FUTURE VS. PRESENT IN RUSSIAN AND ENGLISH ADJUNCT CLAUSES

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ABSTRACT

In this work, we treat the interpretation of tense in adjunct clauses in English and Russian (relative clauses, *before/after/when*-clauses) with a future matrix verb. The main findings of our paper are the following:

1. English has a simultaneous reading in Present adjuncts embedded under *will*. Russian Present adjuncts under *budet* or the synthetic perfective future can only have a deictic interpretation. This follows from our SOT parameter.

2. The syntax of Russian temporal adjunct clauses (*do/posle togo kak*…) shows overt parts that had to be stipulated for English as covert in earlier papers. We present a neat and straightforward analysis of Russian temporal adjuncts. Contrary to Russian, English has Present under Future in *before*-clauses. It would be nice to relate this feature to the SOT parameter, but the construction seems to be an idiosyncrasy in the domain of subordinate tense.

1. ADJUNCT TENSE: THE DATA

The problem, which to our knowledge has not been properly addressed in the literature, is illustrated in the example below from the RuN parallel corpus:

(1R) Ja eto skažu[PF,FUT] emu, kogda on priedet[PF,FUT]. [Tolstoj, "Anna Karenina" – The RuN corpus]

(1E) I'll tell him that when he comes.

(1N) Jeg skal si det til ham når han kommer.

Examples like in (1) with a superordinate (matrix) verb in the future abound and raise the following question: Why does Russian use a future (here: perfective future) in the temporal clause while Germanic languages like English and Norwegian use the present in the subordinate (adjunct) tense? We will refer to the two configurations as a "future under future (Fut\Fut)" (Russian) and a "present under future (Pres\Fut)" (English). Besides the theoretical issues related to a general theory of subordinate tense which will be addressed in this article, these data also pose interesting problems for second language learning.[1]

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[1] Although we cannot back up this claim with a systematic study of L2, our experience with Russians learning Germanic languages tells us that they often make the following mistake under influence of their native language:

(1E') ?? I'll tell him that when he'll come / ?? I will tell him that when he will come.

(1N') ?? Jeg skal/vil si det til ham når han skal/vil komme.

A search on the web shows that the correct form is indeed the one found in the corpus, i.e., (1E/N), "I'll tell him when he comes" [372 hits (yahoo, November 2010)], while the alternative "I'll tell him when he'll come" is not attested [0 hits (yahoo, November 2010)].

We consider two different types of adjunct clauses: (i) Tense in relative clauses; (ii) tense in adverbial clauses, notably *before/after/when*-clauses. In both cases, the contrast between English and Russian is most transparent in constructions with a future matrix.

1.1. Tense in Relative Clauses

With a Past tense matrix verb, English and Russian relative clauses mostly behave in a similar way (Kondrashova, 1998):

(2) a. Mary talked to a boy who is crying. (morphology:Pres\Past)
deictic√, simultaneous*

b. Маша встретила^{PF,PAST} мальчика, который плачет^{IMPF,PRES}. (morphology: Pres\Past)
deictic√, simultaneous*

c. Mary talked to a boy who was crying. (morphology: Past\Past)
deictic√, simultaneous√

d. Маша встретила ^{PF,PAST} мальчика, который плакал^{IMPF,PAST}. (morphology: Past\Past)
deictic√, simultaneous√

The tense in the relative clause is *independent* of the matrix, hence we cannot have a relative present (i.e., simultaneous) interpretation in (2a) or (2b). A similar reasoning holds in principle also for (2c) and (2d), but the context can, of course, provide a simultaneous interpretation for two *independent* past tenses, hence it is possible in (2c/d) that the past crying event temporally overlaps with the past talking/meeting event.

Ogihara observed that things change with a future matrix *will* in English. His famous although quite artificial example is given in (3a).[2] For the Russian counterpart in

[2] In our Russian version of Ogihara's example, we have added the locative adverb "in the aquarium of Bergen" to enforce an episodic interpretation.

(3b), contrary to English, we only get a deictic interpretation, similar to the examples above with a past matrix.

(3) a. Mary will buy a fish that is alive. (Ogihara, 1989)
deictic or simultaneous
b. Masha kupit^{PF,FUT} rybu, kotoraja živet^{IMPF,PRES} v Bergenskom akvariume.
only deictic

Our experience tells us that the reader might not like the examples in (3a/b). Therefore we provide some authentic examples from parallel corpora below which illustrate the same point. While a "present under future" as in (3a) is ambiguous in English, the same tense configuration must unambiguously be deictic in Russian, as for instance in (4R) – *которая лежит за Южным хребтом*.

