Operator, information

Revisiting the operator projection in RRG, with special emphasis on tense, aspect, and finiteness

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Operator, information

In case you wondered about the title...
SYNOPSIS

- Operators: an evolutionary approach
- Operator projections: implications
- Unified theories of TAM
- The proper treatment of TAM in RRG
- Summary
Operators in RRG

“Grammatical categories like aspect, tense and modality are treated as operators modifying different layers of the clause. (...) No language need have all of these operators as grammatical categories; for example, English, unlike Kewa and Quechua, does not have evidentials as a grammatical category. The only operators which every language has are illocutionary force and negation.” (Van Valin 2005: 8-9)

Table 1.1. Operators in the layered structure of the clause (Van Valin 2005: 9)
operator projections in RRG

“Johnson (1987) proposed a formalization of the layered structure of the clause in which predicates and their arguments are represented in a distinct projection from the one representing operators. This formalization he termed a ‘projection grammar’. “ (Van Valin 2005: 12)

Figure 1.1. Layered structure of the clause with constituent and operator projections (Van Valin 2005: 12)
my goals today

- try and sketch a model that predicts from first principles
  - what operators are (and what they are not)
    - in other words, what expressions are entitled to operator projection placement
  - what layers operators operate on
- against this backdrop, propose revisions that
  - incorporate into RRG the consensus model on tense-aspect semantics that emerged in the 1990s
  - introduce to the theory the flexibility needed to deal with the relevant phenomena in tenseless languages
previous classifications: Hockett 1956

**Figure 1.2.** Hockett’s (1956: 264-265) taxonomy of operators (or ‘functors’)

- **Functors**
- **Substitutes**
  ≈ indexicals, shifters
- **Markers**
  Function words other than ‘substitutes’
- **Inflectional affixes**
- ‘Governing’, i.e., category-changing derivational affixes
previous classifications: Hengeveld 1989

Table 1.2. Hengeveld’s (1989: 131-132) classification of operators in Functional Grammar

Operators (positions)

\[ (E_1 : \pi_1 \text{ILL} (S) (A) (\pi_3 X_i : [\text{proposition}] (X_i))) (E_1) \]
\[ (\pi_2 e_1 : [\pi_1 \text{Pred}_p (x_1) (x_2) \ldots (x_n)] (e_1)) \]

\( \pi_1 \): predicate operators  \( \pi_3 \): proposition operators

\( \pi_2 \): predication operators  \( \pi_4 \): illocution operators

(i) **Predicate operators** capture the grammatical means which specify additional properties of the set of SoAs designated by a bare predication.

(ii) **Predication operators** capture the grammatical means which locate the SoAs designated by a predication in a real or imaginary world and thus restrict the set of potential referents of the predication to the external situation(s) the speaker has in mind.

(iii) **Proposition operators** capture the grammatical means through which the speaker specifies his attitude towards the (truth of the) proposition he puts forward for consideration.

(iv) **Ilocution operators** capture the grammatical means through which the speaker modifies the force of the basic illocution of a linguistic expression so as to make it fit his communicative strategy.

<table>
<thead>
<tr>
<th>Semantic domain</th>
<th>Grammatical category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predicate operators</strong></td>
<td></td>
</tr>
<tr>
<td>Internal temporal constituency</td>
<td>Imperfective/Perfective, Phasal Aspect</td>
</tr>
<tr>
<td>Presence or absence of property or relation expressed by predicate</td>
<td>Predicate negation</td>
</tr>
<tr>
<td><strong>Predication operators</strong></td>
<td></td>
</tr>
<tr>
<td>Time of occurrence</td>
<td>Tense</td>
</tr>
<tr>
<td>Frequency of occurrence</td>
<td>Quantificational Aspect</td>
</tr>
<tr>
<td>Actuality of occurrence</td>
<td>Objective mood/Polarity</td>
</tr>
<tr>
<td><strong>Proposition operators</strong></td>
<td></td>
</tr>
<tr>
<td>Source of proposition</td>
<td>Evidential mood</td>
</tr>
<tr>
<td>Commitment to proposition</td>
<td>Subjective mood</td>
</tr>
<tr>
<td><strong>Ilocution operators</strong></td>
<td></td>
</tr>
<tr>
<td>Weakening strategy</td>
<td>Mitigating mode</td>
</tr>
<tr>
<td>Strengthening strategy</td>
<td>Reinforcing mode</td>
</tr>
</tbody>
</table>
previous classifications: mainstream Generative Grammar

