



PROJECT MUSE®

Vendlerian Classes and the Russian Aspectual System

Pavel Braginsky, Susan Rothstein

Journal of Slavic Linguistics, Volume 16, Number 1, Winter - Spring
2008, pp. 3-55 (Article)

Published by Slavica Publishers

DOI: <https://doi.org/10.1353/jsl.0.0009>



➔ *For additional information about this article*

<https://muse.jhu.edu/article/257804>

Vendlerian Classes and the Russian Aspectual System*

Pavel Braginsky and Susan Rothstein

Abstract. This paper considers the relevance of the Vendlerian lexical aspectual classification of verbs in Russian. We focus on the lexical classes of accomplishments and activities and argue that the classification of verbs into activities and accomplishments cuts across the classification into perfective and imperfective verbs. Accomplishments display incremental structure and occur as perfectives and imperfectives. Activities do not display incremental structure and also occur in the perfective and imperfective aspect. The distinction between activities and accomplishments is expressed through their interactions with what we call incremental modifiers: modifiers which are sensitive to the incremental structure of the verb meaning. These modifiers include *postepenno* 'gradually', and 'X by X' modifiers such as *stranica za stranicej* 'page by page' and *etaž za etažom* 'floor by floor'. Imperfective activities do not occur with either *postepenno* or the 'X by X' modifiers, and neither do the verb forms which Padučeva 1996 calls "delimited activities" (*delimitativ*). Accomplishments in both the imperfective and the perfective aspects occur with *postepenno* and the 'X by X' modifiers (although some Russian speakers find some examples of perfective accomplishments with 'X by X' modifiers unnatural owing to what we consider to be pragmatic reasons). We show that the behavior of these modifiers generally follows if we assign accomplishments the incremental structure posited in Rothstein 2004 and treat the modifiers as directly modifying the incremental structure.

1. Introduction

The aim of this paper is to shed some light on the interaction between grammatical and lexical aspect in Russian, in particular, the interaction

* We would like to thank those who provided intuitions and/or commented on earlier drafts of this paper, including Boris and Irena Braginsky, Hana Filip, Armenuhi Grigorian, Mark Korabelnikov, Hans Robert Mehlig, Elena Paducheva, Elena Poptsov, and two anonymous reviewers whose comments were extremely helpful in making revisions. Research for this paper was supported by Israel Science Foundation Research Grant #951-03 to Susan Rothstein and a Presidential Ph.D. Fellowship to Pavel Braginsky. We thank them for their support.

between perfective and imperfective aspectual categories and the Vendlerian classes of lexical verbs (Vendler, 1967). The central question is whether the Vendlerian classification of verbs into states, activities, achievements, and accomplishments has any grammatical relevance in Russian, or whether it is made redundant by the grammatical distinction between perfective and imperfective verbs. We begin with some background about the Vendlerian classes in general and then address how these have been treated in the discussion of Russian aspect.

1.1. Vendlerian Classes in English-Oriented Linguistic Studies

The Vendlerian classification is a four-way classification of verbs into states, activities, achievements, and accomplishments, depending on the properties of the events in their denotation, for example, dynamic vs. static, telic vs. atelic (see, e.g., Vendler 1967, Dowty 1979, Smith 1991, and Rothstein 2004). It has proved relevant in many languages, in particular English, because grammatical operations such as adverbial modification and the progressive operator are sensitive to the distinctions made by this classification. For example, in English, modifiers of the form *in X time* naturally occur with accomplishment and achievement verbs but not with activities or states, while *for X time* naturally modifies a state or an activity but not an achievement or an accomplishment, as in (1).

- (1) a. John grew up in a short time/*for a short time. (accomplishment)
 b. John arrived in a short time/*for a short time. (achievement)
 c. John ran *in a short time/for a short time. (activity)
 d. John lived *in a short time/for a short time. (state)

However, there has been some confusion and disagreement in the literature as to what exactly the Vendlerian classification is supposed to be classifying. On the one hand, it seems to apply to verbs, so that *love* is classified as a state, *arrive* as an achievement, *run* as an activity, and *build* as an accomplishment. Since verbs are taken to denote events (either entities as in the (neo)-Davidsonian framework, or as relations of certain kind as Dowty has argued) and Vendlerian classes classify

according to properties of events, this is very plausible. On the other hand, as Dowty (1979) pointed out, we might take the classification to apply at the VP level since choice of verbal complement affects the linguistic behavior of the VP as a whole. The data in (1) do not support either position, since in these examples the VP and the V contain exactly the same material. But with a transitive accomplishment like *build* the effects of the direct object become clear: *build the house* seems to have accomplishment properties since it appears with *in X time*, but *build houses* looks more like an activity. Similarly, *run a mile* or *ran to the store* behave like accomplishments, although *run* has activity properties:

- (2) a. John built the house in a day/*for a day.
- b. John built houses *in some years/for some years.
- c. John ran a mile in an hour/*for an hour.
- d. John ran to the store in an hour/*for an hour.

Although some linguists have taken the data in (2) as evidence that Vendlerian classes apply to VPs, a more insightful analysis has emerged, especially from the work of Krifka (1989, 1992, and 1998). Krifka gave an analysis of verb phrase meanings which shows how the verb meaning relates to the VP meaning. He argued that the *in α time/for α time* adverbials distinguish between two kinds of VPs, telic and atelic. A telic VP, according to Krifka (1998), is essentially a VP denoting an event holding at a specified temporal interval. So *build the house* in (2a) is telic since the determined NP in direct-object position allows one to specify an interval at which the event took place: an interval which is big enough to build the house in question. *Build houses* in (2b) is not telic, since the bare plural does not allow one to pick out a specific interval. Krifka went on to argue that verbs differ in how they contribute to determining the telicity of the VP which they head. *Build* is a verb with an incremental theme argument, and this is why the direct object, expressing the theme, contributes to the determination of the telicity of the VP. By contrast, *push* does not have an incremental theme argument, and thus the properties of the arguments do not determine the telicity of the VP.

- (3) a. John pushed the cart for an hour/*in an hour.
 b. John pushed carts for an hour/*in an hour.

Krifka's work made it possible to clarify what the Vendlerian classification of event structures applies to. VPs are telic or atelic depending on whether they denote events holding true at a specifiable time interval or not. Verbs belong to different Vendlerian classes since they contribute to determining the telicity of the VPs they head in different ways. An accomplishment denotes an inherently incremental event type, with a theme incrementally related to the event, and thus the properties of the theme determine whether or not the VP it heads is telic. An activity is not incremental, and thus the theme cannot determine the length of an event, and a VP headed by a non-modified activity is atelic. But activities naturally allow themselves to be measured by a variety of modifiers, and thus the examples in (2c–d) contain telic VPs. Achievements denote instantaneous changes and thus normally head telic VPs, since the dimensions of the change determine the interval at which the event holds (Rothstein 2004). States are not inherently measurable and thus do not head telic VPs (unless they have undergone shifts in meaning).

This approach has led to the conclusion that the Vendlerian classification is best seen as part of the study of lexical aspect, that part of aspect which is determined by the property of verbal heads. The classification of verbs into states, activities, achievements, and accomplishments reflects the properties of the events in the denotations of the verbs, and the VP properties demonstrated in (2) follow from the fact that verbs belonging to different lexical classes and denoting different kinds of event types interact with direct objects and modifiers in different ways (see also the discussion in Rothstein 2004). This approach is proving fruitful because it makes it possible to ask in what kinds of ways VPs may be telic. Verbs of different kinds will allow the time intervals at which they hold to be specified differently and may thus be telic for different reasons.

Almost all the discussion of Vendlerian classes has focused on English, but an obvious question is how the Vendlerian classification is relevant in languages with very different verbal systems, such as the Slavic family. If Vendler classes are universal constraints on what kind of meanings verbs can have and what kind of events they can denote, then one might expect them to be *prima facie* relevant in all languages.

However, the question as we have just phrased it is a philosophical one. The empirical issue, which is relevant for linguists, is different. The Vendlerian classification is linguistically relevant in a particular language if and only if certain linguistic operations in that language are sensitive to the distinctions that the Vendlerian classification makes.

In Russian and other Slavic languages, unlike in English and other Germanic languages, verbs are classified into the perfective and imperfective aspect. The obvious question is whether the Vendlerian classification has any relevance in languages with this kind of verbal system, or whether it is made redundant by the grammatical aspectual system. There are three possible answers. One possibility is that mapping verbs in Slavic into the Vendlerian lexical classes is not relevant, since linguistic operations make reference only to the perfective/imperfective distinction. As far as we know, this position has not been explicitly argued by anyone. A second possibility is that the Vendlerian classification in Russian is subsumed under the perfective/imperfective distinction, in which case the Vendler distinctions are relevant only to the degree to which they subdivide the perfective/imperfective distinction. This is a traditional approach to the issue of lexical aspect in Russian, manifested by Brecht (1985), who, among many others, argues that the perfective aspect is reserved for the lexical classes of accomplishments and achievements, while the imperfective aspect coincides with the lexical classes of activities and states. Brecht's account is reviewed in more detail in the next section.

The third possibility is that the semantics of the lexical classes is fully exploited in Russian and that lexical classes cut across the perfective/imperfective distinction. This is the approach taken in Kučera 1983, Eckert 1985, Filip 1999, and Padučeva 1996. Padučeva (1996), for instance, makes explicit use of the Vendlerian classification as a part of her own analysis of the lexical classes of verbs in Russian. If this approach is the correct one, then there should be some linguistic operation which is sensitive to the distinction in lexical class and which provides empirical evidence that lexical classes cut across the perfective/imperfective distinction.

In this paper, we will argue against the first and the second possibilities and defend the third position. We will provide empirical evidence that accomplishment verbs can be realized in both perfective and imperfective aspects in Russian, thus supporting the position of

Padučeva (1996), and provide a lexical categorization of verb classes which builds on Padučeva's analysis. We will also suggest that activities have perfective and imperfective realizations. This means that on our interpretation of what Vendlerian classes are, the class of activities, as well as that of accomplishments, cuts across the imperfective/perfective distinction.

2. Vendlerian Classes in Russian – Some Background

The issue of lexical aspect in Russian and its interaction with the grammatical aspects of perfectivity and imperfectivity has been a subject of intense debate in the linguistic literature (e.g., Bulygina 1982, Forsyth 1970, Mehlig 1985, and Filip 1999). Here we focus on two accounts: Brecht 1985 and Padučeva 1996. Both works discuss the compatibility of the Vendlerian classification with the Russian verbal system and represent two different views on this topic. We summarize the relevant parts of their approaches below before proceeding to our analysis of incremental modifiers.

2.1. Brecht's 1985 Account

In his discussion of the interaction between grammatical aspect and the Vendlerian lexical classes of verbs in Russian, Brecht (1985) argues that perfective verbs denote the telic lexical classes of accomplishments and achievements, while imperfective verbs coincide with the atelic lexical classes of activities and states.¹ He explains this correlation by the assumption that the semantics of perfective aspect is associated with telic situations, while the semantics of imperfective aspect is compatible with incomplete ones. Brecht claims that some unprefixated imperfective verbs belonging to the lexical classes of activities and states can be shifted into accomplishments and achievements by verbal prefixes. Following this shift, the aspectual status of an imperfective verb is automatically changed into a perfective one. Thus, verbal prefixes in Russian serve as lexical operators that transform atelic activities and states into telic accomplishments and achievements. Under such an account, the unprefixated imperfective verb *stroit'*_{IMPF} 'to build'

¹ Brecht uses the term "culminations" instead of accomplishments. We, however, retain the original Vendlerian terminology throughout this paper.

is an atelic activity (example (4a)) that is shifted into the telic accomplishment *postroit'*_{PERF} by the addition of the perfectivizing prefix *po-*, as shown in (4b).

- (4) a. Ivan stroil_{IMPF} dom. [Activity]
 Ivan built house
 'Ivan built a/the house.'
- b. Ivan postroit_{PERF} dom. [Accomplishment]
 Ivan built house
 'Ivan built the house.'

The opposite process of shifting unprefixated perfective accomplishments and achievements into imperfective activities and states is achieved by the imperfectivizing suffix *-(i)va-*. While perfectivization is a lexical process (see also Filip 2000, which claims that perfectivizing prefixes are derivational affixes), the imperfectivizing suffix is a grammatical operator (inflectional affix) that changes the aspectual status of a verb without changing the meaning of the lexical head. The process of turning a perfective accomplishment verb into an imperfective activity is illustrated in the following example:

- (5) a. Ivan obezvredil_{PERF} minnoe pole. [Accomplishment]
 Ivan defused minefield
 'Ivan defused the minefield.'
- b. Ivan obezvrežival_{IMPF} minnoe pole. [Activity]
 Ivan defused minefield
 'Ivan defused a/the minefield.'

