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Activity Hierarchy and Argument Realization in (R)RRG

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Abstract

The actor-undergoer hierarchy hits its limits when it comes to describing the macrorole assignment of several verb classes. This chapter deals with four problematic cases: causation, three-place state predicates, two-place object-experiencer verbs, and finally, transitive versus intransitive verbs of motion. Working out ideas in Kailuweit (2013), I propose the activity hierarchy as an alternative to the actor-undergoer hierarchy. Starting from a set of two actor features (c = causation/control, m = mental) and one undergoer feature (r = resultative), the activity hierarchy brings into play semantic criteria that have dominated the discussion on generalized semantic roles in the last decades. The activity hierarchy allows for a sufficient number of activity degrees to describe the macrorole assignment in the four problematic cases.

1 Introduction

The actor-undergoer hierarchy is the masterpiece of Role and Reference Grammar. In 1984, Foley and Van Valin introduced two levels of semantic roles: an open list of specific thematic relations and two generalized semantic roles, the so-called macroroles: actor and undergoer. Specific thematic relations were arranged in a graded continuum of activity based on *Aktion-sart*. Standard RRG (Foley & Van Valin 1984: 59; Van Valin & LaPolla 1997: 127, 146; Van Valin 2005: 61, 126; Van Valin 2013: 79) distinguishes five degrees of activity. The two more active degrees imply an activity component (**do'** [x, ...]) in the semantic description (logical structure = LS) of the predicate. The prototypical actor is a controlling human being acting as an AGENT,¹ i.e. the first argument of *to murder*. In contrast, the first argument of *to kill* need not have the value +hum. Even a natural force (e.g. *hurricane*) or an abstract concept or

¹ This is formally represented by DO' instead of **do'**.

state of affairs (e.g. *disease*, *drinking too much*) could be the first argument of the predicate. Hence, the first argument of *kill* is not a prototypical actor (an AGENT), but an EFFECTOR.

The other three grades are related to a stative component in the LS (**pred'**(x) and **pred'**(x, y)). RRG distinguishes between one-place and two-place states. The argument of a one-place state is a prototypical undergoer, e.g. an entity undergoing a change of state, being destroyed or killed, or coming into existence. Incidentally, not all one-place states in English, German, or Romance languages are represented in the lexicon by monovalent verbs. On the contrary, one-place states appear as part of the semantic representation of causative verbs of destruction. These verbs show a high activity contrast between the arguments and a complex semantic representation with both a cause and an effect component. The effect component consists of the resultative one-place state. As an effect of a breaking event, for example, an entity remains broken. Note that the lexical entries could be even verbs with a valency of three: *break the teacup against the window*. The entity that undergoes a change of state and remains broken is always selected for undergoer and linked to the direct object position in an active clause.

Two-place states (**pred'**(x, y)) formalize the semantics of bivalent stative verbs such as *own* or *like*. In line with a localist approach to thematic relations (cf. Gruber ([1965] 1976); Jackendoff (1972)), the first argument of these verbs could be considered a LOCATION. Therefore, the x argument (*Mary*) of *Mary owns an old car* is interpreted as a sphere of rights of possession and the y-argument (*car*) falls into this sphere. In *Peter likes pizza*, the x-argument (*Peter*) represents a space where the liking of the y-argument (*pizza*) is located. The second argument of the two-place state corresponds to a THEME in terms of Gruber ([1965] 1976). However, we also find two-place states as part of the semantic representation of three-place verbs of transfer (*give*), putting (*load*, *spray*), or removal (*drain*, *empty*). Depending on the language, the semantic subclass, and in the end the individual lexeme,² some of these verbs allow for a LOCATION argument in the direct object position and, therefore, for a marked undergoer choice, e.g. *Mary gave Peter a book*, *Harry sprayed the wall with paint*. Hence, standard RRG considers the first argument position of a two-place state a candidate for actor or undergoer. It will be the actor of transitive bivalent states, but the undergoer of the LOCATION as direct object construction of (three-place) verbs of transfer, putting, or removal.

² The so-called Dative alternation does not appear in German or in the standard varieties of Romance language (but see Abreu Gomes (2003) for colloquial Brazilian Portuguese). In Kailuweit (2005a), I showed that Pinker's semantic subclass approach to locative alternation (Pinker 1989) does not hold for German or Romance languages. Some of the English subclasses that, according to Pinker, allow for locative alternation do not have any instances in French, Spanish, or German, while others of his classes that do not permit alternation in English do so in German, French, or Spanish. However, we find verbs that do not alternate in every subclass allowing for locative alternation (see Kailuweit 2005a; 2008).

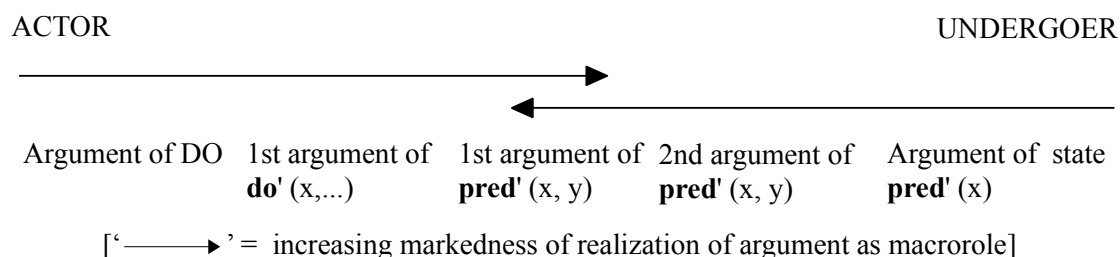


Table 1: Actor-undergoer hierarchy (cf. Foley & Van Valin 1984: 39; Van Valin & LaPolla 1997: 127, 146; Van Valin 2005: 61; Van Valin 2013: 79)

This brief overview has shown that macrorole assignment in RRG only takes five degrees of activity into consideration. In addition, there are no uniform criteria to grade the five degrees. The criteria are quite complex, ranging from lexical semantics (argument of DO versus argument **do'**(x, ...)), to *Aktionsart* (activity versus state), and to the number of arguments (one-place states versus two-place states).

2 Exploring the Limits of the Actor-Undergoer Hierarchy

Independently of the fact that the heterogeneous criteria for macrorole assignment seem to be problematic from a theoretical point of view, the actor-undergoer hierarchy hits its limits when it comes to describing the macrorole assignment of several verb classes. In this section, I will deal with four problematic cases: causation, three-place-predications, two-place object-EXPERIENCER verbs, and finally, verbs of motion.

