A Case against ‘Defective’ Tense in the Bulgarian Subjunctive

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1 The puzzle: the meaning of tense in subjunctive complements

Subjunctive complements in Bulgarian (BG) show unusual temporal properties when compared to corresponding indicative clauses. While present tense verbs in indicative matrix clauses are incompatible with past or future time adverbs, as in (1), these restrictions do not apply to present tense verbs in embedded subjunctive complements1, as in (2):

(1) Pe-e *ute /včera.2
sing.IMPRFV-3SG.PRES *tomorrow/*yesterday.
‘He/she is singing *tomorrow/*yesterday.’

(2) Nakara-x go [da pe-e utre /včera].
force.PRIV-1SG.PAST him DA sing.IMPRFV-3SG.PRES tomorrow/yesterday
‘I forced him to sing tomorrow/yesterday.’

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2 BG does not have any special subjunctive morphology, and the only marker of the subjunctive complements is a modal particle da. However, these complements have a number of semantic properties which distinguish them from the indicative complements, most salient being their incompatibility with the past and future verb forms.

2 I use the following glosses throughout the paper: IMPRFV=Imperfective Aspect, PAST=Past Tense, PRES=Present Tense, PRFV=Perfective Aspect, REFL=Reflexive.
In (1) the present tense verb *pee* ‘he sings’ locates the event of singing at the Speech Time (ST). This meaning is incompatible with the future and past time references introduced by the adverbs *utre* ‘tomorrow’ and *včera* ‘yesterday’, respectively. On the other hand, in (2), the same verb denotes an event which can either precede or follow the ST; hence both past- and future-oriented adverbs are acceptable. These data raise the following questions: i) what is the meaning of present tense verbs in subjunctive complements? ii) how is the temporal location of subjunctive complements determined?

In order to explain the difference between (1) and (2) one might assume that, unlike the present tense in indicative matrix clauses, which locates events at the ST, the present tense in embedded subjunctive complements does not have any semantic contribution. The reasoning along these lines would conform to the general tendency in the current syntactic literature, where tense in subjunctive complements is analyzed as ‘defective’ (e.g. Picallo 1984 on Romance subjunctives, Watanabe 1993 on Balkan subjunctives). With respect to the second question, one of the most common assumptions is that the temporal location of embedded subjunctive complements depends on control properties of the matrix verbs (e.g. Varlokosta & Hornstein 1993 on Modern Greek (MG), Krapova 2001 on BG).

Unlike previous proposals, I argue that the tense in subjunctive clauses is not ‘defective’ and show that the present tense in BG has the same meaning in indicative matrix clauses and in embedded subjunctive complements. Moreover, I show that the temporal location of the event denoted by a subjunctive clause does not depend on control properties of the matrix verb, but is entailed from the tense and semantic type of the main verb.

The paper is organized as follows: in section 2, I discuss problems with the previous analyses and show that the temporal location of subjunctive clauses does not depend on control. In section 3, I discuss the data which show that the temporal location of the subjunctive depends on the semantics of matrix verbs and on the matrix tense. In section 4, I i) show how the temporal location of subjunctive clauses is determined and ii) present a compositional semantic analysis which shows that the present tense is not defective. Section 5 concludes the paper and discusses its wider implications.
2 Previous analyses

In this section I discuss Krapova’s 2001 analysis of subjunctive complements in BG and show that it makes incorrect predictions about the temporal location of subjunctive clauses. I also discuss analyses proposed by Varlokosta & Hornstein 1993 and Giannakidou 2007 for typologically-similar constructions in MG, and show that these analyses cannot be extended to BG.

Krapova 2001 proposes that subjunctive complements should be divided into two groups with respect to their temporal properties: i) complements which are located in the future with respect to the matrix event time (ET); ii) complements which overlap the matrix ET.\(^3\) Krapova assumes that the verbs in group (i) induce forward-shifted readings and those in group (ii) induce overlapping readings and that this difference correlates with the control properties of the matrix verb.\(^4\)