(4E) And you and your children and grandchildren shall be blessed, and some will be Kings of Narnia, and others will be Kings of Archenland which lies yonder over the Southern Mountains. [Lewis, "The Chronicles of Narnia. The Magician's Nephew" – Russian National Corpus]
(4R) И будут благословенны и вы, и ваши дети, и ваши внуки; одни будут королями Нарнии, другие — королями Архенландии, которая лежит за Южным хребтом.

When a "present under future" has a simultaneous, i.e., shifted, interpretation in English, the Russian translation uses a "future under future", as illustrated in (5R) with a *budet-future* in the relative clause. Consider also (6R) which has a perfective future in the subordinate:

(5E) He [God] will punish horribly anybody who torments a bum who has no connections! [Vonnegut, "Slaughterhouse-Five Or The Children's Crusade" – Russian National Corpus]
(5R) Он [Бог] покарает^{PF,FUT} страшной карой каждого, кто будет^{IMPF} мучить^{IMPF,INF}

любого бродягу без роду и племени!

(6R) Sultan ne ostavit^{FUT,PF} beznakazanno to udovol'stvie, kotorym poteshatsja^{FUT,PF} molodcy. (Gogol', "Taras Bul'ba" – Russian National Corpus)

(6E) The Sultan will not permit that which delights our young men to go unpunished.

Russian thus expresses simultaneity in the future with a "future under future" construction. A future tense embedded under a future matrix is also used in Russian with a forward shifted interpretation. Here, "future under future" is typically also found in English:

(7E) "In that case," replied Glinda, "I shall merely ask you to drink a powerful draught which will cause you to forget all the magic you have ever learned". [Baum, "The Marvelous Land of Oz" – Russian National Corpus]

(7R) — Тогда,—ответила Глинда,—я всего лишь попрошу ^{PF,FUT} тебя выпить^{PF,INF} волшебный напиток, от которого ты забудешь^{PF,FUT} все свое колдовство.

So we conclude that a "present under future" is ambiguous in English between a deictic and simultaneous interpretation, while a "future under future" is ambiguous in Russian between a simultaneous and forward shifted interpretation, as summarised in table 1.

Interpretation of relative clause	English		Russian	
	MT	ST	MT	ST
simultaneous	fut	pres	fut	fut
forward shifted	fut	fut	fut	fut
deictic	fut	Pres	fut	pres

Table 1: Correlation between matrix tense (MT) and subordinate tense (MT) in Russian and English future tense contexts.

1.2. Tense in Temporal Adverbial Clauses

Again, the most interesting data come from future constructions. The data are quite parallel to what we observed above for relative clauses. In Russian, the temporal adjunct typically has the same tense as that in the main clause, while English has a shifted relative present. We start with some examples of *before*-clauses, which in virtue of the meaning of "before" encodes the relation MT < ST.

(8E) But I will kill you dead before this day ends. [Hemingway, "The Old Man and the Sea" – RuN-Euro corpus]
(8R) Но я убью^{PF,FUT} тебя прежде, чем настанет^{PF,FUT} вечер.

(9E) Yes, sir, I will send them off at once: the boy will be down there before you are, sir! [Jerome, "Three Men in a Boat (To Say Nothing Of The Dog)" – Russian National Corpus]
(9R) Да, сэр, я отправлю их сию минуту; мальчик принесет^{PF,FUT} их вам раньше, чем вы вернетесь^{PF,FUT}, сэр.

(10E) What you touch at present you may have; but my soul will be on that hill-top before you lay hands on me again. [Bronte, "Wuthering Heights" – Russian National Corpus]
(10R) То, что ты держишь сейчас, останется твоим, но душа моя будет^{FUT} там, на вершине холма, прежде чем ты еще раз притронешься^{PF,FUT} ко мне.

In English, the temporal relation of the subordinate event/state preceding the matrix can, optionally, be further encoded by a perfect in the future matrix:

(11E) Miraz will have finished with Caspian before we get there at that rate. [Lewis, "The Chronicles of Narnia. Prince Caspian" – Russian National Corpus]
(11R) Мираз наверняка покончит^{PF,FUT} с Каспианом раньше, чем мы туда доберемся^{PF,FUT}.