It follows from Brecht's account that there is a homomorphism from lexical to grammatical aspects in Russian: activities and states will be realized as imperfectives, and accomplishments and achievements as perfectives. Hence, examples (6a–b) are activities, while (7a–b) are accomplishments.

- (6) a. Ivan čital_{IMPF} knigu. [Activity]
 Ivan read book
 'Ivan read a/the book.'

- (6) b. Ivan guljal_{IMPF}. [Activity]
 Ivan walked
 ‘Ivan walked.’
- (7) a. Ivan pročital_{PERF} knigu. [Accomplishment]
 Ivan read book
 ‘Ivan read the book.’
- b. Ivan poguljal_{PERF}. [Accomplishment]
 Ivan walked
 ‘Ivan walked for a while.’

2.2. Padučeva’s 1996 Account

Padučeva (1996) incorporates the four Vendlerian classes in her analysis of the lexical classes of verbs in Russian. Similarly to Brecht, she states that the Vendlerian lexical categories of activities and states are manifested by imperfective verbs, while achievements are expressed by perfective ones. Contrary to Brecht, however, Padučeva argues that the lexical class of accomplishments is realized by both perfective and imperfective verbs. These accomplishments form aspectual pairs which she calls “bounded pairs” (*predel’nye pary*) (Padučeva 1996: 91–94). A perfective member of the bounded pair denotes a process that pursued a certain goal and was completed after reaching its inherent limit, resulting in a change in the direct object. An imperfective member describes an ongoing process that aims towards reaching its inherent limit but has not reached it yet. In Padučeva’s terminology, agentive perfective accomplishments are “regular actions” (*dejstvija obyčnye*) and agentive imperfective accomplishments are “actions in progress” (*dejstvija v razvitii*).² Having classified both *dejstvija obyčnye* and *dejstvija v razvitii* as accomplishments, Padučeva points out that

² In her work Padučeva also discusses non-agentive perfective and imperfective accomplishments (“bounded processes” (*predel’nye processy*) and “processes in progress” (*processy v razvitii*)). An example of a non-agentive perfective accomplishment is *Sneg rastajal*_{PERF} ‘The snow melted’. Its imperfective correlate is *Sneg tajal*_{IMPF} ‘The snow was melting’. While we focus mainly on agentive accomplishments in our discussion, we will show that both agentive and non-agentive accomplishments behave in the same way with respect to the incremental modification that we employ, so that the agentive/non-agentive distinction is irrelevant for our purposes.

the original Vendlerian classification, being based on the English data, does not have a lexical class analogous to the imperfective accomplishments (*dejstvoja v razvitii*) in Russian. Furthermore, the Vendlerian classification fails to account for the cases of attenuative procedurals (Forsyth, 1970: 21), perfective verbs which are derived from unprefixated imperfective activities by the delimitative prefix *po-* and which assign to these activities a meaning of duration for some time (after which an activity process stopped). These perfective verbs fall under the lexical category of “delimited activities” (*delimitativ*) which constitute a new lexical class, absent from the Vendlerian system. It is important to mention that for Padučeva perfective delimited activities do not form aspectual pairs with the imperfective verbs they are derived from, due to the fact that they denote a different lexical meaning from the original imperfective verbs. An example of delimited activity is the verb *poguljat'*_{PERF} ‘to walk for some time’ in example (7b).

Applying Padučeva’s classification to our initial examples in (6–7), we get the following taxonomy, with the names of the lexical classes given in both Padučeva’s and Vendler’s terms. Note that the delimited activity in example (9b) does not have a correlate in the Vendlerian classification.

- | | | |
|--------|------------------------------------------------------------------------------------------|---------------------------------------------------|
| (8) a. | Ivan čital _{IMPF} knigu.
Ivan read book
‘Ivan read a book.’ | [<i>Dejstvie v razvitii</i> /
Accomplishment] |
| b. | Ivan guljal _{IMPF} .
Ivan walked
‘Ivan walked.’ | [<i>Dejatel'nost'</i> / Activity] |
| (9) a. | Ivan pročital _{PERF} knigu.
Ivan read book
‘Ivan read a book.’ | [<i>Dejstvie obyčnoe</i> /
Accomplishment] |
| b. | Ivan poguljal _{PERF} .
Ivan walked for a while
‘Ivan walked for a while.’ | [<i>Delimitativ</i>] |

Padučeva’s analysis leads to the following conclusions. First, the lexical class of accomplishments is expressed in both perfective and

imperfective aspects by pairs of verbs that stand in the aspectual pair relation with each other. Padučeva suggests that imperfective accomplishments in Russian are similar to progressive accomplishments in English (Padučeva 1996: 106). This means that there must be something to the semantics of accomplishments which cuts across the imperfective/perfective divide. The second point is that the imperfective aspect is not limited to verbs denoting activities and states but can include the lexical class of accomplishments as well.

The question is, what exactly is the relation between the Vendlerian classification and the Russian data, or in other words, what *is* an imperfective accomplishment—or a delimited activity. We concentrate here on the lexical semantics of accomplishments and suggest that accomplishments denote inherently incremental events, both in English and in Russian, and that it is this semantic feature which crosses the perfective/imperfective divide. We show that the modifier *postепенно* ‘gradually’ and modifiers of the form *X za X*, ‘X by X’ modify only accomplishment verbs and that this is because they are inherently incremental and make reference in their semantics to the incrementality of the accomplishment verb.

In what follows we will present evidence to support this claim about the distribution of incremental modifiers and will suggest a semantics which explains this distribution (section 3). In section 4, we will make some more general observations about the Vendlerian classification and the perfective/imperfective classification and suggest that the interaction between grammatical and lexical aspect in Slavic predicts exactly such strange beasts as imperfective accomplishments and delimited activities.

3. Distribution of Incremental Modifiers

If *čitat’* and *pročitat’* ‘to read’ are both accomplishments, despite the difference in grammatical aspect, then we expect them to pattern together with respect to some linguistic operation and to contrast with activities, whether perfective or imperfective. These patterns occur with what we call incremental modifiers. We will examine the distribution of these modifiers with aspectual pairs like *čitat’* and *pročitat’*, as well as with verbs like *guljat’*, an activity, and *poguljat’*, the delimited activity which is the nearest thing to its perfective counterpart.

We will examine two kinds of incremental modifiers, *postepenno*, corresponding more or less to the English *gradually*, and modifiers of the form *X za X*, 'X by X'. Example (10) shows the distribution of *postepenno*, and example (11) shows the distribution of the *X za X* modifier.³

- (10) a. Ivan *postepenno* čital_{IMPF} knigu.
 Ivan gradually read book
 'Ivan gradually read a/the book.'
- b. Ivan *postepenno* pročital_{PERF} knigu.
 Ivan gradually read book
 'Ivan gradually read the book.'
- c. *Ivan *postepenno* guljal_{IMPF}.
 Ivan gradually walked
 'Ivan gradually walked.'
- d. *Ivan *postepenno* poguljal_{PERF}.
 Ivan gradually walked for a while
 'Ivan gradually walked for a while.'
- (11) a. Ivan čital_{IMPF} knigu stranica za stranicej.
 Ivan read book page by page
 'Ivan read a/the book page by page.'
- b. Ivan pročital_{PERF} knigu stranica za stranicej.
 Ivan read book page by page
 'Ivan read the book page by page.'
- c. *Ivan guljal_{IMPF} šag za šagom.
 Ivan walked step by step
 'Ivan walked step by step.'

³For some speakers, including the first author of this paper and some of his informants, the *X za X* modifiers are somewhat degraded in the perfective. We will discuss this fact later on.

- (11) d. *Ivan poguljal_{PERF} šag za šagom.
 Ivan walked for a while step by step
 'Ivan walked for a while step by step.'

The examples in (10) show that *postepenno* can modify both *čitati*' and *pročitati*', which both superficially correspond to the English accomplishment *read*, but does not occur with either imperfective or perfective forms which correspond to the English activity *walk*. This means that it occurs with the verbs which Padučeva takes to be accomplishments but not with those that she takes to be activities or delimited activities. Example (11) shows that the *X by X* modifiers too occur with the hypothesized accomplishment but not with the imperfective activity *gulgati*' or the delimited activity *pogulgati*'.

This ability to be modified by incremental modifiers generalizes to all verbs classified by Padučeva as accomplishments, while activities cannot be so modified. (An exception is directed motion activities such as *bežati*'_{IMPF} 'to run' and *plyti*'_{IMPF} 'to swim', which behave as a class by themselves; see the discussion later in the paper.) Thus, we have further examples of accomplishments that are acceptable with incremental modifiers: *postepenno pisati*'_{IMPF}/*napisati*'_{PERF} *knigu* 'to write a book gradually' and *pisati*'_{IMPF}/*napisati*'_{PERF} *knigu stranica za stranicej* 'to write a book page by page'; *postepenno risovati*'_{IMPF}/*narisovati*'_{PERF} *kartinu* 'to paint a painting gradually' and *risovati*'_{IMPF}/*narisovati*'_{PERF} *kartinu mazok za mazkom* 'to paint a painting brushstroke by brushstroke'. Conversely, we have further examples of activities which cannot be so modified: **postepenno prygati*'_{IMPF} 'to jump gradually'/**postepenno poprygati*'_{PERF} 'to jump for a while gradually' and **prygati*'_{IMPF} *kamen' za kamnem* 'to jump stone by stone'/**poprygati*'_{PERF} *kamen' za kamnem* 'to jump for a while stone by stone' and **postepenno smežati*'_{sja}_{IMPF} 'to laugh gradually'/**postepenno posmežati*'_{sja}_{PERF} 'to laugh for a while gradually'; **smežati*'_{sja}_{IMPF} *smešok za smeškom* 'to laugh laughter by laughter' and **posmežati*'_{sja}_{PERF} *smešok za smeškom* 'to laugh for a while laughter by laughter'. Note also that most perfective procedurals which are derived from accomplishments can also be modified by these incremental modifiers, as can the secondary imperfectives derived from them, although not, of course, the delimited procedurals derived via *po-* prefixation and meaning 'V for a while', or procedurals that un-

dergo a shift from accomplishments into achievements.⁴ For instance, imperfective accomplishments *stroit'*_{IMPF} 'to build' and *čitat'*_{IMPF} 'to read' can have a wide number of perfective procedurals derived from them (some of which can undergo a secondary imperfectivization). Some examples are *nadstroit'*_{PERF}/*nadstraivat'*_{IMPF} 'to build on top/add construction', *zastroit'*_{PERF}/*zastraivat'*_{IMPF} 'to fill a site with buildings', *perestroit'*_{PERF}/*perestraivat'*_{IMPF} 'to rebuild', *perečitat'*_{PERF}/*perečityvat'*_{IMPF} 'to reread' and *dočitat'*_{PERF}/*dočityvat'*_{IMPF} 'to finish reading'. All these procedurals are compatible with the incremental modifiers, thus: *postepenno nadstroit'*_{PERF}/*nadstraivat'*_{IMPF} *ětaž* 'to gradually add a floor' and *nadstroit'*_{PERF}/*nadstraivat'*_{IMPF} *ětaž komnata za komnatoj* 'to add a floor room by room', *postepenno zastroit'*_{PERF}/*zastraivat'*_{IMPF} *učastok* 'to gradually build up a site' and *zastroit'*_{PERF}/*zastraivat'*_{IMPF} *učastok domami dom za domom* 'to fill a site with houses house by house', *postepenno perestroit'*_{PERF}/*perestraivat'*_{IMPF} *dom* 'to gradually rebuild a house' and *perestroit'*_{PERF}/*perestraivat'*_{IMPF} *dom komnata za komnatoj* 'to rebuild a house room by room'; *postepenno perečitat'*_{PERF}/*perečityvat'*_{IMPF} *knigu* 'to gradually reread a book' and *perečitat'*_{PERF}/*perečityvat'*_{IMPF} *knigu stranica za stranicej* 'to reread a book page by page', *postepenno dočitat'*_{PERF}/*dočityvat'*_{IMPF} *knigu* 'to gradually finish reading a book' and *dočitat'*_{PERF}/*dočityvat'*_{IMPF} *knigu stroka za strokoj* 'to finish reading a book line by line'.