2.1 Causative Predicates

The first problem concerns causativity. When Foley & Van Valin first worked out the actor-undergoer hierarchy in 1984, they followed the prevailing view at that time that all accomplishments are causative and that all causatives are accomplishments (Dowty 1979: 186; Foley & Van Valin 1984: 39). Later work in RRG (cf. Van Valin & LaPolla 1997: 97) has also shown that for states, activities, and achievements, too, there is a corresponding causative class while accomplishments such as *melt* also occur in a non-causative construction: *the hot water melted the ice* $\Leftrightarrow$ *the ice melted*. Hence, causativity is formalized in RRG as “ α CAUSE β where α β are logical structures of any type” (VanValin 2005: 45). Nonetheless, macrorole assignment for causative states and activities does not follow straightforwardly from the actor-undergoer hierarchy. In (1) and (2) the position of the highest ranking argument in the α -part of the con-

struction is the same as the position of the highest ranking argument in the β -part. In addition, in (2) the undergoer argument is an EFFECTOR, a position that is not accessible for undergoer selection in accordance to the actor-undergoer hierarchy.

- (1) Bill's owning a gun frightens Mary. (causative state)
 [have'(Bill, gun)] CAUSE [feel'(Martha, [afraid'])]
 (Van Valin & LaPolla 1997: 97)
- (2) The girl bounced the ball around the room. (causative activity)
 [do'(girl, ...)] CAUSE [do'(ball, [bounce'(ball)])]
 (*ibid.*: 97)

A solution would be to flag the [do'(x, ...)] position (thematic relation: EFFECTOR) as accessible for undergoer assignment. An additional rule could stipulate that the actor argument of causative constructions is always located in the α -part and the undergoer argument in the β -part of the complex construction. However, the question remains open as to whether in causative constructions the whole α -part is the actor or a single argument within the α -part. The first interpretation seems to be appropriate for (1), the second for (2).

2.2 Non-Causative Three-Place Predicates

As far as non-causative three-place predicates like *talk (to somebody about something)* or French *envier* – **envy'**(x, y, (z)) ('envy somebody for something') are concerned, the actor-undergoer hierarchy does not provide a formalism that accounts for the correct macrorole assignment. Standard RRG does not explicitly deal with these predicates. Van Valin & LaPolla (1997: 116–118) give a detailed description of English verbs of saying, but they do not indicate a LS for *talk*. In standard RRG, all three-place verbs are considered causative, but it is clearly the absence of causativity that distinguishes verbs of saying from verbs of telling (cf. Van Valin & LaPolla 1997: 118). Although the type frequency of non-causative three-place predicates is low, the token frequency of verbs of talking is high. However, if verbs of talking raise a problem for the actor-undergoer hierarchy, the problem naturally seems to be resolvable. Standard RRG allows for several classes of two-place activities, i.e. **do'**(x, [**sing'**(x, (y))], **do'**(x, [**see'**(x, (y))], **do'**(x, [**tap'**(x, (y))]) etc. (cf. Van Valin & LaPolla 1997: 115).³ The second argument represents an instance of **pred'**(x, y) (cf. *ibid.*: 127), although the predicate embedded in activities is not a state. Hence, RRG could allow for three-place activities with

³ Two other classes of two-place activities are verbs of consumption and creation with an unspecified object: *eat pizza*, *write letters*. Notice, that the objects of these predicates are not affected undergoers as the specified objects of the active accomplishments *eat a pizza*, *write a letter*. They are instances of **pred'**(..., y), because they are rather the theme of eating and writing than the actually consumed or created object.

an argument in each of the three medium positions of the actor-undergoer hierarchy: **do'**(x), **pred'**(x, ...), and **pred'**(..., y). In Staudinger, Hartung, & Kailuweit (2008), we suggested the following LS for *parler*, the French counterpart of English *talk*:

- (3) *parler* à qn de qc = **do'**(x, [**talk'**(x, y, z)])

Notice that the predicate **talk'**(x, (y), (z)) is not a state just as little as the **sing'**(x, (y)) component is a state in **do'**(x, [**sing'**(x, (y))]) in standard RRG. Activities do not consist of states embedded under a **do'** operator. Hence, we could associate the two arguments y and z with the positions **pred'**(x, ...) and **pred'**(..., y) of the actor-undergoer hierarchy without pretending that they are arguments of a state predicate. Standard RRG associates the y-argument of **sing'** with the **pred'**(..., y) position as well. However, this is not a solution for three-place non-causative states, such as Romance verbs of envy. Take, for example, French *envier*:

- (4) ...cette belle figure creuse [...] il la lui enviait
 ...this pretty face haggard [...] he ACC.3SG;F DAT.3SG envie-PST.3SG
 'It was this pretty haggard face that he envied him for.'
 (FRANTEXT: ETCHERELLI)

The possible LS for French *envier* – **envy'**(x, y, (z)) – does not correspond to the three stative argument positions in the actor-undergoer hierarchy. The three positions **pred'**(x, ...), **pred'**(..., y) and **pred'**(x) distinguish two-place states (**pred'**(x, y)) from one-place states (**pred'**(x)). The position **pred'**(x), i.e. the prototypical undergoer position, cannot be added to the positions **pred'**(x, y), since the structures **pred'**(x) and **pred'**(x, y) exclude each other logically. In addition, the semantics of the OBJECT OF ENVY is different from those of the prototypical undergoer. The OBJECT OF ENVY is not affected by the event as the argument of **dead'** or **broken'** is; it does not undergo a change of state.

2.3 Non-Causative Object-EXPERIENCER Verbs

Nonetheless, it is not only three-place static verbs of emotion which raise problems as far as macrorole assignment is concerned. As I have shown in Kailuweit (2005b, 2013), there is no adequate representation for non-causative two-place episodic verbs of emotion. Standard RRG distinguishes between two types of episodic verbs of emotion, transitive verbs of the *upset*-type, and copular constructions such as **be.angry'**.⁴

⁴ In line with Nissenbaum (1985) and Pesetsky (1995), Van Valin & LaPolla (1997) distinguish between non-episodic verbs of emotion, i.e. verbs of liking which denote a general subjective judgment, and episodic verbs of emotion, i.e. verbs of anger or fear which refer to a change of an emotional state of the experiencer in a concrete situation (cf. Koch 2001; Kailuweit 2005).

