Schema vs. Prototype: An Integrated Approach to Transitivity*

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Abstract

The purpose of this paper is twofold: to introduce Role and Reference Grammar (Van Valin 1993) and its schema-based concept of transitivity; and to integrate it with Hopper & Thompson’s (1980) prototype-based concept of transitivity. They seem to be incompatible at first blush, but turn out to have a common root in categorization. This observation enables us to capture the whole picture of transitivity, which incorporates both either-or (schema) and more-or-less (prototype) judgments, and provides a more natural explanation for case alternations on non-subject arguments of two-participant verbs in a wide variety of languages than any syntactic account of transitivity.

1. Introduction
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1. Introduction

It has been noted that languages exhibit regularities in the mapping between the semantic roles and syntactic arguments of predicates. There has been an intense debate since Fillmore’s (1968) pioneering work about how to capture those regularities in a parsimonious way. Theories of this syntax-semantics interface have been referred to as linking theories (or mapping theories) (e.g., Kiparsky 1987; Baker 1988; Bresnan & Kanerva 1989; Pinker 1989; Grimshaw 1990; Jackendoff 1990; Van Valin 1993; Koenig 1994; Goldberg 1995; Davis 1996). In spite of great differences in how

**Keywords:** transitivity, schema, prototype, macrorole, underspecification

* I refer the reader to Van Valin (1993) and Van Valin & LaPolla (1997) for a full account of the framework adopted here.
to license cases, all major linking theories agree that a two-participant verb normally bears either a ‘nom.-acc.’ or ‘erg.-nom.’ case frame, as illustrated by (1a, b): 

(1) a. John-ga David-o korosi-ta.
    John-NOM David-ACC kill-PAST
    'John killed David.' (Japanese)

b. Ngarrka-ngku ka wawirri panti-rni.
    man-ERG PRES kangaroo:NOM spear-NPAST
    'The man is spearing the kangaroo.' (Warlpiri: Simpson 1991)

However, verbs of emotion, cognition, and possession often fail to conform to this default. A few examples are given in (2a)–(2c): 

(2) a. John-ni musuko-ga i-ta.
    John-DAT son-NOM exist-PAST
    'John had a son.' (Japanese)

    John-DAT Mary-NOM miss-PAST-DEC
    'John missed Mary.' (Korean)

c. Stráknun likar slikir bílar.
    the.boy:DAT like:3PL:PRES such cars:NOM
    'The boy likes such cars.' (Icelandic: Andrews 1990)

These verbs of cognition and possession are much more likely to bear a ‘dat.-nom.’ case frame than verbs such as kill. The concept of transitivity lies at the center of all linking theories, since two-participant verbs as illustrated in (1a,b) are a privileged reference point in the linking between syntax and semantics. This is the reason it is essential to examine how transitivity is characterized in major syntactic frameworks.

This paper is couched within the framework of Role and Reference Grammar [RRG] (Van Valin 1993), but it should be compatible with most monostratal syntactic frameworks, as long as they have a place for generalized semantic roles in the syntax-semantics interface (e.g., Alsina 1996; Davis 1996). The remainder of this paper is structured as follows. Section 2 provides a brief summary of RRG, with a particular focus on its two-tiered system of semantic roles. Section 3 compares the RRG concept of transitivity with another semantic concept of transitivity, proposed by Hopper & Thompson (1980), and argues that they are complementary to each other. Section 4 discusses an advantage of synthesizing these two approaches. Section 5 concludes the paper.
2. Theoretical Framework

2.1. Projection Grammar

RRG is a version of parallel structure grammar with a multi-tiered lexical representation; it distributes grammatical information over three components, syntax, semantics, and information structure, as shown in Table 1. No component serves as an input for deriving another component. RRG is analogous to Lexical-Functional Grammar [LFG] (Bresnan 1994), in that these parallel representations are subject to different organization and governed by different principles (cf., Sadock 1991; Jackendoff 1997). These representations are termed projections in RRG:

<table>
<thead>
<tr>
<th>Syntax:</th>
<th>Constituent Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operator Projection</td>
</tr>
<tr>
<td>Semantics:</td>
<td>Semantic Structure</td>
</tr>
<tr>
<td></td>
<td>Logical Structure (Thematic Relation) Tier</td>
</tr>
<tr>
<td></td>
<td>Macrorole Tier</td>
</tr>
<tr>
<td>Information Structure:</td>
<td>Focus Structure</td>
</tr>
</tbody>
</table>

Constituent structure carries phrase structure information, semantic structure handles semantics of major lexical categories, while focus structure is concerned mainly with topic and focus assignment (cf., Lambrecht 1994). I will focus on semantic structure alone in this section.

2.2. Semantic Structure: A Two-tiered System of Semantic Roles

RRG assumes two tiers of semantic roles, logical structures [LS] and macroroles [MR]. Their associations remain constant under syntactic operations such as passivization and raising and form the basis for the RRG theory of case assignment (see Van Valin 1991, Jolly 1993, Whaley 1993, and Nakamura in press a, among others). The LS tier is based on the theory of verbal semantics à la Vendler (1967), which classifies verbs into four aspectual classes, state, activity, achievement, and accomplishment, as shown in Table 2:

<table>
<thead>
<tr>
<th>Verb Class</th>
<th>Logical Structure (LS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE</td>
<td>predicate’ (x) or (x, y)</td>
</tr>
<tr>
<td>ACTIVITY</td>
<td>do’ (x, [predicate’ (x) or (x, y)])</td>
</tr>
<tr>
<td>ACHIEVEMENT</td>
<td>INGR predicate’ (x) or (x, y)</td>
</tr>
<tr>
<td>ACCOMPLISHMENT</td>
<td>BECOME predicate’ (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>

These decompositional analyses of verbs, whose main components are inherent aspect and causal relations, are termed logical structures (cf., Dowty 1979). BECOME in Table 2 represents change over some temporal span, while INGR stands for ‘ingressive’ and encodes instantaneous change. All activity verbs contain the generalized
unspecified activity predicate do', which serves as the formal marker of membership in this class. The other classes of verbs are derived from the two primitives, state and activity verbs, as can be seen from Table 2. It is also important to note that causation is analyzed in terms of events causing events, in contrast to Croft (1991) and Langacker (1991), who represent causation as individuals acting on individuals.