On the assumption that incremental modifiers modify incremental verbs, these data indicate (i) that the class of incremental verbs (= accomplishments) has both perfective and imperfective instantiations and (ii) that non-stative imperfective verbs denoting events with duration can be divided into those which are incremental (by hypothesis, accomplishments) and those which are not (uncontrovertially, activities). The data in (10–11) thus provide support for Padučeva's position rather than Brecht's. One might suggest that the Brecht's analysis could still be defended by claiming that (8a) and (9a) are transitive activities and (8b) and (9b) are intransitive ones and that what the incremental modifiers react to is the transitive versus intransitive status of activity verbs. However, the examples in (12–15) show that the dis-

⁴ For example, *nedočitat'* 'not to complete reading' and the inchoative *začitat'* 'to begin reading' cannot be modified by incremental modifiers, nor can *počitat'* 'to read for a while'. Mehlig (2008) argues that *počitat'* is derived from a non-incremental use of the verb *čitat'*.

tion between activities and accomplishments with respect to incremental modification is maintained even when accomplishments are intransitive and the activities are transitive.

- (12) a. Cvetok postepenno ro_{S_{IMPF}}.
 flower gradually grew
 'A flower gradually grew.'
- b. Cvetok postepenno vyro_{S_{PERF}}.
 flower gradually grew up
 'A flower gradually reached full bloom.'
- c. *Ivan postepenno iska_{I_{IMPF}} knigu.
 Ivan gradually looked for book
 'Ivan gradually looked for a/the book.'
- d. *Ivan postepenno poiska_{I_{PERF}} knigu.
 Ivan gradually looked for a while for book
 'Ivan gradually looked for a while for a/the book.'
- (13) a. Cvetok ro_{S_{IMPF}} meter za metrom.
 flower grew meter by meter
 'A flower grew meter by meter.'
- b. Cvetok vyro_{S_{PERF}} meter za metrom.
 flower grew up meter by meter
 'A flower reached full bloom meter by meter.'
- c. *Ivan iska_{I_{IMPF}} knigu komnata za komnatoj.
 Ivan looked for book room by room
 'Ivan looked for a/the book room by room.'
- d. *Ivan poiska_{I_{PERF}} knigu komnata za komnatoj.
 Ivan looked for a while for book room by room
 'Ivan looked for a while for a/the book room by room.'
- (14) a. Dinozavry postepenno isčezali_{I_{IMPF}} s lica zemli.
 dinosaurs gradually disappeared from face earth
 'Dinosaurs gradually disappeared from the face of the earth.'

- (14) b. Dinozavry postepenno isčezli_{PERF} s lica zemli.
 dinosaurs gradually disappeared from face earth
 'Dinosaurs gradually disappeared from the face of the earth.'
- c. *Deti postepenno maxali_{IMPF} rukami.
 children gradually waved hands
 'The children gradually waved their hands.'
- d. *Deti postepenno pomaxali_{PERF} rukami.
 children gradually waved for a while hands
 'The children gradually waved their hands for a while.'
- (15) a. Dinozavry isčezali_{IMPF} s lica zemli vid za vidom.
 dinosaurs disappeared from face earth species by species
 'Dinosaurs disappeared from the face of the earth species by species.'
- b. Dinozavry isčezli_{PERF} s lica zemli vid za vidom.
 dinosaurs disappeared from face earth species by species
 'Dinosaurs disappeared from the face of the earth species by species.'
- c. *Deti maxali_{IMPF} rukami dviženie za dviženiem.
 children waved hands movement by movement
 'The children waved their hands movement by movement.'
- d. *Deti pomaxali_{PERF} rukami dviženie za dviženiem.
 children waved hands movement by movement
 'The children waved their hands movement by movement.'

Other examples which support this are *postepenno tajat'*_{IMPF}/*rastajat'*_{PERF} 'to melt gradually' and *tajat'*_{IMPF}/*rastajat'*_{PERF} *sloj za slojem* 'to melt layer by layer', and *postepenno ostyvat'*_{IMPF}/*ostyt'*_{PERF} 'to cool gradually' and *ostyvat'*_{IMPF}/*ostyt'*_{PERF} *gradus za gradusom* 'to cool degree by degree'. All of these are acceptable, as opposed to **postepenno tancevat'*_{IMPF} *tango* 'to gradually dance a tango' / **postepenno potancevat'*_{PERF} *tango* 'to gradually dance a tango for a while', **tancevat'*_{IMPF} *tango šag za šagom* 'to dance a tango step by step' / **potancevat'*_{PERF} *tango šag za šagom* 'to dance a tango for a while step by step', **postepenno xlopat'*_{IMPF} *kryl'jami* 'to gradually

flap wings'/**postepenno poxlopat'*_{PERF} *kryl'jami* 'to gradually flap wings for a while', and **xlopat'*_{IMPF} *kryl'jami ryvok za ryvokom* 'to flap wings swing by swing'/**poxlopat'*_{PERF} *kryl'jami ryvok za ryvokom* 'to flap wings for a while swing by swing'.

An important question is whether all imperfective accomplishments can be modified by these modifiers independent of their interpretation.⁵ In the examples given above, the most natural interpretation of the imperfective accomplishments is that they denote partially completed events or events in progress. However, imperfective verbs in Russian can be interpreted in four different ways: progressive, durative, iterative or habitual, and perfect. As we show below, incremental modifiers occur in all four readings, indicating that the incrementality of the verbal element is a lexical property of the verbal head and not derived from the particular choice of imperfective reading imposed on it.

The four interpretations are illustrated in (16). A progressive focalized-processual interpretation describes a situation occurring at the moment of observation, as in (16a). A durative-processual interpretation denotes a situation that holds at a time interval but is located before some point of reference, as in (16b). This is the most natural reading for the examples which have been used up to now. The iterative reading in (16c), also referred to as the habitual, denotes an iteration of a certain situation. Finally, a perfect reading in (16d) denotes a completed situation with some relevance for the present.

- (16) a. V 12:00, Ivan čital_{IMPF} knigu.
 at 12:00 Ivan read book
 'Ivan was reading a/the book at 12:00.'
- b. Ivan dva časa čital_{IMPF} knigu pered tem kak ja prišel_{PERF}.
 Ivan two hours read book before I arrived
 'Ivan was reading a/the book for two hours before I arrived.'
- c. Ivan čital_{IMPF} žurnal Time po subbotam.
 Ivan read magazine Time on Saturdays
 'Ivan used to read Time magazine on Saturdays'.

⁵ We thank an anonymous reviewer for pointing out to us the importance of this question.

- (16) d. Ivan už čital_{IMPF} *Vojnu i mir* za dve nedeli.
 Ivan already read *War and Peace* in two weeks
 'Ivan has already read *War and Peace* in two weeks.'

As we see in the following examples, incremental modifiers are compatible with all four interpretations, though some readings require contextual support. Note also that these readings are available with both singular and plural direct objects, interpreted as definites or indefinites, which indicates that the incrementality is inherent in the verb meaning and not derived from a structure imposed on a plurality or from a completive reading dependent on the definiteness of the direct object.

- (17) a. ?Kogda ja vošel, Ivan čital_{IMPF} knigu/ knigi stranica za
 when I came in Ivan read book books page by
 stranicej.
 page
 'When I came in, Ivan was reading a/the book / (the) books
 page by page.'
- b. ?Kogda ja vošel, Ivan postepenno čital_{IMPF} knigu/ knigi.
 when I came in Ivan gradually read book books
 'When I came in, Ivan was gradually reading a/the book /
 (the) books.'
- (18) a. Sidja v biblioteke, Ivan čital_{IMPF} knigu/ knigi stranica
 sitting in library Ivan read book books page
 za stranicej.
 by page
 'Sitting in the library, Ivan read a/the book / books page by
 page.'
- b. Sidja v biblioteke, Ivan postepenno čital_{IMPF} knigu/ knigi.
 sitting in library Ivan gradually read book books
 'Sitting in the library, Ivan gradually read a/the book / (the)
 books.'

- (18) c. Ivan dva časa čital_{IMPF} knigu/ knigi stranica za stranicej
 Ivan two hours read book books page by page
 pered èksamenom.
 before exam
 'Ivan read a/the book / (the) books page by page for two hours before exam.'
- (19) a. Po voskresen'jam, Ivan čital_{IMPF} gazety stranica za
 on Sundays Ivan read newspapers page by
 stranicej.
 page
 'On Sundays, Ivan read (the) newspapers page by page.'
- b. Po voskresen'jam, Ivan postepenno čital_{IMPF} gazety.
 on Sundays Ivan gradually read newspapers
 'On Sundays, Ivan gradually read (the) newspapers.'
- (20) a. Ivan uže čital_{IMPF} *Vojnu i mir* stranica za stranicej.
 Ivan already read *War and Peace* page by page
 'Ivan has already read *War and Peace* page by page.'
- b. Ivan uže postepenno čital_{IMPF} *Vojnu i mir*.
 Ivan already gradually read *War and Peace*
 'Ivan has already gradually read *War and Peace*.'

The durative-processual reading in (18), the habitual/iterative reading in (19), and the perfect reading in (20) are compatible with the incremental modifiers *postepenno* and 'bit by bit'. At first sight, the incremental modifiers seem to be incompatible with the progressive focalised-processual interpretation of imperfective *čital* in (17). However, this incompatibility is explained by pragmatic considerations: a speaker is unable to ascertain that the reading process was gradual or proceeded bit by bit at the point of observation. Since the sentences in (17) are narrowed down to a single moment or a very short time interval, the speaker cannot judge whether the reading process is gradual or page by page from what he observes at this short moment. A proper contextual support seems to resolve this problem, as we can see in (21).

- (21) Ivan načal_{PERF} čitat'_{IMPF} knigu s utra. Kogda ja
 Ivan began to read book since morning when I
 uxodil_{IMPF}, Ivan postepenno/ stranica za stranicej čital_{IMPF}
 left Ivan gradually page by page read
 knigu. Kogda ja vernulsja_{PERF} v 12:00, on prodolžal
 book when I came back at 12:00 he continued
 postepenno/ stranica za stranicej čitat' ètu že knigu.
 gradually page by page to read this very book
 'Ivan began reading a book in the morning morning. When I
 was leaving, Ivan was reading the book gradually/page by page.
 When I came back at 12:00, he continued to read the same book
 gradually/page by page.'

Incremental modifiers may still sound a little strange with bounded plural objects in the progressive, but as Mehlig (2008) shows this has to do with the general incompatibility of bounded objects with imperfective accomplishments (except under simultaneous interpretation). Mehlig shows that when a possessive pronoun accompanies the direct object the relevant sentences sound better. In these cases, incremental modifiers are perfectly acceptable and imply that the drinking happened in an ordered fashion, cup after cup.

- (22) a. Ivan postepenno pil_{IMPF} svoi tri čaški kofe.
 Ivan gradually drank his three cups coffee
 'Ivan was gradually drinking his three cups of coffee.'
 b. Ivan pil_{IMPF} svoi tri čaški kofe glotok za glotkom.
 Ivan drank his three cups coffee gulp by gulp
 'Ivan was drinking his three cups of coffee gulp by gulp.'

Notice that while the non-bounded direct objects of the examples using imperfectives can be interpreted as indefinite or definite (as shown in examples (17–19)), the bare plural direct object in the paired perfective sentence must be interpreted as definite.⁶

⁶ As Mehlig points out (p.c.), in some special contexts direct objects of perfective verbs acquire an indefinite reading. One such case is contrastive negation: *On pročital_{PERF} ne knigu, a gazet'u* 'He read a newspaper, not a book'.

- (23) Ivan pročit_{PERF} gazety stranica za stranicej/postepenno.
 Ivan read newspapers page by page gradually
 'Ivan read the newspapers page by page / gradually.'

This contrast is further evidence that the incrementally modified imperfective is an independent construction and not just the progressive correlate of the perfective form.

More support comes from the use of temporal modifiers. While temporal *za* modifiers, the equivalent of *in X time*, are canonically found as modifiers of perfective verbs and *for X time* modifiers are canonically found with imperfective verbs, the *za* modifiers can occur with perfect or completive uses of the imperfective. An example was given in (16d). If incrementality, and thus incremental modification, is dependent on the lexical properties of the head and independent of the particular interpretation given, then incremental modifiers should co-occur with both *za čas* 'in an hour' and *čas* 'for an hour'. This prediction is borne out, as the data in (24) show. Here we see that *stranica za stranicej* can modify both atelic and telic readings of the imperfective, where use of *uže* 'already' and the definite direct object in (24b) makes the telic reading natural.

- (24) a. Ivan čas čit_{IMPF} knigu/ knigi stranica za stranicej.
 Ivan hour read book books page by page
 'Ivan read a/the book / (the) books page by page for an hour.'
- b. Ivan uže čit_{IMPF} ètu knigu/ eti knigi stranica za stranicej za čas.
 Ivan already read this book these books page by page in hour
 'Ivan has already read this book / these books page by page in an hour.'