Figure 1.3. Proposed universal syntactic hierarchies of functional elements (Rizzi & Cinque 2016: 146-154)
previous classifications: Cann 2000

- functional categories can be defined in terms of language-specific distributional classes
- vis-à-vis the major lexical categories V, N, A
  - which Cann assumes to be universal

**Figure 1.4.** Lattice representing a taxonomy of nominal functional categories of English defined in terms of distributional classes (Cann 2000: 18)
previous classifications: Muysken 2008

Figure 1.5. “Crude sub-classification of functional categories” (Muysken 2008: 16)

<table>
<thead>
<tr>
<th></th>
<th>Shifters</th>
<th>Linkers</th>
<th>Projectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determiners</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Person agreement</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Tense markers</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Modals</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Pronouns</td>
<td>+</td>
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</tr>
<tr>
<td>Demonstratives</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question words</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantifiers</td>
<td>+</td>
<td></td>
<td></td>
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<tr>
<td>Prepositions</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Conjunctions</td>
<td></td>
<td>+</td>
<td></td>
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<tr>
<td>Complementisers</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Connectives and particles</td>
<td></td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>
toward a new classification

**Figure 1.6.** A taxonomy of natural language expressions, with special emphasis on the classification of operators

- **Linguistic expressions**
  - Participating in the combinatorial system
  - Combinatorially inert
  - Lexical items: members of major lexical categories
  - Operators
    - Clause-internal e.g., ideophones
    - Clause-external e.g., interjections
  - Placeholders e.g., pro-forms; pronominal demonstratives; cross-reference markers
  - Relators e.g., lexical adpositions and case markers; connectives;
  - Functors e.g., negation; "quantifiers" (i.e., determiners and pro-forms with quantificational meanings); modals; numerals; mensuratives
  - Restrictors e.g., articles; tense; viewpoint aspect; mood; voice; complementizers; structural case; gender / noun class; number; classifiers; evidentials; focus and discourse particles
the rationale behind the classification of operators

Table 1.3. Distinctive properties of the operator types (communicative function is treated as definitional, ‘information status’ as criterial/diagnostic; the remaining properties are hypothetical explananda of the account)

<table>
<thead>
<tr>
<th>Primary communicative function</th>
<th>Placeholders</th>
<th>Functors and relators</th>
<th>Restrictors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples</td>
<td>Pro-forms; pronominal demonstratives; cross-reference markers</td>
<td>Lexical adpositions and case markers; connectives; negation; “quantifiers” (i.e., determiners and pro-forms with quantificational meanings); modals; numerals; mensuratives</td>
<td>Articles; tense; viewpoint aspect; mood; evidentials; voice; complementizers; structural case; gender / noun class; number; classifiers; focus and discourse particles; honorifics</td>
</tr>
<tr>
<td>Information status</td>
<td>Referent may be at-issue content; search domain and existence of referent are necessarily backgrounded</td>
<td>May express at-issue content depending on where they appear in the utterance</td>
<td>Necessarily backgrounded</td>
</tr>
<tr>
<td>Grammaticalization</td>
<td>Weak (depending on form class)</td>
<td>Weak (depending on form class)</td>
<td>Strong (depending on form class)</td>
</tr>
<tr>
<td>Typologically variation in grammaticalization</td>
<td>Intermediate</td>
<td>Weak (numerous near-universals)</td>
<td>Strong</td>
</tr>
</tbody>
</table>
the rationale behind the classification of operators (cont.)

