The grammaticalization of ‘big’ situations:
The IMPF operator and Perfective Imperfects in Bulgarian
(Running Head: The grammaticalization of ‘big’ situations)

María Luisa Rivero, Ana Arregui, and Nikolay Slavkov
University of Ottawa, Ottawa, Canada

Revised version August 2015

1. Proposal

Situation-semantics as developed by Kratzer (e.g. 1989, 2011) has

1 Research partially subsidized by the Social Sciences and Humanities Research Council of Canada (Grant 410-2009-0828 to M. L. Rivero). We are very grateful to Galia Dukova-Zheleva and to Vesela Simeonova for judgments and advice. Usual disclaimers apply. Preliminary versions of this paper were read at WCCFL 33 in Vancouver, B.C., in March 2015, and at the Annual Meeting of the Canadian Linguistic Association in Ottawa, ON, in June 2015; we thank the participants of those conferences for useful comments. A briefer version of this paper will appear in the Proceedings of the 33rd West Coast Conference on Formal Linguistics published by Cascadilla Press.
proven an illuminating framework for a variety of linguistic puzzles, including the proposal that situation ‘size’ serves to explain phenomena such as adverbial quantification and presupposition projection (e.g. Berman 1987, Heim 1990, Elbourne 2005, among others). In this paper, we propose a novel perspective on situation size in order to account for restrictions on the interpretation of aspectual morphology as associated with ‘viewpoint aspect’ (Smith 1991/1997). While situation size has been a topic of discussion in situation-semantics, the focus so far has been on distinguishing ‘minimal’ situations with certain properties (e.g. Berman 1987, Heim 1990). We argue that ‘big’ situations are also worth examining. In particular, we propose that distinctions between ‘big’ vs. ‘small’ situations (e.g. a whole possible world vs. a single event that is a small part of a possible world) provide insights into aspectual oppositions resulting in habitual/generic vs. singular/episodic/ongoing interpretations.

Our empirical focus is on Bulgarian. This language displays a particularly rich array of aspectual morphology, bringing together features that are considered prototypical of the Slavic family with those seen as characteristic of the Romance family. Such a combination provides an ideal vantage point for studying semantic constraints on aspect, in particular those that impinge on situation ‘size’.

The paper is organized as follows. Section 2 outlines the aim of this research: to provide an explanation for interpretative differences triggered by Perfective Imperfect verbs (i.e. those with a perfective stem morphology
and an imperfect tense inflection) and Perfective Aorist verbs (i.e. those with a perfective stem morphology and an aorist tense inflection). When such verbs appear in adjunct clauses combined with a main clause with a verb in the imperfect tense, the perfective imperfect type in the adjunct triggers a habitual reading while the perfective aorist type triggers an episodic reading. Section 3 introduces the different morphological anatomies and readings found in Bulgarian verbs inflected for the imperfect tense. Verbs in the imperfect tense may be primary imperfectives, secondary imperfectives, or perfectives (our main concern), and such morphological combinations are not semantically inert. Section 4 argues that the semantics of all verbs in the imperfect tense in Bulgarian should be unified under a modal operator IMPF, which is a Viewpoint Aspect category. Section 5 proposes an answer to the interpretative puzzle posed by Perfective Imperfects vs. Perfective Aorists, which is that adjuncts with the first type of verb are interpreted in the scope of IMPF, and affect its domain of quantification, while those with Perfective Aorist verbs do not restrict IMPF, and instead modify the topic situation. Section 6 argues that a successful analysis of the interpretative contrast between Perfective Imperfects and Perfective Aorists involves a Viewpoint or high-level operator above Voice Phrase or vP, as opposed to Situation Aspect / Pluractionality or a low level operator at the V-level. Section 7 takes stock of the ideas discussed throughout the paper and offers general conclusions.
2. **Perfective Imperfects vs. Perfective Aorists**

Bulgarian brings together aspectual derivational morphology familiar in the Slavic family and aspectual inflectional oppositions familiar in the Romance family, resulting in a complex system of semantic aspectual relations without exact parallels in either of those two families. Bulgarian shares with other Slavic languages the opposition traditionally labeled ‘vid’ between imperfective (Impf) and perfective (Perf) verb stems, as well as the presence of perfectivizing prefixes (PR). Bulgarian, however, has preserved a series of aspectually marked tenses, which distinguish it from most other Slavic languages, and which it shares with Romance languages. These include contrasting imperfects (IMPF) and aorists (AOR) encoded by verb inflections, as well as present, past, and future perfect tenses (see Rivero and Slavkov 2014 for more details and references). The focus of this paper is on the interaction between the ‘Slavic style’ perfective/imperfective oppositions known as ‘vid’, which reside in verbal stems and in (mostly) prefixes, with the ‘Romance style’ imperfect/aorist distinction in verbal inflections, an important additional characteristic of Bulgarian.

As illustrated in (1a-b) and (2a-b), Bulgarian imperfective (Impf) and perfective (Perf) verb stems can combine with imperfect inflections (IMPF), and in addition can be marked with perfectivizing prefixes (PR).
(1) Imperfective Imperfects

a. pro.čita.še
   PR.read.Impf.IMPF
   ‘(he/she) was reading / (he/she) used to read (to the end)’

b. v.liza.še
   PR.enter.Impf.IMPF
   ‘(he/she) was entering / (he/she) used to enter’

(2) Perfective Imperfects

a. pro.čete.še
   PR.read.Perf.IMPF
   ‘(he/she) (used to/repeatedly) read (to the end)’

b. v.leze.še
   PR.enter.Perf.IMPF
   ‘(he/she) used to enter’

The morphological combinations in (1-2) are the sources of important interpretative effects, as reflected in our translations. Imperfective verb stems with imperfect inflections of type (1) are ambiguous between ongoing and habitual interpretations. By contrast, perfective verb stems with imperfect inflections of type (2) are restricted to habitual interpretations, as illustrated in (3) with pro.čete.še.
In this paper, we focus on contrasts arising between perfective imperfects of type (2) and perfective aorists (i.e. prefixed verbs with an aorist inflection) in adverbial-like adjunct clauses and antecedent clauses in conditional constructions to argue that aspectual morphology grammaticalizes constraints on situation size, with perfective imperfects exclusively encoding ‘big’ situations associated with characterizing readings. To introduce our proposal, let us consider (4a-b) vs. (5a-b):

(4) **Episodic**

a. *Kogato majka mi v.leže v stajata,*

When mother my **PR.come.Perf.AOR** in room.the,

*az (*vse) govorex po telefona.*

I (*always) **talk.Impf.IMPF** on phone

‘When my mother entered the room, I was

(*always) talking on the phone.’
b.  *Kogato Marija v.leze v stajata,*

When M. **PR.enter.Perf.AOR** in room.the,

*Ivan veče izgarjašte mlakoto.*

Ivan already **PR.burn.Impf.IMPF** milk.the

‘When Mary entered the room, Ivan was already burning

the milk.’

