Building Intensive Resultatives

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1. Overview

In this paper, I want to make fully explicit parallelism between what (Švedova (ed.) 1980: §1434) calls intensive-resultative Aktionsart in Russian, exemplified in (1), and reflexive resultatives in English in (2).

(1) Turisty na-gulja-l-i-s'.
tourists $_{NA}$walk$_{PST\text{-}PL\text{-}REFL}$
'By walking, the tourists achieved a state of being satisfied.'

(2) The tourists walked themselves tired.

I suggest that both classes of expressions consists of the same morphosyntactic ingredients, which I call verb stem, result expression, and reflexive expression in (3), and that semantic contribution of these ingredients is essentially similar, as indicated in (4):

(3)

	English	Russian
Verb/verb stem	*walk*	*gulja*
Reflexive expression	*themselves*	*-s'*
Result expression	*tired*	*na-*

(4) Morphosyntactic ingredients and their semantic contribution (to be elaborated below):
Verb/verb stem contributes an event predicate and its argument(s)
Result expression contributes a state an argument attains in the event referred to by the verb/verb stem
Reflexive expression indicates identity between the holder of the result state and the agent of the event

In what follows, I propose an analysis where Russian Intensive Resultatives (RIRs) and English Reflexive Resultatives (ERRs) possess the same underlying structure, but differ as to the later stages of semantic derivation. In section 2, I examine basic similarities and differences between RIRs and ERRs and draw a number of descriptive generalizations about observed regularities. In Section 3, a semantic analysis is developed which is based on Rothstein's (2004) theory of resultatives. I will argue that Russian and

English are fundamentally similar in that the resultative predication involves an activity-to-accomplishment shift. Unlike English, however, Russian does not allow for combining the verb with the result expression through the summing composition rule. Instead, merging the result expression, the prefix *na*-, with the verb stem is interpreted via plain functional application.

2. Russian Intensive Resultatives vis-à-vis English Reflexive Resultatives

2.1. Similarities

Reflexive resultatives in English and Intensive resultatives in Russian exhibit a number of striking similarities as to their semantic characteristics, morphosyntactic distribution, and lexical restrictions. First and foremost, it should to be pointed out that RIRs and ERRs differ from their non-derived counterparts in much the same way. Compare resultatives in (b) examples in (5)-(6) with corresponding (a) examples, which lack both result and reflexive expressions:

(5) a. Turisty gulja-l-i.
tourists $walk_{PST\text{-}PL}$
'The tourists walked/was walking.'
b. Turisty na-gulja-l-i-s'.
tourists $_{NA}walk_{PST\text{-}PL\text{-}REFL}$
'By walking, the tourists achieved a state of being satisfied.'

(6) a. The tourists walked.
b. The tourists walked themselves tired.

Both (5b) and (6b) indicate that there is a property of the subject that gradually changes in the course of the walking event. When the subject acquires this property to a certain contextually salient degree, the event culminates, and the subject enters the result state. The (a) examples, in contrast, do not involve any sense of change of whatever property: both are naturally characterized as plain activity predicates.

Another semantic characteristic that RIRs and ERRs share is telicity. As the test on co-occurrence with measure and interval adverbials indicates, both types of resultatives create telic verbal predicates:

(7) Turisty na-gulja-l-i-s' {za čas || *čas}.
tourists $_{NA}walk_{PST\text{-}PL\text{-}REFL}$ in hour hour
'{In an hour || *for an hour}, the tourists walked themselves into a state of being satisfied.'

(8) The tourists walked themselves tired {in an hour || *for an hour}.

Besides, as Rappaport Hovav and Levin (RH&L) (2001 and elsewhere) observe, ERRs combined with rate adverbials like 'quickly' fail to entail the truth of their non-derived counterparts modified by the same adverbial. RIRs yield exactly the same pattern, as (10a-b) demonstrate.

(9) a. John walked quickly.
b. John walked himself tired quickly. (≠> John walked quickly.)

(10) a. Vasja bystro bega-l.
V. quickly run_{PST}
'Vasja ran quickly.'
b. Vasja bystro na-bega-l-sja.
V. quickly $_{NA}run_{PST-REFL}$
'Vasja ran himself into a state of being satisfied quickly'.
(≠>'Vasja ran quickly.')

