

# Semantic Underspecificity in English Argument/Oblique Alternations<sup>1</sup>

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## 1. Introduction

In this paper I investigate the lexical semantic basis of English argument/oblique alternations. I use the locative alternation in (1) as a case study.

- (1) a. John loaded the hay onto the wagon.
- b. John loaded the wagon with the hay.

In (1a) *the hay*, which I refer to as the **locatum** participant, is realized as direct object, whereas the **location** participant *the wagon* is realized as a locative oblique. In (1b) the opposite pattern occurs, where the locatum is oblique and the location is direct object. The defining property of such alternations is that at least one participant varies in **morphosyntactic prominence** between variants, where direct arguments are more morphosyntactically prominent than obliques.<sup>2</sup> I base this terminology on the relative prominence of different morphological cases on a standard case markedness hierarchy, where direct argument (structural) cases are relatively unmarked compared to oblique cases. Although much work on alternations focuses on factors like topicality (Givón 1984) and heaviness (Wasow 2002), I focus on the semantic contrasts they exhibit.<sup>3</sup> The classic observation about (1) is that the direct objects are holistically affected (all moved or filled, modulo the effects of bare plural/mass nouns; Verkuyl 1972), but obliques are underspecified for this (compatible with both holistic and non-holistic readings; Anderson 1971):

- (2) a. i. John loaded the hay onto the wagon, filling the entire wagon.
- ii. John loaded the hay onto the wagon, and still had room left over.
- iii.#John loaded the hay onto the wagon, and still had a bale left over.
- b. i. John loaded the wagon with the hay, leaving none behind.
- ii. John loaded the wagon with the hay, and still had a bale left over.
- iii.#John loaded the wagon with the hay, and still had room left over.

I argue that these contrasts arise from subtle variations in **thematic roles** of the alternating participants, where thematic roles are defined as sets of entailments

following Dowty (1991). These sets are structured relative to one another in terms of “specificity,” captured as subset relationships between thematic roles. I argue that the principle in (3) governs the mapping from thematic roles to realization.

(3) **Morphosyntactic Alignment Principle:**

Oblique realizations have thematic roles that are underspecified for thematic role information encoded by direct argument realizations.

In §2 and §3 I show that (3) underlies a variety of alternations but that previous predicate decomposition-based analyses do not capture this directly. In §4 I outline an entailment-based approach to thematic roles following Dowty (1991), and in §5 I show how this approach captures the contrasts various alternations exhibit. In §6 I conclude with some discussion of the universal nature of (3).

## 2. Semantic Effects in Argument/Oblique Alternations

The locative alternation has been well discussed in the literature, as has the association of direct objects with holistic affectedness (see Anderson 1971, Tenny 1994, *inter alia*). But in fact many alternations exhibit similar contrasts *not always involving affectedness*. A sampling is given below (largely drawn from Levin 1993):

- (4) **Conative alternation** (Underspecified affectedness)
  - a. John slashed the canvas. (canvas affected)
  - b. John slashed at the canvas. (canvas possibly not affected)
- (5) **Dative alternation** (Underspecified possession/goal)
  - a. John threw/mailed Mary the ball. (Mary a goal and possessor)
  - b. John threw/mailed the ball to Mary. (Mary not necessarily possessor)
  - c. John threw the ball at Mary. (Mary not necessarily goal or possessor)
- (6) **Preposition drop alternation** (Underspecified holistic traversal)
  - a. John climbed the mountain. (entire mountain traversed)
  - b. John climbed up the mountain. (mountain possibly not all traversed)
- (7) **Reciprocal alternation** (Underspecified activeness/motion)
  - a. The truck and the car collided. (both car and truck in motion)
  - b. The truck collided with the car. (car possibly not moving)
- (8) **Search alternation I** (Underspecified degree of coverage)
  - a. John searched the woods for deer. (woods totally searched)
  - b. John searched in the woods for deer. (woods maybe not all searched)

- (9) **Search alternation II (Underspecified existence presupposition)**
- a. John hunted a unicorn in the woods. (unicorn presupposed to exist)
  - b. John hunted in the woods for a unicorn. (unicorn might not exist)