- (5) episodic verbs of emotion (Van Valin & LaPolla 1997: 156, 402)

- a. The photo in the newspaper upsets James.
[**be-in'**(newspaper, photo)] CAUSE [**feel'**(James, [**upset-about'**(**be-in'**(newspaper, photo)))]]
- b. Pat is angry at Kelly.
[**feel'**(Pat, [**angry.at'**(Kelly)))]

As Grimshaw (1990) and Pesetsky (1995) have argued, standard RRG considers the transitive variant causative. According to the LS given in (5), the non-transitive variant that is not only represented by copula constructions, but also by full verbs such as *to worry about*, could be described as a lexicalized anticausative variant of the transitive causative construction. Episodic emotions select the thematic relations EXPERIENCER and SENSATION. Standard RRG represents the SENSATION-argument as a predicate with an internal argument, e.g. **angry.at'**(y). This internal argument is not accessible for macrorole assignment. Therefore, verbs such as *to worry about* should be considered as macrorole intransitive states. Their only argument, the EXPERIENCER, assumes the undergoer macrorole.

There are several problems with this analysis (cf. Kailuweit 2005b, 2013). In the present paper, I shall condense the discussion to verbs of interest. The English verb *interest*, as well as its counterparts in German or in Romance languages, seems to follow the pattern in (4):

- (6) verbs of interest

- a. The photo in the newspaper interested James.
[**be-in'**(newspaper, photo)] CAUSE [**feel'**(James, [**interested-in'**(**be-in'**(newspaper, photo)))]]
- b. James is interested in the photo.
[**feel'**(James, [**interested-in'**(**be-in'**(newspaper, photo)))]]

However, the causative analysis of *interest* is problematic. As a two-place verb, *interest* does not meet the tough-construction test.

- (7) James is easy to upset.
- (8) * James is easy to interest.

In Kailuweit (2005: 188), I have shown that this test – among others – is a good indicator for an active-causative interpretation of transitive object-EXPERIENCER verbs (OE-verbs).

While the majority of these verbs allows for the so-called tough-construction and licenses the imperative, the passive construction, and adverbials such as “deliberately”, a smaller group

of these verbs do not.⁵ Verbs of interest are among those that do not permit a controlling AGENT as the subject argument in English, German, and Romance languages. In addition, all these languages allow for three-place constructions of verbs of interest. These constructions, acceptable to different degrees in the mentioned languages, seem to be causativations. Note that there is a parallel analysis of transitive *march* being the causativation of intransitive *march* in standard RRG (Van Valin & LaPolla 1997: 100).

- (9) a. The troops marched to the barracks.
 b. The sergeant marched the troops to the barracks.
- (10) a. French: Il m' intéressait à ce qui l'
 he ACC.1SG interest-PST.IMPF.3SG in that what ACC.3SG
 intéressait
 interest-PST.IMPF.3SG
 'He got me interested in what he was interested in'
 (FRANTEXT: BEAUVOIR, S. de)
 b. ? Uncle Henry interested James in history.

As three-place constructions, verbs of interest meet the tough-construction test:

- (11) a. * James is easy to interest.
 b. James is easy to interest in anything wholesome.

In conclusion, two-place verbs of interest as well as a considerable subgroup of transitive OE-verbs are not causative. If this were the case, then a natural LS for two-place and three-place verbs of interest would be:

- (12) a. **interest'**(x, y)
 b. [**do'**(x, ∅)] CAUSE [**interest'**(y, z)]

However, these LS predict the wrong macrorole assignment. In the three-place construction, the y argument (EXPERIENCER) would be a marked choice for undergoer. In a parallel way, the x argument (EXPERIENCER) of the two-place construction would be selected as undergoer. This instance of marked undergoer choice would entail marked actor choice: the y-argument of **interest'**(x, y) has to be selected as actor to assume the subject position. Hence, a LS **interest'**(x, y) turns the principles of macrorole assignment upside down.

⁵ Prototypical non-agentive-causative object experiencer verbs in French are *affecter* ('move'), *attirer* ('attract'), *emporter* ('carry away'), *frapper* ('strike'), *intéresser* ('interest'), *obséder* ('obsess'), *préoccuper* ('preoccupy'), *remuer* ('move') and *révolter* ('disgust'), in Italian *allietare* ('delight'), *attrarre* ('attract'), *attrarre* ('appeal'), *colpire* ('strike'), *consumare* ('exhaust'), *divorare* ('devour'), *interessare* ('interest'), *preoccupare* ('preoccupy'), *rivoltare* ('disgust'), *sconvolgere* ('upset'), *trascinare* ('enthuse') (Kailuweit 2005b).

2.4 Motion Verbs as Active Accomplishments

Motion verbs, such as Italian *correre* ('run') or *slittare* ('slide'), constitute a problem for linking theories. In non-directional usage, they behave like activities and select HAVE in compound tenses, while they seem to be accomplishments selecting BE in compound tenses in combination with a goal-adverbial.

- (13) La macchina è slittata nel fosso.
'the car slid into the ditch'
- (14) La macchina ha slittato in modo pericoloso.
'the car slid dangerously'
(Schwarze 1996: 12)

RRG provides an elegant analysis of this phenomenon. Verbs of directed motion are basically activities that could be converted into active accomplishments via a lexical rule (Van Valin & LaPolla 1997: 111–13; Van Valin 2005: 47; Van Valin 2013: 85).

- (15) activity [motion] $\Rightarrow$ active accomplishment:
do'(x, [**pred'**(x)]) $\Rightarrow$ **do'**(x, [**pred'**(x)]) & INGR **be-LOC'**(y, x)

The linking of the active accomplishment construction seems to follow straightforwardly from the general rules. As macrorole-intransitive constructions, they select one macrorole. Due to the activity component, this MR is an actor (Van Valin 2013: 83). However, in Italian the selection of an actor seems to be in contradiction with the auxiliary chosen in compound tenses not only in the activity construction, but also in the active accomplishment construction. The use of auxiliaries in Italian is due to the fact that intransitive activities select HAVE while intransitive states, achievements, and accomplishments select BE (Van Valin 1990). Notice that the macrorole of intransitive non-activities is an undergoer and not an actor. This is in line with approaches that consider "agentlessness" the prevailing factor of inaccusativity (Schwarze 1996). Hence, *correre* and *slittare* as active-accomplishments behave like activities as far as macrorole assignment is concerned, but like accomplishments regarding auxiliary selection.