It is important to note that thematic relations are not primitives in RRG, but they are only shorthands for particular argument slots in the decompositional representations of verbs. Table 3 shows how thematic relations are assigned in RRG:

**Table 3. Thematic Relation Assignment**

<table>
<thead>
<tr>
<th>1. STATE VERBS</th>
<th>2. ACTIVITY VERBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Locational</td>
<td>A. Uncontrolled</td>
</tr>
<tr>
<td>B. Non-locational</td>
<td>1. Single argument</td>
</tr>
<tr>
<td>1. State or condition</td>
<td>do' (x, [predicate' (x)])</td>
</tr>
<tr>
<td>2. Perception</td>
<td>do' (x, [predicate' (x, y)])</td>
</tr>
<tr>
<td>3. Cognition</td>
<td>DO (x, [do' (x,...)])</td>
</tr>
<tr>
<td>4. Possession</td>
<td>x=effector x=effector x=agent</td>
</tr>
<tr>
<td></td>
<td>y=theme y=theme y=theme</td>
</tr>
</tbody>
</table>

For example, effector is a label for the first argument of do', while experiencer and theme refer to the first and the second argument of a two-place state predicate, respectively. These roles are abstracted from more specific, frame-based roles associated with individual verbs (e.g., feeler, wanter, kicker, loader, opened, broken).1) Sample analy-

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1) We may place the association between LS arguments and macroroles in the process of schematization from frame-based concepts (e.g., thinker, hearer, feeler, broken, opened, runner, killer, sender) to macroroles (cf., Van Valin & Wilkins 1996):

[Diagram of schematic relationships]

See Van Valin & Wilkins (1993) for an illustration of how detailed decompositional analyses of verbs may be used to predict their complement selections.
ses of English verbs are given in (3a)–(3f):

(3) 

a. see  

   see' (x, y) x=experimenter y=theme

b. walk  

   do' (x, [walk' (x)]) x=effector

c. die  

   INGR dead' (x) x=patient

d. melt  

   BECOME melt' (x) x=patient

e. kill  

   [do' (x, φ)] CAUSE [INGR dead' (y)] x=effector y=patient

f. give  

   [do' (x, φ)] CAUSE [INGR have' (y, z)] x=effector y=locative z=theme

(3a)–(3d), respectively, illustrate state, activity, achievement, and accomplishment, while (3e) and (3f) are grouped together under the rubric of causative. For example, the verb kill involves a combination of an activity ("[do' (x, φ)]") and achievement ("[INGR dead' (y)]") predicate.

Macroroles consist of actor and undergoer. Actor is prototypically a participant which has control over his/her action and affects or influences another participant, while undergoer is a participant which is causally affected or influenced by another participant and often undergoes a change of state. They are generalized semantic roles which subsume a number of LS arguments for syntactic purposes, e.g., passivization, and function as the interface between logical structures and grammatical relations. Actor and undergoer correspond to the two major arguments of a transitive verb, either one of which may serve as the single argument of an intransitive verb. Unlike Dowty's (1991) proto-roles, macroroles form an independent tier in the syntax-semantics interface.

It is very important to keep in mind that just as actor is not equivalent to agent, it is not equivalent to syntactic subject. Actor often functions as subject as in (4a,c), but it may be realized as an adjunct in passive constructions like (4b). Likewise, undergoer is not equivalent to direct object. (4d) illustrates that it may serve as the subject of an unaccusative predicate such as die.

(4) 


b. Bill [SUBJ, UNDERGOER] was hit by John [ACTOR].

c. Mary [SUBJ, ACTOR] ran into the classroom.

d. Jane [SUBJ, UNDERGOER] died after the election.

e. John [SUBJ, ACTOR] gave a box [OBJ, UNDERGOER] to Sue [NON-MR].

(4e) illustrates that LS arguments which cannot be actor or undergoer become non-macroroles.

The mapping between these two tiers of semantic roles is constrained by the actor-undergoer hierarchy and macrorole assignment principles:
(5) Actor-Undergoer Hierarchy

<table>
<thead>
<tr>
<th></th>
<th>Actor</th>
<th>Undergoer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arg. of DO</td>
<td>do' (x,...)</td>
<td>1st Arg. of pred' (x, y)</td>
</tr>
<tr>
<td>Agent</td>
<td>Effector</td>
<td>2nd Arg. of pred' (x, y)</td>
</tr>
<tr>
<td>Experiencer</td>
<td>Locative</td>
<td>Arg. of state pred' (x)</td>
</tr>
<tr>
<td></td>
<td>Theme</td>
<td>Patient</td>
</tr>
<tr>
<td></td>
<td>Locus</td>
<td></td>
</tr>
</tbody>
</table>

[“—→” = increasing markedness of realization of LS argument as macrorole]

(6) 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.

(5) is adapted from a standard thematic hierarchy, originally proposed in Jackendoff (1972), and makes sure that actor is ranked higher than undergoer; the LS argument which appears leftmost on the hierarchy will be chosen as the actor and the LS argument which appears rightmost on it will become the undergoer.

