Russian, Czech, Upper Sorbian uže / už / hižo and Aspectual Relations

The aim of the paper is to introduce a two-dimensional formal framework explaining the combinatorial behaviour of the phase particles with respect to the imperfective and perfective aspect in Czech, Upper Sorbian and Russian. 

*Uže/už/hižo* (‘already’) illustrate the logical apparatus. It will be shown that ungrammatical combinations yield an incorrect formal representation. This is due to the incompatibilities between different temporal structures built up both from the aspect of the verb and the phase particle.

1. The basic meaning of uže/už/hižo

In this paper, we consider the combinatorial behaviour of the phase particles, sometimes called aspectual particles, with respect to the imperfective and perfective aspect in Czech, Upper Sorbian and Russian. We introduce a two-dimensional framework that provides a logical explanation for the important data. For expository reasons we restricted ourselves to the description and analysis of the phase particle *uže/už/hižo* (already), but the introduced framework can be successfully applied to the analysis of the other phase particles *eščë/ještě/hišće* (still), *eščë ne/ještě/ne/hišće/nic* (not yet) and *bol’še/ne/už/ne/nic wjac* (no longer).

One of the meanings of the phase particles *uže/už/hižo* is illustrated by (1a–c). It is confined to occurrences with a temporal meaning of the phase particle and with wide scope over whole sentences (see Löbner 1989, 1990). The examples in (2) and (3) show that these particles can also have other meanings. For example, in (2a)/(2b) *uže/už* refer to a scale of volume/weight and a local scale, and in (3) *hižo* has narrow scope over the temporal frame adverbial *jutře*.

We follow Löbner (1989, 1990) in assuming that the wide scope use of *uže/už/hižo* in (1a–c) is the basic one. Throughout this paper, we are concerned with the basic use of the phase particles only, unless stated otherwise.

(1)  

1. a. *Poezd uže edet.*  
   The train already drive\textsuperscript{impf/pres}  
   \textit{The train is already moving.}  
   \textit{(Ru)}

2. b. *Petr už dosahuje kopce.*  
   Peter already reach\textsuperscript{impf/pres} mountain  
   \textit{Peter is already reaching the mountain.}  
   \textit{(Cz)}

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\textsuperscript{1} We would like to thank Luisa Marti for helpful comments on this paper and Šárka Lešnerová from Prague for information about the Czech data. Of course, all errors are the authors' responsibility.

\textsuperscript{2} In Zybatow and Malink (2003), we also show the application of the framework on German data concerning the combination of the phase particles with different verbal classes.

\textsuperscript{3} For a more detailed analysis of these uses see Löbner (1989, 1990).
The basic meaning of the phase particles can be divided into an assertion and a presupposition. A sentence like (1a) asserts that the train is moving, and presupposes that the train was not moving at some time in the recent past. More generally, the assertion of užé/hžo states that the sentence P holds at the time of assertion, i.e. at the reference time $t_r$ of the sentence. The presupposition states that P did not hold at some time before $t_r$. The assertion and the presupposition give rise to a temporal structure – the phase structure – consisting of a positive and a negative phase of P. During the negative phase P is false, and during the positive one P is true. Therefore, the reference time $t_r$ is part of the positive phase of P. In table (4) the phase structure triggered by užé/hžo is illustrated graphically and compared to the corresponding phase structures of eščë/jště/hišće (still), eščë ne/jště ne/hišće nic (not yet) and bol'se ne/už ne/nic wjac (=hžo nic) (no longer).

To formalize the basic meaning of the phase particles and their interaction with aspect we will use a many-sorted first order language containing variables of type $<$time$>$ and $<$event$>$. The unary function symbol $\tau$ of type $<$event$>$ $<$time$>$ assigns to every event its event time. The semantic domain of the time variables is an atomic semi-lattice of time points and intervals, ordered by the mereological relation $\subseteq$ (‘improper part of’) (see Krifka 1989). 'AT' is an unary predicate denoting the set of atomic times. The precedence relation $<$ is a sharp partial order within this semi-lattice. In (5) there is a set $\Pi$ of postulates about $\subseteq$ and $<$ we will need, and in

\footnote{1}{If the reference time $t_r$ is the speech time the change from a negative phase to a positive one induced by still is after the speech time. In many cases the speaker may not know surely whether the change will actually take place. Nevertheless, she is at least expecting the change to the positive phase which therefore should be considered as belonging to the 'conceptual content' of still (see Max and Malink 2001, p. 95-101).}

\footnote{2}{We use the term ‘event’ in the broad sense here for all kinds of eventualities.
the following we consider interpretations only which fulfill these postulates (see 6\text{def}). \pi_{1-5} are well known, only \pi_6 is rather specific in stating that every time \(t_1\) which has a right boundary has an atomic last point \(t_2\).