Complements of Non-Obligatory Control (NOC) verbs, as in (3), “yield the ‘unrealized future’ interpretation invariably associated with this type of complement” (p. 117):

\[(3)\]\n\[
\begin{array}{c}
\text{NOC verbs – forward-shifted reading:} \\
\text{Nadjava-m \ se da dojde-š.} \\
\text{Hope\textsubscript{IMPRFV-1SG.PRES} REFL DA \text{come\textsubscript{PRFV-2SG.PRES}}} \\
\text{‘I hope that you come.’ (adapted from Krapova 2001, ex. (10a))}
\end{array}
\]

With Obligatory Control (OC) verbs, “temporal specification of the embedded event is identical to that of the main predicate” (p. 117):

\[(4)\]\n\[
\begin{array}{c}
\text{OC verbs – overlapping reading:} \\
\text{Znaj-a \ da pluva-m.} \\
\text{know\textsubscript{IMPRFV-1SG.PRES} DA \text{swim\textsubscript{IMPRFV-1SG.PRES}}} \\
\text{‘I know how to swim.’ (adapted from Krapova 2001, ex. (28a))}
\end{array}
\]

\(^3\) An underlying assumption of this proposal is that tenses in subjunctive complements are evaluated with respect to the matrix ET, not the ST.
\(^4\) Control properties of verbs are manifested through the referential properties of embedded subjects. Non-Obligatory Control verbs select for complements whose subjects might have split or generic antecedents, while subjects in complements of Obligatory Control verbs are strictly identified with an element of the matrix clause.
However, a closer look at the data shows that a generalization along these lines does not obtain. Examples in (5) and (6) show that both OC and NOC verbs allow forward-shifted readings:

(5) NOC verbs – forward-shifted reading:
Ivan, predlož-i na Maria, [da pe-e_i j utre /včera].
Ivan suggest.PRVF-3SG.PAST to Maria DA sing.IMPRFV-3SG.PRES tom./yest.
‘Ivan suggested to Maria that he/she sing tomorrow/yesterday.’

(6) OC verbs – forward-shifted reading:
Ivan, nakara-Ø Maria, [da pe-e _i j utre/včera].
Ivan force.PRFV-3SG.PAST Maria DA sing.IMPRFV-3SG.PRES tom./yest.
‘Ivan forced Maria to sing tomorrow/yesterday.’

Moreover, contrary to the prediction of Krapova’s analysis the overlapping interpretation is not restricted to complements of OC verbs, as in (7), but is also possible for complements of NOC verbs, as in (8):

(7) OC verbs – overlapping reading:
Prodalžav-a, [da pe-e_i j sega].
continue.IMPRFV-3SG.PRES DA sing.IMPRFV-3SG.PRES now
‘S/he continues to sing now.’

(8) NOC verbs – overlapping reading:
Struxuv-a se [da pe-e _i j sega].
be.afraid.IMPRFV-3SG.PRES REFL DA sing.IMPRFV-3SG.PRES now
‘S/he is afraid of herself/’s/himself/’s/somebody else’s singing.’

These data suggest that the temporal location of the embedded clause does not depend on the control properties of the matrix verbs.

Another aspect of Krapova’s analysis which requires discussion relates to her assumption about the semantic content of the embedded tense. Krapova proposes that complements of NOC verbs have a contentful tense, and are specified as [+T]. On the other hand, complements of OC verbs “do not possess tense features at all” (p. 118),

\[5\] I use subscripts to show control properties of matrix verbs.
and bear a [-T] specification. Since OC and NOC verbs can select complements with morphologically identical verbs, e.g. (5) vs. (6), (7) vs. (8), then the question arises of what mechanisms are responsible for the difference in the semantic content of the embedded tense. While Krapova does not discuss this question, there are two principled ways in which one might account for this difference. First, one might assume that there are two sets of present tense morphemes in BG, the ones which have a semantic content and the ones which do not. The tense morphemes with semantic content appear in indicative matrix clauses, in indicative complements, and in complements of NOC verbs. On the other hand, semantically vacuous tense morphemes appear in complements of OC verbs. However, such an analysis would posit an unmotivated asymmetry between complements of OC and NOC verbs. As an alternative explanation, one might suggest that the tense in subjunctive complements of OC verbs is deleted by some sort of the Sequence of Tense (SOT) rule, similar to the rule proposed by Ogihara 1996 for English. However, it is difficult to imagine what would require this mechanism to apply to complements of OC verbs, while preventing its application in complements of NOC verbs, especially in cases when the two constructions have an identical structure, as in (5) and (6) above. Moreover, BG, along with the majority of other Slavic languages is a non-SOT language. Thus, the existence of the deletion mechanism is unsupported in the first place.