(6a) is concerned with the number of macroroles which a verb may receive. This is largely predictable from its LS; there are three possibilities: 0, 1, 2. If a verb has two or three arguments in its LS, e.g., [do' (x, φ)] CAUSE [INGR have' (y, z)], love' (x, y), [do' (x, φ)] CAUSE [INGR dead' (y)], the unmarked situation is for it to take two macroroles, actor and undergoer, in compliance with (5). If a verb has one argument in its LS, e.g., INGR dead' (x), BECOME open' (x), it normally takes one macrorole. On the other hand, (6b) is designed to handle split intransitivity (Van Valin 1990; cf., Perlmutter 1978) and requires that if the verb has an activity predicate in its LS, e.g., do' (x, [walk' (x)]), do' (x, [swim' (x)]), the macrorole has to be an actor; otherwise, it should be an undergoer. Verbs with no LS argument, e.g., rain', receive no macrorole. (7a)-(7c) describe the macrorole assignments of open, love, and walk, respectively:
(7) a. **open**: \[do (x, \phi) \text{ CAUSE } \text{BECOME open'} (y)\]

    \[
    \begin{array}{c|c|c}
    \text{Actor} & \text{Undergoer} & \text{Nom.} \\
    \text{Nom.} & \text{Acc.} & \text{Acc.}
    \end{array}
    \]

b. **love**: love' (x, y)

    \[
    \begin{array}{c|c|c}
    \text{Actor} & \text{Undergoer} & \text{Nom.} \\
    \text{Nom.} & \text{Acc.} & \text{Acc.}
    \end{array}
    \]

c. **walk**: do' (x, [walk' (x)])

    \[
    \begin{array}{c|c|c}
    \text{Actor} & \text{Undergoer} & \text{Nom.} \\
    \text{Nom.} & \text{Acc.} & \text{Acc.}
    \end{array}
    \]

In contrast to the mapping between LSs and macroroles (which holds universally), there are three possible ways of mapping macroroles to syntactic functions:

(8) **Pivot (subject) selection**

a. **Accusative**: Actor > Undergoer (e.g., English)
b. **Ergative**: Undergoer > Actor (e.g., Dyirbal)
c. **Neither**: No ranking (e.g., Acehnese)

(8) states that syntactic accusativity and ergativity, respectively, correspond to grouping A and S as opposed to O and grouping O and S as opposed to A and that there are a few languages such as Acehnese (Austronesian: Durie 1985) which are neither accusative nor ergative.

Figure 1 provides the whole picture of the linking schema in RRG:

**Figure 1. General Linking Schema in RRG**

<table>
<thead>
<tr>
<th>Syntactic Functions: Direct Core Arguments</th>
<th>Oblique Core Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pivot Selection</td>
<td></td>
</tr>
<tr>
<td>Actor &gt; Undergoer (e.g., English)</td>
<td></td>
</tr>
<tr>
<td>Undergoer &gt; Actor (e.g., Dyirbal)</td>
<td></td>
</tr>
<tr>
<td>No ranking (e.g., Acehnese)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semantic Macroroles:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Actor</td>
<td>Undergoer</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Arg of do' (x,...)</td>
<td>1st arg of pred' (x, y)</td>
</tr>
<tr>
<td></td>
<td>2st arg of pred' (x, y)</td>
</tr>
<tr>
<td></td>
<td>Arg of state pred' (x)</td>
</tr>
<tr>
<td>Transitivity = Number of Macroroles</td>
<td></td>
</tr>
<tr>
<td>Transitive = 2</td>
<td></td>
</tr>
<tr>
<td>Intransitive = 1</td>
<td></td>
</tr>
<tr>
<td>Atransitive = 0</td>
<td></td>
</tr>
</tbody>
</table>

 Argument Positions in LOGICAL STRUCTURE

<table>
<thead>
<tr>
<th>Verb Class</th>
<th>Logical Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE</td>
<td>predicate' (x) or (x, y)</td>
</tr>
<tr>
<td>ACTIVITY</td>
<td>do' (x, [predicate' (x) or (x, y)])</td>
</tr>
<tr>
<td>ACHIEVEMENT</td>
<td>INGR predicate' (x) or (x, y)</td>
</tr>
<tr>
<td>ACCOMPLISHMENT</td>
<td>BECOME predicate' (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>
2.3. Semantic Transitivity

Given this general introduction, we are now in a position to turn to the RRG view of transitivity, which is summarized in (9):

\[(9)\] Transitivity in terms of Macroroles (semantic transitivity)

<table>
<thead>
<tr>
<th>Type</th>
<th>Macroroles</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transitive</td>
<td>2</td>
<td>Actor and undergoer</td>
</tr>
<tr>
<td>Intransitive</td>
<td>1</td>
<td>Actor or undergoer</td>
</tr>
<tr>
<td>Atransitive</td>
<td>0</td>
<td>Macrorole</td>
</tr>
</tbody>
</table>

(9) states that single macrorole verbs are intransitive no matter how many arguments they may subcategorize, while two macrorole verbs are transitive. This means that two-participant verbs are not always transitive under (9), since they may take one or two macroroles; when they receive only one, they are intransitive.\(^2\) This semantic definition stands in contrast to the traditional definition of transitivity, i.e., a number of arguments which appear in the syntax, which is summed up in (10):

\[(10)\] Transitivity in terms of arguments (syntactic transitivity)

<table>
<thead>
<tr>
<th>Type</th>
<th>Arguments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ditransitive</td>
<td>3</td>
</tr>
<tr>
<td>Transitive</td>
<td>2</td>
</tr>
<tr>
<td>Intransitive</td>
<td>1</td>
</tr>
</tbody>
</table>

Distinguishing these two types of transitivity turns out to be useful in explaining non-canonical case frames, which are attributed by Van Valin (1991) to a mismatch between semantic and syntactic transitivity. (11a,b) are Japanese examples:\(^3\)

John-DAT Japanese-NOM understand-PAST
'John understood Japanese.'
Syntactic Transitivity=2
Semantic Transitivity=1
LS: understand' (John, Japanese) [1MR]

John-NOM teacher-DAT defy-PAST
'John defied a teacher.'
Syntactic Transitivity=2
Semantic Transitivity=1
LS: do' (John, [defy' (John, teacher)]) [1MR]

The macrorole assignment in (11a) proceeds as follows. The first question is which macrorole (11a) receives, actor or undergoer. (6b2) dictates that it should be an

\(^2\) It is possible for verbs to receive one less macrorole than stated in (6a). If the number of macroroles does not follow from (6a), it would have to be specified in the lexical entry of the verb. [1MR] means that there is one macrorole, while [0MR] means that there is no macrorole to assign.

