Swarming with bees: property predication and the *swarm* alternation.

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Abstract

This thesis examines the swarm alternation. The previous literature and analyses are reviewed and critically evaluated. A data investigation is also discussed with the conclusions from the data examination informing the theoretical analysis. The verb class-based approach is contrasted with Construction Grammar in order to better understand the meaning of the swarm alternation.

The alternation is presented as separated constructions, one a Locative construction and the other as an extension of an adjectival Property predication construction, the Complex-Property Predication construction. The central source domain for the constructional meaning is identified and the relationship of the metaphorical and peripheral swarm data to this source domain is analysed. The property predication analysis of Dowty is reviewed with reference to his ‘dynamic texture’ property and its role in the constructional account of swarm is investigated.

The thesis presents swarm not as a verbal alternation but as a primarily adjectival construction with metaphorically related verbal instances. The Locative variant is not considered to be derivationally related but is a separate construction. This account is proposed to account for the distributional requirements of the data and also for the characteristic swarm meaning.
1 CHAPTER ONE

1.1 Introduction.

The aim of this thesis is to investigate what is known as the swarm alternation, one of the so-called Locative group of verb phrase-internal argument alternations. I will examine the research to date on this alternation, as well as discussing what it means to describe something as being part of an alternation. I will examine data from the only major study carried out on the swarm group of verbs (Salkoff 1983) and my own data. The conclusions arising from this data examination will form the focus of the latter part of the thesis with an analysis of how they fit into current thinking on alternations and constructions.

This chapter introduces alternations in general and the swarm alternation in particular. The particular issues of alternations are considered and those specific to swarm are highlighted for further discussion. The state of research with regards to swarm is also discussed and the generally accepted view of the swarm alternation presented. This will allow a baseline understanding of the swarm alternation to be established from which to proceed.

1.2 What is an alternation?

Verbal alternation is a term used to describe the phenomenon of a verb or class of verbs that seem to participate in more than one subcategorisation frame. The verbs may have the same meaning in their variant forms or there may be additional meanings in one of the forms. The verbs usually retain a common meaning and the two forms are not considered to have completely distinct or separate meanings. Two examples of common alternations are the benefactive alternation and the spray/load Locative alternation. They are shown below.

\[(1)\]
\[a. \ \text{John}_{\text{Agent}} \ \text{baked a cake}_{\text{Theme}} \ \text{for Mary}_{\text{Benefactive}}.\]
\[b. \ \text{John}_{\text{Agent}} \ \text{baked Mary}_{\text{Benefactive}} \ \text{a cake}_{\text{Theme}}.\]
\[(2)\]
\[a. \ \text{Jane}_{\text{Agent}} \ \text{loaded the hay}_{\text{Theme}} \ \text{into the truck}_{\text{Goal}}.\]
\[b. \ \text{Jane}_{\text{Agent}} \ \text{loaded the truck}_{\text{Goal}} \ \text{with the hay}_{\text{Theme}}.\]
Both of these alternations exhibit the same underlying meaning for each of their variant forms. However for the spray/load alternation there is an additional sense in the (b) variant that is not present in the (a) form. Jane loaded the hay onto the truck\(^1\) does not have the same reading as Jane loaded the truck with the hay, where the truck is said to be completely or holistically affected or filled by the hay. This type of change in the meaning does not occur in the benefactive alternation. John baked a cake for Mary means the same as John baked Mary a cake, in other words that John bakes a cake with the intention that Mary receives it. Whether or not Mary does in fact receive the cake is immaterial.

1.3 Some of the issues surrounding verbal alternations.

1.3.1 The projection of the arguments.

There are a number of background issues surrounding verbal alternations and how it comes to be that there are variant forms of what appears to be the same verb. The first of these is the task of explaining how the arguments are projected syntactically. The purely syntactic account of argument projection relies on what is called a lexical entry. This is an abstract construction which contains the information stored in the lexicon about a lexical item. It determines the phonological form, elements of the semantic structure and the arrangement of the arguments in the syntax. It was stated by Chomsky to take the form below.

“The lexical entry must specify:
(a) properties of phonetic structure that are not predictable by general rule (…);
(b) properties relevant to the functioning of transformational rules; (c) properties of the formative that are relevant for semantic interpretation; (d) lexical features indicating the positions in which a lexical formative can be inserted (by the lexical rule) in a preterminal string.” (Chomsky 1965: 87-88)

The subcategorisation frame is this last part of the lexical entry. It is the means by which the verb specifies what type of phrase it takes as arguments and how they are realised syntactically. Chomsky (1965: 95) states that strict subcategorisation rules, the rules which analyse a symbol in terms of its categorial context, interact with selectional

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\(^1\) The spray/load verbs have a general tendency to sound better if an unspecified noun phrase (NP) is used for the quantity (Theme) in the (b) form. However in the interests of strict consistency, definite NPs are used throughout with the spray/load examples to make the dual holism most clearly an effect of the verb rather than an effect due to the indefinite or generic NP.
rules or restrictions to specify the environment and configuration in which a verb may appear with its arguments.

1.3.2 Thematic roles.

In later extensions to the theoretical concept of the lexical entry, thematic roles were introduced. These are labels for the event’s semantic relations that are expressed by the syntactic arguments of the verb. They were initially proposed as roles that are borne by the participants in an event. They were first proposed by Gruber (1965) and explored further by Jackendoff (1972) who described the roles considered canonical today. There were five roles initially in Jackendoff’s analysis although Gruber had included more, Theme, Location, Source, Goal and Agent. The roles I will be considering in this thesis are those of Agent, Location and the various types of Theme.

The Theme is the entity noun phrase (NP) in the event. The Theme moves in verbs of motion (Jackendoff 1972:29) or its Location is asserted with verbs of Location (Jackendoff 1972:30). It is considered central to the theory of Thematic Relations according to Gruber and is generally realised as subject or direct object in the syntactic projection.

There are a number of different types of Themes that are possible but the most important ones for this thesis are the Motion, Change of State (COS), Incremental and Displaced Themes. The Incremental Theme is displayed by the direct argument in both variants of the spray/load alternation introduced in the previous section.

(3) a. Jane loaded the hay onto the truck.
   b. Jane loaded the truck with the hay.

The Incremental Theme is the measure of the event as it is expended or changes state in the course of the event. In the (a) example above, this is the Motion Theme, the hay. When all of the hay has been loaded into the truck, the event is finished. In (b) this Motion Theme is realised as a Displaced Theme as it is no longer in direct argument position but it is still a Theme and important in the argument structure of the event. The direct argument position is occupied by the truck which was the former Goal and is now a COS Theme. Its initial state changes completely in the course of the event from empty to being filled with hay. As the direct argument, the truck is also the Incremental Theme and the event ends when it is completely filled with hay. A further note is that the Motion
Theme does not need to be physically moved. It can be metaphorically moved as in the example in (4b) below. The theory does not move but it does change its abstract position from unknown to understood in the students’ minds.

The Agent role is the entity which performs the action, generally with a degree of volition or willingness and is animate. It is the role associated most strongly with the external argument, especially in transitive verbs. (Jackendoff 1972:32)

The Location is the last thematic role I will consider. It is often expressed in a prepositional phrase (PP) and is the Location of the event described by the verb if a Location is asserted by a verb (Jackendoff 1972: 31). The Location can also be expressed as the Goal. This is common with verbs of motion such as the example in (4c) where the wall is the Goal, or destination, of the motion event. These roles are shown below in the following examples.

(4)  
a. John$_{Agent}$ sent the letter$_{Motion\ Theme}$ to Mary$_{Goal}$  
b. John$_{Agent}$ explained the theory$_{Motion\ Theme}$ to his students$_{Goal}$  
c. Peter$_{Agent}$ sprayed the paint$_{Incremental/Motion\ Theme}$ on the wall$_{Goal}$  
d. Peter$_{Agent}$ sprayed the wall$_{Incremental/COS\ Theme}$ with the paint$_{Displaced\ Theme}$  

1.3.3 The interaction between meaning and projection.

Thematic roles are semantic constructs. It is necessary to explain how these semantic roles interact with the syntax since it seems quite clear that some of the semantic roles have strong affinities for specific syntactic positions and this interaction between the syntax and semantics of a verb cannot be simple coincidence. There have been a number of hypotheses proposed that outline principles of correspondence by which this interaction may occur. One of these, proposed by Perlmutter and Postal (1984) is the Universal Alignment Hypothesis (UAH). The UAH states: “There exist principles of universal grammar which predict the initial relation borne by each nominal in a given clause from the meaning of the clause” (Perlmutter and Postal 1984: 97). This is a hypothesis proposed under Relational Grammar. However it has application outside of that theory. It simply states that each nominal bears a relation that comes from the meaning of the verb.

Another hypothesis that addresses the correspondence between semantics and syntax in essentially the same way is the Universal Theta Assignment Hypothesis (UTAH) of Baker (1988) which states that “Identical thematic relationships between items are
represented by identical structural relationships between those items at the level of D-structure” (Baker 1988: 46).

Both of these hypotheses explicitly relate semantic relations to the projection of arguments in the syntax. They both state that the meaning is what determines the syntactic relations borne by each argument.

A related hypothesis proposed by Tenny (1992) is the Aspectual Interface Hypothesis (AIH). Tenny recognises the need to link semantics and syntax but claims that the two hypotheses named above do not provide a mechanism whereby they are linked. In the AIH Tenny claims that the aspectual properties of the verb determine the syntactic projection as they are the only part of the semantic structure that is available to the syntax.

The mapping between thematic structure and syntactic argument structure is governed by aspectual properties. A universal aspectual structure associated with internal (direct), external and oblique arguments in syntactic structure constrains the kinds of event participants that can occupy these positions. Only the aspectual part of thematic structure is visible to the syntax. (Tenny 1992: 2)

Tenny contends that her focus on aspectual properties explains how the thematic roles are projected in the syntax. In particular she focuses on the projection of the Measure argument as the direct internal argument. For an example of this, take the action of eating an apple. The event of apple-eating begins when the apple is first bitten into. It continues as the apple is consumed bite by bite as time progresses. The event is considered completed when the apple is consumed. The apple’s diminution measures the event’s progress. The apple is the Measure argument and its complete consumption completes the event. “The internal argument of a simple verb is constrained so that it either undergoes no change or motion, or it undergoes change or motion which ‘measures out the event’ over time” (Tenny 1992: 3).

Tenny claims that her constraint on the internal argument holds for both stative and non-stative verbs although her focus is on non-stative verbs. The Measure argument is characterised by some of the same features that were used to distinguish the Theme from the set of thematic roles introduced earlier and in fact Tenny identifies the Measure argument as a proto-Patient (Dowty 1991) which is not incompatible with the Measure argument being treated as a kind of Theme.

The UAH, UTAH and AIH all concur on one point. If a verb’s meaning determines its thematic array then different thematic arrays must be attributed to different meanings.
This is a problem for alternations because it seems incorrect to call the different senses of an alternation different meanings. The basic meaning does not differ, one variant usually has an additional sense to the basic one. Furthermore it seems completely counterintuitive to suppose that language learners have to learn dual lexical entries for every alternating verb. The UAH, UTAH and AIH do not have any way to account for the behaviour of alternating verbs but this is a problem which must be answered in any alternation analysis.

1.3.4 Markedness and alternations.

Alternating verbs are asymmetric in their behaviour. As noted in section 1.2, alternations tend to have one basic sense and then an additional sense for one of their variants. It is often the case that the variant with the additional sense is more restricted or less common than the other more basic form. This basic form has a wider range of verbs that can appear in its subcategorisation frame whereas the other is much more restricted in the verbs which can appear in its frame. As a general principle the verbs which appear in the restricted form can also appear in the non-restricted form but not all of the verbs which appear in the non-restricted form are able to appear in the restricted form. This is shown in the spray/load examples below.

(5)  a. Mary covered the table with the cloth.
    b. #Mary covered the cloth over the table.

(6)  a. The bricklayer paved the yard with the cobblestones.
    b. #The bricklayer paved the cobblestones in the yard.

(7)  a. Marion coated the chest of drawers with the lacquer.
    b. #Marion coated the lacquer on the chest of drawers.

This difference is part of the fact that, for any given binary opposition, such as a basic form and a derived form, there is a marked form and an unmarked form. A marked form is the restricted, less normal or somehow more complex form whereas the unmarked form is characterised by the absence of those complexities, or is considered to be the normal form (See Jakobson 1990 and Battistella 1990 for further discussion of markedness.)

Markedness may be invoked as an explanation for determining which form of a pair in an alternation is the basic and which is the restricted or ‘derived’ form. To take the benefactive alternation shown in (1) as an example, the basic form is the form where the
recipient is expressed as the indirect argument in a for-PP. This is because many more verbs can be used this way than in the double object ordering structure of the (b) examples.

(8)  
a. Max borrowed a projector for Jill.  
b. #Max borrowed Jill a projector.

(9)  
a. Peter picked up the box for Mike.  
b. #Peter picked up Mike the box.

(10)  
a. Marion obtained a rare manuscript for her mother.  
b. #Marion obtained her mother a rare manuscript.

(11)  
a. Jemima constructed a home for herself.  
b. #Jemima constructed herself a home.

(12)  
a. Harry knitted a hat for the cat.  
b. Harry knitted the cat a hat.

(13)  
a. Joan brought an apple for the teacher.  
b. Joan brought the teacher an apple.

(14)  
a. The cook fried bacon and eggs for the hungry customers.  
b. The cook fried the hungry customers bacon and eggs.

Markedness is exhibited by alternations to a greater or lesser degree. Most of the alternations to be discussed here exhibit a noticeable degree of asymmetry in their forms with one of the two forms being more common than the other. Often the marked or restricted form is the one considered characteristic for the alternation as is the case for the benefactive alternation examples above. The double object construction form is the marked form for that alternation as it is the most restricted.

1.4 A discussion of some alternations.

Some examples of alternations to be discussed in the following sections are the spray/load, clear and material/product alternations. These are verb phrase (VP)-internal alternations, involving the alternation of arguments from within the VP. The dative and conative alternations will also be discussed to illustrate other aspects of argument alternation. These aspects will cover the meaning differences between the variant forms, the argument/adjunct variation and the restrictions on the verbs or variant forms. The first group of alternations to be considered is the so-called Locative alternations.
1.4.1 The spray/load and clear Locative alternations.

The spray/load and clear alternations are classified by Levin (1993: 49-55) as part of the Locative alternation class. The alternations included under the Locative label comprise spray/load; clear (both transitive and intransitive); swarm and wipe. These are all discussed as involving some aspect of putting, covering or removing entities on or from surfaces or locations. The spray/load and clear alternations in particular involve the alternation of the Theme argument and the Goal. Levin suggests that all of the alternations subsumed under the heading of the Locative Alternation can be treated as aspects of the same alternation if the intransitive alternations are analysed as unaccusative (Levin 1993: 50).

Spray/load and clear seem to express semantic inverses with the spray/load alternation expressing events of putting or locating an entity on or within a Goal; and the clear alternation expressing the removal of an entity from a Source2.

Some examples are given below.

(15) a. JohnAgent loaded the hayIncremental Theme into the truckGoal.
    b. JohnAgent loaded the truckIncremental Theme with the hayDisplaced Theme.

(16) a. MaryAgent sprayed the paintIncremental Theme onto the wallGoal.
    b. MaryAgent sprayed the wallIncremental Theme with the paintDisplaced Theme.

(17) a. AnnaAgent cleared the platesIncremental Theme from the tableSource.
    b. AnnaAgent cleared the tableIncremental Theme of platesDisplaced Theme.

Focusing on the spray/load alternation, it is clear that although the meaning is substantively the same for both variants, there is an additional sense for the (b) forms. In the (a) forms the Theme is placed or transferred to the Goal but in the (b) forms there is an additional reading such that all of the Location is filled or covered by the Theme alongside the basic sense that the Theme comes to be at the Goal. This is the holistic effect which is one of the major characteristics of the spray/load alternation.

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2 Source and Goal are the inverse of each other. The Goal is used for events which encode motion towards and the Source is used for events which encode motion away from the location.
The meaning difference between the two forms of the alternation is the most striking aspect of the spray/load alternation. The difference may be explained by reference to Tenny’s Measure argument. The direct argument in both variants is the Measure argument. In the case of the (a) examples below, the hay and the paint are the Measure arguments and their expenditure marks the event’s bound. This is why the sentences below are ill-formed as it is incorrect to assert the completion of the Measure event when the Measure argument has not been fully expended.

(18) a. #John loaded the hay onto the truck and there were six bales left.
    b. John loaded the truck with the hay and there were six bales left.

(19) a. #Mary sprayed the paint on the wall and there was half a can left over.
    b. Mary sprayed the wall with the paint and there was half a can left over.

Similarly in the examples below, the Goal from the (a) forms is now the Measure argument in the direct argument position in the (b) examples. It undergoes a change of state in the course of the event changing from empty to full of hay (20b) or from being blank to being covered with paint as in (21b). Just as the Measure argument had to be fully expended in the examples above for a semantically correct sentence, in these examples the Goal has to be completely affected by the Motion Theme. Therefore it is semantically anomalous to claim this state does not hold when the event has been completed and its bounding was determined by the change of state.

(20) a. John loaded the hay onto the truck and there was still room inside.
    b. #John loaded the truck with the hay and there was still room inside.

(21) a. Mary sprayed the paint on the wall and there were still bare bricks visible.
    b. #Mary sprayed the wall with the paint and there were still bare bricks visible.

It is semantically ill-formed to claim a change of state and undermine it in the same sentence, in the same way that it is equally ill-formed to claim the discharge of an Incremental Theme when part of it remains after the event’s end. For both variants of the spray/load alternation the Theme is obligatory although the Goal/Displaced Theme is not. This can be seen in the examples below.

(22) a. John loaded the hay onto the truck.
b. John loaded the hay.
c. John loaded the truck with the hay.
d. John loaded the truck.

(23) a. Mary sprayed the paint on the wall.
b. Mary sprayed the paint.
c. Mary sprayed the wall with the paint.
d. Mary sprayed the wall.