(5) **Habitual**

a.  *Kogato majka mi v.lezešte v stajata,*

When mother my **PR.come.Perf.IMPF** in room.the,

*az (vse) govorex po telefona.*

I (always) **talk.Impf.IMPF** on phone

‘When(ever) my mother used to/would enter the room, I

used to (always) be talking on the phone.’

b.  *Kogato Marija v.lezešte v stajata,*

When M. **PR.enter.Perf.IMPF** in room.the,

*Ivan veče izgarjašte mlakoto.*

Ivan already **PR.burn.Impf.IMPF** milk.the

‘Whenever Mary used to enter the room, Ivan would

already be burning the milk.’

The sentences in (4a) and (5a) and those in (4b) and (5b) form two
minimal pairs whose only formal difference resides in an Aorist inflection in the prefixed adjunct verb in the first case vs. an Imperfect inflection in the similarly prefixed adjunct verb in the second case. More precisely, the adjunct clause in (4a) contains the Perfective Aorist (Perf.AOR) verb vleze containing the prefix v-, and this triggers an unambiguous episodic/ongoing reading on the main clause imperfective verb govorex inflected for the Imperfect tense (Impf.IMPF). The morphological combination in sentence (4a), then, results in a report about a particular episode: ‘on that occasion, I was talking on the phone’, which is incompatible with the adverb always. By contrast, (5a) contains a Perfective Imperfect (Perf.IMPF) verb in the adjunct clause: vlezeše, also with the prefix v-. In this second case, however, the construction receives a habitual reading, speaking of a generalization involving a series of repeated actions, each of them as complete. So, whereas the main clause imperfect govorex in (4a) gives rise to an episodic ‘was talking’ interpretation, in (5a) it gives rise to a characterizing/habitual ‘used to talk’ interpretation. The use of the adverb vse ‘always’ is optional in (5a), but, to repeat, it is not possible in (4a). The only difference between the two sentences is in the aspectual morphology encoded in the verb inflection of the adjunct clause.

The minimal pair formed by (4b) and (5b) contains an identical adjunct clause to the one in (4a) and (5a) and a main clause verb inflected for the imperfect tense and also marked with secondary imperfectivization. The interpretative contrast between (4b) and (5b) is parallel to the one
between (4a) and (5a). So, whereas the main clause imperfect with secondary imperfectivization izgariše in (4b) gives rise to an episodic ‘was-burning-the-milk’ interpretation, in (5b) it gives rise to a characterizing/habitual ‘used-to-be-burning-the-milk’ interpretation.

The situation as just described thus gives rise to the inescapable conclusion that the episodic nature of (4a-b) and the characterizing nature of (5a-b) are in both cases due to the (unambiguous) interpretative effect of the adjunct verb, which, to repeat, is a Perfective Aorist in the former two cases, and a Perfective Imperfect in the latter two cases.

Perfective Imperfects and their habitual interpretation have not gone unnoticed in the literature on Bulgarian. They have long been noted by descriptive grammarians (Maslov 1959, Pašov 1999, Nitsolova 2008: 284, a.o.), and linguists interested in aspect (Comrie 1976, Bertinetto and Delfito 2000: 215, Gvozdanovic 2012: 792, a.o.). Descriptive grammars often illustrate Perfective Imperfects by means of older literary texts, but these constructions can also be easily attested both in recent literary texts, and in informal posts on the Internet, as in example (6) adapted from (Rivero and Slavkov 2014).

(6) Ako njakoj krivneše da bjaga prez deretata,

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2 Examples and interpretations in this paper also fit the intuitions of three language informants who are educated native speakers of Bulgarian.
If somebody \textit{swerve.Perf.IMPF} to run through ravines, the,

\textit{mu trošexa kokalite s točen dalečen udar}

cl.Dat \textit{break.Impf.IMPF} bones with precise far blow

\textit{i pak “vsičko si idvaše na mjastoto”}

and again ‘all Refl \textit{come.Impf.IMPF} to place’

‘If somebody turned running through the ravines, they used to break his bones with a well-targeted blow from afar and then again ‘everything used to come back to normal’.


The aim of this paper is to provide a preliminary answer to the puzzle arising from the interpretative difference triggered by the \textit{Perfective Aorist} in (4) in contrast with the \textit{Perfective Imperfect} in (3), (5), and (6), which we spell out as (7).

(7) \textbf{The Puzzle:}

In constructions with main clauses with verbs in the Imperfect tense,

- Adjunct clauses with \textit{Perfective Imperfect} verbs only give rise to habitual/generic readings.
- Adjunct clauses with \textit{Perfective Aorist} verbs only give rise to
Advancing ideas, we argue that patterns of type (3), (5), and (6) provide support for the hypothesis that *Perfective Imperfects* grammaticalize or lexicalize ‘big’ situations, as indicated in (8). By contrast, patterns of type (4) indicate that the global effect of *Perfective Aorists* is episodic, and not necessarily linked to ‘big’ situations.

(8) **The Grammaticalizing Size Hypothesis (GSH):**

*Perfective Imperfect* Verbs are marked as having denotations true only in ‘big’ situations (giving rise exclusively to generic/habitual readings).

We capture the different effects of Perfective Imperfects and Perfective Aorists by developing an analysis based on the two core ideas sketched in (9a-b). Both (9a) and (9b) make reference to a modal operator IMPF, which we propose is systematically hosted by all verbs that display an imperfect tense inflection in Bulgarian.