(5) set \(\Pi\) of postulates:
\[
\pi_1 \quad \forall t_1 \forall t_2 \neg (t_1 < t_2 \land t_2 < t_1) \\
\pi_2 \quad \forall t_1 (AT(t_1) \rightarrow \exists t_2 (t_2 < t_1 \land t_1 < t_3)) \\
\pi_3 \quad \forall t_1 \forall t_2 \forall t_3 (t_1 < t_2 \land t_2 < t_3 \rightarrow t_1 < t_3) \\
\pi_4 \quad \forall t_1 \forall t_2 \exists t_3 (t_1 \leq t_3 \land t_2 \leq t_3) \\
\pi_5 \quad \forall t_1 \forall t_2 \forall t_3 (t_1 < t_2 \land t_2 \leq t_3 \rightarrow t_1 < t_3) \\
\pi_6 \quad \forall t_1 (\exists t_2 (t_1 < t_2) \rightarrow \exists t_2 (AT(t_2) \land \forall t_3 (t_1 < t_3 \leftrightarrow t_2 < t_3)))
\]

(6\text{def}) A classical first order interpretation is said to be a \(\Pi\)-interpretation if all the postulates \(\pi_{1-6}\) are true in it. A classical formula is said to be \(\Pi\)-satisfiable if there is a \(\Pi\)-interpretation making it true.

Now, the phase structure of už/než/hižo and of eščë ne/jestë ne/hişće nic can be described by stating the existence of a last atomic time \(t_1\) of the negative phase, such that for all times \(t\), \(P\) holds at \(t\) if \(t\) is after \(t_1\) and \(P\) does not hold at \(t\) if \(t\) is not after \(t_1\), formally \(\exists t_1 (AT(t_1) \land \forall t (t < t_1 \leftrightarrow P(t))\)) or shorter \(\exists t_1 \forall t (t < t_1 \leftrightarrow P(t))\). By analogy, the phase structure of eščë/jestë/hišće and bolšë ne/už ne/nic wjac can be described by \(\exists t_1 \forall t (t < t_1 \leftrightarrow P(t))\). Thus, both pairs of phase particles share the same presupposition respectively and differ only in asserting or negating \(P(t)\).

The phase structure triggered by phase particles does not refer to all times but rather to all times within a contextually determined interval. This interval will be much longer in (7) than in (8), where only one change of the traffic lights is considered and all others are neglected.

(7) Petr už chodzi do školy.
Peter already goes to school.

(8) Svět ofor uže zelënyi.
The traffic lights are already green.

The reference to a certain contextually determined interval can be captured formally by restricting the quantifiers in \(\exists t_1 \forall t (t < t_1 \leftrightarrow P(t))\) to some interval \(t_1\). For the sake of simplicity we do not represent \(t_1\) in our formalization and take the whole domain of time to be a constant (unbounded) default interval. To avoid trivial phase structures, \(t_1\) must not be an initial or final time of the time domain, which is assured by postulate \(\pi_2\).

Assertions and presuppositions will be represented by two-dimensional expressions

\[
\begin{bmatrix}
A \\
B
\end{bmatrix}
\]

as suggested e.g. in Karttunen & Peters (1979), Bergmann (1981) or Max (2002). So we will be able to distinguish formally in a simple manner between falseness and incorrectness of sentences containing phase particles.

(9\text{def}) Let \(A\) and \(B\) be classical first order expressions. Then the two-dimensional expression

\[
\begin{bmatrix}
A \\
B
\end{bmatrix}
\]

is true in a classical interpretation, if \(A\) and \(B\) are true in it; it is false in a classical

\[\text{Example:}\]
Peter already goes to school.

\[\begin{bmatrix}
\text{Petr} \\
\text{chodzi do školy}
\end{bmatrix}
\]

The postulate \(\pi_6\) could be omitted but the proofs in the last section of this paper would get somewhat more involved in this case.
interpretation, if A is false and B true in it; otherwise, i.e. if the presupposition B is false, the two-dimensional expression is incorrect.