In all cases the oblique is underspecified for something specified of the direct argument, which may be holistic affectedness, affectedness, activeness, possession, holistic coverage, or existence presuppositions, depending on the specific alternation. Thus while degree of affectedness is one source of alternations, it is not the only one. The unifying characteristic is the underspecificity of the oblique.<sup>4</sup>

### 3. Semantic Prominence - Structural or Semantic?

Early thematic role theories (e.g. Fillmore 1968) assumed that alternations simply reflect different options for the morphosyntactic realization of the same thematic roles, although this fails to capture the contrasts discussed in §2. More recent work derives alternations instead from lexical or constructional semantic representations (“predicate decompositions”) that capture the different semantics of each variant. A classic such analysis of (1) is given in (10), where *load* is polysemous between two event types: change-of-location vs. change-of-state (see Levin and Rappaport 1988, Pinker 1989, Jackendoff 1990, Gropen et al. 1991, *inter alia*).

- (10) a. John loaded hay onto the wagon. (change-of-location, cf. *put*)  
       [x cause [y to come to be at z]/LOAD]
- b. John loaded the wagon with hay. (change-of-state, cf. *fill*)  
       [[x cause [z to come to be in STATE]]  
       BY MEANS OF [x cause [y to come to be at z]/LOAD]]  
       (cf. Levin and Rappaport 1988, (24), p.26)

In (10a) *load* has a Lexical Conceptual Structure (LCS) representing a change-of-location, where the *y* participant is moved to the *z* participant (similar to *put*). In (10b) *load* is associated with a change-of-state LCS, where the *z* participant comes to be in a certain state by means of a change-of-location (cf. *fill*). Details aside, each structure makes a different participant more prominent (“higher” or “earlier” depending on the implementation) in the LCS. I refer to this as **semantic prominence**. Linking rules map semantically prominent arguments to morphosyntactically prominent positions in the verb’s Predicate Argument Structure (PAS), e.g. as in the following from Levin and Rappaport (1988, (21)-(22), p.25):

- (11) When the LCS of a verb includes one of the substructures in [(12)], link the variable represented by *x* in either substructure to the direct argument variable [the direct object - JTB] in the verb’s PAS.
- (12) a. ...[*x* come to be at LOCATION]...  
       b. ...[*x* come to be in STATE]...

Thus in (10) either  $y$  or  $z$  is mapped to the direct object depending on the sense of *load*. A simple generalization emerges from approaches like this:

(13) Semantic prominence is reflected by morphosyntactic prominence.

This is a very satisfying generalization since it links the morphosyntax transparently to properties of the semantics. However, predicate decomposition approaches suffer from several drawbacks. Particular to the analysis in (10), there is no a priori reason why only (10b) involves a change-of-state, since in fact all loading events involve both a change of location for the locatum and some change in some property of the location (e.g. how loaded it is). Second, there is no a priori reason why there is a BY MEANS OF relation between the two subevents in (10b) nor why BY MEANS OF should encode the prominence relations it does, e.g. why (10b) isn't instead a change-of-location by means of a change-of-state. Although the intuition underlying the LCSs in (10) is that each sense of *load* focuses on or is primarily "about" a different participant, the particular shape of each LCS is motivated by the argument realization paradigms it is intended to explain rather than independent semantic criteria (see Koenig and Davis 2004 for further discussion).

However, most importantly, none of the entailments in §2 fall directly out of structures like those in (10). All the LCSs in (10) do is make certain participants more *structurally* prominent in the semantic representation. Any entailment differences between LCSs must be derived indirectly, and few theories have worked out exactly how this is the case. For example, Gropen et al. (1991, p.162) describe holistic affectedness as "most natural" when one or the other participant is more prominent in the underlying structure, but it is never explained why this should be, how these interpretations come about, or how it is that different entailment patterns should be relevant for different alternations. In the next section I instead take the relevant entailments as central and motivate a truly semantic analysis of argument/oblique alternations that captures these relationships directly.

#### 4. Thematic Roles as Sets

I assume a theory of thematic roles as sets of entailments, based on the proto-role theory of Dowty (1991).<sup>5</sup> On this approach, verbs assign to their participants very specific **individual thematic roles** (following Dowty 1989, p.76) as in (14).

