



HAL
open science

Dead or alive: A lifetime effect of Pomak nominal tense in a self-paced reading experiment

Evangelia Adamou, Seçkin Arslan

► **To cite this version:**

Evangelia Adamou, Seçkin Arslan. Dead or alive: A lifetime effect of Pomak nominal tense in a self-paced reading experiment. 2023. halshs-04355130

HAL Id: halshs-04355130

<https://shs.hal.science/halshs-04355130>

Preprint submitted on 20 Dec 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

Dead or alive: A lifetime effect of Pomak nominal tense in a self-paced reading experiment

Evangelia Adamou and Seckin Arslan

Abstract

Nominal tense is a cross-linguistically rare and understudied phenomenon, with past vs non-past being the minimal distinction. In this study, we investigate for the first time the online processing of lifetime effects (i.e. implicatures about whether an individual is dead or alive) in sentences with past nominal tense and kinship terms following contextual information about this individual's lifetime status (dead or alive). An end-of-sentence acceptability judgment task completes the study. Evidence comes from 25 speakers of Pomak (Slavic, Greece) who use a realis past suffix to form, among others, definite articles, contrasting with a generic suffix for future, habitual, and irrealis. Our results suggest that past nominal tense with kinship terms triggers a lifetime effect which is apparent during online processing. The present study therefore offers support to previous reports of lifetime effects in other languages with nominal tense, highlighting another similarity between nominal and verbal tense.

Keywords

processing; reading; nominal tense; verbal tense; lifetime effect; Pomak

1 Introduction

Nominal tense, whereby tense, aspect, and modality are encoded in nominals through inflectional morphology, is a cross-linguistically rare and understudied phenomenon (Lecarme 2012; Nordlinger & Sadler 2004). A cross-linguistic study by Nordlinger and Sadler (2004) finds that the minimal distinction in languages with nominal tense is past vs. non-past.

Past nominal tense, in particular, locates the referent to the past with respect to the time of the utterance. In some languages, past nominal tense further implies the reading 'deceased', e.g. Halkomelem (Burton 1997; Wiltschko 2003), Movima (Haude 2004), and Tariana (Aikhenvald 2022). In others, the 'ceased to exist' reading of past nominal tense restricts its use with permanent properties, like kinship terms, as lifetime effects are triggered (i.e. implicatures about whether an individual is dead or alive), e.g. Mbyá (Thomas 2014).

In the present study, we investigate for the first time the online processing of lifetime effects in sentences with past nominal tense and kinship terms following contextual information about this individual's lifetime status (dead or alive). An end-of-sentence acceptability judgment task completes the study. Evidence comes from Pomak, a minoritized Slavic variety spoken in Greece (Adamou 2010).

The remainder of this introduction is structured as follows: In 1.1, we present an overview of nominal tense and discuss more specifically the lifetime effect of past nominal tense. In 1.2, we offer some background on past nominal tense in Pomak, and in 1.3, we present the experimental literature on processing lifetime effects.

1.1 Past nominal tense and the lifetime effect

Nominal tense is defined as ‘the existence of tense/aspect/mood as an inflectional category for nominals’ (Nordlinger & Sadler 2004: 776) or as the use of ‘grammatical morphology on argument nominals whose temporal interpretation is independent from the temporal interpretation of the clause’ (Lecarme 2012: 698). The restriction of the definition to argument nominals sets nominal tense apart from the use of tense, aspect, and modality markers with nominals that function as predicates of a clause. The mention of its inflectional status in the definition sets nominal tense apart from lexical derivation (e.g. *ex-husband* in English) and adjectival modifiers (e.g. *former* in English). Nominal tense has scope over the noun phrase and, in some languages, can also have scope over the entire clause (Nordlinger & Sadler 2004).

According to Lecarme (2012), there are three possible sets of time for the interpretation of nominal tense: (i) the predication time of an individual, (ii) the possessive time, and (iii) the existence time of an animate individual, an object or an event. This means that in addition to the temporal anteriority of past nominal tense, its use would imply that: (i) the individual ceased to hold the property described by the predicate (e.g. *former president*), (ii) the individual ceased to be in a possessive relation (e.g. *former house*), (iii) the individual ceased to exist (e.g. *late grandmother* (i.e. deceased), *former house* (i.e. destroyed)).

Example in (1) from Halkomelem, a Salishan language, illustrates how when the (nominal and clausal) past marker *-lh* is suffixed to the noun ‘grandmother’, comprehenders can infer that the time-span of being a grandmother is in the past and, since being a grandmother is a lifetime property, that the referent’s existence is also in the past (Burton 1997; Wiltschko 2003).

(1) Halkomelem (Central Salish, Salishan)

<i>El-éliyemet-tsel-cha</i>	<i>the-l</i>	<i>sí:lá:-lh</i>
RDP-dream_about-1SG.SBJ-FUT	DEF.F-my	grandparent-PST

‘I’ll be dreaming about my late grandmother’. (Nordlinger & Sadler 2004: 782)

Another example comes from Movima, an unclassified Bolivian language. In (2a), the article *kinoj* is used for an absent and accessible referent, ‘aunt’, contrasting with the article *isnoj* in (2b) used for a referent that has ceased to exist, that is, with the reading ‘late aunt’. Because Movima articles can also have scope over the entire clause, it can be seen in (2c) that the article *isnoj* may sometimes override the ‘deceased’ reading.

(2) Movima (Isolate)

a.	<i>kinoj</i>	<i>ney</i>	<i>ay’ku</i>	<i>di’</i>	<i>jayna</i>	<i>kayni</i>
	ART.F.ABSN	DEF	my_aunt	REL	already	be_dead

‘That (absent) aunt of mine who died [yesterday]’. (Haude 2004: 84)

b.	<i>la’</i>	<i>n-oj</i>	<i>soñ-tino:na’</i>	<i>kayni</i>	<i>isnoj</i>	<i>ay’ku</i>
	before	OBL-ART.N	other-N.INCP:year	be_dead	ART.F.PST	my_aunt

‘Last year my aunt died’. (Haude 2004: 84)

c.	<i>n-asko</i>	<i>elaná=uj</i>	<i>pa’</i>	<i>isnoj</i>	<i>ma’</i>
	OBL-PRO.N.ABSN	leave=ART.M	my_father	ART.F.PST	my_mother

‘At that (time) my father left my mother’. (both absent, but alive) (Haude 2004: 87)

Similarly, in Tariana, an Arawak language from Brazil, the completed nominal past tense marker has three different meanings: ‘deceased’, ‘former’, and ‘poor thing’ (Aikhenvald 2022).

Moreover, Thomas (Thomas 2014) proposes a unified analysis of *-kue* in Mbyá (Tupí-Guaraní) as a relative past tense both in its nominal and clausal uses. In this analysis, the existence and change of state properties noted in the nominal uses are temporal implicatures and combine with the presuppositions of the noun phrases. Specifically, the restrictions of *-kue* with permanent properties are pragmatic lifetime effects that can more generally be observed with past tense individual-level predicates.

Indeed, in languages with verbal tense like English, a lifetime effect arises through the use of present or past verbal tense for individual-level predicates as the comprehender makes an inference about the lifetime status of the referent (dead or alive). For example, in an out-of-the-blue utterance like *Gregory was from America*, one infers that Gregory must be dead at the time of the utterance. If one knows that Gregory is alive, then the utterance is infelicitous. In a Gricean framework, Musan (1995) argues that this lifetime effect is a temporal implicature that arises from the use of the past tense in combination with the predicate, *be from America*, that is denoting a permanent property.

In this paper, we investigate the lifetime effect of past nominal tense in Pomak. In the next section, we introduce nominal tense in Pomak.

1.2 Nominal tense in Pomak

Pomak or Pomatsko refers to the Slavic varieties traditionally spoken by Muslim communities living in Bulgaria (about 100,000 people), Greece (about 36,000 people) and Turkey (between 300,000 and 600,000 people) (Adamou & Fanciullo 2018). Today, not everyone who identifies as Pomak is also a speaker of Pomak as a strong language shift is taking place in each country towards the locally dominant language. For historical reasons, this language is Turkish for Pomaks who reside in Greek Thrace (Adamou 2010).

Adamou (2011) is the first study to refer to nominal tense in Pomak discussing evidence from a variety spoken in the department of Xanthi, in Greek Thrace. The analysis follows the *situational anchoring* framework (Culioli 1999). Similar uses were previously described in the Bulgarian Rhodope dialects, albeit without reference to the literature on nominal tense (Kanevska-Nikolova 2006). In most Pomak varieties spoken in Bulgaria, however, nominal tense is currently being lost due to the influence of Standard Bulgarian, a language that does not have nominal tense (Fanciullo 2019).