There are additional problems with motion verbs. They could be intransitive as Italian *correre* ('run') or *slittare* ('slide') and their English counterparts or transitive as English *enter* or *reach*. Some verbs, e.g. English *climb*, even allow for both an intransitive and a transitive construction.

- (16) a. Chris climbed Mont Blanc.
b. Chris climbed up Mont Blanc.

Van Valin & LaPolla (1997: 153) start from Talmy's (1985, 1991) distinction of satellite-framed and verb-framed languages. While English as a Germanic language preferably codes the manner of motion lexically and the GOAL on a satellite (*run into the room*), it is the other way around for Romance languages (i. e. French *entrer au salon en courant* ['enter the room running']). From a typological point of view, English is considered a satellite-framed language; Romance languages are verb-framed. However, English possesses verb-framed predicates such as *enter* while Romance languages express directed motion exceptionally with a satellite-framed construction as we have seen for Italian *slittare* ('slide').⁶

As far as the LS for active accomplishments is concerned, it is not clear how standard RRG would apply this structure to transitive constructions:

- (17) a. Chris ran to the park.
 do'(Chris, [**run'**(Chris)]) & INGR **be-at'**(park, Chris)
- b. Chris entered the room.
 do'(Chris, [**enter'**(Chris)]) & INGR **be-in'**(room, Chris)
 or
 do'(Chris, [**enter'**(Chris, room)]) & INGR **be-at'**(room, Chris)

Nonetheless, starting from any of two LS proposed in (17b), Chris would not only be the first candidate for actor, but also for undergoer. Hence, an additional MR-assignment rule would be necessary: "Assign actor first, then assign undergoer to the remaining direct core argument." The choice of macroroles would not only depend on the internal syntax of the LS, but also on temporal order inside the processing algorithm.

Van Valin (this volume) introduces the following modification to the LS of active accomplishments of motion to account for the incrementality of these predicates: [**do'**(x, [**run'**(x)]) $\wedge$ PROC **cover.path.distance'**(x, (y))] & INGR **be-at'**(z, x). This LS is applicable to transitive constructions of the type *Chris ran two miles*, where the y-argument *two miles* constitutes the Undergoer.

⁶ Van Valin & LaPolla (1997: 153) claim that verbs of motion in verb-framed languages tend to be macrorole transitive. This cannot be confirmed for Romance languages and seems to be incorrect from a typological point of view (Choi 2009). Intransitive French verbs of directed motion are among the most frequent verbs of the language. According to the frequency dictionary of Julliard, Brodin, and Davidovitch (1970) *venir* ('come') is the fourth most frequent verb, *aller* ('go') is the tenth, *rester* the 14th, *passer* the 16th, and *arriver* the 21st most frequent. *Revenir* ('come again') is the 25th, *partir* ('leave') the 35th, *entrer* ('enter') the 36th, and *sortir* ('go out') the 40th most frequent. Van Valin & LaPolla (*ibid.*) explain the transitivity of English *enter* by the fact that the verb is of Romance origin. However, French *entrer* as well as Spanish *entrar* or Italian *entrare* are intransitive verbs. English *climb*, allowing a transitive construction, is of Germanic origin.

- (18) Chris ran two miles.

[**do'**(Chris, [**run'**(Chris)])] $\wedge$ PROC **cover.path.distance'**(Chris, two miles] & INGR
be-at'(path.endpoint, Chris)

However, in constructions with a GOAL, e.g. *to the park*, it remains unclear why the leftmost argument not chosen for actor, the z-argument *park*, is ruled out for undergoer selection. An explanation would be that according to Van Valin (2005: 65) actor and undergoer are never oblique arguments within the core.

- (19) Chris ran two miles to the park.

[**do'**(Chris, [**run'**(Chris)])] $\wedge$ PROC **cover.path.distance'**(Chris, two miles] & INGR
be-at'(park, Chris)

On a side note, PROC **cover.path.distance'**(Chris, two miles) appears to be a rather unusual formalization. Note that the transitive meta-predicate **cover.path.distance'** is not transitive in English **Chris covered the path distance two miles*. A grammatically correct, but still semantically odd version would be *Chris covered the path distance of two miles*. Of course, one could argue that the meta-predicates – in the present example the incremental component – need not correspond to a direct paraphrase in the language. However, this is the principle of evidence in the semantic descriptions (LS) in standard RRG. The ordering of the arguments, especially for two-place states, follows from the internal syntax of the (embedded) state-predicate. Therefore, the correct macrorole assignment and linking of local relations with the LS **be-LOC'**(x, y) could be retrieved from the syntax of English *be* + preposition, for example (Van Valin 2005: 46–47; 58–60).

- (20) Kim is in the library.

be-in'(library, Kim)

Furthermore, if we start from the syntactically more correct formalization PROC **cover.path.distance.of'**(two miles, Chris), *Chris* would be the best candidate for Undergoer. Of course, this argument already bears the actor macrorole as being the leftmost argument in the activity part of an active accomplishment.

Transitive verbs of motion, such as *reach*, raise another puzzling problem that the active accomplishment approach does not account for in a satisfying way.

- (21) The climbers reached the summit.

INGR **be-at'**(summit, climbers)

In line with Dowty (1979: 68), Van Valin (this volume) lists *reach* as a prototypical achievement.⁷ This seems to be true from a logical point of view. Nonetheless, starting from a LS INGR **be-at'**(summit, climbers), *the climbers* should be the undergoer of this transitive predicate and *the summit* the actor.

In personal communication, Van Valin reconsidered *reach* an active achievement adducing the following evidence. On the one hand, *reach* seems to be controllable, allowing for adverbs of the type *deliberately*. On the other hand, *reach* combines with *in x time* adverbials:

- (22) a. Chris deliberately reached the room just after Mary started speaking.
b. Chris reached the meeting room in ten minutes.

The difference between *reach* and *run* lies in the fact that the first is not incremental (Van Valin, personal communication). In my opinion, it is problematic to make an argument out of rather marginal uses of *reach* with a controlling agent. In fact, the argumentation would not cover cases with an inanimate moving object:

- (23) The bullet reached the target.

