

Does tense illusion exist? A contribution from an ERP study on the processing of future constructions in Polish

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The issue Experimental research on real-time sentence processing shows that the human parser is restricted by grammatical constraints at very early stages of analysis and can implement even complex grammatical constraints with a high accuracy. In spite of this, there is also plenty of experimental evidence that the parser makes errors and is less accurate in the implementation of some other, in fact often simple constraints (Dillion 2016; Phillips et al. 2011; Lewis & Phillips 2015). NEGATION (NPI licensing; see Drenhaus et al. 2005; Vasishth et al. 2008; Xiang et al. 2009; Parker & Phillips 2016), comparatives (Townsend & Bever 2001; Wellwood et al. 2017), CASE (Bader & Meng 1999; Bader et al. 2000), NUMBER (see, e.g., Bock & Miller 1991; Clifton et al. 1999; Pearlmutter et al. 1999, Pearlmutter 2000; Bock et al. 2004; Eberhard et al. 2005; Wagers et al. 2009; Häussler 2012; Dillon et al. 2013) and also GENDER (see Slioussar & Malko 2016) are susceptible to grammatical illusions. **The goal** In the present paper we want to access the question of whether TENSE is one of the features that are relevant for grammatical illusions. To the best of our knowledge, there is no work showing that matching TENSE specifications in different words of a sentence can cause grammatical illusions, similar to what has been described for other grammatical illusion phenomena. **The facts** In Polish there are two possibilities to express future time reference: either by using a present tense form of a perfective lexical verb (see (1)) or by using compound future constructions consisting of the so-called “future auxiliary”, and an imperfective lexical verb; see (2). Importantly, Polish has two variants of compound future constructions: one in which the future auxiliary is complemented by an infinitive (2a) and one in which the future auxiliary is complemented by a lexical verb in the so-called *l*-participle form (2b). In both cases the lexical verb complement must be in imperfective aspect, i.e., the future auxiliary selects for an imperfective lexical complement (see Błaszczak et al. 2014 for discussion). What makes Polish interesting in the context of the present paper is the fact that the *l*-participle form is also a form used in the past tense constructions in Polish, as shown in (3). In contrast with compound future constructions, in past tense constructions both imperfective and perfective verbs are allowed; cf. (3) with (2).

- (1) Janek pomaluje pokój Zosi.
 Janek paint_{PFV.PRS.3SG} room Zosi_{GEN}
 ‘Janek will paint Zosia’s room.’
- (2) a. Janek będzie ✓malować /*pomalować pokój Zosi.
 Janek be_{AUX.3SG} paint_{IPFV.INF} / *paint_{PFV.INF} room Zosi_{GEN}
 ‘Janek will pain/be painting Zosia’s room.’
- b. Janek będzie ✓malował / *pomalował pokój Zosi.
 Janek be_{AUX.3SG} paint_{IPFV.PTCP.SG.M} / *paint_{PFV.PTCP.SG.M} room Zosi_{GEN}
 ‘Janek will pain/be painting Zosia’s room.’
- (3) Janek ✓malował / ✓pomalował pokój Zosi.
 Janek paint_{IPFV.PTCP.SG.M} / paint_{PFV.PTCP.SG.M} room Zosi_{GEN}
 ‘Janek was painting / painted Zosia’s room.’

The research questions With this background in mind, we can now ask the central question of the present paper: Can matching TENSE specifications in different words of a sentence give rise to grammatical illusions and thus create opportunities for processing errors? The intriguing question is what will happen when in future sentences (with a future auxiliary) instead of ‘tomorrow’ a semantically incongruent temporal modifier ‘yesterday’ is used. Thus the scenario (comparison) we are interested in would be the following:

- (4) a. future auxiliary + **tomorrow** + lexical verb + object
 vs. b. future auxiliary + **yesterday** + lexical verb + object

Of course, the use of *wczoraj* ‘yesterday’ violates the selectional restriction of the future auxiliary and such sentences are ungrammatical and judged as such by native speakers in

offline grammaticality judgement tasks. The important question is however whether the presence of ‘yesterday’ will affect the processing of the lexical verb and the following element in the sentence in any other significant way in addition to the violation caused by the mismatch between the future auxiliary and the past tense modifier. Will the comprehendor be misled by its presence and at least fleetingly consider it for the purpose of interpretation? Importantly, the presence of ‘yesterday’ should not have any misleading effect in the case of infinitival complements. This is because infinitives (on their own) are not used in past sentences and they are certainly not specified for past tense features, as indicated in (5)-(6).