\(^3\) There is no verb with more than one LS argument which takes no macrorole.
undergoer, since it has no activity predicate do’ in its LS. The second question is which LS argument receives the undergoer status. (5) requires nihongo ‘Japanese’ to be an undergoer, since it ranks nihongo ‘Japanese’ lower than John. The remaining LS argument John has no choice but to become a non-macrorole and takes dative case, the default case for non-macrorole arguments (Van Valin 1991; see also Silverstein 1980/1993 and Nakamura in press a). An analogous account holds for (11b).

3. Towards an Integrated Concept of Transitivity

It may be instructive at this stage to compare the RRG concept of transitivity with another semantic concept of transitivity, proposed by Hopper & Thompson (1980) (cf., Rice 1987). They propose to define transitivity (i.e., carrying over an action from one participant to another) in terms of a set of semantic parameters including (12a)–(12f), which are particularly relevant to the present study:

(12) Semantic parameters contributing to high/low transitivity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>High transitivity</th>
<th>Low transitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Participant</td>
<td>2 or 3 participants</td>
<td>1 participant</td>
</tr>
<tr>
<td>b. Kinesis</td>
<td>Action</td>
<td>Non-action</td>
</tr>
<tr>
<td>c. Aspect</td>
<td>Telic</td>
<td>Atelic</td>
</tr>
<tr>
<td>d. Volitionality</td>
<td>Volitional</td>
<td>Non-volitional</td>
</tr>
<tr>
<td>e. Agency</td>
<td>A high in potency</td>
<td>A low in potency</td>
</tr>
<tr>
<td>f. Affectedness</td>
<td>O totally affected</td>
<td>O not affected</td>
</tr>
</tbody>
</table>

They characterize a clause as more or less transitive, depending on the occurrence of these co-varying features in their positive form in the clause; the more features in their positive form a clause has, the more transitive it is. It is left open which features a given language selects as a determinant of transitivity and which of them are more crucial than others. (12) views transitivity as a gradient phenomenon and is in contrast to (6a1), which allows no degree of membership (each elaboration of the schema has equal status within the category). Thus, we may interpret (12) as an attempt to define transitivity in terms of prototype (Rosch 1975; cf., Jacobsen 1992).4)

Van Valin (1991) says nothing about how (6a1) arises, but we may derive it from a process of schematization among two-participant verbs, illustrated by Japanese examples (13a)–(13d):

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4) Taylor (1990: 530) states as follows:

With categorization by prototype, degree of membership is a function of degree of similarity with the prototype; the closer an entity to the prototype, the higher its membership in the category. With categorization by schema, degree of membership is not an issue.
   John-NOM David-ACC kill-PAST
   ‘John killed David.’
   John-NOM David-ACC believe-PAST
   ‘John believed David.’
   John-NOM David-ACC hate-PAST
   ‘John hated David.’
   that paper-NOM appendix-ACC include-PROG-PRES
   ‘That paper includes an appendix.’

(13a) is a prototypical transitive clause and serves as a focal point from which extensions are made. We may take (13b,c) as extensions from (13a), since they preserve an affinity with (13a) by virtue of having a connotation of choice even if neither of them denotes an action.

Example (13d) illustrates a further deviation from the prototype instantiated by (13a). First, it does not denote an action. Second, (13d) has no connotation of choice which is shared by (13a)–(13c). Grouping (13d) with (13a)–(13c) brings about (6a1), a high-level schema which consists of two arguments which are ranked according to (5).\(^5\) The point is that prototype-based and schema-based representations are not mutually exclusive, since extensions from a prototype necessarily involves schematization (i.e., extracting what is common to all members of a category).\(^6\) Thus, the fact that (13d) is not a good example of transitive clauses does not undermine its transitive status. Since prototypes and schemas arise from the same root, i.e., category organization, we may argue that whether one invokes a prototype or a schema in defining transitivity in a given language depends on how much semantic neutralization or schematization two-participant and three-participant verbs display. An appeal to the schema defined by (6a1) is appropriate for most languages, which allow a wide variety of verbs including verbs of cognition and possession to bear a ‘nom.-acc.’ or ‘erg-nom.’ case frame, while (12) may be more useful than (6a1) when analyzing a few languages, e.g., Kannada (Dravidian: Bhat 1991), most or all of whose

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\(^5\) Jacobsen (1992: Ch.2) observes that Japanese does not allow symmetric predicates such as \textit{niru} ‘resemble’ to bear a ‘nom.-acc.’ case frame:

\begin{verbatim}
  John-ga Tom-ni ni-tei-ta.
  John-NOM Tom-DAT resemble-PROG-PAST
  ‘John resembled Tom.’
\end{verbatim}

He goes on to claim that all transitive predicates in Japanese involve \textit{dominance} (which means that you cannot change the subject and object of a clause without changing its truth-conditional meaning). I leave it for further research to investigate how universal this generalization is and whether or not it has to be incorporated into (6a1).