In addition, there is no linguistic evidence for the fact that *reach* is not incremental. If we focus on the non-specific activity part, there seem to be no specific differences between *run to the park* and *reach the park*. They both imply a gradual approach. In fact, *reach* seems to differ from an achievement such as *find*. *Find* refers to a facultative previous activity of searching. However, while the previous activity of searching is not necessarily an incremental approach to the GOAL of finding, we cannot reach a place without an approaching movement. In conclusion, the *Aktionsart* of *reach* as well as macrorole assignment remains an open question.

3 An Alternative to the Actor-Undergoer Hierarchy

Standard RRG retrieves macrorole assignment and therefore linking from *Aktionsart* information at the lexical level. However, as we have seen in the last sections, additional information is necessary to predict the correct assignment of macroroles. Logical structures show an internal syntax. They are ordered lists of arguments where the position, e.g. first or second argument of **pred'**(x, y), is decisive for macrorole assignment. At the meta-linguistic level,

⁷ Van Valin (2013: 83) considered *reach* a transitive counterpart of an intransitive active accomplishment, such as *run*, with a LS “basically the same for both verbs”, although *reach* has “an unspecified verb of motion in the activity part of the LS”. However, in personal communication, he rejected this analysis, which contradicts the common assumption that *reach* is an achievement.

the position is determined by the syntax of the English predicates used in the formal descriptions. We have seen that at least for some causative constructions the basic rules of macrorole assignment are overridden by event structure information. Since causativity is not represented in the actor-undergoer hierarchy, it has to be stipulated that the actor is always assigned to the α -part of a causative construction (α CAUSE β), while the undergoer is located in the β -part. Hence, even an EFFECTOR, i.e. the first argument of **do'**(x, ...), is accessible for undergoer selection if it is located in the β -part of α CAUSE β .

At the level of the lexical entries, the syntax of the object languages comes into play. If a two- or three-place predicate is macrorole intransitive in a given language this has to be coded in the lexicon. Therefore, English macrorole assignment and linking for English *like* follow straightforwardly from the LS, while Italian *piacere* has to be marked as macrorole intransitive:

- (24) lexical entry for Italian *piacere* ('like')
 MR1 **like'**(x, y)

The lexical entries of Standard RRG do not respect the ideal separation of a lexical-semantic level and a syntactical level of representation mapped onto each other in both directions by linking algorithms. We already find a lot of syntactic information in the lexicon. In addition, Van Valin (2006: 285) proposes logical structures enhanced with macrorole and case assignment information "in order to expedite interpretation". Therefore, what was supposed to be the output of a linking process could at best be described as a result of lexical precompiling driven by lexical rules.

In Kailuweit (2013), I went one step further. My sketch of a Radical Role and Reference Grammar (RRRG) is inspired by unification grammar approaches and provides lexical structures with semantic, syntactic, and pragmatic information organized in feature-value pairings. At the heart of this approach lies the activity hierarchy, i.e. a formalism that represents different degrees of activity for each argument of a predicate. In previous research on verbs of emotion (Kailuweit 2005b, 2007a, 2007b, 2013, 2015), I ordered decomposed thematic relations according to their activity degree. The main sources of inspiration were the feature-based lists of thematic relations found in Rozwadowska (1988) and in Reinhart (2001, 2002). They represent a more formalized alternative to Dowty's (1991) proto-role approach.

Following Rozwadowska (1988), I consider three features: causative and/or control [c], mental (sentient) [m], and resultative (change of state) [r]. In line with Reinhart (2002),⁸ my approach allows the features to assume three values +, –, and $\pm$. While Rozwadowska (1988) allows for $2^3 = 8$ combinations and Reinhart (2001, 2002) for $3^2 = 9$, in my approach $3^3 =$

⁸ Reinhart (2001, 2002) operates with only two features: C and M.

27 combinations are possible. This may seem like a complicated approach, but it is by far a more manageable system in comparison to the proto-role approach. Dowty (1990) lists five proto-agent and five proto-patient properties that are theoretically combinable, yielding $2^{10} = 1024$ possible combinations.

In addition, the number of activity degrees decreases due to the fact that the features are weighted (see Table 2). The feature [c] is a strong actor feature, [m] is a weak actor feature, and [r] is a strong undergoer feature. The presence [+] of a strong feature will duplicate the value of the presence of a weak feature. If an argument is underspecified for one feature [$\pm$], the value will be half of the [+] value.

+c	$\pm$ c	-c	+m	$\pm$ m	-m	-r	$\pm$ r	+r
4	2	0	2	1	0	0	-2	-4

Table 2: Features and Values for Activity Clusters

Weighting the features reduces the 27 possible combinations to eleven different degrees of activity. The combination [+c +m -r] represents the prototypical actor with the value $4+2+0 = 6$, while the prototypical undergoer corresponds to a combination with the value [-c -m +r] $0+0-4 = -4$. Nine intermediate summations are mathematically possible. Once the degree of activity of each argument of a predicate is determined, the assignment of macroroles and the linking of the argument to syntactic functions follow straightforwardly. As in Standard RRG, a transitive construction selects the most active argument for the actor macrorole and the most passive one for the undergoer macrorole. An active construction assigns the PSA-function (subject) to the actor and the direct object function (marked by accusative case in an accusative language) to the undergoer. If the construction is intransitive, it takes only one macrorole. Intransitive predicates denoting a stative subevent select an undergoer, which is realized as the PSA. In the rest of Section 3, I will come back to the four problematic cases I dealt with in Section 2.

3.1 Causative Predicates Revisited

As far as causative states and activities are concerned, there should be a clear contrast of activity between the two arguments, the CAUSER and CAUSEE. The most active argument of causative emotional states⁹ is the argument called the CORRELATE in Kailuweit (2005b) following Ruwet (1993), i.e. the state of affairs at which the emotion is directed, and that is

⁹ The state of affairs that episodic experiencer-object verbs denote is more complex. It consists not only of a state, but of a punctual change of the emotional state of the experiencer in a given situation caused by the

perceived as the CAUSER of the emotion. *Owning a gun* in (1), repeated for convenience in (25), is such an argument:

- (25) Bill's owning a gun frightens Mary. (causative state)

The corresponding feature-value-cluster is $[+c -m -r]$. The EXPERIENCER, *Mary* in example (25) undergoes a change of state in a concrete emotional episode. As I have shown in earlier research (Kailuweit 2005b, 2013), the feature-value-cluster of this type of EXPERIENCER corresponds to $[-c +m +r]$. The macrorole assignment follows straightforwardly:

- (26) frighten (Mary, Bill's owning a gun)
 (Mary $[-c +m +r]$ EXP = -2 $\Rightarrow$ undergoer, Bill's owning a gun $[+c -m -r]$ COR+CAU = 4 $\Rightarrow$ actor)

Note that in the RRRG-approach *frighten*(x, y) is not a logical structure. The list of arguments in *frighten*(x, y) is not a syntactically ordered list. Semantics constitutes the hierarchy of the arguments, not syntax.