1.4.2 The material/product alternation.

The next alternation is the material/product alternation. This is classed by Levin as an alternation of creation or transformation (Levin 1993: 56). It differs from the Locative alternations above by having two potential Theme arguments which both undergo a change of state. These Themes alternate around the direct object position as in the examples below.

(24) a. Jane made a cup out of the clay.
b. Jane made the clay into a cup.
(25) a. Maria carved a longbow out of the yew.
b. Maria carved the yew into a longbow.

In the (a) forms the material is transformed into a product, in the (b) forms the product is created from the material. The Themes in both forms are change of state and they can be seen as examples of Tenny’s Measure argument. The event is delimited by the state of the longbow or the yew or the clay and the cup in being transformed into the end product. This is like the COS Theme in the spray/load alternation but it does differ from that alternation as both forms have the same resulting state. There is also a holistic effect associated with the (b) forms so that all of the clay or all of the yew is expected to be used. This is like the holistic effect of the spray/load alternation.

(26) a. Jane made a cup out of the clay and she only used half of it.
b. #?Jane made the clay into a cup and she only used half of it.
(27) a. Maria carved a longbow out of the yew and she didn’t even use half of it.
b. #?Maria carved the yew into a longbow and she didn’t even use half of it.
The material/product alternation has two patterns of behaviour. The main pattern is shown by the majority of the verbs which occur in this alternation. They are build verbs (Levin 1993: 56). This allows either arguments to be optional when not in the direct argument position. A few verbs do not behave this way. Most surprisingly, one of these verbs is the canonical material/product verb, make. For this small group of verbs the material can be omitted but never the product, whether it is in direct argument position or not. These verbs are shown below.

(28)  a. Jane made a cup out of the clay.
     b. Jane made the clay into a cup.
     c. Jane made a cup.
     d. #Jane made the clay.

(29)  a. John fashioned a noose out of his necktie.
     b. John fashioned his necktie into a noose.
     c. John fashioned a noose.
     d. #John fashioned his necktie.

The other build verbs are acceptable without the product, (30) and (31), because they have a specified manner which can be read as just the action without a necessary endstate result. It seems that the verbs with underspecified manner such as fashion and make are unacceptable as simple manner of acting verbs.

(30)  a. Maria carved a long bow out of the yew.
     b. Maria carved the yew into a longbow.
     c. Maria carved a longbow.
     d. Maria carved the yew.

(31)  a. Max cast the ring out of the gold.
     b. Max cast the gold into a ring.
     c. Max cast the ring.
     d. Max cast the gold.
1.4.3 The conative alternation.

Another alternation is the conative. This differs from the previous alternations, as it is Patient3-centred rather than Theme-centred. The conative is characterised as an alternation between the transitive forms of the verb. The forms alternate between having a direct object and having the same direct argument expressed as a PP headed by at (Levin 1993: 41-2). The verb in both forms of the alternation is generally a verb of contact or motion but the at-variant has an additional sense of failure to achieve contact or movement. This is illustrated below.

(32)  a. Janet kicked the ball.
    b. Janet kicked at the ball.
(33)  a. Paul poked the table.
    b. Paul poked at the table.

In the (a) forms the action is implied to succeed. In the (b) forms however, the action implicitly fails. This can be seen in the examples below.

(34)  a. #Janet kicked the ball and missed.
    b. Janet kicked at the ball and missed.
    c. Janet kicked the ball across the field.
    d. #Janet kicked at the ball across the field. 4
(31)  a. #Paul poked the table and missed.
    b. Paul poked at the table and missed.
    c. Paul poked the table in order to move it a little.
    d. #Paul poked at the table in order to move it a little.

While the meaning difference is a systematic shift in meaning, this alternation differs from the others in that, lacking a Theme argument, there is no Measure reading available as there is for the material/product and spray/load alternations previously discussed.

3 In a verb of contact such as kick or other conative verbs, the Patient is the contactee. The Patient is a Theme-like entity although it is not part of the thematic role list in which Themes occur. Jackendoff contrasts the Patient with the Agent in his Action Tier (Jackendoff 1990: 125)
4 This is acceptable if Janet is across the field herself but not in the sense that her kick propelled the ball across the field.
1.4.4 The dative alternation.

The last alternation considered is the dative, along with the closely related benefactive. This is often treated as a part of the dative alternation (Goldberg 1995 for example). Although I do not treat it as such here, I will discuss them together as they share a number of similarities.

These two alternations are quite different from the other alternations discussed so far. All they have in common is that they are VP-internal. The dative and benefactive are characterised by the alternation of their two internal arguments. This produces no clear meaning change, unlike the Locative material/product and conative alternations.

The dative has alternating arguments in both variants. The meaning tends to involve some kind of transfer by the agent to a recipient. This can be actual transfer such as give or pay, or it can be potential transfer such as promise or owe. The related benefactive meaning has a core sense of an event executed in order to benefit the recipient in some way. The recipient does not need to actually receive the product of the event, it seems that simple intent is sufficient. This is also true for some of the dative verbs although not all of them. The dative verbs can be grouped into three sub-groups: the core dative verbs where the transfer is entailed and must be achieved; the more peripheral dative verbs where the receipt of the Theme is not obligatory; and the benefactive-type of dative where the intention of transfer is sufficient.

The first group can be considered the dative verbs proper. They entail that the recipient receives the object.

(32) a. John gave flowers to Mary. (#but she didn’t get them).
    b. John gave Mary flowers. (#but she didn’t get them).

(33) a. Max handed the file to Jemima. (#but she didn’t receive it).
    b. Max handed Jemima the file. (#but she didn’t receive it).

The second group does not entail that the recipient receives the Theme. These are verbs where the receipt is prevented somehow. Examples are shown below and it must be noted that the entailments of the first group do not apply5.

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5 For some speakers these examples are marginal. See Green, G. (1974) for discussion of this point.
(34) a. John sent flowers to Mary. (but he gave the florist the wrong address).
    b. John sent Mary flowers. (but he gave the florist the wrong address).
(35) a. Max showed the file to Jemima. (but she wasn’t paying attention).
    b. Max showed Jemima the file. (but she wasn’t paying attention).

The internal arguments of both of the first two groups are obligatory and the sentences are ill-formed if either the Goal or the Theme is omitted.

(36) a. #John gave flowers.\(^6\)
    b. #John gave Mary.
(37) a. #Max handed the file.
    b. #Max handed Jemima.
(38) a. #John sent flowers.
    b. #John sent Mary.
(39) a. #Max showed the file.
    b. #Max showed Jemima.

This is not the case for the benefactive-type of dative. This is the dative which has no entailment of receipt or even an attempt at transfer, merely an intention of transfer to the Goal. The Goal is omissible without any odd effects although the Theme is not.

(40) a. John bought flowers for Mary. (but he kept them for himself.)
    b. John bought Mary flowers. (but he kept them for himself.)
(41) a. John bought flowers.
    b. #John bought Mary.

Although the benefactive shares the same configuration of arguments as the dative proper it differs substantially in meaning, entailments and the status of its arguments. The dative is a ternary predicate and all of its arguments are obligatory. The benefactive is not ternary, it borrows the form of the dative but lacks the other elements of meaning. The benefactive shares elements of the dative but at a remove, incorporating the sense of benefit to the recipient but not the necessity of transfer or receipt of the Theme.

\(^6\) For examples (36a), (38a) and (39a) the sentences are generally good if the Goal can be understood from the context.
Having discussed the issues as they apply to other alternations, it is time to look at the alternation that lies at the centre of this thesis. This is the swarm alternation. The next section will outline how the alternation appears in the literature and then cover the characteristics which set this alternation apart from the others. The section following that will discuss the often-cited similarities between the swarm and the spray/load alternations.

1.5 The swarm alternation.

The swarm alternation is one of the Locative VP-internal alternations (Levin 1993: 53). It has been much commented on in the literature but not widely investigated. Most commentary has been confined to noting its characteristic forms which are given below. There have been a number of different terms employed to refer to them by the various researchers who have studied this alternation, I will refer to them as the Locative and the with-variant respectively.

(42) a. Bees\textsubscript{Figure}\textsuperscript{7} swarm in the garden\textsubscript{Location} (the Locative frame) 
b. The garden\textsubscript{Location} swarms with bees\textsubscript{Figure} (the with-frame)

Some other examples include,

(43) a. Water bubbled in the fountain. 
b. The fountain bubbled with water.

(44) a. Thorns bristled on the briar. 
b. The briar bristled with thorns.

(45) a. Fish abounded in the pond. 
b. The pond abounded with fish.

(46) a. Delight sparkled in her eyes. 
b. Her eyes sparkled with delight.

(47) a. Thousands of roaches crawled on the floor. 
b. The floor crawled with thousands of roaches

(48) a. Mischief danced in her eyes 
b. Her eyes danced with mischief.

\textsuperscript{7} Here I am using Figure and Location to refer to the arguments to avoid committing to a thematic role analysis at this point.
a. Thousands of flies buzzed in the room.
b. The room buzzed with thousands of flies

1.5.1 The *swarm* alternation in the literature.

Jespersen appears to make the earliest mention of *swarm* noting both possible sentence forms but not discussing them further, “The subject cannot be defined by mean of such words as active and agent, for they do not cover such cases as […] “the garden swarms with bees” (otherwise expressed as “bees swarm in the garden)” (Jespersen 1933: 319).

Nilsen (1973) mentions the swarm alternation as does Lee, who includes swarm as a kind of ‘peculiar semi-paraphrase’ (Lee 1967: 73) in his examination of the preposition with. He assumes like others, (Levin 1993: 54) that the swarm alternation can be treated as spray/load is if it is assumed that ‘these verbs may lack underlying subjects, and that their underlying objects become superficial subjects’ (Lee 1967: 73).

Fillmore links spray/load and swarm, listing them as the same phenomenon but he does not discuss them further.

i. ‘Bees are swarming in the garden’
ii. ‘The garden is swarming with bees’
iii. ‘He sprayed paint on the wall’
iv. ‘He sprayed the wall with paint’ (Fillmore 1968: 48)

The only person to investigate the swarm alternation in any detail is Morris Salkoff who analysed the productivity of the verbs in the alternation. As part of his investigation Salkoff (1983) introduced a further two frames to the two canonical frames. These were adjectival frames consisting of deverbal adjectives with copula be and pure underived adjectives, as illustrated below.

(50) a. The tree is abud with green shoots.
b. The water is afizz with bubbles.
c. The room is aclatter with typewriters.
d. The grill is asplutter with oil. (Salkoff 1983: 299)
(51) a. The deer is big with young.
    b. He is flush with money.
    c. The story is rich with humour. (Salkoff 1983: 298)

These have not been discussed elsewhere in the literature. Salkoff noted that for a good many of these forms there was no acceptable Locative variant. Although he did not include most of the pure adjectives he discussed as part of the swarm alternation because of this deficit, he did include the deverbal adjectives as they were related to the verbal forms. If there was no Locative deverbal adjective form available, it was usually the case that there was a Locative verbal form instead. Salkoff represented this in a schematic form as shown below. Salkoff claimed that a ‘path’ through the schematic was part of his criteria for deciding if a given verb was a member of the swarm alternation or not. This is illustrated by the blaze examples he gives.

![Schematic diagram of the swarm alternation]

For such a complete paradigm, the schema shows that there are two paths to get from (…) (a) to (…) (d). The first path is

(a) Stars blazed in the sky
   = (b) The sky blazed with stars
   = (d) The sky was ablaze with stars

The second path is (a), (c), (d). (Salkoff 1983: 304)

The (c) and (d) forms are related to the (a) and (b) forms by a process of adjectivalisation which Salkoff represents as a lexical derivation. Despite including the deverbal adjectives in the alternation Salkoff focused squarely on the verbs and did not investigate the adjectival data any further than to ascertain whether they could provide an
acceptable with-variant form in the cases where there was not an acceptable verbal one. The manner in which he represents the “subcategorisation” frame for the deverbal adjectival sentences shows strongly that he considered them more verbal than adjectival for his analysis.

1.5.2 Characteristics of the *swarm* alternation.

Like the other alternations discussed this far, the swarm alternation has certain characteristics. The first of these is the meaning of the variant forms. They are the Locative and the with-variant. The Locative has an activity or event located within an area. This is shown below.

(53) a. Bees swarmed in the garden.
    b. Fleas hopped in the carpet.

The with-variant has the Location from the Locative promoted into subject position and the former subject expressed as a Displaced Theme in a PP headed by with. The with-variant form has the same meaning as the Locative as well as an additional sense of holism which the Locative lacks. This holism has the reading that the referent of the with-PP is distributed throughout the location or otherwise affecting it totally.

(54) a. The garden swarmed with bees.
    b. The carpet hopped with fleas.

The arguments of swarm are different from those of the alternations discussed so far as they have all been transitive alternations. In the Locative form only the subject is obligatory. Although the locative PP is habitually included it is not in fact obligatory. This is shown below.

(55) a. Bees swarmed.
    b. Fleas hopped.

In the case of the with-variant form, both arguments are usually obligatory.
Salkoff includes metaphorical expressions such as *Fury blazed in his eyes*, *His eyes blazed with fury*. The metaphorical expressions differ in the properties reviewed above. There is no clear holism contrast between the Locative variant and the with-variant (compare (57a) and (57b)). The Locative variant of the metaphorical expressions generally cannot appear without the Locative PP (as in (57 c., d.). However the with-variant may appear without the with-PP (see 57 e. and f.).

The metaphorical forms will be discussed further in Chapter Two. Also discussed further in Chapter Two is the marked form, the with-variant. It is the most restricted form and has the particular swarm meaning associated with it.

While all of the above characteristics serve to define the swarm alternation, it is the holistic effect which has attracted all of the attention in the literature. This is the difference, mentioned briefly above, between *Bees swarmed in the garden* and *The garden swarmed with bees* where the Locative sentence implies simply that there are some bees in the garden and they are moving about in a swarm. The with-variant has a more specific sense of the verb such that the garden is understood to have bees swarming throughout, that no part of the garden is free of bees. The nature of this holistic effect is discussed in more detail below as it is the most commonly cited correspondence between the spray/load and swarm alternations. This next section will review the comparison between swarm and spray/load. I will discuss how the alternations differ and where they are similar.
1.5.3  The *swarm* alternation and the *spray/load* alternation.

The swarm alternation has been explicitly linked to the spray/load alternation by a number of different researchers. This is because although swarm is an intransitive alternation and spray/load is a transitive one, they seem to share a number of important features. The first point of correspondence is their sentence forms. Both alternations have a Locative and a transposed with-variant. In the spray/load alternation, the arguments which are transposed to form these pairs are the direct argument and the Locative. For the swarm alternation it is the external argument and the Locative.

It has been suggested that the swarm alternation and the spray/load alternation are aspects of the same Locative alternation (Levin 1993: 50). In this kind of analysis the swarm verbs are treated as unaccusatives, meaning that their Locative subject is an underlying object which corresponds to the spray/load object.

1.5.3.1  The holistic effect.

However the main point of correspondence between the swarm verbs and the spray/load verbs is the holistic effect exhibited by both alternations’ with-frames. In both forms, as shown below, the Location is considered to be totally affected by the Theme (Levin 1993: 50). Thus the garden is full of bees swarming around, everyone in the town is talking about the rumour, the truck is fully laden with hay and all of the wall is considered to be covered with paint.

(58)  a. The garden swarmed with bees.
     b. The town buzzed with the rumour about the mill closing down.

(59)  a. John loaded the truck with the hay.
     b. Mary sprayed the wall with the paint.

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8 Salkoff notes that a middle transformation applied to some transitive verbs yields *swarm*-like sentences, for example *pile up*. A number of the verbs he discusses are *spray/load* verbs however he does not suggest the middle as an explicit link to the *spray/load* alternation.

(a) Max piled up books on the desk.
(b) Max piled up the desk with books.
(c) Books piled up on the desk.
(d) The desk piled up with books. (Salkoff 1983: 324)
Levin calls this the holistic/partitive effect and does not distinguish between the holism shown by the two alternations. However the holism of the spray/load alternation is not that of the swarm alternation. The holistic effect of the spray/load alternation results from the direct internal argument being an Incremental Theme. For example in John loaded the hay into the truck, the hay is moved from its initial location into the truck. It is a Motion Theme. However crucially it is not just moved in the event but ‘used up’ in the course of the event and is properly an Incremental Theme. When all of the hay has been transferred then the event ends. The hay can be said to be the bound of the event. The same process holds for the truck in John loaded the truck with the hay. The with-variant has the Locative NP promoted to direct argument position where it is the Incremental Theme. The promoted Location is not a Motion Theme. It undergoes a change of state from being empty of hay to being full of it at the event’s end so the truck can also be described as a COS Theme. Once the truck is fully laden with the hay the event ends. In the with-variant the truck is the bound of the event.

The swarm verbs have no such bounding. The initial Locative subject is a simple Theme whose existence is asserted in the Location. It is not a Motion Theme because there is no motion into or out of the Location as there is in spray/load. The entity is simply asserted as existing. In the with-variant as well the roles differ from those of the spray/load alternation and the event is also unbounded. The Locative does not change state when it is the subject and thus it keeps its Location thematic role. The Theme is removed from subject position but retains its role as well. In the with-PP it is a Displaced Theme as it still denotes the entity whose existence is asserted in the Location.

The boundedness or telicity exhibited by the spray/load alternation is the property associated with Tenny’s AIH Measure argument. The spray/load verbs imply an inherent endpoint to the events they appear in which is realised by the Incremental Theme or Measure argument.9 When the Measure argument is expended the event ends with it. This does not occur for the swarm verbs because there is no change of state, change of location or anything which can be interpreted as a Measure argument. The subject Location is simply described as completely filled with large numbers of the entities expressed in the with-phrase, which move about within the Location.

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9 The Measure argument is not always an Incremental Theme as not every telic event has an Incremental Theme. However if there is an Incremental Theme in the verbal event, then it will receive the Measure argument interpretation.
The atelicity which is shown by the swarm verbs but not by the spray/load verbs can be tested by adverbial Aktionsarten tests such as the ones shown below. These apply to durative events such as those denoted by both the swarm and spray/load verbs but they have differing results depending on the telicity of the verbal event. The in + time adverbial and the take + time construction express the duration of telic events while the for + time adverbial identifies atelic events.