(9) **The Hypothesis:**

a. *Perfective Imperfects* affect the quantification domain of the IMPF Operator.
b. \textit{Perfective Aorists} modify the topic situation, but do not affect the quantification domain of the IMPF operator.

Whereas clause-adjuncts with Imperfect verbs may serve as restrictors for, and thus be interpreted within the scope of, the IMPF operator, this is not possible for clause-adjuncts with Aorist verbs. In other words, only adjuncts with verbs with Imperfect morphology can affect the domain of quantification of IMPF. Adjuncts with Aorist verbs are not themselves in the scope of IMPF, but instead serve as location for the situations that anchor the claims made by IMPF, a core idea developed in §4.

However, Bulgarian verbal morphology is more complex than usually envisaged in discussions of past verbs with imperfective morphology in most Slavic languages or verbs with imperfect tense inflection morphology in the Romance languages. We note that Bulgarian verbs inflected for the imperfect tense may host a series of additional morphologies, and those prove not to be semantically inert. In §3 we review the anatomy of various Bulgarian verbs in the imperfect tense for an overall understanding of their syntactic behavior and their interpretations.

3. \textbf{The anatomy of verbs with the Imperfect tense inflection in Bulgarian}
In (10a) we exemplify a Perfective Aorist. In (10b-d) we exemplify the three morphological anatomies that may be exhibited by verbs with an imperfect tense inflection. All four forms in (10) represent Third Person Singular verbs that share the stem -ćet- ‘read’. Those in (10a-c) contain the prefix pro-, which roughly speaking indicates completion, as in ‘read (something) to the end’, and (10d) lacks a prefix.

(10)  

a. pro.ćete  Morphology: Perfective Aorist  
       Reading: Episodic (=PERF)

b. pro.ćete.še  Morphology: Perfective Imperfect  
       Reading: Habitual (=IMPF)

c. pro.čita.še  Morphology: Secondary Imperfective Imperfect  
       Readings: Habitual or Ongoing/episodic (=IMPF)

d. čete.še  Morphology: Primary Imperfective Imperfect  
       Readings: Habitual or Ongoing/episodic (=IMPF)

The verb forms in (10a) vs. (10b) illustrate the fundamental contrast at the core of our proposal on grammaticalized ‘small’ and ‘big’ situations. On the one hand, sentence (4) and the form in (10a) serve to illustrate that
readings in Perfective Aorists roughly correspond to episodic pasts in English: *My mother entered the room (on one occasion), (Yesterday), he / she read (something) to the end (once / on various occasions).* In terms of Smith’s dichotomy relating to Viewpoint, morphological Perfective Aorists in Bulgarian have perfective (PERF), and not imperfective (IMPF) readings.  

The verb in (10b), on the other hand, is a morphological *Perfective Imperfect*, a form that has an unambiguous interpretation and a restricted syntactic distribution. It consists of the prefix and the stem in (10a), but combines them with an imperfect tense inflection (i.e. -še). The form in (10b), then, is morphologically parallel to *v.leze.še* ‘used to enter’ in (2b) and (5a) also with a prefix and an imperfect inflection, and *kriv.n.eše* ‘used to turn’ in (6), with the -n- marker for perfectivity, and the imperfect inflection -še. As (3), (5a), and (6) show, Perfective Imperfects display an unambiguous habitual reading that roughly corresponds to English *used to/would*: *(In the past) he used to/would read (something) to the end (on an indefinite number of occasions), My mother used to enter the room (regularly).* In addition, (3), (5a), and (6) also serve to illustrate that Perfective Imperfects are syntactically restricted to adjunct clauses that

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3 We omit *Imperfective Aorists* from our discussion. These are (a) verbs without a prefix, or (b) verbs with a prefix and a secondary imperfectivization marker, which in addition display (c) an aorist inflection.
function as restrictors for main/nuclear scope clauses. Thus, Perfective Imperfects are (excluded from / ungrammatical in) main clauses.\(^4\)

The verb form in (10b) does not exhaust the various anatomies available to Imperfect verbs in Bulgarian, each with its own interpretative effect. Thus, to complete the (relevant) paradigm, we need to also consider

\[\text{Future-oriented counterfactual constructions in Bulgarian constitute a counterexample to our generalization regarding habitual/generic readings.} \]

As illustrated in (i), such constructions may contain Perfective Imperfect adjuncts, and nevertheless display an episodic reading.

\[(i) \quad \text{Ako Ivan } \textcolor{blue}{\text{pro.čete.še}} \text{ tazi kniga utre,} \]

\[\quad \text{If Ivan } \textcolor{blue}{\text{PR.read.Perf.IMPF}} \text{ this book tomorrow,} \]

\[\quad \textcolor{blue}{\text{toj šteše}} \text{ da e mnogo dovelen.} \]

\[\quad \text{he Modal.IMPF to be.Pres very happy.} \]

\[\quad ‘\text{If Ivan (were to) read this book tomorrow, he would be very happy.’} \]

The construction in (i) finds a (semantic) parallel in the Greek constructions that Iatridou (2000) labels ‘less vivid future conditionals’. Bulgarian future-oriented counterfactuals represent a different syntactic and semantic type that should not be unified with the constructions that constitute the topic of this paper. Counterfactuals are left for future research.
the two forms with the *Imperfective Imperfect* label in (10c) and (10d).

First, the verb in (10c) carries the same prefix as Aorist (10a) and Imperfect (10b). This is coupled to the imperfect inflection also found in (10b), and to a secondary imperfective morphology absent in both (10a) and (10b). More precisely, (10c) is a *Secondary Imperfective verb with an Imperfect tense inflection*, and parallel in form to main clause *izgarjaše* ‘was burning’ with prefix *iz*- in (4b) and (5b). We illustrate in (11) and (12) that depending on extra-linguistic or linguistic context, secondary imperfective imperfect verbs in Bulgarian may be ambiguous. They may display either an ongoing/processual reading or a habitual reading, which they share with the Perfective Imperfects topic of this paper.