Finally, what remains unanswered in Krapova’s analysis is the question of how the temporal location of embedded subjunctive clauses

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6 It is generally assumed that [-T] in OC constructions is responsible for the licensing of the Null case of the embedded subject PRO, while [+T] is taken to license the case of pro, the embedded subject of NOC constructions (e.g. Krapova 2001).

7 Ogihara 1996 proposes that the simultaneous reading in English past-under-past constructions as in (i) is due to the application of the SOT rule which deletes the semantic content of the embedded tense. The fact that the corresponding BG construction (ii) does not have the simultaneous reading suggests that BG does not have the SOT rule.

(i) Ivan said that Mary was sick.
   a. Backward-shifted reading: Ivan said: “Mary was sick.”
   b. Simultaneous reading: Ivan said: “Mary is sick.”
(ii) Ivan kaza-Ø že Maria be-še bolna
     Ivan say-PAST that Maria be-PAST sick
     ‘Ivan said that Maria had been sick.’ (backward-shifted reading only)
is determined, in particular, what factors are responsible for the fact that the event of singing is located in the future in (5) and in (6)? While Krapova does not discuss this question, there are several proposals which one might adopt for BG. For example, one might adopt Varlokosta & Hornstein’s 1993 analysis of typologically similar subjunctive constructions in MG.

Varlokosta & Hornstein argue that subjunctive complements in MG have an overlapping interpretation. However, this assumption is problematic for constructions with forward-shifted interpretation illustrated by BG examples in (5) and (6), which are also attested in MG. In order to account for these data, Varlokosta & Hornstein assume that forward-shifted readings are due to implicit temporal adverbs which shift the evaluation time forward. However, an analysis along these lines is ad hoc, and as I show in section 4.3, an alternative, non-stipulative solution to this problem is possible.

An alternative analysis is presented by Giannakidou’s 2007 work on subjunctive complements in MG. Giannakidou proposes that the futurate and overlapping readings of subjunctive complements in MG arise as a consequence of the interactions between the meaning of the embedded non-past verbs and the semantic contribution of the modal particle na, the analogue of the subjunctive marker da in BG. Space limitations preclude a thorough review of the technical details of this analysis here, but what is crucial for the present discussion is that in her analysis a subjunctive complement can only be located in a time interval which starts at the ET of the matrix clause (attitude holder’s now) and stretches into the future. While this proposal would account for the BG data presented above, we will see in section 3 that subjunctive complements in BG can also denote events which temporally precede the matrix clause ET, which makes a straightforward application of Giannakidou’s analysis to the BG data untenable.

3 The dependency of the subjunctive: empirical generalization

The discussion of the previous literature leaves us with the following puzzle: if the temporal location of subjunctive complements does not depend on control properties of matrix verbs, then what are the mechanisms which determine whether a subjunctive complement would be located in the past or future with respect to the ST?
According to an empirical study of over 80 BG verbs selecting subjunctive complements, which was conducted to address the above question and whose results are reported in Smirnova 2008, selecting verbs should be divided into three different groups depending on whether the subjunctive event temporally precedes, follows, or overlaps with the matrix clause event. The largest class consists of verbs such as *iskam* ‘want’, *karam* ‘force’, *predlagam* ‘offer’ etc., which uniformly locate the embedded event in the future with respect to the matrix clause event. I call this group forward-shifting verbs.

(9) Forward-shifting verbs:
   a. Predlaga-m mu [da pe-e utre /*včera].
      offer.IMPRFV-1SG.PRES him DA sing.IMPRFV-3SG.PRES tom./*yest.
      ‘I offer him to sing tomorrow/*yesterday.’
   b. Predlaga-x mu [da pe-e utre /včera].
      offer.IMPRFV-1SG.PAST him DA sing.IMPRFV-3SG.PRES tom./yest.
      ‘I was offering him to sing tomorrow/yesterday.’