\(^6\) See Smith & Medin (1981) for a useful survey of the previous research on categorization.
transitive clauses are licensed by a small number of semantic parameters, e.g., affectedness, sentience, volitionality.\(^7\),\(^8\)

To sum up this section, I have argued that the RRG definition of transitivity is compatible with Hopper & Thompson's (1980) prototype-based definition of transitivity, since prototype effects coexist with a schematic representation, which captures what is common to the prototype and the deviations from it (see Langacker 1987 and Taylor 1990 for further discussion).\(^9\) This means that we may get a whole picture of transitivity only by combining (6a1) with (12):

\[
\begin{align*}
(14) \text{a. Prototype:} & \quad \text{Hopper & Thompson (1980)} \\
& \quad \text{(Tsunoda 1985; Rice 1987; cf., Dowty 1991)} \\
& \quad \text{Extension from the prototype} \\
\text{b. Schema:} & \quad \text{Van Valin (1991)}
\end{align*}
\]

\(^7\) What is striking about Kannada is that the language allows no non-agent NP to receive nominative case in two-participant clauses. This is illustrated by the following pair (Bhat 1991):

\[
\begin{align*}
a. & \quad \text{ga-li} \quad \text{maravannu} \quad \text{urulistu. (poetic use)} \\
& \quad \text{wind-NOM} \quad \text{tree-ACC} \quad \text{toppled} \\
b. & \quad \text{ga-lge} \quad \text{mara} \quad \text{urulistu. (normal use)} \\
& \quad \text{wind-DAT} \quad \text{tree-NOM} \quad \text{toppled}
\end{align*}
\]

'The wind topped the tree.'

They denote a situation in which the wind caused the tree to be topped. However, Bhat (1991) notes that the (a) example involves personification. This indicates that nominative case is licensed only when one may attribute volitionality to an NP marked by nominative case. If so, we may propose the following linking constraint and require it to override (6a): Actor is associated only with agent. This constraint obviates the need to refer to (6b1). Suppose, further, that a language \(X\) allows only a small number of two-place verbs which satisfy a number of parameters listed in (12) to behave as transitive. This language would exhibit no neutralization among two-place verbs which behave as transitive and require no schema, since we may define transitivity in terms of prototype. I leave it open how to handle languages whose transitivity are defined by a small number of semantic parameters. See also Fried (1995: 83–86) for related discussion.

\(^8\) Tsunoda (1985) excludes volitionality from the list of parameters in (12), but languages such as Kannada require us to include volitionality as a determinant of transitivity.

\(^9\) There may be an objection that transitivity as defined by (9a) is actually syntactic transitivity. I will demonstrate in Section 4 that defining transitivity in terms of macroroles is empirically superior to defining transitivity in terms of grammatical relations. One might also object that (9) allows many predicates, e.g., motion verbs like \(\text{run, lie}\), to be marked as exceptions with such case (Fried 1995: 86). See Van Valin and LaPolla (1997: 159-162) for a new account of motion verbs which dispenses with the exception feature [1MR]. Another conceivable objection is that (9) cannot capture fine-grained semantics of verbs. It is far beyond the scope of this paper to explore this issue, but it is important to emphasize that (9) is not the only dimension along which verbs are classified; nothing prevents us from augmenting (9) with a number of semantic dimensions which cross-classify verbs along the line suggested by Wechsler (1995) and Davis (1996).
4. Evidence for a Semantic View of Transitivity

4.1. A Syntactic Alternative

One might wonder whether or not there is any empirical advantage in adopting a semantic view of transitivity captured by (6a1) and (12), since the intuition behind (6a1) is somehow captured by all major syntactic frameworks. To make my discussion more concrete, let me go back to the Japanese example (11a), repeated below for convenience:

      John-DAT Japanese-NOM understand-PAST
      ‘John understood Japanese.’
      Syntactic Transitivity = 2
      Semantic Transitivity = 1
      LS: understand' (John, Japanese) [1MR]

We have seen in Section 2 that RRG derives dative case on John from the assumption that the verb wakaru ‘understand’ has only one macrorole (Nakamura in press b).

Zaenen, Maling, & Thráinsson (1985) alternatively propose (15a) in conjunction with a standard relational hierarchy (15b) as part of an LFG analysis of case marking in Icelandic:

(15) a. The highest available GF [=grammatical function] is assigned NOM case, the next highest ACC case (universal).

   b. Relational Hierarchy
      Subject > Direct Object > Indirect Object > Obliques

(16) a. þéim hef-ur þótt Ólf-ur
      3PL:DAT have-PRES:3SG consider:PSTP Ólf-NOM
      leiðinleg-ur.
      boring:NOM
      ‘They have considered Olaf boring.’ (Van Valin 1991)

   b. pykja: V (experiencer, theme)
          [+DAT]
          (SUBJ OBJ)

They posit two types of case marking rules: the default rule (15a), which assigns nominative and accusative case to subjects and direct objects, respectively, and a set of lexical rules that override (15a) and associate oblique cases with particular thematic relations (see also Mohanan 1990).10)

10) Narasimhan (in press) argues that Mohanan’s (1990) proposal to associate dative case with particular thematic relations is not tenable, since it is impossible to single out particular thematic relations which always take dative case. This points up the necessity of reifying generalized semantic roles such as macroroles which neutralize thematic differences.
A look at (15) suggests that Zaenen et al. (1985) define transitivity as having subject and direct object. The basic assumption behind (15) is that there is no semantic basis for transitivity; it is a syntactic default. This assumption also manifests itself in the guise of **structural Case** in GB (Chomsky 1986). This syntactic view of transitivity forces Zaenen et al. to assign dative case to subjects in terms of pre-linking, which stops the experiencer argument from taking nominative case according to (15a). This is why the remaining argument Ólaf receives nominative case.