The second type of Imperfective Imperfect in (10d) consists of just the verb stem and an imperfect inflection, and may thus be called a *Primary Imperfective verb with an Imperfect tense inflection*. This verb is parallel in form to main clause *govorex* ‘was talking, used to talk’ in (4a) and (5a), which also lacks a prefix. As (4) and (5) serve to illustrate, this type of form too can be considered ambiguous. That is, depending on either extra-linguistic or linguistic context as in (4-5), the same morphology may sustain either an ongoing/processual reading as in (4), or a habitual reading as in (5).

In this paper, we abstract away from differences between the Primary and Secondary *Imperfective Imperfects* in Bulgarian shown in (10c) and (10d), and concentrate on their similarities. The ambiguity in
these two types of Imperfective Imperfects should seem familiar to readers interested in other Slavic languages or languages in the Romance family. On the one hand, other Slavic languages lack Imperfect tenses, but they nevertheless display past imperfective verbs that are ambiguous between ongoing and habitual readings. On the other hand, the Romance languages do not formally distinguish between imperfective and perfective verbs, but they nevertheless display verbs with Imperfect tense inflections that are ambiguous between ongoing and habitual readings.

In the next section we argue that in Bulgarian all verbs with an imperfect tense inflection – that is, all the forms with the morphologies depicted in (10b-d) – can be unified by means of an operator IMPF whose interpretation they share.

4. IMPF in Bulgarian

4.1. Interpreting IMPF

Imperfect tense inflectional morphology in Bulgarian can give rise to both habitual / generic and ongoing interpretations both with primary imperfective verbs and with secondary imperfective verbs, as the sentences
in (11a-b) and (12a-b) respectively illustrate.\(^5\)

(11) **Habitual**


Before 20 years, children *watched* less television

‘20 years ago, children used to watch less TV.’

b. *V minaloto Ivan često izgarjaše mlakoto.*

In past *the Ivan often burned* milk.

‘In the past Ivan used to often burn the milk.’

(Rivero and Slavkov 2014)

(12) **Ongoing (episodic)**

a. *Včera Ivan stroeše pjasăčen zamăk.*

Yesterday Ivan *built* sand castle

‘Yesterday Ivan was building a sand castle.’

\(^5\) As stated in §3, *Perfective Imperfect* verbs are ungrammatical in main clauses. Thus, all the verbs in (11a-b) and (12a-b) belong to the morphological *Imperfective Imperfect* type. Those in (11a) and (11b) are primary imperfective imperfects, and those in (11b) and (12b) are secondary imperfective imperfects.
b. Včera Ivan veče izgara$mle mljakoto.$

Yesterday Ivan already PR.burn.Impf.IMPF milk.the

‘Yesterday, Ivan was already in the process of burning the milk.’

Arregui, Rivero, and Salanova (2014) provide an analysis of the semantic role of IMPF within a Kratzer-style situations semantics (Kratzer 1989, 2011). To account for readings with primary imperfective imperfect verbs, as in (11a) and (12a), Arregui, Rivero and Salanova (2014) argue that in Bulgarian the imperfect inflection hosts an IMPF operator that quantifies over situations. This operator projects in the syntax within the functional layers of the clause that associate with Viewpoint aspect in the sense of (Smith 1991, 1997). On this view, the role of tense is to encode the ‘topic situation’ as characterized by Kratzer (2011). Following Austin (1950), Kratzer argues for the view that utterances are about particular situations known as the ‘topic’ situation. An utterance of the sentence It is raining, for example, may be true of the situation corresponding to Ottawa on July 2 2015, but false of the situation corresponding to Madrid on the same day.

The proposal in this paper combines within a situations semantics (see Kratzer 2011 amongst others) the claim that utterances are about topic situations with a referential approach to tense (e.g. Partee 1973). On this view, tense is characterized as a referential expression or ‘situation pronoun’ that picks out/points to/refers to the contextually salient topic situation (with
tense features serving to impose constraints much as person, gender and number features impose constraints on person pronouns).

Putting together tense and (viewpoint) aspect projections, the proposed syntax of IMPF is as in (13) (with VP identifying the projection that contains external arguments equivalent to vP / Voice Phrase):

(13) Syntax of IMPF

\[
[\text{TP} \quad \text{Tense}_i \quad [\text{AspP} \quad \text{IMPF} \quad [\text{VP} \ldots \text{V} \ldots]]]
\]

Arregui, Rivero, and Salanova do not explicitly discuss secondary imperfective verbs in the imperfect tense of type (11b) and (12b). In this paper, we assume that they represent a case where the IMPF operator in (13) scopes over the secondary imperfective morphology in semantics (see also Rivero and Slavkov 2014 on verbs with multiple-layered morphology and IMPF).

The hypothesis that secondary imperfectivization is semantically subordinate to IMPF, that is, to the imperfect inflection and not vice versa, offers a variety of advantages. One, it can account for the parallel ambiguity affecting main clause primary imperfectives and secondary imperfectives in cases like (11) and (12). Two, it can account for parallel habitual readings in main clause primary and secondary imperfective imperfects when combined with an adverbial clause with a perfective imperfect verb, as in (4b) and (5b). Three, it can account for parallel episodic readings in main
clause primary and secondary imperfective imperfects when combined with
a adverbial clause with a perfective aorist verb, as in (4a) and (5a). We do
not consider secondary imperfectivization to be semantically inert in those
cases, but leave this issue to future research.

Arregui, Rivero, and Salanova follow a tradition that treats the IMPF
operator in (13) as a universal quantifier (Bonomi 1997, Cipria and Roberts
2000, Deo 2009, a.o.). They characterize this operator as a quantifier over
situations with the interpretation depicted in (14).

(14) **Interpretation of IMPF**

Given a context c and variable assignment g,

\[ [[\text{IMPF}]^c, g] = \lambda P_{l, <s, t>>}. \lambda s. \forall s': MB_\alpha(s)(s') = 1, \exists e: P(e)(s') = 1, \]
defined only if there is a contextually or linguistically determined
salient MB of type \(\alpha\).