The formal definition of \textit{už/hižo} is in (10a). (10) also contains, for completeness, definitions for the other three phase particles.

(10_{def}) Let P be an unary first order predicate of type \(<\text{time}, t>\) and \(t_r\) an individual variable of type \(<\text{time}>\):

(a) already =\text{df} \lambda P \lambda t_r [P(t_r) \land \exists t \in \text{time}, \forall t (t < t_r \leftrightarrow P(t))]

(b) not yet =\text{df} \lambda P \lambda t_r [\neg P(t_r) \land \exists t \in \text{time}, \forall t (t < t_r \leftrightarrow P(t))]

(c) still =\text{df} \lambda P \lambda t_r [P(t_r) \land \exists t \in \text{time}, \forall t (t < t_r \leftrightarrow P(t))]

(d) no longer =\text{df} \lambda P \lambda t_r [\neg P(t_r) \land \exists t \in \text{time}, \forall t (t < t_r \leftrightarrow P(t))]

2. Morphological aspect, tense and phase particles in Czech, Upper Sorbian and Russian

The main concern of the present section is the distribution of the phase particles \textit{už/hižo} with respect to morphological aspect and tense. In section four we will show that the combinatorial behaviour of these phase particles can be captured by the two-dimensional formal model of the first section. First we are going to consider perfective and imperfective verbs in the present tense.

2.1. Present Tense:
Along with other Slavic languages Russian, Czech and Upper Sorbian distinguish two morphological aspects – perfective and imperfective. The particle \textit{už/hižo} in its basic meaning can be combined with imperfective verbs in the present tense without any problems or reinterpretations of the verb meanings in all three languages, as the examples (11a-c) show. If the same sentences are used without \textit{už/hižo} as in (11a’-c’) then no phase structure is imposed, which means that (11a’-c’) do not have a phase presupposition like (11a-c).

(11) a. Petr \textit{už} dosahuje kopce. \hspace{1cm} (Cz)
Peter already reach\textit{impf/pres} mountain
Peter is already reaching the mountain.

a’. Petr dosahuje \textit{kopce}.
Peter reach\textit{impf/pres} mountain
Peter is reaching the mountain.

b. Petr \textit{hižo} jabluka šćipa. \hspace{1cm} (USo)
Peter already \textit{impf/pres} apples pick
Peter is already picking apples.

b’. Petr jabluka šćipa.

\footnotesize{\textsuperscript{7} In the type notation, ‘t’ is a constant symbol for the type of truth values.}
Peter apples pick\text{impf/pres}
Peter is picking apples.

c. *Poezd \textit{už} edet.
Train already go\text{impf/pres}
The train is already going.

c. *Poezd edet.
Train move\text{impf/pres}
The train is moving.

The situation is completely different if one considers the combination of \textit{už}/\textit{už}/hižo and perfective verbs in the present tense. Firstly, perfective verbs in the present tense normally express simple future. They do not describe ongoing events in the present (see 12a,b).

\begin{itemize}
\item a. \textit{Petr} dosáhne \textit{kopce}.
Peter reach\text{pf/pres} mountain
Peter will reach the mountain.

\item b. \textit{Pětr jabłuka} zešćipa.
Peter apples pick\text{pf/pres}
Peter will pick the apples.
\end{itemize}

In Czech and Upper Sorbian \textit{už}/hižo cannot be combined with perfective verbs in the present tense, because perfective verbs are incompatible with the phase structure of the phase particles. The reason for this incompatibility is that these kinds of phase structures cannot be imposed on inhomogenous situations as described by perfective verbs in Slavic languages.\footnote{In Czech there is an emotive secondary use of \textit{už} in the sense of \textit{už konečně} (finally, after all) in which (13a) is an acceptable sentence, expressing that John is expected to reach the mountain eventually after big troubles now. However, this use of \textit{už} as a modal particle lays beyond the basic meaning of the phase particles and will be neglected in the following.}

\begin{itemize}
\item a. *Petr \textit{už} dosáhne \textit{kopce}.
Peter already reach\text{pf/pres} mountain

\item b. *Pětr hižo jabłuka zešćipa.
Peter already apples pick\text{pf/pres}

\item c. *Pětr jabłuka hižo zešćipa.
Peter apples already pick\text{pf/pres}
\end{itemize}

Unlike in Czech and Upper Sorbian, Russian perfective verbs in the present tense can express future perfect as well as simple future. This is why the combination of \textit{už} with perfective verbs is possible in Russian (see 14b). As a matter of fact the combination of a perfective verb and \textit{už} forces the future perfect interpretation and a simple future interpretation like in (14a) is excluded in (14b).

\begin{itemize}
\item a. \textit{V vosem časov, poezd uedet}.
At 8 o’clock train depart\text{pf/pres}
At 8 o’clock the train will depart.