After-clauses, which express the opposite relation, i.e. ST < MT, typically have a present perfect in the subordinate adjunct under a matrix future:

(12E) This note, my dear Mary, is entirely for you, and will be given you shortly after I am gone. [Dahl, "Kiss Kiss" – RuN-Euro corpus]
(12R) Это послание, моя дорогая Мэри, предназначено только для тебя, и оно будет^{FUT} вручено тебе вскоре после того, как меня не станет^{PF,FUT}.

(13E) Assure him that the documents will be treated with utmost care, and will be returned after we have completely examined them for authenticity and studied their content. [Miller, Jr. "A Canticle For Leibowitz" – Russian National Corpus]
(13R) Заверьте его, что с документами будут обращаться очень бережно, что их вернут^{PF,FUT} сразу же, как только мы установим^{PF,FUT} их подлинность и изучим^{PF,FUT} содержание.

The general patterns observed above for Russian and English temporal clauses also hold for *when*-clauses, viz. "present under future" in English and "future under future" in Russian (cf. also (1) above).

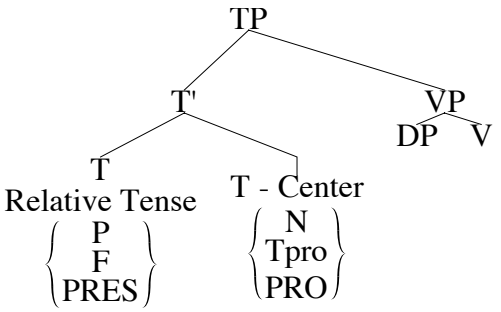
(14E) He sent that note, I bet the Ministry of Magic will get a real shock when Dumbledore turns up. [Rowling, "Harry Potter and the Sorcerer's Stone" – Russian National Corpus]
(14R) Это он послал записку, я уверен; в министерстве магии очень удивятся^{PF,FUT}, когда увидят^{PF,FUT} Думбльдора.

2. TENSE THEORY

Our tense theory is laid out in Grønn & von Stechow (2010, to appear). Each finite sentence has a tense projection TP. The head T' is split into two parts: (a) a relative semantic tense like P(ast), F(uture) and PRES(ent) and (b) a pronominal semantic tense, the *temporal centre* of the clause, which may be N ("now"), denoting the speech time,

Tpro (an anaphoric pronoun bound be a higher tense) or PRO (a zero tense). For the purposes of this paper, the relative tenses have the standard indefinite "Priorian" meanings, i.e. Past means "there is a time before the centre time", Future means "there is a time after the centre time" and PRES means "there is a time identical to the centre time".

(15) Temporal Structure



If we compare this view to Partee's slogan that tenses are pronouns (Partee, 1973), there is a difference: Tenses are not simply pronominal but relations between two times of which only one – the T-centre – is intuitively a pronoun. The other time is here an indefinite article.

The T-centre is the same in the languages we have studied. The distribution of the pronominal tenses is free, but limitations follow from the syntactic environment. All the semantic tenses under T' are covert. Their presence is made visible by features: the semantic tenses P and F have the features [iP], [iF], respectively. PRES and N have the feature [iN]. Features are passed to a verb under semantic binding in the form [uP], [uF] and [uN]. There they have to agree with the inherent morphological feature of the verb.

(16) $[P\ N]_i$ Masha spala(t_i)/*spit

uP uN

iP----------uP

The semantic Past binds the temporal variable of *spala*, transmits its feature uP, which agrees with the inherent feature of the verb. If we had the present form *spit*, we would have a feature conflict with the semantic tense P.

3. INTRODUCTION TO SOT

The deeper explanation for why tense in English adjuncts behaves differently with future matrix verbs than with past matrix verbs is related to the fact that *will* in English (and *budet* in Russian) are *verbal (temporal) quantifiers*. This fact brings us to the theory of sequence of tense (SOT). In Grønn & von Stechow (2010), we proposed the SOT-parameter to account for the different distribution of tenses in subordinate sentences in SOT versus non-SOT languages.

The SOT-parameter

> A language L is an SOT-language if and only if the verbal quantifiers of L transmit temporal features.

Both temporal auxiliaries like *will/budet* and verbs of attitude like *believed/(po)dumal*, *said/skazal* shift the reference time. They are verbal (temporal) quantifiers. Here is an illustration from complement tense:

(17R) Он сказал, что живет под Москвой. [Pelevin, "Pokolenie P" – RuN-Euro Corpus]

(17E) He said he was living just outside Moscow.

(17N) Han fortalte at han bodde utenfor Moskva.