The next observation has to do with the obligatoriness of the two components of the resultative, the result and reflexive expressions. In grammatical descriptions of Russian, *na- -sja* in (1) is regarded as a 'circumfix', that is, as a complex exponent of the intensive resultative Aktionsart. This intuition reflects inappropriateness of (11a) and (11b) where either the prefix *na-* or the reflexive morpheme *-sja* are left out.[1] Again, this pattern resembles what happens to ERRs in (12a-b).

(11) a. *Turisty na-gulja-l-i. b. *Turisty gulja-l-i-s'.
tourists $_{NA}walk_{PST-PL}$ tourists $walk_{PST-PL-REFL}$

(12) a. *The tourists walked tired.
b. *The tourists walked themselves.

The next piece of evidence supporting the suggestion that RIRs and ERRs are morphosyntactically and semantically alike comes from the their lexical distribution. RIRs and ERRs exhibit parallel lexical restrictions. Both tend to be licensed for the same classes of non-derived verbs, intransitive activity verbs like (13a)-(14a) or transitive activity verbs (in terms of RH&L 1998) like (13b)-(14b), not for unaccusatives like (13c)-(14c) and transitive result verbs like (13d)-(14d).

(13) a. Turisty na-gulja-l-i-s'.
tourists $_{NA}walk_{PST-PL-REFL}$
'By walking, the tourists achieved a state of being satisfied.'

[1] (11a) can be appropriate under a different construal, as in *Turisty naguljali sebe appetit* 'Walking gave tourists an appetite', where 'appetite' is a non-subcategorized direct object. Space limitations prevent me from discussing transitive configurations of this type; a possible extension of the analysis presented below is outlined in Tatevosov 2009, see also Kagan and Pereltsvaig, this volume.

b. Vasja na-čita-l-sja.
V. $_{NA}$read$_{PST\text{-}REFL}$
'By reading, Vasja achieved a state of being satisfied.'
c. *Odežda na-suši-la-s'.
clothes $_{NA}$dry$_{PST\text{-}REFL}$
d. ??Vasja na-razbiva-l-sja.
V. $_{NA}$break$_{PST\text{-}REFL}$

(14) a. We yelled ourselves hoarse. (RH&L 2001, (68b))
b. The cows ate themselves sick. (RH&L 2001, (68d))
c. *The pond froze itself solid.
d. *John broke himself tired.
'John achieved a state of being tired by breaking things.'

Clearly, similarities between the two classes of expressions in English and Russian are too significant to be a matter of pure coincidence, hence call for an explanation. But before such an explanation is articulated, a finer look at the peculiarities of Intensive Resultatives and Reflexive Resultatives are due. This will be the topic of the next section.

2.2. Differences

RIRs differ from their English counterparts in a number of respects, most significantly, in descriptive properties of the result state introduced by the result expression, and in obligatoriness of reflexivization.

As (3) suggests, the result state is expressed by overt material in English (e.g., the AP *tired* in (2)) and by a prefix like *na-* in Russian. Combining an overt AP with activity verbs like *guljat'* 'walk' cannot create an intensive resultative predicate: the AP *dovolnyje/dovolnymi* in (15) yields the depictive interpretation whereby the state expressed by the AP is temporally and causally independent from the activity referred to by the verb:

(15) a. # Turisty na-gulja-l-i-s' dovol'n-yje.
tourists $_{NA}$walk$_{PST\text{-}PL\text{-}REFL}$ happy$_{\text{-}NOM.PL}$
'The tourists, who were happy, walked themselves into a state of being satisfied.'
b. # ?Turisty na-gulja-l-i-s' dovol'n-ymi.
tourists $_{NA}$walk$_{PST\text{-}PL\text{-}REFL}$ happy$_{\text{-}INSTR.PL}$
'The tourists, who were happy, walked themselves into a state of being satisfied.'

This fact, together with the observation in (11b) that if the prefix is dropped the resulting configuration is ungrammatical, shows that it is indeed the

prefix that is responsible for the intensive resultative construal. However, the affixal nature of the result expression in Russian has straightforward consequences for its interpretation: in Russian, unlike in English, descriptive properties of a result state are underspecified. While (2) unambiguously signals that the subject enters the state of being tired, (1) is much less specific as to what kind of result state it is. While out of the blue (1) tends to be interpreted as involving a state of satisfaction, examples like (16), where the adjunct PP introduces a state of being exhausted without yielding a contradiction, suggest that 'satisfaction' is a cancelable implicature.

