The Lattice of Case and Agentivity

MSc Thesis (*Afstudeerscriptie*)

written by

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Chapter 1

Introduction

Case-marking is at the crossroads of syntax, morphology, semantics and even occasionally pragmatics. The goal of this investigation is to examine the semantics underlying case-marking. Modulation of parameters such as agency, object individuation and affectedness are known to affect the realization of case-marking (Hopper and Thompson, 1980), especially in the form of case alternations. Yet, explicitly connecting individual parameters with the semantic contribution of case alternations has largely proven elusive.

From a syntactic viewpoint, especially within generative syntactic theories, case has been viewed as partitioned into syntactic case ("structural case") or case assigned in the lexicon ("inherent case"). However, many uses of case can neither be explained in purely syntactic terms, and yet, are too regular to be idiosyncratic and individually assigned elements of lexical entries. This deficiency has been pointed out many times before (e.g., the discussion of the status of the indirect object in (Butt, 2006)) and it is increasingly recognized that there are regular, semantic principles at work in case-marking which are more general than the notion of "inherent case" predicts.

There is an acute need for investigation of the semantics of case-marking. Individual case-markers can be used in a surprisingly wide variety of manners, and without a thorough understanding of the semantics involved in a given case, delivering a unified analysis for such variety is without much hope. Some uses of case are largely semantically transparent; for instance, in many languages, the instrumental case has a consistent and coherent semantic contribution—it marks that the nominal marked by the instrumental was used in the event. The temptation to directly link cases with a semantic contribution is great, but attempts in this direction have been hampered by a lack of serious investigation into what the semantic contribution is grounded in.

There have been many previous attempts to link case-marking with semantics. Of-

ten, case-marking is associated with various grammatical roles such as *agent, recipient, patient* and so forth, allowing to associate a given case marker with a semantic role or concept, as in (Fillmore, 1968). This is an attractive approach, since intuitively, a semantic continuity is found throughout the distribution of a given case marker. In general, such attempts have failed to make progress because such grammatical roles are too coarse-grained to provide the necessary flexibility to match the actual distribution of case-markers. The technique followed here of decomposing broad semantic concepts such as an *agent* into more primitive properties, and then establishing the structure that inheres among these properties, allows to represent a facet of the semantics of a case-marker in more fine-grained detail. In turn, this move provides more depth to the semantics of a given case, which then can be used to explain the different interpretations a case can receive in different contexts.

Much research, especially from typology, has demonstrated that there appear to be (partial) universals at work, which continue to motivate the search for the connection between semantic factors and case-marking. In very oversimplified terms, the primary facts about syntactic and semantic prominence, known as thematic prominence, can be represented by the following prominence scales:

(1) a. Syntactic Prominence: Subject $>$ Object
    b. Thematic Prominence (Fillmore, 1968): Agent $>$ Theme

Looking at these two scales, there is a great temptation to imagine a one-to-one mapping onto (1a) from (1b)—for instance, with agents mapped to subjects and patients mapped to objects. However, once these prominence relations are expanded to include indirect objects and complements for syntax, and other sorts of grammatical roles, such as *experiencers* or *recipients* for the thematic scale, the enterprise becomes enormously complicated. In fact, attempts to establish such a linear scale incorporating all the types of grammatical roles have led to a proliferation of different thematic hierarchies, some contradicting others (cf. discussion in (Levin and Hovav, 2005). Even so, there do appear to be some universals which can be stated with a good deal of empirical certainty, such as that an instrument cannot be realized as subject in the presence of an agent, or a moving entity cannot be an object in the presence of an entity that changes state (Levin, 2005). Providing a framework which allows to capture such generalizations, and connecting them with how such arguments are realized by case-marking, will be a central part of this work.

Yet, case-marking is a wide-ranging phenomena, and is clearly not limited to an algorithm mapping thematic constraints onto syntax, but interacts with a variety of other factors. The importance of these other factors, such as definiteness, animacy and so forth has recently been emphasized in the work of (Aissen, 1999, 2003). These factors, too, can be represented in terms of universal prominence scales.

(2) a. Animacy Scale (Aissen, 2003):
Human > Animate > Inanimate

b. Definiteness Scale (Aissen, 2003):
Pronoun > Name > Definite > Indefinite Specific > Non-Specific

c. Person Scale (Aissen, 1999):
First, Second > Third

In (Aissen, 2003), the scales (2a) and (2b) are conjoined to account for Differential Object Marking, a phenomena whereby objects are case-marked if they appear towards the higher end of the prominence scales. Again, the influence of these scales upon case-marking is most often neither direct nor simple. Then, the question arises concerning how all the parameters mentioned interact—for example, what are the ways in which the parameter of animacy influences that of agentivity.

The tactic used here to provide a manner of associating case-markers with semantic properties is two-fold. First, extending the work of (Dowty, 1991), the parameter of agentivity is decomposed into more primitive semantic properties. Second, the resulting properties are organized in a hierarchical manner, into a lattice, a move inspired by the work of (Aissen, 2003), who organized the above animacy and definiteness hierarchies into a lattice representation as well.

If this analysis is taken as correct, several results follow. First, it is possible to give an account of both canonical uses of case, i.e., the general sense of a case, and its less typical uses. This account is a result of the use of the semantic properties of agentivity as the common denominator of the various uses of a case. Further, this model can then be applied to successfully explain in a principled manner case alternations in a variety of languages—Hindi and Russian are considered here—and other puzzling phenomena associated with case, such as case attraction in Ancient Greek. Finally, and perhaps most importantly for further research, the construction of the lattice of agentivity properties provides a first step for modelling the interaction of several different semantic parameters via a feature-based representation.