The differences in subordinate tense in (17) follow from the SOT-parameter. The English attitude verb *said* is a verbal quantifier and transmits its past feature to the embedded ∅-tense[3], because English is an SOT-language. The ∅-tense binds the temporal variable of the embedded verb *was* and determines its morphology. Since the embedded sentence is tenseless, we have simultaneity.

[3] See (Grønn & von Stechow, 2010) for an analysis of this construction, including the notion of zero tense.

Fig.1 a. PAST He said ∅-tense he was living outside Moscow (English)
|_____|_____|_____| (non-local agreement)
b. PAST On skazal chto ∅-tense PRES živet pod Moskvoj (Russian)
|_____| |_____|_____| (local agreement)

Figure 1: Feature transmission and binding in complement tense

In a non-SOT language like Russian, the verbal quantifier *skazal* does not transmit its Past feature to the complement. To express the simultaneous interpretation, Russian needs a semantically inert relative PRESENT, which binds the temporal variable of *živet* and licenses its morphology. While the analysis with relative PRESENT is standard in the literature, the feature transmission mechanism and its blocking by the SOT-parameter is our innovation.

In this paper, we will show that the SOT-parameter applies also to adjunct tense, notably relative clauses and temporal adjuncts under the verbal (temporal) quantifiers *will/budet*.

4. ANALYSIS: TENSE IN RELATIVE CLAUSES

What is the T-centre in relative clauses? Since a relative clause restricts a noun, PRO is not a candidate. The centre can be N ("now") or a temporal pronoun Tpro. We stipulate that Tpro is free in its sentence but obligatorily bound by some higher tense. The idea that the centre of a relative may be an anaphoric pronoun is implicit in (Kusumoto, 1999). The present formulation is due to Irene Heim (p.c).

4.1. English relatives

Recall that there are two interpretations of Ogihara's sentence in (3a), repeated below as (18), viz. the dependent, simultaneous interpretation, and the independent, deictic interpretation. While the semantics is different, the feature transmission is the same. The two readings are analysed in (19) and (20), respectively.[4]

(18) N Mary will buy a fish that is alive. (Ogihara, 1989)

iN uN uN

|_____|_____|

a. Subordinate tense = matrix tense (simultaneous)

b. Subordinate tense = speech time (deictic)

(19) Simultaneous interpretation of (18)

N λ_1 **will**(t_1) λ_2 **M. buy**(t_2) **a fish** WH_3 $Tpro_2$ λ_4 **is**(t_4) λ_5 x_3 **alive**(t_5)

iN uN uN uN uN

= ($\exists t > s^*$)($\exists x$)[fish(x) & <u>alive(x,t)</u> & buy(Mary,x,t)]

(there is a future time t, such that Mary at t buys a fish which is alive at t)

[4] Due to limitations of space, we must refer the reader to our other papers on subordinate tense for an introduction to the formal framework. Some preliminary remarks are given in the appendix to the present paper as well.

The English auxiliary *will* is a verbal quantifier. According to the SOT-parameter, *will* transmits its temporal feature (uN) to the variable it binds. Note that Tpro – the temporal centre of the relative clause – is semantically bound by t_2, hence the simultaneous interpretation of the buying event and the state of the fish being alive.

The deictic reading requires binding of Tpro to the matrix N:

(20) Deictic interpretation of (18)

N λ_1 **will**(t_1) λ_2 **M. buy**(t_2) **a fish** WH_3 $Tpro_1$ λ_4 **is**(t_4) λ_5 x_3 **alive**(t_5)

= ($\exists t > s^*$)($\exists x$)[fish(x) & alive(x,s*) & buy(Mary,x,t)]

(there is a future time t, such that Mary at t buys a fish which is alive at the speech time)

4.2. Russian Relatives

Russian relative clauses differ from the English ones inasmuch as "present under future" has to be deictic. The simultaneous reading is thus expressed by a "future under future".

We should distinguish between two constructions, depending on the form of the matrix: a) the imperfective *budet* construction, and b) the perfective future. From the perspective of the SOT-parameter, the aspectual choice does not matter, but the difference between the *analytic* imperfective future and the *synthetic* perfective future is of principal importance. The former involves a temporal auxiliary, hence a verbal quantifier, while the latter is a semantic tense. Still, the result is the same: "present under future" cannot be simultaneous in Russian in either case because

a) the future matrix is a verbal quantifier (*budet*) which does not transmit its uN feature from above – since Russian is a non-SOT language.

b) the future matrix contains a semantic tense (i.e., the perfective future) with its own feature iF.

As we recall from the SOT-parameter in section 3, only *verbal quantifiers in SOT-languages* can transmit features.