(16) Turisty na-gulja-l-i-s' do iznemoženija.
tourists $_{NA}$walk$_{PST\text{-}PL\text{-}REFL}$ to exhaustion
'By walking, the tourists achieved a state of being exhausted.'

Therefore, the first difference between RIRs and ERRs is: while ERRs introduce a result state whose descriptive properties are determined by the lexical meaning of an adjective, RIRs are less precise. They indicate that a certain result state is attained but leave a lot for the context and world knowledge to determine as to what exactly this state is.

The second crucial difference between RIRs and ERRs is that the former are constrained in a way the latter are not. In Russian, unlike in English, the argument of the result state must be identical to that of the activity, cf. (17a-b) and (18a-b).

(17) a. John sang himself asleep.
b. John sang the baby asleep.

(18) a. Vasja na-pe-l-sja.
V. $_{NA}$sing$_{PST\text{-}REFL}$
'Vasja sang himself into a state of being satisfied.'
b. *Vasja na-pe-l mlacenca.
V. $_{NA}$sing$_{PST}$ baby$_{ACC}$
'Vasja sang the baby into a state of being satisfied.'

In Russian there are no verbs like *napet'* in (18b), at least with the relevant meaning ('induce a change of state of the theme by singing'). In other words, RIRs differ from ERRs in that their derivation involves obligatory reflexivization.

Let us take stock of what we have observed so far. RIRs and ERRs both refer to events in which a certain property of the participant undergoes a gradual change. This change leads the participant to the result state whose descriptive properties are fully specified in English and underspecified in Russian. In English, the participant undergoing change can and in Russian

must be identical to the subject.[2] In the next section I develop a semantic analysis of RIRs that accounts for the range of their interpretations as well as for the differences from ERRs.

3. The analysis

3.1. Outline

In this section I present an analysis of RIRs based on intransitive (unergative) verbs that consists of the four ingredients: lexical representation for non-derived verb stems, activity-to-accomplishment shift, and semantics for result and reflexive expressions. The outline of the extension of this analysis to RIRs based in transitive verbs can be found in Tatevosov 2009; Kagan and Pereltsvaig, this volume, offer an alternative way of treating the latter type of RIRs.

In what follows, I will not make any specific assumptions as to the syntactic structure of intensive resultatives, in particular, as to the status of the prefix *na-* and the reflexive morpheme *-sja*. Whether they are heads of phrases, and whether they originate within VP/*v*P or merge outside it is still a matter of debate (Harves 2002, Svenonius 2004, Ramchand 2004, Pereltsvaig 2006, Žaucer 2009, Kagan and Pereltsvaig, this volume, among many others). I believe that whatever view proves ultimately to be correct, it will be compatible with the semantics I propose below, possibly with minor technical adjustments.

Without further discussion, I take Rothstein's (2004) time-participant connectedness theory of resultative predication in English as a point of departure. Due to space limitations I will not be able to provide a comparison of Rothstein 2004 with alternative semantic theories of English resultatives, e.g., event structure theory elaborated by Beth Levin and Malka Rappaport Hovav (Levin 1999, RH&L2001, L&RH 1999, 2004) and Angelika Kratzer's (2005) causative theory. It can be shown that Rothstein's account for English faces less complications when extended to Russian material, but discussing details goes beyond the immediate scope of this paper.

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[2] It should be mentioned that Žaucer (2009:64) questions the view advocated here. Discussing Slovenian counterparts of RIRs he points out: "It is often noted that the *na- se* construction resembles certain English resultative structures with unselected reflexives, such as *run oneself exhausted/tired*. The parallel, however, is not perfect. Such English cases do not exhibit any scope ambiguities with adverbials, etc." It is difficult to evaluate the validity of this suggestion, since Žaucer does not elaborate on it in any detail. It should be noted at least that Levin and Rappaport Hovav (1999 and elsewhere) argue at length that resultatives in question involve a complex event structure consisting of two subevents that *can* by modified by adverbials independently. If Levin and Rappaport's generalizations are correct, they seriously undermine the claim that the parallel between ERRs and RIRs "is not perfect".

In a nutshell, Rothstein (2004) proposes that the derivation of reflexive resultative predications in English, e.g., in (2), consists of the following steps, summarized in (19).

