FORMALIZING FUNCTIONALISM: A SCHEMATIZATION-BASED LINKING THEORY

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1. Introduction

It has long been realized that languages exhibit regularities in the mapping between a verb’s semantic roles and their syntactic functions. There has been a long-continued debate about how to describe those regularities parsimoniously since Fillmore’s (1968) pioneering work. Theories of this syntax-semantics interface have been referred to as linking theories.¹ These collective efforts have led to an increasing interest in verbal semantics and grammatical relations, but it is fair to say that not many linking theories are yet equipped to treat syntactically
ergative languages on a par with syntactically accusative ones (Dixon (1994: Appendix)).

The book under review provides a detailed introduction to Role and Reference Grammar [RRG], a typologically-oriented grammatical theory which was proposed originally by Foley and Van Valin [FVV] (1984) and developed further by Van Valin [VV] (1993). RRG comes in between formalist theories which hold the syntacticocentric view of grammar and extreme functionalist theories (e.g. Hopper (1987)) which attempt to reduce grammar into discourse; RRG is a monostratal theory which views syntax as an independent level of representation that may be fully understood with reference to semantics and discourse-pragmatics. An analogous, multi-dimensional view of grammar has recently been gaining ground in theoretical linguistics (e.g. Sadock (1991), Bresnan (1994), Pollard and Sag (1994), Jackendoff (1997)) and it is reasonable to think of RRG as a framework which makes a unique contribution to this trend. The most salient feature of RRG is its strong commitment to cross-linguistic applicability; its theoretical constructs are designed to apply equally well to accusative languages (e.g. English, German), ergative languages (e.g. Dyirbal, Sama), active-stative languages (e.g. Acehnese, Lakhota), and a group of languages (e.g. Tagalog) which resist this three-way classification.

The fact that RRG provides a principled account of a wide range of morphosyntactic phenomena (e.g. grammatical relations, voice alternations, case assignment, reflexivization, control constructions, extraction constructions, the interaction between syntax and information structure) each of which has been the focus of much attention in the literature over the past few decades makes it worthwhile to review Van Valin and LaPolla [VVL] (1997), since we may expect to find in it invaluable clues as to how to construct a typologically valid linking theory; examining a wide range of "exotic" languages has had a strong

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2 For example, Grimshaw (1990) and Bresnan (1994) construct their linking theories in such a way that highest-ranking theta roles (e.g. agent) are always realized as subjects. It is clear that these linking theories have difficulty in accommodating syntactically ergative languages.

3 This is why the theory is termed 'Role (= semantics)' and 'Reference (= discourse-pragmatics)' Grammar.
impact on VVL's linking theory, in particular their treatment of semantic roles and grammatical relations.

RRG has undergone empirical expansions and a number of technical revisions since FVV (1984) was published, but its theoretical underpinnings remain unchanged. VVL (1997) addresses a wide variety of topics listed in (1):

(1) a. Phrase Structure
b. Verbal Semantics
c. Grammatical Relations
d. Information Structure
e. Linking

Space limitation precludes discussion of (1a) and (1d). It is particularly regrettable that there is no space here for the RRG theory of complex sentences, since it is one of the original proposals made by RRG which have been applied to a wide range of languages. I refer the reader to Ohori (1992) and Hasegawa (1996), both of which contain a summary of the RRG theory of complex sentences and its extensive application to Japanese. It is also unfortunate that VVL's account of extraction phenomena (see also Van Valin (1995)) is beyond the scope of this review article.

The rest of this article is organized as follows. Sections 2 and 3 will provide a summary of VVL's linking theory, with a particular focus on verbal semantics and grammatical relations. Section 4 will point out a problem with VVL's treatment of these linking processes and will propose a solution to it. Conclusions will be drawn in Section 5.

2. Semantic Structure: Verbal Semantics

2.1. Lexical Decomposition

VVL (1997) bases their verbal semantics on two types of semantic representations, logical structures [LS] and semantic macroroles [SMR]. These two representations constitute the core of a verb's lexical entry in RRG. LSs are decompositional representations (i.e. paraphrasing

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5 Hansell (1993), Watters (1993), and Yang (1994) handle the clause linkage patterns in Mandarin Chinese, Turkish, and Korean, respectively.
verbal semantics in terms of a set of primitive elements in a well-defined semantic metalanguage) and consist of two major components, inherent aspect and causal relation (cf. Dowty (1979), Pinker (1989), Jackendoff (1990), Kageyama (1996)).

First, VVL’s theory of lexical decomposition is based on Vendler’s (1967) four-way classification of verbs: state, activity, achievement, and accomplishment:

<table>
<thead>
<tr>
<th>Verb Class</th>
<th>Logical Structure (LS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE</td>
<td><strong>predicate’</strong> (x) or (x, y)</td>
</tr>
<tr>
<td>ACTIVITY</td>
<td><strong>do’</strong> (x, <strong>[predicate’</strong> (x) or (x, y)])</td>
</tr>
<tr>
<td>ACHIEVEMENT</td>
<td><strong>INGR predicate’</strong> (x) or (x, y)</td>
</tr>
<tr>
<td>ACCOMPLISHMENT</td>
<td><strong>BECOME predicate’</strong> (x) or (x, y)</td>
</tr>
<tr>
<td>CAUSATIVE</td>
<td>‘P’ CAUSE ‘Q’, where ‘P’ and ‘Q’ are LSs of any type</td>
</tr>
</tbody>
</table>

VVL (1997) follows the conventions of formal semantics and present constants (normally predicates) in boldface followed by a prime and variable elements in normal typeface. The elements in boldface plus prime are part of the vocabulary of the semantic metalanguage used in the RRG decompositional analyses; they are not taken from any particular human language. This means that the same representations are used for all natural languages.

VVL (1997) defines these aspectual classes in terms of three binary features, [+static], [+telic], and [+punctual]. Each class is illustrated by a few English verbs:6

(2) a. State [+static], [-telic], [-punctual] e.g. be tough, be tall, hate, believe, belong to
b. Activity [-static], [-telic], [-punctual] e.g. walk, run, roll, swim, eat
c. Accomplishment [-static], [+telic], [-punctual] e.g. melt, freeze, dry, learn
d. Achievement [-static], [+telic], [+punctual] e.g. explode, shatter, crash, burst

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6 VVL (1997) uses a number of tests (many of which are taken from Dowty (1979)) to determine which of these classes a verb belongs to.
VVL (1997) analyzes causation in terms of events causing events (see Table 1), in contrast to Talmy (1985), Croft (1991), and Langacker (1991), all of which adopt a causal-chain model and represent causation as individuals acting on individuals.