Let us start with the case of *budet*. Consider the Russian translation in (21R), and the simplified illustration of feature transmission in (22):

(21E) Let me hope she will be less cruel to the splendid train which are to meet at the tournament. [Scott, "Ivanhoe" – Russian National Corpus]
(21R) Надеюсь, что она не будет^{FUT} столь жестока к тому блестящему обществу, которое мы встретим^{PF,FUT} на турнире.

(22) N ne budet žestoka k obščestvu, kotoroe vstretim. *(features in (21R))*

iN uN (feature transmission broken) iF uF

|_____|____xxxxxxxxxxxxxxxxxx_____|___|

The SOT-parameter explains why the simultaneous interpretation in (21R) must be expressed by a "future under future". The temporal quantifier *budet* shifts the reference time forward but it exhibits present tense morphology (a feature uN). However, *budet* does not transmit its feature uN to the relative clause since Russian is a non-SOT language. Accordingly, the subordinate tense cannot get its present form **встречаем* – *meet* from the higher *budet*.

We assume the following semantics for the synthetic perfective future[5] in Russian:

(23) Synthetic future in Russian

$[[F_{Rus}]] = \lambda t.\lambda P.(\exists t')[t' > t \ \& \ P(t')]$, feature iF

Unlike verbal quantifiers (auxiliaries and verbs), F_{Rus} does not have an uninterpretable tense feature, hence the issue of feature transmission from a higher tense does not arise in

[5] In fact, the semantics in (23) is a simplification since we ignore the role of (perfective) aspect in this paper. See (Grønn & von Stechow, to appear) for a more comprehensive analysis.

the same way as with *budet*. On the contrary, a semantic tense like F_{Rus} binds its own feature.

To be concrete, let us return to our Russian "Ogihara-sentence" and show why a "present under future" in (24) cannot have a simultaneous interpretation as in (25):

(24) Маша купит рыбу, которая живёт в Бергенском аквариуме.
ST = speech time (only deictic interpretation available)
*ST = MT (not possible)

(25) ***N λ_1 F_{Rus} (t_1) λ_2 …kupit(t_2)…WH Tpro$_2$ λ_3…živet(t_3)…**
iF uF—uF uF uN—uF !

To get the Ogihara reading (ST = MT), Tpro must be bound by F_{Rus} in (25). However, unlike English *will*, F_{Rus} does not transmit uN but checks uF. Thus, the temporal variable of *живёт* ("lives") gets the feature uF via Tpro$_2$. This feature should agree with the inherent feature uN of the verb, but it does not and we have a feature mismatch.[6]

We have so far been concerned with the shifted simultaneous reading (ST = MT), but there are, of course, other possible temporal configurations with a future matrix. We can also have a backward shifted (ST < MT) or forward shifted interpretation (MT < ST). For instance, in order to obtain a forward shifted interpretation, we typically need a "future under future" both in English and Russian. We provide an analysis in (27) of a Russian example from above, repeated here as (26R)[7]:

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[6] We have to make sure that a simultaneous interpretation is not generated in (24) by insertion of PRES. There are two ways of doing that: (a) Use PRES only if you have to, i.e. there are no other ways to express the intended meaning; (b) The argument of PRES is PRO by stipulation, as in (17R) above.

[7] Note that (26R) is a control construction, where the main verb of the complement of *poprošu – will ask* is non-finite (*vypit' – drink*). Accordingly, we do not have to license the morphology of the main verb by a relative PRES, which we would have to do if the verb were finite and present.

(26E) "In that case," replied Glinda, "I shall merely ask you to drink a powerful draught which will cause you to forget all the magic you have ever learned". [Baum, "The Marvelous Land of Oz" – Russian National Corpus]

(26R) — Тогда,—ответила Глинда,—я всего лишь попрошу ^{PF,FUT} тебя выпить^{PF,INF} волшебный напиток, от которого ты забудешь^{PF,FUT} все свое колдовство.

(27) N λ_1 $F_{Rus}(t_1)$ λ_2 **ja poprošu**(t_2) **tebja** ~~PRO~~ λt_3 PRO **vypit'**(t_3) **napitok ot**
iF----------uF
kotorogo $Tpro_3$ λ_4 $F_{Rus}(t_4)$ λ_5 **ty zabudeš**(t_5) **vse**
iF----------uF

The time variable of the embedded F_{Rus} is bound by the zero tense. F_{Rus} binds the embedded verb and does the forward shifting.