Note further that incremental modifiers appear with intransitives of verbs like *čitat'* only if the content of the direct object is recoverable from context. Thus (25) is acceptable only in the context of a situation where, for example, I have given Ivan an enormous pile of papers or exams to grade and I say:

- (25) Ivan čital_{IMPF} postepenno/ stranica za stranicej.
 Ivan read gradually page by page
 'Ivan was reading gradually / page by page.'

But this result is expected, since the presence of an incremental theme (either explicit or understood from context) is essential to get an incremental reading of a verb. In English too, standard accomplishment verbs such as *write* get a non-incremental activity reading when intransitivized, as in the acceptable *he wrote for some hours*. It thus looks as if incremental modifiers will provide a means for distinguishing between accomplishment verbs and activity verbs in Russian exactly along the lines that Padučeva's theory requires. We now need to explain why these modifiers behave the way they do and show that their distribution hinges on the difference in structures between accomplishments and activities. We turn to this in the following sections.

4. The Interpretation of Incremental Modifiers

4.1. *Postepenno*

If incremental modifiers are indeed a test for accomplishments, we may assume that the distribution of these modifiers follows from their interpretation. We thus need an account of the semantics of *postepenno* and *X za X* which will show how they interact with the denotations of the verbs they modify and why they have the distribution they do. We begin with *postepenno*, the Russian equivalent of *gradually*.

The only serious study of the semantics of *gradually* that we know of is Piñón's 2000 study of *gradually* in English. Piñón is the first to point out that the distribution of *gradually* in English allows us to make aspectual distinctions among verbs. *Gradually* in English can occur sentence initially, preverbally, or post-verbally. In sentence initial position and also in preverbal position, it arguably scopes over tense and can modify the stages leading up to an event, but as a verbal modifier it applies directly to the verb itself and only with verbs denoting events of change along some kind of scale. Thus, as a verbal modifier *gradually* occurs in English with degree achievements such as *cool* and *expand*, with almost all accomplishments (with the exception of *rescue*, which is arguably an achievement anyway), but with activities and states only if some kind of scale of measurement is added explicitly.

As in English, *postepenno* in Russian can occur either sentence-initially, preverbally, or post-verbally, as shown in (26).

- (26) a. *Postepenno*, *led rastajal*_{PERF}.
 gradually ice melted
 b. *Led postepenno rastajal*_{PERF}.
 ice gradually melted
 c. *Led rastajal*_{PERF} *postepenno*.
 ice melted gradually.
 ‘The ice gradually melted.’

Preverbal position seems to be the most natural in Russian (as well as in English). As we saw in the previous section, *postepenno* naturally occurs with what we pretheoretically would consider accomplishment types and not with activities.

A further look at the data indicates some more fine-grained distinctions and indicates also that the facts about the distribution of *postepenno* in Russian do not carry over directly from the facts about *gradually*. Unlike the English data, *postepenno* never modifies states and activities, even when these have been already modified by a scalar or degree modifier. In English, as Piñón (2000) has shown, *gradually* can modify activities and states after the addition of *more and more* modification, as in (27).

- (27) a. *Children gradually ran.
 b. Children gradually ran more and more quickly.
 c. *Peter gradually loved Mary
 d. Peter gradually loved Mary more and more.

In Russian, however, the addition of the *more and more* modifier does not affect the incompatibility of *postepenno* with activity and state verbs, as we can see in (28). Note that there is no problem in adding a degree modifier, as in (28a, d), but crucially these degree modifiers do not license *X za X* modification.

- (28) a. *Deti bežali_{IMPF} vse bystree i bystree.*
 children ran all faster and faster
 'The children ran more and more quickly.'
- b. **Deti postepenno bežali_{IMPF}.*
 children gradually ran
 'The children gradually ran.'
- c. **Deti postepenno bežali_{IMPF} vse bystree i bystree.*
 children gradually ran all faster and faster
 'The children gradually ran more and more quickly.'
- d. *Ivan ljubil_{IMPF} Mašu vse bol'se i bol'se.*
 Ivan loved Masha all more and more
 'Ivan loved Masha more and more.'
- e. **Ivan postepenno ljubil_{IMPF} Mašu.*
 Ivan gradually loved Masha
 'Ivan gradually loved Masha.'
- f. **Ivan postepenno ljubil_{IMPF} Mašu vse bol'se i bol'se.*
 Ivan gradually loved Masha all more and more
 'Ivan gradually loved Masha more and more.'

In order to express the meanings in (28c, f) Russian uses the accomplishment verb *ubystrijat'*_{IMPF} 'to quicken' and the inchoative achievement *vlubljal'sja*_{IMPF} 'to come to love/to fall in love' respectively:

- (29) a. *Deti postepenno ubystrijali_{IMPF} svoj beg.*
 children gradually quickened their run
 'The children gradually quickened their pace'.
- b. *Ivan postepenno vse bol'se i bol'se vlubljal'sja_{IMPF}*
 Ivan gradually all more and more fell in love
 v Mašu.
 in Masha.
 'Ivan gradually fell more and more in love with Masha.'

Predictably, achievements denoting singular events cannot be modified by *postepenno* in initial, pre-, or post-verbal positions:

- (30) a. *Postepenno vozdušnyj šarik lopnul_{PERF}.
gradually balloon popped
- b. *Vozdušnyj šarik postepenno lopnul_{PERF}.
balloon gradually popped
- c. *Vozdušnyj šarik lopnul_{PERF} postepenno.
balloon popped gradually
'The balloon gradually popped.'
- d. *Postepenno Igor' umer_{PERF}.
gradually Igor' died
- e. *Igor' postepenno umer_{PERF}.
Igor' gradually died
- f. *Igor' umer_{PERF} postepenno.
Igor' died gradually
'Ivan gradually died.'

However, they can appear sentence-initially, pre-, and post-verbally with achievements, on condition that the verb phrase can denote a plurality. In the following examples *postepenno* modifies the plurality of events in the VP and is true if the plurality of instantaneous events is spaced out gradually over an extended time period. The plural achievements are also acceptable with one specific *X za X* type modifier, 'one by one'.

- (31) a. Postepenno, vozdušnye šariki lopnuli_{PERF} odin za drugim.
gradually balloons popped one by another
'Gradually, the balloons popped one by one'.
- b. Vozdušnye šariki postepenno lopnuli_{PERF} odin za drugim.
balloons gradually popped one by another
'The balloons gradually popped one by one'.
- c. Vozdušnye šariki lopnuli_{PERF} postepenno, odin za drugim.
balloons popped gradually one by another
'The balloons popped gradually, one by one'.
- d. Postepenno, okna v dome tresnuli_{PERF} odno za drugim.
gradually windows in house cracked one by another
'Gradually, the windows in the house cracked one by one.'

- (31) e. Okna v dome postepenno tresnuli_{PERF} odno za drugim.
 windows in house gradually cracked one by another
 'The windows in the house gradually cracked one by one.'
- f. Okna v dome tresnuli_{PERF} postepenno, odno za drugim.
 windows in house cracked gradually one by another
 'The windows in the house cracked gradually, one by one.'
- g. *Okna v dome tresnuli_{PERF} postepenno, oskolok za
 windows in house cracked gradually fragment by
 oskolkom.
 fragment
 'The windows in the house cracked gradually, fragment by
 fragment.'

Interestingly, pluralities of activities and states cannot be modified by *postepenno*. Thus (32a–b) are unacceptable, while (32c–d) are acceptable, because the activity stem in (32a) and the state stem in (32b) have been prefixed by the prefix *za-*, plausibly shifting them into achievements in (32c–d), respectively.

- (32) a. *Postepenno, gosti kurili_{IMPF} sigarety.
 gradually guests smoked cigarettes
 'The guests gradually smoked cigarettes.'
- b. *Postepenno, deti dremali_{IMPF}.
 gradually children slept
 'The children gradually slept.'
- c. Postepenno, gosti zakurili_{PERF} sigarety.
 gradually guests began to smoke cigarettes
 'Gradually, the guests lit up cigarettes.'
- d. Postepenno, deti zadremali_{PERF}.
 gradually children fell asleep
 'Gradually, the children fell asleep.'

The position of *postepenno* in (32) can also be pre- or post-verbal in all the examples without affecting the judgments. The initial position is nonetheless the most natural one for *postepenno* when it modifies the

plural achievement events, as in (31a–d). We conclude from this that *postepenno* behaves as a sentential modifier when it modifies plural achievement events. We will, however, ignore this use of *postepenno* in the rest of the paper.

One other important difference between *postepenno* and *gradually* concerns direct objects. While in English *gradually* is incompatible with mass or bare plural objects, as in (33a), *postepenno* does not create such a problem in Russian:

- (33) a. *Ivan gradually ate cheese.
 b. *Ivan gradually ate cakes.
- (34) a. Ivan postepenno el_{IMPF} syr.
 Ivan gradually ate cheese
 'Ivan gradually used to eat cheese / was eating the cheese.'
 b. Ivan postepenno s''el_{PERF} syr.
 Ivan gradually ate cheese
 'Ivan gradually ate the cheese.'
- (35) a. Ivan postepenno el_{IMPF} pirogi.
 Ivan gradually ate cakes
 'Ivan gradually ate (the) cakes.'
 b. Ivan postepenno s''el_{PERF} pirogi.
 Ivan gradually ate cakes
 'Ivan gradually ate the cakes.'
 c. Ivan el_{IMPF} pirogi kusok za kuskom.
 Ivan ate cakes bit by bit
 'Ivan ate (the) cakes bit by bit.'
 d. Ivan s''el_{PERF} pirogi kusok za kuskom.
 Ivan ate cakes bit by bit
 'Ivan ate the cakes bit by bit.'

Note that while the English examples are ungrammatical except on the habitual reading 'Ivan gradually came to eat cheese/cakes', Russian allows non-habitual readings. The example (34a) has a habitual interpretation, meaning that in general Ivan used to eat (an unknown

amount of) cheese gradually, and a durative interpretation, in which the denotation of cheese will be restricted to the concrete, contextually defined piece of cheese. The perfective example (34b) has only a completed interpretation in which the contextually defined piece of cheese was eaten. The Russian examples in (35) have two possible non-habitual interpretations. First, Ivan ate the cakes (in perfective sentences—all available cakes) gradually and simultaneously, biting a piece of each cake in turn. Second, Ivan gradually ate the cakes, completely finishing one cake and then starting another. In both cases, each individual cake was eaten gradually (or bit by bit).

The semantics which Piñón proposes for *gradually* in English make it a modifier of relations R between events and degrees, and “asserts that as an event e unfolds, the degree of e as determined by R steadily increases.” Piñón’s semantics require that *gradually* only modifies verbs that have a degree argument, and this naturally constrains its distribution. Degree achievements such as *cool* can naturally be modified by *gradually*, as in *The soup cooled gradually*, and Piñón’s semantics give this the meaning that the soup cooled and the degree of its coolness steadily increases as the event continues. Verbs which can be modified by *gradually*, but do not have an explicit degree argument require a degree argument to be introduced by a degree function. A crucial element of Piñón’s analysis is that the degree function can only be added directly to a verbal meaning if the verb has an incremental argument which incrementally reflects the development of the event. Accomplishments are incremental and have an incremental theme (the direct object of a transitive verb and subject of an intransitive, usually unaccusative, verb). This means that an implicit degree function can be added to the accomplishment verb meaning and the resulting output can be modified by *gradually*. Activities and states can be modified by *gradually* only if an explicit scalar modifier is added to the VP as in *love Mary more and more* and *run more and more quickly*, as illustrated above.

The analysis we present in this paper shares with Piñón’s account the assumption that the semantics of graduality is inherently tied up with incrementality. However, we present a simpler analysis of *postepenno*, in which the modifier directly modifies an incremental event instead of assuming a relation between the event and the degree argument and modifying that relation. Our reasons for taking this approach are based on the data above. The crucial examples are (28c, f), repeated here, which show that, unlike the corresponding English ex-

amples, *postepenno* cannot modify an activity or a state, even if it includes an explicit expression of degree.

- (28) c. *Deti postepenno bežali_{IMPF} vse bystree i bystree.
 children gradually ran all faster and faster
 ‘The children gradually ran faster and faster.’
- f. *Ivan postepenno ljubil_{IMPF} Mašu vse bol’še i bol’še.
 Ivan gradually loved Masha all more and more
 ‘Ivan gradually loved Masha more and more.’