VVL (1997) proposes to add active accomplishment to Vendler’s (1967) four-way classification in (2), on the grounds that some verbs (e.g. Italian andare ‘go’) have this as their inherent meaning and always involve motion to a goal. (3a, b) represent its subtypes:

(3) a. \( \text{do}' (x, \text{predicate}_1' (x)) \) & \text{BECOME predicate}_2' (y, x)

b. \( \text{do}' (x, \text{predicate}_1' (x, y)) \) & \text{BECOME predicate}_2' (y)

VVL (1997) introduces ’&’ as an abbreviation for ‘and then’ to represent the successive states of affairs in motion, consumption, creation, and transfer of possession. (4b) and (5b) are active accomplishments derived from the corresponding activities in (4a) and (5a):

(4) a. John ate pizza (for an hour/*in an hour).
LS: \( \text{do}' (\text{John}, [\text{eat}' (\text{John}, \text{pizza})]) \)

b. John ate the pizza (*for an hour/in an hour).
LS: \( \text{do}' (\text{John}, [\text{eat}' (\text{John}, \text{pizza})]) \) & \text{BECOME consumed}' (pizza)

(5) a. John walked (for an hour/*in an hour).
LS: \( \text{do}' (\text{John}, [\text{walk}' (\text{John})]) \)

b. John walked to the university (*for an hour/in an hour).
LS: \( \text{do}' (\text{John}, [\text{walk}' (\text{John})]) \) & \text{BECOME be-at}' (university, John)

The elements in all capitals in Table 1 are modifiers of the predicates: INGR stands for ‘ingressive’ and encodes instantaneous change, while BECOME represents change over some temporal span. States are presented as simple predicates (e.g. feel’, be-at’, dead’, open’). There is no special formal indicator that marks state verbs. On the other hand, all activity LSs contain the generalized activity predicate do’, which functions as the marker of membership in this class (e.g. do’

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7 One might wonder why we cannot replace ‘&’ with ‘CAUSE’ and include (4b) and (5b) under the rubric of causative accomplishment. One reason against this analysis is that no language with causative morphology to signal causative counterparts of non-causative verbs uses the same device to represent active accomplishment (VVL (1997: 101)).
(x, [sing' (x)]), do' (x, [run' (x)]), do' (x, [drink' (x, y)]). The other classes of LSs (i.e. achievement, accomplishment, active accomplishment, and causative) are derived from these two primitives, state and activity, as can be seen from Table 1 and (3).  

VVL (1997) goes on to postulate causative counterparts of state, activity, achievement, accomplishment, and active accomplishment and subsume them under the rubric of causative. Examples (6a–e) illustrate these five subtypes of causative verbs:

(6) a. Causative state:
   e.g. The dog frightens/scares the boy.

b. Causative activity:
   e.g. The girl bounced the ball around the room.

c. Causative accomplishment:
   e.g. The hot water melted the ice.

d. Causative achievement:
   e.g. The cat popped the balloon.

e. Causative active accomplishment:
   e.g. The captain marched the soldiers to the town.

2.2. Semantic Roles

VVL (1997) departs from FVV (1984) and VV (1993), in that they replace the familiar set of thematic relations used in FVV (1984) and VV (1993) with more verb-specific roles as illustrated in Table 2, in order to emphasize that these labels are only shorthands for particular argument slots in the decompositional representations of verbs. Table 2 uses only two types of predicates, state and activity, to define verb-specific semantic roles, since all the other predicates are derived from these primitive predicates (VVL (1997: 115)):

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8 LSs are meant only to capture syntactically relevant aspects of verbal semantics which permit the expression of significant generalizations through a set of linking principles (Pinker (1989), Levin and Rapaport Hovav (1995), Mohanan and Wee (1999); cf. Goldberg (1995)). See Kemmerer (2000, in press) for neurolinguistic evidence for distinguishing syntactically relevant meanings from syntactically irrelevant ones.
Table 2: Definitions of Semantic Roles

1. STATE VERBS

A. Single argument
1. State or condition  
   broken’ (x)  
   x=patient
2. Existence  
   exist’ (x)  
   x=entity

B. Two arguments
1. Pure location  
   be-LOC’ (x, y)  
   x=location  
   y=theme
2. Perception  
   hear’ (x, y)  
   x=perceiver  
   y=stimulus
3. Cognition  
   know’ (x, y)  
   x=cognizer  
   y=content
4. Desire  
   want’ (x, y)  
   x=wanter  
   y=desire
5. Propositional attitude  
   consider’ (x, y)  
   x=judger  
   y=judgment
6. Possession  
   have’ (x, y)  
   x=possessor  
   y=possessed
7. Internal experience  
   feel’ (x, y)  
   x=experiencer  
   y=sensation
8. Emotion  
   love’ (x, y)  
   x=emoter  
   y=target
9. Attributive/identificational  
   be’ (x, y)  
   x=attributant  
   y=attribute

2. ACTIVITY VERBS

A. Single argument
1. Unspecified action  
   do’ (x, 0)  
   x=effector
2. Motion  
   do’ (x, [walk’ (x)])  
   x=mover
3. Static motion  
   do’ (x, [spin’ (x)])  
   x=static-mover
4. Light emission  
   do’ (x, [shine’ (x)])  
   x=light-emitter
5. Sound emission  
   do’ (x, [gurgle’ (x)])  
   x=sound-emitter

B. One or two arguments
1. Performance  
   do’ (x, [sing’ (x, (y))])  
   x=performer  
   y=performance
2. Consumption  
   do’ (x, [eat’ (x, (y))])  
   x=consumer  
   y=consumed
3. Creation  
   do’ (x, [write’ (x, (y))])  
   x=creator  
   y=creation
4. Repetitive action  
   do’ (x, [tap’ (x, (y))])  
   x=effector  
   y=locus
5. Directed perception  
   do’ (x, [see’ (x, (y))])  
   x=observer  
   y=stimulus
6. Use  
   do’ (x, [use’ (x, (y))])  
   x=user  
   y=implement

2.3. Semantic Macroroles

Semantic macroroles consist of actor and undergoer. They are termed ‘macroroles,’ since each of them subsumes a number of LS arguments for morphosyntactic purposes (e.g. passivization, verb agreement). VVL (1997) claims that SMRs result from generalizations across the argument-types found with particular verbs as in (7):

\[
(7) \quad \begin{array}{ll}
\text{kill} & [\text{do’}(x, 0)] \quad \text{CAUSE} \quad [\text{BECOME} \quad \text{dead’}(y)] \\
\text{see} & \text{see’}(x, y) \\
\text{put} & [\text{do’}(x, 0)] \quad \text{CAUSE} \quad [\text{BECOME} \quad \text{be-LOC’}(y, z)] \\
\text{present} & [\text{do’}(x, 0)] \quad \text{CAUSE} \quad [\text{BECOME} \quad \text{have’}(y, z)] \\
\end{array}
\]

Actor  
Undergoer
These generalized semantic roles are prototypically the thematic relations agent and patient. They correspond to the two major arguments of a transitive verb, either one of which may act as the single argument of an intransitive verb. English happens to allow many argument-types in both the actor and undergoer categories, but other languages are much stricter. In contrast to Dowty's (1991) proto-roles, SMRs constitute a distinct level of representation in the syntax-semantics interface which morphosyntactic rules may make reference to.

