if it would result in the production of an ungrammatical word, the patients substitute an inflectional morpheme with some other inflectional

morpheme. For this reason, Czech verbal morphemes tend to be substituted rather than omitted.

### LINGUISTIC THEORIES EXPLAINING AGRAMMATISM

As was already stated, agrammatism can be generally defined as “the loss of grammar”. How is it possible that some parts of grammar remain intact while others are lost? Linguistic aphasiology has long attempted to explain why certain grammatical domains remain intact while others are particularly vulnerable in agrammatism; Bastiaanse and Jonkers (2012) divide linguistic theories accounting for agrammatic production into four main categories, based on which component of grammar or cognition is hypothesized to be impaired:

- theories describing agrammatism as a word-order impairment
- theories saying that the condition is caused by the inability to assign theta roles to the verb
- theories stating that part of the syntactic tree is missing
- theories arguing that agrammatism stems from the impairment of time perception and time referencing

As can be seen, some approaches place the deficit within syntactic computation, others within morphological realization, and others view the deficits as a cognitive impairment linked to time perception. The present article compares selected theories and argues that Czech data currently do not license strong confirmations for any of them, and further research in this area is needed.

This section examines some of the theories stated above. A prominent example of a word-order-based account is the Derived Order Problem Hypothesis (DOP-H; Bastiaanse, Van Zonneveld 2005, as cited in Bastiaanse, Jonkers 2012). From this theoretical perspective, every language has a basic, unmarked word order, and structures that deviate from this base order through constituent movement are particularly vulnerable in agrammatic production. DOP-H thus successfully predicts difficulties with constructions that involve movement to the Complementizer Phrase (CP) domain, such as clauses headed by complementizers like *that* or *if*. However, as Bastiaanse and Jonkers note, the hypothesis does not straightforwardly account for the pervasive problems with tense morphology that are observed across languages, which require an explanation beyond word order alone.

Within the second group of theories, which attribute agrammatism to the loss or inaccessibility of parts of the syntactic tree, the Tree Pruning Hypothesis (TPH) is one of the most influential theories. In its original formulation, TPH assumes that in agrammatic speakers, the syntactic tree is “pruned” at a certain functional node, so that projections above this point cannot be generated or accessed. As illustrated in Grodzinsky's (2000) representation (Figure 1), agrammatic speakers may produce structures that are well-formed up to the Tense

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1 -0 represents a zero inflection morpheme

node (T), while projections dominating T (including higher functional heads such as complementizers and *wh*-elements) remain unavailable. This architecture predicts relatively preserved agreement morphology (Agr, encoding person, gender, and number), impaired tense marking and difficulties with copulas, complementizers, *wh*-words, and embedded clauses (Friedmann, Grodzinsky 1997).

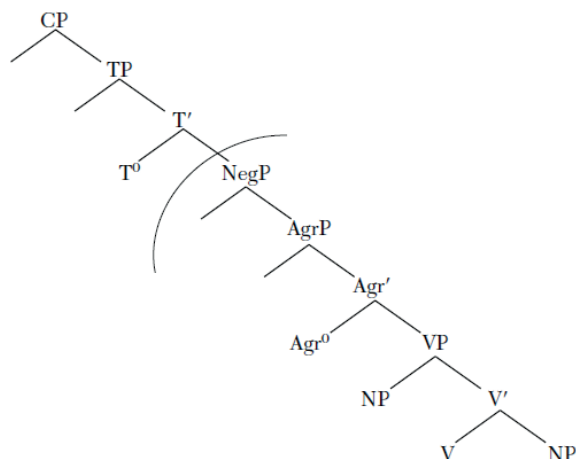


Figure 1: Pruned Tree (TPH; Grodzinsky, 2000)