(19) STEPS OF DERIVATION OF ERRS BASED ON ACTIVITY VERBS
1. a. Non-derived activity verb
b. Result state description
2. Activity-to-Accomplishment shift
3. Summing of the shifted activity and the result state description.
4. Reflexivization

First, the denotation of the *activity verb* turns into an *accomplishment event structure.* Secondly, this event structure combines with *a result expression* by *the summing composition rule***.** Finally**,** individual argument positions are saturated; as is clear from the discussion in Rothstein 2004:83 *et seq*., reflexivization also occurs at this stage. The outcome is an event description where a complex event consists of an accomplishment and a result state components, these components share a (theme) participant, and the result state is temporally coextensive with the culmination of the accomplishment component.

I suggest that RIRs share most of the steps of derivation with ERRs:

(20) STEPS OF DERIVATION OF RIRS BASED ON ACTIVITY VERBS
a. Non-derived (intransitive) activity verb
b. Activity-to-Accomplishment shift
c. (Obligatory) reflexivization
d. Prefixation

One can easily see that (19a-b) and (20a-b) are identical, hence the same underlying structure of RIRs and ERRs and a number of similarities discussed in Section 2.1. At the same time, I suggest that Russian is fundamentally different from English is that it does not allow for combining event descriptions through summing in (19c). As we will see shortly, an immediate consequence of this is that the reflexivization in (20c) is obligatorily and the result state is introduced by a prefix, (20d), by means of the plain functional application. Below I will set out this line of reasoning in more detail.

3.2. The common ground

The starting point of the derivation is a lexical representation for intransitive activity verbs like *walk* / *gulja-* 'walk', which, by hypothesis, is the same for English and Russian (see (3)):

(21) || gulja || = || walk || = λxλe. WALK(e) ∧ AG(e)=x

WALK in (21) is a paradigmatic instance of an activity predicate. However, as we saw in Section 2.1, a characteristic property of both RIRs and ERRs is that they involve change of a gradable property of an individual, a property of being tired in (2) and some underspecified property in (1). Following Rothstein 2004, I suggest that the meaning of change that shows up in resultative configurations reflects a shift of the activity event structure like the one in (21) to the accomplishment event structure.

Rothstein (2004) treats accomplishments as consisting of two subevents, activity and change of state connected by the incremental relation. Here I implement the same idea in a slightly different way, assuming a degree approach to event structure elaborated in Hay et al. 1999, Kennedy and Levin 2002, 2008, Piñon 2008, among others. (22) represents a possible way of analyzing lexical accomplishments in terms of gradable change:

(22) LEXICAL ACCOMPLISHMENT EVENT TEMPLATE
λyλxλdλe [V′(e) ∧ AG(e)=x ∧ TH(e)=y ∧ INCREASE(G(y))(d)(e)]
where *V′* is an event description and *G* is a gradable property specified by the lexical meaning of the verb and
INCREASE(G(y))(d)(e) = 1 iff the degree to which *y* possesses a gradable property *G* increases by *d* in *e*

According to (22), lexical accomplishments are relations between two individuals, events and degrees such that both individuals stand in appropriate thematic relations to the event, and the degree to which an internal argument possesses a relevant gradable property increases in the course of the event to an extent specified by the degree of change argument.

Assuming (22) as a template for lexical accomplishments, we can define an activity to accomplishment shift for intransitive activities as follows:

(23) ACCOMPLISHMENT SHIFT (FOR INTRANSITIVE ACTIVITIES)
$\text{SHIFT}_{\text{ACT}\rightarrow\text{ACC}}$ (λxλe.V′(e) ∧ AG(e)=x) = λyλxλdλe [V′(e) ∧ AG(e)=x ∧ INCREASE(G(y))(d)(e)]

The contribution of $\text{SHIFT}_{\text{ACT}\rightarrow\text{ACC}}$ consists of an individual argument *y*, a degree argument *d*, a free variable *G* over gradable properties, and the INCREASE relation. Applying (23) to the relation between individuals and events in (21) yields a four-place relation in (24):

(24) || $\text{SHIFT}_{\text{ACT}\rightarrow\text{ACC}}$(gulja) || = λyλxλdλe[WALK(e) ∧ AG(e)=x ∧ INCREASE(G(y))(d)(e)]