It is important to emphasize at this juncture that SMRs are independent of grammatical relations. (8a, b) show that SMRs remain constant under passivization, while (8c, d) illustrate how macrorole assignments proceed in intransitive constructions:

\begin{align*}
(8) & \quad \text{a. Fred [ACTOR] broke the window [UNDERGOER].} \\
& \quad \text{b. The window [UNDERGOER] was broken by Fred [ACTOR].} \\
& \quad \text{c. Fred [UNDERGOER] died yesterday.} \\
& \quad \text{LS: BECOME \textit{dead'} (x)} \\
& \quad \text{d. Fred [ACTOR] swam in the river.} \\
& \quad \text{LS: \textit{do'} (x, [swim' (x)])}
\end{align*}

The mapping between verb-specific roles and macroroles is constrained by the Actor-Undergoer Hierarchy [AUH] and Default Macrorole Assignment Principles [DMAP]:

\begin{align*}
(9) \quad \text{Actor-Undergoer Hierarchy:}^{10} \\
\text{Actor} & \quad \text{Undergoer} \\
\text{Arg. of} & \quad \text{1st Arg. of} & \quad \text{1st Arg. of} & \quad \text{2nd Arg. of} & \quad \text{Arg. of state} \\
\text{DO} & \quad \text{\textit{do'} (x, \ldots)} & \quad \text{pred'} (x, y) & \quad \text{pred'} (x, y) & \quad \text{pred'} (x) \\
\text{Arg. of state} & \quad \text{Agent} & \quad \text{Effector} & \quad \text{Experiencer} & \quad \text{Theme} & \quad \text{Patient} & \quad \text{Locative} & \quad \text{Locus} \\
\left[\text{\rightarrow} \right] & \quad \text{increasing markedness of realization of LS argument as macrorole}
\end{align*}

9 For example, Lakhota (Siouan) and Jakaltek (Mayan) permit only (quasi-) animate arguments to serve as actors, while English allows inanimate actors such as instrumentals (VVL (1997: 143)).

10 ‘DO’ in (9) represents a volitional activity predicate.
Default Macrorole Assignment Principles:

a. Number: the number of macroroles which a verb takes is less than or equal to the number of arguments in its LS:
   1. If a verb has two or more arguments in its LS, it will take two macroroles.
   2. If a verb has one argument in its LS, it will take one macrorole.

b. Nature: for verbs which take one macrorole:
   1. If the verb has an activity predicate in its LS, the macrorole is actor.
   2. If the verb has no activity predicate in its LS, the macrorole is undergoer.

(9) is adapted from a standard thematic hierarchy and shows how likely an LS argument is to be realized as actor or undergoer. As pointed out above, VVL (1997) eliminates the traditional thematic relations (e.g. agent, experiencer, patient), but I put them back in the AUH in order to show that these thematic relations arise as generalizations over the verb-specific roles.

(10a) determines the number of macroroles when there is no prespecification about the number of macroroles which a verb takes. (10b) is designed to handle split intransitivity (Van Valin (1990); cf. Perlmutter (1978), Burzio (1986)). It states that if an intransitive verb contains an activity predicate in its LS (e.g. do’ (x, [run’ (x)]), do’ (x, [swim’ (x)])), the macrorole should be an actor; otherwise (e.g. INGR dead’ (x), BECOME NOT exist’ (x), BECOME open’ (x)), it is an undergoer.11

We may place the associations among verb-specific roles, thematic relations (as used in VV (1993)), and SMRs in the process of what VVL (1997) terms neutralization:

Three Different Levels of Semantic Roles (adapted from Van Valin and Wilkins (1996)):

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11 Van Valin (1990) proposes that telicity and volitionality are the two semantic parameters for unaccusativity. See also Merlan (1985), Legendre (1989), Levin and Rappaport Hovav (1995), and Kishimoto (1996) for related discussion.
This path of semantic neutralization leads us to ask what will happen if the semantic distinction between actor and undergoer is neutralized. This is an issue to be discussed in Section 3.

2.4. Two Types of Transitivity

Given this general introduction, VVL (1997) defines transitivity as in (12). (12) states that single macrorole verbs are intransitive no matter how many arguments they may subcategorize, while two macrorole verbs are transitive:

(12) Transitivity in terms of Macroroles (Macrorole Transitivity or M-Transitivity)
   a. Transitive 2 Macroroles (Actor and undergoer)
   b. Intransitive 1 Macrorole (Actor or undergoer)
   c. Atransitive 0 Macrorole

This means that two-participant verbs are not always transitive under (12), since they may take one or two macroroles; when they receive
only one, they are intransitive. This macrorole-based definition of transitivity stands in contrast to the traditional definition in terms of a number of arguments which appear in the syntax:

(13) Transitivity in terms of Arguments (Syntactic Transitivity or S-Transitivity)
   a. Ditransitive 3 Arguments
   b. Transitive 2 Arguments
   c. Intransitive 1 Argument

VVL (1997) exploits a gap between M-transitivity and S-transitivity when they account for non-canonical case frames as illustrated by (14a):

   John-Dat Japanese-Nom understand-Past
   ‘John understood Japanese.’

   b. LS: understand’ (John, Japanese) [MR1]

VVL (1997) derives quirky case frames as in (14a) from a prespecification about the number of macroroles; wakaru ‘understand’ has [MR1] in its lexical entry. The macrorole assignment in (14a) proceeds as follows. First, (10b2) dictates that the only macrorole is an undergoer, since (14a) has no activity predicate in its LS. The second question is which LS argument receives the undergoer status. The AUH requires nihongo to be the undergoer, since it ranks nihongo higher than John with respect to undergoer selection. The remaining argument has no choice but to become a non-macrorole and takes dative case, the default case for non-macrorole arguments (Van Valin (1991a); cf. Michaelis (1993), Yang (1994), Nakamura (1998)).

We may see that wakaru ‘understand’ is far from a prototypical transitive verb as characterized in Hopper and Thompson (1980) (cf. Tsunoda (1985), Rice (1987), Dowty (1991), Primus (1999)), but the fact that it is next to impossible to predict these quirky verbs in absolute terms makes it necessary to put the exception feature [MR1] in their lexical entries.