In the Pomak variety from Greek Thrace, nominal tense is expressed through deictic suffixes that are used to form definite articles, demonstratives, possessive pronouns, relative pronouns, as well as temporal subordinators (Adamou 2011). The encoding of nominal tense through definite articles is a relatively common cross-linguistic feature (Lecarme 2012).

Specifically, the Pomak deictic suffixes are used in the here-and-now situations (where the situation of process, Sit₂, is identical to the situation of utterance, Sit₀, i.e. Sit₂=Sit₀) depending on the distance between the referent and the speech participants: The *s*-suffix is used when the referent is in the speaker’s sphere, illustrated in (3a), the *t*-suffix when the referent is in the interlocutor’s sphere, in (3b), and the *n*-suffix when the referent is away from both, in (3c). These uses can be manipulated for pragmatic reasons like politeness or social deixis (Adamou 2011).

(3) Pomak (Slavic, Indo-European)

- | | | | |
|----|--------------|------------|------------------|
| a. | <i>'jela</i> | <i>nah</i> | <i>'matsa-sa</i> |
| | come.IMP.2SG | to | table-DEF.SPKR |

‘Come to the table (close to me)!’ (Adamou 2011: 875)

b. *na* 'matsa-ta
 at table-DEF.ADRE
 'On the table (close to you)!'
 (Adamou 2011: 875)

c. *pri* 'matsa-na
 next table-DEF.DIST
 'Next to the table (away from both of us)!'
 (Adamou 2011: 875)

Crucially, when the noun phrase is located in a space and time frame distinct from the utterance situation ($Sit_2 \neq Sit_0$) or has no relation to it ($Sit_2 \omega Sit_0$), Pomak speakers use the *t*- and *n*- suffixes to encode nominal tense (Adamou 2011). The interlocutor's *t*-suffix is used when the time of the noun phrase is located in the past with respect to the time of the utterance. The distal *n*-suffix is used to locate the noun phrase in the future, irrealis, or habitual (see Adamou 2011 for a detailed analysis).

This can be seen in the examples in (4), based on naturalistic speech and then constructed with Pomak language consultants to illustrate the contrasts. (4a) illustrates the *s*-suffix, which is restricted to spatial-pragmatic uses in the here-and-now. In (4b), the *t*-suffix is used for a referent that is close to the interlocutor and contrasts with (4c) where it locates the referent in the past in relation to the utterance situation; in this context, the glasses are not close to the interlocutor. The distal *n*-suffix is used for irrealis, as in (4d), habitual (as in the narration of traditions), and future in relation to the utterance situation, as in (4e).

(4) Pomak (Slavic, Indo-European)

a. *gju* 'zlutfi-se 'zæ-se 'nosem (ai'sa) 'jatse sa 'hubavi
 glasses-DEF.SPKR PRO.REL-SPKR wear.1SG now very be.3PL nice
 'The glasses that I'm wearing (now) are very nice!' (Adamou 2011: 881)

b. *gju* 'zlutfi-te 'zæ-te 'nosis (ai'sa) pa'ratiki sa
 glasses-DEF.ADRE PRO.REL-ADRE wear.2SG now ugly be.3PL
 'The glasses that you're wearing (now) are ugly'. (Adamou 2011: 881)

c. *gju* 'zlutfi-te 'zæ-te 'noseh (la'ni) 'beha gu'ljami
 glasses-DEF.ADRE PRO.REL-ADRE wore.1SG last_year were.3PLbig
 'The glasses that I wore (last year) were big'. (Adamou 2011: 881)

d. *gju* 'zlutfi-ne mu 'beha/ 'bili gu'ljami
 glasses-DEF.IRR DAT.3SG.M were.3PL/were.EVID.3PL big
 'The glasses were big for him'. (as part of a tale) (Adamou & Haendler 2020: 512)

e. *gju* 'zlutfi-ne 'zæ-ne fe 'kupem sa tfe'rveni
 glasses-DEF.FUT PRO.REL-FUT will buy.1SG be.3PL red
 'The glasses that I will buy are red'. (Adamou 2011: 881)

In (4d), the modal irrealis interpretation of nominal tense morphology in the narration of a tale is accompanied by the use of evidentiality in the verbal system (Adamou 2013). The blending of temporal and modal readings in Pomak is not unique. As Lecarme (2012) observes, modal interpretations are common not only in verbal tense morphology but also in determiner systems. A similar observation is made in Bertinetto (2020) arguing that all

combinations of tense, aspect, and modality should be possible in verbal and nominal tense alike.

In Table 1, we summarize the uses of the Pomak deictic suffixes in one community from the Xanthi area (the name of the community is not made public because of the sensitive political context and pressure regarding linguistic matters).

Table 1. Pomak suffixes used with definite articles (adapted from Adamou 2011).

	<i>spatial-pragmatic uses</i>	<i>temporal-modal uses</i>
<i>s-suffix</i>	speaker's sphere	—
<i>t-suffix</i>	interlocutor's sphere	realis past
<i>n-suffix</i>	neither speaker's nor interlocutor's sphere	future, habitual, irrealis

To test whether the temporal interpretations of the Pomak suffixes could be experimentally demonstrated, Adamou and Haendler (2020) conducted a study where Pomak speakers were asked whether a referent bearing either the *t-* or the *n-*suffix is located in the past or future. This task would have been impossible in a language without nominal tense but Pomak participants successfully responded for referents that had no other temporal information than that conveyed by the deictic *t-* and *n-*suffixes (e.g. *my dress*, *my bag*, or *my coat*) as for those with additional pragmatic and semantic information (e.g. *my baby bath*).

In addition to nominal tense, Pomak, as any other Slavic language, has verbal tense. To better understand how nominal and verbal tense work together in this language, Adamou and Haendler (2020) conducted an acceptability judgment experiment. Results show that participants prefer sentences where the past article is congruent with the past verbal tense, but can accept sentences where the past *t-*article contrasts with future verbal tense like in (5).

(5) Pomak (Slavic, Indo-European)

? *fe 'dam na 'kiro 'kofta-ta faf sela 'nik za 'busene*
 will give.1SG to rent house-DEF.PST in NP for year
 'I will rent the_[*t*-article] house in Salonica for the year'. (future verb, *t*-article) (Adamou &

Haendler 2020: 515)

For example, in (5), the past suffix locates the house in the past with the reading 'the former house', affecting the possessive relation. However, this reading can be felicitous in some contexts but not in others: it is felicitous if this is the house the speaker owns and used to live in but no longer does, but it is infelicitous if this is the house the speaker owned but no longer does. In a footnote, Adamou and Haendler (2020) note that there are no implicatures about the existence of the house ('destroyed'). The study, however, does not explore such pragmatic effects in detail. Similarly, Adamou (2011) notes that although nominal tense is used with a variety of nouns, kinship terms may behave differently, but does not elaborate further about any possible implicatures like the lifetime effect. According to this analysis, the interlocutor's *t-*suffix is used when the time of the noun phrase is located in the past with respect to the time of the utterance but that depending on the context, like the use with kinship terms, it could be read as 'deceased', what we refer to as the lifetime effect.

In our exploratory study, we seek to fill this gap by investigating whether a lifetime effect can be noted when comprehenders process past nominal tense with kinship terms. In the next section, we present a review of the literature on processing lifetime effects.

1.3 Lifetime effects in processing

Processing of lifetime effects has been investigated in languages with verbal tense, like English, and tenseless languages, like Chinese, where tense is not realized morpho-

phonologically. To date, there are no experimental studies exploring lifetime effects in languages with nominal tense.

To our knowledge, the first processing study of lifetime effects is Chen and Husband (2018). Authors conducted a self-paced reading experiment and an acceptability judgment task in English and Chinese where they tested the contradictory inferences arising when one individual is dead and one alive. Participants read brief contextual descriptions about two individuals including information about their lifetime status. In one condition, both individuals were described as being alive, in the second condition, both were described as being dead, and in the third condition, one was described as dead and one as alive. In English, participants read the critical sentence in present simple, which is infelicitous with dead referents, e.g. *They are both very handsome*, and in Chinese, the critical sentence without any tense marking using *shi* 'be'.