With Rothstein 2004:127-128, one can observe a crucial difference between lexical accomplishments based on the template in (22) and shifted activities like (24). The non-derived activity verb stem *gulja* in (21) only defines the agent thematic role. Since the agent is the sole participant of the walking event, the derived internal argument *y* in (24) cannot receive a thematic role from *walk/gulja*. But crucially, in (24) *y* is construed as an internal argument of the whole event, and, as the huge literature on argument structure suggests (see especially Kratzer 2003), thematic properties of internal arguments have to be lexically fixed. This means that the shift rule cannot specify a thematic relation of *y* to the eventuality and *y* only comes out as an argument of the measure function *G*. Therefore, in (24) the new argument, *y*, which does not stand in a thematic relation to the event, is not properly licensed. As a result, $\text{SHIFT}_{\text{ACT} \rightarrow \text{acc}}$(|| gulja/walk ||) does not exist as a lexical transitive verb in either Russian or English:

(25) *Basil walked Peter.
'By walking, Basil brought about a change in some of Peter's gradable properties.'

(26) * Vasja gulja-l Petj-u.
V. walk_{PST}.M $\text{P}_{\text{.ACC}}$
'By walking, Vasja was bringing/brought about a change in some of Petja's gradable properties.'

Another significant aspect of the semantics of the relation in (24) is: The lexical meaning of the verb stem *gulja* in (21) cannot fix a gradable property *G* that undergoes change in the event referred to. *G* is underspecified for descriptive content. In (23) and (24), this is captured by assuming that *G* comes as a free variable over degree functions and is interpreted relative to a context.

3.3. The summing parameter

Up to this point, ERRs and RIRs are alike. I hypothesize that differences emerge at subsequent stages of derivation. Rothstein argues that in English, $\text{SHIFT}_{\text{ACT} \rightarrow \text{ACC}}$(|| walk ||) combines with the resultative AP through the summing operation. In (27), I present a version of this operation modified as to incorporate the analysis of accomplishment structure in terms of degrees.

(27) SUMMING OPERATION FOR RESULTATIVE PREDICATION
(cf. Rothstein 2004:76)
$\text{RSUM}[S_{<e,<e,<n,<v,t>>>>}, R_{<e,<v,t>>}] = \lambda x \lambda y \lambda e \exists d \exists e' \exists e''[\, e = {}^{S}(e' \oplus e'') \wedge S(y)(x)(d)(e') \wedge R(y)(e'') \wedge \text{TPCONNECT}(y)(e'')(\text{Cul}(e'))]$

where $^{S}(e \oplus e')$ is a singular entity made out of *e* and *e′*, *S* and *R* are relations denoted by a shifted activity and result AP, respectively, and TPCONNECT is a relation of time-participant connectedness. Two events *e* and *e′* are TPCONNECTed with respect to an individual *x* iff their running times are identical and x participates in both *e* and *e′*.

Let us assume that result APs like *tired* denote relations between individuals and (stative) eventualities like $\lambda y \lambda s.\text{TIRED}(s) \wedge \text{THEME}(y)(s)$. Applying RSUM to the shifted activity in (24) and to the denotation of *tired*, we get a reation in (28b). Then, identifying the agent of walking with the theme of being tired through reflexivization (i.e., $\lambda S_{<e,<e,<v,t>>>} \lambda x \lambda e.S(x)(x)(e)$) and saturating the individual argument position yields an event predicate in (28c) as a partial semantic representation of the sentence in (28a).

(28) a. Tourists walked themselves tired.

b. $\lambda y \lambda x \lambda e \exists d \exists e' \exists s[e = {}^{S}(e' \oplus s) \wedge \underline{\text{WALK}(e') \wedge \text{AG}(e')=x \wedge \text{INCREASE}(\text{G}(y))(d)(e')} \wedge \underline{\text{TIRED}(s) \wedge \text{TH}(s)=y} \wedge \text{TPCONNECT}(y)(s)(\text{Cul}(e'))]$

c. $\lambda e \exists d \exists e' \exists s[e = {}^{S}(e' \oplus s) \wedge \underline{\text{WALK}(e') \wedge \text{AG}(e')=\text{tourists} \wedge \text{INCREASE}(\text{G}(\text{tourists}))(d)(e')} \wedge \underline{\text{TIRED}(s) \wedge \text{TH}(s)=\text{tourists}} \wedge \text{TPCONNECT}(\text{tourists})(s)(\text{Cul}(e'))]$

where the || $\text{SHIFT}_{\text{ACT} \rightarrow \text{ACC}}$ (walk) || component is underlined, and the || tired || component is double underlined.

