The Interaction of Causation and Affectedness in Transitivity

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Introduction

I examine the interaction of causation and affectedness in determining the transitivity, and propose a restricted system for classifying verbs in terms of how these properties are distributed across arguments that relies crucially on force-dynamic structure.

Background - Transitivity as Maximal Contrasts

Hopper and Thompson (1980), Tsunoda (1981, 1985, 1999) define transitivity in terms of a myriad of factors (affectedness of O, potency of A, etc.). Testelec (1998) (see also Blume 1998) classifies verbs by two features based on Dowty (1991):

(1) a. [+con(trol)]/[+cause]: bears proto-agent entailments
b. [+aff(ected)]: bears proto-patient entailments

Testelec and Blume identify core transitives as follows:

(2) **Core Transitives:**
A, O are maximally distinct; A is [+cause], O is [+aff].

Two features+two arguments yields 16 possible verb types.

However, this full spectrum is not attested: there are no verbs in which the 0 argument is causal and the A is not.

I propose a more constrained lexical semantics.

Restricting The Semantic Features

Two components to lexical meaning:

- **Lexical entailments** (Dowty 1991, Primus 1999, Ackerman and Moore 2001, Beavers 2006), e.g. proto-agent and proto-patient entailments, implicated in subject and object selection:

(3)

Proto-Agent (Dowty 1991:572, (27))	Proto-Patient (Dowty 1991:572, (28))
i. volitional involvement in the event or state	i. undergoes change of state
ii. sentience (and/or perception)	ii. incremental theme
iii. causing an event or change of state in another participant	iii. causally affected by another participant
iv. movement (relative to the position of another participant)	iv. stationary relative to movement of another participant

- **The force-dynamic causal chain** of Talmy (1976) and Croft (1990, 1991, 1993, 1998, in prep), which determines inherent causal asymmetries between co-arguments:

(4) John broke the window with the hammer.

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 x  · · · · · · ·   y   ====== (y) ————         z
* * * * *break * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
Subj          A.Obl                            Obj
John          hammer                           window
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Determining Feature Assignments:

- A participant is [+aff] if it bears proto-patient properties.
- A participant is [+cause] if
  - It bears proto-agent properties or
  - *It is causally precedent in the force-dynamic structure.*

Thus one participant is *always* causal (coerced or entailed; Croft 1993) and this will always be the A argument (Croft 1998), ruling out causal O/non-causal A verbs (8 of 16 logical possibilities).

Verb Classes

Core Transitives - Caused Change-of-State Vs

These are core caused change-of-state verbs:

(5) **Causal A and Affected O:**
a. John$_{[+\text{cause}]}$ broke/killed/destroyed the robot$_{[+\text{aff}]}$.
b. *John* ⟶ *robot*
$* * * * V * * * * * * * * * *$
[+cause] [+aff]

The maximal distinction determines high transitivity.

Affected A - Two Argument Possession/Motion Vs

Possessor or figure A plus a second argument:

(6) **A but not O affected, e.g. A traverses O:**
John$_{[+\text{cause},+\text{aff}]}$ walked/climbed (up) the mountain$_{[\,]}$.

(7) **A and O both affected, e.g. A comes to possess O:**
John$_{[+\text{cause},+\text{aff}]}$ took the book$_{[+\text{aff}]}$.

These predicates display transitive or intransitive encoding across languages (with the O marked as an oblique).

Causal O - Two Argument Interaction Vs

With human interaction verbs (Blume 1998) the O is an agent in some superevent of the event described by the verb.

(8) **Both A and O are causal but neither is affected:**
John$_{[+\text{cause}]}$ praised/thanked/greeted Bill$_{[+\text{cause}]}$.

(9) **Both A and O are causal and one is affected:**
a. John$_{[+\text{cause}]}$ helped/aided Bill$_{[+\text{cause},+\text{aff}]}$.
b. John$_{[+\text{cause},+\text{aff}]}$ needs/depends on Bill$_{[+\text{cause}]}$.

(10) **Both A and O are causal and both are affected:**
John$_{[+\text{cause},+\text{aff}]}$ fought Mary$_{[+\text{cause},+\text{aff}]}$.

These verbs often have dative O (Blume 1998). In (10) the A and O are semantically symmetric, yielding a range of transitive, intransitive, and reciprocal encoding (cf. Quang Phuc Dong 1970):

(11) **Symmetric Dynamic Verbs:**
a. John$_{[+\text{cause},+\text{aff}]}$ fought with Mary$_{[+\text{cause},+\text{aff}]}$.
b. [John and Mary]$_{[+\text{cause},+\text{aff}]}$ fought (each other).
c. Mary$_{[+\text{cause},+\text{aff}]}$ fought John$_{[+\text{cause},+\text{aff}]}$.

Asymmetric Two Argument Stative/Activity Vs

Causal A and O with no features corresponds to perception and activity verbs (where the O is a "root" argument; Levin 1999):

(12) **Causal A, unaffected, non-causal O:**
a. John$_{[+\text{cause}]}$ saw/looked at Bill$_{[\,]}$.
b. John$_{[+\text{cause}]}$ wiped the table$_{[\,]}$.

Perception verbs are often intransitive (Tsunoda 1981, 1985).