It should be mentioned from the outset that this study does not directly engage in the logical formalisms frequently found in work on semantics. The central reason is that in order to engage in such formalisms, a clear idea of what is being formalized must be present. This is precisely what is lacking in the current state of knowledge about the semantics underlying case. Instead, this study attempts to render conspicuous exactly what are the semantic factors contributing to case realization. It turns out that both the data and the analysis of case phenomena pose clear challenges to the view of formal semantics focussing on extensions.

The organization of the thesis is as follows. Chapter 2 discusses the general principles of case-marking with reference to how case-marking is realized in a variety of languages and how case-markers are formed via the process of grammaticalization. In Chapter 3, a hierarchical representation of the semantic properties at work

in argument structures, i.e., agentivity, patientivity, etc., is constructed via a lattice. This chapter contains the core theoretical contribution of this study. The next two chapters focus on applications of the lattice approach. In Chapter 4, typological generalizations surrounding the notion of *transitivity* are treated, followed by an account, still on the typological level, of the different systems of core case-marking, i.e, the marking of subjects and objects, including a treatment of Differential Object Marking (DOM). The lattice is then used throughout Chapter 5 to provide an explanatory model of non-canonical case marking in particular languages, that is, phenomena such as case alternations and case attraction. After accomplishing this, the relation of this study to formal semantics will be considered in Chapter 6, where it will be shown that this study actually presents several challenges for formal semantics. In the final chapter, I review the argument and its success in accounting for a diverse range of phenomena. Finally, I discuss some problems for further research.

Chapter 2

Case: An Overview

2.1 Case: Morphological, Syntactic, Semantic and Functional Properties

The study of case has not arrived at a satisfactory definition of case which is succinct and properly circumscribes the range of functions of case-marking. What the nature of case *is* is largely undetermined in most studies of case. (Blake, 1994) gives a tentative definition of case as "a system of marking dependent nouns for the type of relationship they bear to their heads." Yet, this definition, as is almost immediately admitted in (Blake, 1994), does not hold for all cases. To give only one troublesome example among many, Ancient Greek disposes of a case known as the vocative, which is used primarily with names of persons and whose force is that the speaker is addressing the person whose name is put into the vocative. In this situation, the vocative case makes no reference to the relation of the noun to its head, but instead serves in a discourse function. More crucially, certain cases are primarily used to indicate a semantic relation to its head rather than a strictly syntactic one, and vice versa. The instrumental case is an instance of the former, since the instrumental case marks that the argument was used as an instrument in the event, and the nominative case is an instance of the latter, marking that the argument is the subject of the predicate. While there is truth to the statement that various cases designate a type of relation, succinctly defining which relations are appropriate to case-marking is nearly as difficult as the initial task of defining case.

For the purposes at hand, it is best to conceive of case as a morphological means of marking arguments for syntactic, semantic and/or pragmatic content. I will be developing the view that cases are associated with, or "contain", a core semantic element, namely thematic content—information about participants, and types of participation, in events designated by the predicate. A word of caution must be inserted at this point, that I use the term "semantic" in a broader sense than formal, or

truth-conditional, semantics (the relation between the semantic elements I discuss and formal semantics will be discussed in 6).

Case is a complex notion in terms of morphological definition as well. The distinction between cases which are fused to nominals (i.e., inflected cases) and adpositions which are syntactically separate units (i.e., prepositions and postpositions) is often a contentious one. Functionally, there seems to be little distinction since both serve to mark nouns for their relation to the predicate. A striking example of the proximity of postpositions and case-markers occurs in languages of the Dravidian family. The same root surfaces in some members of the family as a postposition, and in others as a suffix, i.e., a case-marker. For example, in Tamil, *-uḷ* is a postposition, designating 'inside'. However, the related *-lō* in Telugu is used as both a postposition and case marker, e.g., *in-ṭi-lō*, 'in the house' (Krishnamurti, 2003). Here too, I will use the term 'case' in a morphologically broad sense, not troubling about the fuzzy boundary between inflections and adpositions, since it is the functional and semantic properties that will be of interest.

The dismal picture that emerged in the preceding paragraphs of case as an undefined concept should not depress us for very long, since there are quite a few things known about case systems. The very fact that linguists can discuss different languages while using the same labels of 'nominative', 'accusative', 'dative', etc., referring to case-markers found in the different languages is telling of a universal component to case marking. A cursory glance at the case systems of the world shows that languages whose geographical and historical circumstances are completely disjoint make use of case-markers with quite similar functions. For instance, Australian languages dispose of a dative case, the case responsible for marking an indirect object, just as Indo-European languages do. There are uses particular to each language which distinguish the dative case of a given Australian language from the dative case of a given Indo-European language, but it is worthwhile to emphasize that there is enough in common between the two to merit the use of the same label, 'dative', in describing each language.

What all these case systems have in common is that they use case to mark how nominals are integrated into the predicate, syntactically and/or semantically. An argument structure representation of a predicate states that a predicate requires certain types of participants as its subject, object, etc. For instance, the verb *hit* in English requires that the subject be an agent, one that performs the action, and that the object be a patient, one who submits to the effects of the action. Marking argument structure is the primary reason for having a case system in the first place—in order to signal what is the subject, object, etc. of the predicate. Put differently, if a language has case, its cases at least have this function. Certainly, case-marking can have many more uses, as the discussion of the vocative exemplified, yet its fundamental responsibility is toward marking argument structure. Since argument structure is determined by thematic content, it follows that case assignment is determined in part by thematic content as well.

Having discussed these generalities about case, I now turn to two more specific discussions. First, I will outline the general architecture of case systems, which will introduce the type of data with which this study is concerned. Second, I discuss how cases arise in the first place, that is, the process of grammaticalization which results in case systems. This second topic will give a historical basis to one of my main claims, that cases have a central semantic content, which while possibly extended during the process of grammaticalization, is still very relevant for any treatment of case.

