FUTURES IN POLISH AND SLOVENIAN FROM THE PERSPECTIVE OF A FORCE-DYNAMIC MODEL[1]

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1 The make-up of future forms in Polish and Slovenian

In Polish there are two ways of expressing future reference: by using a perfective form of a present tense verb, as presented in (1a), or by using a periphrastic future consisting of an auxiliary BE, which selects only an imperfective lexical verb in form of either an *l*-participle or an infinitive, as shown in (1b).

(1) a. zje   ⇨ simple future (*sf*)
         eat.prs.perf.3sg
         (≈ 'He/she will eat / will have eaten.')
     b. będzie   jadł   / jeść   ⇨ periphrastic future (*pf*)
         be.aux.3sg   eat.prt.impf.sg.m   / eat.inf.impf
         (≈ 'He/she will eat / will be eating.')

Imperfective aspect is obligatorily selected by the auxiliary BE in *pf* not only in Polish but also in, for example, Russian, Czech, and Slovak. It could be concluded that it is a general pattern. However, we find in Slovenian a periphrastic future in which the auxiliary BE is compatible both with an imperfective and a perfective *l*-participle, as shown in (2a) and (2b) respectively.

(2) a. bom   pisal
         be.aux.3sg   write.prt.impf.sg.m
     b. bom   napisal
         be.aux.3sg   write.prt.perf.sg.m

In Slovenian, there is no *sf*. The Polish simple future form would be expressed in Slovenian by means of a periphrastic future form with a perfective complement.

The facts about two future forms in Polish and Slovenian are summed up in Table 1:

Polish	Slovenian
simple future (*sf*) *lexical verb.prs.perf* periphrastic future (*pf*) *be.aux + lexical verb.prt.impf* *be.aux + lexical verb.inf.impf*	periphrastic future (*pf+perf*) *be.aux + lexical verb.prt.perf* periphrastic future (*pf+impf*) *be.aux + lexical verb.prt.impf*

Table 1 Future forms in Polish and Slovenian

The goal of this paper is twofold. Firstly, we intend to show that despite syntactic differences between future forms in Polish and Slovenian, there are some interesting semantic similarities between them. More specifically, *sf* in Polish is semantically equivalent to *pf+perf* in Slovenian and the Polish *pf* is semantically equivalent to the Slovenian *pf+impf*. Secondly, we show that apart from an aspectual contrast between *sf* and *pf* in Polish and between *pf+impf* and *pf+perf* in Slovenian there are other semantic differences between them. More specifically, we observe on the basis of a scenario-based online questionnaire that Polish *pf* and Slovenian *pf+impf* are strongly preferred in contexts which express pre-arranged, pre-planned future actions. We account for this observation in the framework of *force dynamics* proposed by Copley and Harley (2010, 2011).

2 Syntactic differences between Polish and Slovenian futures

2.1 Different syntactic structures of periphrastic futures in Polish and Slovenian – negation facts

Obviously *sf* in Polish is syntactically different from *pf+perf* in Slovenian as only the latter contains an auxiliary BE. What is more surprising, however, is that *pf* in Polish and *pf+impf* in Slovenian differ syntactically, despite their identical morphological make-up. The syntactic difference between *pf* in Polish and *pf+impf* Slovenian follows from negation facts. At the surface level, there is no difference between the position of negation in Polish and Slovenian *pf* as negation precedes both *bo* and *będzie*, as shown in (3). However, it is a standard assumption in Slavic linguistics that there is a difference in the syntactic position of negation in Polish and Slovenian (cf. Rivero 1991, Borsley and Rivero 1994). In Polish NegP is projected between TP and VP and in Slovenian it is projected above TP (cf. (4a) and (4b)).

(3)   a.   Jan   nie   będzie   pisał.   Polish
                Jan   NEG   be.aux write.prt.impf.sg.m
        b.   Janez   ne   bo   pisal.   Slovenian
                Janez   NEG   be.aux   write.prt.impf.sg.m
                'John will not write.' ('John will not be writing.')

(4)   a.   TP > NegP > VP   Polish
       b.   NegP > TP > VP   Slovenian

Given that the auxiliary BE in Polish and Slovenian follows negation linearly, it must be realised lower than NegP in syntax. This means that only the Slovenian BE auxiliary can be realised at the level of TP but the Polish auxiliary BE has to be realised below TP , i.e., in some kind of light *v*P-shell or "Aspect Phrase". Being a TP-related functional element, Slovenian BE does not have any influence on the selection of the aspectual form of its complement, i.e., the *l*-participle. Consequently, the verbal complement of BE in Slovenian can be both imperfective and perfective. In contrast, BE in Polish is a VP-related element ("lower auxiliary"). Given its low position it can directly select its verbal complement.