Essentially, the RSUM operation takes two relations based on distinct events, shifted activities and states, and creates a new relation in which the event is a mereological sum of eventualities contributed by the input components. The degree of change argument of the shifted activity gets existentially bound, indicating that the participant undergoes a certain change in the gradable property *G*. Crucially, the summing composition rule identifies the "non-thematic" argument of $\text{SHIFT}_{\text{ACT} \rightarrow \text{ACC}}$(walk) with the holder of the result state, since $\text{SHIFT}_{\text{ACT} \rightarrow \text{ACC}}$(walk) and the result state are TPCONNECTed with respect to that argument. Therefore, this argument is finally licensed as an argument of the result state. Summing is thus the way English makes use of to repair thematic ill-formedness of the relation in (24).

Note that the relation resulting from RSUMMing of the shifted activity and result state (e.g., (28b)) contains two distinct argument positions. For *sing asleep* in (17), for instance, we get a relation in (29), parallel to (28b).

(29) $\lambda y \lambda x \lambda e \exists d \exists e' \exists s[e = {}^{S}(e' \oplus s) \wedge \text{SING}(e') \wedge \text{AG}(e')=x \wedge \text{INCREASE}(\text{G}(y))(d)(e') \wedge \text{ASLEEP}(s) \wedge \text{TH}(s)=y \wedge \text{TPCONNECT}(y)(s)(\text{Cul}(e'))]$

The analysis predicts, correctly, that at this point we can either identify argument positions by reflexivization or to saturate them by (the denotations of) distinct DPs. These two options lead us to (30a-b) as partial representations of *John sang himself asleep* and *John sang the baby asleep* in (17), respectively:

(30) a. $\lambda e \exists d \exists e' \exists s[e = {}^{S}(e' \oplus s) \wedge \text{SING}(e') \wedge \text{AG}(e')=\text{John} \wedge \text{INCREASE}(\text{G}(\text{John}))(d)(e') \wedge \text{ASLEEP}(s) \wedge \text{TH}(s)=\text{John} \wedge \text{TPCONNECT}(\text{John})(s)(\text{Cul}(e'))]$

b. $\lambda e \exists d \exists e' \exists s[e = {}^{S}(e' \oplus s) \wedge \text{SING}(e') \wedge \text{AG}(e')=\text{John} \wedge \text{INCREASE}(\text{G}(\text{the baby}))(d)(e') \wedge \text{ASLEEP}(s) \wedge \text{TH}(s)=\text{the baby} \wedge \text{TPCONNECT}(\text{the baby})(s)(\text{Cul}(e'))]$

I hypothesize that availability of the summing composition rule RSUM is a parameter that allows for different settings in different languages. Specifically, I suggest that Russian is a non-summing language: unlike in English, no eventuality description can be combined by RSUM with a state description. The decisive evidence comes from examples like (15) showing that expressions like *dovol'nyje* 'happy' cannot be interpreted as referring to a state brought about by the activity denoted by the verb. If this generalization is correct, and eventualities that share a participant cannot be combined via RSUM in Russian, the non-thematic argument of $\text{SHIFT}_{\text{ACT} \rightarrow \text{ACC}}$(gulja-) in (24) cannot be licensed in the same way as in Enlgish, by identifying it with the holder of the result state. I suggest that instead, Russian identifies the argument of that state with the agent argument through reflexivization and introduces a result state by means of a verbal prefix.

3.4. Intensive resultatives through reflexivization and prefixation

The variant of Rothstein's RSUM composition rule based on degree semantics in (27) accomplishes two tasks at one step: it licenses the derived individual argument of the shifted activity and discharges the degree of change argument. If, by hypothesis, Russian is a language that lacks RSUM, licensing the derived individual argument and binding the degree argument should happen at two distinct stages of derivation.

In the absence of RSUM, reflexivization offers a way of getting rid of the "non-thematic" argument in (24) by identifying it with the agent argument. The reflexive *-sja* morpheme in (31) applies to (24) yielding a relation between events, individuals and degrees in (32).

(31) REFLEXIVE *-SJA* MORPHEME

$|| \text{sja} || = \lambda T_{<e,<e,<n, <v, t>>>>} \lambda x \lambda d \lambda e.T(x)(x)(d)(e)$

(32) || sja ($SHIFT_{ACT \rightarrow ACC}$(gulja-)) || =
λdλxλe [WALK(e) ∧ AG(e)=x ∧ INCREASE(G(x))(d)(e)]

Arguably, since identifying the "non-thematic" argument with the holder of the result state is not an option, reflexivization is the only way of repairing thematic ill-formedness of (24), and this accounts for why it is obligatory for intensive resultatives: as we saw in (17)-(18), unlike in English, in Russian (18b), a non-reflexive counterpart of (18a), is ungrammatical.