In (14), \(l\) is the type for events, \(s\) is the type of situations, \(P\) is a variable
ranging over properties of events, and \(MB_\alpha\) for ‘modal base’ technically
speaking corresponds to an *accessibility relation*: a function from situations
to sets of situations, i.e. \(<s, <s, t>>\).

According to the proposal in (14), the IMPF operator takes as an
argument a property of events \(P\) (corresponding to the denotation of the
sister VP) and has as output a proposition true in a situation \(s\) if and only if
all situations s’ made accessible to s by the relevant modal base (MB) are situations in which there exists an event e instantiating the P-property.

On this view, specific interpretations for IMPF arise through either the contextual specification or the linguistic specification of Kratzer-style Modal Bases (MBs) construed as accessibility relations for situations. Generic / habitual and ongoing readings are distinguished from each other by means of different MBs, as discussed in §4.2 and §4.3 respectively.⁶

4.2. Generic / habitual readings

Building on Cipria and Roberts (2000), Arregui, Rivero and Salanova (2014) characterize generic and habitual Imperfects in terms of quantification over characteristic situations given the MB in (15). Arregui, Rivero and Salanova do not distinguish between generic and habitual readings, a practice we also adopt. According to (15), a generic modal base (MB_{generic}) takes a situation s as argument, and outputs a proposition true in a situation s’ if and only if s’ is a characteristic part of s. In other words, MB_{generic} ‘makes accessible’ to s all situations s’ that are characteristic parts of s:

⁶ We refer interested readers to Arregui, Rivero and Salanova (2014) for further details, discussion, and additional references, and to Rivero and Slavkov (2014) for a more precise implementation of this program in Bulgarian, and relevant references on descriptive grammars and earlier work on this language.
(15) \[ \text{MB}_{\text{generic}} = \lambda s.\lambda s'.s' \text{ is a characteristic part of } s. \]

Cipria and Roberts tell us that characteristic situations are those that are normal or usual, where both context and the utterance itself have a role in deciding what this is. Natural laws often play a role in identifying characteristic situations, resulting in quantification over situations that obey the laws of the evaluation world. On this view, the interpretation of example (11a) is as given in (16).

(16) \[ [[11a]]^{\mathcal{E}/\mathcal{G}} = 1 \text{ iff } \]
\[ \forall s': \text{MB}_{\text{generic}} (\text{Srelevant 20-years-ago situation})(s') = 1, \]
\[ \exists e: e \text{ is an event of the children watching less TV than now in } s'. \]

According to (16), (11a) will be true if and only if in all characteristic situations part of the topic situation set 20 years ago, the amount of TV watched by children was less than it is now.

4.3. **Ongoing readings**

Arregui, Rivero and Salanova (2014) distinguish between two interpretations for IMPF that can intuitively be termed ‘ongoing’ or
‘episodic’, and they relate each to a different MB.

The first episodic-like interpretation relies on the Ongoing MB in (17), where all parts of the topic situation are quantified over, and matched with a certain eventuality. This gives rise to repetitive or stative interpretations. The Ongoing modal base (MB$_{ongoing}$) takes a situation s as its argument and has as output a proposition true in situations s’ that are part of s. In other words, this MB makes accessible to s the situations s’ that are part of s:

(17) $\text{MB}_{\text{ongoing}} = \lambda s. \lambda s'. s' \prec s.$

Given the MB in (17), the interpretation of sentence (18a) is as given in (18b).

(18) a. $Včera \, Ivan \, \text{govoreše po telefonu}.$

Yesterday Ivan talk.Impf.IMPF on phone

‘Yesterday Ivan was talking on the phone.’

b. $[[18a]]^c, s = 1 \text{ iff}$

$\forall s': \text{MB}_{\text{ongoing}} (\text{topic (yesterday)})(s') = 1,$

$\exists e: e \text{ is an event of Ivan talking on the phone in } s'.$

According to (18b), (18a) will be true if and only if in all situations s’ that
are part of the topic situation included in yesterday there is an event of Ivan talking on the phone. We make the standard assumption (see e.g. Heim 1982) that in constructions with universal quantification, presuppositions in the nuclear scope put constraints on the domain of quantification identified by the restrictor. In the case of (18), it means that the situations quantified over must be sufficiently large with respect to granularity to accommodate an event of Ivan talking on the phone. If the topic situation is very small, there may be a single situation that is part of it that can accommodate an event corresponding to the nuclear scope (presumably, a ban against vacuous quantification would rule out cases where the topic situation is too small to accommodate an event corresponding to the nuclear scope).

The second episodic-like reading for IMPF relies on the Event-inertia MB in (19), which underlies so-called ‘imperfective paradox’-type examples (Dowty 1979).\footnote{As Arregui, Rivero, and Salanova (2014) acknowledge, the Event-Inertia MB proposal we borrow in this paper simplifies many issues. It is well known that inertia-style analyses of the imperfective paradox give rise to problems. See, for example, Portner (1998) for discussion.}

\begin{align}
\text{(19) } \text{MB}_{\text{Event-inertia}} = \lambda s. \lambda s'. s' \text{ is an Event-inertia situation for } s.
\end{align}

Where for any two situations s and s’, s’ is an Event-inertia situation
for s iff all the events that have actually started in s continue in s’ as they would if there were no interruptions.

The Event-inertia MB in (19) speaks of incomplete events at the past topic situation that are in progress in the actual world. That is, all continuations of the topic situation in which eventualities continue ‘without interruption’ include an eventuality of a certain type. On this view, the interpretation of (12a) is given in (20), and the prediction is that the sentence will be true iff all inertia situations s’ for the topic situation included in yesterday are such that they include an event of Ivan building a sandcastle (intuitively, there is an event of Ivan building a sandcastle in all situations in which the topic situation continues ‘without interruptions’).

\[(20) \quad [[(12a)]]^c-g = 1 \text{ iff} \]
\[
\forall s': \text{MB}_{\text{Event Inertia}}(s_{\text{topic (yesterday)}})(s') = 1,
\]
\[
\exists e: e \text{ is an event of Ivan building a sandcastle in } s'.
\]

In § 2, we introduced the different interpretative effects on nuclear scope Imperfect verbs when Perfective Aorist verbs and Perfective Imperfect verbs are contained in adjunct clauses. Namely, Perfective Aorists trigger episodic readings while Perfective Imperfects trigger habitual readings. In the next section, we develop a preliminary proposal to
capture such semantic contrasts, with the characteristics of the IMPF operator introduced in this section playing a major role.