(14) **Predicate**      **Individual Thematic Roles**  
*build*( $x, y$ )     $x \approx_{\text{BUILDER}}$ (= set of entailments associated with  $x$  by *build*)  
                          $y \approx_{\text{BUILDEE}}$ (= set of entailments associated with  $y$  by *build*)

In (14) each argument of *build* is assigned a very specific set of entailments that characterizes its role in a building event. Each individual thematic role may be more or less like one of two **proto-roles**. Proto-roles are not thematic roles per se but rather are sets of entailments representing canonical agents and patients, used

for determining argument realization.<sup>6</sup> Dowty’s proto-patient role, relevant for the discussion of the locative alternation in the next section, is given in (15).

- (15) Contributing properties for the Patient Proto-Role (Dowty 1991, (28), p.572):
- i. undergoes change of state
  - ii. incremental theme
  - iii. causally affected by another participant
  - iv. stationary relative to movement of another participant
  - v. does not exist independently of the event, or not at all

Direct arguments encode participants with the *most* proto-typical roles (i.e. have the most entailments in common with some proto-role) according to (16).

- (16)  $\text{Subj}_V \approx \text{Proto-agent}_V$  (=V’s most proto-agentive participant)  
 $\text{DO}_V \approx \text{Proto-patient}_V$  (=V’s most proto-patientive participant)  
 (cf. the ARGUMENT SELECTION PRINCIPLE, Dowty 1991, (31)-(34), p.576)

The “proto-patient of *V*” is the participant of the event described by *V* whose role is most like the proto-patient in (15). With this as a backdrop, I now turn to how alternations are licensed and what semantic contrasts they indicate.

## 5. Some Alternations and Non-Alternations

Dowty’s argument selection principle only applies to verbs that have a subject and object. It is clear from the data in §2, however, that some verbs also allow these participants to be realized as obliques. I assume that this possibility is licensed when a verb and an oblique marker in a given language assign compatible individual thematic roles (following Gawron 1986). For example, the core property of all locative alternating verbs is that the location is some kind of static location and the locatum is *causally intermediate*, i.e. intermediate in a force-dynamic chain relating the agent, locatum, and location, following Croft (1991):

- (17) *John*            *hay*            *wagon*            (Participants)  
           •        →        •        →        •            (Force dynamic chain)

The force-dynamics in (17) involve the agent operating first on the locatum and then on the location, thus placing the locatum at an intermediate position in the force-dynamic relationships of the participants. Thus in terms of thematic roles, *load* assigns the following entailments to the locatum and location participants:

- (18) a.  $\text{LCTM}_{load} = \left\{ \begin{array}{c} \dots \\ \text{x is causally intermediate} \\ \dots \end{array} \right\}$     b.  $\text{LOC}_{load} = \left\{ \begin{array}{c} \dots \\ \text{x is a location} \\ \dots \end{array} \right\}$

Furthermore, English has two classes of oblique markers that also encode these entailments: the instrumental *with*-marker<sup>7</sup> and various locative markers:

- (19) a. *with* = {x is causally intermediate}    b. *onto* = {x is a location}

Since the roles in (18) subsume the roles in (19), this licenses the possibility that either participant could be realized either directly by the verb or as an oblique. This licensing condition makes broad predictions about when alternations will occur based on morpholexical inventories of particular languages. For example, in the dative alternation in (5a,b) the core property underlying both variants is that the recipient be a goal (where the first object is additionally specified for possession). Crucial, then, is the existence of an allative oblique goal-marker *to* in English. Romance languages, on the other hand, generally do not allow dative alternations like those in English. But crucially these languages also lack a general purpose goal-marker on a par with *to* (Talmy 2000). Thus the presence of an alternation in a language can partly be determined by the available oblique-marking inventory.