The data in (28) show that *postepenno* modifies only an inherently incremental verb, and this implies that in Russian it is the incremental structure of the verb itself which is modified, not a degree argument which has been added to the verbal meaning. We take this as support for the claim that it is lexical incrementality which is essential to the semantics of *postepenno*, rather than degrees,⁷ and we give an analysis which builds on this.

Intuitively, *postepenno* applies to verbs of incremental change, and adds the information that the change was not brought about in a rush but in small steps. The meaning of adding *postepenno* to “X V-ed” is not that the degree assigned to the incremental stages is constantly increasing but that the incremental steps are small or, put differently, that there are sufficient incremental stages for the changes between each stage to be small. We show that the interpretation of the adverb

⁷ It is true that the examples in (31) indicate that an incremental structure can be constructed on a plural set of achievements. This clearly requires an explanation (which we are not going to attempt here), but since the phenomenon is restricted to achievements and not dependent on an explicit expression of degree, it does not affect our basic claim. Mehlig (2008) presents evidence based on temporal modification which shows that plural achievement predicates can be interpreted as incremental. The fact that achievement predicates in Russian can be modified by *odin za drugim* ‘one after another’ but not by other *X za X* modifiers suggests that it is a derived incrementality (rather than a lexical incrementality), derived from imposing incremental structure on a plurality of instantaneous events. Crucially, this cannot be done generally, but only with achievements, and presumably is connected to the temporal and/or lexical properties of achievements. This raises many interesting questions about achievements and plurality which we will not discuss further here. Note that the data in (31) provide evidence for characterizing the lexical class of achievements. Unlike accomplishments, singular achievements cannot be modified by *postepenno*, but unlike activities and states plural achievements can be so modified.

presupposes that the event denoted by the *V* has an incremental structure and that this adverb distinguishes between accomplishments and activities, no matter what grammatical aspect the verb appears in, precisely because an accomplishment has an incremental structure in both aspects.

In order to show how the semantics of *postepenno* works, we first need some background on a formal representation of Vendler classes and a theory of incrementality. We illustrate this using the semantics for accomplishments introduced in Rothstein 2004. Although our semantics for incremental modifiers could no doubt be instantiated in other theories of incrementality, such as Krifka 1992 and 1998, Rothstein's account is particularly suited to our analysis since it presupposes that incrementality proceeds in discrete stages. We will claim that it is the set of stages, or the incremental structure determined by this set of stages that both *postepenno* and *X za X* modify. We will say more about this below.

Rothstein's (2004) account is based on a reworking of the Vendlerian classification system in a neo-Davidsonian framework (see Parsons 1990 and Landman 2000). In this framework, verbs denote sets of events or event types, and thematic roles denote functions from events to their participants. Lexical classes are distinguished by the different properties that the events in their denotations have, and the set of lexical classes may be seen as a disjunction of constraints on the possible event types that can be denotations of verbal heads. Rothstein argues that the diagnostic tests indicate that Vendler's four classes can be seen as instantiations of two features: whether a verb denotes an event which can be analyzed as having distinguishable stages and whether it denotes an event of change. The notion of event stages was introduced in Landman 1992 and discussed further in Landman 2008. An event e' is a "stage" of e if the following hold:

- (36) e' is a stage of e iff:
- (i) $e' \sqsubseteq_e e$; i.e., e' is a temporal part of e ;
 - (ii) e and e' have the same temporal starting point;
 - (iii) e is a development of e' ; i.e., e and e' are qualitatively distinguishable, having different properties.

Activities and accomplishments have stages (which is why they naturally occur with the progressive), while states and achievements

do not. States do not have stages because they are entirely static, and any subevent of a state e is indistinguishable from any other subevent in the relevant respects. Achievements do not have stages because they are too short. They are analyzed as essentially instantaneous changes from $\neg \phi$ to ϕ , which therefore hold at two consecutive instants, the last moment that $\neg \phi$ is true and the first moment that ϕ is true (see Dowty 1979).

With respect to change, achievements and accomplishments are analyzed as events of change, while states and activities are not. Since a change has a natural culmination or end point, the point when the change has “happened”, this explains the fact that achievements and accomplishments naturally head telic VPs. In English, the activity-headed VP in *John ran* is atelic because we do not know when the process of running was over, while the accomplishment headed VP in *John drew a picture* is telic because the given event was over when the painting of the picture was completed. Rothstein (2004, chapter 8) shows that the analysis of the four verb classes in terms of these two features can be summed up in the following way:

Table 1: Features of Lexical Classes

Lexical Class	[\pm stages]	[\pm event of change]
States	–	–
Activities	+	–
Achievements	–	+
Accomplishments	+	+

As can be seen from Table 1, accomplishments are the most complex of these verb classes because they have both stages, and denote events of change. Event stages are ordered temporally. However, in an accomplishment event the stages can be ordered not only according to the temporal size but according to how close they bring you along the process of change to a predefined culmination point.

Rothstein 2004 thus differs from Krifka 1989, 1992, 1998, and similar proposals, as Krifka argues that accomplishments are incremental because there is a homomorphism between the part structure of the theme argument and the part structure of the event. Rothstein pro-

poses instead that the incrementality of accomplishments is determined by the inherent ordering of event stages. She analyses accomplishment events as complex events consisting of an activity subevent and an event of change and argues that the process of change is used to “measure” or plot the progress of the activity event. The process of change has contextually defined stages, and the structure of this chain of stages is imposed on the event as a whole. The culmination point of the change, i.e., the point at which the change is achieved, determines the culmination or end point of the whole event.

More precisely, an accomplishment event is a singular event formed out of the sum of an activity event and a temporally extended BECOME event. These are linked by an **incremental relation**, which works as follows. It assumes a contextually determined incremental chain, $C(e_2)$, imposed on the event of change via the *stage of* relation holding between its subevents (where stage is defined as in (36) above). This incremental chain assigns the BECOME event a break down into its contextually relevant parts. A function, call it μ , maps the elements of the incremental chain onto the activity event in such a way that each element of $C(e_2)$ is mapped onto that part of e_1 which shares its running time. Thus, the structure captures the generally accepted intuition (Dowty 1991, Krifka 1992, Tenny 1994, and others) that the change of state “measures out” or marks the progress of the activity and thus of the event as a whole.

An incremental chain is defined as in (37).

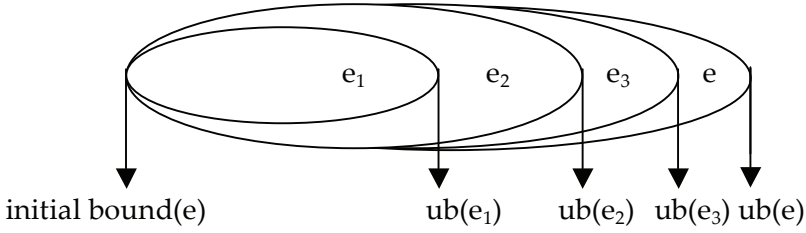
(37) **Incremental Chain**

Let e be a BECOME event:

An incremental chain $C(e)$ is a set of stages of e such that:

- (i) the smallest event in $C(e)$ is the initial bound of e ;
- (ii) for every e_1, e_2 in $C(e)$, $e_1 \sqsubseteq e_2$ or $e_2 \sqsubseteq e_1$;
- (iii) $e \in C(e)$.

So an incremental chain breaks a BECOME event down into a set of temporally ordered stages, which start with its beginning and plot its growth into the complete event. This is represented graphically in (38), where the initial bound of e is the starting point of e , and the upper bound of an event e is its final point or culmination.

(38) **An incremental chain $C(e)$** 

In an accomplishment event the incremental chain, or division into ordered stages, is mapped by a one-to-one function μ onto the activity event via the incremental relation in (39) (where $\tau(e)$ maps an event onto its running time):

(39) **Incremental relations:**

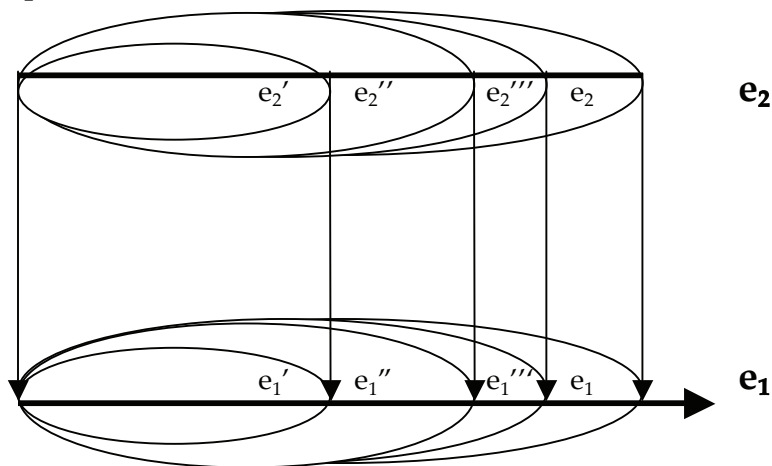
Let e_1 be an activity, e_2 be a BECOME event, and $C(e_2)$ be an incremental chain defined on e_2 .

$\text{INCR}(e_1, e_2, C(e_2))$ (e_1 is incrementally related to e_2 with respect to the chain $C(e_2)$) iff:

there is a one-to-one function μ from $C(e_2)$ into $\text{PART}(e_1)$ (the set of parts of e_1) such that:

for every $e \in C(e_2)$: $\tau(e) = \tau(\mu(e))$.

So the incremental relation maps the salient incremental parts of e_2 , the BECOME event, onto those parts of e_1 , the activity event, that have the same running time. Note that “identity” here is identity up to bounds, since the point of the μ function is that it enables the bounded intervals in e_2 to impose a right-bound on the intervals in e_1 , which are inherently only left-bounded. So, while the incremental chain $C(e_2)$ imposes an incremental structure on the BECOME event, the incremental relation imposes this structure onto the event as a whole. This is illustrated graphically in (40), where e_1 is the activity event, whose temporal trace is a right-open interval, and e_2 is the BECOME event, which is a right-closed interval that imposes its temporal trace on the structure of the event as a whole.

(40) **Accomplishment event structure**

The template for accomplishment verbs given in (41) shows how the meaning of a lexical item “unpacks” to express this structure.⁸ The sum operation used is the composition of the standard sum operation based on the part of relation and an operation which takes plural entities into a singular entity. Thus $^s(e_1 \sqcup e_2)$ gives the singular event which is formed from the sum of e_1 and e_2 . For justification of this operation see Rothstein 2004:

(41) **Accomplishment Template**

$$\lambda x \lambda e. \exists e_1, e_2 [e = ^s(e_1 \sqcup e_2) \wedge P_{\text{ACTIVITY}}(e_1) \wedge \text{Th}(e_1) = x \\ \wedge \text{BECOME-P-ed}(e_2) \wedge \text{Arg}(e_2) = \text{Th}(e_1) \wedge \text{INCR}(e_1, e_2, C(e_2))]$$

An accomplishment verb thus denotes a complex event with an activity subevent e_1 and a BECOME subevent e_2 in which the theme undergoes the activity expressed by P. The accomplishment READ thus denotes a set of events, each of which is the sum of an event e_1 in the denotation of $\text{READ}_{\text{ACTIVITY}}$ and an event e_2 in which the theme of

⁸ Note that in (41) the content of the activity and of the BECOME event are lexically related, while the definition in (39) leaves open the possibility that they are independent. This is because (41) is the template for a basic lexical accomplishment verb, while the definition in (39) covers also derived accomplishments formed via lexical type shifting operations in, for example, resultative constructions. See Rothstein 2004 for details.

READ_{ACTIVITY} gets read. In the interests of brevity we will use $\lambda x \lambda e. P^*(e) \wedge Th(e) = x$ as a short form for (41), so that $\lambda x \lambda e. READ^*(e) \wedge Th(e) = x$ is the short form of the denotation of the accomplishment *read* whose long form would use the template in (41).⁹ Arg is a general function from events to their participants, and $Arg(e_2) = Th(e_1)$ specifies that the thematic argument of e_2 or participant of e_2 is the same entity as the theme argument of e_1 . The value of this function is thus the incremental theme. An INCR($e_1, e_2, C(e_2)$) relation holds between e_1 and e_2 , requiring e_1 and e_2 to be incrementally related by means of an incremental chain $C(e_2)$ built on e_2 .

The crucial point is that there are obviously many incremental chains which can be constructed on the BECOME event because there are many possible ways of picking out salient sets of stages for the event of change. For example, the relevant stages of a book-reading event will depend on how long the book is, how fast the reader, what purpose the book is being read for, what kind of book it is, and so on. Thus the incremental relation is contextually determined, depending on the contextually determined choice of what the salient stages of the event of change which determines the incremental chain are.