2.2 Varieties of Case

2.2.1 Core Case Markers

Core case-markers are responsible for marking the arguments of one- and two-place predicates. The strategies used to achieve this task fall into two main categories, either aligning the subject position with the Agent or the Patient, which correspond to accusative and ergative systems, respectively. In accusative systems, the subject aligns with the Agent and is usually unmarked (nominative) while the Patient stands in the marked (accusative) case, as in (3).

(3) LATIN (Palmer, 1994)

Puer hominem planxit
boy.NOM man.ACC hit.3.SG

The boy hit the man.

Conversely, ergative systems mark the Agent (ergative marking), and the Patient is aligned with the subject and typically unmarked (absolutive).

(4) DYRIBAL ((Dixon, 1979) taken from (Palmer, 1994))

a. numa banaga-ju
father.ABS return.PAST
Father returned.

b. numa yabu-ngu buɽ-n
father.ABS mother.ERG see.PAST
Mother saw father.

The accusative system is the more frequent, comprising over seventy percent of the world's case systems.

Agentive systems demonstrate yet another different, and least frequently found, method of assigning core case assignments. Here, the subject of intransitive verbs

is marked as Agent with some verbs and as Patient with others, depending on the verb. Occasionally, the same verb permits both possibilities.

(5) EASTERN POMO ((McLendon, 1978), taken from (Palmer, 1994))

a. há c'exélka
1SG.AGT slip
I'm sliding

b. wí c'exélka
1SG.PAT slip
I'm slipping

From the outset, it should be made clear that the use of 'Patient' has at least two different uses which should be kept in mind. In literature on Thematic Roles (which investigates the semantic classification of participants in events or states, such as 'Agent', 'Patient', and so forth), 'Patient' is used in a specific, although still too often vague, sense: the entity which submits to the affects of the action of the event designated by the predicate. In the typological literature, 'Patient' is used much more generally, as in the above, and is often equivalent to 'Non-Agent'. In describing different alignment systems, i.e., ergative vs. accusative, the symbols *A* and *P* are used rather than Agent or Patient. In what follows, the context should make clear which sense is pertinent, but I shall try to add clarification where there could be doubt.

In summary, the three systems can be schematically represented by table 2.1.

Table 2.1:

System	**Alignment**
Accusative	S=A
Ergative	S=P
Agentive	S=A/P

2.2.2 Peripheral Cases

Most case systems contain between six and a dozen cases and vary as to what relations are marked. Here, I am concerned with distinguishing core cases, which are mostly used for the functions of marking subjects and objects, from those which are primarily used for other functions, indirect object or adjunct markers, and cases with specific semantic content. Here listed are some of the more typologically prominent peripheral cases with informal definitions.

Dative: Most often associated with the indirect object of ditransitive verbs, especially when the indirect object designates a benefactive or recipient function. The term dative actually has its etymological origins in the Latin, 'dativus', which signifies "appropriate to giving".

Genitive: The case used to designate possession, and as such, usually marks relations between nouns rather than between a noun and a verb.

Instrumental: The case which marks a noun as the instrument or means by which the action depicted by the predicate is effected.

Locative: This case designates location, and roughly corresponds to prepositions in English such as 'in', 'on', or 'at'.

Comitative: The case of accompaniment, designating with whom the subject or object participated in the event.

There are dozens of other cases which have many specific functions, but I will only be directly concerned with the core cases and the first three peripheral cases listed.

2.3 Diachronic Perspective on Case

Throughout the following chapters, it is helpful to keep grammaticalization patterns in mind as providing a semantic foundation to case-marking. It has been argued that case markers have "general meanings" (Jakobson, 1984), i.e., a semantics that transcends the often quite diverse uses of a case in different contexts. The source of a case-marker can be seen as an underlying general meaning, which through high frequency of usage and idiomatization, extends its range of particular uses. Even though the range of meanings of case-markers develops by the process of grammaticalization to be much wider than the meaning of their source material, their original senses often still influence both the eventual semantics of the case-marker and potentially its distribution.

Case markers have their origins in other lexical items; most frequently verbs or nouns, and to a lesser extent adverbial particles. The first change is from lexical item to adposition, that is, a preposition or postposition. Verbs possessing meanings which are in high demand, such as 'come', 'leave', 'take' and 'give', end up being used as second verbs added to the main verb, a process by which serial verb constructions arise. An example is provided by Ewe, from the Niger-Congo family:

(6) EWE ((Heine et al., 1991), found in (Blake, 1994))

a. me-ná ga kofí
1SG.give money Kofi
I gave Kofi money

b. me-wɔdɔ´ vévíé ná dodókpɔlá
1SG.do work.hard give exam.DEF
I worked hard for the exam

In Kwe, the verb is bound to its subject, as in (6a). In (6b), it stands alone, indicating that it is no longer functioning as a verb, but rather as an adposition denoting the 'beneficiary'.

Verbs recruited for service in serial constructions become stripped of their ability to mark all the grammatical categories that finite verbs do, such as tense, aspect or mood. Gradually, these serial verbs become adpositions, that is they become "functionally equivalent to a preposition" (Blake, 1994, p.164). This process is both widespread and follows a general pattern. The relation between the meaning of the lexical source and the general meaning of the adposition is most clearly seen with oblique cases, e.g., the Kwe example of 'give' above being used for benefactive. The second object of 'give' is by default a beneficiary, so it is unsurprising that this verb is recruited to mark beneficiaries in general.

The path from verb to postposition to case is paved with much reanalysis and extension of meaning; however, the original distribution properties associated with the verb often linger when used as a postposition or suffix. One illustrative example is the Mandarin Chinese object marker *bǎ* as discussed in (Li and Thompson, 1974), (Li and Thompson, 1981) and (Lord, 1989). *Bǎ* was initially employed in Classical Chinese as a verb, meaning 'take hold of', 'grasp', then figured in serial verb constructions, as in (7).