It has been a common practice in the literature to extend this account to cover verbs as in (11b) which mark their non-subject arguments with dative case:

    John-NOM teacher-DAT defy-PAST
    'John defied a teacher.'
    Syntactic Transitivity = 2
    Semantic Transitivity = 1
    LS: do' (John, [defy' (John, teacher)]) [1MR]

Zaenen et al. (1985) attribute the idiosyncrasy to the verb’s case frame, while RRG stipulates the number of macroroles taken by a verb. Since these two stipulations are equally costly, it would not be unreasonable to view them as notational variants if there were no empirical difference between them. The question posed at the start of this section may now be recast as follows: is there any merit in stipulating the number of macroroles?

### 4.2. Variable Transitivity: An Underspecification Account

There are two-participant verbs in many languages which may be transitive or intransitive under (9). Let us begin with (17) and (18) (Japanese). These case alternations present a serious challenge to Zaenen et al. (1985), since they have no choice but to postulate two separate case frames for these verbs with no explanation for the case alternations:

    John-NOM mountain-DAT climb-PAST

---

11) One immediate advantage of stipulating the number of macroroles is that it is not necessary to lexically mark the two case attributes in the following Icelandic example. We must make a stipulation only once (i.e., [1MR]). If we chose to fill in the case values directly, on the other hand, we would have to make two stipulations (i.e., [+ DAT]):

| Æg | skila-ði | henni | pening-un-un. |
| 1SG:NOM | return-PAST-1SG | her:DAT | money-DEF-DAT |
| 'I returned her the money.' (Van Vain 1991) |
| LS: [do' (I, ø)] CAUSE [INGR have' (she, money)] [1MR] |
| MR: Actor | NMR | NMR |
| Case: Nom | Dat | Dat |
  John-NOM mountain-ACC climb-PAST
  'John climbed a mountain.'

    John-NOM another-GEN shop-DAT try-PAST
    John-NOM another-GEN shop-ACC try-PAST
  'John tried another shop.'

For example, (17b) gives us the impression that John walked up the mountainside to the summit of the mountain, in contrast to (17a), which leaves it open how John reached it. This means that John is construable as making a wider contact with the mountain in (17b) than in (17a). In order to confirm this intuition, compare (19a) with (19b) (Kuno 1973: Ch.5):

    John-NOM helicopter-INSTR mountain-DAT climb-PAST
    John-NOM helicopter-INSTR mountain-ACC	climb-PAST
  'John climbed a mountain with a helicopter.'

The unacceptability of (19b) indicates that (17b) may not be used to describe a situation in which someone landed his/her helicopter on the summit of the mountain. We may take this contrast as a piece of evidence that John is construed as making a wider contact with the mountain on his way to its summit in (17b) than in (17a).

An analogous semantic contrast obtains in (18): when the verb bears a 'nom.-dat.' case frame as in (18a), the sentence sounds more appropriate if John only phoned the shop, while when it bears a 'nom.-acc.' case frame as in (18b), the sentence sounds more appropriate if John visited the shop and talked to a clerk. This means that John is more likely to be construed as making a direct contact with the shop in (18b) than in (18a). From these observations, we may see that (17) and (18) exhibit a correlation between case marking and degrees of affectedness.

The easiest solution available in RRG would be to assume that the verb has two distinct lexical entries, one with a lexical feature [1MR] and the other with no such prespecification. These two lexical entries are given in (20b):

(20) a. noboru: [do' (John, φ)] CAUSE [BECOME climbed' (mountain)]
b. 1. [do' (John, φ)] CAUSE [BECOME climbed' (mountain)] [1MR]
    2. [do' (John, φ)] CAUSE [BECOME climbed' (mountain)]

(6a1) requires that (20b2) takes actor and undergoer in the absence of any exception feature. This macrorole assignment is responsible for the 'nom-acc.' case frame in (17b). In contrast, (20b1) receives only one macrorole because of the feature
[1MR]. (6b1) dictates that the only macrorole should be an actor, since (20b1) contains an activity predicate. The remaining LS argument yama ‘mountain’ cannot be actor or undergoer; it has no choice but to receive non-macrorole status and takes dative case, the default case for non-macrorole arguments (Van Valin 1991; cf., Silverstein 1980/1993). (21a,b) describe how the macrorole assignments proceed in (17a,b), respectively:

(21) a. LS: [do' (John, s)] CAUSE [BECOME climbed' (mountain)] [1MR] (=17a)

<table>
<thead>
<tr>
<th>Th.Rel.:</th>
<th>Effector</th>
<th>Patient 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR:</td>
<td>Actor</td>
<td>Non-MR</td>
</tr>
</tbody>
</table>

b. LS: [do' (John, s)] CAUSE [BECOME climbed' (mountain)] (=17b)

<table>
<thead>
<tr>
<th>Th.Rel.:</th>
<th>Effector</th>
<th>Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR:</td>
<td>Actor</td>
<td>Undergoer</td>
</tr>
</tbody>
</table>

The challenge here is how to explain the correlation between case marking and degrees of affectedness without multiplying the number of lexical entries. The previous RRG literature, e.g., Van Valin (1991), Michaelis (1993), Yang (1994), Roberts (1995), Kishimoto (1996), Nakamura (1997), assumes that there are two classes of two-participant verbs, those which follow (5) and (6a,b) and those which follow (5) and (6b), but allow lexical features such as [1MR] to override (6a). It is not difficult to see that we would have no choice but to assume two distinct case frames for verbs such as noboru ‘climb’ under the traditional assumption.

It is important to note at this stage that the number of macroroles taken by the verb noboru ‘climb’ in (17a,b) is predictable from their semantic interpretations; it is determined by whether the mountain was traversed entirely or not. This predictability obviates the need to lexically specify the number of macroroles taken by noboru ‘climb’ and leads us to propose another class of two-participant verbs, i.e., those verbs which may take one or two macroroles:

(22) There is a class of two-place verbs which follows (6b), but leaves it unspecified in lexical representation how many macroroles they take, e.g., noboru ‘climb’ (Japanese). The clausal contexts determine how many macroroles they actually receive.