Causative activities such as (2), repeated for convenience as (27), are slightly different. Their CAUSER-argument is a prototypical actor bearing the feature-value-cluster $[+c +m -r]$. The CAUSEE-argument seems to be what Rozwadowska (1988) calls an affected AGENT bearing actor- and undergoer-features. Nonetheless, *the ball* can be classified as a non-animate object. Hence, the value for the $[m]$ -feature is $[-]$. The only applicable actor-feature is $[c]$. From a logical point of view, inanimate moving objects have no control over their movements, but their physical properties are, to a certain extent, responsible for the way in which they move. We can bounce a ball around the room, but not a stone or a table. This fact licenses the attribution of a $[\pm]$ value to the $[c]$ -feature. The *room* as a location-argument is represented by the cluster $[-c -m -r]$. Notice that in the non-causative construction the *ball* is not affected. Due to a feature-value cluster of $[\pm c -m -r]$, the activity degree is 2. Hence, *ball* is more active than *room* and will be selected as actor.

- (27) The girl bounced the ball around the room. (causative activity)
 bounce (girl, ball, room)
 (girl $[+c+m-r] = 6 \Rightarrow$ actor, ball $[\pm c -m +r] = -2 \Rightarrow$ undergoer, room $[-c -m -r] = 0$)
- (28) The ball bounced around the room.
 (ball $[\pm c -m -r] = 2 \Rightarrow$ actor, room $[-c -m -r] = 0$)

non-experiencer argument, the CORRELATE. In addition, they also denote the emotional state in its temporal extension as the parallel mental state of awareness of the CORRELATE. Therefore, they do not properly fit into any of the Vendler-Dowty classes of *Aktionsart* (Kailuweit 2015).

3.2 Non-Causative Three-Place Predicates Revisited

Non-causative three-place predicates show the following activity contrasts. Verbs of talking attribute the thematic relations SPEAKER, ADDRESSEE, and TOPIC OF CONVERSATION to their arguments. The SPEAKER controls his or her activity without being a CAUSER, so the value for [c] will be $\pm$ and the cluster is $[\pm c +m -r]$. The ADDRESSEE is supposed to hear the talking $[+m]$ but not to be specifically affected $[-r]$. Hearing somebody talk is not a controlled activity $[-c]$. Notice that talking does not imply controlled listening: we are not always listening to someone who is talking to us. Hence, the cluster for the ADDRESSEE is $[-c +m -r]$. Finally, the TOPIC OF CONVERSATION as a state of affairs corresponds to the non-causative CORRELATE of verbs of emotion bearing a neutral cluster $[-c -m -r]$. Thus, the SPEAKER is the most active argument, followed by the ADDRESSEE. Prototypically, a dative is assigned to an argument showing a middle degree of activity. French *parler* corroborates this rule:

- (29) J' ai parlé à ma mère de notre nouvelle vie
 I have-PRS.1SG talk-PTCP to my mother about our new life
 'I have talked to my mother about our new life.'
 (FRANTEXT: MOTHERLAND, H.)

- (30) parler (1sg, mother, new life)
 1sg $[\pm c +m -r] = 4 \Rightarrow$ actor, mother $[-c +m -r] = 2 =$ Dat, new life $[-c -m -r] = 0$.

In Kailuweit (2005b), I describe Romance verbs of envy as a non-causative class of verbs of emotion. Their EXPERIENCER is rather active as the EXPERIENCER of *love* or *hate* is, expressing a subjective judgment.¹⁰ This fact is coded by a value $\pm$ for [c] yielding the cluster $[\pm c +m -r]$. The other two arguments correspond to the CORRELATE and to a role, which I introduced with the label POINT OF REFERENCE. This thematic relation corresponds to the one Pesetsky (1995) named, rather obscurely in my opinion, a SUBJECT MATTER OF EMOTION. The POINT OF REFERENCE appears as the non-EXPERIENCER argument of *to fear for somebody*. Notice that the CORRELATE of your anxiety is not the person you fear for, but the fact that this person is in danger. Hence, the CORRELATE is unexpressed with *to fear for*, but combines with the POINT OF REFERENCE, i.e. the OBJECT OF ENVY, for three-place verbs of envy. The POINT OF REFERENCE is represented by the feature-value-cluster $[-c \pm m -r]$. The CORRELATE is the most passive argument and assumes the undergoer macrorole. The activity clusters for French *envier* ('envy') are given under (31), where I repeat example (4) in a modified version:

¹⁰ In standard RRG, this EXPERIENCER is called an EMOTER.

- (31) ...Paul lui enviait cette belle figure creuse
 Paul DAT.3SG envie-PST.IMPF 3SG this pretty face haggard
 'Paul envied him for this pretty haggard face.'
 (Paul [$\pm c$ $+m$ $-r$]EXP = 4 $\Rightarrow$ actor, pretty face [$-c$ $-m$ $-r$]COR = 0 $\Rightarrow$ undergoer,
 DAT.3SG [$-c$ $\pm m$ $-r$]POR = 1)

Again, the argument of a middle degree of activity receives the dative.

3.3 Non-Causative Two-Place Object experiencer Predicates Revisited

As far as non-causative two-place object EXPERIENCER verbs are concerned, the activity degree of the EXPERIENCER is decisive. With episodic emotions, the emotional state begins at the moment the CORRELATE is perceived. The EXPERIENCER undergoes an uncontrollable change in his or her emotional state, although she or he does not consider the CORRELATE the CAUSER of the emotion. According to the proposal in Kailuweit (2005b, 2013), the difference between causative (e.g. *frighten*, see example (25) above) and non-causative transitive OE-verbs should be coded at the CORRELATE. I consider the activity degree of the experience the same in both constructions. The EXPERIENCER undergoing a change of state in a concrete emotional episode corresponds to a feature-value-cluster [$-c$ $+m$ $+r$]. Hence, the macrorole assignment follows straightforwardly for both classes of episodic accusative-EXPERIENCER predicates.