(7) CHINESE (Li and Thompson, 1974)

Shī jù wú rén shì yín bǎ jiàn kàn
poem sentence no man appreciate should hold sword see

Since no one appreciates poetry, I should take hold of the sword to contemplate it.

In Modern Chinese, *bǎ* has become a direct object marker, as in (8).

(8) CHINESE (Li and Thompson, 1974)

Zhāng-sān bǎ Lǐ-sì pīping le
Zhang-san ba Li-si criticize ASPECT

Zhang-san criticized Li-si.

However, the distribution of *bǎ* shows signs of its former meaning in that it is *not* allowed to mark objects of verbs such as *ài*, 'to love', or *xiǎng*, to miss (someone), being "generally confined to definite and generic patients."(Blake, 1994) However, it must be noted in passing that *bǎ* only occurs as a direct object marker when the object is fronted before the verb, a construction with is much less frequent than the regular position of the direct object in Chinese, after the verb. The restricted use of *bā* could aid in explaining the retention of its selectional traits.

Similarly, in the West African language Gā, the object marker *kè*, once a verb meaning 'take', disallows marking on Experiencer-Patient circumstances, as in (9):

(9) Gā (Lord, 1989)

a. Tètè nà Kɔ̀kó
Tete saw Koko
Tete saw Koko.

b. * Tètè kè Kɔ̀kó nà
Tete ke Koko saw
Tete saw Koko.

Verbs and nouns are not the sole sources of case markers. It often happens that markers of core grammatical relations are derived from markers of oblique cases, i.e., a case-marker extends its distribution to a new context. For instance, in Urdu/Hindi, the direct object, or "accusative", marker *ko* is directly derived from the dative marker *ko*. Significantly, *ko* does not mark all direct objects, but is overwhelmingly used to mark humans as direct objects, and less regularly with animate objects and definite inanimates. Anticipating slightly, the dative case is primarily associated with recipients and beneficiaries, which are mostly human. Thus, in these cases too, there is a correlation between the meaning of the source of a marker, e.g., dative from accusative, and its usage in its new context.

Pronouns provide another frequent lexical source of eventual case-markers, especially for the nominative case. For instance, in Georgian, the nominative singular ending *-i* has its origins in the 3rd person singular deictic pronoun *igi* or *isi* (Schmalstieg, 1980). Here, too, the source material influenced the distribution of the case ending. In Old Georgian, the influence of the deictic/definite sense was still in effect, and personal names did not possess a nominative case. In current-day Georgian however, the nominative case applies generally.

In what immediately follows, I will be exploiting a particular area of semantics, agentivity properties, and be arguing that a given case is semantically consistent with respect to these properties. The grammaticalization pattern of case-markers is the ultimate source of these agentivity properties, and even in instances when we do not have direct evidence of a lexical source for, e.g., the instrumental case, it

can be inferred that it comes from an appropriate lexical item, say, ‘use’. In this way, the picture I am about to develop concerning case-marking is consistent with what we know about the diachronic facet of case.

Chapter 3

The Agentivity Lattice

As discussed in the last chapter, since case-marking serves a variety of functions, one over-arching definition of case has remained elusive. However, there are different claims as to what, on a general level, is the primary function of case-marking. Two principal views on case-marking are what have been termed as discriminatory and indexical (Song, 2001). The discriminatory view of case-marking contends that case-marking serves to distinguish the arguments of a predicate from one another. This accounts for the distribution of case found with primary arguments of verbs, namely the subject and object in transitive clauses. In accusative systems, the subject is unmarked and the object is formally marked with the accusative case. The case-marking on the direct object fulfills the function of distinguishing the object from the subject, preventing any confusion while interpreting the phrase. In contradistinction to accusative systems, ergative systems leave the object unmarked and mark the subject. While the details surrounding these different systems are notoriously difficult to deal with in a summary way, the end result of the marking, in functional terms, is identical—the subject and object are formally distinguished from one another.

While the discriminatory view clearly makes sense, it remains silent on many other facets of case-marking. One central fact of case-marking that is left unaccounted for is case alternations, the phenomenon whereby the case typically assigned to a nominal can vary with a different case when the semantic circumstances permit. While both cases of the alternation serve to mark the subject (object), they differ in their semantic contribution. A common phenomenon cross-linguistically is dative "experiencer" marking, where the subject of clauses in which the predicate involves an emotional or psychological event, as in the following:

(10) HINDI (Narasimhan, 1998)

Raam-ko dar lagaa
Raam.DAT fear.NOM be.struck.SG.MASC.PAST

Raam became afraid.

While "dative experiencer" subjects in Hindi retain all the properties of the subject with respect to all relevant tests of subjecthood (Masica, 1991), it is difficult to claim that the subject and object are marked only in accordance with a discriminatory function, especially since the dative can also be used, and primarily is, to mark (indirect) objects. A further difficulty is that many languages show a certain level of tolerance for subject and object to be both unmarked with certain verbs.

The indexical view of case-marking proposes that case marking on subjects and objects does not exist merely to distinguish one from the other, but, in effect, encodes the relative value of subjects qua subjects and objects qua objects. This view, first argued in detail in (Hopper and Thompson, 1980), proposes that this encoded value is relative to the *transitivity* of the clause. In the view of (Hopper and Thompson, 1980), transitivity is loosely defined as "a carrying-over or transferring an action from one participant to another," with canonical examples being of the type "John struck Bill". Transitivity is then viewed as a quality that phrases can possess, the prototypical transitive phrases being closer to 'Cardinal Transitivity', i.e., the highest level of transitivity. It is argued that phrases which are higher (lower) in transitivity are encoded as such. The primary empirical evidence of the encoding presented is case alternations, which are posited to explicit the phrases' degree of transitivity. Thus, in the dative experiencer example above, marking by the dative indicates that the experiencer, while the subject, is not a full agent, in contrast to the subjects of clauses high in transitivity, which would be in the nominative (ergative). It is notable that according to this analysis, transitivity is taken to be the over-arching concept and case-marking is predictable in that the marked argument is marked in as much as it is consonant or dissonant with 'Cardinal Transitivity'.