The study reports lower acceptability ratings and longer reading times in English when the verbal tense was incongruent with the lifetime status of both referents (present-dead) but not in Chinese (*shi* 'be'-dead), in line with the analysis of Chinese as a language that does not have a past/non-past tense distinction.

Importantly, in the reading experiment, authors find sentence final wrap-up effects during reading in both languages. This suggests additional computational steps as readers update the discourse. These findings have implications about the discussions of Chinese tense, in favor of the existence of a covert future/non-future distinction.

In addition, in English, when two referents were described in the contextual sentences as dead, processing costs were only noted at spillover/post-critical verb regions, whereas when one referent was alive and one was dead, processing costs were also found in the immediate post-verb region.

Palleschi et al. (2020) conducted an eye-tracking experiment and a naturalness judgment task to explore lifetime effects in English. Participants read contextual descriptions about famous people including information about their lifetime status; e.g. *Beyoncé is an American performer. She lives in California* (lifetime status: alive) or *Whitney Houston was an American performer. She died in California* (lifetime status: dead). Critical sentences were either in present perfect, e.g. *She has performed in many arenas in the past, apparently*, or in future, e.g. *She will perform in many arenas in the future, apparently*. Participants also rated these sentences for naturalness.

The authors report longer reading durations for dead referents in the present perfect condition that are late/cumulative. These sentences also received lower naturalness ratings than the alive referents in the present perfect condition, but the ratings remain relatively high. Authors interpret this result as evidence that the violation was either undetected or considered less significant.

In contrast, they find shorter reading durations for dead referents in the future condition, a result that they attribute to the overtness and severity of the violation. This is corroborated by the very low naturalness ratings.

In summary, only a handful of studies have experimentally examined lifetime effects, and none has done so for nominal tensed languages. The findings from studies on languages with verbal tense showed lower acceptability ratings and reading disruptions in English when the verbal tense was incongruent with the lifetime status, but only sentence final wrap-up effects in Chinese, suggesting that lifetime status effects are prone to cross-linguistic differences (Chen & Husband 2018). A study employing more time-sensitive techniques has shown incongruent/dead referent in the context of future tense in English is detected immediately with short fixation durations in the critical regions (Palleschi, Ronderos & Knoeferle 2020).

In the current study, we examine for the first time how speakers process lifetime effects in a language with past nominal tense, Pomak, in combination with permanent properties.

2 Method

2.1 Goals

Our main goal is to test whether a lifetime effect arises during processing of Pomak past nominal tense. Following Musan (1995) and Thomas (2014), we define the lifetime effect of nominal tense as either the implicature about an individual's life time-span triggered by the use of past nominal tense or its (in)felicity when there is additional relevant contextual information or common knowledge available about this individual's lifetime status. In our design, we specifically test the (in)felicity of the lifetime effect following a context that offers information about the lifetime status of this individual (dead or alive).

We used a non-cumulative self-paced reading design with an end-of-sentence rating task (Just, Carpenter & Woolley 1982). This methodology was chosen to allow us to measure word-by-word reading times and provide insights into the time-course of interpretation.

As Adamou and Haendler (2020) have already provided experimental evidence for Pomak speakers' sensitivity to nominal tense, we do not tackle this research question in the present study.

2.2 Participants

25 Pomak speakers residing in Greece participated in this study (age: mean = 39.07, $SD = 17.04$). Pomak has no official status in Greece and its use is restricted to the family and the community. In the community under study, Pomak speakers also know Greek and Turkish. Even though a shift to Turkish is often completed in other communities of the area, this is not the case in the community where we conducted our study.

After the experimental session, participants responded to a language background questionnaire where they were asked to name the languages they spoke and self-assess their proficiency on a scale from 1 to 5, with 1 being the lowest score and 5 being the highest score (1=very little; 2=little; 3=well; 4=very well; 5=perfectly). Proficiency in Pomak was above 3 for all participants (mean = 4.4) and therefore no participant was excluded. Two more languages, Greek and Turkish were listed; the mean proficiency rate was 4 and 2.96 respectively. Knowledge of other Slavic languages was not reported. In general, Pomaks make occasional visits to Bulgaria and are in contact with Bulgarian migrants in Greece, but the language of communication is variable and inter-comprehension with speakers of Standard Bulgarian relatively limited, not only because of grammatical and phonetic differences but also because of lexical differences and, in particular, because of the use of Turkish words for salutations, counting, and expressing thanks in Pomak and their absence in Standard Bulgarian (Adamou 2010).

Since Pomak is a minoritized language that is typically neither read nor written, previous experimental studies were conducted with spoken stimuli (Adamou & Haendler 2020). However, Pomak has been increasingly used in writing, in informal texting within the community under study (e.g. using smartphones). We therefore felt confident that participants could complete a reading task. In the text messages we saw, the Latin script is used, and this is the script we used in our study. In formal publications, Pomak has been variably written in the Greek and Latin alphabets (similar to Greek and Turkish that are used in formal education), while use of the Cyrillic alphabet is very rare (Adamou & Fanciullo 2018).

In the language background session, we asked participants to rate their use of Pomak in reading and writing. Results show some familiarity with reading and writing Pomak, with a mean rate of 3.12 for each. No participant reported difficulties completing the task.

2.3 Materials

Our stimuli included a total of 80 critical sentences with past nominal tense shown in four conditions across which *Lifetime Status* (dead × alive) and *Tense Concord* (congruent × incongruent) were manipulated.

For the *Lifetime Status* condition, a contextual sentence preceded the critical noun phrase with information about the lifetime status of a kin referent which was described as either *dead* (e.g. *I have a grandmother who is dead*) or by default as *alive* (e.g. *I have a grandmother*).

The critical sentence started with the same kin referent as in the contextual sentence but differed in that it carried a past definite article attaching to a first-person pronoun (e.g., *my[+past] grandmother*). We used kinship terms because they typically refer to a lifetime property. While *past-husband* (*ex-husband* in English) is felicitous since it corresponds to a relationship that can end, *?past-grandmother* restricts the range of possible interpretations; the reading *ex-grandmother* should be infelicitous since the relationship does not typically end, while the reading *late grandmother* should be felicitous.

The critical noun phrase was followed by a transitive verb either in *past perfect* or *simple future*. In the *Tense Concord* condition, the congruent and incongruent sentences were obtained by matching and mismatching past nominal tense with verbal tense/aspect (past perfect vs. future), where future tense marking was unsettling to the context of a past article. Table 2 illustrates this with examples; see Appendix 2 for the full list of the stimuli.

We chose not to manipulate the nominal tense itself, similar to the design in Chen and Husband (2018) that does not manipulate verbal tense. In addition, we note that in our study manipulation of nominal tense would have offered a baseline but would not have been infelicitous as the future/habitual/irrealis suffix is versatile and could have been interpreted in this experimental design as a distal (compatible with dead or alive status), irrealis since this is an experimental task (compatible with dead or alive status), and future (compatible with alive status). A different design, like in Adamou and Haendler (2020), would have been necessary to successfully restrict the interpretation of the *n*-suffix as future.

The sentence stimuli were presented over 6 regions. The (in)felicity between lifetime status and nominal tense could be noticed at the end of the noun phrase at region 2 (R2) (see Table 2). The (in)felicity between lifetime status/nominal tense and verbal tense/aspect could be noticed when participants reached the verb at region 3 (R3).

In order to refrain our participants from familiarization effects, 40 filler sentences were intermixed with the experimental sentences. The filler sentences were constructed as excerpts from traditional folktales and included no definite articles.

All stimuli were constructed with a local Pomak research assistant who came from the same community where the experiment was run to avoid issues arising from dialectal differences.

Table 2. Examples of sentence stimuli used in the self-paced reading experiment (slashes indicate per-word regions).

<i>Contextual sentence with lifetime status</i>	<i>R1 Possessive pronoun + Article + Nominal tense</i>	<i>R2 Noun</i>	<i>R3 Verb + Verbal tense/aspect</i>	<i>R4 Post-verb region</i>	<i>R5 Post-verb region</i>	<i>R6 Sentence final</i>
<u>a. status dead; past article; past perfect verb</u>						
Imam yeno sestra ta ye umrala.	Moyta/	sestra/	kupila be/	yeno/	tileorasi/	za mayka hi./
I have one sister who has died.	My(past)	sister	had bought	one	TV	for her mother.
‘I have a sister who is dead. My(-t) sister had bought a television set for her mother’.						
<u>b. status dead; past article; future verb</u>						
Imam yeno sestra ta ye umrala.	Moyta/	sestra/	še kupova/	yeno/	tileorasi/	za mayka hi./
I have one sister who has died.	My(past)	sister	will buy	one	TV	for her mother.
‘I have a sister who is dead. My(-t) sister will buy a television set for her mother’.						
<u>c. status alive; past article; past perfect verb</u>						
Imam yeno sestra.	Moyta/	sestra/	kupila be/	yeno/	tileorasi/	za mayka hi./
I have one sister.	My(past)	sister	had bought	one	TV	for her mother.
‘I have a sister. My(-t) sister had bought a television set for her mother’.						

d. status alive; past article; future verb

Imam yeno sestra. Moyta/ sestra/ še kupova/ yeno/ tileorasi/ za mayka hi./

I have one sister. My(past) sister will buy one TV for her mother.