5. ANALYSIS: *BEFORE/AFTER/WHEN*-CLAUSES

We assume an analysis for *after/before* following (von Stechow, 2002) and (Beaver and Condoravdi, 2004): the prepositions are relations between two times t and t' and mean that t is after/before t'. t *when* t' means t = t' (or t ⊆ t' or t overlaps t'). Let us start from some simple past tense sentences:

(28) a. John left before/after Mary left.
b. Vanya ušel do/posle togo kak Masha ušla.

Inspired by (Heim, 1997) and (Beaver and Condoravdi, 2004) we analyse the complement of *before/after* as: "the earliest time that is at a past time and Mary leaves at that time".

To get this, we need a lot of covert structure, namely the EARLIEST-operator,

i.e., a sort of definite article, a temporal *at*-PP that locates the reference time of the complement and a wh-movement that creates the temporal property, which the EARLIEST operator maps to a particular time. The surface syntax of English does not provide the necessary hints that we need all that. Fortunately, Russian syntax as in (28b), is transparent in this respect: *togo* 'this' gives evidence that the complement of the preposition is a definite term. The wh-word *kak* shows that the argument of the determiner EARLIEST is formed by wh-movement. English has these two things covert.

The EARLIEST-operator, which makes the complement of *after/before* definite, is due to (Beaver and Condoravdi, 2004).

(29) $[\![\text{EARLIEST}_C]\!] = \lambda P.$the earliest time t according to the contextual parameter C such that P(t).
= the t, such that $C(t) \,\&\, P(t) \,\&\, (\forall t')[C(t') \,\&\, P(t') \rightarrow t < t']$

Apart from the differences in abstractness there is no crucial structural difference between English and Russian "past under past" constructions. So the corresponding sentences in (28a) and (28b) are analysed alike, cf. (30) below:

(30) Ваня ушел после/до того как ушла Маша. (morphology: Past\Past)
John left after/before Mary left
N λ_1 P(t_1) λ_2 Vanja ušel(t_2) t_2 posle/do EARL$_C$ kak$_3$ Tpro$_1$ λ_5 P(t_5) λ_4 t_4 AT t_3 Maša ušla(t_4)
= ($\exists t_2 < s^*$) Vanja leaves at t_2 & $t_2 >$ (<) the earliest t_3: $t_3 < s^*$ & Maša leaves at t_3
(there is a past time t_2, such that Vanja leaves at t_2 and t_2 is after (before) the earliest time t_3 such that t_3 is before the speech time and Mary leaves at t_3)

Concerning the more intriguing future matrix construction, we observed a similar distribution for relative clauses and temporal adverbial clauses in sections 1.1 and 1.2,

hence we expect a similar analysis. However, our account, which worked nicely for relative clauses, cannot generate a "present under future" in English *before/after* clauses:

(31) John *will* leave before/after Mary *leaves*.
(cf. authentic examples like (8E) and (9E) above)

This *looks* as if the [uN] feature of *leaves* were licensed by the matrix N via transmission of the [uN] feature of *will*, but this does not make sense semantically, as can be seen from (32):

(32) "present under future" in English *before/after* clauses *(first try)*
N λ_1 **will**(t_1) λ_2 **John leave**(t_2) t_2 **before**/**after**
EARL WH_3 $Tpro_2$ AT t_3 **Mary leaves**(t_3)
($\exists t_2 > s^*$) John leaves at t_2 & t_2 <(>) the earliest t_3: $t_2 = t_3$ & Mary leaves at t_3

The truth-conditions in (32) are contradictory, saying that t_2 should be before (after) t_2! We are convinced that this construction is an idiosyncrasy of English-like languages, and that there is no way of deriving the correct interpretation in an entirely compositional way. We may need a repair mechanism in the style of Ogihara's optional SOT-rule (Ogihara, 1989), as in (33):

(33) Repair mechanism (Ogihara's SOT-rule):
A semantic tense may be deleted if c-commanded by the same semantic tense.[8]

This means that the deleted tense is replaced by an existential quantifier ∃, cf. (34):

[8] Verbal quantifiers do not qualify as semantic tenses.

(34) "present under future" in English *before/after* clauses *(version 1)*

N λ_1 **will**(t_1) λ_2 **John leave**(t_2) t_2 **before**/**after**

EARL$_C$ WH$_3$ ~~N~~ ∃ λ_4 t_4 AT t_3 **Mary leaves**(t_4)

iN----------uN

= (∃t_2 > s*) John enters the room at t_2 & t_2 </> the earliest t_3 s.t. Mary leaves at t_3.