(60)  
  a. Jane loaded the piano onto the truck in five minutes.
  b. Jane loaded the truck with the piano in five minutes.

(61)  
  a. It took Jane five minutes to load the piano onto the truck.
  b. It took Jane five minutes to load the truck with the piano.

(62)  
  a. #Jane loaded the piano onto the truck for five minutes.
  b. #Jane loaded the truck with the piano for five minutes.

The opposite holds for the swarm verbs. There is no endpoint encoded into the verb and so they are acceptable with the for + time adverbial because the bees can be understood to be simply swarming around within the garden for that set period of time with no commitment to finishing swarming at the end of the time, unlike the unacceptable readings in (63) and (64) where they are implied to finish their swarming in the allotted time. There is a repair reading of a delay before the onset of the activity possible with both (63) and (64) but the sense that the swarming event ends at the end of the time period is unacceptable.

(63)  
  a. #The garden swarmed with bees in five minutes.
  b. #The bees swarmed in the garden in five minutes.

(64)  
  a. #It took a day for the garden to swarm with bees.
  b. #It took a day for the bees to swarm in the garden.

(65)  
  a. The bees swarmed in the garden for a minute.
  b. The garden swarmed with bees for a minute.

1.5.3.2 The unaccusative analysis.

The attempted unification of the spray/load and the swarm alternations requires that the swarm verbs be unaccusative so that the surface swarm with-variant subject is considered to be an underlying object like the spray/load with-variant Locative NP. In fact
they are not, as is shown by the causativisation test below. Unaccusatives allow themselves to be causativised because their subject is an underlying object and thus at deep structure there is an empty subject position for the agent to occupy. Unergative verbs resist causativisation because they have underlying subjects and no objects and there is no external argument position free for the causative agent to occupy.

(66)  

a. John froze the sorbet. (The sorbet froze.)  
b. Maria melted the wax. (The wax melted.)  
c. Paula collapsed the tent. (The tent collapsed.)

(67)  

a. ?John swarmed the garden with bees.  
b. #John swarmed the bees in the garden.

(68)  

a. #Maria danced her eyes with mischief.  
b. #Maria danced mischief in her eyes.

(69)  

a. #Paula buzzed the jar with flies.  
b. #Paula buzzed the flies in the jar.

The swarm alternation and the spray/load alternation cannot be given a single unified analysis as the swarm verbs are not unaccusative. They are instead unergative. This means that the argument arrays cannot be treated similarly. Furthermore as the swarm verbs are atelic process verbs this means that there is no Measure interpretation available as there is for the spray/load verbs. This is a contrast to Tenny who explicitly includes swarm verbs as unaccusatives (Tenny 1994: 55-57).

1.5.3.3 The distributive noun phrase.

Although the holism of the spray/load alternation is not the same as that of the swarm alternation and they cannot be treated as related to each other in an underlying form, there is one point of correspondence between them that is usually overlooked. This relates to the observation made by Salkoff (1983: 291-293) and others that the swarm alternation generally requires a mass NP for the with-variant PP. This is because the Locatum is spread or distributed throughout the Location and therefore requires an NP with a distributive referent.10 A singular or count NP is generally not distributive. The

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10 A distinction must be made between holism and distributivity. Distributivity is the quality whereby an NP may be spread or distributed throughout the location. Holism is the degree to which the NP affects its location. Thus bees are distributive in the with-variant and the garden is claimed to be holistically affected in the with-variant. Between the spray/load and swarm alternations there
examples below show how the Locative form in both alternations is acceptable with a singular NP but the with-variant is unacceptable. In (70a) the book can be loaded onto the truck without any problem because the entire entity denoted by the NP is loaded onto the truck, satisfying the requirement that all of the Motion Theme be transferred. However in (70b) the sentence is unacceptable because the NP is not distributable and so the truck cannot be considered to be laden or full. Similarly in (71) and (72) the jar and the garden cannot be considered distributively affected by a small, defined number of bees. A small number of bees cannot seem to overwhelm a garden to the extent that they appear to be everywhere within the location. If they are distributed throughout the location they are not of significantly large enough number to have an impact.

(70) a. Paula loaded the book onto the truck.
    b. #Paula loaded the truck with the book.

(71) a. A dozen bees swarmed in the garden.
    b. #The garden swarmed with a dozen bees.

(72) a. A fly buzzed in the jar.
    b. #The jar buzzed with a fly.

The entailed endstate in the spray/load construction assumes the Goal is full or totally covered, so the Theme must be distributed throughout the location for this to hold. The holistic interpretation in the swarm alternation is also understood as distributive location. Nevertheless the alternations will be assumed to be distinct.

1.5.4 Summary of the relationship between the spray/load alternation and the swarm alternation.

The traditional view of the swarm alternation is that it is related to the spray/load alternation. It has been demonstrated in the above section that this comparison is chiefly derived from the apparent similarity of the holistic effect they both exhibit. However it has also been shown that the holism is of a rather different sort and is not in fact a valid basis for a comparison. The spray/load verbs are of a different type from the swarm verbs, being eventive, transitive and having a Theme in the direct argument position while the swarm verbs are both eventive and stative, as well as being atelic and, as intransitive unergative

is a correspondence in their requirement for a distributive NP but a difference in the holism which is exhibited by the alternations.
verbs, having no direct argument Theme. The notion that the swarm alternation could be
treated as an unaccusative does not hold up to close scrutiny either despite the statements
of Tenny (1994) and Levin (1993) amongst others. The differences between the verbs in
the swarm alternation and the spray/load alternation are simply too great to be considered
to be aspects of the same alternation as has been suggested by Levin (1993: 50). It would
seem that there is no basis to the assumption that the swarm alternation and the spray/load
alternation are related beyond a shared requirement for a distributive NP in the with-phrase
variant.

The most obvious implication of the comparison between the swarm alternation and
the spray/load alternation is that they will be analysed in a similar fashion. That is to say
that it would be generally assumed that the swarm alternation is like the other alternations
discussed above in having one form derived from or somehow related to the other. The
disjunction between the swarm and spray/load alternations casts this assumption into doubt
and it must be asked how should the swarm alternation be analysed if it is not analysed
according to the behaviour and structure of the spray/load alternation? This discussion will
form the major part of Chapter Three where the two main analytical approaches are
discussed and evaluated for their applicability to the swarm alternation.

1.6 Summary.

Any analysis of the swarm alternation has some serious points to consider and
explain. One of these is the question of whether the swarm alternation is in fact a verbal
alternation like the others discussed earlier in this chapter. It seems possible that a standard
verbal analysis of the swarm alternation may not adequately cover such aspects of the
alternation as the presence of adjectives in the data already discussed.

If the swarm alternation is to be analysed as a verbal alternation then there are a
number of general alternation issues to be explained as well as ones which are specific to
the swarm alternation alone. It will be necessary to ascertain which of the forms is the
basic and which is the restricted or marked form. This relationship usually implies some
form of derivation from basic to restricted and so the rule of derivation must also be
formulated and tested. The underlying assumption behind this kind of derivation stems
from the principles of the UAH and UTAH, that the meaning determines the projection.
Therefore as well, the analysis must explain how it is that the one meaning gives rise to
two projections, or else it must account for the relationship between two lexical entries for
the same verb. The analysis must also account for the exceptions in the data as well as the adjectival forms that are not predictable from a verbal lexical entry. Such an analysis must also account for the holistic effect displayed by the swarm alternation’s with-variant form in such a way as concurs with the data.

While there is much to answer in a verbal account of the swarm alternation, the alternative is to explore what kind of alternation the swarm alternation could be if it is not a verb-based one. This moves away from the traditional derivational model and may allow for a better understanding of the behaviour of alternations in general and the swarm alternation in particular. The non-verbal issues of the swarm alternation must still be addressed but there would no longer be a need to explain a rule of derivation or make an explicit link between the basic and derived forms.

The discussion of the status of the alternation will comprise Chapter Three. This will take the form of a comparison between the verb class-based approach favoured by Levin and Rappaport amongst others and the Construction Grammar approach of Goldberg, Fillmore and others. There will be a discussion of the implications of the outcome of this evaluation in Chapter Four, along with an assessment of how it may encompass the recent research of Dowty into the swarm alternation. Chapter Two will present the data free of any theoretical framework so that its behaviour may be more clearly seen.
2 CHAPTER TWO

2.1 The verb classes.

This chapter looks at the data examined in the analysis of the swarm alternation. I will evaluate the claims made in the literature about the types and behaviours of the verbs claimed as part of the swarm alternation as well as introducing my own data analysis and the findings from that.

Although there has been very little substantial research carried out on the swarm alternation, there is a high degree of consensus about the types or classes of verbs that make up this alternation. There are three main classifications of the verbs in swarm. They are by Salkoff (1983), Levin (1993) and Dowty (1999, 2000).

The first classification is that of Salkoff (1983). He proceeds from a simple observation that words with a similar meaning to swarm also tend to appear in similar sentences. His study extended to over 300 verbs and produced classes of verbs of sound emission (including animal sound); dance verbs; light emission; swarm and motion verbs (Salkoff 1983: 318-21). He notes that the pattern of productivity is far from predictable though, even within these classes. (Salkoff 1983: 321)

Levin (1993) cites Salkoff as her major reference for the swarm alternation and as such her groups are similar to Salkoff's. Levin has seven classes: light, sound and substance emission; sound existence; entity-specific mode of being; mode of being involving motion and swarm (Levin 1993: 53-4). She draws a distinction between the sound emission and sound existence verbs although it is not clear if this is in fact a useful or motivated distinction to make. Levin’s list of verbs which occur in the alternation corresponds largely to that of Salkoff. Levin also notes that there are some verbs which do not alternate, having either a Locative or a with-variant form but not both forms. This is in contrast to Salkoff (1983: 304) who required a pair of forms for inclusion in the alternation. Levin includes these asymmetric forms in the swarm alternation. She also noted that mass NPs are a requirement for some of the verbs. However she confines this to the non-alternating Locative preposition forms rather than the somewhat more widespread distribution given by Salkoff (1983: 292-3).
The verb classes noted by Dowty (1999, 2000) are derived from Levin and Salkoff. He reduces Levin’s seven groups to five, consisting of small, simple or repetitive movements; animal or other perceptually simple sounds; conceptually simple light emission; smells and tastes and degree of abundance (Dowty 2000: 115). He echoes the stipulation that the NP be mass or plural in the L-Subject (Levin’s with-variant/Salkoff’s Transposed variant, Levin 1993: 53; Salkoff 1983: 288). In addition to these semantic generalisations of verb class, the swarm verbs are intransitive, unergative and atelic verbs as noted in Chapter One.

2.2 The subcategorisation frames:

2.2.1 The canonical swarm frames.

In analysing and describing the swarm alternation, it is necessary to examine the subcategorisation frames in which the verbs appear. The first two frames are the canonical swarm alternation frames. They are called the Locative and the Transposed in Salkoff’s terminology, (Salkoff 1983: 288), the Locative and the with-variant in Levin’s discussion (Levin 1993: 51) and the Agent-Subject (A-Subject) and Location-Subject (L-Subject) by Dowty (Dowty 2000: 12). I will employ Levin’s terminology. The Locative takes the form of a noun phrase (NP) subject with an intransitive verb and a locative prepositional phrase (PP) adjunct as in (1). The with-variant has the Location from the Locative in the subject position with the former subject from the Locative in a (usually) obligatory PP with an invariant with as the preposition as in (2) below.

(1) NP₁ V P NP₂

The bees swarmed in the garden.

(2) NP₂ V with NP₁

The garden swarmed with bees.

These frames are usually considered to be the extent of the swarm alternation (Jespersen 1933: 319; Lee 1967: 73 and Fillmore 1968: 48), but there are actually two more frames that deserve closer attention. These are forms of the with variant with either a deverbal adjective, as in (3) below, or an underived adjective, shown in (4), replacing the lexical verb.
Salkoff names these as a kind of ‘work-around’ in the instance that a verb does not have a complete pair of verbal forms (Salkoff 1983: 299-304). The first of this pair is the deverbal adjective frame. Salkoff noted that most, if not all, of the adjectives in this frame are derived from verbs which are acceptable in one or other of the basic swarm frames. In fact he exploits this in the case of the verbs which lack one of the two canonical forms, using the deverbal adjective to complete his paradigm (Salkoff 1983: 299-306). Salkoff notes that his principal criterion for selecting a verb as a swarm verb was whether it had a with-variant form or not (Salkoff 1983: 305). The Locative was apparently assumed to always be acceptable although Salkoff does not state this.

The deverbal adjectives are derived by a process of affixation, either of the prefix a-, the suffix -y or by affixation of some other adjective-forming morpheme. The most common appears to be the prefix a- and Salkoff discusses the productivity of this affix in some detail. He notes that it is a very productive affix although many of its forms are considered non-standard because of their lack of attestation (Salkoff 1983: 300). He also notes that it is generally true that swarm verbs which have an acceptable deverbal adjective form also have an acceptable verbal form.

The final frame added to the analysis is also adjectival. However none of the adjectives that occur in this frame are derived from the swarm alternation verbs. Although Salkoff noted a number of examples of underived adjectives as possible participants in the swarm alternation, he ultimately excluded them from his analysis in any significant numbers because there were no satisfactory Locative forms. He included a few where ‘there is no difficulty with the forms’ (Salkoff 1983:299).

In order to investigate what kind of relationship these adjective sentences bore to the swarm alternation, I included a large number of them in the data analysis. The kinds of adjectives included tended to be simple properties such as colour, temperature or texture. Some examples are shown below.
In the next section the data will be discussed in detail, starting with the verbs, then moving to the adjectives and the deverbal adjectives, in order to give a more complete understanding of the behaviour of the swarm alternation.

2.3 The Data.

2.3.1 Verbs.

In Chapter One I discussed what it means to say that a verb or verb class is part of an alternation. One of the key points noted there about alternations is that one of the subcategorisation frames is considered to be more basic, or less restricted, in its behaviour.

The swarm alternation, like the other alternations discussed, exhibits this behavioural asymmetry. It is clear from the data analysis that the least restricted frame is the Locative. Obviously in an examination of data culled from other lexical studies of a particular verbal phenomenon there will be few verbs that do not participate at least partially in the phenomenon and the swarm verbs show this. Of the data examined there were Locative and with-variant frames for almost all of the verbs studied. What is interesting to note is that in a wider context there are a great many potential swarm verbs which can appear in a Locative frame which are not actually swarm-class verbs and which cannot occur in a with-variant frame. For example verbs such as fly, play, parade, crouch, and squat could be considered manner of motion verbs like swarm, teem, crawl. They have Locative forms and yet they are not acceptable in the swarm with-frame.

(5)   a. The shirt was red with blood.
      b. Her nose was yellow with pollen.
      c. The hills were white with snow.
      d. The house was alive with termites.
      e. John was flush with money.
      f. Jane was livid with rage.
      g. His eyes were wide with fear.

(6)    a. Birds flew in the sky.
      b. #The sky flew with birds.
(7)  
  a.  Children played in the garden.
  b.  #The garden played with children

(8)  
  a.  Bands paraded in the square.
  b.  #The square paraded with Bands.

(9)  
  a.  Marines crouched in the undergrowth.
  b.  #The undergrowth crouched with marines.

(10)  
  a.  Boys squatted in the corner.
  b.  #The corner squatted with boys.

None of these verbs have a possible with-variant form. This observation can be extended to verbs which do not even potentially fit into one of the semantic classes discussed previously, such as eat, drive, die and teach.

(11)  
  a.  Men ate in the cafeteria.
  b.  #The cafeteria ate with men.

(12)  
  a.  Tourists drove in the country.
  b.  #The country drove with tourists.

(13)  
  a.  Soldiers died in the trenches.
  b.  #The trenches died with soldiers.

(14)  
  a.  English teachers taught in France.
  b.  #France taught with English teachers.

While all of these examples have acceptable Locative forms, none of them have with-variants which are even slightly acceptable. This shows a marked difference between the Locative and with-variant. Verbs which participate in the with-variant tend to have a matching Locative variant. However verbs which have a Locative but no with-variant are very common. Some have been identified above and there are many others which do not fit into the semantic classes identified for swarm verbs and yet can appear in the Locative frame. This asymmetry shows that the with-variant is the frame which needs to be examined more closely as it clearly has more to offer about the meaning of the swarm alternation. Accordingly the rest of this chapter will focus on the behaviour of the with frame.
2.3.2 The *swarm* verbs proper.

Membership in the swarm alternation then is dependent on whether a verb can occur in the with-variant or not, regardless of whether it has a Locative form as well. Additionally the swarm verbs have some behavioural peculiarities within the groups already identified. One of these peculiarities is with the interaction between the sound verbs and their with-phrase NP. For some of them a simple NP denoting the producer of the sound is less acceptable than one denoting the sound itself.11

(15) a. #?The hills echoed with rutting stags.  
    b. The hills echoed with the roars of the rutting stags.

(16) a. ?The hall twanged with guitars.  
    b. The hall twanged with the sound of guitars.

(17) a. #?The courtyard cackled with geese.  
    b. The courtyard cackled with the calls of geese12

There are also sound verbs which behave in the opposite fashion where the with-phrase NP must denote the producer rather than the sound to be acceptable.

(18) a. The eaves twittered with sparrows.  
    b. #?The eaves twittered with the chirping of sparrows.

(19) a. The room buzzed with flies.  
    b. #?The room buzzed with the high-pitched whine of the flies.

(20) a. The office clattered with typewriters.  
    b. #?The office clattered with the tapping of typewriters.

It must be noted that Salkoff claims the opposite effect for the animal sound verbs like twitter, saying that all words referring to the production of sound by animals are acceptable in the with-variant if they refer to the sound rather than the producer (Salkoff 1983: 307). There is a great deal of variation as to whether the sound can be judged

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11 This is noted by both Dowty and Salkoff. Salkoff offers a method of determining if an NP must be modified or not in his paper (Salkoff 1983: 307-308), while Dowty notes that it may be due to specific lexical restrictions on the verbs so that they cannot be used to denote both sound and producer, unlike the LIGHT verbs which tend to allow this. (Dowty 2000: 118). Neither offers an explanation of why this occurs.