‘I have a sister. My(-t) sister will buy a television set for her mother’.

2.4 Procedure

The experiment was programmed and presented in PsychoPy 3.0 (Peirce 2007). Each participant was tested individually in their home in Western Thrace, Greece, under supervision by a Pomak-speaking local research assistant.

Participants were seated in front of a laptop computer with a Latin keyboard with a comfortable reading distance. Each trial started with a fixation cross (+) in white color on a dark gray background presented in the middle of a screen for 500ms. Immediately following the cross, the sentence stimulus in each trial appeared centered to the middle of the screen as a whole and words were masked with dashes. Each masked word was separated by a space, but any use of punctuation was not visible. Commencing from the first word at the left-hand side corner of the stimulus screen, participants were instructed to read the stimulus sentences a segment at a time by pressing the space bar on the keyboard at their own pace. At each spacebar press, the next word in a segment appeared in a successive linear fashion from left to right (which is the normal reading direction in Pomak), and the previous word was masked with dashes back again. Segments contained one or more than one word where necessary. The sentence stimulus was presented in Latin script, as shown above in Table 2, using Courier fonts as this font type has equal width for each character. We used normalized units of 0,07 for font sizes in PsychoPy which roughly equated to 2.32cm height per character on a 2240x1260px presentation screen.

When the sentence stimulus ended in a given trial, participants saw an end-of-trial acceptability task. They were instructed to respond whether or not the sentence they had read was acceptable by using ‘s’ and ‘l’ keys. Participants rated the entire sentence as either ‘good’ or ‘bad’ (*‘Would you say that this sentence was ‘good’ in Pomak?’*). To facilitate memorization of the keys, ‘s’ was marked with a happy face emoji and the ‘l’ key with an unhappy face emoji. The post-sentence end-of-trial task appeared after each trial. The trials were presented in a fully randomized order with condition manipulations of the same sentence positioned in different blocks.

Participants responded to all 120 trials within a fully crossed design, that is, all participants saw all items. We opted for this design instead of a counterbalanced design—which is often used in psycholinguistic studies on well-studied languages—as in minoritized non-standardized languages, individual variability in language profiles is wider. Therefore, developing counterbalanced lists with fixed participant characteristics is not necessarily warranted. Furthermore, in minoritized language contexts, it is not always possible to access large groups of individuals in order to gain adequate statistical power, and hence, fully crossed designs improve power as the total number of stimuli is not divided over participants.

Three to four brief breaks were offered whenever participants needed to rest. The average session lasted 30 minutes. Participation was voluntary and participants did not receive any monetary compensation in agreement with local cultural norms. We followed the ‘oral informed consent’ procedure in compliance with ethics guidelines for protecting minoritized populations.

2.5 Analysis

We recorded per-region reading times (RTs), end-of-sentence acceptability ratings, and response latencies. Two kinds of data preprocessing actions were taken for RTs. First, following Jegerski (2013), we applied an absolute cut-off by removing RTs shorter than 200ms in order to exclude key presses that may have occurred haphazardly. The removed observations were minimal (<0.75% in critical region). In many psycholinguistic studies, an absolute cut-off of 4000ms is also applied for L1 speakers (Jegerski 2013); however, we decided not to follow such a uniformed high cut-off as our participants are L1 speakers of Pomak but they bear rather large variability in their reading experience in Pomak. Instead of

an absolute cut-off for longer RTs, we removed 2.5 *SD* around the mean, which resulted in removal of another 1.14% of data. After outlier removal, the remaining RTs ranged between around 200ms and 3000ms, which is well in accordance with Jegerski's recommended preprocessing norms on native speaker RTs. Second, prior to statistical analysis RTs were log-transformed to normalize the skewness of distribution. End-of-trial response latencies were preprocessed by removing outliers that are larger than 2.5 *SD* around the mean, corresponding to 3.9% of the data.

RTs and response latencies data were analyzed using the linear mixed-effects regression models with the *lme4* package (Bates et al. 2015) using R (R Development Core Team 2019). Acceptability ratings were collected as 1-0 binary data and were analyzed using logit transformation (Jaeger 2008) within general linear mixed effects regression models. In our models, we included *Lifetime Status* (dead × alive) and *Tense Concord* (congruent × incongruent, i.e. between past article and verbal tense/aspect) as fixed effects. Participants and items were added as random intercepts. Fixed effects were sum-to-zero coded to avoid bias. A separate model was built per region of interest. Region length was added as a fixed/nested factor where applicable to be able to account for different length of characters across regions. In certain regions we removed region length from the models due to equal number of characters across the stimuli (e.g. in Region 1, the word is always 'Moyet' or 'Moyta'). We first implemented the maximal random effect structure following Barr (2013), and then, when necessary, more simplified models were re-implemented by removing random effects to determine the best fitting model. In the linear mixed-effect models, *p*-values were obtained by utilizing the Satterthwaite's approximation in *lmerTest* package in R (Kuznetsova, Brockhoff & Christensen 2017). Any post-hoc pairwise comparisons were computed with the *emmeans* package in R using the Bonferroni correction (Lenth 2016). Statistical significance is set to $p < 0.05$.

2.6 Predictions

Following Adamou and Haendler (2020), we predict that the *t*-article in our design should be processed as past tense as the reading 'close to the interlocutor' is not relevant. We also predict that, in context, a lifetime effect should arise for kinship terms. Specifically, *past-grandmother* should be felicitous following the lifetime context *dead* and infelicitous following the default lifetime context *alive*. Differences in lifetime status (*alive*) and temporal interpretation of nominal tense (*past*) should increase processing costs due to the difficulty of readers to integrate the temporal information. We therefore tentatively predict greater reading disruptions reflected as longer reading times in the conditions *alive status/past article* as compared to *dead status/past article*. These processing costs should in turn decrease the acceptability in the judgments that immediately follow. In addition, we expect stimuli with incongruent nominal and verbal tense to be read more slowly than congruent ones, in line with the lower acceptability rates of similar sentences in Adamou and Haendler (2020).

If a parallel can be drawn with the results in Chen and Husband (2018), we should find longer reading times immediately following nominal tense (i.e. in region 3). In addition, we should find general costs sentence-finally in the same conditions (*alive status/past article*) as readers update the discourse information (i.e. in region 6). In the judgment task, we expect that *alive status/past article* sentences should receive similar ratings as *dead status/past article*. However, what might make a difference in both reading times and the assessment of the sentences is the use of verbal tense and its congruence with past nominal tense. Specifically, all *past article/future verbal tense* sentences should receive lower ratings given that kin terms would trigger the 'deceased' reading independent from the status in the context. Overall, sentence final reading times should result from a combination of

incongruence between the two tenses and lifetime status rendering the combined effect difficult to predict.

In addition, to the extent that we can compare a reading experiment with an eye-tracking study like Palleschi et al. (2020), we expect shorter reading times in the sentences with overt violations involving the verb, like *dead status/future verbal tense*. These should be sentence-final effects (i.e. region 6). Similar to Palleschi et al. (2020), we predict that these sentences should be rated lower in the explicit language judgments as they contain overt and severe violations. Given that Pomak is a language with clear verb-noun opposition, we expect violations involving verbal tense to strongly impact both processing and explicit judgments.

Table 3 summarizes the predictions for the two tasks and the four conditions (RTs for the main region of interest, R3).

Table 3. Predictions per task and condition.