A related but distinct proposal is the Tense Underspecification Hypothesis (TUH; Wenzlaff, Clahsen 2004). TUH builds on formal distinctions within the tense system, such as  $[\pm\text{Realis}]$  and  $[\pm\text{Past}]$  in T/INFL, and argues that agrammatic errors cannot be explained solely by preserved agreement and impaired tense, as originally suggested under TPH. Instead, TUH attributes the deficit to an underspecification of these morphosyntactic features, which in turn reflects a reduced ability to compute “extrasentential relationships” at the time of utterance (Jonkers, Bastiaanse 2012). Empirical data from German agrammatic speakers show that tense is selectively impaired across different markers of finiteness, whereas mood and subject–verb agreement remain largely intact (Wenzlaff, Clahsen 2004). Since mood is assumed to occupy a position within the TP domain, these findings challenge a pure tree-pruning account and instead point to a more specific impairment in the realization of particular tense-related feature combinations.

A related line of work draws on Distributed Morphology, which treats inflectional morphemes as post-syntactic realizations of abstract feature bundles (Halle, Marantz 1993). In linguistic aphasiology, this idea is captured by a theory according to which agrammatic speakers’ functional morphology deficits reflect difficulties in implementing the rules that map inflectional features onto morphemes, as suggested by in Wang et al. (2014) parallel impairment patterns for functional categories in clauses and nominal phrases.

From these perspectives, morpheme omission and substitution are not just linguistic simplifications, but rather a reflection of more or less severe impairment of an underlying grammatical system responsible for

temporal computation. Crucially, these perspectives account for cross-linguistic variation, as different languages encode temporal morphology differently, which leads to different tendencies in omission or substitution.

The last type of theories, i.e., theories arguing that agrammatism stems from the impairment of time perception and time referencing (discourse-linking accounts), will be discussed in a separate section.

To conclude this section, tree-based accounts and DM approaches propose clear structural predictions for Czech. If past tense morphology is encoded higher in the functional hierarchy than present tense morphology, these models predict that past forms should be more vulnerable than present forms and that PAST→PRES substitutions should co-occur with difficulties in other high-level projections, such as aspect, negation, or complementizers, depending on a position in a tree or morphosyntactic computation.

### TASKS AND METHODOLOGICAL CONSIDERATIONS

Various theories might be used to account for impaired tense morphology in agrammatic aphasia. What has to be considered, is not only a reliable theoretical account, but also experimental tasks; the task selected in an experiment for examining aphasia may substantially influence the pattern and apparent severity of tense production deficits (Faroqi-Shah, Friedman 2015).

In sentence completion, the patient is presented with a sentence that they are supposed to finish e.g., *Yesterday the girls ... with dolls* (play, played, will play). The patient may be given options, such as in the example above, or just the infinitive of a verb, which should be inflected accordingly.

Test for Assessing Reference of Time (TART; Bastiaanse, Jonkers, Thompson 2008) is a sentence production priming paradigm, in which a set of pictures is presented to a patient. The patient is shown two side-by-side pictures with the same object, but a different verb (e.g., to write/to read a letter), and based on the examiners priming (with temporal adverbs), the patient is supposed to produce the target structure (Bos, Bastiaanse 2014).

Narrative is used in aphasia research as well. The examiner may ask the patient to share some personal stories, or – which is more common – to re-tell a story or a video. Some examiners have been using fairy tales in narration (Stark 2010).

Even though all of the abovementioned tasks are frequently used in examining aphasic language production and/or comprehension, they still have some limitations, such as lexical retrieval demands, overload to the working memory, or word order, which can interact with tense marking performance in non-trivial ways (Faroqi-Shah, Friedman 2015; Cordonier et al. 2024).

For future research, this implies that experimental designs must carefully disentangle task-driven performance differences from genuine tense morphology deficits. In an ideal case, an experimenter should consider combining the abovementioned tasks.

As the present article aims to draw attention to a possible approach to Czech agrammatic aphasia, the following section briefly focuses on Czech verbal morphology.