There is nothing which necessarily makes these two views on case-marking incompatible, and the end of this chapter will synthesize the two views. Yet, while the discriminatory view does not consider the semantics of case, the research within the indexical view of case-marking has shown that there is a semantic component which influences case assignment. Research over the last several decades has uncovered a body of evidence of the semantic factors that influence core case assignment, and I will be concerned in this chapter with abstracting from that data to provide hierarchized representation of the factors at work in case assignment, from which a principled account of non-canonical case assignment can then be derived. How these semantic factors interface with the syntax of a given language is quite complicated, and will mostly be ignored in this study; however, providing further structure to the underlying semantic structure of the phrase will provide a foundation from which these matters can be further explored.

3.1 Case and Thematic Content

The primary claim that will be developed in what follows is that the semantics of case-marking envelopes thematic content, i.e., information about participants, and types of participation, in events designated by the predicate. Theories of thematic content have been hotly debated in modern linguistics, and I will be extending and restructuring one particular approach pioneered in (Dowty, 1991). This will lead to a treatment of core case-marking in terms of thematic content. In preparation for the reformulation of this approach, I briefly discuss first the development of the theory of Thematic Roles, and then the original proposal laid out in (Dowty, 1991).

3.1.1 Grammatical Roles and Thematic Roles

The concept of grammatical roles, which I use here as a theory-neutral term as opposed to 'Thematic Roles', such as 'Agent', 'Patient' or 'Instrument' is not a new idea at all, and had been elaborated by the Sanskrit grammarian Panini as early as the 6th century BCE. The attempted integration of the notions of 'Agent' et al. into formal grammars and an investigation into their semantic contribution to phrasal structure was articulated in the theory of Thematic Roles, originating in the works (Gruber, 1965) and (Fillmore, 1968). The distinction made between the Agent and the Patient in the Thematic Roles literature not only owed a debt to the older ideas of grammatical roles but had considerable overlap with the traditional grammarians' distinction between logical subject and grammatical subject. Among many other reasons, the theory of Thematic Roles failed to progress because it was consistently shown that taking roles such as "Agent" as primitive, while pre-theoretically appealing, led to many difficulties. In particular, roles such as 'Agent' and 'Patient' resisted precise definitions and there was no one-to-one mapping from different roles to, say, cases. One result was that a particular strain of work on grammatical roles, Fillmore's Case Grammar, was forced to propose an ever increasing list of roles for particular lexical situations.

A crucial distinction which must be kept in mind while dealing with such entities as Thematic Roles, in particular Agents, is that what is contributed by the semantics of the verb and what is depicted in the resulting phrase are often not identical. Pre-theoretically, agents are most often seen as volitional actors. For example, in the phrase "Oscar smiled at Jane", Oscar, it seems, willingly smiles at Jane, that is, it is an action where Oscar is volitionally involved. Yet, volition is not a requirement of "smile", since one could equally have the phrase 'Oscar smiled at Jane although he had planned all morning to ignore her" whereby one would conclude that Oscar's smile was non-volitional. In the first instance, Oscar is more of an Agent than in the second with respect to the situation. The Thematic Roles are an attempt to capture the semantic criteria required by a verb, not what is manifested in a completely interpreted sentence. This distinction has caused a good deal of

confusion, and it must be borne in mind throughout that the Agentivity (Patientivity) of a fully interpreted phrase is not the same as the Agentivity (Patientivity) inherent in the lexical semantics of the predicate. For instance, it has been noted the pre-theoretical notion of an agent as a volitional actor should not be taken as a primitive, since very few predicates in English actually require such an agent (Van Valin and Wilkins, 1996).

3.1.2 From Thematic Roles to Proto-Roles

In an effort to untangle the mess that had become of the notion of Thematic Roles, (Dowty, 1991) recast the various roles that had been proposed at the time, such as Agent, Benefactive, Patient, Instrument, etc., in terms of two overarching terms, Proto-Agent and Proto-Patient. The essence of the idea is that the proposed Thematic Roles were not in themselves primitive, but emergent properties that could be described using event-based entailments of the predicate. Proto-Agent and Proto-Patient are defined as "cluster concepts" of more fine-grained concepts, such as 'causally affecting' and 'undergoing a change of state', which are (second order) event-based properties entailed by the predicate. Thus, the Agent in a transitive argument would probably possess qualities such as 'causally affecting' another entity with respect to the event depicted by the predicate, and the Patient would probably possess the property of 'undergoing a change'. Yet, no one property defined agentivity, but it was rather arrived at accumulation of sufficient amount of properties relative to the other arguments of the predicate.

The essence of Dowty's proposal is the following Proto-role properties:

Table 3.1:

Proto-Agent	**Proto-Patient**
volitional involvement in the event	undergoes change of state
sentience (and/or perception)	incremental theme
causing an event or change of state in another participant	causally affected by another participant
movement (relative to the position of another participant)	stationary (relative to the position of another participant)
(exists independent of the event)	(does not exist independently of the event, or not at all)

In (Dowty, 1991), these proto-properties are shown to be independently entailed by various predicates.

(11) a. Volition alone: John is being polite to Bill. John is ignoring Mary.

b. Sentience/perception alone: John knows/believes/is disappointed at the statement. John sees/fears Mary.

c. Causation alone: His loneliness causes his unhappiness.

d. Movement alone: The rolling tumbleweed passed the rock. Water filled the boat. He accidentally fell.

e. ((e) Independent existence: John needs a car.)