The second group of verbs consists of verbs such as *spomnjam si* ‘remember’ and *seštam se* ‘recollect’, which locate the subjunctive event in the past with respect to the matrix event. I call them backward-shifting verbs:

(10) Backward-shifting verbs:
   a. Spomnja-m si go [da pe-e *utre/včera].
      remember.IMPRFV-1SG.PRES REFL him DA sing.IMPRFV-3SG.PRES *tom./yest.
      ‘I remember him singing *tomorrow/yesterday.’
   b. Spomnja-x si go [da pe-e *utre /včera].
      remember.IMPRFV-1SG.PAST REFL him DA sing.IMPRFV-3SG.PRES *tom./yest.
      ‘I remembered him singing *tomorrow/yesterday.’

Finally, there is a group containing verbs such as *čuvam* ‘hear’ and *viždam* ‘see’. When subjunctive complements are selected by these verbs, the event denoted by the subjunctive complement must overlap with the event of the matrix clause. I call these verbs overlap-imposing.
Overlap-imposing verbs:

a. Čuva-m go [da pe-e *utre /*včera/sega].
   hear.IMPRFV-1SG.PRES him DA sing.IMPRFV-3SG.PRES *tom./*yest./now
   ‘I hear him singing *tomorrow/*yesterday/now.’

b. Čuva-x go [da pe-e *utre/včera/*sega].
   hear.IMPRFV-1SG.PAST him DA sing.IMPRFV-3SG.PRES *tom./yest./*now
   ‘I heard him singing *tomorrow/yesterday/*now.’

Examples (9a) vs. (10a) vs. (11a) show that the temporal location of the embedded event depends on the type of the selecting verb. Since in these examples the tense of the main verb (present) and the tense of the embedded verb (present) are kept constant, and what varies is the type of the selecting verb, i.e. forward-shifting in (9a), backward-shifting in (10a), and overlap-imposing in (11a), then it is the type of the selecting verb which affects the temporal location of the embedded event.

Moreover, the contrasts in (9), (10), and (11) show that tense of the matrix verb is another factor that affects temporal interpretation of subjunctive complements. For example, with the present tense overlap-imposing verb čuva-m ‘hear’, the event of singing must overlap the ST (11a), but when the same verb is in the past, the event of singing must be realized in the past with respect to the ST (11b). Note that in these examples the type of the matrix verb (overlap-imposing) and the tense of the embedded verb (present) are the same, and the only parameter that varies is the tense of the matrix verb. Therefore, the temporal location of singing in each case must be dependent on the matrix tense.

The data discussed in this section allow us to make the following empirical generalization:

(12) The temporal location of the subjunctive event depends on:

(i) type of the selecting verb (i.e. forward-shifting, backward-shifting, or overlap-imposing)

(ii) tense of the selecting verb

In the next section I propose an analysis which shows that the temporal location of the embedded subjunctive event follows from temporal information provided by the tense of the matrix verb, and its semantic type.
4 Analysis

4.1 Theoretical assumptions
Following Reichenbach 1947 and Klein 1994, I assume that tense and grammatical aspect encode the relations between three temporal parameters: the Speech Time, the Event Time, and the Reference Time. Tense and grammatical aspect are defined in terms of the precedence (<), the equivalence (=) and the subset (⊆) relations between these temporal intervals.

(13) Tense as a relation between the ST and the RT:
   a. Present: ST=RT
   b. Past: RT<ST
   c. Future: ST<RT

(14) Grammatical aspect as a relation between the RT and the ET:
   a. Perfective: ET⊆RT
   b. Imperfective: RT⊆ET

The following example illustrates how these parameters interact in a simple sentence:

(15) Pe-e
    sing.IMPRFV-3SG.PRES
    'He/she is singing.'

(16) Temporal information:
   a. Present tense: ST=RT
   b. Imperfective Aspect: RT⊆ET
   c. ST=RT & RT⊆ET entail ST⊆ET

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8 I will argue in section 4.3 that the definition of tense as a relation between ST and RT is somewhat simplistic in light of the behavior of the present tense in BG in matrix clauses and embedded subjunctive clauses. I will propose an alternative view there that tense states relations between the RT and the ‘evaluation time’, i.e. the time with respect to which events are located in time, whose utility has been recognized in the literature on embedded tense. However, since this issue only becomes relevant when the meaning of tense in embedded contexts is considered, I keep to the simpler and more standard definition of tense in sections 4.1 and 4.2.
The two relations in (16a,b) entail $ST \subseteq ET_{\text{sing}}$, meaning that the singing event overlaps the time at which (15) is uttered.