- (32) causative OE-verbs, e.g. *frighten* (x, y)
 ([$-c$ $+m$ $+r$]EXP = -2 $\Rightarrow$ undergoer, [$+c$ $-m$ $-r$]COR+CAU = 4 $\Rightarrow$ actor)
 (33) non-causative OE-verbs, e.g. *interest* (x, y)
 ([$-c$ $+m$ $+r$]EXP = -2 $\Rightarrow$ undergoer, [$-c$ $-m$ $-r$]COR = 0 $\Rightarrow$ actor)

For causative OE-verbs there is a considerable difference in activity between the CORRELATE perceived as the CAUSER of the emotion and the EXPERIENCER undergoing a change in his or her emotional state. For non-causative OE-verbs the CORRELATE is still the most active argument. Therefore, the CORRELATE receives the actor macrorole. However, there is only a slight contrast in activity between the two arguments. In Kailuweit (2015), I argue that this fact explains the well-known psych-properties of transitive OE-verbs (Belletti & Rizzi 1988, Landau 2009).¹¹ My claim is that psych-properties prototypically appear with non-causative transitive OE-verbs.

¹¹ Bouchard (1995) refuted Belletti & Rizzi's (1988) psych-properties one by one. However, he adduced causative OE-verbs as counter-evidence. What makes things puzzling is the fact that causative and non-causative OE-verbs do not form two clear-cut classes, but rather a continuum around prototypes such as *frighten* at the causative pole and *interest* at the non-causative pole (Kailuweit 2005, 2015 for a discussion of Spanish and Italian data).

3.4 Verbs of Motion Revisited

Finally, yet significantly, the activity hierarchy could help readjust the description of transitive verbs of motion. We have seen that standard RRG would fail to predict the undergoer selection of *run* with a DISTANCE-argument and a GOAL-argument. In addition, there is no description of variation shown for the locative argument of *climb*. Finally, macrorole assignment for transitive *reach* remains unclear, if we consider *reach* an achievement. I repeat the examples (16), (18), and (19) for convenience:

- (34) a. Chris climbed Mont Blanc.
 b. Chris climbed up Mont Blanc.
 (35) Chris ran two miles to the park.
 (36) The climbers reached the summit.

Starting from the frame-analysis of motion events by Talmy (1985), we could distinguish the following components (Choi 2009: 170). Since DISTANCE is a relevant participant in our examples, it should be added to the list:

MOTION	presence of motion
FIGURE	the moving object
GROUND	the reference object
PATH	the course followed by the Figure object with respect to the GROUND object.
DISTANCE	PATH length covered by the MOVER

Table 3: Components of Non-Causative Motion Events

One idea to deal with the difference between the two versions of *climb* could be substituting the *Gestalt* psychology conception of ‘ground’ – opposed to ‘figure’ – with a more specific participant role corresponding to the motion event:

- (37) GROUND: The material basis in or on which the motion takes place.

The thematic relations realizing these four participant roles with specific predicates may correspond to three different degrees of activity. The most active argument is the ‘figure’, or in more specific terms, the MOVER with a feature-value-cluster $[\pm c -m -r]$ as we have already seen for the MOVER-argument of the non-causative construction of *bounce*. If the MOVER is animate, controlling the movement, the cluster is $[\pm c +m -r]$.

I propose a passive cluster for the DISTANCE argument $[-c -m \pm r]$. The reason to attribute a $\pm$ value of the feature $[r]$ to the DISTANCE-argument lies in its incrementality. In line with

Dowty (1991), I consider incrementality an undergoer property. If we like to put it like this, the DISTANCE is metaphorically “consumed” the more the motion proceeds.

In between the two lies the activity degree of the PATH-argument. The PATH as a LOCATION neither controls the movement, nor is it affected by it. Therefore, the PATH-argument shows a neutral degree of activity corresponding to the cluster $[-c -m -r]$.

Should we consider the GROUND to be different from a LOCATION with a neutral cluster $[-c -m -r]$? Actually, we could ponder a more passive feature-value-cluster $[-c -m \pm r]$, in fact, the same we attributed to the DISTANCE-argument. The GROUND is at least to some extent affected by the motion: WALKERS, RUNNERS, RIDERS, or BIKERS leave traces on the GROUND they are moving on. Even SWIMMERS produce waves in the water they swim through. Yet still, the stairs we step on undergo usual wear and tear. We might code this less prototypical affectedness – if we compare it to objects that a specific activity consumes or destroys – by the $\pm$ value of the feature $[r]$.

However, from a semantic point of view, this does not seem to be the right solution. Applied to our examples, the difference between *climb Mont Blanc* and *climb up Mont Blanc* does not consist in the considerable impairment of the mountain’s landscape by the act of climbing. It is the completion of the action that comes into play, and to an extent, an inversion of ‘figure’ and ‘ground’. The climbers are no longer the ‘figure’ that appears on the mountain as a ‘ground’, but the mountain seems to be the ‘figure’ situated in the trophy collections of the climbers.

As a consequence, I propose that the motion scenario includes a participant role that I will call the TARGET. The TARGET does not undergo a physical change of LOCATION or state, but when it is achieved it falls into the MOVERS domain. It is inscribed, so to speak, into the MOVERS logbook. Hence, an appropriate feature-value-cluster would be $[-c -m \pm r]$. Note that the cluster is identical for DISTANCE and TARGET. In the end, both types of arguments belong to the same incremental process. While the DISTANCE describes the precise length of the PATH covered by the motion, the TARGET focuses on the endpoint of this incremental process. Dowty (1991) pointed out that it is not the MOVER who undergoes an incremental process, but the PATH. This seems to be correct, but it is not the PATH as an external LOCATION that is affected, but the subjective PATH appropriated by the MOVERS. While the DISTANCE from the mountain hut the climber starts from, to the summit of Mont Blanc remains objectively the same and could be covered by other climbers, the climber who has climbed Mont Blanc has incorporated this DISTANCE in an incremental way.