Upon these properties, he founds an 'Argument Selection Principle':

"In predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the subject."

In general, this principle performs adequately, accounting for, say, verbs of perception, where the argument which entails the property 'sentient' is realized as subject and the argument which has no entailments is realized as object. It will be noted, however, that both participants potentially could satisfy all the properties, as in the phrase "John looked at Suzy," where Suzy has cleverly positioned herself volitionally in order to be seen. The question of the adequacy of the Argument Selection Principle will be taken up again in section 4.2.2.

3.2 Reformulating the Proto-Role Approach

3.2.1 Primitive Properties of Agentivity

I adopt the groundwork established by Dowty and revise his original categorization and nomenclature. Rather than have two independent, but related sets of properties, I use one set of properties, which roughly correlate to the Proto-Agent entailments. In privative opposition to these properties is the lack of entailed properties. Then, Proto-Patient properties are seen as a lack of Proto-Agent properties, as shown in table 3.2. The resulting set of features gives two diametrically opposed classes, one an existing, active, causal, willful and moving substance, and the other whose existence is not even proclaimed.

Before proceeding, it is useful to give a set of informal definitions pertaining to these properties.

Volition: Volition is assigned to any argument wherein the participant intends, i.e., consciously plans, to bring about the event designated by the predicate. This distinction is grammaticalized in a variety of languages, as in this example from Chepang, a Tibeto-Burman language:

Table 3.2:

Agentive	**Patient**
volitional	−volition
sentience	−sentience
instigation	−instigation
motion	−motion
existential persistence(beginning)	− existential persistence(beginning)
existential persistence(end)	− existential persistence(end)
qualitative persistence(beginning)	− qualitative persistence(beginning)
qualitative persistence(end)	− qualitative persistence(end)

(12) CHEPANG ((Caughley, 1982), found in (Naess, 2004))

a. həw-kay pu?-nis-?i sat-?a-theəy
YoBro.GOAL OBro.DUAL.AGENT kill.PAST.DUAL.AGENT
The two older brothers killed the younger brother.

b. pu?-nis-?i həw sat-?aka-c-u
OBro.DUAL.AGENT YoBro kill.PAST.DUAL.AGENT
The two older brothers killed the younger brother (accidentally).

Sentient: Sentient is adopted following the description found in (Rozwadowska, 1988): "conscious involvement in the action or state." Clearly, [+ *sentient*] is entailed by, among others, emotional, psychological and cognition predicates.

Motion: Motion is entailed just in case the argument is required to be in motion, which is most obviously the case with verbs of motion, such as 'come', 'go' and so forth, but also verbs such as 'throw' or 'scrub'.

Instigation: Any argument effecting the event designated by the predicate is entailed—in short, any argument "doing something" will have the Instigation property. Typically, one thinks of the initiators of events as instigators, but one also wants to allow for the causal arguments of experiencer verbs, such as the subject argument of "The portrait frightened Kenneth."

Persistence: An entity which is unchanged by the event or state is said to persist. This is a two-tiered notion, for something can persist existentially, that is, its

essence remains the same during the course of the event/state, or it can persist qualitatively, that is it persists in all its particulars. This notion is nothing new, and can be traced back to Aristotle (*On Generation and Corruption* I:4 (Ackrill, 1987)). *Persistence* has been further divided according to whether it is entailed at the beginning of the event or at the end. This distinction is visible in verbs of creation or destruction, which entail that the object shifts from non-existence to existence and from existence to non-existence, respectively, during the course of the event. Thus, in "Juan baked a cake", 'bake' will entail that its object is $-$ *existential persistence(beginning)* while in "Kim destroyed the car", 'destroy' would entail on its object that the object is $-$ *existential persistence(end)*. *Qualitative persistence* covers any other change besides an existential one. Merely to remain with Aristotle for a moment, we can the think of the primary changes covered as quality, quantity or location. For instance, if Juan moves his newly-baked cake to the counter-top, the cake has not persisted in location, and the second argument would be noted as $-$ *qualitative persistence(end)*. In what follows, if the type of persistence is not at issue, I will denote the properties by $+/-$ *persistence*, which is meant to range over both *qualitative persistence* and *existential persistence*.

3.2.2 Causation and Affectedness

There are several significant differences between this arrangement and that of (Dowty, 1991) which should be noted. First, the proto-property *instigation* has been added, which marks whichever argument instigates the event. *Instigation* is a weaker property than "causing an event or change of state in another participant". Second, while Dowty only reluctantly included "existence" as one of the proto-roles, the corresponding category in the above table, *persistence*, is now a full proto-property. Further, this property now serves also to account for the notion of affectedness. Also, there are some of Dowty's original proto-properties that are missing, namely "causing an event or change of state in another participant", "causally affected by another participant", "undergoes change of state" and "incremental theme". The latter two are replaced by *qualitative persistence*. If an entity is entailed to undergo a change of state, in the system of proto-properties outlined above, it receives $-$ *qualitative persistence(end)*. Thus, there is a reversal of the manner of marking here that is consistent with the adoption of privative opposition that is assumed—the proto-patient property of being affected is defined here as the lack of a proto-agent property, *persistence*[1]. Causation and affectedness are complex notions, and just as Agent and Patient are best not taken as primitive, I argue directly below that it is not necessary to take causation or affectedness as primitive

[1]Even though the above discussion of *Persistence* has made reference to Aristotelian conceptions, it should be noted that *Persistence* as an element of event structure is also taken up in many modern logical frameworks, namely the work of Event Calculus. For example, the following is an axiom from a "simplified version of the event calculus" in (Kakas et al., 1998):

either. Finally, it should be noted that Dowty's analysis takes the transitive situation, i.e., two participants mediated by an event, as the primitive situation. This appears in his formulation of the proto-properties, several of which are defined relative to another participant, namely "causing an event or change of state in another participant", "causally affected by another participant", "movement (relative to the position of another participant", and "stationary (relative to the position of another participant)". In the formulation of the agentivity properties in the above section, the properties were left neutral with respect to their involvement with other participants. This will be shown to be preferable in that it results in a capacity to treat a greater number of constructions.