In constructions with subjunctive complements, there are more times to consider, since the matrix and the embedded verbs each have their own ET and RT, so the number of temporal parameters rises to five ($ET_{\text{main}}, RT_{\text{main}}, ET_{\text{emb}}, RT_{\text{emb}},$ and ST). I assume that the temporal dependency between matrix verbs and subjunctive verbs, discussed in section 3, should be formulated as a relation between the RT of the embedded verb $RT_{\text{emb}}$, and the RT of the main verb $RT_{\text{main}}$ (see Smirnova 2008 for the motivation of this analysis). Moreover, since the temporal location of the embedded event depends crucially on the semantics of the selecting verb, I assume that the relation between the $RT_{\text{main}}$ and the $RT_{\text{emb}}$ should be encoded in the meaning of the selecting verb as follows:

(17) Temporal dependency between matrix and embedded verbs:

a. Forward-shifting verbs (force): $RT_{\text{main}} < RT_{\text{emb}}$

b. Backward-shifting verbs (remember): $RT_{\text{emb}} < RT_{\text{main}}$

c. Overlap-imposing verbs (hear): $RT_{\text{emb}} = RT_{\text{main}}$

4.2 The temporal location of subjunctive clauses in time

In this section I show how temporal information contributed by the tense of the matrix verb and its semantic type entails the temporal location of the subjunctive event, stated as a relation between the ST and the $RT_{\text{emb}}$. From the discussion below, it might seem that the present tense in the subjunctive clause is not playing any role in determining the temporal location of the subjunctive clause. However, I will show in the next subsection that the meaning of the present tense can be defined uniformly as an identity function – a standard theoretical object in model-theoretic semantics. Thus, the present proposal subtly but crucially differs from a claim that the tense in subjunctive clauses is semantically ‘defective’.

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9 In the formal analysis that I present in section 4.3, the relation is actually stated between the $RT_{\text{main}}$ and the evaluation time of the embedded clause (since the evaluation time is the only temporal parameter that can be accessed from outside the embedded clause in the compositional semantics). However, in all of the examples that I consider in this paper, the $RT_{\text{emb}}$ happens to be identical to the evaluation time of the embedded clause (due to the fact that the embedded tense is present; see the analysis in 4.3). Since the main purpose of this section is to present the core of the analysis in semi-formal terms, I simply state the relevant generalizations in terms of the $RT_{\text{main}}$ and the $RT_{\text{emb}}$. 
The following is an example with the present tense forward-shifting verb:

(18) Kara-m     go [da pe-e utre /#včera].  
force.IMPRFV-1SG.PRES  him DA sing.IMPRFV-3SG.PRES tom./#yest.  
'I force him to sing tomorrow/#yesterday.'

In (18) the event of singing must be located in the future with respect to the ST. Thus, the relation (ST<RT\text{sing}) should be available during the semantic interpretation of this sentence. This relation follows from the semantic property of the matrix verb *karam* ‘force’ (RT\text{force}<RT\text{sing}) and its present tense (ST=RT\text{force}):

(19) RT\text{force}<RT\text{sing} & ST=RT\text{force} \textbf{entail} ST<RT\text{sing} (Future)

When the same matrix verb appears in the past tense, the singing can be located in the past or future with respect to the ST:

(20) Kara-x     go [da pe-e utre / včera].  
force.IMPRFV-1SG.PAST  him DA sing.IMERF-3SG.PRES tom./#yest.  
'I was forcing him to sing tomorrow/yesterday.'

The past (RT\text{sing}<ST) and the future (ST<RT\text{sing}) relations are entailed from the semantic contribution of the forward-shifting matrix verb (RT\text{force}<RT\text{sing}) and its past tense (RT\text{force}<ST):

(21) RT\text{force}<RT\text{sing} & RT\text{force}<ST \textbf{entail} RT\text{sing}<ST (Past) OR  
ST<RT\text{sing} (Future)

This analysis shows that temporal location of events denoted by subjunctive complements directly follows from the temporal properties of matrix verbs, and not from any implicit temporal adverbs as in Varlokomsta & Hornstein 1993.