functors and relators express part of the speaker’s communicative intent

the reason they’re not members of the major lexical categories is their combinatorial properties

reflected in their semantic types

Table 1.4. Standard-issue extensional Montegovan type system for English sans events/situations
placeholders represent referents that are part of the speaker’s intended message

and thus potentially at-issue content

however, their *semantic* meanings are “search domains” that do not form part of the intended message

and are necessarily backgrounded (Kaplan 1989; Bohnemeyer 2015)

(1.1) [Looking at the faculty page of UB Linguistics: Q: Who is the guy who started RRG? - A, pointing at RVV’s pic:]

*THIS* is / *the founder of RRG / Robert Van Valin / Van*

at-issue content: the pic pointed to shows RVV, (one of) the founder(s) of RRG

backgrounded: the pic in question is being drawn selected attention to by the combination of the pointing gesture and the demonstrative
the rationale behind the classification of operators (cont.)

- restrictors do not express any part of the speaker’s intended message
  - their expression is instead generally compelled by the grammar
  - and they arguably serve to facilitate comprehension by reducing ambiguities

- simple illustration: gender

(1.2) Floyd\textsubscript{i} encontró a Sally\textsubscript{j} enojos-o\textsubscript{i}/-a\textsubscript{j}  
SPA Floyd encountered Sally annoyed-M.SG/-F.SG  
‘Floyd\textsubscript{i} found Sally\textsubscript{j} annoyed\textsubscript{i}/\textsubscript{j}’ [constructed]
the rationale behind the classification of operators (cont.)

- a more complex example: tense

(1.3) [Q: What happened at Sheila’s party last Friday?]
   A: Sam got drunk [constructed after Partee 1984: 245]

- the past tense in (1.3) is not informative
  - it merely introduces a presupposition to the effect that the utterance concerns a specific past **topic time**

**Topic time** (Klein 1994): Every utterance, with the exception of generics, makes an assertion or asks a question or issues a command (etc.) about a specific situation. The utterance’s **topic time** is the time of that situation.
the rationale behind the classification of operators (cont.)

- this presupposition serves as a coherence device

(1.4) *Sheila had a party last Friday and Sam got drunk*  
(Partee 1984: 245)

(1.5) John got up, went to the window, and raised the blind.  
\[ e_1 \quad e_2 \quad e_3 \]
It was light out. He pulled the blind down and went back to bed.  
\[ s_1 \quad e_4 \quad e_5 \]
He wasn’t ready to face the day. He was too depressed.  
\[ s_2 \quad s_3 \]

(Partee 1984: 254)

The topic time of an utterance is distinct from the *situation/event times* of the lexical event descriptors it might contain. For example, the topic times of (1.5) are properly contained in the situation times of the stative clauses.
the rationale behind the classification of operators (cont.)

- the topic time presuppositions of tenses are analogous to the antecedent presuppositions of pronouns
  - Partee (1973, 1984); Kratzer 1998; *inter alia*

- the temporal relation expressed by the tense marker *constrains* this topic time

- the way a pronoun’s gender constrains its referent
can tenses express at-issue content? - nope!

(1.6) [Q: Has Floyd finished his paper on operators? - A: No, but] he WILL finish it! [constructed (duh!)]

stress on the auxiliary marks verum “focus” in (1.6)

which is arguably not focus at all, but a *sui-generis* operator that bridges between (1.6) and its QuD

- cf. Gutzmann et al (ms.)

the content of tense morphemes is necessarily backgrounded

- it cannot be focalized and can never be at-issue content
are the differences between the operator types categorical?

- I doubt it!

- my assumption is that there are three continua

**Figure 1.7.** Graded transitions between operator types
example: numeral classifiers

- Yucatec has three ‘inherent-state’ (Berlin 1968) numeral classifiers
  - which divide the entire nominal domain exhaustively into
    - humans and (higher) animals (*túul*)
    - living plants, mushrooms, and hair (*kúul*)
    - inanimates (*p’éeel*)
  - these never express at-issue content

(1.7) Ts’a’ tèen **hun-p’éeel/#mòok** su’m! give(IMP) me one-CL.IN/CL.knot rope ‘Give me a rope!’ [constructed]
example: numeral classifiers (cont.)