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12 This is based on Silverstein’s (1993) observation that dative is the default case marker for oblique NPs (Van Valin (1991a); see Janda (1993) for an alternative proposal).
3. Grammatical Relations

3.1. Overview

VVL (1997) advocates a different approach to grammatical relations from the majority of grammatical theories; it does not regard grammatical relations as universal primitives as in Relational Grammar [RelG] (Perlmutter (1983)) and the early LFG (Bresnan (1982)) nor does it tie grammatical relations to configurational positions as in GB/MP (Chomsky (1986, 1995)).\(^{13}\) (15) provides a summary of VVL’s view of grammatical relations:

\[
\begin{align*}
(15) & \quad a. \text{ Grammatical relations are not theoretical primitives, but arise from a restricted neutralization of the macrorole distinction for morphosyntactic purposes.} \\
& \quad b. \text{ Subject is the only grammatical relation in RRG; there is no grammatical relation comparable to direct object or indirect object.}
\end{align*}
\]

What (15a) means is that the subject arises at the end point of semantic neutralization, in which no semantic role plays any grammatical role. (16) diagrams how this neutralization of semantic role distinctions (or schematization) for morphosyntactic purposes brings about the concept of subject, which is renamed privileged syntactic argument [PSA] by VVL (1997):

\[
\begin{align*}
(16) & \quad \text{Increasing Neutralization of Semantic Distinctions} \\
& \quad \text{Thematic Relations} \quad \text{Semantic Macroroles} \quad \text{Grammatical Relations} \\
& \quad \text{Effector/Agent} \quad \text{Experiencer} \quad \text{Actor} \\
& \quad \text{Locative} \quad \text{Theme} \quad \text{Undergoer} \\
& \quad \text{Patient} \quad \text{Subject/PSA}
\end{align*}
\]

VVL’s claim that grammatical relations have to be verified empirically with respect to particular morphosyntactic constructions entails (17a, b) (see Dryer (1997) for an analogous proposal):

\[
\begin{align*}
(17) & \quad a. \text{ Grammatical relations are not universally available; there may be languages which have no evidence for any}
\end{align*}
\]

\(^{13}\) The current version of LFG decomposes grammatical relations into two binary features, [±o] and [±r] (see Bresnan and Kanerva (1989) for detailed discussion).
grammatical relation.

b. The PSA (i.e. VVL's term for subject) is construction-specific; it exists only with reference to a specific morphosyntactic phenomenon.

It is important to note in connection with (17b) that VVL (1997) divides the PSA further into the syntactic pivot (i.e. an NP which is the target of syntactic operations including relativization, coordinate reduction, equi-NP-deletion, raising, nominalization, and reflexivization) and the syntactic controller (i.e. an NP which controls morphological expressions such as case marking and verb agreement).\(^{14}\) (18) summarizes how the traditional category of subject is represented in VVL (1997):

\[
\begin{array}{c}
\text{Subject} \rightarrow \text{Privileged Syntactic Argument} \\
\text{Syntactic Pivot} \quad \text{Syntactic Controller}
\end{array}
\]

3.2. Restricted Neutralization

VVL (1997) illustrates what they term restricted neutralization with reference to control constructions and compare them with relative clause constructions (VVL (1997: 252–253)):

(19) Relative Clause Constructions

Mary talked to the man. (a) who [AGENT] bought the house down the street.

(b) who [PATIENT] the dog bit.

(c) to whom [RECIPIENT] Bill sold the house.

Mary looked at the box. (d) in which [LOCATION] the jewelry was kept.

(e) out of which [SOURCE] the jewelry had been taken.

(20) Equi (Control) Constructions

a. Susan\(_i\) wants \(__i\) to run in the park.

b. Susan\(_i\) wants \(__i\) to eat a hamburger.

c. Susan\(_i\) wants \(__i\) to be taller.

\(^{14}\) Syntactic pivots and syntactic controllers are concerned with what Keenan (1976) terms behavioral properties and coding properties, respectively.
d. *Susani does not want the police to arrest ____.
e. Susani wants ____ to be arrested by the police.

A look at (19a-e) suggests that the head of relative clauses in English may bear virtually any semantic role; the head can be agent, patient, recipient, location, source, and so on. This means that English relativization does involve a neutralization of semantic roles, but that it is not a restricted neutralization (since it may apply to more than one NP within a clause). This is an instance of unrestricted neutralization and provides no evidence regarding grammatical relations in the language.15

In contrast, (20a-e) show that not just any semantic role can be omitted when it is coreferent with the matrix subject; these control constructions have a restriction on which NPs can be omitted. A look at (20a–e) suggests that the missing NPs in the dependent clauses in (20a, b) are actor arguments, while the missing NPs in (20c, e) are undergoer arguments. It is important to see that the missing NPs in (20d, e) bear the same semantic role (undergoer) of the same verb. This means that the restriction cannot be stated in semantic terms. Another important point to note here is that the omitted NP is only the actor or undergoer argument; only one of them can be omitted when both are available. This demonstrates that control constructions as illustrated in (20a–e) involve a restricted neutralization.

(21) Restricted Neutralization
   a. Neutralization:
      It is impossible to describe a particular morphosyntactic phenomenon by appeal to semantic roles (i.e. thematic relations and SMRs).
   b. Restriction:
      When more than one candidate is available, only one of them is eligible to be a controller of morphological encodings or a target of a syntactic operation.

(22) displays an analogous instance of restricted neutralization (VVL (1997: 250–251)):

(22) Verb Agreement
   a. The dog dies.
   b. The dogs die.
   c. John kills the ducklings.

15 This means that the English relativization is a pivotless construction.
d. The ducklings are killed by John.
This construction involves a neutralization of the macrorole distinction, since it allows either the actor or the undergoer argument of the same verb to be a controller of agreement. That (22) involves a restricted neutralization is demonstrated by the fact that either an actor or undergoer of a transitive verb controls the verb agreement and that when both are available, only one of them may do so. This suggests that the agreement is with the syntactic relation of subject.

3.3. Four Types of Syntactic Pivots/Controllers
We saw in the previous subsection how syntactic pivots/controllers arise in English through a neutralization of the macrorole distinction in (23):\textsuperscript{16}

(23) Accusative Pattern 1: [A, S, derived-S (passive)] $\leftarrow \rightarrow$ [U]
This neutralization is not the only pattern available, however. In order to prove this, VVL (1997) cites purposive constructions in Dyirbal (Pama-Nyungan) (VVL (1997: 267–269)):

(24) a. Ba-yi ya-ra-o walma-\textnu way\textnjil-i.
Deic-Abs.1 man-Abs get.up-Tense go.uphill-Purp
‘The man got up to go uphill.’

b. Ba-yi ya-ra-o walma-\textnu bangun
Deic-Abs.1 man-Abs get.up-Tense Deic.Erg.2
dugumbi-\textru bural-i.
woman-Erg see-Purp
‘The man got up to be seen by the woman.’

c. Ba-yi ya-ra-o walma-\textnu ba-gu-n
Deic-Abs.1 man-Abs get.up-Tense Deic-Dat-2
dugumbil-gu bural-\textnay-gu.
woman-Dat see-Antip-Purp
‘The man got up to see the woman.’

d. *Ba-yi ya-ra-o walma-\textnu ba-la-n
Deic-Abs.1 man-Abs get.up-Tense Deic-Abs-2
dugumbil-\texto bural-i.
woman-Abs see-Purp
‘The man got up to see the woman.’

\textsuperscript{16} ‘[W, X, (Y)] $\leftarrow \rightarrow$ [Z]’ means that W, X, and Y stand in contrast to Z, in that the former (but not the latter) serve as PSAs (or subjects).
A glance over (24a-c) suggests that Dyirbal allows the only argument of an intransitive verb [S] and an undergoer argument of a transitive verb [U] to be omitted when it is coreferent with the matrix subject; it is impossible to leave out an actor argument of a transitive verb [A] in the purposive construction, as demonstrated by the ungrammaticality of (24d). In order to make constructions such as (24d) grammatical, it is necessary to apply antipassivization, which turns the actor argument of a transitive verb [A] to that of an intransitive verb [S] as in (24c).