2.2 Different syntactic structure of periphrastic futures in Polish and Slovenian – diachronic facts

This syntactic difference between periphrastic futures in Polish and Slovenian can be additionally supported by diachronic facts. There is diachronic evidence that Polish *będzie* originates from the perfective present tense paradigm of the Old Church Slavonic (OCS) verb *byti* 'to be' (van Schooneveld 1951). In her discussion of the origins of the Slavic BE-future, Whaley (2000:23f.) points out that the nonpast perfective form of *byti* 'be(come)' was attested in copular constructions with predicative nouns and adjectives as well as with various participles. The nonpast perfective of *byti* plus the *l*-participle was also scarcely used as *futurum exactum* (future perfect). Importantly, there was no other grammaticalized future tense form in OCS.[2] One may argue that the currently used *pf* form with an auxiliary BE in Polish is a direct descendent of *futurum exactum*. Can this be true? Appealing as it may be, this hypothesis is problematic. Firstly, if this was the case, we would expect that the current *pf* form in Polish is not restricted to imperfective verbal complements, the more so since *futurum exactum* was more often attested with perfective than with imperfective *l*-participles. Secondly, the PF form with a participial complement was an innovative form, and it was the infinitival complement that was used in PF in earlier Polish texts. Were *futurum exactum* the source of the *pf* in Polish, the opposite should be the case. By contrast, the *pf* forms in Slovenian very likely originate from *futurum exactum,* because an auxiliary BE in these futures takes an *l*-participle and not an infinitive as a complement and more importantly, like in the case of *futurum exactum* the BE-auxiliary selects for both perfective and imperfective complements. To sum up, the BE-auxiliary *będzie* in Polish is a perfective form of the present tense verb BE, whereas the BE-auxiliary *bom* in Slovenian is a pure future tense marker.

2.3 Restriction for an imperfective complement in *pf* in Polish

The next question is why Polish *będzie* is compatible only with imperfective verbal complements. There are two possible diachronic explanations. One explanation proposed by Whaley (2000) is that the Common Slavic change-of-state verb **bǫbǫ* could have been reinterpreted as an inceptive verb, and as such it behaved like other phase verbs (e.g. 'begin'),

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[2] This does not mean that there were no ways of expressing future meaning. It is mentioned by Whaley (2000:23) that in future contexts the nonpast forms of several verbs (e.g., 'have', 'is (destined) to', 'want', 'begin') are attestested in combination with infinitives.

which also co-occur only with imperfective complements. Another explanation is that in North Slavic languages perfective nonpast denotes bounded future eventualities. One might speculate that at some point there was a need for a means for the expression of unbounded future eventualities. The periphrastic BE-future filled this gap. Actually both of these assumptions are in line with our syntactic assumptions. We assume that *będzie* occupies some kind of *v*P or AspP in syntax. From this position it can directly select its verbal complement. Additionally, our hypothesis is that unlike the Slovenian *bo*, the Polish *będzie* is not completely devoid of the lexical content. It denotes a state BE. This assumption is related to the observation that the copular *będzie* in Polish means 'will be'. In fact the combination of the BE-aux with a lexical complement *be* gives rise to ungrammaticality, as shown in (5 a and b).

(5)   a.   **będę*   *był*   be.aux.1.sg be.prt.sg.m
        b.   **będę*   *być*   be.aux.1.sg be.inf
                (intended: 'I will be')

Denoting a state, *będzie* is compatible only with [+durative] eventualities. BE in Polish selects for an imperfective complement because only imperfective aspect can morphologically realize the feature [+durative]. Our prediction is then that in Slovenian, *bo*, which is a purely functional tense head should be able to co-occur with the lexical complement *be* spelling out the lower "VP" part of the tree. This prediction is corroborated, as shown in (6).

(6)   *bom*   *bil*
        be.aux.1.sg be.prt.sg.m
        'I will be.'   *(due to Lanko Marušić, p.c.)*[3]

So far, it has been shown that future forms in Polish and in Slovenian differ syntactically but do they differ semantically? The next section focuses on the semantic differences between the *pf* and the *sf* in Polish and between *pf+impf* and *pf+perf* in Slovenian. Additionally, it is shown that the semantic contrasts between *pf+perf* and *pf+impf* in Slovenian have their mirror image in the opposition between the *pf* and the *sf* in Polish.

3 Semantic differences between Polish and Slovenian futures

3.1 Aspectual difference

The only generally known semantic difference between *pf+perf* and *pf+impf* in Slovenian and *sf* and *pf* in Polish is aspectual. *Pf+perf* in Slovenian and *sf* in Polish denote bounded eventualities compatible only with temporal frame adverbials, whereas *pf+impf* in Slovenian and *pf* in Polish denote unbounded eventualities compatible with duration adverbials (cf. (7) and (8)).