(5a) ‘**tomorrow_imperfective_infinitive**’

Janek	będzie	<i>jutro</i>	<u>malować</u>	pokój	Zosi.
Janek	will	tomorrow	paint _{IPFV,INF}	room	(of) Zosia
	[FUTURE]	[FUTURE]	[]		

(5b) ‘**yesterday_imperfective_infinitive**’

* Janek	będzie	<i>wczoraj</i>	<u>malować</u>	pokój	Zosi.
Janek	will	yesterday	paint _{IPFV,INF}	room	(of) Zosia
	[FUTURE]	[PAST]	[]		

(6a) ‘**tomorrow_perfective_infinitive**’

* Janek	będzie	<i>jutro</i>	<u>pomalować</u>	pokój	Zosi.
Janek	will	tomorrow	paint _{PFV,INF}	room	(of) Zosia
	[FUTURE]	[FUTURE]	[]		

(6b) ‘**yesterday_perfective_infinitive**’

* Janek	będzie	<i>wczoraj</i>	<u>pomalować</u>	pokój	Zosi.
Janek	will	yesterday	paint _{PFV,INF}	room	(of) Zosia
	[FUTURE]	[PAST]	[]		

Predictions If matching TENSE specifications in different words of a sentence can cause grammatical illusions, similarly to what has been described for other grammatical illusion phenomena, then we may expect to find significant differences in the online processing of the two variants of compound future constructions in Polish. More precisely, two such differences are potentially expected. For one thing, illusory licensing effects could arise with participial complements but not the infinitival ones, and secondly, the interference from the incongruent adverbial ‘yesterday’ may be stronger for perfective participles than imperfective ones. Such grammatical illusions could be manifested in lower accuracy rates in grammaticality judgment task (behavioral data) and in reduced ERP amplitudes (attenuated or absent ERP effects).

Results and discussion The reported ERP experiment on the processing of compound (infinitival and participial) future constructions in Polish does not provide evidence for the hypothesis that matching TENSE specifications in different words of a sentence can cause grammatical illusions, unlike what has been described for other grammatical illusion phenomena. This conclusion is consistent with the claim found in the literature that the *l*-participle does not have the past tense specification (e.g., Dornisch 1997; Witkoś 1998; Błaszczak et al. 2014 contra Fisiak et al. 1978 and Tajsner 1997). The findings of the reported study in this paper are also consistent with the result of the ERP study by Bos et al. (2012), who examined violations of a past tense context (*zonet* ‘a moment ago’) with a noncongruent nonpast periphrastic verb form (e.g., *gaat malen* ‘will grind’) as compared to a congruent past periphrastic verb form (e.g., *heeft gemalen* ‘has ground’). Importantly, though both periphrastic verb forms contained a present tense auxiliary: *gaat* ‘will’ and *heeft* ‘has’ respectively, only in the former case (non-past [future] periphrastic verb form) a present tense auxiliary evoked a positivity in the past tense context. Based on this observation, Bos et al. (2012) argue that “[t]ense violation only cause a positivity if they lead to an incongruent time reference” (p. 296). In other words, Bos et al.’s (2012) observation is that what matters is not just the tense form of the auxiliary as such but rather “the time reference of the complete verb forms” (ibid., p. 283). If correct, in the context of the present ERP study, this could be taken to mean that the time reference of the complete periphrastic verb form was future and that the superficial morphological similarity of the participial complement of the future auxiliary to a past tense form on its own is not enough to cause any tense related grammatical illusions.