The relation in (32) does not contain arguments not standing in a thematic relation to the walking event. But there is another problem with (32) that prevents || sja ($SHIFT_{ACT \rightarrow ACC}$(gulja-)) || from being a possible verb denotation in Russian (see (11b)): its degree argument is neither saturated, nor bound. I suggest that binding of the degree variable occurs at the final stage of derivation, when the *na-* prefix applies to the relation in (32).

I take the prefix *na-* in RIRs like (1) to be identical to the cumulative prefix *na-* occurring in examples like (33):

(33) Vasja na-bra-l gribov / na-vari-l supa.
V. $_{NA}$take$_{PST}$ mushroom$_{GEN.PL}$ $_{NA}$cook$_{PST}$ soup$_{GEN.SG}$
'Vasja collected a quantity of mushrooms / cooked a quantity of soup.'

Various analyses of this prefix can be found in the literature, see Isačenko 1960, Zaliznjak, Šmelev 2000, Filip 2000, 2005a,b, Pereltsvaig 2006, Romanova 2006, Tatevosov 2007, Žaucer 2009. In what follows I assume a modified version of the semantics of *na-* from Tatevosov 2007 represented in (34):

(34) || na || = $\lambda S_{<e, <n, <v, t>>>}$ λxλeλdλe′λs [e = e′⊕s ∧ S (x)(d)(e′) ∧ CAUSE(s)(e′) ∧ α(s) ∧ ARG(s)=x]

According to (34), *na-* denotes a function that takes a three-place relation between individuals, events, and degrees and yields a two-place relation between individuals and events. The semantic contribution of the prefix consists of the following parts.

First, it introduces a result state α with underspecified descriptive properties[3]. This is what makes *na-* a close counterpart of overt result expressions like *tired* in English, the only difference being that α, the predicate over states, does not possess a fixed interpretation. The rationale behind this move is: since result states are introduced by the prefix,

[3] See Žaucer 2009, who argues extensively that, contra Filip 2000 and elsewhere, *na-* should be analyzed as a resultative prefix.

and the prefix combines with an open class of verb stems, its meaning cannot be too specific, hence the descriptive properties of the state should not be rigidly fixed. As we saw in Section 2, underspecification of descriptive properties is one of the characteristics that distinguishes RIRs from ERRs, and (34) captures this in a principled way.

Secondly, *na-* creates a complex eventuality e′⊕s consisting of the event and state, causally related, and makes sure that the argument of the state is identical to the argument of the event. In this respect, the semantics of *na-* reconstructs Rothstein's crucial idea that the event and state add up to an internally complex atomic eventuality and share a participant.

Finally, the prefix binds the degree argument. This latter component of the analysis is supported by the observation that *na-* only combines with Vs/VPs that are based on (or at least can be coerced into) an event predicate denoting a gradual change. Sentences like (33) above refer a to gradual change in the quantity of mushrooms collected or the soup cooked. In contrast, in (35) the verb *mešat'* 'stir' involves no change at all, while in case of *peresalivat'* 'oversalt' the change is not gradual:

(35) ??Vasja na-meša-l / na-peresal-iva-l supa.
V. $_{NA}$stir$_{IPFV\text{-}PST}$ $_{NA}$oversalt$_{IPFV\text{-}PST}$ soup$_{GEN}$
'Vasja stirred / oversalted a quantity of soup.'

Since in the current system it is exactly the gradual change that is represented through the degree argument, (35) provides an independent support for the generalization that the cumulative *na-* operates on degrees.[4]

Applying *na-* in (34) to the relation in (32) and saturating the individual argument position produces an event predicate in (36) representing (the relevant part of) the meaning of (1):

(36) λe∃d∃e′∃s [e = e′⊕s ∧ WALK(e′) ∧ AG(e′)=tourists ∧ INCREASE(G(tourists))(d)(e′) ∧ CAUSE(s)(e′) ∧ α(s) ∧ ARG(s)=tourists]

(36) is an event predicate that denotes events consisting of walking and a result state brought about by walking. In walking events, tourists are the

[4] Kagan and Pereltsvaig, this volume, independently develop an analysis in which *na-* is treated much in the spirit of the proposal presented here: they suggest that *na-* binds the degree variable and sets its value above the contextually determined standard. Essentially, this amounts to analyzing *na-* as an equivalent of the positive degree operator (e.g., Kennedy, McNally 2005) in the domain of events.

agent and their gradable property, contextually determined, increases by some degree. The event leads tourists to a new state, whose descriptive properties are determined contextually as well.