4. The interpretative effects of clausal restrictors on IMPF

Recall the puzzle in (7) repeated now as (21).

(21) The Puzzle:
In constructions with main clauses with verbs in the Imperfect tense,

- Adjunct clauses with Perfective Imperfect verbs only give rise to habitual/generic readings.
- Adjunct clauses with Perfective Aorist verbs only give rise to episodic (ongoing) readings.

We provide the following answers to the puzzle in (21). On the one hand, we propose that adjuncts with Perfective Imperfect verbs of the type illustrated in (22a) and (22b) are classically interpreted in the scope of IMPF, and affect its domain of quantification.

(22) Habitual

a. (V minaloto, kogato Marija pro.čete.še tazi kniga,
(In past.the) when Maria **PR.read.Perf.IMPF** this book,  
**tja plačešë.**

she **cry.Impf.IMPF**

‘(In the past,) whenever Maria used to read this book from cover to cover, she cried.’

b. **(V minaloto,) kogato zvâncêt zvânešë,**

(In past.the) when bell.the **ring.Perf.IMPF**,  
**Ivan gledašë televizija.**

Ivan watch.Impf.IMPF TV.

‘(In the past,) whenever the bell rang, Ivan used to be watching TV.’

The adjunct / restrictor clauses in (22a) and (22b) involve generalizations concerning complete actions that are repeated / instantiated an indefinite number of times in the evaluation / actual world (optional adverbs of quantification that we do not illustrate are possible either in the adjunct clause or in the main clause).

On the other hand, adjunct clauses with **Perfective Aorist** verbs of the type illustrated in (23a-b) do not restrict IMPF, and we propose instead that they modify the topic situation.

(23) **Episodic (Ongoing)**
a.  \textit{Kogato Marija (nakraja) pro\v{c}ete t\v{z}i kni\v{g}a},

When Maria (finally) PR.read.Perf.AOR this book,

\textit{tja (ve\v{c}e) pla\v{c}e\v{s}e}.

she (already) cry.Impf.IMPF

‘When Maria (finally) read this book from cover to
cover, she was (already) crying.’

b.  (*\textit{Vseki p\'at) kogato zv\'anc\'at zv\'anna},

(*Every time) when bell.the ring.Perf.AOR,

\textit{Ivan gleda\v{s}e televizija}.

Ivan watch.Impf.IMPF TV

‘(Every time) when the bell rang, Ivan was watching TV.’

Note that sentences (22a) vs. (23a) and sentences (22b) vs. (23b)
constitute two minimal pairs, with the only formal difference between each
pair residing in the Imperfect vs. Aorist inflection on the subordinate verb,
again supporting the view that such inflections are the source of the noted
interpretative contrast.

\textbf{5.1 A proposal on restrictors with Perfective Imperfects}

The relevant general schema for restrictors with Perfective
Imperfect verbs is given in (24) for (22a). The interpretation of (24) is given
in (25).

(24)  \[ \text{[Stopic [IMPF [when Maria read this book] [Maria cried]]]} \]

(25)  \[ [[(24)]] = 1 \text{ iff } \forall s': \text{MB}_{\alpha} (s_{\text{topic}}) (s') = 1 \& \exists e: \text{Maria read this book} (e) (s') = 1, \exists e: \text{Maria cried} (e) (s') = 1. \]

According to (25), (22a) with the structure sketched in (24) will be true iff in all situations accessible to the topic situation via the relevant MB which also include events of Maria reading this book, Maria cried. In other words, the accessible situations in which Maria read a book are ‘matched’ (in the sense of (Rothstein 1995)) with situations in which Maria cried. The choice of MB will determine the domain of quantification and establish the ‘flavor’ of the interpretation of IMPF. Crucially, the adjunct clause in (22a) that serves as restrictor displays a verb that carries Perfective Imperfect morphology, namely \textit{pro.čete.še}. We propose that such morphology carries constraints on the size of the situation at which the adjunct predicate may be evaluated: perfective imperfects require ‘big’ situations, as encoded in the \textit{Grammaticalizing Size Hypothesis} (GSH) first given in (8). We now spell out the GSH in (26), with the constraint on size characterized as a presupposition:
(26) **Grammaticalizing Size Hypothesis (GSH)**

Perfective Imperfect verbs are marked as being true only in ‘big’ situations:

Where \[ [[\text{verb}]] = \lambda s. \text{verb}(s) = 1, [[\text{verb}^{\text{Perf.Impf}}]] = \lambda s: \text{BIG}(s). \text{verb}(s) = 1. \]

The GSH in (26) makes use of the fact that the framework of situations semantics allows truth-conditions to target situation size. As we mentioned earlier, traditionally, the interest in the literature on situation size has been on ‘small’ or minimal situations. In Kratzer’s proposal, situations can be very small, corresponding to an individual and a single property, but they can also be very big. Worlds are the biggest situations (they are defined as situations that are not proper parts of other situations). According to the proposal in (26), verbs with Perfective Imperfect morphology denote properties of situations that can only be true in situations that reach a certain size (indicated here with the placeholder constraint ‘BIG’). In the limit case, such situations will be possible worlds, but they may also be smaller situations that are still ‘big’ enough to count as BIG. The restriction of Perfective Imperfect adjuncts to habitual/generic interpretations of IMPF arises as a side-effect/corollary of the GSH in (26). Only habitual/generic MBs systematically make accessible situations that satisfy the size constraint imposed by Perfective Imperfects. Habitual/generic readings can
only arise when the situations quantified have reached a certain ‘size’: they must be large enough to accommodate whatever is (contextually) considered ‘normal’ or usual, i.e. characteristic. Thus, only habitual/generic interpretations of IMPF guarantee the satisfaction of the size presupposition of Perfective Imperfects.\(^8\) Other types of MBs including the Ongoing kind allow for quantification over small situations that would clash with the size constraint in (26). These MBs do not make accessible ‘characteristic’ situations and thus need not be large enough to make true what is considered ‘normal’. If the situations quantified over are not ‘big’, the presuppositions of Perfective Imperfectives will not be satisfied, and the result will be semantic undefinedness due to presupposition failure.