The above consideration suggests that purposive constructions in Dyirbal involve a restricted neutralization in (25):

\[(25) \text{ Ergative Pattern 1: } [U, S, \text{ derived-S (antipassive)}] \leftarrow [A]\]

VVL (1997) goes on to divide syntactic pivots/controllers into invariable syntactic pivots/controllers and variable syntactic pivots/controllers.\(^{17}\) For purposes of illustration, let us consider the following set of examples taken from Warlpiri (Pama-Nyungan), a morphologically ergative language with no voice alternation:

\[(26) \]
\[\begin{align*}
a. \quad & \text{Ngaju-rlu } \varnothing-rna \ yankirri-\varnothing \ pantu-rnu, \ ngapa-\varnothing \\
& 1\text{Sg-Erg Aux-1Sg emu-Abs spear-Past water-Abs} \\
& \text{nga-rninyja-kurra.} \\
& \text{drink-Inf-while} \\
& \text{‘I speared the emu while [it was] drinking water.’}
\end{align*}\]

\[\begin{align*}
b. \quad & \text{Nyampuju wati-}\varnothing \ ka-rla \ nyi-na \\
& \text{this man-Abs Pres-D at sit-Non-past} \\
& \text{papardi-nyanu-}\varnothing \ karnta-ku \ wangka-nja-kurra-ku.} \\
& \text{brother-Kin-Abs woman-Dat talk-Inf-while-Dat} \\
& \text{‘This man is the big brother to the woman [who is] talking.’}
\end{align*}\]

\[\begin{align*}
c. \quad & \text{Ngaju-}\varnothing \ ka-rna-ngku \ mari-jarri-mi \ nyuntu-ku,} \\
& 1\text{Sg-Abs Pres-1Sg-2Sg grief-being-Non-past 2Sg-Dat} \\
& \text{murumuru nguna-nja-kurra-(ku).} \\
& \text{sick lie-Inf-while-(Dat)} \\
& \text{‘I feel sorry for you while [you are] lying sick.’}
\end{align*}\]

\(^{17}\) VV (1993) uses the terms ‘semantic pivot’ and ‘pragmatic pivot’ for ‘invariable syntactic pivot/controller’ and ‘variable syntactic pivot/controller,’ respectively.
d. Karli-o ø-rna nya-ngu pirli-ngirli
boomerang-Abs Aux-1Sg see-Past stone-Elative
wanti-nyja-kurra.
fall-Inf-while
‘I saw the boomerang falling from the stone.’

A look at (26a–d) suggests that the missing NPs in these participial constructions (termed -kurra constructions by VVL (1997)) are the subjects of the non-finite clauses. In this case, only intransitive constructions involve a neutralization of the macrorole distinction; it may be either an actor (as in (26b)) or an undergoer (as in (26c, d)). There is no choice with respect to transitive constructions as in (26a); only actor arguments can be omitted in the -kurra constructions, since Warlpiri has no voice alternation. VVL (1997) terms this kind of pivot/controller invariant syntactic pivot/controller and distinguishes it from a variable syntactic pivot/controller as found in (20, 22) (English) and (24) (Dyirbal). The above discussion suggests that these participial constructions involve a restricted neutralization in (27):

(27) Accusative Pattern 2: [A, S] →← [U]

Finally, (28) shows that Basque displays an [U, S] neutralization in the distribution of partitive case; the undergoer of a transitive verb [U] and the actor/undergoer of an intransitive verb [S] may receive partitive case, while the actor argument of a transitive verb [A] may not:

(28) a. Ez d-u-ø gizon-ak ikusi ikasle-rik.
Neg 3Sg.Abs-Aux-3Sg.Erg man-Erg see student-Part
‘The man [actor] did not see any students/a (single) student [undergoer].’

b. Ez d-a gizon-ik etorri.
Neg 3Sg.Abs-Aux man-Part come
‘No men [actor] came.’

Neg 3Sg.Abs-Aux-3Sg.Erg man-Part see book-Abs
‘Not a man [actor] saw the book [undergoer].’

(29) is a summary of the four types of syntactic pivots/controllers reviewed in this subsection:

(29) Types of Syntactic Pivot/Controller Grouping
a. Accusative variable syntactic pivot/ [A, S, derived-S]
controller:
e.g. (20) (English control constructions)
(22) (English verb agreement)
b. Accusative invariable syntactic pivot/ [A, S] controller:
e.g. (26) (Warlpiri participial constructions)
c. Ergative variable syntactic pivot/ [U, S, derived-S] controller:
e.g. (24) (Dyirbal purposive constructions)
d. Ergative invariable syntactic pivot/ [U, S] controller:
e.g. (28) (Basque partitive case assignment)

VVL (1997) goes on to propose a syntactic pivot/controller selection principle which governs the selection of the PSA with multi-argument verbs by reinterpreting the AUH as a unidirectional hierarchy with 'argument of DO' as the highest-ranking argument and 'argument of state pred' (x)' as the lowest-ranking argument. The hierarchy is presented in (30):

(30) Privileged Syntactic Argument Selection Hierarchy [PSASH]:
Arg. of DO > 1st Arg. of do' > 1st Arg. of pred' (x, y) >
2nd Arg. of pred' (x, y) > Arg. of state pred' (x)

VVL (1997: 282) claims that if a verb takes an actor and undergoer arguments, the actor will outrank the undergoer in terms of the PSASH, since the actor will always code a higher LS argument than the undergoer:

(31) Actor > Undergoer > Others (e.g. non-macrorole)

Given (31), VVL (1997) proposes the PSASP and two sets of case assignment rules:

(32) Privileged Syntactic Argument Selection Principle [PSASP]:
a. Syntactically accusative languages/constructions:
   highest-ranking macrorole is default choice.
b. Syntactically ergative languages/constructions:
   lowest-ranking macrorole is default choice.

(33) a. Case Assignment Rules for Accusative Languages/Constructions
   1. Assign nominative case to the highest-ranking macrorole argument.
   2. Assign accusative to the other macrorole argument.
   3. Assign dative case to non-macrorole arguments (default).
b. Case Assignment Rules for Ergative Languages/Constructions
1. Assign absolutive case to the lowest-ranking macro-role argument.
2. Assign ergative to the other macrorole argument.
3. Assign dative case to non-macrorole arguments (default).

3.4. Semantic Pivot/Controller: Grammatical Relations Are Not Universal

VVL’s claim that the concept of subject arises as a result of restricted neutralization of the macrorole distinction for morphosyntactic purposes entails that if no grammatical construction in a language involves any restricted neutralization, it has no grammatical relation. This means that subject may not be universally available. In fact, VVL (1997) cites Acehnese (Austronesian), a head-marking language spoken in Indonesia whose verbal cross-reference system is active-stative, as representative of such languages and focus their attention on control and raising constructions (see Hope (1974), LaPolla (1990), Bhat (1991), Fried (1995), and Chelliah (1997) for similar claims about Lisu, Mandarin Chinese, Kannada, Czech, and Manipuri). VVL (1997) borrows the data and analysis from Durie (1985, 1987).