Turning now to the particular semantic contrasts exhibited by the locative alternation, I assume there are only two entailments relevant for determining the proto-patient of locative verbs. The first is what I refer to as **affectedness**, i.e. the general condition that some property (position, coverage, state, existence, etc.) of the participant has changed in the event (following the mereological approach to dynamic predicates in Beavers to appear; this subsumes “causally affected by another participant”, “does not exist independently of the event”, “undergoes change of state” in (15i,iii,v)). The second proto-patient property is **holistic affectedness**, i.e. affectedness where all of the participant has completely changed (cf. “incremental theme” in (15ii)). *Load* assigns the following location and locatum roles:

$$(20) \text{ a. } LCTM_{load} = \left\{ \begin{array}{l} x \text{ is affected} \\ x \text{ is holistically affected} \\ \dots \\ lctm \text{ properties} \\ \dots \end{array} \right\} \text{ b. } LOC_{load} = \left\{ \begin{array}{l} x \text{ is affected} \\ x \text{ is holistically affected} \\ \dots \\ loc \text{ properties} \\ \dots \end{array} \right\}$$

Each participant is licensed by the verb to be both affected and holistically affected, and in addition each role has some idiosyncratic location/locatum semantics which I largely ignore here but which includes the entailments in (18). Thus both participants are qualified to be the proto-patient of *load* and therefore its direct object. However, only one participant may actually be the direct object since only one direct object is ever licensed in English. The other participant must be realized by a compatible oblique marker if it is realized at all.

However, in §2, when an oblique alternates with a direct argument the oblique bears some of the same verb-assigned properties as the direct argument, but crucially not all of them. How does this come about? I assume this is due to the oblique-marking: when a verb-licensed participant is realized as an oblique, it is instead assigned its thematic role indirectly by the oblique marker (cf. *mediated  $\theta$ -selection*; Pesetsky 1995). When this happens, the oblique marker assigns only a *subset* of the verb-assigned role. For *load*, the roles determined by the oblique

markers are specified for affectedness but underspecified for holistic affectedness. The proto-patient properties relevant for each option are as follows:

- (21) a.  $DO_{load} = \left\{ \begin{array}{l} x \text{ is affected} \\ x \text{ is holistically affected} \\ \dots \end{array} \right\}$     b.  $with_{load} = \left\{ \begin{array}{l} x \text{ is affected} \\ \dots \end{array} \right\}$     c.  $onto_{load} = \left\{ \begin{array}{l} x \text{ is affected} \\ \dots \end{array} \right\}$

The exact role of the  $DO_{load}$  corresponds to the role assigned by *load* to either the locatum or location participant. For *with* and *onto* the roles are respectively the locatum or location role determined by the verb minus any entailments regarding holistic affectedness. But why this particular contrast? To answer this, consider the behavior of *cut* and *break*, which superficially seem to participate in something similar to the locative alternation (Fillmore 1970, 1977):

- (22) a. John cut/broke his foot on the rock. (foot affected, rock maybe not)  
 b. John cut/broke the rock with this foot. (rock affected, foot maybe not)

The participants in (22) share causal intermediacy and locationhood in common. But here the direct objects are merely affected but not necessarily holistically (cf. *cut/break up*, which have holistic readings), and the obliques are underspecified even for this property. This means that the space of realization options regarding proto-role entailments for *cut* and *break* are those given in (23).

- (23) a.  $DO_{cut/break} = \left\{ \begin{array}{l} x \text{ is affected} \\ \dots \end{array} \right\}$     b.  $with_{cut/break} = \{ \dots \}$     c.  $on_{cut/break} = \{ \dots \}$

The exact role of the  $DO_{cut/break}$  is the locatum or location role, and for the two obliques it is the verb's locatum and location roles minus any entailments of affectedness. From (21) and (23) a pattern emerges. In all cases the oblique is *minimally underspecified* relative to the direct argument, i.e. obliques bear roles missing a single proto-patient entailment from the direct object realization. This still leaves open the question of why the contrasts line up as they do, i.e. why it is holistic affectedness vs. affectedness in one case and affectedness vs. underspecified affectedness in another. Potentially this follows from the nature of the entailments: holistic affectedness implies affectedness, so the contrasts indicate successively weaker degrees of affectedness along a natural implicational hierarchy. The contrast a verb exhibits depends on the degree of affectedness it assigns to its direct arguments. The thematic roles-to-realization mapping is given in (24).

- (24) a. Subject/object roles are determined by maximal prototypicality.  
 b. Obliques form *minimal underspecificity contrasts* with corresponding direct arguments.