(7)   a.   Pismo bom   napisal   v 3 ure   / *3 ure.
                letter be.aux.1sg   write.prt.perf.sg.m   in 3 hours   / *3 hours

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[3] We would like to thank Frank Marušić for pointing out this data to us. According to him (p.c.), there might be some dialectal variation. Additionally to the western dialects (Lanko's included), *bom bil* is supposedly popular also among the kids.

b.	Napiszę	list		w trzy godziny / *trzy godziny.	
	write.prs.perf.1sg	letter		in 3 hours / *3 hours	
	'I'll write the letter in three hours.'				
(8) a.	Pismo bom		pisal	3 ure	/ *v 3 ure..
	letter be.aux.1sg		write.prt.impf.sg.m	3 hours	/ in 3 hours
b.	Będę		pisał list	3 godziny / *w 3 godziny.	
	be.prs.perf.1sg		write.prt.impf.sg.m	3 hours / *in 3 hours	
	'I'll be writing the letter for three hours.'				

(Slovenian examples are due to Lanko Marušić, p.c.)

A careful reader will wonder at this point, why *pf* in Polish has a durative meaning even though one of its components, namely the auxiliary BE is morphologically perfective. As pointed out in the previous section, *będzie* (BE) introduces a state. We would like to suggest that *będzie* does not introduce its own eventuality argument. The only eventuality argument in the whole periphrastic future form in Polish is introduced by a lexical complement. How is it possible that *będzie* introduces a state but it does not introduce an eventuality argument? In a neo-Davidsonian paradigm the assumption is that any verbal predicate (including states) has an underlying Davidsonian event argument. However, in this study we assume following Maienborn (2001) that there are two kinds of states. While verbs such as *sit, stand, sleep* refer to eventualities in the sense of Davidson, the states denoted by such stative verbs like *know, weigh,*and *own*, as well as any combination of a copular verb plus a predicate are *Kimian states*. Maienborn argues that Kimian states do not introduce a typical eventuality argument but rather they introduce a referential argument for a temporally bound property exemplification. *Będzie* in Polish introduces a Kimian state, hence perfective aspect does not have any access to an eventuality argument, and therefore it does not have any other semantic effect apart from the forward-shifting of the reference time. Since *będzie* denotes a state BE which is durative and since it can only be complemented with [+durative] eventualities, i.e., states and processes, the whole periphrastic future in Polish ends up being durative.

3.2 New semantic contrasts

Apart from the aspectual difference between *sf* and *pf* in Polish and *pf*+*perf* and *pf*+*impf* in Slovenian there are other less known semantic contrasts between them. It is true that it is impossible to make a clear-cut semantic distinction between *sf* and *pf* in Polish and *pf*+*perf* and *pf*+*impf* in Slovenian as they do not occur in complementary distribution. There are contexts in which both forms can be used. For example, both forms can express prediction, as shown for Polish in (9).

(9) a.	*Patrz*	*na*	*jego*	*twarz. Zaraz*	*się*	*rozpłacze*.	
	look.impf.2sg	at	his	face	soon	refl	burst-into-tears.prs.perf.3sg
	'Look at his face. He is going to/will burst into tears right now.'						
b.	*Patrz*	*na*	*jego*	*twarz. Zaraz będzie*		*płakał.*	
	look.impf.2sg	at	his	face	soon	be.aux.3sg	cry.prt.impf.sg.m
	'Look at his face. He is going to/will cry right now.'						

However, we show on the basis of the new evidence from an online scenario-based questionnaire that there are contexts in which there is a clear contrast/difference in meaning between the two future constructions.[4]

3.2.1 Warning contexts

The first difference in meaning between *sf* and *pf* in Polish and *pf+perf* and *pf+impf* in Slovenian can be observed in 'warning contexts' presented in (10) and (11). Examples in (10) (*sf* in Polish and *pf+perf* in Slovenian) are preferred in contexts of the type exemplified in Scenario 1, whereas examples in (10) are naturally used in contexts of the type presented in Scenario 2.

Scenario 1: We see a blind man walking towards a precipice. We see that he is just about to fall down. So we want to warn the man to prevent him from falling.

(10)	a.	Uwaga,	spadniesz!		Polish
		caution	fall-down.prs.perf.2sg		
	b.	Pazi,	padel	boš!	Slovenian
		caution	fall-down.prt.perf.sg.m	be.aux.2sg	
		'Be careful. (If not) you are going to fall down!'			