Examples (34a–d) illustrate control constructions in Acehnese:

(34) a. Gopnyan geu-tem [(geu-)]jak
   3Sg 3-want  go
   ‘(S)he wants to go.’
   b. Geu-tem [(geu-)]taguen bu
      3-want cook rice
      ‘(S)he wants to cook rice.’
   c. *Gopnyan geu-tem [rhet].
      3Sg 3-want fall
      ‘(S)he wants to fall.’
   d. *Aneuk agam nyan ji-tem [geu-peuréksa le dokto].
      child male that 3-want 3-examine by doctor
      ‘That child wants to be examined by the doctor.’

The ungrammaticality of (34c, d) suggests that there is a restriction on the omitted argument in the dependent clause, and the question is how to characterize this restriction. The macrorole-based analysis correctly predicts that only actors may be omitted (when it is coreferent with the experiencer in the matrix clause) in the dependent clause of these desiderative constructions.
A different situation is found in possessor raising constructions. The possessive NP is the undergoer of the intransitive predicate seunang 'happy' in (35a, b). The possessive NP in (35c) is the undergoer of the transitive verb têt 'burn.' These data suggest that possessor raising may occur only from undergoer arguments in Acehnese:

(35) a. Seunang até lôn.
   happy liver 1Sg
   ‘My liver [undergoer] is happy (=I am happy).’

b. Lôn seunang-até.
   1Sg happy-liver
   ‘I [undergoer] am happy.’

c. Ka lôn-têt rumoh gopnyan.
   Asp 1Sg-burn house 3Sg
   ‘I burned her house [undergoer].’

d. Gopnyan ka lôn-têt-rumoh.
   3Sg Asp 1Sg-burn-house
   ‘I burned her house [undergoer].’

e. *Gopnyan ka aneuk-woe.
   3Sg Asp child-return
   ‘His/Her child [actor] returned.’

This hypothesis is confirmed by the fact that (35e) is ungrammatical.

VVL (1997) goes on to discuss raising constructions as illustrated in (36):

(36) a. Gopnyan teuntèe [geu-woe].
   3Sg certain 3-return
   ‘He/She is certain to return.’

b. Gopnyan teuntèe [geu-beuet hikayat prang sabi].
   3Sg certain 3-recite epic
   ‘He/She is certain to recite the Prang Sabi epic.’

c. Hikayat prang sabi teuntèe [geu-beuet].
   epic certain 3-recite
   ‘The Prang Sabi epic is certain to be recited by him/her.’

These examples provide no evidence for a restricted neutralization; they allow any semantic argument of the verb in the dependent clause to show up in the matrix clause. This means that this raising construction is pivotless; it involves an unrestricted neutralization.

(37) is a summary of the foregoing discussion about the Acehnese constructions:
(37) Pivots/Controllers in Acehnese
a. Verbal Cross-Reference (see below):
   Proclitic (actor argument),
   Enclitic (undergoer argument)

b. Control Constructions:
   Actor arguments

c. Possessor Raising Constructions:
   Undergoer arguments

d. Raising Constructions:
   Pivotless (any semantic argument of a verb)

VVL (1997) argues that Acehnese has no instance of restricted neutralization of the macrorole distinction and that there is no reason to postulate any grammatical relation in Acehnese.¹⁸

VVL (1997) calls pivots/controllers as in (37a–c) semantic pivots/controllers (since they are controlled by macrorole arguments) and contrast them with syntactic pivots/controllers which neutralize the macrorole distinction. (38) presents a summary of this subsection:¹⁹

(38) VVL’s Typology of Pivots/Controllers

<table>
<thead>
<tr>
<th>Actor</th>
<th>Undergoer</th>
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</tr>
<tr>
<td>Accusative</td>
<td>Invariable</td>
</tr>
<tr>
<td>Variable</td>
<td>[A, S, derived-S]</td>
</tr>
<tr>
<td>Ergative</td>
<td>Invariable [U, S]</td>
</tr>
</tbody>
</table>

¹⁸ Some might argue that in Acehnese, actors and undergoers function as grammatical relations. On this view, grammatical relations are universal, but their manifestations may differ from language to language (e.g. Langacker (1991: 317-321)). The major problem with this view is that it uses the term ‘grammatical relation’ very differently from the way it has been used in theoretical linguistics over the past three decades.

¹⁹ What distinguishes VVL’s view of subject from Givón’s (1979) view of subject as grammaticalized topic is that VVL (1997) does not commit itself to the idea that patient-like arguments [U] in transitive clauses are more topical than their agent-like arguments [A] in syntactically ergative languages like Dyirbal (cf. Shibatani (1991)). Cooreman’s (1988) text-count study demonstrates that agent-like arguments are
4. Discussion

4.1. Contribution of the Book

The book under review makes a substantial contribution to the linking theory. Many functional linguists have argued with reference to many morphosyntactic phenomena that they are not susceptible to configurational or relational analysis and that they are primarily controlled by semantic and/or discourse-pragmatic factors. It seems fair to say that VVL (1997) provides a basis for accommodating and formalizing these empirical findings. What is most noteworthy about VVL (1997) is that its linking theory successfully elucidates how syntactic functions arise from the well-motivated verbal semantics outlined in Section 2.1. Attributing the mapping between verbal semantics and syntactic functions to neutralization/schematization enables VVL (1997) to provide the principled typology of pivots/controllers in (38). This schematization-based linking theory has the following three advantages.

First, positing SMRs in the mapping between verb-specific roles and syntactic functions permits VVL (1997) to treat those languages (e.g. Acehnese) which show no evidence for assuming any grammatical relation on a par with English. A grammatical relation-based analysis would predict that Acehnese requires the only argument of an intransitive verb to be cross-referenced in the same way. This prediction is not borne out, however:

\[(39) \begin{align*}
\text{a. } & \text{(Gopnyan) geu-mat lôn.} \\
& (3\text{Sg}) \quad 3\text{-hold} \quad 1\text{Sg} \\
& '(\text{S})\text{he [actor] holds me [undergoer].}' \\
\text{b. } & \text{(Lôn) lôn-mat-geuh.} \\
& (1\text{Sg}) \quad 1\text{Sg-hold-3} \\
& 'I [actor] hold him/her [undergoer].' \\
\text{c. } & \text{Geu-jak (gopnyan)} \\
& 3\text{-go} \quad (3\text{Sg}) \\
& '(\text{S})\text{he [actor] goes.'}
\end{align*}\]

more topical than patient-like arguments in Dyirbal transitive clauses even if the former are not subjects.

\[20 \text{ We may equate what VVL (1997) terms neutralization with schematization (Langacker (1987)), since schematization always involves a neutralization of semantic distinctions.}\]
(39) shows that proclitics and enclitics refer to actor and undergoer arguments, respectively. This split intransitivity is beyond the purview of the grammatical relation-based analysis.21

Second, VVL’s linking theory encounters no problem in handling languages in which accusative constructions and ergative constructions co-exist. For example, VVL (1997) reports that Tzutujil (Mayan) has a reference-tracking system organized on an accusative basis, while its focus constructions operate on an ergative basis. These split-pivot languages pose no problem, however, since nothing prevents different constructions in a language from displaying different degrees of schematization (i.e. verb-specific role $\leftrightarrow$ thematic relation $\leftrightarrow$ SMR $\leftrightarrow$ PSA) and/or different patterns of schematization (i.e. actor $\leftrightarrow$ undergoer, accusative $\leftrightarrow$ ergative).