To get the morphology right, we have to license the present morphology prior to tense deletion. Alternatively, we could say that ∃ has the feature iN.

The "present under future" in (34) is the only residual case we are aware of that may require Ogihara's SOT-rule in (33). All the other cases of tense agreement can successfully be reduced to feature transmission under binding.

However, there is an alternative method to get the semantics right in (31). The trick is to allow the insertion of a covert Future in the complement:

(35) "present under future" in English *before/after* clauses *(version 2 – covert future)*

N λ_1 **will**(t_1) λ_2 **John leave**(t_2) t_2 **before**/**after**

EARL$_C$ WH$_3$ Tpro$_1$ FUT(t_1) λ_4 t_4 AT t_3 **Mary leaves**(t_4)

----------uN----------uN

Here, the undelined FUT is the covert one. It has the same meaning as *will*. We would have to say exactly which contexts allow the insertion of a covert Future. For instance, in English matrix sentences we do not want an insertion of covert FUT under N. Furthermore, we have to stipulate that covert semantic tenses do not block feature transmission.

Contrary to the English construction, the Russian "future under future" is unproblematic and analysed precisely as in the case of relative clauses[9]:

[9] Of course we also find constructions with temporal adjuncts under a matrix *budet* (see for instance (10R)

(36) Ваня уйдет после/ до того как уйдет Маша.

N λ_1 $F_{Rus}(t_1)$ λ_2 **Vanja ujdet**(t_2) t_2 **posle/do**

EARL$_C$ **kak**$_3$ Tpro$_1$ λ_4 $F_{Rus}(t_4)$ λt_5 t_5 AT t_3 **Maša ujdet**(t_5)

iF----------uF

= ($\exists t_2 > s^*$) John leaves at t_2 & t_2 >(<) the earliest t_3: t_3 in C & $t_3 > s^*$ & Mary leaves at t_3

In (36), the [uF] feature of the embedded verb is licensed by a local F_{Rus}(uture). We note that from a semantic point of view a "future under future" would make sense also in English *before/after*-clauses. Indeed, some informants accept the construction below:

(37) John will leave before Mary will leave

N λ_1 **will**(t_1) λ_2 **John leave**(t_2) t_2 **before/after**

iN----------

EARL WH$_3$ Tpro$_1$ λ_4 **will**(t_4) λt_5 t_5 AT t_3 **Mary leave**(t_5)

----------uN---------uN

6. ADJUNCT TENSE EMBEDDED UNDER ATTITUDES

For the examples discussed above we obtain the same result if we assume N instead of Tpro in the adjunct clause. But in the general case, N is not possible as the T-centre, because we can embed the adjunct under an attitude and get a bound reading:

(38) John said that he left before Mary left.

Here a Tpro, which is bound by the matrix PRO, is obligatory in the adjunct.[10]

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and (12R) above). The feature transmission of uN to the adjunct tense is then blocked by the SOT-parameter, completely analogous to relative clauses in section 4.2

[10] See (Grønn & von Stechow, to appear) for a detailed analysis of adjunct tense embedded under attitude

Our theory makes the following predictions: The tense centre of the highest sentence under the attitude is PRO, i.e., eventually λ_i. This tense binds the Tpro in the subordinate adjunct. The difference in tense distribution follows from the SOT-parameter.

1. In English, PRO gets its temporal feature via the attitude predicate from the (relative) matrix tense and transmits it to the Tpro of the adjunct.

2. In Russian, PRO does not inherit a temporal feature from the matrix. Therefore the feature of the adjunct tense must be checked by the relative tense in the highest embedded clause.

This theory can account for the fact that past in English relatives is sometimes semantically void and must sometimes be bound, cf. *had* in (39) which clearly need not have past tense reference.

(39) John thought Mary would give birth to a son that had blue eyes.

N λ_0 P(t_0) λ_1 **John thought**(t_1) ~~PRO~~ λ_2 **would**(t_2) λ_3 **M give birth** (t_3)

iP----------uP----------uP----------uP

a son WH_4 $Tpro_3$ λ_5 t_4 **had blue eyes**(t_5)

----------uP--------uP

The temporal variable of *had* in the relative inherits its feature from the matrix P via binding. Note that the binding chain goes through the infinitive *give*, which has no inherent temporal feature.

Compare the construction above with its Russian equivalent in (40):

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verbs and modals in English and Russian.