however, in addition, Yucatec and other Mayan languages have a large form class

of ‘temporary state classifiers’ (Berlin 1968) which appear in the same morphological position

these are non-redundant and primarily used predicatively

(1.8) Le=su’m=o’ ka’-mòok yàan-ik.
DEF=rope=D2 two-CL.knot EXIST-EF(B3SG)
‘The rope, it is two-knotted (i.e., there are two knots in it).’ [elicited]

tentatively, on the proposed classification

inherent-state classifiers are restrictors

temporary-state classifiers are functors
an evolutionary model of the grammaticalization of restrictors

**Figure 1.8.** The grammaticalization of restrictors as an evolutionary process
what the evolutionary model is meant to explain

- restrictors show strong evidence of grammaticalization
  - out of sources that belong to distinct categories: lexical items, functors/relators, or other restrictors
  - unlike the other three types of operators
- there is an enormous amount of crosslinguistic variation in the presence of particular restrictor types
  - unlike in the case of the other three types of operators
- several semantic functor/restrictor types actually appear to be expressed nearly universally
  - e.g., negation, quantification
evidence for cross-linguistic variation: WALS

Figure 1.9. Distribution of definiteness markers in WALS (Dryer 2013)
evidence for cross-linguistic variation: WALS (cont.)

Figure 1.10. Distribution of past tense markers in WALS (Dahl & Velupillai 2013)
evidence for cross-linguistic variation: WALS (cont.)

Figure 1.11. Distribution of gender/noun class markers in WALS (Corbett 2013)
evidence for cross-linguistic variation: WALS (cont.)

Figure 1.12. Gender marking in independent pronouns in WALS (Siewierska 2013)
SYNOPSIS

- Operators: an evolutionary approach
- Operator projections: implications
- Unified theories of TAM
- The proper treatment of TAM in RRG
- The case for finiteness
- Summary
OPERATOR PROJECTIONS: IMPLICATIONS

- What you see is what you get
  - What you don’t see isn’t there
    - unless it’s defined by contrast
  - the evolutionary model severely restricts the possibility space for null operators - especially null restrictors
- considerable language-specificity in what is expressed
  - again, especially when it comes to restrictors

Abbreviations: CP for constituent projections; OP for operator projections.
grammaticalization of restrictors is arguably the primary piece of evidence motivating the existence of OPs

- functors/relators and placeholders can be assigned traditional semantic types
  - suggesting they participate in the ordinary combinatorial system, i.e., are CP constituents

- it is specifically the grammaticalization of restrictors that creates mismatches
  - between where restrictor morphemes appear in the surface structure

  - and where they enter the semantic composition
what can we gain from OPs?

- possibly, a compositional semantics of operators directly working off the OP

- which would simplify the analysis of sentence meaning enormously!
SYNOPSIS

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UNIFIED THEORIES OF TAM

  - among ‘speech point’, ‘event point’, and ‘reference point’
  - decomposing Reichenbach’s ternary relations into pairs of binary relations
- Klein (1992, 1994): neo-Reichenbachian theory reinterpreting reference time as **topic time**
  - and extending the theory to cover **viewpoint aspect**
UNIFIED THEORIES OF TAM (CONT.)

terminological intermezzo

**Situation aspect** (Smith 1991): the temporal properties of a situation type as described by lexical event descriptors and their syntactic projections.

**Viewpoint aspect** (Smith 1991): the temporal perspective an utterance takes on a described particular (except for habitual and generic reference) situation. Alternative terms in the literature include ‘grammatical aspect’ and ‘propositional aspect’ (both of which are awful).

the terms ‘situation aspect’, ‘lexical aspect’, and ‘aktionsart’ are commonly treated as synonymous - **not so here!**

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**Figure 3.1. Aspectual properties and operators - a taxonomy**

Actually the original meaning of the term! (Agrell 1908)
“By ‘aktionsart’ I mean … not the two main categories of the slavic verb, the incomplete and complete action forms (the imperfective and perfective) - these I call ‘aspects’. With the term ‘aktionsart’ I designate semantic functions of the complex verbs (and a few base forms and suffixal formations) which specify further how the action is conducted, the manner of its execution. These have heretofore received little attention, let alone been classified.” (Agrell 1908: 78; translation JB)