Finally, VVL’s schematization-based linking theory provides a natural explanation for data from language acquisition in which children acquire SMRs before they acquire PSAs (Weist (1990); see also Bowerman (1990), Rispoli (1991), and Van Valin (1991b, 1994)).

4.2. Empirical Problem
4.2.1. Data

VVL’s schematization-based linking theory encounters no problem when it is applied to verbs whose M-transitivity is fixed lexically. We saw in Section 2.4 that VVL (1997) attributes quirky case frames as in (14a) to a prespecification about the number of macroroles which overrides (10a1) (“If a verb has two or more arguments in its LS, it will take two macroroles”):

John-Dat Japanese-Nom understand-Past
‘John understood Japanese.’

b. LS: understand (John, Japanese) [MR1]

Kishimoto (1996) argues on the basis of deverbal nominal modification in Japanese that an SMR-based account of unaccusativity fares better than the corresponding GB account (e.g. Burzio (1986), Levin and Rapaport Hovav (1995)) which depends crucially on underlying syntactic configurations.
This either-or view of transitivity runs into a difficulty, however, when it is confronted with case alternations as illustrated in (40):

    John-Nom Tom-Dat run-Caus-Past
    ‘John had Tom run.’

    John-Nom Tom-Acc run-Caus-Past
    ‘John made Tom run.’ (Japanese)

It has long been realized that (40b) represents a coercive causation, while (40a) describes a non-coercive one (e.g. Shibatani (1973)). To put it differently, the causee in (40a) is construable as having an option of refusing the causer’s request, while the causee in (40b) has no choice but to run. This observation suggests that the following correlation holds in (40):

(41) (40a) (40b)
    Volitionality of the Causee Yes No
    Affectedness of the Causee Less More
    Case of the Causee Dative Accusative

The above correlation is spelled out by modifying (40a, b) with adverbials such as muriyari ‘by force, forcedly.’ The fact that (42a) sounds quite odd confirms that the causee in (40a) remains volitional:

    John-Nom Tom-Dat forcedly run-Caus-Past
    ‘John had Tom run forcedly.’

b. John-ga Tom-o muriyari hashir-ase-ta.
    John-Nom Tom-Acc forcedly run-Caus-Past
    ‘John made Tom run forcedly.’

The first step in explaining this case alternation is to look at the LS of the causative verb *hasir-ase* ‘make run.’ The easiest solution available here would be to assume that the verb has two distinct lexical entries, one with [MR1] and the other with no such prespecification, under the assumption that the causative verb has its own lexical entry (Kitagawa (1986), Miyagawa (1989)). (43a, b) show how macrorole assignments proceed in (40a, b), respectively:

(43) a. LS: [do’ (J, ø)] CAUSE [DO (T, [do’ (T, [run’ (T)])])] [MR1]
    Th.Rel.: Effector Agent
    MR: Actor Non-macrorole
(10a1) requires that (43b) takes actor and undergoer under the assumption that the effector of the superordinate CAUSE outranks the embedded effector for actor status (VV (1993: 124)). On the other hand, (43a) takes only one macrorole (actor) because of [MR1]. The causee receives a non-macrorole status, since it cannot be an actor or undergoer.

These macrorole assignments account for the case frames in (40a, b) in conjunction with the set of case assignment rules in (33a), but (43) alone leaves it unclear how to derive the case alternation from (41), since it reduces the verbal polysemy in (40) to the presence/absence of [MR1] in the lexical entry of hasir-ase 'make run' and fails to connect the case alternation with the semantic alternation in (40). It is clear that we need to spell out how the verbal polysemy in (40) influences the mapping between LS arguments and SMRs.

4.2.2. Proposal

An important clue is provided by Hopper and Thompson (1980) (cf. Tsunoda (1985), Rice (1987)), who do not view transitivity as an either-or concept, but as a gradient concept which consists of a cluster of semantic properties as in (44):

(44) Semantic Properties Contributing to High/Low Transitivity:

<table>
<thead>
<tr>
<th>High Transitivity</th>
<th>Low Transitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants:</td>
<td>2 or more participants</td>
</tr>
<tr>
<td>Kinesis:</td>
<td>action</td>
</tr>
<tr>
<td>Aspect:</td>
<td>telic</td>
</tr>
<tr>
<td>Volitionality of A:</td>
<td>volitional</td>
</tr>
<tr>
<td>Affirmation:</td>
<td>affirmative</td>
</tr>
<tr>
<td>Affectedness of O:</td>
<td>O totally affected</td>
</tr>
</tbody>
</table>

A cluster of the semantic properties on the left-hand side represents the prototypical member of two/three-participant clauses.

It is important to note at this stage that the number of macroroles taken by hasir-ase is predictable from the semantic interpretations of (40a, b): the more transitive alternant takes two macroroles. This consideration suggests that it is not necessary to fix the number of
macroroles lexically and leads us to propose the third class of two-place verbs (Nakamura (1999)):

(45) Underspecified Macrorole Assignment Hypothesis [UMAH]:
   a. There is a class of two-place verbs that follow (10b), but leave it lexically underspecified how many macroroles they receive. The set of semantic properties in (44) determines whether they receive one or two macroroles.
   b. If a two-place verb participates in a semantic alternation that is responsible for its case (frame) alternation, then the alternant which is the more prototypically transitive in terms of (44) receives two macroroles.

The UMAH recasts Hopper and Thompson’s (1980) insight in RRG terms: the more semantic properties on the left-hand side in (44) a two-place verb bears, the more transitive it is. This principle may apply only when there is a case alternation with an associated semantic contrast. Another important point to note in this connection is that (45) is numerical; the contrast between (40a) and (40b) is based on the relative constellations of the semantic properties in (44).

We can see that the UMAH provides an explanation for the macrorole assignments in (43a, b), given that (40b) is more transitive than (40a) under Hopper and Thompson’s (1980) prototype-based view of transitivity.