### CZECH VERBAL MORPHOLOGY

In Czech, verbal morphology is considerably richer than in languages with a higher level of analytic features, such as English, and constitutes a key component of the grammatical system. Czech also exhibits a systematic interaction between tense and aspect, with most verb lexemes occurring in aspectual pairs, so that temporal reference is expressed through a combination of inflectional morphology and lexical aspect (Čechová et al. 2000). This means that the temporal interpretation of a given verb form is rarely determined by tense morphology alone, but emerges from the interplay of aspect, auxiliaries, and discourse context.

The following examples illustrate Czech verbal morphology<sup>2</sup>:

- (1) (já) peč- u.  
I bake 1.SG.PRES  
I bake./I am baking.
- (2) (já) js- em pek- l- a.  
I be.AUX 1.SG.PRES bake PAST FEM  
I was baking.
- (3) (já) bud- u péct.  
I be.AUX.FUT 1.SG.PRES bake.INF  
I will bake./I will be baking.

The examples in (1) – (3) illustrate this layering of temporal information. In (1), the synthetic present form *peču* can denote an event unfolding at speech time, but in appropriate contexts it may also receive habitual or scheduled future readings; as stated above, the meaning of the verbal tense is not always strictly determined by the verbal morphology, but it often depends on some extralinguistic factors, such as temporal reference or context. Thus, the sentence *Odpoledne peču dort* meaning *I will bake a cake in the afternoon* is inflected for the present tense, but it actually refers to future time because of the use of the temporal adverbial *odpoledne* (afternoon). In Czech, present-tense forms of imperfective verbs are sometimes used to express planned future events, especially in the presence of temporal adverbials such as *zítra* (tomorrow) or *odpoledne* (in the afternoon). Consequently, substitutions of future forms by present-tense forms in agrammatic speech cannot be treated as errors *per se* unless the target representation is defined in a way that excludes these grammatically and pragmatically licensed strategies. In the context of the present theoretical paper, it has to be distinguished between (i) ungrammatical or pragmatically infelicitous uses of present tense in future contexts and (ii) structurally well-formed present-tense forms with future interpretation

(i.e., future time reference), which may reflect a preference for morphologically less demanding forms rather than a failure to encode future time morphologically.

In (2), past time reference is expressed analytically by a combination of the auxiliary *být* (be), in the present tense, and the past participle, while in (3) the future auxiliary *být* combines with an infinitive to form the analytic future. Crucially, all the verbal forms in Czech are obligatorily inflected for person, number, and in some cases for gender, so that the omission of a bound morpheme typically results in a non-word or a severely ungrammatical form.

This typological profile, i.e., a complex morphology in which one morpheme usually expresses multiple features, makes Czech particularly relevant for the study of agrammatism, because speakers cannot simply drop tense morphology; instead, they are forced to resort to morpheme substitution, which provides a transparent window into how temporal reference is computed under conditions of impaired morphosyntactic processing.

In agrammatic patients, a selective impairment in the production of tense morphemes is often observed, with the past tense being more severely affected cross-linguistically; the reason might be impaired temporal cognition. Therefore, such structures and their interpretation may cause difficulties. (Cordonier et al. 2024).

Cross-linguistic research findings suggest that agrammatic production of Czech verbs is not influenced only by morphological complexity, but also by the level of temporal reference and contextual meaning. This phenomenon is compatible with the PAST DISCOURSE LINKING HYPOTHESIS (PADILIH), which proposes that the past tense is more demanding to produce because it requires an explicit link to a past event.

### PAST DISCOURSE LINKING HYPOTHESIS AND ITS POSSIBLE APPLICATION TO FINDINGS IN CZECH

In what follows, PAST DISCOURSE LINKING HYPOTHESIS (PADILIH), is discussed in a separate section because, unlike more established structural accounts, it has not yet been systematically applied to or tested on Czech agrammatic data. I first outline PADILIH, which is one of the current discourse-linking accounts, and then I will discuss supporting and conflicting evidence, and finally relate these findings to existing data on Czech agrammatic aphasia.

In order to argue for the PADILIH, we have to make a distinction between tense and time. Tense refers to the morphological category encoded on the verb, while time denotes the actual temporal interval in which the event takes place.