Scenario 2: You are a parachuting instructor. Your student is just about to jump. The jump has been prearranged and you only want to signal its beginning.

(11)	a.	Uwaga,	będziesz	spadał!	Polish
		caution	be.aux.2sg	fall-down.prt.impf.sg.m	
	b.	Pazi,	boš	padal!	Slovenian
		caution	be.aux.2sg	fall-down.prt.impf.sg.m	
		'Caution: you are about to begin falling down.'			

The future forms in (10), i.e. *sf* in Polish and *pf+perf* in Slovenian express a strong warning and they imply that the hearer can still do something to prevent the action of falling. In other words, the action of falling in (9) is not pre-arranged at the moment of speaking, as highlighted in Scenario 1. By contrast, the *pf* in Polish and *pf+impf* in Slovenian used in the warning context in (11) announce an action which is already settled at the moment of speaking, as it follows from Scenario 2.

3.2.2 Question contexts

The second semantic contrast between *sf* and *pf* in Polish and *pf+perf* and *pf+impf* in Slovenian can be observed in 'question contexts' presented in (12) and (13). Questions in (12) (*sf* in Polish and *pf+perf* in Slovenian) are preferred in Scenario 3, whereas questions in (13) (*pf+impf* in Polish and Slovenian) are preferred in Scenario 4.

Scenario 3: Your car has just broken down. You need help so you ask your older brothers who of them would agree to help you repair the car. It is not pre-determined whether any of them would

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[4] A Polish version of our scenario-based online questionnaire is available at www.ifa.uni.wroc.pl/questionnairePL and a Slovenian version is available at www.ifa.uni.wroc.pl/questionnaireSL.

agree to do this. So you actually ask two question: whether a future action is going to take place and who will perform it.

(12) a.   Kto   naprawi   mi   samochód?   Polish
           who   repair.prs.perf.3sg   me.dat car.acc
      b.   Kdo mi   bo   popravil   avto?   Slovenian
           who me.dat be.aux.3sg repair.prt.perf.sg.m   car.acc
           'Who will repair my car?'

Scenario 4: Your car has broken down. You take it to a car repair station. They agree to repair your car within a week. You are still curious which mechanic exactly will be repairing your car. In this context the future action is preplanned and you only want to know who will perform it.

(13) a.   Kto   będzie   mi   naprawiał   samochód?   Polish
           who   be.prs.perf.3sg me.dat   repair.prt.impf.sg.m car.acc
      b.   Kdo mi   bo   popravljal   avto?   Slovenian
           who me.dat be.aux.3sg repair.prt.impf.sg.m   car.acc
           'Who will be repairing my car?'

In Scenario 3, we actually ask two questions: who will perform a future action and whether the future action will take place at all. It is not certain at the moment of asking whether the action of repairing a car will take place in the future or not. In contrast, in Scenario 4, we ask only one question: who will perform a future action. It is certain that someone will be repairing my car but it is still unknown who it will be.

3.2.3 Offering contexts

The third difference in meaning between Polish *sf* and Slovenian *pf+perf,* on the one hand, and *pf+impf* in Polish and Slovenian, on the other hand, can be observed in 'offering contexts' (see Copley 2002, 2009). Only the former can be used in these contexts under an episodic interpretation, as shown in (14 a and b) for Polish and (14 a' and b') for Slovenian.

(14) a.   Jeśli   chcesz,   nasza firma   naprawi   ci   samochód.
           if   want.prs.2sg   our   company   repair.prs.perf.3sg you.dat   car.acc
      a'. Če želiš,   ti   bo   naše podjetje popravilo   avto.
           If want.prs.2sg you.dat   be.aux.3sg   our company repair.prt.perf.sg.n car.acc
           'If you want, our company will repair your car.'
      b.   #Jeśli   chcesz,   nasza firma   będzie   ci   naprawiać
           if   want.prs.2sg   our company   be.prs.perf.3sg you.dat   repair.inf.impf
           samochód.
           car.acc
      b'. #Če želiš,   ti   bo   naše podjetje popravljalo   avto.
           If want.prs.2sg you.dat   be.aux.3sg   our company repair.prt.impf.sg.n car.acc
           'If you want, our company will repair your car.'[5]

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[5] This use of *pf* in Polish and *pf+impf* in Slovenian is implausible under an episodic reading but okay under a habitual reading.

As observed by Copley (2002, 2009), when we make an offer, our addressee should have a possibility of either accepting or rejecting it. This implies that we cannot offer future actions which are already settled at the moment of speaking. Why do *pf+impf* forms in Polish and Slovenian seem to conflict with offering contexts? These forms imply that the action being offered is already pre-arranged at the moment of speaking. This means that the hearer, to whom the offer is made, does not have a chance to decide whether he or she wants the offer to be realized in the future, as it is the case in (14 a and a') but not in (14 b and b').