**Figure 3.2. Sigurd Agrell**

(1881-1937) (source: Wikipedia)
Klein’s big idea, Part I

viewpoint aspect can be understood in terms of temporal relations between topic time and situation time

it’s this relation that defines the aspectual perspective

and it’s topic time that defines the viewpoint

(3.1)[Context: investigator eliciting witness testimony]

a. What did you notice when you entered the room?

b. A man was lying on the floor.

c. He was Chinese or Japanese.

d. He did not move.

e. A woman was bending over him.

f. She was taking a purse from his pocket.

g. She turned to me. (Klein 1994: 39-40)

Figure 3.3. Diagramming the temporal structure of (3.1)
Klein’s big idea, Part II

- since viewpoint aspect already relates topic time to situation time
  - tense does not need to access situation time at all
  - instead, it relates topic time to utterance time
    - this makes the correct predictions for state descriptions (e.g., (2.1.c-d))

**Table 3.1.** Klein’s (1994) analysis of the English tense-aspect system (key: \( t_{\text{top}} \) - topic time (projection range); \( \tau(e) \) - situation time (the runtime of the described eventuality); \( t_u \) - utterance time)

<table>
<thead>
<tr>
<th>Tense Relation Aspect Relation</th>
<th>Past ( t_{\text{top}} &lt; t_u )</th>
<th>Present ( t_u \subset t_{\text{top}} )</th>
<th>Future ( t_u &lt; t_{\text{top}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect ( \tau(e) \subseteq t_{\text{top}} )</td>
<td>Simple Past ( I \text{ wrote} )</td>
<td>Present ( I \text{ write} )</td>
<td>Simple Future ( I \text{ will write} )</td>
</tr>
<tr>
<td>Imperfective ( t_{\text{top}} \subset \tau(e) )</td>
<td>Past Progressive ( I \text{ was writing} )</td>
<td>Present Progressive ( I \text{ am writing} )</td>
<td>Future Progressive ( I \text{ will be writing} )</td>
</tr>
<tr>
<td>Perfect ( \tau(e) &lt; t_{\text{top}} )</td>
<td>Pluperfect ( I \text{ had written} )</td>
<td>Present Perfect ( I \text{ have written} )</td>
<td>Future Perfect ( I \text{ will have written} )</td>
</tr>
<tr>
<td>Prospective ( t_{\text{top}} &lt; \tau(e) )</td>
<td>Past Prospective ( I \text{ going to write} )</td>
<td>Present Prospective ( I \text{ am going to write} )</td>
<td>Future Prospective ( I \text{ will be going to write} )</td>
</tr>
</tbody>
</table>
a simpler version of these ideas had simultaneously been discovered by scholars in Discourse Representation Theory

cf. Kamp (1979); Kamp & Rohrer (1983); Kamp & Reyle (1993); Kamp et al. (2011)

differences

instead of ‘topic time’, the DRT tradition adopted an anaphoric version of Reichenbach’s ‘reference point’

the treatment of aspect is reduced

to a distinction between ‘event reference’ (= perfective) and ‘state reference’ (= imperfective)
the DRT approach has dominated the treatment of tense and aspect in dynamic semantics

while Klein’s approach has been widely adopted in non-dynamic work in formal semantics

e.g., Arche (2013); Bohnemeyer (2014); Bohnemeyer and Swift (2004); Demirdache and Uribe-Etxebarria (2004, 2007); Stowell (2007)
some expansions

- Bohnemeyer (2014): on typological grounds, true relative/anaphoric tenses exist
  - and have semantic properties distinct from those of viewpoint aspects

- Bohnemeyer (in press), Cable (2013): temporal remoteness markers (a.k.a. ‘metrical’ tenses) aren’t tenses
  - or at least not in all languages
  - their semantics seems to be closer to that of aspects

- Bohnemeyer (2012, 2016): the semantics of mood markers (subjunctive/irrealis) can likewise be expressed
  - in terms of temporal relations b/w situation time and topic time