We assume that it is this choice which is constrained by *postepenno*. We look again at the data showing the distribution of *postepenno*:

- (42) a. Ivan postepenno čital_{IMPF} knigu.
 Ivan gradually read book
 ‘Ivan read a/the book gradually.’
 b. Ivan postepenno pročital_{PERF} knigu.
 Ivan gradually read book
 ‘Ivan read the book gradually.’

⁹ *Read* also has an activity reading as in *I read the story to the child for hours*. Rothstein (2004) argues that this reading is derived from the accomplishment reading. The lexical accomplishment *read* denotes $\lambda x \lambda e. \exists e_1, e_2 [e = S(e_1 \sqcup e_2) \wedge READ_{ACTIVITY}(e_1) \wedge Th(e_1) = x \wedge BECOME-READ(e_2) \wedge Arg(e_2) = Th(e_1) \wedge INCR(e_1, e_2, C(e_2))]$, but *read* as an activity denotes $\lambda x \lambda e. READ_{ACTIVITY}(e) \wedge Th(e) = x$. As far as we can tell, the subevent $\lambda e. BECOME-READ(e)$ does not have an independent usage outside the accomplishment reading, but maybe it is the basis of the middle usage as in *This book reads easily*.

- (42) c. *Ivan guljal_{IMPF} postepenno.
 Ivan walked gradually
 ‘Ivan walked gradually.’
- d. *Ivan poguljal_{PERF} postepenno.
 Ivan walked for a while gradually
 ‘Ivan walked for a while gradually.’

Let us assume that if an event is gradual, then the change brought about is brought about in small stages and not in a rush. If (42a) is true, then Ivan read the book in small stages and not in one sitting. We assume this can be captured by the constraint that the event is analyzed as having salient, identifiable stages, which guarantees that it does not happen “in one go” or “in a rush”. If Ivan read the book gradually, we should be able to identify stages in the event of reading that book at each of which a different quantity of book had been read. These parts do not have to be homogeneous. I can read a book gradually over a period of time, reading more and more of the book at different rates (several chapters on one sitting, another chapter over a period of weeks, and so on). Similarly, I can build a house gradually over a period of time, digging the basement and then pausing for a while, and then continuing with work stages and pause stages of different and unpredictable durations and types. But in order to ensure that the event is gradual it has to be assigned an incremental structure consisting of a large enough number of salient subevents. We can call such an incremental structure “dense.” The fact that gradual events tend to be slow follows from the fact that in order to have a large enough set of salient subevents a gradual event needs to last long enough for the subevents to be noticed.

We treat *postepenno* as a VP modifier, applying to VP meanings and returning VP meanings, i.e., an expression of type $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ denoting a function from sets of events to sets of events. (Note we use ‘e’ here as denoting the type of event entities.) It applies to VPs headed by accomplishments and returns the set of events whose incremental subevent is analyzed as having a sufficiently large number of relevant stages. Thus, while *postepenno* applies to a VP structurally, its effect cannot be seen without unpacking the meaning of the accomplishment verb so that the structure given in (41) is visible. It is important to see that the unpacking itself is not an effect of adding the modifier: this

structure is always there but is not usually represented explicitly unless it is necessary. With incremental modifiers, it is necessary.

An accomplishment-headed VP modified by *postepenno* will have the structure $\lambda e.VP(e) \wedge \text{postepenno}(e)$ that will be interpreted as in (43).

- (43) $\lambda e \exists e_1, e_2 [e = s(e_1 \sqcup e_2) \wedge P_{\text{ACTIVITY}}(e_1) \wedge \text{BECOME-P-ed}(e_2)$
 $\wedge \text{INCR}(e_1, e_2, C(e_2))$
 $\wedge |C(e_2)| = \text{BIG}]$

The meaning given is that a gradual event is one in which the cardinality of the chain which is the domain for the incremental relation is in BIG. A cardinality is in BIG if it is sufficiently above the norm, where of course the norm, and thus the denotation of BIG, is context dependent. Thus we have a contextually defined incremental chain which consists of more stages than expected relative to some standard of interpretation. So *postepenno* can modify a VP whose meaning contains reference to an incremental chain, i.e., a VP headed by an accomplishment, and it adds the information that this incremental chain has many stages. This ensures that events in the denotation of the modified VP have incremental structures with enough subevents to be considered gradual. Examples (42a) and (42b) will both have the interpretation in (44), abstracting away from the differences due to the semantic expression of perfectivity.

- (44) $\exists e, e_1, e_2 [e = s(e_1 \sqcup e_2) \wedge \text{READ}(e_1) \wedge \text{Ag}(e_1) = \text{IVAN}$
 $\wedge \text{Th}(e_1) = \text{THE BOOK}$
 $\wedge \text{BECOME READ}(e_2) \wedge \text{Arg}(e_2) = \text{Th}(e_1)$
 $\wedge \text{INCR}(e_1, e_2, C(e_2))$
 $\wedge |C(e_2)| = \text{BIG}]$

‘There was an event of Ivan reading the book in which the book became read which had many incremental stages (and was therefore gradual).’

The semantics of degree achievements is beyond the scope of this paper, but it seems clear that they have a naturally incremental structure (as argued in Hay, Kennedy, and Levin 1999) and are therefore predicted to occur with *postepenno*.

- (45) a. Temperatura postepenno podnimalas'_{IMPF}.
 temperature gradually rose
 'The temperature gradually rose.'
- b. (Nebo) Postepenno temnelo_{IMPF}.
 sky gradually darkened
 '(The sky) gradually darkened.'

To sum up this section, we have analyzed *postepenno* as an incremental modifier which modifies inherently incremental verbs. We have proposed treating *postepenno* as a modifier which constrains the incremental structure of the verb to have enough distinguishable incremental stages, where "enough" is contextually determined, and we have suggested that the intuitive understanding of what *gradually/postepenno* means follows from this. We have instantiated this analysis in Rothstein's (2004) theory of the structure of accomplishments.

It should now be clear why we chose Rothstein's theory over more conventional ones. We analyze *postepenno* as modifying the incremental structure of the event. Rothstein's account differs from more standard accounts such as Krifka 1992 and 1998 in arguing that an accomplishment event has incremental structure consisting of a chain of contextually determined incremental stages. Since in this theory an event has an explicit incremental structure, the event structure is modifiable and can be constrained by incremental modifiers. In a Krifka-style account of incrementality, incrementality is the result of a gradual relation between the incremental argument and the event, such that for any two event stages *e* and *e'*, if *e* is a proper part of *e'*, the theme of *e* will be a proper part of the theme of *e'*. This makes incrementality a property of the relation between event and theme and does not require an explicit choice of stages which are incrementally related or an explicit context-dependent incremental structure. In such a theory it would not be possible to treat incremental modifiers as modifiers of incremental structure. In the next section, we give the semantics for *X by X* modifiers, providing further support for a theory of accomplishments which requires accomplishment events to be assigned an explicit incremental structure expressed by an incremental chain.

4.2. *X za X* Modifiers

The semantics of *X za X* modifiers is naturally more complicated, in part because unlike with *postepenno* there are a few exceptions to the general pattern of distribution. Nonetheless, the overwhelming pattern is that *X za X* modifiers appear only with accomplishments. A very natural semantics builds on the relation between the modifier and the incremental structure of the verb, and this provides further support for the claim that accomplishments, defined by their inherently incremental structure, appear in the imperfective as well as the perfective aspect.

Against the background of our analysis of *postepenno*, the function of modifiers such as *page by page*, *step by step*, and so on can very naturally be analyzed as constraints on the elements of the incremental chain as well, i.e., on the domain of the μ function and thus as constraints on the incremental structure of the event. *X za X* modifiers determine what are the contextually relevant stages which chart the progress of the event or, more formally, what is the domain of the “stage-of” relation that determines the incremental chain. Consider the examples in (46):

- (46) a. On stroil_{IMPF} dom ètaž za ètažom.
 he built house floor by floor
 ‘He was building a/the house floor by floor.’
 b. Ivan el_{IMPF} kornfleks ložka za ložkoj.
 Ivan ate cornflakes spoon by spoon
 ‘Ivan ate cornflakes spoon by spoon.’

Example (46a) is true if there was an event of building the house and the relevant stages which marked the progress of the building event are stages that are measured in terms of the building of floors. Example (46b) is true if there was an event of eating cornflakes whose salient parts are the (sub)events of eating spoonfuls. Contrast example (46b) with (47):

- (47) On el_{IMPF} kornfleks xlopinka za xlopinkoj.
 he ate cornflakes cornflake by cornflake
 ‘He ate cornflakes cornflake by cornflake.’

Sentence (47) asserts that the contextually relevant stages of the eating cornflakes event were stages which grew by the eating of just one cornflake. We can imagine a situation in which (47) is appropriate. It would be a situation in which the eating of each separate cornflake was perceptually salient and the event progressed at what was probably a snail's pace. Note crucially that (46b) and (47) are mutually incompatible, as an event of eating cornflakes spoon by spoon cannot at the same time be an event of eating cornflakes flake by flake. Furthermore, not only are the salient stages of the event, i.e., the events in the incremental chain, measured in terms of *X*, but all events which can be measured in terms of *X* must be in the incremental chain. So if Ivan built a house floor by floor, then each and every event of accomplishing another floor is relevant, and if Ivan ate his cornflakes spoonful by spoonful, then each miniaccomplishment of eating another spoonful is relevant and must appear in the incremental chain.

We thus want an analysis of *X za X* modifiers which will capture these intuitions: *X by X* modifiers specify the properties of the incremental stages of an event, proposing a scale in terms of which the stages in the event are measured. In the theory we are using, accomplishment meanings include an incremental chain which determines the salient incremental stages of the event. *X za X* modifiers are naturally analyzed as VP modifiers which constrain this incremental chain by determining the scale in terms of which stages in the incremental chain are measures. Roughly speaking, the modifier imposes the constraint that the incremental chain includes a new stage for every unit of measurement specified by the modifier.

We define *X za X* modifiers in the following way:

First, we assume a generally available measure function $MEAS_S$ (relevant for any grading operation) which assigns to an entity (individual or event) a pair consisting of cardinality and a standard of measure relative to a particular scale *S* (see, e.g., Landman 2004). If Ivan is six feet tall, then $MEAS_{height}(i)$ has the value $\langle 6, FOOT \rangle$ and if he is six feet wide, then $MEAS_{width}(i) = \langle 6, FOOT \rangle$. $MEAS_S$ can apply to events: if an event *e* takes two hours, then $MEAS_{duration}(e) = \langle 2, HOUR \rangle$. We call the set of ordered pairs which are the values of $MEAS_S$ for some scale *S*, R_S . Since we are concerned only with measuring the duration of events, we will leave out the subscript on $MEAS$ (and on R).

The $MEAS$ function is generally available in the grammar (since it is used by comparative constructions), and *X za X* modifiers make use

of it too. $X \text{ za } X$ modifiers constrain the members of the incremental chain $C(e_2)$ to be all and only those events, which are part of e_2 , which can be measured in terms of numbers of X s, where X is floors, spoonfuls, and so on. In other words, if a verb V is modified by $X \text{ by } X$, then the salient stages of V becoming the case will be the event of V -ing one X , the event of V -ing two X s, the event of V -ing three X s, and so on. *Stroil*_{IMPF} *dom ètaž za ètažom* ‘built a/the house floor by floor’ constrains the salient incremental stages of the event of building the house to be the event of building one floor, the event of building two floors and so on. *El*_{IMPF} *kornflakes ložka za ložkoj* ‘ate cornflakes spoon by spoon’ determines that the perceptually salient stages of the event of eating the cornflakes are the event of eating one spoonful, the event of eating two spoonfuls, and so on. This means that the stages of the maximal event e of eating the cornflakes are eating stages in which each subsequent stage grows by the extent of eating another spoonful.