(22) means that when John traversed the entire mountain, yama ‘mountain’ receives an undergoer status, while it takes a non-macrorole status otherwise. This is consistent with (12), according to which affectedness of O correlates with degree of transitivity:

12) Yama ‘mountain’ is named patient, since it is an argument of a one-place state predicate (see Section 2.2 for an RRG definition of patient). It is not crucial for our discussion at all whether yama ‘mountain’ in (17) has a patient or locative interpretation.
An analogous correlation obtains in (18) as well.

We may extend this underspecification account to similar case alternations with similar semantic effects found in a typologically diverse set of languages, e.g., Spanish, German, Tongan (Polynesian), Kannada (Dravidian), Adyghe (Northwest Caucasian), Kalkatungu (Pama-Nyungan). Some examples are given in (24)–(29):

(24) a. Kupaŋuru caa kalpin-ku ́ai-miŋa.
    old.man: NOM here young.man-DAT hit-IMPERF
    ‘The old man is hitting the young man.’

    old.man-ERG here young.man:NOM hit-PAST
    ‘The old man hit the young man.’ (Kalkatungu: Blake 1976)

(25) a. Naʔe kai ʔa e sianá ʔi he ika.
    PAST:3SG eat NOM DET man LOC DET fish
    ‘The man ate part of the fish.’

b. Naʔe kai ʔe he sianá ʔa e ika.
    PAST:3SG eat ERG DET man NOM DET fish
    ‘The man ate the fish.’ (Tongan: Kikusawa 1997)

(26) a. Die Mutter schlug mir ins
    the:NOM mother:NOM hit me:DAT in.the:ACC
    Gesicht.
    face:ACC

b. Die Mutter schlug mich ins
    the:NOM mother:NOM hit me:ACC in.the:ACC
    Gesicht.
    face:ACC
    ‘The mother hit me in the face.’ (German: Wierzbicka 1988)

(27) a. jəjedʒakʷe-r š’ale-m jewišJAš.
    teacher-NOM youth-DAT admonished

b. jəjedʒakʷe-m š’ale-r jewišJAš.
    teacher-ERG youth-NOM admonished
    ‘The teacher admonished the youth.’ (Adyghe: Catford 1975)

13) (12f) contrasts ‘O totally affected’ with ‘O not affected’, but we may likewise contrast ‘O more affected’ with ‘O less affected’.
(28) 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.' (Spanish: Treviño 1990)

John-NOM Tom-DAT run-CAUS-PAST
'John had Tom run.'

John-NOM Tom-ACC run-CAUS-PAST
'John made Tom run.' (Japanese)

(24b)–(28b) are more transitive under (12) than (24a)–(28a). For example, (26b) implies that the event is very painful or it is difficult for the patient to ignore, while (26a) has no such implication (Wierzbicka 1988). Likewise, Catford (1975) notes that the action of admonishing in (27a) only touched on the young man, while the admonishment in (27b) produced an essential change in him. An analogous observation may also be made about (25a, b) and (28a, b). Thus, (25b)–(28b) represent the referents of their non-subject arguments as undergoing a change of state, while (25a)–(28a) do not.

Furthermore, we may treat (29) on a par with (24)–(28) under the assumption that Japanese causative verbs as in (29) are formed in the lexicon (see Kitagawa 1986 for supporting evidence). (29a) and (29b) exhibit a contrast in volitionality and affectedness; the causee in (29a) is construed as more volitional and less affected than the causee in (29b). This is demonstrated by the addition to (29a,b) of an adverbial phrase muriyari ‘forcibly, by force’ (cf. Shibatani 1976):

   John-NOM Tom-DAT forcibly run-CAUS-PAST
   'John had Tom run forcibly.'

   John-NOM Tom-ACC forcibly run-CAUS-PAST
   'John made Tom run forcibly.'

(31) shows that (24)–(29) exhibit a contrast in telicity, change of state, and/or affectedness of O, each of which contributes to high transitivity according to (12).\(^{14}\)

\(^{14}\) I propose that these two-participant verbs specify which parameters control their case alternations in their lexical entries. For example, schlagen ‘hit’ in (26) requires (12f) to control its case alternation, while causative verbs as in (29) require both affectedness and volitionality to be determinants of transitivity. This explains the following contrast:
(31)  

<table>
<thead>
<tr>
<th>Language</th>
<th>Aspect</th>
<th>Change of state</th>
<th>Affectedness of O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalkatungu</td>
<td>(24a)</td>
<td>Atelic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(24b)</td>
<td>Telic</td>
<td>No</td>
</tr>
<tr>
<td>Tongan</td>
<td>(25a)</td>
<td>Atelic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(25b)</td>
<td>Telic</td>
<td>Yes</td>
</tr>
<tr>
<td>German</td>
<td>(26a)</td>
<td>Telic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(26b)</td>
<td>Telic</td>
<td>Yes</td>
</tr>
<tr>
<td>Adyghe</td>
<td>(27a)</td>
<td>Telic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(27b)</td>
<td>Telic</td>
<td>Yes</td>
</tr>
<tr>
<td>Spanish</td>
<td>(28a)</td>
<td>Atelic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(28b)</td>
<td>Atelic</td>
<td>Yes</td>
</tr>
<tr>
<td>Japanese</td>
<td>(29a)</td>
<td>Telic</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>(29b)</td>
<td>Telic</td>
<td>No</td>
</tr>
</tbody>
</table>

Since (24b)–(29b) are more transitive than (24a)–(29a), we may claim that these case alternations also fall under the scope of (22). The fact that (17), (18), and (24)–(29) receive a unified account under (22) demonstrates its cross-linguistic validity.15)