It has long been noted that affectedness is not a binary concept (i.e., being affected or not), but rather a three-way distinction between unaffected, partially affected and totally affected. Not taking affectedness as primitive, but rather defining it in terms of *persistence* allows to express this three-way distinction, at least with respect to existence. Unaffected arguments correspond to those entities which persist throughout the event both existentially and qualitatively, partially affected arguments correspond to those entities which persist existentially, but not in all their qualities, throughout the event, and totally affected arguments correspond to those entities which do not persist existentially, and therefore also not qualitatively, by the end of the event. The more subtle effects of the "partially"/"totally" affectedness phenomenon, such as the much discussed spray/load alternations, are not treated here, as they depend on greater specificity of lexical information that I assume here. There is certainly much more to say about the nature and meaning of "affectedness", a concept which has thus far resisted a clear definition within the literature. I will not be concerned with stating more here than that the distinction made by *qualitative change* is the minimal property of being affected.

Causation is a complex notion, and in fact a composite one. Causation implies at least two participants, and some sort of direct link between them. Therefore, causation is better seen as a relation between arguments rather than as a property of a single argument. This composite property can be replaced by two more prim-

(1)
$$\begin{aligned} \textit{holds\_at}(P, T_2) \quad \leftarrow \quad & happens(E, T_1), \\ & T_1 < T_2, \\ & initiates(E, P), \\ & \textit{persists}(T_1, P, T_2). \end{aligned}$$

In prose, this axiom states that "new information that a property holds at a particular time point can be assimilated by adding an explanation in terms of the happening of some event that initiates this property at an earlier point of time together with an appropriate assumption that the property persists from one time to the other" (Kakas et al., 1998). Clearly, the agentivity properties I have been arguing for in the above are consonant with such a treatment. In turn, the logical formalism of the Event Calculus has recently shown to be amenable to treatment of linguistic problems, notably that of aspect in (van Lambalgen and Hamm, 2005). I cannot pursue this matter further within the context of this work, yet it should be made clear that the analyses to come are conceived of as analyses which are tractable in formal frameworks. I will further discuss this in section 6.

itive ones[2]: *instigation* and − *persistence(end)* (either qualitative or existential). Causation, then, can be represented as a pair: (ArgX: [+ *instigation*], ArgY: [− *persistence(end)*]), whenever we need to appeal to the notion. This Ockham's razor argument is only appealing since the results that can be attained by the proposed primitives are conservative with respect to the results achieved in (Dowty, 1991).

Another notion which has been prominent in the typological literature concerning transitivity and related concepts is that of control. Again, while appeal to control as property gives broad explanatory power, it is doubtful that is should be taken as primitive, for just like causation, control is a relation on arguments. (Klaiman, 1991) distinguishes between 'external' control, which holds of two arguments, the controller and the controlled, and 'internal' control, which designates that the agent of one-place verbs has control over the event. In both instances, the controller is seen as volitional and the initiator of the event. Therefore, the controller can be replaced by the primitives *volition, sentient*, and *instigation* while the controlled argument in 'external control' clauses simply must not be marked *volitional* or *instigation*. Thus, control as well can be defined as a pair: (ArgX: [+ *instigation*,+ *sentient*, + *volition*], ArgY: [− *instigation*, − *volition*]).

In addition to taking complex relations as primitive, (Dowty, 1991) also defines his proto-properties with the transitive construction as given. This assumption cannot be maintained once one wants to account for constructions which are not strictly transitive. First, it should be noted that defining properties relative to other participants often leads to awkward predictions. For instance, *motion* is required to be "relative to the position of another participant". But there are clearly cases where motion is bilateral, as in 'Ernest threw the ball', where both Ernest and the ball would seem to both be necessarily in motion.

One of Dowty's central concerns is constructing a theory which correctly accounts for alignment between subject and agent and between patient and object, and deviations thereof. While this is generally captured, in the above reformulation of the proto-properties, predictions are also made for one-argument predicates, specifically those classified as 'middle' verbs. The 'middle voice', as far as I know, has resisted a typologically adequate and formally pleasing definition, but a good description is found in (Lyons, 1968, 373): "The implications of the middle (when it is in opposition to the active) are that the 'action' or 'state' affects the subject of the verb or his interests." One prominent class of verbs that take the middle voice when it is a grammatical option is 'grooming' verbs, e.g., 'wash', 'comb', etc. These verbs alternate between the active and middle voice. In the active voice, they do participate in a transitive situation, as in the following examples from Ancient Greek show (expanded from the discussion in (Lyons, 1968)):

(13) ANCIENT GREEK (Lyons, 1968)

[2]This has the additional benefit of paying adequate homage to Hume.

a. Loúō
Wash.1st.SING.ACTIVE
I am washing (something).

b. Loúomai
Wash.1st.SING.MIDDLE
I am washing myself.

c. Loúō khitôna
Wash.1st.SING.ACTIVE shirt
I am washing a shirt.

d. Loúomai khitôna
Wash.1st.SING.MIDDLE shirt
I am washing myself a shirt.