The meaning for $X \text{ za } X$ is given formally in (48) (where N is the set of natural numbers). Like *postepenno*, $X \text{ za } X$ is a VP modifier of type $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$. However, it does not specify the properties of the incremental subevent e_2 , but rather of the incremental chain mapping from e_2 to the activity event:

$$\begin{aligned}
 (48) \quad & \lambda e. \exists e_1, e_2 [e = {}^s(e_1 \sqcup e_2) \wedge P_{\text{ACTIVITY}}(e_1) \wedge \text{BECOME-P-ed}(e_2) \\
 & \wedge \text{INCR}(e_1, e_2, C(e_2)) \\
 & \wedge \forall e' \in C(e_2): e' \in P_{\text{ACTIVITY}} \wedge \text{MEAS}(e') \in R_X \\
 & \wedge \text{MEAS}(e_2) = \langle n, X \rangle \rightarrow \forall n' < n: \exists e'' \in C(e_2): \text{MEAS}(e'') = \\
 & \langle n', X \rangle]
 \end{aligned}$$

$\lambda e. P^*(e) \wedge X \text{ za } X(e)$ denotes a set of events in P which consist of an activity e_1 and a BECOME-P-ed event e_2 , where e_2 is incrementally related to e_1 via an incremental chain. The incremental chain is a linearly ordered set of events which are stages of e_2 , and which themselves are activity parts in the denotation of P , whose duration can be measured in terms of the measure determined by X , and which includes an event marking each X -stage of the development of e_2 . Example (46b), *Ivan el*_{IMPF} *kornfleks ložka za ložkoj* is interpreted in (49):

- (49) $\exists e, e_1, e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{EAT}(e_1) \wedge \text{Ag}(e_1) = \text{IVAN}$
 $\wedge \text{Th}(e_1) = \text{THE CORNFLAKES}$
 $\wedge \text{BECOME EATEN}(e_2) \wedge \text{Arg}(e_2) = \text{Th}(e_1)$
 $\wedge \text{INCR}(e_1, e_2, C(e_2))$
 $\wedge \forall e' \in C(e_2): e' \in \text{EAT}_{\text{ACTIVITY}} \wedge \text{MEAS}(e') \in R_{\text{SPOONFUL}}$
 $\wedge \text{MEAS}(e_2) = \langle n, \text{SPOON} \rangle \rightarrow \forall n' < n: \exists e'' \in C(e_2):$
 $\text{MEAS}(e'') = \langle n', \text{SPOON} \rangle]$

'There is an event which has an activity subevent of eating cornflakes with Ivan as agent and a change subevent in which the cornflakes become eaten, and these two events are incrementally related by an incremental chain on the event of change, and the stages of the event of change are eating events, and the measure of each of these eating events is in terms of eating n spoons of cornflakes, and if the event of change is an event of eating n spoonfuls, then for every n' smaller than n , the incremental chain includes an event on eating n' spoons of cornflakes.'

So the incremental chain picks out as contextually salient the event of eating one spoon of cornflakes, the event of eating two spoons of cornflakes, the event of eating three spoons of cornflakes, and so on up to the maximal event. Line 5 of the meaning gives us the sortal restriction on the stages, that they all have the activity property, in this case that they are all eating stages, and that each event in the incremental chain (i.e., each relevant stage) has a measure in terms of spoonfuls. This means that once we have chosen our measurement by means of the *X za X* modifier, stages which are measured in terms of some other scale are excluded from the incremental chain. Line 6 gives us the statement that the BECOME event has a measure of n spoonfuls, and that for all numbers n' less than n , the event of eating n' spoonfuls is in the incremental chain. This guarantees that the stages of eating each and every number of spoonfuls are in the incremental chain.

The modifier, which determines what the salient parts of the BECOME event are, interacting with pragmatic considerations and the semantic restrictions on incremental chains, influences our perception of the rate at which the event took place. Compare (46b) with (47). In *On el_{IMPF} kornflakes xlopinka za xlopinkoj*, 'He ate cornflakes cornflake by cornflake' the modifier picks out as salient events in which one cornflake is eaten. This of course imposes an incremental chain which is

very much more fine-grained than the chain used in the interpretation of (46b), where the events involve spoonfuls. Since the semantic constraints on incremental chains require the stage-of relation to impose a linear order on the set and every natural number smaller than the maximal measure has to be represented in the chain, there will be many more elements in the chain if the measure of event stages is how many cornflakes have been eaten than if it is how many spoonfuls of cornflakes have been eaten.

We can now see why *X za X* modifiers, like *postepenno*, can only modify accomplishments. Since these modifiers constrain the incremental relation, they can only occur with verbs whose meaning includes reference to an incremental relation.

Note that we constrain all events in the incremental chain to be of the same type as the activity part of the verbs meaning. This constrains the meaning in two ways. First, the relevant salient incremental stages of the event are not pause stages. This corresponds with our intuition that all the salient event stages of the eating-cornflakes event are themselves eating events. Second, this explains the unnaturalness of the example in (50a), despite the fact that *čini_{IMPF}* is clearly incremental, since it can be modified by *postepenno*, as in (50b):

- (50) a. #Ivan čini_{IMPF} komp'juter, (proverjaja) detal' za detal'ju.
 Ivan repaired computer checking part by part
 'Ivan repaired the computer (by checking) part by part.'
- b. Ivan postepenno čini_{IMPF} komp'juter.
 Ivan gradually repaired computer
 'Ivan repaired the computer gradually.'

The infelicity of (50a) is predicted by the clause in line 4 of (48b), which provides that all event stages of the incremental chain be events which have characteristics of the activity itself. The events in the incremental chain of *el cornflakes ložka za ložkoj* 'ate cornflakes spoon by spoon' are themselves in 'eat' and the events in the incremental chain of *stroil dom etaž za etažom* 'built a house floor by floor' are themselves events in 'build'. However, if Ivan repairs a computer by checking part by part, the stages which make up the incremental chain are not in themselves repair stages, since the repairing only happens at the final stage when Ivan finds what the problem is. They are events which can be parts of

the repairing activity, but they do not share enough properties of the characteristic activity of the verb itself. We can see that this is a pragmatic matter and not a property of *činit'*_{IMPF} because the verb is compatible with an *X za X* modifier in a context in which the condition in line 5 of (48) is met straightforwardly, as it is in (51), which entails that each stage of the event of repairing the clock mechanism is an event of repairing a cogwheel.

- (51) Ivan *činit'*_{IMPF} časovoj mexanizm šesterenka za šesterenkoj.
 Ivan repaired clock mechanism cogwheel by cogwheel
 'Ivan repaired a/the clock mechanism cogwheel by cogwheel.'

Sentence (50) is better if asserted in a situation where the computer has a number of things wrong with it, and each stage of the process of repairing the computer is itself an event of repairing a part until finally all parts are repaired and the computer is thus repaired. In such a context (50a) is unproblematic.

As mentioned above, for some speakers, the *X za X* modifiers do not occur easily with perfective verbs. For them (52) is acceptable only in some contexts, for example, if Ivan usually builds the houses block by block but in this one case he built it floor by floor.

- (52) Ivan *postroil*_{PERF} dom ètaž za ètažom.
 Ivan built house floor by floor
 'Ivan built the house floor by floor.'

The fact that (52) is perfectly acceptable in the appropriate contexts indicates that the issue is a pragmatic one. A possible direction of explanation is the following. Assume that perfectivity is associated with boundedness or totality (see for example Filip 2000 and Filip and Rothstein 2005), with the perfective verb denoting a set of total or maximal or bounded events. Since the choice of perfective verb indicates that the event is being related to as a complete and maximal whole, some speakers may find it inappropriate to predicate properties of the parts or stages of the event unless a specific context is set up to do so.

The only non-accomplishments which allow *X za X* modification seem to be imperfective verbs of motion as in (53).¹⁰

- (53) a. Ivan bežal_{IMPF.DET} kilometr za kilometrom.
 b. Ivan begal_{IMPF.INDET} kilometr za kilometrom.
 'Ivan ran kilometer by kilometer.'

We assume that these verbs are lexically associated with a path, or measure of distance incrementally covered. They can thus be modified by *X za X* modifiers, but only as long as the unit of measure is a measure of distance. They thus differ from accomplishments where the unit of measure can be any contextually relevant measure. There is some leeway, since apparently some lexical items can be metaphorically interpreted as measures of distance, but this is quite limited. So (54a) is acceptable but (54b) absolutely is not, presumably because stones are not reinterpretible as measures of distance. No such constraint occurs with accomplishments:

- (54) a. Ivan bežal_{IMPF.DET} ulica za ulicej.
 Ivan begal_{IMPF.INDET} ulica za ulicej.
 'Ivan ran street by street.'
 b. *Ivan bežal_{IMPF.DET} kamen' za kamnem.
 *Ivan begal_{IMPF.INDET} kamen' za kamnem.
 'Ivan ran stone by stone.'

The motion verbs constitute a separate subclass of activity verbs within the Russian aspectual system. They are divided into determinate and indeterminate motion verbs, both of which are imperfective.

¹⁰ More properly, motion verbs seem to be the only class of exceptions. There seem to be a couple of rogue examples with activity verbs which allow *X za X* modification:

- (i) Ptica xlopala kryl'jami xlopok za xlopokom.
 bird flapped wings flap by flap
 'The bird flapped its wings flap by flap.'
 (ii) Ivan smotrel televizor fil'm za fil'mom.
 Ivan watched television movie by movie
 'Ivan watched television movie by movie.'

Determined motion verbs denote a motion in one direction, while indeterminate ones define a motion type in general or motion in different directions, excluding a reference to specific motion at a specific point in time. Lexical representations of both types of verbs plausibly involve reference to a path. In contrast, *guljat'* 'to walk', which we used as an example of an activity above, is not a part of the motion verb class since it is neutral with respect to the directionality. Thus, the Russian sentence *Ivan guljal po parku* is best compared to the English *John took a walk in the park*, meaning that John did not have a specific destination or direction in mind but was simply engaged in a walking process without any restrictions on directionality or specific time frame. Being a verb outside the motion verbs class, *guljat'* is incompatible with the measures of distance, presumably since its meaning involves no reference to a path. Thus we get a minimal contrast between (53) and the completely unacceptable (55).

- (55) a. **Ivan guljal_{IMPF} po parku kilometr za kilometrom.*
 Ivan walked on park kilometer by kilometer
 'Ivan walked in the park kilometer by kilometer.'
- b. **Ivan guljal_{IMPF} ulica za ulicej.*
 Ivan walked street by street
 'Ivan walked street by street.'

This supports our original claim that incremental modifiers modify verbs which are inherently incremental.

We have one final point. For reasons which we do not as yet understand, *X by X* modifiers with accomplishments are less acceptable when the standard of measure is a canonical measure, such as *hour by hour* or *meter by meter*. The construction clearly prefers standards of measures determined by the lexical content of the V. So (56) is less natural than the other examples but still grammatical.

- (56) *On čital_{IMPF} knigu čas za časom.*
 he read book hour by hour
 'He read a/the book hour by hour.'

5. Delimited Activities

The account that we proposed so far allows us to make some interesting general points about the aspectual system in Russian and the comparison between the Russian and English systems.

We have identified a class of incremental modifiers which apply to verbs with incremental structure in both perfective and imperfective aspects. We showed that incremental modifiers apply to these verbs independently of their aspect and independently of whether they are understood to denote bounded or unbounded, completed or uncompleted events, even in the imperfective. Such incremental modifiers do not modify activities (except, in a restricted way, the verbs of directed motion), states, or achievements. The verbs which can be modified by these incremental modifiers lexically correlate with those argued to be accomplishments in English. We conclude therefore that incremental modification picks out a class of verbs with incremental structure which can be characterized as accomplishments occurring in both imperfective and perfective aspects. This supports Padučeva's (1996) claim that accomplishments are not restricted to a single aspect but occur in both aspects, and it further provides a test for whether a particular verb is indeed classifiable as an accomplishment. It opens the way for a study of how the semantics of the perfective/imperfective distinction interacts with the semantics of accomplishments to obtain the differences in meaning that we see in pairs, such as *stroit'*_{IMPF}/*postroit'*_{PERF}.

More generally, the implications of this study are that the Vendlerian classification is indeed a characterization of kinds of events. Being an accomplishment is being an extended event whose parts have an inherent temporal ordering according to a template laid down by an incremental structure dictated by the meaning of the verb. A temporal ordering of a non-accomplishment event is extensional, mapping the stages of some event onto their temporal location in the world and ordering the results. A temporal ordering of an accomplishment can be seen as intentional, mapping an event onto its incremental structure and assigning the inherently ordered stages of this structure their temporal locations. Incremental modifiers constrain the properties of this incremental structure.

Understanding the Vendlerian classification as a characterization of the inherent properties of events in this way is precisely the con-

ceptual position underlying the hypothesis that the Vendlerian classification is a potential linguistic universal and thus constitute a set of cross-linguistic constraints on properties of verbal meaning. Crucially, this set of constraints interacts with the grammatical properties of a particular language, and consequently imperfective and perfective accomplishments will have different properties in Russian because of the interaction between the semantics of the aspects and the properties of the accomplishments. Thus we can see that the two classes of verbs that Padučeva identifies as *dejstvija obyčnye* (regular actions) and *dejstvija v razvitii* (actions in progress) show up as the result of the interaction of the system of lexical aspect described by Vendler with the grammatical system of perfectivity and imperfectivity which is part of Russian grammar. This results in Russian in a more flexible exploitation of lexical aspect, in particular of accomplishments, than is possible in English.