12 These are Dowty’s judgements (Dowty 2000: 118). There was no consensus on these examples in my datasets.
acceptable or not. If the sound is prototypically made by the producer, whether this is animal or otherwise, then the sound itself seems to be preferred as the with-variant NP. This would appear to be a metonymic relationship where the prototypical sound is understood to mean its producer. If the sound is not a usual or typical sound for that producer, the metonymic relationship cannot hold and so the sentence is considered odd. However this is speculation as the judgements on the datasets were inconclusive. It seems that the judgement as to whether a sound is able to characterise a Location is an idiosyncratic one and a precise examination is best left to another study.

The entity-specific modes of being verbs are also notable for some peculiarities of behaviour. This group includes verbs like bloom, blossom, flower and sprout. They sound awkward in sentences with a simple NP in the with-phrase, particularly one which is zero-related to the verb as in the examples below.

(21) a. The bush bloomed with blooms.
    b. The cherry tree blossomed with blossom.
    c. The garden flowered with flowers.
    d. The seed-tray sprouted with sprouts.

These examples are acceptable with a modified NP, as in (22), or with a different Theme in the with-phrase.

(22) a. The bush bloomed with thousands of fluffy white blooms.
    b. The cherry tree blossomed with clusters of tiny pink blossom.
    c. The garden flowered with all kinds of colourful flowers.
    d. The seed-tray sprouted with tiny green sprouts.

The unacceptability could be attributed to an effect from the apparent incorporation of the entity named as the Theme into the verb. Repetition of this again produces an awkward reading. These entity specific verbs are notable also for being the only ones in the groups which systematically allow the with-phrase to be omitted. For other swarm verbs this results in unacceptable sentences. Compare (23) and (24):

(23) a. The bush bloomeda.
    b. The cherry tree blossomed.

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(24) a. The bush bloomeda.
    b. The cherry tree blossomed.
c. The garden flowered.

d. The seed-tray sprouted.

(24)  a. #The garden swarmed.
      b. #The eaves twittered (with sparrows).
      c. #The room buzzed (with flies).
      d. #The office clattered (with typewriters).

### 2.3.2.1 Hyperbole, metaphor and the holistic effect.

As will be apparent from the data discussed thus far, there are verbs which do not show the characteristic holistic effect which is the most noted aspect of the swarm alternation. This is often found in the light emission verbs but it is not an effect which is confined solely to them.

(25)  a. Her eyes sparkled with delight.
      b. Delight sparkled in her eyes.

(26)  a. His eyes twinkled with laughter.
      b. Laughter twinkled in his eyes.

(27)  a. Her eyes danced with mischief.
      b. Mischief danced in her eyes.

(28)  a. The child’s eyes glittered with fever.
      b. Fever glittered in the child’s eyes.

(29)  a. He burned with lust.
      b. Lust burned within him.

There are no grounds for claiming a holistic effect in the with-variant, it appears to express the same meaning as the Locatives in the (b) examples. However they are still appear to be swarm verbs. To see what is happening further, consider the following set of sentences as well.

(30)  a. The sky sparkled with stars.
      b. Stars sparkled in the sky.

(31)  a. The cave twinkled with glow-worms.
      b. Glow-worms twinkled in the cave.
In this latter group of sentences there is a holistic effect in the with-variant (a) forms. To understand why some sentences have a holistic effect and why some do not, the with-NP and the sense of the sentence must be considered. As noted by Dowty there are three kinds of meaning in the swarm sentences, literal, hyperbole and metaphorical (Dowty 2000:119). The literal sense is seen in the canonical sentence The garden swarms with bees. This means that there are lots of bees swarming around and they are in the garden. The hyperbolic sense is shown in the example above, (32a), The night air danced with thousands of fireflies, where the fireflies perform a movement that can be interpreted as having a physical resemblance to a dance but cannot be called a dance because the flies are not following steps or music. The metaphorical sense can be seen in Her eyes danced with mischief. Her eyes do not actually dance and nor do they move in a manner resembling a dance, the metaphorical meaning is that ‘Her expression is such that she has a mischievous expression.’

It would seem that the metaphorical and some of the hyperbolic readings lack the holistic sense hitherto considered a diagnostic of the swarm alternation because the referent of the NP contained within the predicate is such that it cannot be conceived of as distributed throughout the location as it is in the literal and some hyperbolic senses, such as The night air danced with thousands of fireflies or The garden swarmed with bees. To illustrate this point with just one verb, consider twinkle.

(34) a. The sky twinkled with stars.
   b. His eyes twinkled with good humour.

In (a) the sky itself does not give off light in bright pinpoints, it is the abundance of stars emitting light at different frequencies and strengths that creates an illusion of an overall shifting moving emission of light. This has a holistic reading, for the sky can only twinkle if there are so many stars that their cumulative presence is the focus rather than the black sky behind them. In the case of the metaphorical His eyes twinkled with good humour there are no discrete instances of good humour that twinkle in his eyes. There is
no holism in this example because there are no concrete or discrete examples of good humour to be distributed about the location.

In the examples where there is an actual physical referent, a mass or plural NP like the bees or fireflies, there is a holistic effect because the referent can be distributed around the Location and therefore a reading of being wholly filled can be made because of the degree to which the distributed NP is seen to be affecting the Location. In the examples where the referent is an abstract entity such as mischief or good humour there is nothing that can be distributed around the Location and thus there is no degree of affectedness or holistic reading available. For both senses there is an effect of property predication whereby the individual details of the referents are less salient than the whole, overall impression given by the referents in the location. This is a kind of perceptual distancing which is not dependent on a distributive entity within the Location. When there is a distributive entity it can be seen to be throughout the Location and a holistic effect can be inferred from the extent of its spread. When the entity is not distributive then it is just the perceptual distancing which occurs and there is no holistic effect. The holistic effect is therefore an incidental effect of having a distributive entity as part of the property predication sense of the alternation. This predication will be discussed further in the next section.

2.3.2.2 Predicating a property of the Location.

If the holistic effect is not a diagnostic for the swarm alternation then what is? The answer lies in the distinctive meaning associated with the with-variant which cannot be explained as an effect of a subject-forming process which derives the with-variant from the Locative. One of the ways to investigate this meaning is to examine the entailments of the with-variant. The first point to note is that The garden swarms with bees has a number of entailments. The first of these is that if the garden swarms with bees then there are bees in the garden. A second is that if the garden swarms with bees then the bees are swarming. These two entailments combine to form the complex property $P'$. This can be shown as below.

i. The bees have the property $P$ of swarming.

\[ P(x) \]

ii. The bees are distributively located at the garden.

\[ x \text{ be D-Loc at } y \]
iii. Therefore, the garden has the property of swarming-with-bees.

\[ P'(y) = [P(x) \land x \text{ be D-Loc at } y] \]

\( P' \) is predicated on the subject, namely that the garden swarms with bees because there are bees distributed throughout the garden and they are swarming. This is a complex compositional property. The simple property \( P \) cannot be borne by the Location. A Location cannot swarm; this is an action performed by groups of small insects such that they move about in a dense group.

These entailments hold for all the members of the swarm alternation, both the adjectives and the verbs. However the degree to which they hold can best be described as a cline from pure physical location of a physical entity to a metaphorical location or metaphorical entity. The central physical sense of the alternation is extended to a fully abstracted sense.

The canonical swarm sentence illustrates the most common meaning ascribed to the swarm alternation, that of physical entities in a physical location that shows a high degree of affectedness by the entities thus located. As has been mentioned already there are extensions to this central physical sense such as the hyperbolic and metaphorical senses noted by Dowty (Dowty 2000: 119). Rather than simply stating these extensions as unconstrained abstractions their entailments can be examined to see to what extent or degree they share the central complex physical property associated with this alternation.

As the next step in the cline consider The air danced with fireflies. This entails There are fireflies in the air and their movement can be interpreted metaphorically as resembling a dance. Therefore because property \( P \) holds (the fireflies are dancing) and the distributive location property holds, \( P' \) holds and the air has the complex property \( P' \), that of dancing-with-fireflies. However unlike the swarm example, the sense here is not a purely physical property. The interpretation of the fireflies as dancing is an abstraction, a hyperbolic use of the verb and this carries through into the whole composite property \( P' \).

A further step away from the central physical sense towards a purely abstract sense of the alternation is shown in the example, The girl’s eyes sparkled with delight. Although the locational entailment holds, There was delight in the girl’s eyes, it is not true that delight sparkles. This is the first example where the property \( P \) is not borne by the with-NP. Delight does not inherently sparkle as it is an emotion, not a physical object capable of emitting or reflecting light. What actually sparkles is the eyes of the girl as part of her
delighted expression. If P does not hold then \( P' \) should not follow and yet it seems that \( P' \) does in fact still hold, albeit in a metaphorical sense. Although there is no actual delight which can be concretely referred to or located the overall expression fits with the complex property meaning of \( P' \). This is the most abstract sense exhibited for the verbal forms and it shows that even though the property entailment P does not hold, the central sense of the complex property is retained through semantic extension.

This cline from pure physical referentiality to abstract metaphor is reflected in the adjectives discussed below. The next sections will examine the underived adjectives and then the deverbal adjectives. Included in this latter section are the passives which can be shown to be part of the swarm alternation.

2.3.3 Adjectives.

Salkoff alone of the commentators on the swarm alternation discusses an adjectival frame as part of the alternation. However he ultimately excluded adjectives as a major part of the alternation because they did not fit into his verbal analysis of swarm. While he retained the deverbal adjectives as a minor group, he dismissed the underived adjectives from his study save for a few where there was ‘no difficulty with the forms’ (Salkoff 1983: 299). One of his difficulties with the adjectives was the extensive number of adjectival with-variants which did not have Locative counterparts. Another difficulty lies with his focus on the verbs. His deverbal adjective subcategorisations are represented as morphological derivations from the verb and it is difficult to see how he could have represented underived adjectives without a prior verbal base. It is possible that his reason for representing them this way was to show the relationship between the deverbal forms and the verbs they were derived from. However they are not good subcategorisation frames as they mix morphology and syntax in the same frame. The relationship between the variant forms of the alternation needs to be represented in a way so as to separate the morphological processes from the syntactic operation. It is clear from Salkoff's discussion and his frames that adjectives which are not considered permutations of verbal forms have no place in his analysis of the swarm alternation.

2.3.4 The underived adjectives.

The canonical adjectival frame shares the same qualities as the verbal with-variant. It is the attribution of a complex property to a location. Generally the adjectives found in this construction denote colour or texture. Some examples are shown below.
(35)  

a. The shirt was red with blood.
b. The tip of his nose was yellow with pollen.
c. The hills were white with snow.
d. The shirt was crisp with starch.
e. The field was rich with grass.
f. John was flush with money.
g. The deer was big with young.
h. Jane was livid with rage.
i. His eyes were wide with fear.

As noted by Salkoff, the majority of the adjectives lack a Locative form of the type found in the verbal section. However as has also been noted in the verbal section, the with-variant entails a number of properties and one of these is a requirement that the entity is in or at the Location. So while there is seldom a Locative sentence like the verbal Locative, a locative sentence can be entailed of the with-variant. The adjectives follow the same cline as the verbal forms with respect to the diminishing physicality and increase in abstraction and metaphor. This is demonstrated with the examples below.

The shirt was red with blood entails that the blood is red. In a contrast to the properties held by the verbal with-NPs, the property entailed here is an inherent or individual-level property. The property held by the verbal NPs was not an inherent property but rather a stage-level or impermanent property. A strong implicature of this property is that the basic property held by the with-NP is also not held by the Location. Thus the shirt cannot already be a red shirt. Its redness comes from the redness of the blood. This is analogous to the compulsory nature of the with-PP in the verbal forms. If the modifying PP is not part of the sentence then the property entailed by the verb is predicated on the subject and as has already been shown, a location cannot swarm or dance. In the case of the adjectival forms, the property can be ascribed to the Location but it changes the meaning of the sentence to that of a simple property rather than the complex property associated with the swarm alternation. This complex property is not inherently borne by the Location, it is a stage-level, impermanent state dependent on the conjunction of the i-level property in the Location (see Kratzer 1995 for further discussion of i- and s-level predicates).

The second entailment is that if The shirt is red with blood is true then there is blood on the shirt. This is the same locational property as shown by the verbs. This Locative
sentence is the only acceptable one for the majority of the adjectives. There is not an adjectival Locative like the verbal Locative given in section 2.3.1. Because both property \( P \) and the locational relation hold then property \( P' \) holds as well. Because blood is red and it is distributively located on the shirt the shirt can be described as red-with-blood. The redness of the blood is ascribed to the shirt as a function of the distribution of the blood on the shirt.

The next adjectival example is that of The shirt was crisp with starch. The first entailment is that the starch is crisp. This holds because starch dries to a hard, brittle substance. The shirt itself is not dry or brittle in the same way that it cannot be red as in the previous example. The starch is sprayed onto the shirt and is thus distributively located on the shirt so the entailment of location holds as well as property \( P \). Therefore \( P' \) holds, the shirt is crisp-with-starch because starch is crisp and it is all over the shirt. However the meaning of the property is slightly different to that of the red-with-blood example. The crispness in the shirt is not the same as that for the starch. A shirt that is crisp with starch has a feeling of smooth stiffness rather than being hard and brittle although the starch itself in the shirt is indeed hard and brittle. While there is both a physical location and a physically located entity, the meaning is less literal than the first adjectival example.

A third example which is even less literal than the last is that of The field was rich with grass or John was flush with money. In both of these examples the locational entailment is held. There is grass in the field and there is money in John’s possession. However \( P \) is not borne by the referent of the with-variant. Grass is not rich in itself and nor is money flush. \( P \) is not borne by the Location either. Both adjectives refer to the degree or extent with which the NP occurs in the Location. If John is flush with money then he has lots of it and if the field is rich with grass then the grass is growing abundantly. Despite this failure of \( P \) to be attributed to the with-variant, it is not correct to say that these are not swarm sentences. They seem very strongly to be swarm examples even though the complex property \( P' \) (flush with money, rich with grass) is not composed from a simple property \( P \). Like the verbal example The girl’s eyes sparkled with delight, the central sense of predication of a property still holds even though the entailment of \( P \) fails.

The final example for the adjective cline is Jane was livid with rage. Like the last example, \( P \) does not apply to the with-variant NP. In this example the adjective is predicated directly onto the subject, it is Jane who is livid not the rage. Rage has no inherent livid quality, it is the experiencer of the rage who takes on the discoloured or mottled appearance associated with being livid. The with-PP is an adverbial phrase which
gives additional information about Jane’s lividity, in this case it gives a cause for her livid appearance. The meaning of the sentence is the same whether the with-PP is present or not. While P does not hold, the locational entailment is acceptable. While it sounds a little odd in the above example, There is rage in Jane, it is more clearly acceptable in There was fear in his eyes (His eyes were wide with fear).

The behaviour exhibited by both the verbs and the underived adjectives illustrate a cline from the strongest, canonical sense of the attribution of a complex physical property to the location, to an extended sense of this meaning such that the basic simplex property is attributable to the subject and the with-NP is merely an adverbial modifier. This cline seems to be the most fully demonstrated by the underived adjectives. However it is also amply demonstrated by the remaining swarm alternation members, the deverbal adjectives and the passive participles which are to be discussed below.

2.3.5 The deverbal adjectives.

The second of the adjective frames is the deverbal adjective frame. It takes the same form as the underived adjective frame above but uses a deverbal adjective instead. The adjectives are derived by a process of affixation, most commonly prefixing the adjective forming prefix a- onto the verb or suffixing -y. Examples of the deverbal adjectives are below.

(36) a. The garden was aswarm with bees.
    b. The house was alive with termites.
    c. The town was abuzz with rumours.
    d. He was awash with emotions.
    e. His eyes were agleam with pure mischief.

Like the underived adjectives, the deverbal adjectives do not generally allow a Locative variant, although the pattern here is not at all clear. For example, of the adjectives above, none forms a completely acceptable Locative although some (37 b, d) are worse than others.

(37) a. (?)Bees were aswarm in the garden.
    b. #Termites were alive in the house.
    c. (?)Rumours were abuzz in the town.
d. #Emotions were awash in him.

e. (?)Pure mischief was agleam in his eyes.

For the most part the adjectives are derived from *swarm* verbs although as can be seen, the asymmetry of the underived adjectives predominates in the sense that the Locative acceptability judgements appear to follow the adjectives rather than those of the verbs. The *a*- derivation is highly productive and it is easy to create new forms. However many of these are unattested as Salkoff notes and this may contribute to the difficulty in assessing their acceptability. As noted elsewhere too, the Locative sentences which have a concrete referent are less likely to be unacceptable than those which have a metaphorical reading.

As discussed in Chapter One, the deverbal adjective frame was noted by Salkoff (1983) who considered it part of the *swarm* alternation. It would appear that he did not investigate beyond its *with*-variant forms as to the acceptability of the Locatives. However given the much freer acceptability of the Locative verbal frame, the oddness of the deverbal adjective Locative is likely to have gone unnoticed.

Following the semantic cline established by the verbal and adjecival forms, the deverbal adjectives can be shown to behave according to the same cline. The first example to consider is *The garden was aswarm with bees*. The bees have the s-level property of being in a state of swarming. They are also physically located within the garden as in the verbal example already discussed. Therefore the complex property $P'$ holds for this sentence. The garden has the property of being aswarm-with-bees because the bees themselves are in the state of being aswarm and they are distributed throughout the garden.

The second example is that of *The house was alive with termites*. Both of the entailments hold for this example, there are termites in the house if the house is alive with them and property $P$ is true that the termites have the property of being alive. Therefore $P'$ is held as well. Like the second example in the adjective section, *The shirt was crisp with starch*, the meaning is somewhat abstracted from the robust physicality of the first example. While the termites themselves are alive, the house being alive with termites does not mean that it takes on their living qualities. What it means is that the perception of being alive is given by the proliferation of the termites inside the house, the sense of movement given by their rustling and moving about in the walls and woodwork. This is a more metaphorical reading than that given by *The garden was aswarm with bees*. 
The physical meaning has been almost completely lost in the third example, *John was awash with emotions*. This is an example where the entailment of the Locative holds (as possessional Location) but the property is not one borne by the *with*-NP. Emotions cannot be awash, they are something which is felt. Like the third example pair in the adjective section this expresses the degree to which the subject is affected by the *with*-NP. If John is awash with emotions it means that they overwhelm him. Because P of P’ does not hold up, the complex property is not composed from P. But again like the third group of examples in the verb and adjective discussions previously, the complex property can be seen to still follow through a process of semantic extension as metaphor.