3.2.4 Idiomatic 'I cannot believe' (= 'I am amazed') contexts

The fourth contrast in the meaning of *sf* in Polish and *pf+perf* in Slovenian, on the one hand, and *pf+impf* in Polish and Slovenian, on the other hand, arises in idiomatic 'I cannot believe that' contexts (see Copley 2002, 2009). Apart from its literal meaning, 'I cannot believe that' has an idiomatic reading 'I am amazed that'. The idiomatic meaning of 'I cannot believe that' is available in the context presented in Scenario 5.

Scenario 5: Your boss has just asked your colleague John to organize a conference for 200 people. You think this decision is wrong because John is unexperienced and badly-organized. After coming back home you express your amazement to your wife: (see (15) as a possible and (16) as an impossible continuation of this context).

(15)   a.   Ciągle nie mogę   uwierzyć, że Janek będzie   wykonywał
               still   not can.1sg believe   that John   be.aux.3sg fulfil.prt.impf.sg.m
               tak odpowiedzialne   zadanie.
               so   responsible   task
       b.   Ne morem verjeti, da   bo   Janek opravljal
               not can.1sg believe that be.aux.3sg John   fulfil.prt.impf.sg.m
               tako odgovorno nalogo.
               so   responsible task
               'I cannot believe that John will be performing such a responsible task.'
               = 'I am amazed that John will be performing such a responsible task.'
(16)   a.   #Nie chce   mi   się   wierzyć,
               not   wants me.dat refl   believe.inf
               że   Janek wykona   tak   odpowiedzialne   zadanie.
               that   John fulfil.prs.perf.3sg   so   responsible   task
       b.   #Ne morem verjeti, da bo   Janek opravil
               not can.1sg believe that be.aux.3sg John   fulfil.prt.impf.sg.m
               tako odgovorno   nalogo.
               so   responsible task
               'I cannot believe that John will fulfill/perform such a responsible task.'
               (#'I am amazed that John will fulfill/perform such a responsible task.')

Why can only *pf+impf* future forms in Polish and Slovenian be used in Scenario 5 to express amazement, as presented in the contrast between (15) and (16)? This happens so because one can only be amazed by something which is already presupposed to be true and only *pf+impf* future forms in Polish and Slovenian imply that a future action is settled at the moment of speaking.

3.2.5 Preliminary conclusions

So far we have seen that *sf* forms in Polish and *pf+perf* forms in Slovenian are strongly preferred in the following contexts: (i) warning as caution, (ii) offering context, (iii) question: 'whether' = undetermined, 'who' = undetermined. In contrast, the PF form in Polish is strongly preferred in the following contexts: (iv) warning as an announcement, (v) idiomatic 'I can't believe' (= 'I am amazed'), (vi) question: 'whether' = determined, 'who' = undetermined. All these observations lead to a conclusion that only the *pf+impf* form in Polish and Slovenian is preferably used to express future actions which are settled at the moment of speaking. Two questions arise at this point. Why are Polish *sf* forms and Slovenian *pf+perf* forms more compatible with contexts in which future actions are not pre-arranged and why are Polish *pf* forms and Slovenian *pf+impf* forms compatible with contexts in which future actions are settled at the moment of speaking? This question will be handled in the framework of *force dynamics* recently proposed by Copley and Harley (2010, 2011).

4 Two futures in Polish and Slovenian from the perspective of a force-dynamic model

Copley and Harley (2010, 2011) replace events by means of *forces*, where a force is treated as a transition from an initial situation to a situation that results *ceteris paribus (all else being equal)*. Situations are understood as spatiotemporal arrangements of individuals along with their properties. Copley and Harley claim that introducing *forces* makes it possible to create simpler accounts of a number of linguistic phenomena. For example, they point out that in an event-chaining approach it is not possible to account for the fact that the causation relationship between a causing sub-event e_1 and a caused sub-event e_2 might fail to occur. In some languages, e.g., in (some) Salish languages it is possible to express morphologically whether a causing sub-event e_1 implies or entails the successful completion of the caused sub-event e_2 in the case of verbal predicates denoting accomplishments. Unlike in an event-chaining framework, in a force-dynamic semantics, forces interact with each other in predictable ways. The same force applied to the same object may produce a different or no result, depending on what other forces are active in the situation. In other words, if you have an initial situation and a force is applied, and no stronger force intervenes, the final situation results. How can *forces* help us understand subtle differences in the meaning and use of two future forms in Polish and Slovenian? Copley and Harley (2011) represent the relation between the present and the future by means of causal chains of situations with net forces envisaged in Diagram 1.
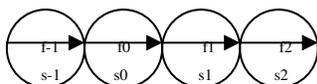