\item b. \textit{V vosem časov, poezd \textit{už} uedet}.
At 8 o’clock train already depart\text{pf/pres}
At 8 o’clock the train will already have departed.
\end{itemize}
2.2 Past Tenses:
As the combination of imperfective verbs and uže/užihižo is unproblematic in all tenses, we just look at the data with perfective verbs. In Czech and Russian there is only one past tense and perfective verbs are compatible with už in this past tense (see 15 and 16). The Sorbian perfect tense allows the combination of a perfective verb with hižo as well (17a). But all three sentences need to have a perfect interpretation (reference time = speech time). Simple past interpretations with reference time before speech time like in (17b) are not available in (15), (16) and (17b).

(15) Petr už dosáhl kopce.
Peter has already reached the mountain.

(16) Pëtr uže vyigral.
Peter has already won.

(17) a. Pětr je jabłuka hižo zešćipał.
Peter has apples already picked
b. Jako přińđech na zahrodu, je Pětr hižo jabłuka šćipał.
When came into the garden Peter was already picking apples.

There is another past tense in Upper Sorbian – the synthetic past. This past tense is called 'aorist' for perfective verbs and in some cases it is homonymous with the present tense. When perfective verbs appear in the 'aorist' tense they are incompatible with hižo as they are in the present tense.

(18) a. *Pětr hižo jabłuka zešćipa.
If the reference time $t_r$ is located before the speech time (i.e. through context) then uže/užihižo force a past perfect interpretation if combined with perfective verbs. Czech and Upper Sorbian have other means to express past perfect (see 19c and 20c) and it cannot be expressed by the perfect or the past tense. Therefore, (19b) and (20b) are ungrammatical. Both sentences are correct without the phase particle už/hižo in which case the main clause receives a simple past reading (see 19a and 20a). (19b) and (20b) are grammatical without the preceding subordinated clause and have a present perfect reading in this case. The ungrammaticality of (19b) and (20b) is caused by the subordinated clause, which excludes the perfect reading by shifting the reference time before the speech time.

When came into the gym, he won.

b. *Jako přińđe wona do sportoweje hale, je wón hižo dobył.

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9 Upper Sorbian has a past perfect tense (19c) and Czech can use a possessive resultive construction with the n/t-participle to express past perfect meaning (20c).
When came she into gym, is he already won perf/pres perfect

When came she into gym, he had already won.

(Aus)

When came she into gym, he won.

(20)

When came into gym, he had already won.

(21)

When she came into the gym, he had already won.

Again the situation is different in Russian. The morphological tense system of Russian is very poor and the past tense can have a past perfect reading when combined with užë (21b).

In summary one can say that, in the basic meaning, uže/užë/hížo are allowed with imperfective verbs without restrictions. A combination of perfective verbs and uže/užë/hížo is possible only when a (present, future or past) perfect reading is available.

3. Aspectual Relations

It is well known that one has to distinguish between morphological aspect and semantic aspect or so-called 'aspectual relations'. The task of semantic aspect (aspectual relations) is to introduce the reference time $t_r$ and to determine the relation between the event time $\tau(e)$ and $t_r$ (see Klein 1994; Paslawska and von Stechow 2002). To represent the interplay between the syntax and semantics of aspect and tense, we start out from the assumption that the functional aspect category is located between the tenseless VP and the tense phrase TP. For the sake of simplicity, the VP will be represented semantically by an unanalysed event predication $F(e)$. The task of the TP is to determine the relation between the reference time $t_r$ and the speech time.

The question now is at which position the phase particles should be located in the semantic composition. Aspectual information determines the (un)grammaticality of phase particles as the above examples have shown. On the other hand, purely temporal information, the relation between the reference time and the speech time, is not relevant for the (un)grammaticality of
phase particles. Grammatical present tense sentences containing phase particles remain grammatical in any other tense, they can be shifted freely along the time axis (see e.g. 26). Ungrammatical present tense sentences containing phase particles stay ungrammatical in other morphological tenses as long as aspectual information is not affected by them (19b, 20b). This is why we assume that the phase particle is adjoined to the AspP and therefore beneath the TP-node.