4.3. Crosslinguistic Extension

It is important to mention that a wide variety of languages permit some two-place verbs to display similar case alternations with similar semantic motivations. Examples (46)–(49) come from Spanish, Kannada, Tongan, and Kalkatungu (Pama-Nyungan), respectively. It is worth investigating whether these case (frame) alternations are amenable to the UMAH or not:

(46) a. Los perros le molestan.
    the dogs him:Dat harass:Pres
    ‘The dogs bother him.’
   b. Los perros lo molestan.
    the dogs him:Acc bother:Pres
    ‘The dogs harass him.’
    (Treviño (1992))

(47) a. na:yì avanige kadiyutu.
    dog-Nom him:Dat bit
    ‘The dog bit him (experienced patient).’
A class of Spanish psych verbs (e.g. molestar ‘bother,’ aburrir ‘bore,’ preocupar ‘frighten’) allow their non-subject arguments to take accusative or dative case. Treviño (1992) points out that the experiencer in (46b) is construable as undergoing a change of state by virtue of the dogs’ harassment, while the experiencer in (46a) is not. To put it differently, (46b) denotes a situation in which the dogs actually bark at the experiencer or even bite him, while (46a) means that the experiencer does not like dogs in general.

Kannada (Dravidian) allows a class of two-place verbs as illustrated in (47) to display case alternations sensitive to sentience. Bhat (1991) observes that (47a) describes the victim as being aware of the dog’s attack, while (46b) does not. Since sentience is a semantic property associated typically with an actor, we may argue that the victim in (47b) is more undergoer-like than the victim in (47a) and that (47b) is more transitive than (47a).

Analogous alternations with analogous semantic effects are found in ergative languages as well. Tongan (Polynesian) permits non-subject arguments of two-place verbs such as kai ‘eat’ in (48) to receive dative or absolutive case, depending on whether the patient is totally consumed or not. (48) shows that kai ‘eat’ marks a totally consumed patient with absolutive case, but requires a partly consumed patient to take dative case.

Finally, the case frame alternation between (49a) and (49b) comes down to whether they are perfective or imperfective. Blake (1982) re-
ports that (49a) is favored when the speaker refers to an action being directed toward a goal, as opposed to one which has been completed.

(50) is a summary of the semantic alternations attested in (40) and (46)–(49):

<table>
<thead>
<tr>
<th>(50)</th>
<th>Perfectivity</th>
<th>Change of state</th>
<th>Volitionality or sentience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accusative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japanese</td>
<td>(40a)</td>
<td>–</td>
<td>–</td>
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<tr>
<td>(40b)</td>
<td>–</td>
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<tr>
<td>Spanish</td>
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<td>–</td>
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<tr>
<td>(46b)</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Kannada</td>
<td>(47a)</td>
<td>+</td>
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<tr>
<td>(47b)</td>
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<tr>
<td>Ergative</td>
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<tr>
<td>Tongan</td>
<td>(48a)</td>
<td>–</td>
<td>+</td>
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<tr>
<td>(48b)</td>
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<tr>
<td>Kalkatungu</td>
<td>(49a)</td>
<td>–</td>
<td>–</td>
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<tr>
<td>(49b)</td>
<td>+</td>
<td>–</td>
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</tbody>
</table>

(50) shows that the (b) examples are more transitive than the corresponding (a) examples in terms of (44). This means that all of these alternations fall under the scope of the UMAH. For example, (51a, b) show the macrorole assignments in (49a, b), respectively:

<table>
<thead>
<tr>
<th>(51)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>dog</td>
<td>snake</td>
<td>actor non-macrorole</td>
</tr>
<tr>
<td>b.</td>
<td>dog</td>
<td>snake</td>
<td>actor undergoer</td>
</tr>
</tbody>
</table>

Application of the set of case assignment rules in (33b) to (51a) and (51b) yields the ‘abs.-dat.’ case frame in (49a) and the ‘erg.-abs.’ case frame in (49b), respectively.

This section has shown that a set of case alternations as illustrated in (46)–(49) poses a serious problem for VVL’s macrorole-based concept of transitivity and that those alternations require it to be combined with Hopper and Thompson’s (1980) prototype-based concept of transitivity. It is easy to see that this problem stems from VVL’s schematization-based linking theory, since their emphasis on schematization does not leave much room for prototype effects.22

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22 See Ackerman and Moore (1999) for an analogous account of the transitivity
5. Conclusion

This article has examined VVL (1997) with a special emphasis on its monostratal linking theory, since RRG has been known for its persistent challenge to the universality of "subject" since its inception. We saw in Section 3 that the RRG linking theory (whose central mechanism is schematization) handles accusative, ergative, and active-stative languages in an even-handed way, a considerable success which not many grammatical theories have achieved. Although VVL (1997) is very impressive in providing a unified account of the typologically diverse linking patterns, two problems remain to be addressed.

First, it is necessary to enrich VVL’s schematization-based linking theory, in particular their either-or conception of transitivity, with a prototype-based model as found in Hopper and Thompson (1980) (see Langacker (1987: 369–386) and Taylor (1990), both of whom argue that prototypes and schemas are compatible with each other). It is important to mention in this connection that we can extend this approach to other transitivity-related phenomena. It seems particularly fruitful to incorporate Shibatani’s (1985) prototype account of passivization into VVL’s typology of voice alternations (cf. FVV (1984: 149–181), Roberts (1995)).

Second, VVL’s linking theory needs further formalization. Although VVL (1997) borrows some architecture from Construction Grammar [CG] (Fillmore and Kay (1994)) and make some efforts to formalize their linking theory, its description (termed ‘linking algorithm’) remains overtly procedural; VVL (1997) assumes two directions of linking, the linking from semantics to syntax and the linking from syntax to semantics, and follow these two-way processes step by step alternations. I have to leave it to another occasion to critically compare their account (which views the alternations as relational rather than semantic) with the UMAH, but one crucial difference between them is that the UMAH provides a unified account of (40) and (46)–(49), while Ackerman and Moore (1999) would not. The reason is that under the assumption that these alternations are relational in nature, (49) involves an alternation between subject and indirect object (note that Kalkatungu is a syntactically ergative language), while (40) and (46)–(48) involve an alternation between direct object and indirect object. In contrast, the UMAH is able to treat (49) on a par with (40) and (46)–(48); they all involve an alternation between undergoer and non-macrorole.
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(VVL (1997: 324–376)). However, this scheme is not only incompatible with the constraint-based architecture of CG, but with the highly incremental and integrative nature of human language processing (e.g. Altmann and Steedman (1988)):23

(52)  
- LSs → SMRs → (PSAs) → Morphosyntactic Encodings
- Morphosyntactic Encodings → (PSAs) → SMRs → LSs

One needs to recast RRG as a full-fledged constraint-based framework, if one is to make RRG compatible with the results of psycholinguistic research.

Despite these potential problems, there is no doubt that VVL (1997) deserves more attention, given that the majority of generative grammarians have paid relatively little attention to the theoretical challenges posed by ergative languages, active-stative languages, and split-pivot languages. This is an unfortunate situation, since thorough investigation of a wide variety of such “exotic” languages (e.g. Simpson (1991), O’Connor (1992), Kroeger (1993), Austin and Bresnan (1996), Bittner and Hale (1996), Arka (1998), Nordlinger (1998)) would bring about a fruitful dialogue between RRG and GB/MP/LFG/HPSG.

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23 PSAa are put in parentheses in (52), since not all languages have grammatical relations.
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