2.3.6 The passives.

In investigating the adjectival frames, another aspect of the verbal side of the *swarm* alternation became apparent that has not been commented on before. This is the passive examples that can be seen in the examples below.

(38) a. The field was dotted with sheep.
    b. The steak was marbled with fat.
    c. The glade was dappled with sunlight.
    d. The countryside was blanketed with snow.
    e. Her eyes were rimmed with kohl.
    f. The tablecloth was spotted with food.

These have Locative variants although they are not like the *swarm* Locatives. They are the active sentences corresponding to the passives given above.

(39) a. Sheep dotted the field.
    b. Fat marbled the steak.
    c. Sunlight dappled the glade.
    d. Snow blanketed the countryside.
    e. Kohl rimmed her eyes.
    f. Food spotted the tablecloth.
These are not Locative sentences of the same form as the *swarm* Locative sentences as the second NP is actually the direct object. Unlike the *swarm* Locatives, the NP cannot be omitted. Compare the examples below.

(40) a. #Sheep dotted.
b. #Fat marbled.
c. #Sunlight dappled.
d. #Snow blanketed.
e. #Kohl rimmed.
f. #Food spotted.

(41) a. Bees swarmed.
b. Bulls bellowed.
c. Stars twinkled.
d. The garden bloomed.
e. The vine bristled.
f. The trumpets blared.

In this respect the active forms are not Locative *swarm* variants. They do not locate an entity or activity in a Location. The *with*-variant forms are also unacceptable in the active form as is shown below.

(42) a. #The field dotted with sheep 
b. #The steak marbled with fat.
c. #The glade dappled with sunlight.
d. #The countryside blanketed with snow.
e. #Her eyes rimmed with kohl.
f. #The tablecloth spotted with food.

The sense of the examples in (40) can be expressed with compound deverbal adjectives as in (43). This strengthens the case for these examples being adjectival and thus members of the *swarm* construction.

(43) a. The sheep-dotted fields were lush and green from the rain.
b. The fat-marbled steak was meltingly tender.
c. The sunlight-dappled glade was filled with animals.
d. The snow-blanketed countryside was eerily quiet.
e. Her kohl-rimmed eyes were brimming with tears.
f. The food-spotted tablecloth was put in the wash.

It would seem that these examples should be included in the *swarm* alternation but that they can only be included as part of the adjective data since none of the active verb forms are acceptable. This can be confirmed by examining their entailments as was done for the verbal and adjectival forms. If the first example is examined, *The fields were dotted with sheep*, it is clear that the locational entailment is sound. If there fields are dotted with sheep then clearly there are sheep in the field. However the sheep are not themselves dotted nor do they do any dotting. P does not hold and immediately it is clear that this is not the same property predication as exhibited by *The shirt was red with blood* or *The garden swarms with bees*. It seems rather that the passives are like the third group of the verbal and adjectival forms in having their complex property predicated of the subject despite the failure of the property entailment, P. The property predicated of the passive subjects is different from that of the more conventional *swarm* predicates. The kind of verbs which appear in these passives predicate a pattern on the Location and it is this pattern which is the property predicated by the passive verbs. Like the metaphorical examples from the verbs and adjectives, the complex property P’ still seems to hold despite the failure of P as either an i- or s-level property of the Theme. The passives share the semantic extension of the metaphorical examples and for this reason I have included them as *swarm* participants, albeit peripheral ones.

2.3.6.1 The *spray/load* passives.

It must be noted at this point that many of the *spray/load* verbs form identical passive forms. These tend to be of Levin’s non-alternating FILL class (Levin 1993: 49) and they share the same features as the *swarm* passives above.

(44) a. The street was lined with trees.
b. Her dress was edged with satin ribbon.
c. The hill was covered with snow.
d. The fruitcake was studded with cherries.
e. His shirt was stained with coffee.
f. The halls were decked with boughs of holly.

These parallel the *swarm* passives with respect to the unacceptable nature of the active forms and the corresponding acceptability of the adjective forms, although there is a major difference in that the *spray/load* passives are able to be made into active causatives as shown below.

\[(45)\]
\[\begin{align*}
\text{a. The town planner lined the street with trees.} \\
\text{b. The dressmaker edged her dress with satin ribbon.} \\
\text{c. The storm covered the hill with snow.} \\
\text{d. The baker studded the fruitcake with cherries.} \\
\text{e. He stained his shirt with coffee.} \\
\text{f. The merrymakers decked the halls with boughs of holly.}
\end{align*}\]

This is not generally acceptable with the *swarm* passives as can be seen from the following examples.

\[(46)\]
\[\begin{align*}
\text{a. ?The farmer dotted the field with sheep.} \\
\text{b. ?The good feeding marbled the steak with fat.} \\
\text{c. ?The angle of the sun dappled the glade with sunlight.} \\
\text{d. Winter blanketed the countryside with snow.} \\
\text{e. Jane rimmed her eyes with kohl.} \\
\text{f. ?Maria spotted the tablecloth with food.}
\end{align*}\]

While there are strong parallels to the *spray/load* passives, the two passives do not seem to be related and, as has already been discussed in Chapter 1, the *swarm* and the *spray/load* alternations have been shown to be quite different alternations.

### 2.4 General Discussion:

The *swarm* frames have traditionally been limited to the two verbal frames outlined in section 2.2. This chapter has shown that the Locative frame is a very ordinary locative whereby the existence of an entity or activity is asserted within a location. It follows the pattern of a general locative sentence with the Locative expressed as a PP and is not a unique form in any way. A minor point of interest is that the Locative frame resists a
metaphoric or hyperbolic interpretation. Beyond this point the Locative is the unmarked and least restricted of the *swarm* frames under consideration. By stark contrast the *with-* variant is strongly marked, occurring with unergative verbs from semantically constrained classes as well as with deverbal and underived adjectives. The alternation is heavily asymmetric with the major interest lying in the adjectival data, briefly discussed by Salkoff and dismissed as problematic for the most part. The restrictions on the *with-* variant and the equally marked behaviour of the adjectives lead to the conclusion that the *swarm* alternation is not best described as an alternation but would rather benefit from a single construction approach, taking the *with-* variant as the basis for this construction.

As becomes clearest in the adjectival data, the *swarm* construction is a property predication. It is somewhat idiosyncratic in its meaning and a number of forms are in fact fully idiomatic such as *green with envy*. While the Locative is entailed by the complex property which comprises the predicate, this is not an alternation in the traditional sense. The *swarm* construction has verbal and adjectival realisations as well as a passive participial form which is subsumed under the adjectival realisation. These varied forms share a central overriding property – that of a complex property predicated on a Location. This property follows a cline from strictly physical predication to a thoroughly metaphorical sense which still keeps the characteristic quality of property predication through semantic extension from the central meaning. The often-discussed holistic effect may be explained as an effect of the interaction between this predication and the *with-* phrase NP.

When a property is predicated of an object the predication is assumed to be total unless it is otherwise specified. For example, curtains which are yellow are assumed to be mostly or completely yellow. If there was only a small amount of yellow and the majority of the curtains were blue, it would be unacceptable to describe the curtains as yellow. In the case of the swarm construction, the complex property is internally modified by the with-NP which specifies the degree or type of property attributed to the Location. Thus in the example The shirt was red with blood, it is not true to claim that the shirt was red if the redness is the property held by the blood and extended to the shirt by virtue of the fact the blood is distributively located all over the shirt. As noted already there is a strong implication that the shirt is any other colour than red initially (for pragmatic reasons it should be a colour light enough that the blood can show up). The holistic effect arises when the with-NP referent which modifies the lexical item is distributive in nature. When the NP is a distributive entity such as bees or blood then the degree to which the property is predicated onto the Location can be seen to be maximal. In the case of a non-distributive
entity such as mirth or delight there is no holistic effect possible because there is no
distributed NP to be maximally predicated onto the Location but the complex property
may still be attributed to the Location.

The previous analyses have focused squarely on the verbal alternation and either
ignored the adjectives (Dowty 2000) or reanalysed them as morphological derivations
(Salkoff 1983). With this verbal bias, the prevailing analysis has tended to a derivational
approach and attempting to account for the apparently transformational relationship
between the Locative and the with-variant. A derivational account cannot accommodate
the change in lexical class entailed by the adjectival data and so an analysis which contains
this data will not be derivational. This raises some interesting issues for the formal
approaches, two of which will be compared in the following chapter. The verb class-based
approach of Rappaport and Levin will be contrasted with Goldberg’s Construction
 Grammar analysis in an effort to ascertain which analytical approach can best account for
the dual lexical classes and behaviour illustrated by the members of the swarm
construction.
3 CHAPTER THREE

Introduction.

This chapter will introduce the verb class-based analysis and that of Construction Grammar. These two approaches, which proceed from very different perspectives of the same semantic phenomena, will be compared and contrasted in order to determine which one can best account for the data of the swarm alternation. In the discussion of both analyses the spray/load alternation is considered and a side-effect of this discussion is that the fundamental disjunction between the swarm and spray/load alternations is established beyond a doubt. This is important because of the number of researchers who equate the two alternations on the basis of their surface similarities. The first part of this chapter will examine the verb class-based approach through Rappaport and Levin’s 1988 analysis of the spray/load alternation and the second half will discuss the work of Goldberg in Construction Grammar with the Caused-Motion construction. For both analyses an attempt will be made to analyse swarm according to their principles and the outcome analysed.

3.1 The verb class-based approach.

The verb class-based approach is one of the dominant analyses of lexical semantic phenomena. It utilises the concept that verb meaning is instrumental in determining the kind of syntactic constructions in which a verb can appear. In argument alternations it is found as the basis for the assumption that the semantic grouping which a verb belongs to will determine its syntactic behaviour.

The meaning of the verb is taken to be the basis on which the verb’s behaviour is based. Verbs with similar meanings or shared elements of meaning are therefore expected to behave similarly, hence their grouping into classes. It is expected that verbs of the same class will appear in the same subcategorisation frames as each other and a verb’s participation in a certain construction is also expected to be predictable from examination of the class of verbs which appear in that subcategorisation frame. The verb class-based approach is a ‘bottom-up’ approach, meaning that the meaning of the verb determines the form of the sentence and the disposition of the arguments.
Before discussing the application of this approach, there are two analytical devices used in the verb class-based approach outlined below which need to be explained. These are the Lexical Conceptual Structure (LCS) and the Predicate Argument Structure (PAS).

The LCS is a lexical-semantic construct similar to those used by Hale and Laughren (1983) and Hale and Keyser (1986, 1987). It is sublexical and is the decomposition of the verb’s meaning in terms of primitive predicates and argument variables. The use of the LCS is motivated by the idea that semantically related verbs share elements of meaning which can be analysed as a way of explaining why they behave similarly, while the differences in meaning are explained as a separable element. A verbal event is rarely a single event, its execution can be decomposed into the primitives which make up a complex meaning. To see how this works, consider the LCS for put below.

(1) PUT: \( [ x \text{ cause } [ y \text{ come to be at } z ]] \) (Rappaport and Levin 1988: 24)

This says that the meaning of the verb put is analysed as an event of the entity denoted by the x variable causing the entity denoted by the y variable to come to be at the location or entity denoted by z. For example, in the sentence The boy put the apples in the bowl, The boy is the agent of the event, the x variable. The apples are the entity which is moved, y and The bowl is the location it is moved to, z. As the LCS operates outside of both the lexicon and syntactic structure there must be some means by which this abstract configuration can interact with the lexicon or the syntax. This means is the PAS.

The PAS is used to link the abstract semantic representation of the LCS to a syntactic realisation. It is a lexical-syntactic representation of the verb’s argument structure which provides ordering for the verb’s argument array and links the variables from the LCS to this array. It lays out the argument ordering with respect to which argument is realised as the external argument (represented outside the verb phrase (VP)), which is the direct internal argument (indicated by underlining in this discussion) and which is the indirect internal argument (if the verb realises an indirect argument). Linking rules (to be discussed in the following section) derive the PAS from the LCS, as well as linking the variables in the LCS to their syntactic realisation. So for the example above, the PAS would take the form shown in (2)

(2) PUT: \( x <_P_{\text{loc}} y z > \) (Rappaport and Levin 1988: 15, from Zubizarreta (1987))
Where x is the external argument, y is the direct internal argument, z is the indirect internal argument and Ploc is a locative preposition. To see how this works for actual language the example above will be used with x as The boy, y as The apples and z as The bowl. The LCS from above gives the meaning and variables for the arguments, the PAS orders the variables with respect to the external and internal arguments, ‘translating’ this into the required ordering for the d-structure,

**LCS:** \[x \text{ cause } [y \text{ to come to be at } z]\]

**PAS:** \[x<y \text{ Ploc } z>\]

**D-structure:** \[\text{The boy}<\text{the apples, Ploc the bowl}>\]

**S-Structure:** The boy put the apples in the bowl.

The PAS enables the abstract LCS to be fleshed out with arguments from the lexicon and mediates the argument configuration.

The LCS and PAS replace the earlier subcategorisation frames of the 1960s (Chomsky 1965 for example). Whereas subcategorisation frames baldly state the arrangement of the verb and its arguments, the LCS offers a semantic structure whereby the meaning is detailed and the arguments fall naturally into place by means of the PAS. In this way the arguments can be seen to be semantically motivated in their placement and predictable as well. As Rappaport and Levin show, the LCS and PAS offer a means by which the relationship between the sentence pairs of an alternation can be captured rather than simply stated as multiple subcategorisation frames. How the LCS and PAS achieve this is the subject of the next section.

### 3.2 What to do with Theta-roles - Rappaport and Levin’s analysis of the spray/load alternation.

The 1988 Rappaport and Levin analysis of the spray/load alternation uses predicate decomposition and LCSs to analyse spray/load. They compare their analysis to one based on a single theta-role list and PAS approach.
Initially Rappaport and Levin set three conditions which any representation of an alternation must fulfil to be a useful explanation of the alternation. These requirements are that:

a) The near-paraphrase relation between the two variants must be captured.
b) The linking of the arguments should be predictable in terms of their theta-roles.
c) The affected interpretation of the goal as direct argument must be accounted for. (Rappaport and Levin 1988:19)

In the initial non-decompositional analysis, the arguments are identified as Agent, Locatum and Goal, corresponding to the NPs below.

(3)  

(4)  

The Locatum role is one which Rappaport and Levin introduce (from Clark and Clark 1979) for the entity which undergoes the movement of the verb. The initial discussion of the lexical-semantic representation aims to show that there are difficulties with using a single lexical-semantic representation. If the alternation is analysed as having just the one shared theta-role list for the variant sentences, it initially has the form shown in (5).

(5) LOAD: <Agent, Locatum, Goal>

The variant sentences are produced by the interaction of this theta-role list with two PASs and linking rules which assign theta-roles to the NPs as shown below.

Location frame PAS: LOAD: x < y, P_{loc} z >
With frame PAS: LOAD: x < z, P_{with} y >

LINKING RULES:
• Link the Agent role with the external argument variable in the PAS.
• Link the Theme or Patient role with the direct argument variable in the PAS.
• Link each remaining theta-role to an indirect argument variable in the PAS which is associated with an appropriate preposition.

(Rappaport and Levin 1988:19-20)

Using these linking rules creates a problem. There is no Theme specified in the above lexical-semantic representation. Rappaport and Levin suggest rewriting the theta-role list with the Locatum renamed as a Theme in the sense that Gruber (1965) and Jackendoff (1972) use it, as below.

(6) \text{LOAD: \langle Agent, Theme, Goal \rangle}

After application of the linking rules, this results in the PAS below which has its roles filled.

(7) \text{LOAD: Agent \langle Theme, Goal \rangle}

Jane\textsubscript{Agent} sprayed the paint\textsubscript{Theme} on the wall\textsubscript{Goal}.

This is successful for the assignment of theta-roles to the NPs in the locative variant but not so successful when applied to the with-variant. Rappaport and Levin show that another linking rule is needed to associate the Goal with the direct argument variable for this form. As well, the holistic interpretation also needs to be associated with the direct argument but only in the with-variant as it does not apply to the direct argument of the Locative variant. For the single theta-role list-two PAS approach, the requirement that the near-paraphrase relation must be captured can be fulfilled but neither of the other two requirements can be.

The next approach proposed by Rappaport and Levin is to say that the variants do not share one lexical-semantic interpretation at all, that they have separate theta-role lists. Rappaport and Levin suggest keeping the one given above for the Locative variant and creating a new one for the with-variant.

In order to do this they take advantage of a second notion of Theme (Anderson 1977) as the ‘affected entity’ in order to relabel the Goal phrase appropriately. This then
means that there are two putative Themes under consideration. This is remedied by retaining the Locatum role from the initial theta-role list, for use in the with-variant theta-role list. The Locatum is now defined for the with-variant as ‘the entity which undergoes a change of location’ whereas the Theme is defined as the ‘entity which undergoes a change of state’.

(8) Locative frame: LOAD: Agent <Theme, Goal>

Jane sprayed the paint on the wall

(9) With frame: LOAD: Agent <Theme, Locatum>

Jane sprayed the wall with paint

While this works superficially because there is no clear agreement on the definition of Theme as it applies to both theta-role lists, it is an unsatisfying attempt to relabel the internal NP so that its appearance as the direct argument is motivated.

This separation of the theta-role lists also loses the near-paraphrase relation which is one of Rappaport and Levin’s necessary requirements for characterising the alternation. The separated theta-role lists have no implicit relationship to each other or to other possibly related alternations such as the clear/wipe alternation. Any attempt to relate them would have to be arbitrarily specified rather than being a natural consequence of the analysis.