\footnote{Due to the space limitations I consider examples with forward-shifting verbs only. See Smirnova 2008 for the analysis of constructions with backward-shifting and overlap-imposing verbs.}
4.3 The meaning of the present tense: compositional semantic analysis

The analysis presented in the previous section leaves one question unanswered: if the temporal location of subjunctive clauses is derived from the semantic type of the selecting verb and its tense, then what is the semantic contribution of the embedded present tense? In this section I argue that the present tense in both indicative matrix clauses and embedded subjunctive clauses has the same semantic content, and show how the meanings of these sentences are derived compositionally.

If the meanings of tenses are defined by means of ST and RT, the present tense in (22) should denote ST=RT_{sing}.

(22)   Pe-e                       #utre
       sing.IMPRFV-3SG.PRES #tomorrow.
             ‘He/she is singing #tomorrow.’

However, the meaning of the same verb inside the subjunctive complement in (23) seems to be different:

(23)   Kara-m                   go   [da pe-e                       utre /*včera].
       force.IMPRFV-1SG.PRES him  DA  Sing.IMPRFV-3SG.PRES tom./*yest.
              ‘I force him to sing tomorrow/*yesterday.’

Unlike (22), the singing in (23) can be realized in the future with respect to the ST, so the relation between the ST and the RT should be ST<RT_{sing}. However, if the present tense directly encoded ST=RT_{sing}, as we have assumed in (16a), that would contradict the actually observed temporal relation in (23). The solution to this apparent problem comes from defining the meaning of (present) tense in a slightly different way. Specifically, I follow Gennari 2003, among others, and assume that the ST is not directly referred to in the meaning of the present tense per se. Rather, the present tense just identifies the RT of the clause with the ‘evaluation time’ (RT = t_{eval}), where t_{eval} is the temporal parameter with respect to which clauses are located in time.\textsuperscript{11} When a present tense verb appears in a matrix clause, the evaluation time is identified with the ST

\textsuperscript{11} See Kubota et al. (2009) for a detailed discussion of the notion of evaluation time and its application to the analysis of interpretation of embedded tense cross-linguistically.
The event denoted by this verb is interpreted with respect to the ST, which yields the desired effect that the ST and the RT are identified (ST=RT). But, crucially, that identification comes about only indirectly by means of an interaction of separate factors.

This analysis can be formally implemented by assuming that the present tense denotes an identity function\(^\text{12}\) of type \(<<i,t>,<i,t>>\):

\[
(PRES) = \lambda P \lambda t \ [P(t)]
\]

In (24), \(t\) is just a temporal variable, which can, but does not have to be identified with the ST.

The derivation of a simple sentence in (22) proceeds as follows: the denotation of the sentence radical,\(^\text{13}\) i.e. ‘he sing’ in (25a), which is of type \(<<i,<ev,t>>\), serves as an argument to the Imperfective Aspect (25b), of type \(<<i,<ev,t>>, <i,t>>\). The result is taken as an argument by the Present Tense.

(a) Sentence radical: \(\lambda t' \lambda e' [sing' (t', e', x)],\) where \(t'=RT_{\text{sing}}\)

(b) Imperfective Aspect: \(\lambda Q \lambda t' \exists e' [Q(t', e') & t' \subseteq \tau(e')]\)

(26) Semantic derivation of (22):

\[
\lambda t \exists e' [sing' (t', e', x) & t \subseteq \tau(e')]
\]

Tense: \(\lambda P \lambda t [P(t)]\)

\[
\lambda t' \exists e' [sing' (t', e', x) & t' \subseteq \tau(e')]
\]

Aspect: \(\lambda Q \lambda t' \exists e' [Q(t', e') & t' \subseteq \tau(e')]\)

\[
\lambda t \lambda e [sing' (t, e, x)]
\]

The temporal variable \(t\) bound by the lambda operator in the resultant formula in (26) designates the evaluation time of the matrix clause. The ST=s* is supplied as an argument to this expression when the sentence is interpreted in the discourse, yielding (27) as the final interpretation:

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\(^{12}\) I thank Yusuke Kubota for helping me with this part of the analysis.

\(^{13}\) By ‘sentence radical’ I mean the denotation of the clause before the application of the Aspect and Tense.