(40) Ваня подумал, что Маша родит сына, у которого будут голубые глаза *(как и у отца)*

N λ_0 P(t_0) λ_1 **Vanja podumal**(t_1)

λ_2 PRES(t_2) λ_3 F(t_3) λ_4 **Maša rodit**(t_4) **syna kotorogo**$_5$ Tpro$_2$ λ_6 **budut**(t_6)

iF----------uF

iN----------uN----------uN

λ_7 BYT'(t_7) **u** t_5 **golubye glaza**

In (40), *budut* is bound by the local PRES via Tpro. Hence its present morphology is justified.

7. CONCLUSION

Russian relatives behave like their English counterparts with one important exception: When the English matrix contains a future (*will*), the simultaneous/shifted reading is expressed by a present tense in the relative clause. Russian has to use a future tense in the relative clause as well.

This paper is part of a larger research project on tense semantics, notably subordinate tense. We apply our theory for the syntax-semantics interface to real data from parallel corpora. So far, we have dealt with complement tense (Grønn & von Stechow, 2010). The present paper in combination with (Grønn & von Stechow, to appear) provide a full-fledged theory for adjunct tense. Finally, our theory will also include an analysis of modals and counterfactuals (known for their fake past tense and tense agreement between the antecedent *if*-clause and matrix). Hence, we will eventually be able to properly analyse the tense configurations in complex authentic examples like the following:

(41R) EslI^{IF} by$^{SUBJ.PART}$ v te dalekie gody emu skazali^{PAST,PF}, čto on, kogda vyrastet^{FUT,PF}, stanet^{FUT,PF} kopirajterom, on by$^{SUBJ.PART}$, naverno, vyronil^{PAST,PF} ot izumlenija butylku "Pepsi-koly" prjamo na gorjačuju gal'ku pionerskogo

pljaža. [Pelevin, "Generation P" – RuN-Euro Corpus]

(41E) If in those distant years someone had told him that when he grew up he would be a copywriter, he'd probably have dropped his bottle of Pepsi-Cola on the hot gravel of the pioneer-camp beach in his astonishment.

(41N) Hvis han i fjerne tider hadde^{PAST,AUX} visst^{PAST,PART} at han skulle^{PAST,MODAL} bli^{INF} copywriter når han ble^{PAST} voksen, ville^{PAST,MODAL} han antakelig ha^{INF,AUX} mistet^{PAST,PART} Pepsi-flasken rett i den glovarme hellegangen på stranden i pionerleiren.

This example displays most of the subordinate tense constructions we are interested in. The temporal **adjunct** (*kogda vyrastet – when he grew up*) occurs in a **complement** of an attitude verb ("told"), which itself is the **antecedent** of a counterfactual conditional. In future work, we will show that our tense theory can explain why we end up with perfective future morphology in the Russian complement (*vyrastet…stanet*), while languages like English and Norwegian have past tense morphology (*grew up… would be*).

8. APPENDIX: THE SEMANTIC LANGUAGE

We are using an intensional λ-language. It is based on the the types e (individuals) and i (times), t (truth-values) and s (worlds). It has the usual syntax and semantics. The meaning of tenses assumed here are these:

(i) Tenses

a. Deictic Present $[\![N]\!] = \lambda w.s^*$ feature iN

b. Relative Present $[\![PRES]\!] = \lambda w.\lambda t.\lambda P_{it}.(\exists t' = t)P(t')$ feature iN

c. Past: $[\![P]\!] = \lambda w.\lambda t.\lambda P_{it}.(\exists t' < t)P(t')$ feature iP (Heim, 1997)

d. Future: $[\![F_{Rus}]\!] = \lambda w.\lambda t.\lambda P_{it}.(\exists t' > t)P(t')$ feature: iF (aspect is ignored)

A covert F in English would not have features.

(ii) Verbal quantifiers

a. **will**: $\lambda w.\lambda t.\lambda P_{it}.(\exists t' > t)P(t')$ feature uN

b. **budet**: $\lambda w.\lambda t.\lambda P_{it}.(\exists t' > t)P(t')$ feature uN

(iii) Temporal pronouns

a. N: a deictic pronoun denoting the speech time

b. PRO (TPRO): no meaning, no type (∅-tense)

c. Tpro: gets its meaning from an assignment g.

(iv) Verbs

[[**sleeps**]] = λwλtλx.x sleeps in w at t feature uN

[[**slept**]] = λwλtλx.x sleeps in w at t feature uP

All verb forms have a tenseless semantics. They are only distinguished by an un-interpretable temporal feature which makes sure that the form is combined with the correct semantic tense.

The semantics and the feature theory are introduced in greater detail in (von Stechow, 2009).

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