The two approaches, utilising the theta-role lists and a conventional LCS, so far each fail in their respective ways, the former because, of the three requirements that the analysis must satisfy, only the near-paraphrase relation can be captured. The latter approach, which separates the two theta-role lists, fails because, despite its success in capturing the affected interpretation and the predictability of the linking rules, the near-paraphrase relation cannot be described except by an unacceptably arbitrary declaration of the relationship. Rappaport and Levin conclude that the use of theta-role lists abstracts the meaning of a verb in such a way that only a partially satisfactory representation can be achieved. Their solution to the quandary of how to achieve a full representation of the shared meaning and relationship between the alternation’s variant forms is to utilise predicate decomposition. Thus the verbal meaning is decomposed into primitive elements that can be shared and combined between related verbs to capture the similarities and differences in meaning. This is how LCSs come into the analysis. They encode the primitives for each frame and
the PAS is used to link the argument variables as described in the introduction to this chapter.

3.2.1 Predicate decomposition and the spray/load alternation.

Rappaport and Levin propose two related LCSs for the two spray/load frames.

LOAD: Locative  \[ x \text{ cause } y \text{ to come to be at } z \]/LOAD

\[
\text{With } \quad [[x \text{ cause } z \text{ to come to be in } \text{STATE}]]
\text{ BY MEANS OF } [x \text{ cause } y \text{ to come to be at } z]/LOAD
\]

The locative LCS means that ‘load names an event in which x causes y to changes location to z’ and the with-variant means that ‘load names an event in which x causes z to change state by means of x causing y to change its location to z’. The with LCS contains the locative LCS as a by means of clause. Rappaport and Levin claim that the extra information in the LCS for the with-variant explains why the affected interpretation only occurs in the with-variant. The Locative, lacking this extra information, does not have an affected interpretation. The relationship between the two LCSs is claimed to be an entailment relation. Rappaport and Levin claim that the passive-active pairs, shown below, demonstrate this.

(10)  
\begin{align*}
a. & \quad \text{Henry loaded hay onto the wagon.} \\
b. & \quad \text{Henry loaded the wagon with hay.}
\end{align*}

(11)  
\begin{align*}
a. & \quad \text{Hay was loaded onto the wagon.} \\
b. & \quad \text{The wagon was loaded with hay.} \quad (\text{Rappaport and Levin 1988: 26})
\end{align*}

Rappaport and Levin say that while ‘Henry loaded hay onto the wagon’ and ‘Henry loaded the wagon with hay’ both entail ‘Hay was loaded onto the wagon’, only the with-variant ‘Henry loaded the wagon with hay’ entails ‘The wagon was loaded with hay’. Rappaport and Levin state that this is because only the variant with the affected interpretation can entail the passive which also has an affected interpretation. This entailment relation is their answer to the problem of how to represent the near-paraphrase relation.
Another advantage of using the entailed LCSs is that the decision of which NP appears as Theme is made clearer. Rappaport and Levin state that the linking of the variables is assumed to be subject to the main clause of the decomposition, not the subclauses. In both cases this results in the appropriate argument bearing the Theme role (variable z in the case of the with frame and variable y in the case of the locative.)

Rappaport and Levin conclude that using predicate decomposition offers a motivated explanation for the relationship between the two forms of the alternation and why there is such a difference between them. The LCSs are claimed to be distinct but related with independent linking rules to realise their arguments.

3.3 Lexical derivation and the swarm alternation.

If this approach is to be used for the swarm alternation then the same steps must be followed. The first issue to be addressed is the explicative requirements: like the spray/load analysis above, what is required of an analysis to be considered an accurate representation of the swarm alternation?

The requirements of Rappaport and Levin can be used with some minor modifications, as they accurately capture the issues to be addressed by an analysis of the lexical-semantic representation of the alternation.

a) The near-paraphrase relation between the two variants must be captured.

b) The linking of the arguments should be predictable in terms of their theta-roles.

c) The affected interpretation of the Location as subject must be accounted for.

The next consideration is what kind of verbs appear in the swarm alternation. If Aktionsarten tests (Van Valin and LaPolla 1997, Kearns 2000) are applied then it appears that they are state or process verbs.13 Clearly the decompositional elements used by Rappaport and Levin will not apply here as their analysis deals with change of state and

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13 See Chapter 1 for discussion of the Aktionsarten.
change of location verbs. The swarm sentences do not involve movement into or out of a Location and nor do they involve the establishment of a state. As durative events without an endpoint, the swarm sentences are simple existence predicates. The decomposition must show this lack of change or transformation. The predicate decomposition for spray/load may be adapted for the swarm alternation quite easily. If the elements signifying the change of state and change of location, ‘come to be in’ and ‘come to be at’ are replaced with simple stative primitives like ‘be in’ and ‘be at’ then the analysis proceeds very similarly to that of Rappaport and Levin. I propose that the LCSs for SWARM could reasonably be expected to look like this,

SWARM:  Locative  [x be at y]/SWARM  
  With  [y be in STATE] BY MEANS OF [x be at y]/SWARM

These LCSs can be explained in much the same way as Rappaport and Levin discuss their spray/load LCSs. The with-LCS has the Locative embedded as a by means of clause. This entails said Locative and thus accounts for the near-paraphrase relationship. As well, the clause unique to the with-LCS, [y be in state], is the means by which the affectedness interpretation is ascribed only to the with-variant. Fulfilling the final of the three requirements of Rappaport and Levin, the linking of the variants is assumed to be subject only to the main decompositional clause, which then gives the appropriate linking of arguments to their variables.

However the account of the swarm alternation is incorrect on three major points.

The first of these is that the entailment of the Locative, Bees swarmed in the garden, is not as straightforward as it would otherwise appear. Rappaport and Levin state that Henry loaded the wagon with hay entails that Henry loaded the hay onto the wagon. The parallel swarm LCS has the same entailment whereby The garden swarmed with bees entails that Bees swarmed in the garden. However this entailment does not hold for all the members of swarm. If the Rappaport and Levin analysis is followed exactly, the clear implication is that the with LCS entails the Locative LCS which corresponds to the Locative sentence Bees swarmed in the garden. However The garden swarmed with bees actually entails two locative sentences: Bees swarmed in the garden and Bees were in the garden. While the Rappaport and Levin-style LCS entails the former, it does not entail the latter of the two sentences explicitly. This would not be a problem except that in the case of the adjectival swarm data, the equivalent Locative to Bees swarmed in the garden,
Blood was red on the shirt, is unacceptable. The shirt was red with blood entails only that Blood was on the shirt. The fact that the swarm with-LCS can only entail one of the locative sentences is problematic because Rappaport and Levin utilise the entailment relation to capture the relationship between the Locative sentence and the with-variant. As the LCS cannot entail this Locative form for all of the swarm data, it means that the entailment relation does not capture the near paraphrase relation, thereby failing in one of the major requirements for the representation of the relationship between the swarm variants.

It is interesting to note that the entailment does not work for all of the spray/load verbs either. There are verbs such as cover and deck, Levin’s fill verbs (Levin 1993:51), which do not allow a Locative sentence to be entailed of them in the same way as the swarm data.

(12) a. Jane covered the tomatoes with the chopped basil.
   b. #Jane covered the chopped basil over the tomatoes.
   c. The chopped basil was over the tomatoes.
(13) a. The organisers decked the hall with the boughs of holly.
   b. #The organisers decked the boughs of holly in the hall.
   c. The boughs of holly were in the hall.

It is unclear if Rappaport and Levin were aware of this large group exception to their analysis of the alternation.

The second problem is that of the Aktionsarten. The events in the Locative verbal sentences are processes whereas the with-variants seem to be more stative events (the sense of movement and dynamic action in the verbal with-variant will be discussed in Chapter Four). Although it is notoriously difficult to distinguish between states and processes, evidence for this distinction between the Locative and with-variant of the swarm alternation may be seen in the unquestionably stative adjectival data. These are exclusively of the with-variant form and encode a complex property, composed of a simple property and the distribution of entities bearing that property throughout a specified location. This complex property is predicated of the Location of the sentence. The change in Aktionsart from process to state does not occur in the spray/load examples where the events in both variants are accomplishments. Moreover the with-variant in the spray/load alternation is a COS predication. When the hay is loaded or the truck is full, the event ends
with the endstate achieved or the full expenditure of the Incremental Theme. The with-variant in the swarm alternation is neither a COS nor an accomplishment. The event contained in the sentence has no endstate to be achieved nor Incremental Theme to be expended, it is simply a description of the state of the Location.

The third problem with the verb class-based approach is what underlies the first two problems. In this analysis there is an explicit assumption that what occurs between the two forms is lexical derivation. In lexical derivation there is no place for the kind of cross-category phenomenon which is seen in the swarm alternation. The kind of category change swarm has is more commonly found in morphological derivation. However morphological derivation is not a satisfactory way to account for the mixture of lexical categories which constitute the swarm data. The meaning of the with-variant seems fixed, almost idiomatic in its central property predication sense. Both the verbal and adjectival with-variants access this meaning, even the peripheral and metaphorical examples of 2.3.4 and 2.3.6. This rigidity of meaning and mixture of word classes cannot be expressed adequately by the verb class-based approach which supposes the swarm alternation to be a lexical and therefore mono-categorial derivation.

The evidence from the data chapter argued for a single construction approach to the analysis of the swarm alternation, focusing on the with-variant. This was based on the marked asymmetry exhibited by the with-variant when considered as one of a pair of related sentences or alternation. The analysis of Rappaport and Levin, the verb class-based approach, shows that a single or separated analysis for the forms of the swarm alternation is desirable because a unified alternational analysis cannot account for the mixture of categories found in the swarm data nor for the asymmetry of the adjectival behaviour.

Accordingly the second half of this chapter will consider the constructional approach favoured in Construction Grammar. I will examine the principles of this theory and look at the analysis of the English Caused-Motion construction which includes the spray/load alternation.

3.4 An alternative to the verb class-based approach.

Another approach to the analysis of alternations is that of Construction Grammar. The central point of this theory is that the form and meaning of a sentence are not derived solely from the meaning of the verb but rather the form and general meaning of the
sentence are derived from the construction which interacts with the specific verbal meaning to produce the sentence. This contrasts with the verb class-based approach which relies on the verb’s lexical semantics to predict the form of the subcategorisation frame for the verb. In the verb class-based approach lexical rules are used to map semantic structure onto syntactic form. Construction Grammar takes the opposite approach in contending that the form and meaning are predicted by the construction and the verb’s semantics determines whether the verb appears in the construction or not. Before discussing the specific aspects of the Construction Grammar analysis of the spray/load alternation as a type of caused –motion construction, there are a number of theoretical concepts particular to Construction Grammar which need to be explained.

### 3.5 Introduction to Construction Grammar.

Construction Grammar proceeds from a different analytical approach to that of the verb class-based analysis. The forms of common, basic sentences are held to carry meaning independently of the verbs which appear in them. While constructions are a relatively old concept in linguistic theory, (Chomsky 1965 for example), the current theory has grown out of work in language acquisition (Clark 1978; Slobin 1985; Bowerman 1989); psycholinguistics (Carlson and Tanenhaus 1988) and work by Fillmore (1985, 1988) and Lakoff (1987) in particular amongst others. It goes against the prevailing analytical preference for the verb class to determine the meaning of a sentence and states that the verbal meaning does not determine the forms of the sentence but rather that semantically compatible verbs appear in certain constructions which have their own meaning which fuses with that of the verb to produce the sentence.

In determining what constitutes a construction there is one major criterion:

\[ C \text{ is a construction iff } \text{def } C \text{ is a form-meaning pair } <F_i, S_i> \text{ such that some aspect of } F_i \text{ or some aspect of } S_i \text{ is not strictly predictable from } C \text{’s component parts or from other previously established constructions.} \text{ (Goldberg 1995: 4)} \]

This uniqueness condition means that there are relatively few basic constructions but that there are many possible extensions of those few senses. The motivation behind this restriction of the basic constructions lies originally in Frame Semantics (Fillmore 1977), which is a way of defining meanings relative to the humanly relevant scenes in which they belong. For example roof and ceiling are both the top of a room or house. However roof is
defined relative to the exterior of the house whereas ceiling is defined relative to the interior of the house. This is argued to be especially relevant linguistically in that verbs in particular of the lexical categories, encode complex and detailed contextual knowledge in their meanings. In most cases, verbs can be decomposed into broad basic primitives with only their particular nuances of meaning and contextual properties differentiating them from one another. Take bowl and pitch for example. Both verbs are verbs of directed motion involving throwing a ball of some kind at some kind of target, usually a batter of some kind. But this is where their similarity ends, for each verb has a narrowly defined specific frame in which is it used. Bowl is used in cricket for example and pitch in baseball. The two, so apparently similar verbs cannot be exchanged without being considered to be improperly used. The speaker needs to know much more about the context in which the verb is to be used than just that it means ‘to cause a ball to move through the air towards a target in order for that target to hit the ball with a bat of some kind’.

The generalised meanings are the basis for the constructions. They provide the frame for the specialised lexical meaning. The verb class-based approach proceeds from the observation that verbs which share general elements of meaning behave the same way. That approach suggests that verbs with shared meanings ‘cluster’ together in terms of their behaviour. Construction Grammar looks at this from a different angle and suggests that the prototypical meanings of the constructions attract compatible verbs which are able to share in the prototypical senses to a greater or lesser degree.

3.5.1 Inheritance.

This sharing is accomplished through a concept borrowed from computer science – inheritance. Inheritance is a one-way sharing of information from the dominant construction to the daughter or dominated construction. This allows the similarities between closely related constructions to be captured without incorporating their differences as well. From the central source domain the daughter constructions inherit parts or all of the constructional meaning in 4 different ways, polysemy, metaphor, subpart and instance. For the present discussion, polysemy and metaphor are the most relevant and so I will not discuss the subpart and instance inheritances here.

Polysemous inheritance (IP) is used in instances where the constructional sense is inherited as an instance of polysemous extension. An example of this is the Caused-Motion Construction whose central and related senses are shown below:
(14) ‘X CAUSES Y to MOVE Z’ (central sense)
Pat pushed the piano into the room.

(15) Conditions of satisfaction imply ‘X CAUSES Y to MOVE Z’
Pat ordered him into the room.

(16) ‘X ENABLES Y to MOVE Z’
Pat allowed Chris into the room.

(17) ‘X CAUSES Y not to MOVE FROM Z’
Pat locked Chris in the room.

(18) ‘X HELPS Y to MOVE Z’
Pat assisted Chris into the room. (Goldberg 1995: 77)

The central sense is said to motivate its extensions, all of which are minimally different from it. The syntactic specifications are inherited from the central sense, offering an explanation as to how peripherally related constructions can still share the same argument disposition as the central sense.

Metaphorical inheritance (IM) is the link which holds between two constructions which are related by metaphorical extension. The metaphor specifies the way in which the semantics of the dominant construction are mapped onto the dominated construction’s semantics. Goldberg gives the example of the relationship between the Caused-Motion construction and the Resultative construction. The Resultative “can be seen to be a metaphorical extension of the Caused-Motion construction” (Goldberg 1995: 81) where the resulting state is a metaphorical goal.

3.5.2 Profiling.

As well as inheritance which specifies how constructions share information between themselves, there is profiling which determines how the lexical and constructional roles interact. There are two types of profiling, lexical participant role profiling and constructional argument role profiling. Lexical profiling utilises the participant roles of the verb. Goldberg states that these are distinct from the construction’s argument roles:

The distinction is intended to capture the fact that verbs are associated with frame-specific roles, whereas constructions are associated with more general roles such as agent, patient, goal (…) Participant roles are instances of the more general argument roles and capture specific selectional restrictions as well. (Goldberg 1995: 43)
These participant roles are profiled by the verb. In explaining how this concept works, Goldberg gives the example of rob vs. steal. In rob, the target and the thief are profiled whereas in steal the thief and the stolen goods are profiled. Profiling corresponds to which roles are most relevant in the scene for which they are intended.

(19) Jesse robbed the rich (of all their money).
(20) Jesse stole money (from the rich). (Goldberg 1995: 45)

Profiled participant roles can be identified by examining the syntactic configuration of a verb. The profiled elements are usually obligatory. In Construction Grammar they are shown in boldface.

The second type of profiling is the constructional argument role profiling. This gives the most relevant roles for the constructional meaning. The roles which are profiled are those which express direct grammatical relations such as subject or object. They could be considered analogous to the theta-role lists of Rappaport and Levin in the early part of this chapter although Goldberg notes that they are not a simple list of unstructured roles but instead are semantically constrained by the constructional meaning.

3.5.3 The principles of fusion.

As in any theory, there are a number of principles which constrain the explanatory mechanisms and the relationship between lexical and constructional profiling is no exception. There are two principles which govern this interaction and they are shown below.

1. The Semantic Coherence Principle: Only roles which are semantically compatible can be fused. Two roles $r_1$ and $r_2$ are semantically compatible if either $r_1$ can be construed as an instance of $r_2$, or $r_2$ can be construed as an instance of $r_1$. (...) Whether a role can be construed as an instance of another role is determined by general categorisation principles.

2. The Correspondence Principle: Each participant role that is lexically profiled and expressed must be fused with a profiled argument role of the construction. If a verb has three profiled argument roles, then one of them may be fused with a nonprofiled argument role. (Goldberg 1995:50)
The process which these principles regulate is the fusion of the participant and argument roles when the verb is entered into the construction template. Basically if two roles are semantically compatible with each other then they can fuse. However any profiled participant role (the ones contributed by the verb) must fuse with a profiled argument role. A non-profiled argument role may fuse with a profiled participant role in the event that there is a mismatch of roles and there are more profiled participant roles than argument roles. How this happens will be demonstrated by the analysis of the Caused-Motion construction to be explained below.

### 3.6 The Caused-Motion Construction.

With the theoretical requirements outlined, we can proceed to see how the Construction Grammar approach works in practice. The analysis here is of the Caused-Motion construction in English, exemplified by the examples in (19).

(21) a. Sue let the water out of the bathtub.
    b. Sam helped him into the car.
    c. They sprayed the paint onto the wall. (Goldberg 1995: 152)

The basic semantics are described as ‘X cause Y to move Z.’ “The causer argument directly causes the theme argument to move along a path designated by the directional phrase.” (Goldberg 1995: 152). The different senses outlined above in 3.5.1 share the central sense of direct causation.