	<i>a. status dead; past article; past perfect verb</i>	<i>b. status dead; past article; future verb</i>	<i>c. status alive; past article; past perfect verb</i>	<i>d. status alive; past article; future verb</i>
Acceptability ratings	high	low	low	low
Reading times at post-noun phrase region (R3)	shorter than (c), and (d)	shorter than (c) and (d)	longer than (a) and (b)	longer than (a) and (b)

3 Results

3.1 Acceptability ratings

Mean acceptability ratings and response latencies are given in Table 4 and the outputs from a generalized mixed-effects regression model on the acceptance ratings are given in Table 5. These outputs showed significant fixed effects of Tense Concord and Lifetime Status, and the interaction between the two. The interaction was driven by the null difference between the conditions *Status alive: congruent* (i.e. *past article/past perfect verb*) and *Status alive: incongruent* (i.e. *past article/future verb*), and lower acceptance ratings for *Status dead: incongruent* (i.e. *past article/future verb*) than for *Status dead: congruent* (i.e. *past article/past perfect verb*) ($\beta = 1.75$, $SE = 0.15$, $z = 11.13$, $p < .0001$); see Figure 1 for the interaction plot.

In sum, a living referent is acceptable with past perfect and future tense, independent from the past article's congruence with verbal tense/aspect. A dead referent is only acceptable with past perfect, not with future tense.

We found no differences in response latencies (see Table 6).

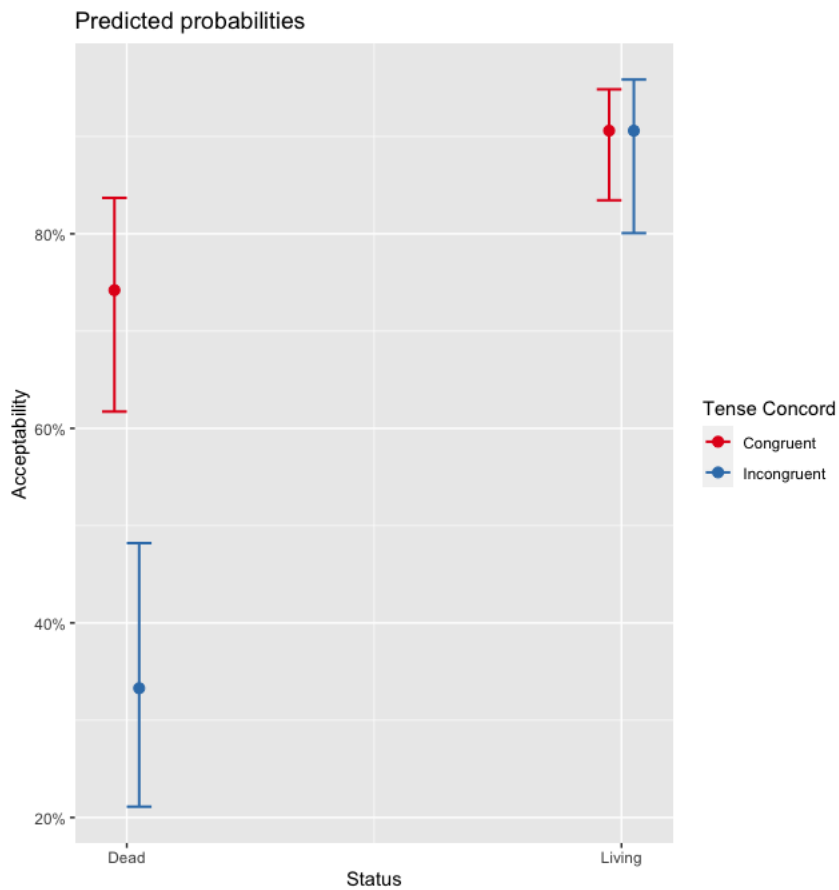


Figure 1. Interaction plot showing percent predicted probabilities for acceptability ratings (back transformed to percentages). Congruent conditions: *status dead/past article/past perfect verb* and *status alive/past article/past perfect verb*; Incongruent conditions: *status dead/past article/future verb* and *status alive/past article/future verb*.

Table 4. Per-region raw reading times in milliseconds, mean end-of-trial acceptance ratings in proportions and response latencies in milliseconds. Standard deviations are in parenthesis. Incongruent conditions are marked with star (*).

<i>Condition</i>	<i>Region 1</i>	<i>Region 2</i>	<i>Region 3</i>	<i>Region 4</i>	<i>Region 5</i>	<i>Region 6</i>	<i>End of trial acceptance ratings</i>	<i>End of trial response latencies</i>
<i>status dead; past article; past perfect verb</i>	759.83 (470.68)	733.45 (480.43)	1036.85 (648.21)	714.71 (339.81)	821.16 (488.68)	770.25 (348.14)	0.67 (0.46)	1204.33 (1214.83)
<i>status dead; past article; future verb *</i>	749.21 (451.78)	728.07 (407.45)	1057.80 (662.60)	725.62 (404.82)	803.58 (424.84)	598.56 (356.03)	0.35 (0.47)	1148.33 (1058.20)
<i>status alive; past article; past perfect verb</i>	675.07 (386.33)	662.79 (370.31)	1187.79 (708.21)	751.28 (400.97)	788.94 (473.09)	675.29 (545.87)	0.85 (0.35)	1215.67 (1325.03)
<i>status alive; past article; future verb *</i>	697.46 (401.16)	699.05 (433.05)	1174.31 (725.33)	792.93 (437.87)	774.61 (424.23)	897.85 (514.98)	0.85 (0.35)	1220.51 (1327.56)

Table 5. Statistical outputs from mixed-effects models computed on acceptability ratings and response times. β = model estimates based on logit transformed probabilities in glmer and log-transformed response times in lmer, SE = standard error, p-values are calculated with the Satterthwaite approximation. Significant fixed effects are bolded.

	<i>Acceptability</i>			<i>Response Latencies</i>		
	β (SE)	<i>Z</i>	<i>p</i>	β (SE)	<i>t</i>	<i>p</i>
<i>Intercept</i>	1.22 (0.29)	4.14	<.001	6.79 (0.08)	76.81	<.001
<i>Tense Concord</i>	-0.87 (0.12)	-7.11	<.001	-0.01 (0.02)	-0.02	.98
<i>Status</i>	2.08 (0.12)	16.29	<.001	-0.02 (0.02)	-0.75	.45
<i>Tense Concord</i> × <i>Status</i>	1.75 (0.24)	7.11	<.001	0.03 (0.05)	0.69	.48

Code in R: sumcoding = -contr.sum(2)/2 ; model = glmer(Acc ~ Tense Concord*Status + (1|participant) + (1|number), family = binomial, data = qdata, control = glmerControl(optimizer='bobyqa'), contrast=list(Tense Concord=sumcoding, Status=sumcoding))

Table 6. Statistical outputs from mixed-effects models computed on per-region raw reading times. β = model estimates based on log-transformed reading times, SE = standard error, p-values are calculated with the Satterthwaite approximation. Significant fixed effects are bolded.

	<i>Region 1</i>			<i>Region 2</i>			<i>Region 3</i>			<i>Region 4</i>			<i>Region 5</i>			<i>Region 6</i>		
	β (SE)	<i>t</i>	<i>p</i>	β (SE)	<i>t</i>	<i>p</i>	β (SE)	<i>t</i>	<i>p</i>	β (SE)	<i>t</i>	<i>P</i>	β (SE)	<i>t</i>	<i>p</i>	β (SE)	<i>t</i>	<i>p</i>
<i>Intercept</i>	6.46 (0.06)	111.61	<.001	6.44 (0.06)	108.74	<.001	6.85 (0.08)	88.24	<.001	6.52 (0.05)	128.52	<.001	6.56 (0.06)	99.51	<.001	6.42 (0.09)	58.18	<.001
<i>Region Length</i>	-	-	-	0.04 (0.01)	3.36	.001	0.12 (0.01)	8.71	<.001	0.08 (0.01)	7.76	<.001	0.08 (0.01)	5.33	<.001	-	-	-
<i>Tense Concord</i>	0.01 (0.01)	0.66	0.512	0.03 (0.02)	1.60	.110	0.04 (0.02)	2.25	.024	0.02 (0.01)	1.50	.135	-0.01 (0.02)	-0.59	.553	-0.09 (0.07)	-1.36	.175
<i>Status</i>	-0.07 (0.01)	-5.30	<.001	-0.07 (0.01)	-4.26	<.001	0.14 (0.02)	7.14	<.001	0.06 (0.01)	4.42	<.001	-0.04 (0.02)	-2.36	.019	0.07 (0.06)	1.26	.211
<i>Tense Concord</i> × <i>Status</i>	0.04 (0.03)	1.43	.154	0.02 (0.03)	0.49	.623	-0.02 (0.04)	-0.65	.514	0.05 (0.03)	1.63	.104	0.01 (0.03)	0.39	.696	0.52 (0.12)	4.53	<.001