5.2. **A proposal on adjuncts with Perfective Aorists**

While Imperfective Imperfects in adjunct clauses restrict the domain

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\(^8\) The formula in (26) suggests that Bulgarian ‘lexicalizes’ ‘big’ situations, where verbs are atomic and not composed of complex morphemes. However, the internal anatomy of Perfective Imperfects suggests that the size constraint may be based on compositionality, with different semantic effects assigned to each aspectual layer, with a formulation we leave to future research.
of IMPF, Perfective Aorists in adjuncts do not, but instead contribute towards the identification of the topic situation.

Before we formalize the hypothesis that (Perfective) Aorists cannot restrict the domain of IMPF, let us briefly motivate it. In constructions with verbs in the Imperfect tense in the main clause, Aorists are grammatical / well-formed in adverbial adjuncts introduced by several items that include kogato ‘when’ in (4a), (23a), and (27a), or also štom ‘as, given that’, and sled kato ‘since’, etc., which are not illustrated. Crucially, however, in Bulgarian Aorists are deviant/ungrammatical in clauses introduced by ako ‘if’. In other words, Bulgarian Aorists cannot appear in antecedents of canonical conditional constructions, as shown in (27b), which forms a minimal pair with (27a).

(27)  

a.  **Kogato majka mu v.leze v stajata,**

If mother his **PR.come.Perf.AOR** in room.the,

*Ivan govorešte po telefona.*

Ivan talk.Impf.IMPF on phone

‘When his mother entered the room,

Ivan was talking on the phone.’

b.  **Ako majka mu v.leze v stajata,**

If mother his **PR.come.Perf.AOR** in room.the,

*Ivan govoreshe po telefona.*
Ivan talk.Impf.IMPF on phone

‘*If his mother entered the room,

Ivan was talking on the phone.’

Aorists also contrast with Imperfects (whether primary imperfectives, secondary imperfectives or perfectives), which are well formed in antecedents of conditional constructions.

We propose that the contrast in (27a-b) provides motivation for our core claim on adjunct Aorists: they may not serve as restrictors for, and thus cannot be interpreted within the scope of, the IMPF operator. Adjuncts with Aorists cannot affect the domain of quantification of IMPF as they are not in the scope of IMPF, but instead serve as location for the situations that anchor the claims made by IMPF.⁹

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⁹ An account for why Bulgarian Aorists are deviant in antecedent clauses in conditionals is beyond the scope of this paper. However, we note in passing that the Bulgarian grammatical tradition views Aorists as ‘absolute tenses’ for witnessed events. Expressed in the framework adopted in this paper, Aorists constitute viewpoint perfective categories that function as ‘referential’ pronouns that anchor to the actual world. Thus, a hypothesis to be pursued could be that they cannot be under the scope of modal IMPF because such structural position prevents them from being licensed as
Now let us formalize the idea just stated. From our perspective, the role of a *when*-clause with a Perfective Aorist is to delimit the topic situation. On this view, the sentence in (23b) is analyzed as in (28).

\[
([23b])^{f-g} = 1 \text{ iff } \forall s': MB_{\text{ongoing}}(\text{bell-rang})(s') = 1, \exists e: \text{watch TV } (e)(s') = 1.
\]

Adverbial clauses with (perfective) Aorists serve to identify the topic situation. In this sense, they functions like ‘frame adverbials’ such as *yesterday, on Monday*, etc. The topic situation in (28) is a specific situation of the bell ringing, and the truth-conditions claim that the sentence in (23b) will be true if and only if all situations that are part of this topic situation include eventualities of Ivan watching TV. This will be the case if Ivan was watching TV throughout that specific situation of bell-ringing. Crucially, the predicate of bell ringing does not serve as restrictor, and there is no iteration and ‘matching’ of bell ringing events with TV-watching events.

The absence of quantificational readings for Perfective Aorists in adverbial adjuncts where they are allowed should not be understood to follow from a general prohibition against iteration. Even though they cannot referential pronouns that must pick up a past situation in the evaluation world. We leave the development of this idea to future research.
be under the scope of the IMPF operator and restrict it (so are deviant in the *ako*-antecedents of conditionals), Perfective Aorists are compatible with frequency adverbs, such as *mnogokratno* ‘multiple times’ and *na dva puti* ‘twice’ in the sentences in (29a-c).

(29) Frequency adverbs

a. *Kogato Ivan neočakvano v.leze v stajata,*

When Ivan unexpectedly enter.perf.AOR in room.def

az *mnogokratno go pomolix da se izvini.*

I multiple.times him ask.perf.AOR to refl excuse.

“When Ivan unexpectedly entered the room, I repeatedly asked him to apologize.”

b. *Kogato Marija pročete tazi kniga mnogokratno*

When Marija PR.read.Perf.AOR this book multiple-times

*i ne moža da ja razbere, tja se razplaka.*

and Neg could to it undersdand she Refl PR.cry.Perf.AOR

‘When Mary read this book multiple times and could not understand it, she started crying.’

c. *Kogato Ivan izgori mljakoto na dva puti včera predi*

When Ivan PR.burn.perf.AOR milk.the twice yesterday

breakfast mother his already refl PR.complain.impf.IMPF
zakuska, majka mu veče se oplakavaše.

‘When Ivan burned the milk twice yesterday before breakfast, his mother was already complaining.’

Interpretations in (29a), (29b), and (29c) are all episodic. Perfective Aorist adjuncts in these cases seem to be of the type that indicates an ‘accidental generalization’ in the sense of Menéndez Benito (2002). Sentence (29b) pairs a Perfective Aorist in the adjunct with a Perfective Aorist in the main clause in parallel to (29a) with a frequency adverb in the main clause. Sentence (29c) pairs a Perfective Aorist in the adjunct with a Secondary Imperfective Imperfect in the main clause whose reading is of the ongoing type. Namely, Ivan’s mother was in the process of complaining when Ivan misbehaved in two different episodes.