Symmetric Two Argument Stative Vs

Some two argument verbs do not describe dynamic events and have no causal/proto-role properties, but are mapped onto dynamic case frames with coerced [+cause] (Croft 1993):

(13) **Neither A nor O has features, except by coercion:**
a. John$_{[(+\text{cause})]}$ resembled the pope$_{[\,]}$.
b. A$_{[(+\text{cause})]}$ intersects B$_{[\,]}$.

Like other symmetric verbs, these admit a range of encodings:

(14) **Symmetric Stative Verbs:**
a. A$_{[(+\text{cause})]}$ intersects with B$_{[\,]}$.
b. A$_{[(+\text{cause})]}$ and B$_{[(+\text{cause})]}$ intersect (each other).
c. B$_{[(+\text{cause})]}$ intersects A$_{[\,]}$.

Single Argument Vs

With single argument predicates, there are no force-dynamics. Here [+cause] and [+aff] are determined solely by proto-role properties, producing 4 logical types (with unaccusatives split by external/internal causation; Levin and Rappaport Hovav 1995):

(15) a. The winner$_{[\,]}$ is happy. (Stative)
b. The winner$_{[+\text{cause}]}$ smiled. (Unergative)
c. The vase$_{[+\text{aff}]}$ broke. (Externally caused unaccusative)
d. The flower$_{[+\text{cause},+\text{aff}]}$ bloomed. (Internally caused unaccusative)

Summary of Verb Classes

This exhausts 8 possible transitive and 4 intransitive classes, distinguishing and expanding the Testelec/Blume classes:

	Features (Proto-Roles+Causal Precedence)					
Example	A/S	→	O	Testelec	Blume	Note
wipe, see, resemble (coerced)	[(+cause)]	→	[ ]	VI/VIII	III	Psych/statives
walk (to), traverse, search	[+cause,+aff]	→	[ ]	???	???	Directed motion
make, kill, break	[+cause]	→	[+aff]	IV/V	I	Core Transitive
pull, take	[+cause,+aff]	→	[+aff]	V	I	Transitive?
speak to, ask	[+cause]	→	[+cause]	I/II/III	II	Interactional
depend (on)	[+cause,+aff]	→	[+cause]	II??	II??	Interactional
help, aid	[+cause]	→	[+cause,+aff]	II??	II??	Interactional
fight, quarrel with	[+cause,+aff]	→	[+cause,+aff]	II	II??	Reciprocal
is happy	[ ]		N/A			Stative
swim, smile	[+cause]		N/A			Unergative
break, die	[+aff]		N/A			Ext. Caus. Unacc.
bloom, rust	[+cause,+aff]		N/A			Int. Caus. Unacc

Figure 1: Summary of Verb Classes

Specific proto-role entailments determine subclasses, e.g. assuming (3) we would have caused change-of-state subtypes such as:

	Features (Proto-Roles+Causal Precedence)			
Example	A	→	O	Class
make	[+cause change, +precedent]	→	[+comes into existence]	Core Transitive
kill	[+cause change, +precedent, +volitional]	→	[+changes state]	Core Transitive
break	[+cause change, +precedent]	→	[+changes state]	Core Transitive
		etc.		

Figure 2: Example sub-classes of caused change-of-state depending on actual proto-agent/patient features

Semantics to Morphosyntax

Whether a verb is transitive depends on language-particular cutoffs (van Voorst 1996, Malchukov 2005, *inter alia*) for:

- How much non-maximal distinctiveness is allowed and
- How many and which proto-agent/proto-patient properties are required for subject/object realization even if cut-off is met (Ackerman and Moore 2001, Beavers 2006).

For verbs that are intransitive, the exact encoding of A and O depend on the specific semantic features involved (Beavers 2006):

(16) **Oblique Encoding of O in Intransitive Frames:**
a. O is path/location: locative oblique
b. O is goal: allative oblique
c. O is causal: dative of interaction (Blume 1998)
d. O is moved: displaced theme oblique (e.g. *with*) (Rappaport and Levin 1988)
e. O is weakly affected: conative (Beavers 2006)

This is determined by shared semantics between oblique markers and verbs (Gawron 1986, Wechsler 1995, Beavers 2006).

(17) **Oblique Encoding Rule:** An argument of a verb not realized as a direct argument may be realized by an oblique marker compatible with the role assigned by the verb.

For example, many non-agent/patient properties (e.g. being a goal or location) are assigned by verbs *and* encoded by oblique markers, e.g. the object of *hit* and the complement of *at* are locations.

(18) **Argument Structure of *Hit* and *At*:**
a. *hit* : < AGENT, TARGET >
b. *at* : < TARGET >

(19) **Conative Alternation:** (Levin 1993, Beavers 2006)
a. John hit the fence.
b. John hit at the fence.

Conclusion

Previous work classified verbs by gross features of causation and affectedness, but overpredicted classes. I propose instead:

- Causal features are determined by *both* proto-agent properties and force-dynamic chains.
- This forces causal asymmetries, reducing verb classes.
- Remaining classes follow by distribution of affectedness and remaining causal features.

Actual encoding is determined on a language by language basis:

- Cut-off points for transitive/intransitive encoding.
- Oblique-marker inventories for non-direct arguments.

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