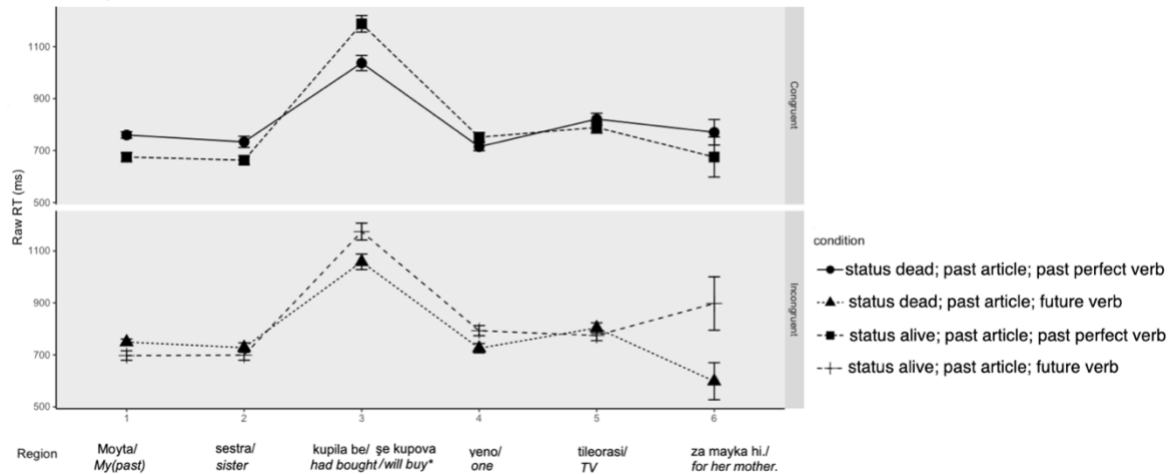


Figure 2. Mean raw RTs across critical regions of interest. Error bars show standard error around the mean.

3.2 Reading times

Table 4 and Figure 2 illustrate per-region raw RTs and the statistical outputs for per-region RTs analysis are given in Table 6.

In the first two regions (R1 and R2), we found a fixed effect of Lifetime Status without an interaction, see Table 6. In both R1 and R2, sentences following a *dead status* were associated with longer RTs. This effect was not modulated by Tense Concord (congruence between nominal and verbal tense) since readers had not yet reached the verb.

At the verb (R3), we found a fixed effect of Tense Concord and Lifetime Status without an interaction between the two. The fixed effect of Tense Concord indicates that *past article/future verb* was associated with longer RTs. At this region, the direction of the Lifetime Status effect was reversed compared to the effect in R1 and R2: participants read sentences following an *alive status* more slowly (longer RTs) than those following a *dead status*. This lifetime effect was sustained in R4.

Finally, a significant interaction for Tense Concord \times Status was found in the sentence final region (R6). A set of post-hoc tests revealed that sentences with a dead referent in congruent trials (*past article/past verb*) elicited longer RTs in this region than their incongruent counterparts (*past article/future verb*) ($\beta = -0.35$, $SE = 0.09$, $t = 3.86$, $p = .001$). However, the difference between congruent and incongruent trials was not significant for sentences with a living referent ($\beta = -0.17$, $SE = 0.09$, $t = -1.90$, $p = 0.23$). Further, in congruent trials (*past article/past verb*), sentences with dead referents elicited longer RTs in this final region than those with living referents ($\beta = 0.18$, $SE = 0.09$, $t = 2.83$, $p = .02$). This picture was reversed for incongruent trials (*past article/future verb*), where sentences with dead referents elicited faster RTs than their living counterparts ($\beta = -0.33$, $SE = 0.09$, $t = -3.54$, $p = 0.03$). All other comparisons returned non-significant (all $ps > .23$).

4 Discussion

In this study, we explored for the first time how Pomak readers integrate contextual information about the lifetime status of a kin referent (dead or alive) with past nominal tense and how they rate these sentences. We note that, even though Pomak is a minoritized

language and speakers have variable experience with reading it, participants successfully completed the reading task.

Table 7 summarizes our predictions (for the region of interest) and indicates whether they were borne out.

Table 7. Predictions per task and condition following the results.

	<i>a. status dead; past article; past perfect verb</i>	<i>b. status dead; past article; future verb</i>	<i>c. status alive; past article; past perfect verb</i>	<i>d. status alive; past article; future verb</i>
<i>Acceptability ratings</i>	✓ high	✓ low	✗ low	✗ low
<i>Reading times at post-noun phrase region (R3)</i>	✓ shorter than (b), (c), and (d)	✓ longer than (a), shorter than (c) and (d)	✓ longer than (a) and (b)	✓ longer than (a) and (b)

Based on Adamou and Haendler (2020), we expected that the *t*- suffix would be associated to realis past interpretations, and in combination with kinship terms, we expected a lifetime effect to arise. Congruence between past nominal tense and past verbal tense were also predicted to be preferred over incongruence.

More specifically, for acceptability ratings, we predicted lower ratings for both conditions *alive status/past articles* (c and d in Table 7) but also expected to find lower ratings for both conditions *past article/future verb* (b and d in Table 7). We found that participants rated sentences based on the lifetime status (*dead* or *alive*) and its agreement with verbal rather than nominal tense, suggesting that nominal tense lifetime effects are less salient in explicit linguistic judgments. Differences in ratings based on differences in the severity and overtness of violations are also noted in Palleschi et al. (2020) for English; their participants detect the overt and severe violation of an utterance with a dead referent and a future verb but not the more subtle and less severe violation of a dead referent and a present perfect verb.

A significant interaction in our acceptability ratings analysis was driven by reduced ratings in *dead status/future verb* condition (b in Table 7) in comparison to all other conditions. That is, participants found a future verb in a context with a dead referent less acceptable than in a context with a living one, and less acceptable than a past verb with either a dead or an alive status. We believe that, in the linguistic judgments, the *alive status* of the referent established in the context may have overridden the subtler lifetime effect of the past article.

For reading times, we hypothesized that the lifetime effect triggered by Pomak past nominal tense should lead to longer reading times in the infelicitous conditions, *alive status/past article* (c and d), as compared to the felicitous *dead status/past article* (a and b).

In the absence of previous processing studies of nominal tense and its lifetime effect, we relied on studies of the lifetime effect in languages with verbs for more detailed predictions. Drawing a parallel with the reading experiment in Chen and Husband (2018) that finds lifetime-related costs in the post-critical verb region and sentence finally, we tentatively predicted costs for living referents in post-nominal tense regions and general costs sentence finally, although we refrained from making specific predictions for the latter.

In agreement with our predictions for the post-noun phrase region, our results reveal reading disruptions as measured by longer RTs for the two conditions *alive status* (c and d) as compared to *dead status* (a and b) at the regions immediately following the critical noun phrase (i.e. R3 and R4). We interpret this as an indication of the infelicity of these sentences due to the lifetime effect triggered by past nominal tense.

In addition, at the beginning of the critical sentence, Pomak readers slightly slowed down in their RTs during the first two pre-verbal noun phrase segments (R1 and R2) for dead as compared to living referents. This is an intriguing finding as at this sentence's initial stage the manipulation of nominal tense was not yet seen (readers discover the kin referent in R2). We believe that this sentence-initial reading disruption for dead referents occurred as a result of forms of carryover effects from the pre-critical contextual sentence. These sentence initial critical noun phrases (e.g. *my sister*) are linked to the previous discourse in which the referents are introduced for the first time (e.g. *I have a sister*). In the two conditions with dead status, contextual sentences contained information that the referent is deceased (i.e. *I have a sister who is dead*). One possibility is that the emotional content of the contextual sentence involving the death of kin, that was also marked for first-person suggesting that the kin is related to the speaker, has elevated reading times at the noun phrase region in our experiment. Indeed, emotional valence influencing sentence processing is reported in behavioral data (Jiménez-Ortega et al. 2012).

Moreover, in line with Palleschi et al. (2020), we found shorter RTs in the sentence-final region for the *dead status/past article/future tense* sentences (condition b) in comparison to the *alive status/past article/future tense* (condition d). This is a common effect in reading experiments in general as participants tend to read post-critical regions in a given sentence stimulus with obvious violations more quickly, leading to a form of facilitation (Jegerski 2013).