If we apply the set of activity clusters determined for verbs of motion to our examples, macrorole assignment and linking seem to follow straightforwardly:

- (38) a. Chris climbed Mont Blanc.
 Chris $[\pm c +m -r] = 4 \Rightarrow$ actor, Mont Blanc $[-c -m \pm r] = -2 \Rightarrow$ undergoer
- b. Chris climbed up Mont Blanc.
 Chris $[\pm c +m -r] = 4 \Rightarrow$ actor, Mont Blanc $[-c -m -r] = 0$
- (39) Chris ran two miles to the park.
 Chris $[\pm c +m -r] = 4 \Rightarrow$ actor, two miles $[-c -m \pm r] = -2 \Rightarrow$ undergoer, park $[-c -m -r] = 0$
- (40) The climbers reached the summit.
 climbers $[\pm c +m -r] = 4 \Rightarrow$ actor, summit $[-c -m \pm r] = -2 \Rightarrow$ undergoer

Note that there is no difference in the activity clusters between transitive *climb* and *reach*. *Reach* selects a TARGET argument as transitive *climb* does. In my opinion, there is no evidence against an incremental interpretation of the state of affairs denoted by *reach*. The verb implies an unspecific directed motion covering path distance.¹² Therefore, *reach* combines perfectly with *in x time* adverbials.

- (41) a. The climbers reached the summit in five hours.
 b. Peter reached the conference room in 10 minutes.

There is still an unsolved problem concerning the varying auxiliary selection of Italian verbs of motion such as *correre* ('run') or *slittare* ('slide'). Fundamentally, motion has to be distinguished from change of LOCATION. A theme-argument undergoing change of LOCATION corresponds to the cluster $[-c -m +r]$. At the lexical level, the prototypical verb of change of LOCATION that does not combine with adverbs such as *deliberately* is *arrive*.

The activity hierarchy approach would explain the varying auxiliary selection of Italian *slittare* ('slide') as a mismatch of the lexical and the constructional level. At the lexical level, *slittare* is a verb of motion focusing on the manner of motion. Only if the verb *slittare* is constructed with a GOAL-argument can it become an active accomplishment denoting a change of LOCATION. The constructional schema overrides the activity degree of the MOVER that becomes an argument undergoing a change of location ($[\pm c +m -r] \Rightarrow [-c -m +r]$).

However, such an approach has consequences for the interpretation of *Chris ran two miles to the park*. If we consider *run* in this construction a three-place predicate denoting a change of LOCATION, then macrorole assignment and linking would clash. *Chris* ($[\pm c +m -r] \Rightarrow [-c -m +r] = -4$) would be the most passive argument and therefore the first choice for undergoer,

¹² This is not surprising from an etymological point of view. The etymology of *reach* is "stretch out, extend" (in various lit. and fig. uses). OE. *ræcan* (pt. *ræhte*, *rāhte*) <http://www.oxfordreference.com>. This meaning component is not only present as a metaphor *in reach for*, but also licences the combination with *in x time* that would be ruled out for activities and achievements.

and *the park* ($[-c -m -r] = 0$) would be the most active argument and therefore the actor. Nonetheless, a closer look at the semantics reveals that *run two miles to the park* is not just a three-place version of *run to the park*. While *run to the park* focuses on the change of location, *the park* in *run two miles to the park* functions as the endpoint of the path incrementally covered by the MOVER. Hence, *the park* in *run two miles to the park* is not the third argument of *run*, but depends on the DISTANCE-argument as a specification of the path with the length of two miles.

- (42) During sports day, the two miles from the schoolyard to the park were run by each pupil.

In conclusion, *run to the park* and *run two miles to the park* are both two-place constructions. The latter is a motion construction with a DISTANCE-argument, the former a change of location construction with a GOAL-argument.

4 Conclusion and Outlook

In this paper, I have shown that the activity hierarchy is a powerful tool that helps to solve difficult cases of macrorole assignment where RRG's actor-undergoer hierarchy hits its limits. On the one hand, the activity hierarchy allows for a finer grained semantic analysis. On the other hand, it is less complex, avoiding questions of syntactic order and even temporality in the process of macrorole assignment. Starting from a set of two actor features and one undergoer feature, the hierarchy brings into play semantic criteria that have dominated the discussion on generalized semantic roles in the last decades. The semantic analysis of different verb classes starts from a holistic approach to human communication in line with Van Valin's (1980: 229) claim in the early days of RRG. The activity degrees of different participants in a specific state of affairs are determined by interpretation, but not in an arbitrary way. They are not always based on morpho-syntactic tests. However, the tests that motivate the *Aktionsart* classification in RRG might not falsify the assumed feature-value clusters. Hence, the clusters are as objective as the logical structures in RRG, but allow for a sufficient number of activity degrees to describe the macrorole assignment in complex verb classes.

In the present paper, I dealt with 11 different feature-value clusters (out of 27) and 7 different activity degrees (out of 11). The following table summarizes the results.

Note that the participant roles listed in the third column have no theoretical states. In this respect, the activity hierarchy does not differ from the actor-undergoer hierarchy. In the fourth column, examples of English verbs are given restricted to the verb classes discussed in this paper.

[+c +m -r]	6	AGENT-CAUSER	bounce (x, y, z), interest (x, y, z)
[+c -m -r]	4	INANIMATE CAUSER	frighten (x, ...)
[±c +m -r]	4	CONTROLLING MOVER/SPEAKER/EMOTER	talk (x, ...), climb, love(x, ...)
[c -m -r]	2	INANIMATE MOVER	bounce(x, y)
[-c +m -r]	2	ADDRESSEE	talk(... y ...)
[-c ±m -r]	1	POINT OF REFERENCE OF EMOTIONS	fear for (... y)
[-c -m -r]	0	LOCATION/PATH/CORRELATE OF EMOTIONS/TOPIC OF CONVERSATION	run (... y), interest (x, y), talk (... y)
[-c -m ±r]	-2	DISTANCE/TARGET	run (... y), climb (... y) 2MR
[±c -m +r]	-2	AFFECTED MOVER	bounce (x, y, z)
[-c +m +r]	-2	AFFECTED EXPERIENCER	interest (x, y)
[-c -m +r]	-4	PATIENT (undergoing a change of state)/THEME (undergoing a change of location)	arrive (... y)

Table 4: Activity Hierarchy of Arguments of Selected Predicates.

Further research will have to show whether the activity hierarchy is able to describe a broad field of verb classes in a satisfying way. In RRRG as a more radical version of RRG (Kailuweit 2013), the activity hierarchy would replace the actor-undergoer hierarchy. However, RRRG does not aim to be a completely new theory. It is a project of theory building that – deeply inspired by the work of RRG’s founder, Robert Van Valin – will eventually develop into an independent version of RRG, or just give an impulse to people working in the RRG framework to remodel central parts of the theory, e.g. the formalism of semantic representation and the mechanisms of macrorole assignment.

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