In English, the present tense can refer to present time: *I am drinking tea now* or to future time: *I am visiting my relatives tomorrow*. Similar mismatches between tense and time can be found in multiple languages, including Czech: *Ted' peču dort*, where the verb *peču* is morphologically marked for first person singular present, and the

<sup>2</sup> For simplification, only verbs with the unmarked aspect are exemplified.

sentence refers to the present tense, however, the same verb with the same morphological inflection refers to a future time event in the following sentence: *Odpoledne peču dort*, already mentioned in the previous section. This mismatch is central to understanding why temporal morphology becomes impaired in agrammatism.

Avrutin (2006) pointed out that the agrammatic population does not necessarily show deficits in all (morpho-) syntactic production, but we have to distinguish between narrow syntax and discourse (extralinguistic information necessary for interpretation). The discourse-linked elements refer outside the narrow syntax, and in order to interpret the meaning of a sentence, a person has to rely on extra-linguistic factors. This hypothesis was connected to Zagona's hypothesis (2003), who claimed that past tense is discourse-inherently linked: to interpret it correctly, one has to access a representation of an event prior to the speech time.

Bastiaanse et al. (2011) hypothesized that it is not past tense that is discourse-linked, but rather past time reference. According to their findings, any linguistic structure referring to past time – even such that does not require past tense morphology – requires discourse linking, and, therefore, is impaired in people with agrammatism, because of its high processing cost.

The appropriate use of grammatical forms in aphasic speech is highly dependent on discourse context. Patients often struggle with selecting grammatically and pragmatically suitable forms, especially in relation to temporal reference and tense, reflecting the interaction between language production and extralinguistic knowledge (Flanderková 2015).

Evidence for the PADILIH comes from typologically diverse languages with varying morphosyntactic typologies and profiles. In Germanic languages such as English and Dutch, agrammatic speakers show greater impairment on past and perfect verb forms, while present and future forms are better preserved; errors often involve the substitution of non-past forms for past tense targets (Bastiaanse et al. 2011; Bos et al. 2014). In typologically different systems like Turkish and Chinese, the same pattern exists: past time reference is particularly impaired, with Chinese aphasics additionally struggling with aspectual adverbs that encode temporal information (Bastiaanse et al. 2011). In Russian, a language typologically similar to Czech, patients with agrammatism also show an advantage in the production of non-past forms in comparison to past (Dragoy, Bastiaanse 2013). In Swahili–English bilingual agrammatic speakers, impaired past time reference occurs in both languages regardless of differences in their verbal inflection systems, while studies on Akan similarly show more errors with past references than non-past (Abuom, Bastiaanse 2013). This evidence supports a discourse-linked explanation of the deficit rather than one purely morphological or lexical.

Agrammatism in Czech, particularly in individuals with Broca's aphasia, shows selective deficits that affect both morphological structures and syntactic processes. These impairments manifest with considerable variation

depending on the linguistic context and the nature of tasks, which suggests that the underlying deficits are influenced by language-specific features as well as individual cognitive differences (Flanderková 2015).

Czech has a rich verbal morphology paradigm, and in some contexts, the temporality interpretation requires context. Lehečková's findings (1988, 2001) support the theory, as in Czech agrammatic aphasia, it is highly frequent that the patients substitute past morphemes for present ones:

(4) Elicited structure  
je to 11. dubna 1980.  
be.3.SG.PRES it 11 april 1980  
It is on April 11, 1980.

(5) Target structure  
bylo to 11. dubna 1980.  
be.3.SG.PAST it 11 april 1980  
It was on April 11, 1980.

Moreover, Lehečková adds that even analytic future morphemes are often substituted for present tense morphemes:

(6) Elicited structure  
Zítra volá.  
tomorrow call.3.SG.PRES  
She calls tomorrow.

(7) Target structure  
zítra bude volat.  
tomorrow be.AUX.3.SG.FUT call.INF  
She will call tomorrow.