Our design did not allow observing sentence final wrap-up effects related to the lifetime effects of nominal tense presumably because of the manipulation of verbal tense. As Palleschi et al. (2020) suggests, this may result from the two different types of conflict that comprehenders are exposed to, that is, those arising from the two tenses (Tense Concord) and those arising from the knowledge provided in the contextual sentence (Lifetime Status). In the future, an experiment without manipulation of verbal tense could help shed light on the sentence final processing effects of nominal tense.

Taken together, our results suggest that past nominal tense with kinship terms triggers a lifetime effect that is apparent during online processing. The lifetime effect is either undetected or judged as less severe in explicit acceptability ratings due to the presence of the more overt and severe violations of the verbal tense.

Although this study provides the first experimental evidence that a lifetime effect is triggered by nominal tense in Pomak, more research is needed to address some limitations of the present design. First, we chose not to manipulate nominal tense, that is, the article used in the critical noun phrase was always in realis past and did not contrast with a future/irrealis/habitual article. This decision was taken because, in the sentence contexts of our design, the future/irrealis/habitual suffix becomes ambiguous with a distal reading, which is also possible. In a future study, we will use a different design to manipulate nominal tense by narrowing down the possible readings of the future/irrealis/habitual suffix similar to Adamou and Haendler (2020) who explicitly asked participants whether a noun phrase was past or future.

Second, we believe that in sentences with *alive status*, sentence final effects should be viewed with care. This is due to the fact that our sentence materials were relatively short, with few segments following the critical manipulations, and hence, these sentence final effects might have been blended with effects resulting from readers' recovery from seeing a

grammatical violation. In other words, in conditions with *alive status* there is a form of logical gap because the kin referent presented in the context with a default ‘alive’ value is then interpreted as ‘dead’ because of the lifetime effect of past nominal tense and then, in some sentences, this dead kin is presented as performing an action in the future. This interpretation is consistent with our data because, in this sentence final region, we found an interaction effect between Tense Concord and Lifetime Status, which was due to significant differences between congruent and incongruent sentences with *dead status* (*past article/past verb vs. past article/future verb*) and lack of differences between congruent and incongruent trials with *alive status*. We conclude that integrating sentence meaning was effortful in trials with *alive status* because of its complex combination with the lifetime effect triggered by past nominal tense and verbal tense. To tease these different effects apart, an additional study might explore this issue with a design where nominal tense is placed post-verbally.

Despite these limitations, the current exploratory study breaks new ground in lending support to previous reports of lifetime effects in other languages with nominal tense and highlighting an additional similarity between nominal and verbal tense.

Abbreviations

1, 2, 3 first, second, third person; ABSN absential; ADRE addressee; ART article; DAT dative; DEF definite; EVID evidential; F feminine; FUT future; IRR irrealis; IMP imperative; M masculine; N neuter; N.INCP incorporated noun; NP proper noun; OBL oblique; PL plural; PRO pronoun; PST past; RDP reduplication; REL relative; SBJ subject; SG singular; SPKR speaker

Ethics and consent

All procedures under this study conform to the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards for research on human subjects. This study was approved by the ethics committee of University of Cote d’Azur (No. 2022-053).

Acknowledgements

We thank the Pomak participants for their collaboration in this study. We are indebted to our research assistant, who wishes to remain anonymous, for their previous help with the preparation of the stimuli and the data collection process. AU1 was supported by the French National Research Agency (grant no. ANR-21-CE27-0020-01). AU2 declares funding support by the French National Research Agency (grant no. ANR-15-IDEX-01) and by the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Action (grant no. 838602).

Competing Interests

The authors declare no conflicts of interest.

Authors’ contributions

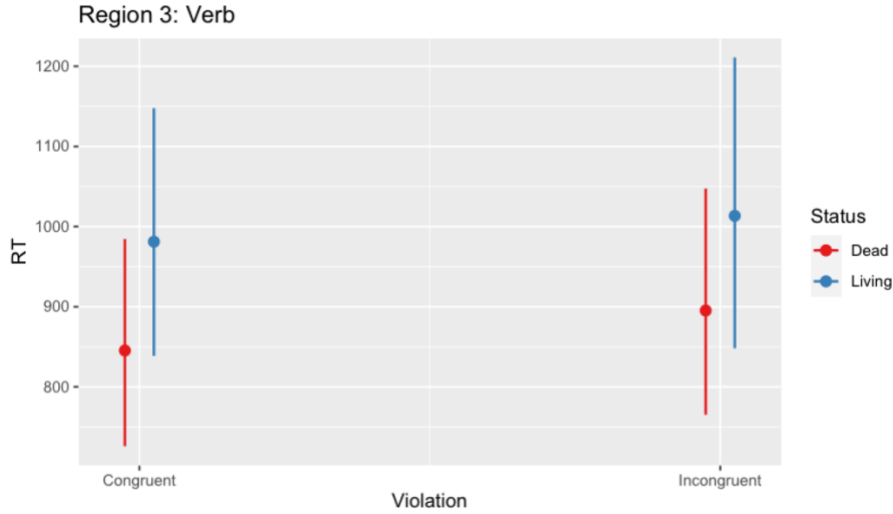
AU1 and AU2 designed and conceived the study, AU2 programmed the experiments, AU1 supervised the data collection, AU2 processed and analyzed the data, AU1 and AU2 drafted the manuscript.

References

- Adamou, Evangelia. 2010. Bilingual speech and language ecology in Greek Thrace: Romani and Pomak in contact with Turkish. *Language in Society* 39(2). 147–171. <https://doi.org/10.1017/S0047404510000035>.
- Adamou, Evangelia. 2011. Temporal uses of definite articles and demonstratives in Pomak (Slavic, Greece). *Lingua* 121(5). 871–889. <https://doi.org/10.1016/j.lingua.2010.12.001>.
- Adamou, Evangelia. 2013. Change and variation in a trilingual setting: Evidentiality in Pomak (Slavic, Greece). In *The Interplay of Variation and Change in Contact Settings*, 229–252. John Benjamins. <https://www.jbe-platform.com/content/books/9789027272485-silv.12.09ada>. (18 July, 2023).
- Adamou, Evangelia & Davide Fanciullo. 2018. Why Pomak will not be the next Slavic literary language. In Dieter Stern, Motoki Nomachi & Bojan Belic (eds.), *Linguistic regionalism in Eastern Europe and beyond: minority, regional and literary microlanguages*, 40–65. Peter Lang.
- Adamou, Evangelia & Yair Haendler. 2020. An Experimental Approach to Nominal Tense: Evidence from Pomak (Slavic). *Language* 96(3). 507–50. <https://doi.org/10.1353/lan.2020.0040>.
- Aikhenvald, Alexandra Y. 2022. Beyond nominal tense: Temporality, aspect, and relevance in Tariana noun phrases. *Studies in Language* 46(1). 40–75. <https://doi.org/10.1075/sl.20056.aik>.
- Barr, Dale J. 2013. Random effects structure for testing interactions in linear mixed-effects models. *Frontiers in Psychology* 4. <https://doi.org/10.3389/fpsyg.2013.00328>.
- Bates, Douglas, Martin Mächler, Ben Bolker & Steve Walker. 2015. Fitting Linear Mixed-Effects Models Using **lme4**. *Journal of Statistical Software* 67(1). <https://doi.org/10.18637/jss.v067.i01>.
- Bertinetto, Pier Marco. 2020. On nominal tense. *Linguistic Typology* 24(2). 311–352. <https://doi.org/10.1515/lingty-2020-2033>.
- Burton, Strang. 1997. Past Tense on Nouns as Death, Destruction, and Loss. *North East Linguistics Society* 27(1). 6. <https://scholarworks.umass.edu/nels/vol27/iss1/6>.
- Chen, Sherry Yong & E. Matthew Husband. 2018. Contradictory (forward) lifetime effects and the non-future tense in Mandarin Chinese. *Proceedings of the Linguistic Society of America* 3(1). 6. <https://doi.org/10.3765/plsa.v3i1.4296>.
- Culioli, Antoine. 1999. *Pour une linguistique de l'énonciation: Formalisation et opérations de repérage*. Editions OPHRYS.
- Fanciullo, Davide. 2019. *Temporal expression in nominals: tripartite deictics in the Bulgarian Rhodope dialects*. Peter Lang D. <https://doi.org/10.3726/b15767>.
- Haude, Katharina. 2004. Nominal tense marking in Movima: Nominal or clausal scope? *Linguistics in the Netherlands* 21. 80–90. <https://doi.org/10.1075/avt.21.11hau>.
- Jaeger, T. Florian. 2008. Categorical data analysis: Away from ANOVAs (transformation or not) and towards logit mixed models. *Journal of Memory and Language* 59(4). 434–446. <https://doi.org/10.1016/j.jml.2007.11.007>.
- Jegerski, Jill. 2013. Self-Paced Reading. In Jill Jegerski & Bill VanPatten (eds.), *Research Methods in Second Language Psycholinguistics*, 20–49. Routledge.
- Jiménez-Ortega, Laura, Manuel Martín-Loeches, Pilar Casado, Alejandra Sel, Sabela Fondevila, Pilar Herreros de Tejada, Annkathrin Schacht & Werner Sommer. 2012. How the Emotional Content of Discourse Affects Language Comprehension. (Ed.)