Diagram 1: A causal chain of situations with net forces

4.1 Aspect in a force-dynamic model

What is essential for us in our account of semantic differences between future forms in Polish and Slovenian is how a force-dynamic model handles a distinction between states and events. In a force-dynamic model, events involve a force reflecting an input of energy into a situation, while states are simply true of a situation. How does a force-dynamic model formalise grammatical aspect? According to Copley and Harley (2010, 2011), aspect maps from predicates

of forces to predicates of situations. This corresponds to the common assumption that aspect maps from event predicates to temporal predicates. Imperfective aspect takes a predicate of forces (π, the denotation of the *v*P) and a topic situation s_0 provided by tense and says that the property π holds of the net force of this topic situation, as shown in (17).

(17) $[[\text{imperfective}]] = \lambda\pi\lambda s_0.\pi(\text{net}(s_0))$

In the case of imperfective predicates, a force with a property π is the net force in the topic situation s_0, and if all else is equal and nothing external interferes, s_1 will result, as shown in the causal chain of situations with net forces in Diagram 2.
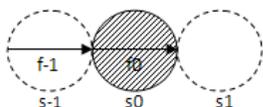
Diagram 2: A causal chain of situations for the *imperfective aspect*

In Diagram 2, shading indicates the situation whose net force has the property π, namely s_0, the topic situation. A broken line indicates situations which are not part of the denotation of the imperfective. On the other hand, perfective aspect takes a predicate of forces (π, the denotation of the *v*P) and a topic situation s_0 provided by tense and says that the predicate of forces π is the net force of s_{-1}, as shown in (18).

(18) $[[\text{perfective}]] = \lambda\pi\lambda s_0.\pi(\text{net}(s_{-1}))$

In (18) s_{-1} is a situation in the causal chain preceding s_0. Perfective aspect signals that the result situation of some force holds as of the topic situation provided by tense. That is, π is true of the force that caused s_0, the topic situation, as envisaged in Diagram 3.
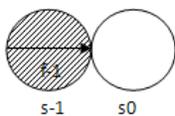
Diagram 3: A causal chain of situations for the *perfective aspect*

In Diagram 3, shading indicates the situation whose net force has the property π, namely s_{-1}, the predecessor of the topic situation s_0. Using these formal definitions of imperfective and perfective aspect, we intend to show that tense and aspect morphemes in *sf* in Polish and *pf+perf* in Slovenian interact compositionally to form longer causal chains of situations than it is the case for *pf* in Polish and *pf+impf* in Slovenian. The longer the causal chain of situations is, the more opportunities there are for possible changes or interventions, or more formally, for other net forces to be formed. This in turn implies that the longer the causal chain is, the less certain the future outcome is. Since *sf* in Polish and *pf+perf* in Slovenian are preferable in 'warning as caution' and 'offering' contexts, i.e., in non-prearranged future contexts allowing for changes or interventions, we expect that the causal chain in these contexts is longer than in *pf* in Polish and *pf+impf* in Slovenian, which are preferable in 'warning as an announcement' and idiomatic 'I can't believe' contexts, i.e., in pre-arranged/pre-planned or settled future contexts allowing for

almost no changes or interventions. Two questions arise at this point: (i) How does the length of the causal chain of situations follow from the semantics of the respective future forms in Polish and Slovenian?; (ii) How to account for the fact that there is the following semantic correspondence between the Polish and Slovenian future forms in spite of the fact that these forms are not identical: *sf* (Pol.) ≈ *pf+perf* (Slov.) and *pf* (Pol.) ≈ *pf+impf* (Slov.)? As mentioned in Sections 1 and 2, *sf* in Polish is a present tense form of a perfective lexical verb, while the future auxiliary *będzie* in Polish is a perfective form of the present tense verb BE. On the other hand, in Slovenian, there is no *sf* and the BE-auxiliary *bom* in Slovenian *pf+perf* and *pf+impf* forms is a pure future tense marker. Additionally, the future auxiliary *będzie* in Polish obligatorily selects for an imperfective complement, whereas its counterpart *bo* in Slovenian can select for both perfective and imperfective complements. How can these facts be translated into the language of force-dynamics? Let us first focus on how causal chains of situations are formed in Polish *sf* and Slovenian *be+perf*.