Finally, not all locative verbs alternate:

- (25) a. John put/\*filled the water into the bucket.  
 b. John filled/\*put the water with the bowl.

Previous accounts (cf. Levin and Rappaport 1988) argue that *put* is simply a change-of-location and *fill* simply a change-of-state, but unlike *load* neither is polysemous, thus blocking an alternation. But as discussed in §3 this does not directly capture the relevant entailment contrasts. On the approach sketched here locative alternations arise from symmetric role assignments to two participants, each of which may be holistically affected. Non-alternations must therefore be due to *asymmetric* thematic role assignments. *Put* associates with its locatum the property of holistic affectedness (all of it is moved) but not its location (it is not necessarily all filled), whereas *fill* associates holistic affectedness with its location but not its locatum. Thus in each case only one participant can be the proto-patient and consequently the direct object, blocking an alternation. The other participant is realized with a compatible oblique marker. Since there is no possibility of an alternation there is no underspecificity of the verb role, and so the oblique marker takes on the complete role assigned by the verb. The full typology is given in (26).

(26)

verb	location	locatum
<i>cut</i>	{ x is affected }	{ x is affected }
<i>put</i>	{ x is affected }	{ x is affected x is holistically affected }
<i>fill</i>	{ x is affected x is holistically affected }	{ x is affected }
<i>load</i>	{ x is affected x is holistically affected }	{ x is affected x is holistically affected }

Why different verbs lexicalize different assignments is more of a mystery, though presumably this is partly due to functional pressure towards a full paradigm as well as the effects of components such as manner in each verb's meaning (see Dowty 1991, Gropen et al. 1991 for some discussion). But when locative alternations do arise it is because (a) a verb licenses an individual thematic role for a participant that is compatible with the inherent role of a particular oblique marker, (b) two participants are given symmetric thematic roles relative to a particular proto-role and thus either could be a direct argument, and (c) there are less direct argument realization options than participants. When all of these conditions obtain, one participant otherwise eligible to be a direct argument must be realized as an oblique and subsequently takes on a less specific role by the general principle in (24).

A slightly different situation occurs in alternations involving just a single participant, such as the conative and reciprocal alternations in (4) and (7). Again,

the alternations arise from compatibility between a verb-assigned role and the inherent role of some oblique marker (which presumably has to do with intended contact for *at*, following Laughren 1988, and reciprocity for *with*). The realization options are given in (27) and (28), where the underspecificity follows from (24).

- (27) a. John slashed (at) the curtain.  
 b.  $DO_{slash} = \left\{ \begin{array}{l} \text{x is affected} \\ \dots \end{array} \right\}$     c.  $at_{slash} = \{ \dots \}$
- (28) a. The truck and the car collided/The truck collided with the car.  
 b.  $Subj_{collide} = \left\{ \begin{array}{l} \text{x moves independently} \\ \dots \end{array} \right\}$     c.  $with_{collide} = \{ \dots \}$

The main difference between these alternations and the locative alternation is that there is no conflict for a direct argumenthood between two participants. Note that the underspecificity requirement explains why verbs that entail no affectedness do not undergo the conative alternation (cf. *John touched (\*at) the paper*), since there is nothing to underspecificity (cf. Laughren 1988). This is of course not the entire story, since some change-of-state verbs that appear to involve contact still do not alternate (cf. *\*break at*). Thus further restrictions may be necessary. But the general framework outlined here is a crucial first step towards a general, entailment-based analysis of such alternations. Note also that (28) does not involve affectedness, highlighting the generality of this approach beyond the oft-discussed correlation of holistic affectedness to direct objecthood.

## 6. Conclusion and Further Work

To summarize, thematic roles are defined as sets of entailments, and realization options are determined as follows:

- (29) **Morphosyntactic Alignment Principle:**  
 Oblique realizations have thematic roles that are underspecified for thematic role information encoded by direct argument realizations, where:
- a. Subject/object roles are determined by maximal prototypicality.
  - b. Obliques form *minimal underspecificity contrasts* with corresponding direct arguments.