4. Summary and conclusions

In conclusion, I will show briefly that all the facts discussed in Section 2 fall out naturally from the proposed analysis. First, RIRs and ERRs are correctly predicted to differ from their non-derived counterparts (see examples in (5)-(6)) in essentially the same way, since both classes of resultatives involve essentially the same steps of derivation. Specifically, both undergo activity-to-accomplishment shift, both are combined (although in a different way) with a result expression, and both involve reflexivization.

Secondly, it is not difficult to see that RIRs as well as their ERR counterparts are telic. Consider the event predicate in (36). A proper part of an event which is the sum of walking (where some property of a walker changes to some degree) and the result state caused by walking does not count as an event of the same event type: if the tourists walked themselves tired/satisfied in the event *e*, it is not the case that they walked themselves tired in any proper part of *e*. This means that the predicate is quantized (e.g., Krifka 1992, 1998), and telicity of RIRs/ERRs (e.g., (7)-(8)) follows.

Thirdly, the analysis explains why non-derived verbal predicates and RIRs/ERRs produce different interpretations when modified by rate adverbials, as exemplified in (9)-(10). This happens because non-derived predicates and resultatives have different events in their extensions. Assuming that adverbials are event predicates and ignoring tense, we get (37) as a semantic representation for (10a) and (38) for (10b).

(37) $\exists e[\text{RUN}(e) \wedge \text{AG}(e)=\text{Vasja} \wedge \text{QUICKLY}(e)]$

(38) $\exists e \exists d \exists e' \exists s[e=e' \oplus s \wedge \text{RUN}(e') \wedge \text{AG}(e')=\text{Vasja} \wedge \text{INCREASE}(\text{G}(\text{Vasja}))(d)(e') \wedge \text{CAUSE}(s)(e') \wedge \alpha(s) \wedge \text{ARG}(s)=\text{Vasja} \wedge \text{QUICKLY}(e)]$

In (37), the adverbial modifies the running event, so the event predicate contains events of quick running in its extension. In (38) the adverbial modifies an event in which the agent achieves a certain new state through running, so what happens quickly in (38) is not running by itself, but getting into that new state. Therefore, (38) does not entail (37), as required.

Fourthly, lexical restrictions on RIRs and ERRs also follow from the analysis. RIRs/ERRs cannot be derived from unaccusatives like *freeze* /

sušit'sja 'dry' in (13c)-(14c) because their derivation involves the activity-to-accomplishment shift, but unaccusatives of this type are not activities and cannot thus serve as a suitable input to the SHIFT operation. Transitive result verb like *break / razbivat'* 'break', (13d)-(14d), cannot produce RIRs/ERRs for a different reason. The derivation of both RIRs and ERRs adds a result state to an eventuality from the original denotation of an event predicate, but, as the huge literature on predicate decomposition starting from Dowty 1979 suggests, verbs like *break* possess a result state to begin with. Whatever constraints on well-formedness of event structure prevent a complex event description from having two result states (cf., e.g., RH&L's 1998 constraint on template augmentation), these constrains guarantee that RIRs/ERRs cannot be formed from transitive result verbs.

Fifthly, the analysis accounts successfully for the differences between RIRs and ERRs. By hypothesis, Russian does not allow for combining event descriptions by summing. This explains why in Russian the result expression cannot be an overt AP, but can be a prefix: prefixes combine with verbs via functional application. It is also correctly predicted that that reflexivization is obligatory for RIRs: this happens because it provides a unique way of getting rid of derived arguments not associated with events via thematic roles.

Finally, the analysis reduces the non-compositional "Intensive Resultative Akrionsart", of which *na- -sja* is a complex exponent, to a fully compositional combination of the two pieces of morphology independently attested in Russian, the cumulative prefix *na-*, and the reflexive morpheme *-sja*. In view of the Ockham's razor, this seems to be a welcome consequence of the analysis.

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