(23) TP
    AspP
    Phase Particle
    AspP
    VP

The three most important aspectual relations are defined in more detail in (24) (see Klein 1994; Paslawska and von Stechow 2002).

(24) PERFECTIVE: \( \lambda F \lambda e \lambda t \cdot \tau(e) \subseteq t \land F(e) \) F of type <event,t>

IMPERFECTIVE: \( \lambda F \lambda e \lambda t \cdot t \subseteq \tau(e) \land F(e) \) F of type <event,t>

PERFECT: \( \lambda F \lambda e \lambda t \cdot \tau(e) < t \land F(e) \) F of type <event,t>

The semantic PERFECTIVE aspect states that the event time \( \tau(e) \) is included in the reference time. The boundaries of the event lay within the reference time which leads to a bounded interpretation of the event. This corresponds to the intuition that in perfective sentences the event is seen from the outside. On the contrary, the semantic IMPERFECTIVE aspect states that the reference time is included in the event time. The boundaries of the event do not lie within the reference time. This corresponds to the intuition that in imperfective sentences the event is seen from the inside as an unbounded event. The semantic PERFECT aspect simply states that the event time is before the reference time. Due to the transitivity of < the PERFECT aspect can be thought of as expressing an everlasting resultant state (Kratzer 2000).

(25) Jurij je hižo klawěr hral.
    Jurij has already piano play
    Jurij has already played the piano.

(26) Jako wčera do korčmy přiındzech, je Jurij hižo klawěr hral.
    When yesterday into pub come has Jurij already piano play
    When I came into the pub yesterday, Jurij was already playing the piano.

(25) and (26) illustrate the difference between PRESENT PERFECT and PAST IMPERFECTIVE interpretations, respectively, of the same morphological tense. (25) has a PERFECT reading with reference time = speech time when uttered by Jurij's father, asking whether he has done his daily stint in playing the piano yet. The same sentence gets a PAST IMPERFECTIVE interpretation when the reference time is shifted before the speech time e.g. by a preceding subordinated clause (26).

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10 Note that the definitions in (24) depart from the definitions in Klein (1994) and Paslawska/von Stechow (2002) in that the event variable 'e' is not bound by an existential quantifier. The formal results of this article can be obtained when 'e' is existentially bound as well. However, the technical details get somewhat more involved in this case and more postulates are needed than the postulates in (5). For the sake of simplicity we assume that 'e' is bound somewhere above the aspectual node.
In order to explain the data of section two we have to assume a relation between morphological and semantic aspect/tense. This is done in table (27) in a straightforward manner. Note that Russian morphological present tense perfective aspect allows for both semantic PERFECTIVE and PERFECT aspect. Russian morphological past tense perfective aspect allows for a PAST PERFECTIVE (21a), PAST PERFECT (21b) and PRESENT PERFECT (16) reading.

Of course there are exceptions of the rules stated in table (27). Particularly in Upper Sorbian the distinction between morphological perfective and imperfective verbs is not as strong as e.g. in Czech. Because of such exceptions we do not insist on the claims about morphological aspect, e.g. that phase particles cannot be combined with morphologically present tense perfective verbs in Upper Sorbian. What we claim is that phase particles lead to incorrectness in sentences licensing the semantic PERFECTIVE aspect. Table (27) is just a rough guideline to relate this general claim to the concrete morphological categories of the three Slavic languages considered here.

The distributive behaviour of the phase particles with respect to semantic aspect is confirmed by data from non-Slavic languages like German. Even though German has no morphological category of aspect its verbs are distinguishable with respect to verbal lexical classes (like the Vendlerian classes). Without going into detail it can be shown that only process and state verbs – both referring to homogeneous events and licensing the semantic IMPERFECTIVE aspect – can easily combine with the phase particles in all tenses. On the other hand, accomplishments and achievements cannot be combined with phase particles in most cases because these verb classes license the semantic PERFECTIVE aspect.