4.2　Causal chains of situations in *sf* in Polish and *pf+perf* in Slovenian

Since the auxiliary *bo* in the Slovenian *be+perf* is a TP-related auxiliary, its function is to temporally locate the topic situation right after the speech time. Its complement is an *l*-participle, which is marked as perfective. Perfective aspect takes a predicate of forces π (the denotation of the *v*P) and a topic situation s_0 provided by tense and says that the predicate of forces π is the net force of s_{-1}, where s_{-1} is a situation in the causal chain preceding s_0. This results in a causal chain of situations presented in Diagram 4.

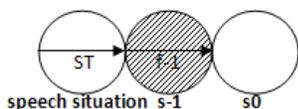

Diagram 4: A causal chain of situations for *be+perf* in Slovenian

In the causal chain of situations in Diagram 4, the topic situation s_0: (i) is provided by tense; (ii) is the situation the speaker is talking about; (iii) is the result situation of s_{-1}. The shading indicates the situation whose net force has the property π, namely s_{-1}, the predecessor of the topic situation s_0. The same causal chain of situations is obtained in *sf* in Polish. The *sf* in Polish is a combination of present tense and perfective aspect. According to Copley and Harley (2011), perfective aspect signals that the result situation of some force holds as of the topic situation provided by tense. However, what we have in Polish is present tense, i.e., the topic situation should be true of the situation surrounding the speech time ST ⊆ s_0, contrary to fact. Obviously, the situation you are talking about (i.e., the topic situation) in *sf* in Polish lies in the future. How to account for the fact that the combination of perfective aspect with present tense gives rise to a future time reference? There exists evidence that the combination of present tense and perfective aspect is sufficient to trigger future time reference, as shown in (19).

(19)　a.　*Muszę　　　myć　　　　tę klatkę schodową　　za karę.*
　　　　　　must.1sg　　clean.impf　this staircase.acc　　as punishment
　　　　　　'I have to clean this staircase as a punishment.'
　　　b.　*Muszę　　　umyć　　　tę klatkę schodową　　za karę.*
　　　　　　must.1sg　　clean.perf　this staircase.acc　　as punishment
　　　　　　'I have to clean this staircase as a punishment.'

The only formal difference between (19a) and (19b) is the aspectual form of an infinitival complement of a present tense modal verb. This difference results in a semantic contrast. (19a) means by default (when no adverbial modifiers are used) that the speaker is cleaning a staircase at the moment of speaking because it is his or her obligation. On the other hand, (19b) means that the speaker will clean a staircase after the moment of speaking because he or she has such an obligation at the moment of speaking. This points to a conclusion that perfective aspect has the function of forward-shifting of the reference time (see Condoravdi 2001). More formally speaking, we assume, following Borik (2002), that the meaning of perfective aspect is that there cannot be any overlapping between the speech time (ST) and reference time (RT) (where RT corresponds to our topic situation), i.e., $ST \cap RT = \varnothing$. In order to fulfill this condition, RT has either to precede or to follow the ST, i.e. there are two options: (i) RT > ST and (ii) ST > RT. The first option (i) RT > ST is excluded for the simple reason that Polish future forms combine present tense (and not past tense) and perfective aspect. So the only option available is (ii) ST > RT. Hence the topic situation follows the speech time, i.e., $ST > s_0$ (where $RT = s_0$). Perfective aspect takes a predicate of forces π (the denotation of the vP) and a topic situation s_0 in this case provided by the combination of present tense and perfective aspect and says that the predicate of forces π is the net force of s_{-1} , where s_{-1} is a situation in the causal chain preceding s_0. This results in a causal chain of situations presented in Diagram 5, which is directly equivalent to Diagram 4.

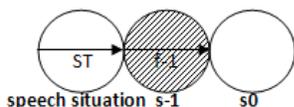

Diagram 5: A causal chain of situations for *sf* in Polish

In Diagram 5 the topic situation s_0: (i) is provided by perfective aspect; (ii) is the situation the speaker is talking about; (iii) is the result situation of s_{-1}. The shading indicates the situation whose net force has the property π, namely s_{-1}, the predecessor of the topic situation s_0. To sum up, in *sf* in Polish and in *pf+perf*, the situation whose net force has the property π is s_{-1}, i.e., the situation in the causal chain immediately preceding s_0, the topic situation. In other words, the causal chain of situations is long enough ($s_{-1} + s_0$) to create opportunities for other forces to creep in. This explains why these forms are preferred in contexts, which require that there is an option of changing or preventing the future outcome.