\(^{14}\) Here \(t, ev\) and \(t\) are types for time, eventuality description and truth value, respectively.
According to (27), there exists an event of an individual x’s singing, which happens at the ST. Crucially, while the ST is not a part of the meaning of the present tense, the meaning given in (27) conveys the same information, i.e. \( ST \subseteq ET_{\text{sing}} \), as in the framework in which the ST is introduced by the tense, as in (16).

Thus, looking at the matrix environments alone, there does not seem to be any substantial difference between the present proposal and the more standard Reichenbachian view. However, the difference between the two becomes clear once embedded environments are brought into the picture. Specifically, for the present tense in BG, a unified analysis that covers both the matrix indicative clauses and the embedded subjunctive clauses is only possible by not including the reference to the ST in the meaning of the tense itself.

Regarding the meaning of tense in the subjunctive complement in (23), I assume that the present tense in this example has the same meaning as in (22), namely, it denotes an identity function given in (24). The derivation of (23) would proceed as in (26), up to the point at which the embedded clause combines with the sentence radical of the matrix clause, which has the meaning in (28):

\[
([\text{I-force}]) = \lambda P \lambda t \lambda e \exists t' [\text{force}'(t, e, x, P(t')) & t < t']^{15},
\]

where \( sp = \text{speaker}, t = RT_{\text{main}}, t' = RT_{\text{emb}}, \) and \( t < t' \) encodes that forcing precedes singing temporally.

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\(^{15}\) As pointed out by an anonymous reviewer, the existential quantifier outside the scope of the predicate ‘force’ entails that there exists some specific time in the future at which the embedded event takes place. A possible solution would be to redefine the meaning of the verb ‘force’ as in (i), and assume that the order between the matrix and the embedded event is taken care of by the meaning postulate in (ii):

(i) \( [[\text{force}]] = \lambda P \lambda t \lambda e \text{force}'(t, e, sp, P) \)

(ii) \( \text{force}'(t, e, x, P) \models \exists t[P(t') & t < t'] \)

I thank Yusuke Kubota for pointing out this alternative to me.
(29) (Partial)\textsuperscript{16} semantic derivation of (23):

\[\lambda t \exists e' \exists t'' [force'(t', e', sp, \exists e[sing'(t'', e, x) \& t'' \subseteq \tau(e)]) \& t < t'' \& t \subseteq \tau(e')]\]

\[\text{...}\]

\[\lambda P \lambda t \lambda e'' \lambda t''' [force'(t', e', sp, P(t''')) \& t < t''' \& t \subseteq \tau(t'')]\]

The result of semantic derivation, applied to the ST yields (30):

(30) \[\exists e' \exists t'' [force'(s*, e', sp, \exists e[sing'(t'', e, x) \& t'' \subseteq \tau(e)]) \& s* < t'' \& s* \subseteq \tau(e')]\]

According to (30), there exists an event of the speaker forcing an individual \(x\) to sing, which happens at the ST, and the event of singing is located in the future with respect to the ST. Note that in this case, the temporal variable introduced by the present tense morpheme is not identified with the ST which does not serve as the local evaluation time of the embedded tense, but is instead simply existentially quantified as specified in the meaning of the sentence radical of the matrix clause in (28). The result of the semantic derivation in (29) is applied to the ST. The relation \(s* < t''\), i.e. \(ST < RT_{\text{sing}}\), which results from this application signals that singing is located in the future with respect to the ST, what is exactly the meaning of (23).

5 Conclusions and wider implications

In this paper I have argued that the present tense in embedded subjunctive clauses is not defective semantically, and that it has the same meaning as the present tense in indicative matrix clauses. The uniform analysis is possible because of the assumption that the ST is not directly encoded in the meaning of the present tense, and that the present tense denotes a relation between the RT and the time of evaluation, which has been recognized in the literature dealing with the question of embedded tense. Moreover, I have shown that the temporal location of embedded

\textsuperscript{16} In the bottom line in (29), the sentence radical of the matrix clause applies to the denotation of the embedded clause. The result of this application first combines with the matrix Aspect, and then with the matrix Tense (these steps are skipped in (29), but see the appendix for the details of the compositional analysis).
subjunctive clauses in BG is not dependent on control, as suggested by Krapova’s 2001 analysis, but follows from the semantic properties of matrix verbs and the meaning of the matrix tense. One of the theoretical consequences of this analysis is that tense in NOC and OC complements has the same meaning, so that the syntactic distinction between [+T] and [-T] becomes unmotivated, which in turn challenges the claim that pro in NOC, and PRO in OC complements are licensed by the [+T] node, and by the [-T] node respectively.