Goldberg discusses the ways in which the Caused-Motion construction is unique. These include the fact that many of the verbs which appear in the construction are otherwise not causative. Furthermore many of the verbs she includes in the construction do not have directed motion outside of their use in the construction, squeeze for example.

(22) a. Frank squeezed the ball.
    b. Frank squeezed the ball through the crack. (Goldberg 1995: 153)
Furthermore, verbs which have a caused-motion sense in the construction may lack this sense in a simple transitive sentence as in (23) below.

(23)  
   a. Sam mixed/stirred the paint thinner into the paint. 
   b. Sam mixed/stirred the paint thinner. (Goldberg 1995: 154)

Finally verbs can appear in the construction with the appropriate meaning which do not otherwise fulfil the syntactic requirements of the construction as in the example which Goldberg uses often, the verb sneeze used as an instance of caused-motion. The construction accounts for an otherwise inexplicable sense of the verb by having the sense as part of its constructional meaning.

(24) Frank sneezed the napkin off the table. (Goldberg 1995: 154)

The basic Caused-Motion construction is shown below.

<table>
<thead>
<tr>
<th>Sem</th>
<th>CAUSE-MOVE</th>
<th>&lt; cause</th>
<th>goal</th>
<th>theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRED</td>
<td>&lt;</td>
<td></td>
<td></td>
<td>&gt;</td>
</tr>
<tr>
<td>Syn</td>
<td>V</td>
<td>SUBJ</td>
<td>OBL</td>
<td>OBJ</td>
</tr>
</tbody>
</table>

Figure 1. The Caused-Motion construction. (Goldberg 1995: 160)

3.6.1 The spray/load alternation as an extension of the Caused-Motion construction.

The spray/load alternation is discussed as part of the Caused-Motion construction. Goldberg begins by identifying the two forms of the alternation as belonging to separate constructions rather than being derivationally related to each other.
She identifies the Locative variant as being an instance of the Caused-Motion construction while the with-variant is identified as a causative with an adjunct with-phrase, much like an instrumental with-phrase.

There are three profiling patterns identified for the spray/load alternation in the Caused-Motion construction based on the seven classes of verbs identified by Pinker (1989). The first of these covers the slather, heap and cram-classes. In this pattern, all three participant roles are profiled:

(25) \textit{slather} $<$\textit{slatherer, thick-mass, target}$>$

(26) a. Sam slathered shaving cream onto his face.
    b. Sam slathered his face with shaving cream. (Goldberg 1995: 176)

The lexical profiling of slather is compatible with both the causative and Caused-Motion constructions as there are no mismatches between the number of constructional and lexical roles. The Caused-Motion construction has cause, goal and theme roles. Goldberg notes that the target lexical role is fully compatible with the goal role, his face in (24a). The slatherer lexical role fuses with the cause argument role and the thick-mass with the theme.

While Goldberg does not state the causative construction schema, she does state that it has three roles, causer, patient and theme. The with-phrase is a profiled adjunct in the causative construction and it is linked to the theme argument, as the with-adjunct expresses the entity which undergoes a change of location. The other profiled roles are causer and patient which are fused with the slatherer and target respectively.

The second profiling pattern is the one shown by the load-class of verbs. Goldberg states that it is unclear if all the roles need to be overtly expressed because the theme is sometimes optional as in her example below.

(27) a. Sam loaded the truck (with the hay). (Goldberg 1995: 178)
    b. Sam loaded the hay onto the truck.

However she notes that if the theme is to be omitted then it is presumed to be known through the context or prior information. A completely unknown theme cannot be omitted. She therefore includes the theme role amongst her list but brackets it to show that it is a
definite null complement (Goldberg 1995: 58-9), which is lexically profiled despite its non-obligatory status.

(28) \textit{load} < \textbf{loader, container, \{loaded-theme\}>

In the Caused-Motion construction, as in (27b), the loader fuses with the cause, the container with the goal and the loaded-theme with the theme argument. In the causative construction (27a), the loader fuses with the cause, the container with the patient and the loaded-theme with the theme again.

The final pattern differs from the first two. While the spray-class are similar to the load class in allowing the theme role for some instances of this class to be unexpressed if it is licensed by context (29a), it differs in that the causer role can be left unexpressed as well as in (29b) and (29c).

(29) a. The skunk sprayed the car.
    b. Water splashed onto the lawn.
    c. Water sprayed onto the lawn. (Goldberg 1995: 178)

There are two sub-patterns at work here. One has the causer without profiling but with the target and the liquid still profiled and the other has the causer also without profiling and the liquid as also omissible if it is recoverable from context as a definite null complement. These correspond to two similar verbs, splash (28) and spray (29).

(30) \textit{splash} < \textbf{splasher, target, liquid}>
(31) \textit{spray} < \textbf{sprayer, target, \{liquid\}>

Goldberg explains these as showing that in the Caused-Motion construction the sprayer is a cause, the liquid is the theme and the target is a goal-path. The non-profiled status of the cause in both verbs allows them to participate in the intransitive Motion construction, (29b, c), which has the roles <theme, goal-path>. In the causative construction, as in the first two profiled patterns, the target is interpreted as a kind of patient.
Goldberg concludes the section by noting that the double construction approach captures the differences between the variant forms of the alternation without needing to posit a separate verb sense. The single spray/load alternation meaning is fused with the Caused-Motion construction and a causative construction plus with-adjunct thereby producing the two variant forms.

3.7 Construction Grammar and the swarm alternation.

With an understanding of how the spray/load alternation is analysed according to the precepts of Construction Grammar, it is time to examine the swarm alternation. The first step is to establish if either form of the swarm alternation is a unique construction or if they are extensions of extant constructions. The Locative does not have a particular meaning associated with it. As noted in Chapter 2, it is a normal locative sentence in which the existence of a process is asserted as occurring in a location. Therefore the Locative variant would be best described as belonging to a Locative construction. For the Locative sentences, the only lexically profiled role is the subject. It is necessarily expressed by the verb. The Locative PP is not obligatory as the examples below show.

(32) a. The bees swarmed (in the garden).
    b. The water bubbled (out of the fountain).

Therefore for these verbs the profiling will be as follows:

(33) a. swarm < theme, location >
    b. bubble < theme, location >

The Locative construction has a profiled location argument role, thus allowing the location to be expressed in this construction. It also has a profiled theme role. The construction is shown below.
The location is expressed simply as location rather than goal or path because the verb does not encode any kind of movement towards or along as would be expected of a goal or path role. A fused Locative construction is shown in Figure 4, with the canonical swarm alternation verb, swarm.

The with-variant or swarm construction poses more of a challenge. While it is true that its form and meaning are not strictly predictable from its component parts, it does not seem accurate to say that the construction is without precedent. To see what I mean by this, consider the sentence, The shirt was red. This was mentioned in the discussion in 2.3.3 of the swarm sentence The shirt was red with blood. There is a strong implicature that if the shirt is red with blood then it is not already or inherently red. Nor can red with blood be described as an i-level property or distinguishing characteristic. The shirt only has any kind of red property because it is soaked in blood and blood is red.

As the relationship between the shirt and red is an adjectival property predication, the principles and forms of Construction Grammar must be adapted slightly. Goldberg
only discusses verbs in her treatment of Construction Grammar but I believe that my proposed analysis still conforms to the major principles of the theory and in fact extends it. The adaptations allow for intuitions about the event to be captured by the construction in a way that corresponds with the data.

In Construction Grammar the verbal information is represented in pred, outside of the list of participant roles the verb provides. As adjectives (A) commonly take a copula be which is semantically empty compared to the information encoded in adjectives, I have replaced the verb in the construction with the adjective. The construction is a property predication whereby a property of some kind is predicated onto the subject. This is shown in Figure 5.

![Figure 4. The Property Predication construction.](image)

The construction profiles the patient and property roles. The A profiles the possessor of the property and the property role as shown by red below. The fused construction is shown in Figure 6.

(34) red < **possessor, property** >

![Figure 5. Fused Property Predication construction with red.](image)
The swarm red with blood examples follow the same basic structure. However as the property red with blood is a complex one composed of a property and a theme, the linking of the participants’ roles to the argument property role is not a single link. This indicates that although the constructional meaning is a single property, the AP contributes two lexically profiled participant roles which combine to form the single property just as in the earlier discussion in Chapter Two, the complex property \( P' \) was composed of simple property \( P \) and the distributive location of the theme. The Complex-Property Predication construction is shown below.

![Figure 6. Fused Complex-Property Predication construction with red with blood.](image)

The Complex-Property Predication construction is related to the Property Predication construction by IP links. It inherits the property predication sense and argument role array while adding the sense of complexity and necessity for binary branching of the component parts of the property.

![Figure 7. The relationship of the Property Predication construction to the Complex-Property Predication construction.](image)
The verbal complex property is analysed the same way as the AP in Figure 6. The phrase swarm with bees fills the pred slot in the construction and the separate elements swarm and bees are combined by the construction to form the complex. The verbal Complex-Property Predication construction is treated as a metaphorical inheritance (IM) of the complex property predication because predication of a property is a canonically adjectival property, rather than a verbal property. The attribution of a property predication to a verbal event is an abstract metaphorical extension of the adjectival sense. This will be discussed further in Chapter Four.

### Figure 8. The fused verbal Complex-Property Predication construction with *swarm*.

The most peripheral examples in the data were those seen in examples such as Jane was livid with rage (see section 2.3.4 for discussion). They were discussed as being examples of usage where the simple property is predicated of the subject rather than the complex-property and the with-phrase is simply additional information. This use of the verb is related to the central Property Predication sense via an IP link and the with-phrase is then included as an adjunct. When verbs are used in the With-adjunct construction, the theme is not lexically profiled although it is contributed from the verb. The participant role list for livid-class adjectives above, will look like this: livid < experiencer, property, [theme] >. The livid-class of adjectives tends to be associated with an idiomatic interpretation of the construction. The theme is represented as a definite null complement because it can only be omitted when it is recoverable from the idiomatic context. It is not omissible when the adjective is literally used as in the literal sense of livid as ‘mottled or discoloured as from a bruise’.

(35) a. Jane was livid (with rage).
    b. Jane’s arm was livid (with bruises from the car accident).
The four constructions are shown below with their relationships to each other.

<table>
<thead>
<tr>
<th>Property Predication Construction</th>
<th>IP: Property predication</th>
<th>With-adjunct construction</th>
<th>With adjunct construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td></td>
<td>livid with rage</td>
<td></td>
</tr>
</tbody>
</table>

↓ IP: Property predication

<table>
<thead>
<tr>
<th>Complex-Property Predication Construction</th>
<th>IM: adjectival property</th>
<th>Complex-Property Predication Construction</th>
<th>With adjunct construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>red with blood</td>
<td></td>
<td>swarm with bees</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9. The relationship between the Property Predication constructions.

It is when we come to the metaphorical extensions of the swarm meaning such as His eyes glinted with malice or Her voice dripped with sarcasm, that the constructional account proposed comes into its own. Accounting for these meanings is difficult if the entailments are held to be the means by which the complex meaning is composed, as property P is not actually entailed in these examples. This should mean that the complex property P', composed of P and the distributive theme location, does not apply. However the complex-property meaning does apply which raises questions about the nature of the relationship between the property and the theme roles. If the argument array proposed is examined it can be found to be unusual. The proposed array is < possessor, complex-property' >. The complex-property can be decomposed into a list: (complex-property property, theme).

The question has been raised as to what relationship the property and theme bear to the argument structure of the predicate swarm with bees. As represented here, the property and theme are not part of the argument structure because they are not actually related formally to the predicate. Theme and property are defined in relation to something that they are the theme and property of, namely the predicate. There is no predicate for them to be part of as they are simply represented as decomposed elements in a list. The elements are components in a situation described by the predicate. Together they compose an argument, the complex-property argument of the swarm with bees predicate but separately they bear no necessary relation to each other. This means that there is no requirement for the theme to bear the property.
What this means is that in the situation described by the predicate there is an unspecified property and an unspecified (located) theme. Their relationship is constructed by inference if such a relationship is plausible from the semantics of the situation. Therefore in the ‘expression’ metaphorical examples above, there is no plausible relationship because an expression such as malice has no light-emitting properties and so cannot glint. However the non-metaphorical examples such as The garden swarmed with bees do have a pragmatically inferable property entailment between the bees and the swarming action because swarming is a characteristic and normal activity for bees to do. Similarly blood can have a red property because of its chemical makeup and so a relationship between blood and the red property is inferable.

The entailments, which were held to compose the complex-property in Chapter Two, are not attributed to the construction’s argument structure but instead must be attributed to an inference made from the lexical semantics. The construction contributes the property predication meaning and this is why the metaphorical senses discussed in Chapter Two, which lacked the plausible entailment of property P, can still be understood as having the complex-property P’, because this property comes from the construction.

If the construction is assumed to be underspecified with respect to the composition of the complex-property, the lexical semantics can be assumed to fill in the rest of the information. The entailments may be supplied by inference if they are readily available from the lexical inputs. This means that the metaphorical swarm extensions can be treated in the same single construction as the core swarm examples without positing any additional constructions or internal structure to the argument array.

The advantage of the above analysis is that there is no need for the entailments to be included in the construction. Leaving the meaning underspecified and subject to implicature allows for a single unified treatment of the disparate yet similar senses of the Complex-Property Predication construction. However if the entailments were to be included it would be far more difficult not only to unify the analysis but also to actually accomplish the entailments.

Consider the construction The garden swarmed with bees. Firstly the property needs to be linked to the theme so that the property of swarming can be entailed of the theme, bees. The theme also needs to be linked to the location-possessor so as to express the Bees were in the garden entailment. However this would require some kind of indexing or repetition of the role in the participant role lists to show the relationship to each other as
well as to the whole predicate. This could be accomplished as some kind of nested structure with the possessor participant and constructional roles co-indexed with a nested location to show that they are the same role. However the nested location would need to be inside the complex-property list so that it can have the theme linked to it rather than being a simple component as it is under the current analysis. As well, the theme is the actor of the verbal event and should be indicated as such to show that it is the property-bearer.

This could look something like the construction below:

```
Sem  COMPLEX-PROPERTY  < possessor_j complex-property' >

If  <possessor_j (complex property location_j, theme_i )>

↓  ↓  ↓  ↓

Syn  AP  SUBJ  [vp  [vp  with  NP]]
```

Figure 10. Possible construction accounting for the entailment relations.

However it is unclear where the property role fits into this. While a state can be a type of location (Jackendoff 1972:31) and a property could conceivably be considered a kind of state (the state of swarming) this is not an intuitive or easily comprehensible way to account for the property. In attempting to account for entailments which may be explained by inference and pragmatics, it would seem that there is a lot of extraneous information required. I conclude that attempting to encode the entailment relations in any way is not tenable as it requires a thoroughly unwieldy analysis which renders a formerly transparent account of the data opaque.

### 3.8 General discussion.

In this chapter, the swarm alternation has been evaluated within the frameworks of two major analytical approaches. The Construction Grammar approach has been preferred because it offers the most comprehensive account of the swarm data. There were problems with the verb class-based analysis of the entailment relations between the with-variant and the Locative sentence, primarily because it strongly implied that all with-variants have a
specific Locative sentence entailed which is not the case for the adjectival data. The verb class-based approach is unable to accommodate the adjectival swarm data in any way which maintains its relationship with the swarm with-variant. The implicitly derivational nature of the verb class-based approach and the importance placed on relating the two canonical swarm sentences was concluded to be inappropriate for the swarm analysis.

The data study of Chapter Two suggested that the swarm alternation has an underlying sense of property predication which was exhibited by both the verbal and adjectival with-variants but not by the Locative variant. This suggested that there was some kind of constructional relationship between the different with-variants and that the Locative needed to be analysed separately. Construction Grammar offers a way in which this can be done because the constructions need not be derivationally linked. The Locative has been analysed as an instance of the intransitive Locative construction separate from the with-variant which has been analysed as being an adjectival construction (the Complex-Property Predication construction) related to a basic Property Predication construction. The Complex-Property Predication construction has two forms, the adjectival and its metaphorical extension, the verbal Complex-Property Predication construction. There is a further extension of the Property Predication construction in the With-adjunct construction which expresses the livid-class relation whereby the property of the adjective is predicated on the subject and the with-Property-Predication is an adjoined phrase.

The unified approach to the analysis of the swarm alternation offered by Construction Grammar allows for the distribution of the verbs and adjectives which appear in the various swarm frames to be treated consistently and accurately.

The next chapter will conclude the thesis by considering the place of the analysis of the swarm alternation offered by Dowty.
The previous chapter concluded that the swarm alternation was best analysed under a Construction Grammar approach which treated the two forms of the alternation as separate constructions. The with-variant, previously identified as the marked form of the alternation which carried the distinctive swarm meaning, was shown to be the extension of a property predication construction whereby a complex property was predicated onto a location. Moreover the basic members of this construction were claimed to be adjectives rather than the verbs which have been assumed to be the basic members of the alternation (Salkoff 1983, Levin 1993). Following the Construction Grammar approach as set out by Goldberg (1995), I have claimed that the occurrence of verbs and adjectives in the construction is governed by the compatibility of the constructional semantics with the semantics of the individual adjectives or verbs.

Recent work by Dowty (1999, 2000, 2001) has focused on the nature of the property predication involved in the swarm alternation. This work will be reviewed in this chapter as it allows for further clarification of the relationship between the verbal and adjectival variants.

4.1 **Dowty's analysis of the swarm alternation.**

Dowty (2000) focuses on the swarm alternation as part of a discussion on polysemy. His initial concern is to ascertain what purpose the with-variant serves in the alternation or more generally why there is an alternation at all. As noted earlier in Chapter One, alternations are problematic from the point of view of the UAH and UTAH because they are dual projections apparently resulting from a single meaning and this is not supposed to occur. Meaning determines projection and if there are multiple projections then there should be multiple meanings to ensure that the relationship is kept as a one to one mapping. However it is usually assumed that the meaning difference between the alternation’s forms is not significant enough to motivate a second lexical entry. Dowty argues that there must indeed be something significant enough about the meaning of the second argument array to justify its projection, “we should rather ask for what semantic purpose the second form exists that the first does not” (Dowty 2000: 111).
He begins his analysis of the swarm alternation by reprising five characteristics about the alternation which have already been covered in this thesis: the semantically restricted verb classes, the plurality requirement for the with-NP, the relationship between the sound verbs and their with-NPs, the abstract or metaphorical interpretation of the with-variant compared with the literal reading of the Locative variant and the specific with-variant meaning where the activity is understood to fill the locational space, a meaning which is lacking in the Locative variant.