4.3 Causal chains of situations in *pf* in Polish and *pf+impf* in Slovenian

In Section 3, we observed that both *be+impf* in Slovenian and *pf* in Polish can be used to express pre-arranged events. Hence, we expect that these future forms have shorter causal chains of situations, in which it is less likely that other net forces will be formed thus preventing the future outcome. How is a causal chain of situations obtained compositionally in *be+impf* in Slovenian and *pf* in Polish? Let us first focus on *be+impf* in Slovenian. As in the case of *be+perf*, the temporal auxiliary *bo* in Slovenian situates the topic situation right after the speech time, i.e., $ST \geq s_0$. The *l*-participle is marked as imperfective. Imperfective aspect says that the denotation of the vP (π) holds of the net force of s_0 (i.e., the topic situation provided by tense). This results in a causal chain of situations presented in Diagram 6.
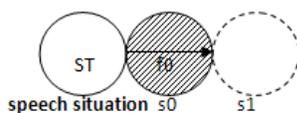
Diagram 6: A causal chain of situations for *pf+impf* in Polish

In Diagram 6 the topic situation s_0: (i) is provided by tense; (ii) is the situation the speaker is talking about. The shading indicates the situation whose net force has the property π, namely s_0, the topic situation. If nothing external interferes s_1 will result but essentially s_1 is not a necessary outcome of s_0. A similar situation arises in the Polish *pf* form despite its different syntactic make-up. Recall that *pf* in Polish is a combination of *będzie* + an imperfective complement. We saw evidence showing that morphologically and diachronically, *będzie* is a perfective present tense form of BE (van Schooneveld 1951). Unlike the Slovenian *bo*, the Polish *będzie* is not completely devoid of the lexical content, as it denotes a state BE, more precisely, a Kimian state. That is, it does not have an event argument, hence the perfective aspect cannot operate on it. Additionally, *będzie* can only combine with an imperfective form of an *l*-participle. The combination of present tense and perfective aspect in *będzie* temporally locates the topic situation (s_0) after the speech situation, i.e., $ST > s_0$ (see Section 4.2 for the motivation). The state BE introduced by *będzie* predicates over the topic situation (s_0). The lexical complement of *będzie* is marked as imperfective. Imperfective aspect says that the denotation of the *v*P, i.e., π, holds of the net force of the topic situation (s_0). This means that the combination of a state BE introduced by *będzie* and the denotation of the imperfective *v*P (π) hold of the topic situation (s_0). This results in the causal chain of situation presented in Diagram 7:
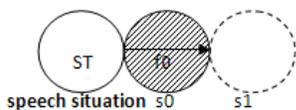

Diagram 7: A causal chain of situations for *pf* in Polish

In Diagram 7 the state introduced by *będzie* + *v*P hold of the topic situation (s_0). The topic situation s_0: (i) is provided by perfective aspect; (ii) is the situation the speaker is talking about; (iii) is the situation of which the state BE and the property π denoted by *v*P hold. In *pf* in Polish and *pf+impf* in Slovenian, the situation whose net force has the property π is s_0 (the topic situation), and not s_{-1}. The causal chain of situations for *pf* in Polish and *pf+impf* in Slovenian is not long enough to create opportunities for other forces to creep in. This fact explains why these forms are preferably used for pre-planned/pre-arranged/settled future eventualities. Whenever a speaker wants to express a pre-planned/pre-arranged future eventuality, he or she will choose a form which more faithfully expresses his or her desire for this future eventuality to be realized. As there is no intermediate situation (s_{-1}) in the denotation of *pf* in Polish and *pf+impf* in Slovenian, the topic situation will (normally) immediately follow the speech situation and thus be a natural continuation of pre-arrangements or plans.

5   Conclusions

Despite syntactic differences between future forms in Polish and Slovenian, we observe the following semantic equivalence between them: (i) Slov. BE-aux+*l*-participle.**impf** ≈ Pol. **PF** and (ii) Slov. BE-aux+*l*-participle.**perf** ≈ Pol. **SF**. *Pf* in Polish and *pf+impf* in Slovenian form compositionally shorter causal chains of situations. In the denotation of these forms there is no intermediate situation (s$_{-1}$) between the speech situation and the topic situation. Hence *pf* in Polish and *pf+impf* are more compatible with the contexts in which the future event is already settled/determined at the moment of speaking. *Sf* in Polish and *pf+perf* in Slovenian form compositionally longer causal chain of situations, as in the denotation of these forms there is an intermediate situation (s$_{-1}$) between the speech situation and the topic situation. Hence *sf* in Polish and *pf+perf* in Slovenian are more compatible with contexts in which future eventualities are not the realisations of pre-arrangements or plans, which require that there should be opportunities for changes or interventions. We would like to emphasize that the existence of a PLAN is not presupposed by *pf* in Polish and *pf+impf* in Slovenian. A PLAN is not part of the semantics of these forms. What we want to say is that the semantics of these forms makes them more compatible in contexts expressing pre-planned future eventualities.

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