Perfective Aorists, then, are compatible with frequency adverbs that involve ‘accidental generalizations’, as (29a-b) show. However, as illustrated in (23b), Perfective Aorists are incompatible with bona fide generalizations: they do not tolerate Quantificational Adverbs such as vse ‘always’ and vseki pát ‘every time’; they do not tolerate Imperfect verbs with habitual readings in the main clause; and, to repeat, they cannot be constituents in antecedents introduced by ako ‘if’ in conditionals with main clause Imperfects.

To summarize, Perfective Imperfect adjuncts restricting IMPF trigger an exclusively habitual/generic reading because Perfective
Imperfect morphology encodes a constraint requiring ‘big’ situations. This restriction can only be guaranteed in a natural manner when IMPF is interpreted in relation to a characteristic MB, which thus gives rise to the habitual/generic reading. By contrast, Perfective Aorist adjuncts do not put constrains on the domain of quantification of IMPF, but delimit the topic situation, which can be ‘small’, whether viewed in an iterative fashion or not.

5. **Viewpoint-level Operators vs. V-level Operators**

Our proposal builds on the characterization of IMPF as a wide-scope aspectual operator or quantifier. As sketched in (13) repeated now in (30), IMPF projects in the clausal area associated with Viewpoint aspect, and scopes over VP. VP is equivalent to either Voice Phrase or vP, the projection that dominates both external arguments including Agents, and internal arguments.

(30) **Syntax of IMPF**

\[
[TP \quad \text{Tense}_i \quad [\text{AspP} \quad \text{IMPF} \quad [\text{VP} \ldots \text{V} \ldots ]]]
\]

In contrast with our proposals, we find views in the literature that approach habitual readings in terms of operators without wide scope that
are placed much lower in the sentential structure, relating to frequentative aspect / plurality at the V-level (see van Geehoven 2004, 2005, among others). Thus, before we conclude this paper, it seems important to motivate the hypothesis that Perfective Imperfects in Bulgarian involve ‘high’ level quantification (i.e. Viewpoint Aspect) as opposed to ‘low’ V-level ‘actional’ plurality (i.e. Situation Aspect) in particular.

We can find support for the ‘high quantification’ view of habituality espoused in this paper in so-called ‘donkey pronoun’ examples which exhibit what appear to be binding effects between quantifiers in an adjunct and pronouns in a main clause (see e.g. Geach 1962, Heim 1990). In Bulgarian, such examples can be constructed with Perfective Imperfective adjuncts. To see the ‘binding effects’ in the Bulgarian case, consider the examples in (31) and (32). In (31), the so-called donkey pronoun in the main clause (go ‘him’) co-varies with the indefinite noun phrase in the adjunct clause (politsaj ‘a policeman’). A common assumption is that in ‘donkey sentences’ of this type the indefinite does not c-command the pronoun, and that the binding relation between the two is established in semantics and not in syntax.

10 The current proposal raises questions for a ‘minimal situations’ type analysis of donkey-pronouns (e.g. Berman 1987, Heim 1990), which we are not able to address here.
Let us take a closer look at the Bulgarian data. Both (31) and (32) contain adjunct clauses with Perfective Imperfects: *spreše* ‘stopped’ and *polučeše* ‘received’ respectively. They also contain bare singular NP subjects with an indefinite interpretation bearing a ‘coreferential’ relation with subject or object pronouns in the nuclear scope clause: *politsaj* ‘(a) policeman’, and *učenik* ‘(a) student’ respectively. The natural reading of both sentences is the one that alludes to an indefinite number/plurality of
policemen in the first case, and an indefinite number/plurality of students in the second case and not one that involves just one policeman or one student that act repeatedly.

If we took inspiration in van Geehoven’s proposal (2004, 2005) based on West Greenlandic, we could derive habituality from a type of aspect called frequentative, which associates with a V-level or Pluractional Operator (‘Actionality’ roughly corresponds to ‘Situation Aspect’). Taking such a view, we could assign the multiplication of events in (31) and (32) in Bulgarian to quantification at the V-level, in contrast with the higher Viewpoint level we propose for the IMPF Operator. However, on the V-level alternative, the natural reading would be ‘frequentative’, with one and the same policeman and one and the same student both acting repeatedly in (31) and (32). The interpretation with a plurality of policemen and students would be unnatural, deviant, and in need of additional stipulations or analytical steps. Thus, a V-level operator analysis does not account in an obvious way for the binding effects and plurality of cases observed in donkey-sentences. A high-level IMPF operator analysis, on the other hand, appears a better candidate. Scoping above the clausal level, IMPF can affect the interpretation of the entire clause, taking scope over the nominal phrases and pronouns in the whole structure.

To conclude, we have seen that Bulgarian clearly distinguishes between ‘habituality’ and ‘frequentativity’ by means of the type of adverbs that are compatible with verbs in the Imperfect tense and those that are
compatible with verbs in the Aorist tense. In addition, we have noted that an analysis of habituality in terms of V-level frequentative aspect leaves anaphoric relations and quantificational effects in donkey pronouns potentially unexplained.

6. Conclusions

The main aim of this paper is to support the view that constraints on syntax and morphology can target ‘situation size’ in semantics. Constraints on situation size are familiar in the semantic literature, but the focus has been on ‘small’ (minimal) situations. We have argued for the necessity of constraints on ‘big’ situations, and for their grammaticalization. Based on Bulgarian, we have proposed that some complex aspectual interactions involving Perfective Imperfect verbs encoded in syntax and morphology associate with habitual interpretations, and result in propositions that can only be true in ‘big’ situations. These allow for what could be informally described as ‘non-accidental generalizations on repeated actions that are complete’. Our proposal, which is based on the morphological contrast between Perfective Imperfects and Perfective Aorists, accounts for restrictions on the modal interpretations of imperfective aspect and provides a grammaticalized basis for the distinction between ongoing and habitual readings, that is, a canonical overt realization of the restriction of a modal
IMPF.

References

Arregui, Ana, María Luisa Rivero, and Andrés Pablo Salanova. 2014.