4. 'The facts predicted'

In this section we discuss the results of applying the phase particle already as defined in (10) to the three semantic aspects in (24). Thus, we relate the formal apparatus of section one and three to the empirical data of section two. The details of the application of already to IMPERFECTIVE are shown in (28) and (29a-c) shows the results of applying already to each of the semantic aspects in (24).

\[
\text{already (IMPERFECTIVE)} = \\
\lambda P \lambda t_\tau \left[ P(t) \right] \eta t \in t(t_\tau < t \leftrightarrow P(t)) \left( \lambda F \lambda e \lambda t_\tau . \ t_\tau \subseteq \tau(e) \land F(e) \right)
\]

\[
\lambda F \lambda e . \ (\lambda P \lambda t_\tau . \left[ P(t) \right] \eta t \in t(t_\tau < t \leftrightarrow P(t)) \left( \lambda t_\tau . \ t_\tau \subseteq \tau(e) \land F(e) \right)) \quad \text{(functional composition)}
\]

\footnote{For the present purposes it does not matter whether the phase particles are applied directly to the semantic aspect or whether the semantic aspect is applied to a VP-event-predication \( \lambda e . F(e) \) first. We have chosen the first option here.}
\[
\lambda F \lambda \epsilon \lambda t. \left[ t_r \subseteq \tau(e) \land F(e) \land \exists^\tau t_r \forall t (t_r < t \leftrightarrow (t \subseteq \tau(e) \land F(e))) \right]
\]

(\lambda\text{-application})

(29a) \textbf{already} (IMPERFECTIVE) = \lambda F \lambda \epsilon \lambda t. \left[ t_r \subseteq \tau(e) \land F(e) \land \exists^\tau t_r \forall t (t_r < t \leftrightarrow (t \subseteq \tau(e) \land F(e))) \right]

(29b) \textbf{already} (PERFECTIVE) = \lambda F \lambda \epsilon \lambda t. \left[ \tau(e) \subseteq t_r \land F(e) \land \exists^\tau t_r \forall t (t_r < t \leftrightarrow (\tau(e) \subseteq t \land F(e))) \right]

(29c) \textbf{already} (PERFECT) = \lambda F \lambda \epsilon \lambda t. \left[ \tau(e) < t_r \land F(e) \land \exists^\tau t_r \forall t (t_r < t \leftrightarrow (\tau(e) < t \land F(e))) \right]

The presuppositions of (29a-c) differ only in the relation between \( \tau(e) \) and \( t \) on the right side of the material equivalence, but this difference has important consequences. The presupposition of (29a) (i.e. \( \exists^\tau t_r \forall t (t_r < t \leftrightarrow (t \subseteq \tau(e) \land F(e))) \)) behaves like a presupposition should behave: it is \( \Pi \)-satisfiable\(^{12}\) (see 6\text{def}) and it is not trivial in the sense that it follows from the assertion. There are no technical difficulties in applying \textbf{already} to IMPERFECTIVE. This corresponds to the unproblematic use of \textit{uželo/užo/hizo} in imperfective sentences (see 1a-c). The situation changes completely when applying \textbf{already} to PERFECTIVE.

\textbf{CONSEQUENCE 1.} \textbf{already} (PERFECTIVE) is incorrect in every \( \Pi \)-interpretation, its presupposition is not \( \Pi \)-satisfiable.

\textit{Proof.} If there is a \( t_x \) such that \( \text{AT}(t_x) \) and \( \forall t (t_x < t \leftrightarrow (\tau(e) \subseteq t \land F(e))) \), there would be a \( t_1 \) and a \( t_2 \) such that \( t_1 < t_x \land t_1 < t_2 \) due to postulate \( \pi_2 \). Because of the bivalence \( t_1 < t_2 \leftrightarrow (\tau(e) \subseteq t_2 \land F(e)) \) we have \( \tau(e) \subseteq t_2 \land F(e) \). Postulate \( \pi_4 \) gives us the existence of a \( t_3 \) such that \( t_1 \leqslant t_3 \land t_2 \leqslant t_3 \). With \( \tau(e) \subseteq t_2 \land F(e) \) and postulate \( \pi_5 \) we get \( \tau(e) \subseteq t_3 \land F(e) \) and by the bivalence \( t_x < t_3 \). From \( t_x < t_3 \) and \( t_1 \leqslant t_3 \) we get \( t_x < t_1 \) by postulate \( \pi_3 \). But at the same time \( t_1 < t_x \) does hold, which contradicts \( \pi_1 \).