(Lehečková 2001)

Lehečková's findings (2001) show that when it comes to tense production errors in aphasia, the most common type is to substitute the past tense morphemes with the present tense morphemes, and her data show that in all tense errors, 61% were caused by PAST→PRES substitution. However, as Flanderková (2015) states, errors in agrammatic speech may not solely originate from morphosyntactic processing failures but can also involve difficulties with lexical retrieval and integration. Consequently, some traditionally classified morphosyntactic errors could partly reflect disruptions at the lexical level, highlighting the multifaceted nature of language processing breakdown in aphasia (Flanderková 2015).

Recent systematic reviews and meta-analyses have reinforced the notion of a selective impairment of past tense production in patients with aphasia, particularly within the domain of non-fluent and agrammatic aphasia (Cordonier et al. 2024). This extensive review, which analyses multiple languages and aphasia types, confirmed that the past tense is generally more impaired than present and future tenses. Importantly, the study highlights substantial inter-individual variability, and the significant influence of task demands and cognitive factors such as

working memory and age on tense production performance. Cordonier's findings support the view that temporal morphology deficits in agrammatic aphasia reflect a complex interplay of linguistic and cognitive variables rather than a simple, uniform impairment of temporal reference processing. This aligns with the idea that the observed substitutions of tense morphemes may stem not only from linguistic deficits but also from broader cognitive constraints.

In contrast, Faroqi-Shah and Friedman (2015) conducted a comprehensive meta-analysis and found substantial variability in the severity of tense production deficits across languages and individuals. Their work suggests that the impairment may reflect a broader deficit in morphological processing, modulated by task demands and linguistic complexity, rather than a specific deficit in temporal reference or cognitive time perception. Their view is supported by Fyndanis et al. (2018), who tested the PADILIH on Greek- and Italian-speaking aphasic speakers, and their results are not in accordance with the PADILIH, but show that there is not dissociation between past and future reference production. Fyndanis et al. (2018) hypothesize that "future reference poses greater demands on encoding processes and past reference on retrieval processes", which might be both impaired in aphasia. For Czech, these contrasting findings suggest that observed substitutions of past/future morphemes with present forms may arise from an interplay of discourse-linking demands and general morphological processing load rather than a singular deficit mechanism.

As already stated, Lehečková (2001) found that in Czech speakers with aphasia, the production of future tense morphemes is impaired, and the morphemes are sometimes substituted for present tense morphemes (FUT→PRES; in 33% of all errors). However, in some cases the Czech verbal form for the present tense can refer to future time – as can be seen from her example (7), in some cases there might be a mismatch between the tense-time reference, but from the grammatical perspective, this use is perfectly correct, and the patients might just have produced the less demanding form (present) to encode some other meaning (future). In this specific case, the target was the analytic future form, thus this was considered an error. For this reason, a future study in Czech agrammatic aphasia should strictly define target representations, including verbal aspect and pragmatic aspects, and distinguish between an experimentally-defined error in contrast to system-internal acceptable alternative.

Existing Czech data show a clear tendency for PAST and FUT target constructions to be realized by present-tense forms, but they do not systematically control for discourse context, aspect, or task effects. As a result, the observed PAST→PRES and FUT→PRES substitutions can be interpreted in multiple ways: as reflecting increased discourse-linking demands for past time reference, as favoring structurally or morphologically simpler feature bundles, or as by-products of broader lexical and

processing constraints. For these reasons, Czech offers an ideal testing ground to distinguish between these accounts, but rigorous experimental work is still needed to determine whether discourse-linking, syntactic structure, or morphological complexity plays the primary role in the manifestations of tense impairments.

In contrast to TPH or DM-like theories, accounts that attribute tense deficits primarily to discourse-linking or temporal cognition, such as PADILIH, do not treat past forms as structurally more complex per se, but expect a selective disadvantage for past time (or future time) reference irrespective of the precise morphological realization. The deficits are manifested (not only) in the verbal morphology as the substitution or omission of morphemes, depending on the language typology. With this view, patients with agrammatism do not simply forget tense markings; they lack access to the cognitive mechanism for temporal reference in general. As a result, they produce default forms, or forms that are cognitively less demanding.