Finally, Bhat (1991) reports that Kannada (Dravidian) allows a class of two-participant verbs to display case alternations on their non-subject arguments, as illustrated by (32) and (33).16) These case alternations are apparently beyond the scope of (12) and (22), since they display no contrast in telicity, change of state, or affectedness of O:

(32) a. nayi  avanige  kaḍiyutu.  
     dog-NOM  him-DAT  bit  
     'The dog bit him (experienced patient).'

b. nayi  avanannu  kaḍiyutu.  
     dog-NOM  him-ACC  bit  
     'The dog bit him (affected patient).' (Bhat 1991: 40)

15) (22) extends further to analogous case alternations displayed by causatives of intransitive verbs in Spanish and Korean:

<table>
<thead>
<tr>
<th>Language</th>
<th>Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le/La</td>
<td>hice</td>
<td>enter</td>
</tr>
<tr>
<td></td>
<td>her:DAT/her:ACC</td>
<td>1SG:caused enter</td>
</tr>
<tr>
<td></td>
<td>'I had/made her enter.' (Spanish: Strozer 1976)</td>
<td></td>
</tr>
<tr>
<td>John-i</td>
<td>Tom-eykey/ul</td>
<td>tena-key hay-ss-ta.</td>
</tr>
<tr>
<td>John-NOM</td>
<td>Tom-DAT/ACC</td>
<td>leave-CMPL do-PAST-DEC</td>
</tr>
<tr>
<td></td>
<td>'John had/made Tom leave.' (Korean)</td>
<td></td>
</tr>
</tbody>
</table>

16) See Bhat (1991) for more examples of these two-place verbs.
(33) a. naːnu  avanige  bayde.
     I-NOM  him-DAT  scolded
     ‘I scolded him (in his presence).’

b. naːnu  avanannnu  bayde.
     I-NOM  him-ACC  scolded

(32) and (33) exhibit a contrast in sentence instead; (32a) construeds the victim as being aware of the dog’s attack, while (32b) does not. Given that being sentient is a property typically associated with agent (Dowty 1991), we may think of the victim in (32a) as less patient-like than that in (32b). This consideration allows us to analyze (32a) as less transitive than (32b) and subsume the case alternations in (32) (as well as those in (24)–(29)) under the scope of (22). An analogous account holds for the case alternation in (33) as well.

17) These Kannada examples suggest that it is necessary to incorporate more semantic features into (12). It is an interesting project to compare Hopper & Thompson’s (1980) concept of transitivity with Dowty’s (1991) concept of proto-roles. See Ackerman & Moore (1995, 1997), who modify Dowty’s original proposal in a way which I think is compatible with Hopper & Thompson’s (1980) account of transitivity.

18) Knecht (1986) reports that two Turkish verbs, tap ‘worship’ and kohla ‘blow on’, display transitivity variation under causativization and passivization:

Ben  san-a/*sen-i  yap-ti-m.
     I  you-DAT/you-ACC  worship-PAST-1SG
     ‘I worshipped you’.

Ben  ayana-ya/*ayana-yi  hihla-di-m.
     I  mirror-DAT/mirror-ACC  blow.on-PAST-1SG
     ‘I blew on the mirror’.

These verbs normally mark their non-subject arguments with dative case alone. However, some speakers of Turkish allow their objects to receive accusative or dative case under causativization:

Ufug-a  ayana-yi/ya  hohla-t-ti-m.
     Ufuk-DAT  mirror-ACC/DAT  blow.on-CAUS-PAST-1SG
     ‘I made Ufuk blow on the mirror’.

It is also important to notice that the objects of tap ‘worship’ and kohla ‘blow on’ may take nominative or dative case under passivization:

Ayna/Ayna-ya  hohl-a-n-ti-dt.
     mirror:NOM/mirror-DAT  blow. on-PASS-PASS-PAST
     ‘The mirror was blown on’.

Sen  tap-ti-dt-n.
     you:NOM  worship-PASS-PAST-2SG
     San-a  tap-ti-dt.
     you:DAT  worship-PASS-PAST
     ‘You were worshipped’.

We may take these alternations as an indication that the non-subject arguments of tap ‘worship’ and kohla ‘blow on’ may receive undergoer status, since Turkish normally allows only undergoers to be passivized and receive nominative case. We may attribute this restriction to the fact that both causativization and passivization serve to highlight the affectedness of non-subject arguments.
5. Conclusion

This paper began with an introduction to RRG and its schematic definition of transitivity. In the course of the discussion, I have integrated the RRG view of transitivity with Hopper & Thompson’s (1980) prototype-based view. They seem to be incompatible at first blush, since (6a1) allows no degree of membership, while (12) characterizes transitivity as a gradient phenomenon. They turned out to have a common root in categorization, however, since they correspond to two different phases of category organization, prototype effects and schematization. 19)

The second half of this paper is devoted to comparing this integrated view of transitivity with a syntactic view which is based on grammatical relations. Specifically, it tested both views against a set of case alternations on non-subject arguments of two-place verbs. The key to a principled account of variable transitivity turned out to be underspecifying the number of macroroles taken by verbs, which, in turn, is made possible by the assumption that macroroles have an independent status in the interface between syntax and semantics (see Van Valin 1992 and Koenig 1994: 221–235 for critical appraisals of proto-role accounts). This empirical success argues for a semantic view of transitivity which has a place for generalized semantic roles such as macroroles and proto-roles (cf., Alsina 1996; Davis 1996) over a syntactic view which is based on grammatical relations.

References


19) Hopper & Thompson (1980) and Van Valin (1991) focus only on the semantic aspects of transitivity. See Gibson & Starosta (1990) for a set of non-semantic criteria (i.e., text frequency, productivity, ease of processing) for identifying transitive clauses.
Advances in Role and Reference Grammar, Amsterdam: John Benjamins.