\textbf{CONSEQUENCE 1} predicts that \textit{uželo/užo/hizo} cannot be applied to the PERFECTIVE semantic aspect. Sentences allowing only for a PERFECTIVE reading are therefore incorrect, which explains the incorrectness of the Czech and Upper Sorbian present tense and aorist examples (13a-c, 18ab), assuming the rules of table (27). In sentences allowing for a PERFECTIVE and a PERFECT reading the PERFECTIVE reading is ruled out by \textit{uželo/užo/hizo} in the same way. This is what happens in the Russian examples (14b, 21b). In all three languages the PAST PERFECTIVE interpretation of the morphological (perfect) past tense of perfective verbs is ruled out by \textit{uželo/užo/hizo} and the PRESENT PERFECT reading is forced instead (15-17, 19b, 20b).

\textbf{CONSEQUENCE 2.} The phase particle in \textbf{already}(PERFECT) is, so to speak, informationless since the presupposition triggered by it follows logically from the assertion.

\(^{12}\) The proof of the \( \Pi \)-satisfiability of \( \exists^\tau t_r \forall t (t_x < t \leftrightarrow (t \subseteq \tau(e) \land F(e))) \) is omitted here for brevity.
Proof. Let the assertion $\tau(e)<t \land F(e)$ hold in a classical interpretation. Then by $\tau(e)<t$ and $\pi_6$ there is a $t_x$ such that $AT(t_x) \land \forall t (t_x<t \leftrightarrow \tau(e)<t)$. Since $F(e)$ is true and the variable $t$ does not occur free in $F(e)$ we get $\forall t (t_x<t \leftrightarrow (\tau(e)<t \land F(e)))$ and thereby $\exists t_x \forall t (t_x<t \leftrightarrow (\tau(e)<t \land F(e)))$.

CONSEQUENCE 2 states that applying $užé/už/užížo$ to a sentence which licenses the PERFECT semantic aspect does not cause any incorrectness (see the unproblematic sentences 15-17). $užé/už/užížo$ does not add any new information to the sentence at all since the triggered presupposition follows logically from the assertion, which is not affected by the phase particle. Indeed, in (1a-c) $užé/už/užížo$ add the phase presupposition that the situation did not hold at some time before the reference time and that the reference time is part of a specific phase structure (see (11a'-c') vs. (11a-c)). In the PERFECT sentences (15-17), on the contrary, the phase particles do not impose a new phase structure since PERFECT sentences already express a phase structure by themselves. The only contribution of $užé/už/užížo$ to the meaning of (15-17) is to give rise to the PERFECT reading of the underspecified morphological (perfect) past tense. Once this reading is specified, (15-17) carry exactly the same temporal information as they do without $užé/už/užížo$. Any further contributions of $užé/už/užížo$, e.g. evaluation of the situation as 'early'\textsuperscript{13}, lay beyond our semantic formalization.

CONSEQUENCE 1 and CONSEQUENCE 2 explain why $užé/už/užížo$ is the disambiguator par excellence for sentences allowing for both a PERFECT and a PERFECTIVE reading. It is incompatible with the PERFECTIVE reading and does not change the meaning of the PERFECT reading. Sentences allowing for a (PRESENT) PERFECT and (PAST) IMPERFEFCTIVE reading stay ambiguous after adding $užé/už/užížo$ and have to be disambiguated by other means (see 25 vs. 26).

5. Conclusion

The multi-dimensional formalization of phase particles is able to cover a whole range of data concerning the combination of the phase particles $užé/už/užížo$ and (im)perfective verbs in Czech, Upper Sorbian and Russian. Examination of the data showed that the only possibility of combining $užé/už/užížo$ with a perfective verb, regardless of the morphological tense, is a PERFECT interpretation of the sentence. Russian perfective verbs can have a PERFECT interpretation in the present and the past tense. In Czech and Upper Sorbian only the (perfect) past tense allows for a PERFECT reading. Formally, $užé/už/užížo$ gives rise to a contradiction when applied to the aspectual relation PERFECTIVE. In the two other cases (IMPERFECTIVE and PERFECT) the application of $užé/už/užížo$ does not lead to a contradiction. Thus, the framework presented above successfully accounts for the data of interest here.

Bibliography


\textsuperscript{13} See Löbner (1989), van der Auwera (1993) and again Löbner (1999) for a discussion of the status of such meaning components of the phase particles.


Löbner, S. (1999) 'Why German schon and noch still are Duals: A Reply to Van der Auwera'. *Linguistics and Philosophy* 22, 45-106