These insights highlight the complexity of agrammatic aphasia and caution against overly simplistic interpretations of tense morpheme substitution as a direct reflection of impaired temporal cognition.

#### **CLINICAL IMPLICATIONS AND FURTHER DIRECTIONS: THE NEED TO REASSESS AGRAMMATIC APHASIA IN CZECH**

The findings discussed above underscore the intricate relationship between morphosyntactic processing and cognitive mechanisms underpinning temporal reference in agrammatic aphasia. From a linguistic perspective, these data highlight how languages with rich inflectional morphology, such as Czech, pose unique challenges to the expression of tense, especially the past tense, where morphological cues must align with discourse-level temporal frameworks.

This complexity invites a reconsideration of the theoretical models of agrammatism, suggesting that temporal processing deficits should be integrated alongside morphosyntactic impairment to fully capture the nature of tense production difficulties. The variable patterns of morpheme substitution and omission observed across individuals and languages indicate that temporal cognition, working memory, and linguistic typology jointly shape these profiles.

A targeted empirical study could test this interplay in Czech through sentence-completion tasks contrasting discourse-linked past vs. non-past contexts, narrative retelling with temporal adverbials, and correlational analyses with working memory measures. The planned doctoral research will implement such a design by combining sentence-completion and narrative tasks with manipulations of temporal reference, thus allowing competing accounts – PADILIH-type, tree-based, and DM-style approaches – to be compared within a unified experimental framework.

Different theoretical frameworks make distinct predictions about task effects. Under PADILIH, larger deficits

are expected in tasks that require an explicit temporal anchor in discourse, such as narrative or retelling paradigms, than in decontextualised sentence-completion tasks with minimal discourse support. Morphological-complexity and DM-style accounts instead predict that performance will decrease as the morphological load and combinatorial demands of the task increase, for example in paradigms requiring the manipulation of multiple affixes or agreement relations. Tree-based approaches anticipate that tasks tapping higher-level structures, such as embedded clauses or question formation, will be disproportionately affected even when the amount of overt morphology is comparable.

From the perspective of PADILIH, such cases complicate the interpretation of FUT→PRES substitutions, because they blur the boundary between impaired temporal reference and typologically licensed strategies for future time reference; this underscores the need for carefully defined target forms in future Czech experiments.

These considerations form the basis of the empirical program currently being developed in the author's doctoral research, which will directly test how discourse-linking demands, syntactic structure and morphological complexity shape tense morphology in Czech agrammatic aphasia.

### CONCLUSION

This article has reviewed key theoretical and empirical contributions concerning tense morphology and temporal processing in agrammatic aphasia, with a focus on the Czech language. Evidence indicates that difficulties in producing past tense morphemes are a robust marker of agrammatic speech, mediated by both linguistic complexity and cognitive temporal mechanisms. However, considerable inter-individual variability and task-dependent effects underscore the multifaceted nature of these impairments.

These findings support a model in which morphological errors, specifically substitution of verbal morphemes, reflect the interaction between morphosyntactic knowledge and temporal cognition. The synthesis of cross-linguistic data and language-specific studies emphasizes the need to integrate linguistic and cognitive perspectives in research.

This integrated approach will provide a theoretical foundation for ongoing investigations within the author's doctoral research aimed at unraveling the mechanisms underlying temporal processing deficits in agrammatic aphasia.

### ACKNOWLEDGEMENTS

I would like to thank the reviewers for their careful reading of the article and for their insightful comments and suggestions.

### FUNDING

This publication was made possible thanks to targeted funding provided by the Czech Ministry of Education,

Youth and Sports for specific research, granted in 2023 to Palacký University Olomouc (IGA\_FF\_2023\_030).

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