- Jean-Claude Baron. *PLoS ONE* 7(3). e33718.
<https://doi.org/10.1371/journal.pone.0033718>.
- Just, Marcel A., Patricia A. Carpenter & Jacqueline D. Woolley. 1982. Paradigms and processes in reading comprehension. *Journal of Experimental Psychology: General* 111(2). 228–238. <https://doi.org/10.1037/0096-3445.111.2.228>.
- Kanevska-Nikolova, Elena. 2006. *Trojnoto členuvane v rodopskite govori*. Univ. Izdatelstvo Paisij Xilendarski. Plovdiv.
- Kuznetsova, Alexandra, Per B. Brockhoff & Rune H. B. Christensen. 2017. **lmerTest** Package: Tests in Linear Mixed Effects Models. *Journal of Statistical Software* 82(13). <https://doi.org/10.18637/jss.v082.i13>.
- Lecarme, Jacqueline. 2012. *Nominal Tense*. Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780195381979.013.0024>.
- Lenth, Russell V. 2016. Least-Squares Means: The R Package **lsmeans**. *Journal of Statistical Software* 69(1). <https://doi.org/10.18637/jss.v069.i01>.
- Musan, Renate Irene. 1995. *On the temporal interpretation of noun phrases*. Massachusetts Institute of Technology Thesis. <https://dspace.mit.edu/handle/1721.1/11077>. (18 July, 2023).
- Nordlinger, Rachel & Louisa Sadler. 2004. Nominal Tense in Crosslinguistic Perspective. *Language* 80(4). 776–806. <https://doi.org/10.1353/lan.2004.0219>.
- Palleschi, Daniela, C. R. Ronderos & P. Knoeferle. 2020. Effects of linguistic context and world knowledge on the processing of tense and aspect: evidence from eye-tracking. In, 3363–3369. <https://www.semanticscholar.org/paper/Effects-of-linguistic-context-and-world-knowledge-Palleschi-Ronderos/961fe4142e097adf2a5478d1634de0dd4ddce976>. (24 March, 2023).
- Peirce, Jonathan W. 2007. PsychoPy—Psychophysics software in Python. *Journal of Neuroscience Methods* 162(1–2). 8–13.
<https://doi.org/10.1016/j.jneumeth.2006.11.017>.
- R Development Core Team. 2019. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing.
- Thomas, Guillaume. 2014. Nominal tense and temporal implicatures: evidence from Mbyá. *Natural Language Semantics* 22(4). 357–412. <https://doi.org/10.1007/s11050-014-9108-2>.
- Wiltschko, M. 2003. On the interpretability of tense on D and its consequences for case theory. *Lingua* 113(7). 659–696. [https://doi.org/10.1016/S0024-3841\(02\)00116-X](https://doi.org/10.1016/S0024-3841(02)00116-X).

Appendix 1. Predicted mean RTs at the verb region (R3), back-transformed into milliseconds.



Appendix 2. List of linguistic stimuli used in the experiment.

1. *Imam edin brat to ye umral. / Imam edin brat. Moyet brat plati /še plata mlogu pari jenine mu.* “I have a brother who is dead./ I have a brother. My(-t) brother paid/will pay a big pension to his ex-wife.”
2. *Imam yeno sestra ta ye umrala. / Imam yeno sestra. Moyta sestra kupi/še kupova yeno tileorasi za mayka hi.* “I have a sister who is dead./ I have a sister. My(-t) sister bought/will buy a new TV for the family.”
3. *Imam edin mije to ye umral./ Imam edin mije. Moyet mije vorna/še vrašta moynu doru natzat.* “I have an uncle who is dead./ I have an uncle. My(-t) uncle returned/will return my gift.”
4. *Imam edin brat to ye umral./ Imam edin brat. Moyet brat dade/še dava edin porsten jenune mu.* “I have a brother who is dead./ I have a brother. My(-t) brother offered/will offer a ring to his wife.”
5. *Imam yeno sestra ta ye umrala./ Imam yeno sestra. Moyta sestra kupi /še kupova edin tumafil za nah rabutana.* “I have a sister who is dead. / I have a sister. My(-t) sister bought / will buy a black Mercedes for work.”
6. *Imam edin sin to ye umral./ Imam edin sin. Moyet sin kupi/še kupova dve košte na Iskeçe.* “I have a son who is dead./ I have a son. My(-t) son bought/will buy two houses in Xanthi.”
7. *Imam yeno doštore ta ye umrala./ Imam yeno doštore. Moyta doštore nagudi/še nagada edin fustan za arkadaškana hi.* “I have a daughter who is dead./ I have a daughter. My(-t) daughter made / will make a black dress for the wedding.”
8. *Imam yeno tize ta ye umrala./ Imam yeno tize. Moyta tize nagudi/še nagada eno tourta za daskala.* “I have an aunt who is dead./ I have an aunt. My(-t) aunt made/will make a pink cake for the teacher.”

9. *Imam edin brat to ye umral./ Imam edin brat. Moyet brat unese/še unisa eno pitsa arkadašune mu.* “I have a brother who is dead./ I have a brother. My(-t) brother brought/will bring the pizza to his friend.”
10. *Imam edin sin to ye umral./ Imam edin sin. Moyet sin prudade/še prudava edin mutor arkadašune mu.* “I have a son who is dead./ I have a son. My(-t) son sold/will sell his motorbike to his friend.”
11. *Imam yeno doštere ta ye umrala./ Imam yeno doštere. Moyta doštere ubagri/še bagri eno udayo červenu.* “I have a daughter who is dead./ I have a daughter. My(-t) daughter painted /will paint one bedroom in red.”
12. *Imam yeno nine ta ye umrala./ Imam yeno nine. Moyta nine zbra/še zbira taze dumadi za saltsana.* “I have a grandmother who is dead./ I have a grandmother. My(-t) grandmother collected/will collect fresh tomatoes for the sauce.”
13. *Imam edin dadu to ye umral./ Imam edin dadu. Moyet dadu kupi/še kupova edin zayek detinem.* “I have a grandfather who is dead./ I have a grandfather. My(-t) grandfather bought/will buy a rabbit to his grandchildren.”
14. *Imam yeno nine ta ye umrala./ Imam yeno nine. Moyta nine sfari/še vari yemek za tsala hanosa.* “I have a grandmother who is dead./ I have a grandmother. My(-t) grandmother cooked/will cook dinner for the family.”
15. *Imam edin sin to ye umral./ Imam edin sin. Moyet sin utfori/še utfare eno kahveno na platiyena.* “I have a son who is dead./ I have a son. My(-t) son opened/ will open a coffee shop in the central square.”
16. *Imam yeno sestra ta ye umrala./ Imam yeno sestra. Moyta sestra pumogna/še pumaga sas miškusu dete.* “I have a sister who is dead./ I have a sister. My(-t) sister helped /will help me raise my child.”
17. *Imam edin brat to ye umral./ Imam edin brat. Moyet brat iskara/še iskarva eno kadru za daskala.* “I have a brother who is dead./ I have a brother. My(-t) brother painted/will paint a picture for his school teacher.”
18. *Imam edin dadu to ye umral./ Imam edin dadu. Moyet dadu nadena/še nadava edin kustum na sfatbana.* “I have a grandfather who is dead./ I have a grandfather. My(-t) grandfather wore / will wear a suit at the wedding.”
19. *Imam yeno tize ta ye umrala./ Imam yeno tize. Moyta tize ütiledisa/še ütiledisfa balu gelinlikan za sfatbana.* “I have an aunt who is dead./ I have an aunt. My(-t) aunt ironed / will iron the white dress for the wedding.”
20. *Imam edin mije to ye umral./ Imam edin mije. Moyet mije pisa/še pisfa edin kitap za jvotan mu.* “I have an uncle who is dead./ I have an uncle. My(-t) uncle wrote/will write an important book about his life.”