References

APPENDIX: Formal analysis
Tense: a. [[PRES]] = \(\lambda P \lambda t \ P(t)\)  
b. [[PAST]] = \(\lambda P \lambda t' \ \exists t[P(t) & t < t']\)
Aspect: [[Imperfective]] = \(\lambda Q \lambda t' \ \exists e' [Q(t', e') & t' \subseteq \tau(e')]\)
Sentence radicals:  
a. Embedded verbs: [[sing]] = \(\lambda t \lambda e [\text{sing}'(t, e, x)]\), where \(t = \text{RT}_\text{sing}\)  
b. Embedding verbs, where \(t = \text{RT}_\text{main}, t'= \text{RT}_\text{emb}\):  
Forward-shifting verbs: [[I force]]=\(\lambda P \lambda t \lambda e [\text{force}'(t, e, sp, P(t')) & t < t']\)
Back-shifting verbs: [[I remember]]]=\(\lambda P \lambda t \lambda e [\text{remember}'(t, e, sp, P(t')) & t < t']\)
Overlap-imposing verbs: \[[\text{I hear}]=\lambda P \lambda t \lambda e \exists t’ [\text{hear}’(t, e, sp, P(t’)) \& t’=t]\]

(1) Kara-m        go        da  pe-e        him        DA sing        IMPRF-3SG.PRES
‘I force him to sing.’

The order of morpheme application:

TENSE\text{main} [\text{ASP} [V_{main} [\text{TENSE}_{emb} [\text{ASP} [V_{emb}]]]]]

Semantic Derivation of (1):\(^{17}\)

1. \[[\text{he-sing’}]]=\lambda t’\lambda e’[\text{sing’}(t’, e’, x)]
2. \[[\text{Imperfective Aspect}]]=\lambda Q \lambda t \exists e [Q(t, e) \& t \subseteq t (e)]
3. \[[\text{Asp} ([1])]]=[\lambda t \exists e[\text{sing’}(t, e, x)\& t \subseteq t (e)]
4. \[[\text{PRES}]=\lambda P \lambda t'[P (t’)]
5. \[[\text{PRES} ([3])]]=\lambda t’\exists e[\text{sing’}(t’, e, x) \& t \subseteq t (e)]
6. \[[\text{I-force’}]=\lambda P \lambda t \lambda e’[\exists t”[\text{force’}(t, e”, sp, P(t”)) \& t”<t”]’
7. \[[\text{I-force’} ([5])]]=\lambda t \lambda e”\exists t”[\text{force’}(t, e”, sp, \exists e[\text{sing’}(t”’, e, x) \& t”’ \subseteq t (e))] \& t”’<t” & t”’ \subseteq t (e’)]
8. \[[\text{Imperfective Aspect}]=\lambda Q \lambda t’\exists e’ [Q(t’, e’) \& t”’ \subseteq t (e’)]
9. \[[\text{Asp} ([7])]]=\lambda t’\exists e”[\exists t”[\text{force’}(t’, e’, sp, \exists e[\text{sing’}(t”’, e, x) \& t”’ \subseteq t (e))] \& t”’<t” & t”’ \subseteq t (e’)]
10. \[[\text{PRES} ([9])]]=\lambda t \exists e” [\exists t”[\text{force’}(t, e”, sp, \exists e[\text{sing’}(t”’, e, x) \& t”’ \subseteq t (e))] \& t”’<t” & t”’ \subseteq t (e’)], which applied to the ST=s* yields:
11. \exists e’ \exists e” [\exists t”[\text{force’}(s*, e’, sp, \exists e[\text{sing’}(t”’, e, x) \& t”’ \subseteq t (e))] \& s*<t” & s* \subseteq t (e’)]

\(^{17}\)For the sake of simplicity I present an extensional analysis, leaving out the world variables.