Dowty argues that these points, taken together, show that the with-variant has a ‘sensory’ property meaning. He claims that they reduce the referentiality of the Agent argument in favour of the Location and furthermore that they imply a “‘descriptive’, ‘vivid’, ‘sensory-oriented’ role for this construction” (Dowty 2000: 121). He believes this is good reason for the with-variant to have a different semantic function to the Locative. In topicalising the Location and backgrounding the Agent argument, Dowty claims that the with-variant takes on a significantly different meaning.

Dowty claims that the alternation is a verbal derivation which derives the with-variant from the Locative on the grounds that the with-variant is more restricted, has a specialised restricted meaning which has the Locative meaning as its basis and that the with-variant meaning is consistent across the verbs which appear in it. These are cited as evidence for treating the process of derivation as a word formation rule (WFR). There are lexical gaps in the distribution of the verb forms in the with-variant, (1) and (2), which Dowty cites as evidence for the partial productivity of the WFR. There are no equivalent gaps in the Locative variants so the direction of derivation must be from Locative to with-variant.

(1)  a. The horizon blazed with bonfires.
    b. #The woods burned with campfires.

(2)  a. His voice dripped with sarcasm.
    b. #His voice dripped with righteous indignation. (Dowty 2000: 121)

The claim that the derived form is the with-variant is supported by the greater restrictions on the types of verbs which can appear in the with-variant compared to those which appear in the Locative. Dowty notes that the with-variant’s meaning is significantly different to that of the Locative variant. He claims that this is not attributable to any other subject-promotion process such as passive formation, tough-movement or middle-verb
formation as these have their own associated semantics which are different from those associated with the with-variant. He attributes the difference in meaning to the different sense of the verb created by the WFR derivation which also accounts for the general consistency in meaning of the output forms.

4.2 The Dynamic Texture Hypothesis.

As reviewed in the precious section, Dowty proposes that there are five main characteristics of the with-variant which show it to have a property predication sense. He reformulates his observations into ten claims about the with-variant, which are chiefly concerned with the semantics of the with-variant. The first three claims concern themselves with the establishment of the fact that the with-variant has a semantic function distinct from that of the Locative and that it is not merely a restatement of the Locative. Thus the first claim holds that, according to Gricean principles, the with-variant is a novel derivation derived for a humanly relevant purpose which could not be fulfilled by the Locative. The second claim simply states that the With-variant conforms to normal English propositional structure of a subject and a predicate with the subject as the “default discourse topic” (Dowty 2000: 122). The third claim extends the first two claims to state that the with-variant construction characterises the subject (Location) as a category that is significant for human purposes, something which the Locative does not do. This is further specified in the fourth claim which declares that not only does the with-variant characterise the Location but ascribes to it an abstract property through the activity which takes place within it. This characterisation categorises the Location in a way that is most relevant to the discourse.

Claims five and six extend the abstract property characterisation to the NPs which perform the action, serving to not only background the individual entities but to require that they be semantically plural. Also included is the requirement that the verbs used in the with-variant be small-scale movement or perceptually simple. Dowty states the converse of these claims, a reading where the individuals are more readily perceived than their actions, has an anomalous reading, as in the examples below.

(3) a. The room swarmed with a hundred mosquitoes.
   b. ?The room swarmed with seventy-three mosquitoes.

(4) a. My philodendron is crawling with dozens of snails.
b. My philodendron is crawling with fifty-seven snails. (Dowty 2000: 123)

Although the (a) examples are not completely vague, they are numbers which are imprecise when compared to the exact count implied in the unnatural (b) examples.

The eighth claim is concerned with the holistic effect. Dowty accounts for this as an implicature which results from the meaning that “the perception of activity is sufficient to categorise the Location itself” (Dowty 2000:123). This is seen as a natural consequence of the property which is ascribed to the Location. The penultimate claim about the with-variant is that the tendency for metaphorical or abstract senses of the verb to be more acceptable in this form is due to the fact that the ascription of the already abstract property of the Location being characterised by the activity which occurs within it, is sufficiently far abstracted that the metaphorical senses of the verb are simply extensions of the inherently abstract nature of the construction. In other words, as the meaning of the construction is abstract enough as it is, further abstraction is not anomalous. To further this extension the verbs which occur in this construction are ideally suited to metaphorical treatment as they are simple, easily recognised actions that do not require a great deal of analysis to understand. In his final claim, Dowty considers the invariant preposition, with, which marks the ‘demoted’ Locative subject. Dowty claims that its use is no lexical accident but that it is bound up with the primary instrumental meaning of the preposition. In its other uses, with marks the means by which the action is achieved. Its use in the with-variant to mark the Agent14 NP in the oblique phrase is consistent with this.

Dowty unifies these ten claims under the concept of ‘dynamic texture’ which he attributes to a suggestion by Jackendoff. ‘Dynamic texture’ is a property, like any other tactile or visual texture. It is distributed around a region, it is of a small or simple nature and it is not an inherent or discrete property about the region or property-bearer as a whole, unlike properties like size or shape. This can be seen in the examples below.

(5)  a. The floor was sticky.
    b. The marble was cool.
    c. The apple was mouldy.
    d. The snake’s skin was warm.
    e. The car was dusty.

---

14 I would contend that the NP in the with-phrase is not an Agent but is rather a displaced Theme. Elsewhere Dowty argues the same (Dowty 1999). However in this section I am conforming to Dowty’s usage in the 2000 paper.
These are all properties which are predicated of an area and which are simple in nature. After all, it only takes a glance to see that a car is dusty or a single step to tell that the floor is sticky. And they are also discrete, being separated from the referent they describe. A floor is covered with a substance or residue if it is sticky whereas if the floor is flat, this is a property it has intrinsically. It is not a separable property. And if an apple is mouldy then there is mould on the apple surface and possibly penetrating the interior. It is not the same as The apple is round which is an emergent property drawn from the referent as a whole. A random point on the apple’s surface cannot be sampled and claimed as round, although a sample could certainly be claimed as mouldy.

These properties described thus far are all static. The difference between conventional texture and the dynamic texture that Dowty espouses is that the texture is an activity. The texture is created in the perception of the movement of the bees in the garden or the tactile sensation of the many pinpricks from a bristling vine. This is shown in the examples below.

(6)  a. The garden swarmed with bees.
    b. The vine bristled with thorns.
    c. The sky twinkled with stars.
    d. The fountain bubbled with water.
    e. The cake oozed with syrup.

The sky in (c) does not literally twinkle, emitting tiny flashes of light. The stars across the sky emit light at differing strengths and this gives the visual sensation that the light shifts and sparkles as the observer’s eye is caught by the brighter stars and moves between them. Similarly the fountain does not bubble in (d); the water’s noise as it exits the pipe of the fountain creates the auditory perception that the fountain itself is emitting bubbling noises. This is complemented by the visual element in the water’s movement out of the fountain which adds to the dynamism of the perception.

The dynamic texture is also more than just a surface predication. It fills the region it is predicated of and is thus three-dimensional. Moreover it relies on more than one type of perception. As in the examples above, The garden swarmed with bees draws on the visual recognition of the bees but also on the aural; the buzzing of the bees is a counterpoint to
the sight. Similarly in (6b), the vine looks bristly and thorny and this is confirmed by the tactile sensation or expectation of the anticipated sensation.

Dowty suggests a hypothesis based on this textural concept which is a synthesis of the ten claims outlines above. He states his hypothesis as a lexical derivation which takes the Locative as the basic input form from which the with-variant is derived.

The Dynamic Texture Lexical Rule:

“For any verb input $\alpha$, the rule yields a new verb (or “new verbal construction”) with the same phonological form as before, with new syntactic subcategorisation “$y$ $\alpha$ with $x$” (i.e. subject and with-phrase complement), and with a new meaning, which describes the property a location $y$ has when the kind of activity denoted by the original $\alpha$ is being performed in most/all (very small) subparts of location $y$, by some instance of $x$ in each case; that is the original property $\alpha$ is distributed throughout all small regions of $y$” (Dowty 2001: 7)

4.3 Dynamic Texture and the With-construction.

The analysis of the with-variant, proposed by Dowty as being a kind of property predication, is clearly consistent with the analysis presented by this thesis. In this proposed analysis the unified treatment of the verbal and adjectival forms has been emphasised as a major feature of the analytical approach as it accounts for the striking similarities in the behaviour and sense of these two word classes in the with-variant. Nevertheless there are differences between the verbs and adjectives which must be accounted for in the constructional representation. The relationship between the verbal and adjectival variants is discussed in this section and the connection to Dowty’s analysis is shown.

As noted in Chapter Three, the simple adjectival forms were concluded to be the basis from which the property predication of the with-variants originates. The basic With-construction, the Complex-Property Predication construction, was considered to be primarily adjectival. The source domain for this construction is the simple adjectival Property-Predication construction shown below. The predicate red is shown in the construction, as in The shirt was red.
The relationship between the lexical head and the construction’s semantics was not included in the previous chapter’s discussion on the Complex-Property Predication construction. It will be discussed in detail now. The R relation is the function which expresses the relation between the semantics of the head and the constructional meaning as a whole. As Goldberg states it, “verbs which do not directly denote the meaning associated with the construction often denote the means by which the action is performed” (Goldberg 1995: 60). She notes that this is seen in the relationship between the verbs of ballistic motion, such as kick, and the ditransitive construction as in Joe kicked Bob the ball (Goldberg 1995: 61). The relationship is one of transfer by means of kicking. Other kinds of R relations include the intended result of the conative construction where the intended result is indicated by the meaning of the verb although the implicit assumption is that the intention fails. The instance relation is shown, in conjunction with the means relationship, in the Caused-Motion construction. The verbs which appear in the Caused-Motion construction are instances of caused motion as in Frank sneezed the tissue off the nightstand (Goldberg 1995: 161), and they are also the means by which the motion event is accomplished. Goldberg formalises the types of R relation as follows:

Summary of the Relations between Verb Semantics and Construction Semantics.

Let \( e_c \) be the event type designated by the construction, and \( e_v \) the event type designated by the verb.

I. \( e_v \) must be related to \( e_c \) in one of the following ways:
   A. \( e_v \) may be a subtype of \( e_c \).
   B. \( e_v \) may designate the means of \( e_c \).
   C. \( e_v \) may designate the result of \( e_c \).
   D. \( e_v \) may designate a precondition of \( e_c \).
E. To a very limited extent, e\textsubscript{v} may designate the manner of e\textsubscript{c}, the means of identifying e\textsubscript{c}, or the intended result of e\textsubscript{c}.

II. e\textsubscript{v} and e\textsubscript{c} must share at least one participant. (Goldberg 1995:65)

The relation which is the most relevant for the discussion of swarm is A – that e\textsubscript{v} may be a subtype of e\textsubscript{c}, or an instance of e\textsubscript{c}. The relationship between the simple adjectives and the meaning of the Property Predication construction is that of instance. The shirt is red is an instance of the predication of the property red onto the shirt. This is shown below in the construction by the R: instance annotation.

![Figure 12. The Property Predication construction with R relation.](image)

The Complex-Property Predication construction (The shirt was red with blood) is an elaboration of the basic Property Predication construction (The shirt was red). Just as red is an instance of the predicate in the simple Property-Predication construction, so red with blood is an instance of the complex property in the Complex-Property Predication construction, The shirt was red with blood. Accordingly R = instance for this construction as well.

![Figure 13. The Complex-Property Predication construction with R relation.](image)
In Chapter Three the adjectival construction shown in Figure 12 was presented as the most basic Complex-Property Predication construction. The verbal construction was presented as a metaphorical inheritance (IM) extension. The relationship indicated by the IM link captures the intuition that the verbal construction expresses a metaphorical property predication and is actually the more abstract predication.15

Dowty’s analysis of the swarm with-variant as representing a kind of ‘dynamic texture’ predicated upon the location is an insightful understanding of the metaphor the construction encodes. The distancing effect of the textural reading, where the physical entities’ movements are reduced to a perceptual pattern is an abstraction of the physical movement to a metaphorical dynamic property.

The verbal construction produced by this IM extension from the adjectival Complex-Property Predication construction is a different kind of instance of the Complex-Property Predication meaning. Accordingly the R relation is annotated to show this as ‘dynamic instance.’ This reflects the dynamic textural nature of the metaphor expresses in the verbal Complex-Property Predication construction.

```
Sem  COMPLEX-PROPERTY < possessor complex-property’ >
    
    SWARM WITH BEES < possessor (complex property property theme ) >
    
    Syn  AP  SUBJ  [vp v [pp with NP]]
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Figure 14. The verbal Complex-Property Predication construction with a dynamic instance R relation.

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15 This contrasts with the alternative view that the verb construction is syntactically and semantically more basic, and the construction primarily expresses an activity performed by actors distributed over a location.
4.4 Advantages of the present analysis.

The Construction Grammar analysis proposed here has a number of advantages over the more conventional verb class-based approaches of Dowty and Rappaport and Levin. This analysis has a unified treatment of the verbs and adjectives which occur in the with-variant. It is considered significant that both the verbal and adjectival instances share properties which are considered to be characteristic of the construction16. As noted in 2.3.3, The shirt was red has a number of available inferences.

(7) a. Blood was on the shirt.
   b. Blood was red.
   c. Blood was (more or less) all over the shirt.

As was also noted, 2.3.2 these are the same inferences as can be drawn from the more widely-studied verbal forms. Thus from The garden swarmed with bees, three inferences, corresponding to the adjectival ones above, can be drawn.

(8) a. Bees were in the garden.
   b. The bees were swarming.
   c. The bees were (more or less) all over the garden.

In addition to the identical inferences, the adjectives show the same distributivity requirements for the with-NP already noted for the verbal with-NP in the construction.

The previous analyses, which treat the alternation as a verbal lexical derivation, cannot include the adjectival forms and cannot therefore account for the obviously related phenomena. Dowty notes that zero-derivations such as the swarm alternation which “change valence but not major lexical class” (Dowty 2000: 121) should be treated in the same way as zero-derivations which change major lexical class, as “matters of word derivation” (Dowty 2000: 121). Despite this observation, it does not appear that Dowty

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16 It must be noted that the ‘expression’ instances, Her eyes sparkled with glee, are exceptional in several ways (2.3.2). However the present analysis can accommodate these exceptions by means of the underspecification of the construction advocated in 3.8 which utilises available inferences from the individual semantics to complete the meaning.
considered the adjectives in his analysis. Certainly he makes no explicit commentary on them and does not include them in his WFR statement above (4.2).

The chief advantage of assuming the adjectival Complex-Property Predication construction as the basic construction is that it allows for an explanation of why the verbal Complex-Property Predication has the Property-Predication sense. After all, as Dowty has noted, this sense is not attributable to any other subject-forming process and otherwise it must be stipulated as the specific constructional meaning. But the analysis of the verbal Complex-Property Predication as a metaphorical property predication explains how this meaning is achieved. The WFR rule advanced by Dowty can only state the meaning of the construction and cannot account for why it occurs. The present analysis shows that the property predicating semantics are not at all surprising or idiosyncratic but follow naturally from the extension of the basic function of simple adjectives.

This is also why there is a strong intuition that between the with-variant and the Locative variant there is a change in Aktionsart, between state and process, although it is impossible to prove (1.5.3.1, 3.4). In Chapter Three it was claimed that the Locative and with-variants were separate constructions with the Locative denoting an action performed in a location. The verbal with-variant was earlier claimed to have an essentially stative reading supported by the occurrence of the adjectival with-variant. The link between the verbal with-variant and the adjectival with-variant has been claimed as an IM link from the Complex-Property Predication construction The shirt was red with blood, itself an IP (polysemous inheritance) extension of the adjectival Property-Predication construction The shirt was red, which is canonically stative. The sense of disjunction between the alternations’ Aktionsarten is captured by the separate constructions analysis that does not force one construction to entail the other.

The property predicating semantics of the construction, as Dowty argues, predict which activity verbs appear in the verbal Complex-Property Predication construction. The ‘perceptual property’ requirement he notes is also consistent with the fact (2.3.3) that the adjectives which appear in the Complex-Property Predication construction generally denote colour or texture, canonical perceptual properties. They are entirely consistent with Dowty’s observations on the meaning of the construction. The property predicated is perceptual rather than abstract.17

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17 *Flush with money* could be argued to be an exception to this claim. However it is most likely to be an example of an idiom.
The Construction Grammar framework in general allows an account of alternations, including the swarm alternation, in which the distribution of lexical items is mediated by their compatibility with the relevant construction. This results in some items appearing to alternate between two constructions while others do not. Adjectives which appear in the Complex-Property Predication construction generally do not appear in the Locative construction while many activity verbs which do appear in the Locative construction cannot appear in the Complex-Property Predication construction because they are incompatible with that construction. Any lexical derivational account will have difficulties with this distribution as a lexical derivational account assumes that lexical heads which appear in the marked variant are a subset of those which appear in the less marked or basic variant. The Construction Grammar approach does not explicitly connect the with-variant and the Locative variant, therefore it does not assume a distributional overlap. Where a head appears in both the With- and Locative constructions it does so because its lexical semantics are independently compatible with both of the formally unrelated constructions.
References:


### Appendix 1:

**A summary table of the acceptability judgements of the data examined.**

A solid box indicates that the resulting sentence was considered acceptable.

1. $NP_1 \ V \ P \ NP_2$
2. $NP_2 \ V \ with \ NP_1$
3. $NP_2 \ be \ A-V \ with \ NP_1$
4. $NP_1 \ be \ ADJ \ with \ NP_1$
5. THERE be ADJ-NP$_1$ P NP$_2$
6. THERE be NP$_1$ V-ing P NP$_2$

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