Alternations are licensed when a verb assigns a role that is compatible with an oblique marker's inherent role, where (29) determines the thematic role of each realization option. Of course, not all alternations show semantic contrasts (cf. *John blamed Mary for his problems/his problems on Mary*), although given the range of semantic and non-semantic factors governing argument realization there is no reason to assume that the contrasts explored here underlie all alternations. But

when alternations are semantically governed, it is always of the form described here. Note that this approach expands the approach of Dowty (1991) since it gives a uniform characterization to oblique roles (underspecificity) and also covers transitivity alternations, something Dowty explicitly ignores. Likewise, the approach here differs from the related approach of Ackerman and Moore (2001) in particular ways. Ackerman and Moore propose that obliques simply bear “less prototypical” thematic roles than direct arguments (their PARADIGMATIC ARGUMENT SELECTION PRINCIPLE, *ibid.*, (2), p.169). On my approach “less prototypical” corresponds directly to minimal underspecificity, a stronger condition. Furthermore, my approach provides a key to understanding what licenses alternations and which obliques show up in which alternations in terms of shared semantics. Finally, the principle in (29) is not *necessarily* keyed to prototypicality (although I assume it is for subjects and objects), and thus is compatible with alternations such as the dative alternation, for which there may not exist a proto-recipient role even if the first object/*to* contrast is nonetheless one of underspecificity as in §2.

Furthermore, this approach has significant cross-linguistic validity in a variety of domains. For example, accusative/dative causee marking in Japanese and French derived causatives indicate greater or lesser specificity of how directly the causee is manipulated by the causer (Shibatani 1973, Authier and Reed 1991), and dative/oblique marking for goals of motion in so-called “verb-framed” languages corresponds to specificity contrasts in the goal-like nature of the participant (Beavers 2004). But why should such contrasts exist, and why would they be universal? For a tentative answer to this, consider again the principle in (13) relating morphosyntactic and semantic prominence in predicate decompositions:

(30) Semantic prominence is reflected by morphosyntactic prominence.

The approach outlined here allows us to give this principle some genuine semantic teeth by defining semantic prominence not in terms of structural positions in decompositions but rather in terms of thematic role information:

(31) A participant is more semantically prominent if it has a more specific thematic role.

In other words, *languages encode most economically what you say most about*, giving greater prominence to participants more central to the event as determined semantically. This principle is just one piece of the larger puzzle of argument realization, and operates in tangent with discourse/information structural factors and semantic properties such as animacy and humanness that I have largely ignored here. The interaction of these factors is a matter of future work. Likewise, further work will necessarily involve addressing the questions of why it is the entailments should line up as they do and furthermore why certain verbs and verb classes participate in some alternations but not others, all questions I touched upon tentatively here but have not proposed definitive answers to yet.

## Notes

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<sup>2</sup>I exclude here direct argument/direct argument alternations such as voice or causative alternations.

<sup>3</sup>I ignore here factors such as animacy and humanness — properties of referents which Evans (1997) calls “cast” properties. I focus instead purely on the roles participants play in the event.

<sup>4</sup>One could argue that holistic affectedness is a by-product of aspect since it brings with it a telic interpretation of the predicate (following Tenny 1994, *inter alia*). However, though telicity and affectedness are intertwined in many ways, they do not necessarily correlate, since one can find atelic resultative verbs (e.g. degree achievements like *cool*) and telic non-resultative verbs (e.g. semelfactives like *tap*; Beavers to appear). Thus holistic affectedness must be viewed as distinct from telicity

<sup>5</sup>I use “entailment” in the sense of Dowty’s (1989, p.75) “lexical entailments”, i.e. properties a verb assigns to an entity due to its role in an event, ignoring their status as e.g. entailments vs. implicatures.

<sup>6</sup>I ignore recipients for the rest of this paper, which I do not assume follow from a proto-role analysis though they are covered by the same generalization in (3).

<sup>7</sup>This use of *with* is often thought of as a “displaced theme” marker (Levin and Rappaport 1988), i.e. it marks a theme that has been knocked out of direct object status by the location. However, displaced themes share the property of causal intermediacy with instruments (see Croft 1991, p.178 on instruments) and thus I assume they share the same marker, though they are licensed in different ways.

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