We hypothesize that the same approach can explain the presence in Russian of what has often been called a non-Vendler class, namely, the class of bounded activities, or perfective activities which Padučeva (1996) calls *delimitativ* and Piñón (1993) calls “pofectives.” Padučeva and Piñón both argue that these verbs are derived from activities and have the meaning of “do the activity for some time/for less time than contextually expected” (after which the activity stopped). Characteristic examples are *pogulat'*_{IMPF} ‘to walk for a while’ and *porabotat'*_{IMPF} ‘to work for a while’.¹¹ Piñón 1993 shows that these *po*+verbs are a puzzle, since on the one hand they clearly have properties of perfective verbs and on the other seem also to have properties of imperfective verbs. What indicates that they are perfective is: (i) that they cannot have present-tense interpretation in non-past forms (*Ivan guljaet*_{IMPF} ‘Ivan is taking a walk’, *Ivan poguljaet*_{PERF} ‘Ivan will take a walk’); (ii) they do not admit a progressive reading in the past tense (*Ivan guljal*_{IMPF}, *kogda ja ego uvidel*_{PERF} ‘Ivan was walking when I saw him’ vs. **Ivan poguljal*_{PERF}, *kogda ja ego uvidel*_{PERF} ‘Ivan walked for a while, when I saw him’); and (iii) an assertion that a *po*- event occurred in the past is not compatible with an assertion that this event unexpectedly continued (**Ivan poguljal*_{PERF} *i do six por guljaet*_{IMPF} ‘Ivan walked for a while and is

¹¹ Mehlig (2006) argues that *po*- can be prefixed onto accomplishments if they are associated with a homogeneous activity, in which case the resulting verb is treated as non-incremental as in *čitat'*_{IMPF}/*počitat'*_{PERF} ‘to read/to read for a while’.

still walking'). On the other hand, they have properties which we associate with the unprefixed imperfective forms; in particular, they are compatible with durative adverbs such as *for an hour*, and the modifier *a little* can have a temporal and not a nominal interpretation:

- (57) a. Ivan poguljal_{PERF} čas.
 Ivan walked hour
 'Ivan walked for an hour.'
- b. *Ivan pročit_{PERF} knigu čas
 Ivan read book hour
 'Ivan read a book for an hour.'
- c. Ivan nemnogo poguljal_{PERF}.
 Ivan a little walked for a while
 'Ivan walked for a little while.'
- d. *Ivan nemnogo pročit_{PERF} knigu.
 Ivan a little read book
 'Ivan read a/the book a little.'

We are not going to propose an analysis of the *po-* prefix here. Piñón proposes a very plausible account in which the imperfective root denotes a process, while the *po-* prefix is a derived measure function, mapping the imperfective stem denotation onto a quantized denotation. In his account imperfectives denote normally non-quantized processes (or states), while perfectives denote quantized events. "Pofectives" are a hybrid, because they are essentially quantized processes. Without going into the details of his analysis (which would require a detailed discussion of how the event/process/state distinction relates to the Vendlerian classification), we want to suggest a way of analyzing pofectives which explains his conclusions and solves Padučeva's question of what kind of lexical class these verbs belong to.

We assume that the semantics of perfective aspect is essentially the semantics of boundedness. This can be expressed in terms of quantized reference as in Piñón's paper, in terms of totality as in Filip 2004, or in terms of a maximality operation as suggested in Filip and Rothstein 2005. In all these cases the perfective aspect is interpreted as denoting some kind of operator which is applied to a verb meaning (a measure operation, a totality operation, or a maximalization opera-

tion), imposing a bounded structure on the event. We continue to assume that the semantic properties of Vendlerian classes classify the inherent properties of the event type itself, a classification of the kind of event it is. In one case (achievements), the event type is naturally bounded, but in the other cases this is not so. We thus have a framework for classifying verb behavior: a verb may have some distributional properties because of its Vendlerian class, and it may have other properties because of its aspect. As we have seen, incremental modification is a property which is (mostly) determined by Vendlerian class, while the possibility of a progressive reading is determined by aspect. From this point of view, the conflicting properties of perfectives are explained in the following way. Perfectives such as *poguljat'* are indeed perfective, since the *po-* prefix is quantizing operator (Piñón 1993, Filip 2005) and the resulting verb is quantized/total/maximal/bounded. However, denoting a process verb (in Piñón's terms) is a reflection of lexical class or of the intensional properties of the event type itself, and the *po-* quantizer does not affect this. This explains Padučeva's intuition that these verbs are best classified as *delimitativ* or delimited activities. However, delimited activities are not a new Vendlerian class, but a class of verb which results from the interaction of the lexical semantics of activities, the semantics of the prefix, and the semantics of perfective aspect. In terms of the table of verb features in Table 1 (section 4), we see that *guljat'*_{IMPF} and *poguljat'*_{PERF} should both be classified as activities, since they both denote sets of events which are dynamic and do not involve change. However, the perfective aspect imposes a boundedness on the perfective predicate *poguljat'*_{PERF}. This correctly predicates that *poguljat'*_{PERF} does not behave as an accomplishment, since it does not acquire incremental structure, and indeed it cannot be modified by *postепенно*.¹²

¹² Note that the accumulative prefix *na-* with an activity *begat'*_{IMPF} 'to run' forms a perfective accomplishment: *Ivan postепенно nabegal*_{PERF} *100 kilometrov* 'Ivan gradually accumulated 100 kilometers by running'. We can explain this data either by assuming that *na-* is a shift operator from activity into accomplishment, or by suggesting that the motion verbs in some cases exhibit accomplishmentlike behavior because they have their own incremental structure, albeit different from the incremental structure of accomplishments.

- (58) *Ivan postepenno poguljal_{PERF}.
 Ivan gradually walked for a while
 ‘Ivan gradually walked for a while.’

A consequence of this analysis and the analysis of accomplishments in the previous section is that prefixation in Russian does not necessarily change lexical class. Prefixing *po-* to an activity verb does not necessarily affect the lexical class of the event type it is attached to. For example, in *lubit'*_{IMPF}/*polubit'*_{PERF} (to love/to come to love) the prefix attaches to a state and results in an achievement.

Our conclusion is, therefore, that the basic division of lexical classes into states, activities, accomplishments, and achievements is relevant both in English and in Russian and that it cuts across the perfective/imperfective distinction. The Vendlerian classification reflects the basic characterizing features of event predicates: whether they denote inherently extended events, (i.e., can be analyzed as having stages) and whether they are events of change. While both activities and accomplishments are extended and thus have stages, the interaction between the part structure and the [+change] features is such that accomplishments have an incremental structure, to which incremental modifiers are sensitive, while activities do not. There are apparently more verb classes in Russian than in English, since we can distinguish between activities and delimited activities, and between *dejstvija obyčnye* and *dejstvija v razvitii*, but this is an epiphenomenon, resulting from the interaction of lexical aspect with the semantics of the perfective/imperfective distinction.

References

- Brecht, Richard D. (1985) “The form and function of aspect in Russian”. Michael S. Flier and Richard D. Brecht, eds. *Issues in Russian morphosyntax*. Columbus, OH: Slavica, 9–34.
- Bulygina, T.V. (1982) “K postroeniju tipologii predikatov v russkom jazyke”. O.N. Seliverstova, ed. *Semantičeskie tipy predikatov*. Moscow: Nauka, 7–85.

- Dowty, David R. (1979) *Word meaning and Montague grammar: The semantics of verbs and times in generative semantics and in Montague's PTQ*. Dordrecht: Reidel.
- Eckert, Eva. (1985) "Aspect in repetitive contexts in Russian and Czech". Michael S. Flier and Alan Timberlake, eds. *The scope of Slavic aspect*. Columbus, OH: Slavica, 169–79.
- Filip, Hana. (1999) *Aspect, eventuality types, and nominal reference*. New York: Garland Publishing. [Outstanding dissertations in linguistics.]
- Filip, Hana. (2000) "The quantization puzzle". James Pustejovsky and Carol Tenny, eds. *Events as grammatical objects, from the combined perspectives of lexical semantics, logical semantics, and syntax*. Stanford: CSLI Press, 3–60.
- Filip, Hana. (2004) "Prefixes and the delimitation of events". *Journal of Slavic linguistics* 11(1): 55–101.
- Filip, Hana and Susan Rothstein. (2005) "Telicity as a semantic parameter". James Lavine, Steven Franks, Mila Tassea-Kurktchieva, and Hana Filip, eds. *Formal approaches to Slavic linguistics: The Princeton meeting*. Ann Arbor, MI: Michigan Slavic Publications, 139–56.
- Forsyth, J. (1970) *A grammar of aspect: Usage and meaning in the Russian verb*. Cambridge: Cambridge University Press.
- Hay, Jennifer, Christopher Kennedy, and Beth Levin (1999): "Scalar structure underlies telicity in 'Degree Achievements'". *Proceedings of Semantic and Linguistic Theory* 9. Ithica, NY: CLC Publications, 124–44.
- Krifka, Manfred. (1989) "Nominal reference, temporal constitution and quantification in event semantics". Renate Bartsch, Johan van Benthem, and Peter van Emde Boas, eds. *Semantics and contextual expressions*. Dordrecht: Foris, 75–115.
- Krifka, Manfred. (1992) "Thematic relations as links between nominal reference and temporal constitution". Ivan Sag and Anna Szabolsci, eds. *Lexical matters*, CSLI Publications, 29–53.
- Krifka, Manfred. (1998) "The origins of telicity". Susan Rothstein, ed. *Events and grammar*. Dordrecht: Kluwer Academic Publishers, 197–235.

- Kučera, Henry. (1985) "A semantic model of verbal aspect". Michael S. Flier, ed. *American Contributions to the Ninth International Congress of Slavists*. Columbus, OH: Slavica, 171–84.
- Landman, Fred. (1992) "The progressive". *Natural language semantics* 1: 1–32.
- Landman, Fred. (2000) *Events and plurality*. Dordrecht: Kluwer Academic Publishers.
- Landman, Fred (2004) "The almost but not quite naïve theory of measures". Ms., Tel Aviv University.
- Landman, Fred (2008) "1066: On the differences between the tense-perspective-aspect systems of English and Dutch". Susan Rothstein, ed. *Theoretical and crosslinguistic approaches to the semantics of aspect*. Amsterdam: John Benjamins, 107–66.
- Mehlig, Hans Robert. (1985) "Semantika predloženiya i semantika vida v russkom jazyke". T.V. Bulygina and A.E. Kubrik, eds. *Novoe v zarubežnoj lingvistike*. Moscow: Progress, 227–49.
- Mehlig, Hans Robert (2008) "Aspect and bounded quantity complements in Russian". Susan Rothstein, ed. *Theoretical and crosslinguistic approaches to the semantics of aspect*. Amsterdam: John Benjamins, 257–90.
- Padučeva, E.V. (1996) *Semantičiskie issledovaniya*. Moscow: Jaziki russkoj kul'tury.
- Parsons, Terence. (1990) *Events in the semantics of English: A study in subatomic semantics*. Cambridge, MA: MIT Press.
- Piñón, Christopher. (1993) "Aspectual composition and the 'pofective' in Polish." Sergey Avrutin, Steven Franks, and Ljiljana Progovac, eds. *Formal approaches to Slavic linguistics: The MIT meeting*. Ann Arbor, MI: Michigan Slavic Publications, 341–73.
- Piñón, Christopher. (2000) "Happening gradually". Lisa J. Conathan, et al., eds. *Proceedings of the twenty-sixth annual meeting of the Berkeley Linguistics Society*. Berkeley: Berkeley Linguistics Society, 445–56.
- Rothstein, Susan (2004) *Structuring events: A study in the semantics of lexical aspect*. Oxford: Blackwell Publishing.

- Smith, Carlota S. (1991) *The parameter of aspect*. Dordrecht: Kluwer Academic Publishers.
- Vendler, Zeno. (1967) *Linguistics in philosophy*. Ithaca, NY: Cornell University Press, 97–121.

Gonda Multidisciplinary Brain Research Ctr.
Bar-Ilan University
Ramat Gan 52-900
Israel
pavel.braginsky@gmail.com

Received: June 2005
Revised: January 2007

Gonda Multidisciplinary Brain Research Ctr.
Bar-Ilan University
Ramat Gan 52-900
Israel
rothss@mail.biu.ac.il