In terms of Dowty's proto-properties, the transitive use of "wash" in (13a) and (13c) would entail that the realized subject "causes a change of state in another participant" and that the realized object is "causally affected by another participant" and that it "undergoes a change of state" (abstracting from properties not relevant to the discussion, e.g., "movement"). In (13b), since there is no other participant, the argument of 'loúomai' would not entail "causes a change of state in another participant", but only "undergoes a change of state". From this it would seem that this active/middle voice alternation could be captured by stating that in the middle voice the sole argument is entailed by "undergoes a change of state". However, the middle voice in Ancient Greek can also be used if the action carries along with it a benefit for the subject, as in (13d) where the subject receives a clean shirt for his efforts, a usage which (Lyons, 1968) tentatively titles 'reflexive-causative'[3]. The crucial point is that (13b) and (13d) will receive inconsistent assignments of proto-properties. In (13d), the subject will have "causes a change of state in another participant" and the object will have "causally affected by another participant" and "undergoes a change of state". The subject of (13d) does *not* "undergo a change of state", in contrast to (13b), since it is the shirt, not the subject, who is washed. What one would like to see is that the subject 'causally affects' himself, but this does not seem possible as long as causation is defined with respect to distinct participants.

Thus, while there is a formal distinction realized in the voice of the verbs in (13b) and (13d), this is not captured by Dowty's proto-properties because of their bias towards two-participant transitive situations. Further, this distinction is one that approximately says that the initiator of the event is the beneficiary of the event, beneficiary being among the notions that proto-properties were designed to capture. This forces the conclusion that causation should not be defined with respect to distinct participants. If instead, causation is defined, as discussed above, as a (third-order) property for pairs (ArgX: + *instigation*, ArgY: − *persistence*) where

[3]This construction is not limited to languages with an overtly realized middle voice, but occurs in less exotic languages such as French ['Il se lave une chemise' ('He washes himself a shirt')].

ArgX and ArgY are not taken to be necessarily distinct, and we assume that beneficiaries are noted as + *sentience* and − *qualitative persistence*, then this relation is applicable to both pairs, the washer and himself, and the washer and the shirt.

In summary, the reformulation of agentivity properties in the manner outlined in section 3.2.1 is able to account for complex relations as such, a theoretical gain in itself, and is substantiated by greater empirical reach, both in capacity to treat partial and total affectedness, and to extend to constructions other than transitive ones.

3.2.3 Psychological Facets of the Agentivity Primitives

The choice of these primitives receives support from studies of cognitive development, especially perceptual development. Perceptual development offers insights into what is most learnable for infants, and if the above agentivity properties can be linked with categories of phenomena which are learnable, it implies that they would be more quickly adopted as abstract linguistic notions.

Persistence and *Instigation* correspond to the most fundamental stage of perceptual development. Infants learn, essentially from birth, to distinguish between what is continuous and what is novel. One of the first stages of perceptual development involves mastering the concept of 'object permanence'—the capacity for "understanding that an object continues to exist in the world even though it is hidden or cannot be seen" (Cohen and Cashon, 2003), clearly related to our notion of *persistence*. In various experiments, infants are shown objects, which are then hidden from their vision. At the earliest stages of development, the infant displays surprise and increased attention after the object has been removed from sight. But already between the ages of 1 1/2 to 4-5 months, infants are capable of retrieving partially hidden objects and by 8 months they are capable of retrieving a completely hidden object, demonstrating that they are aware of the object's continued existence. While, on the one hand, infants develop a notion of the continuity of their surroundings, infants also demonstrate early on that they shift the focus of their attention to entities that begin to do something, which correlates with the loose definition of *instigation*, whether visual (blinking lights) or auditory (rattles coming from speakers).

Motion is similarly a privileged concept from the standpoint of perceptual development. Motion also elicits young children's attention who then focus their attention on moving objects in preference to stationary ones. Further, independently moving objects are more perceptually salient than stationary objects. For instance, studies state that as early as the age of three-months, infants "perceive two objects as distinct if they are separated by depth or move independently" (Berenthal, 1996). If the objects are stationary or adjacent, the infants do not distinguish them as different objects, despite differences in texture, color, etc.

Infants between four and six months are further capable of distinguishing between motion and biological motion (Fox and McDaniel, 1982). Given two types of motion, one of an inanimate object and one of an animate creature, the child will focus attention on the animate creature. From this follows an understanding of the distinction between sentient and non-sentient.

While the above perceptual capacities emerge either essentially at birth or within the first two to four months of life, causal perception only begins around six months, presumably antecedent to having mastered to some degree the concepts outlined above. There have been speculations that causation is a nativist concept, but these have generally been shown to be problematic (Cohen et al., 1998). This lends support to the decision not to take causation as primitive concept, but to found it upon *instigation* and *persistence*.

Finally, volition, while a rather abstract concept, also appears in the pre-linguistic stage. Current theories posit that an awareness of intentional acts emerges between 9 and 15 months of age, by the end of which infants can successful imitate intentional/goal-oriented behavior (Meltzoff, 2002).

The research cited from work on cognitive development demonstrates that the agentivity properties correlate to what infants discover in the pre-linguistic stage, therefore, as linguistic concepts, these properties should be easily acquired. Further, while these features all are simple and demonstrably acquired at an early age, it is questionable if this holds for the proto-property *incremental theme*, and there is evidence that causation should raise similar doubts.

3.3 Hierarchization of the Agentivity Properties

Having developed and justified the choice of the primitives, I now turn to putting them into use. I begin by organizing them into hierarchical relations which are an outgrowth of the logical relations between the primitives. This will result in the construction of a lattice, ordered by inclusion, which will take the primitives as atoms.

3.3.1 Construction of the Lattice

In the last section, a number of agentivity properties were established. Taking these as primitive, one can regard these properties as atoms from which "proto-roles" are composed. These atoms and their combinations can be ordered in terms of inclusion—thus both *motion* and *instigation* are included in the composite term *motion*$\wedge$*instigation*, in symbols: *motion*$\subseteq$*motion* $\wedge$ *instigation* and *instigation*$\subseteq$*motion* $\wedge$ *instigation*. This set of atomic elements, ordered by inclusion (i.e., a partial order), can then yield a mathematical structure, a lattice. A partially ordered set

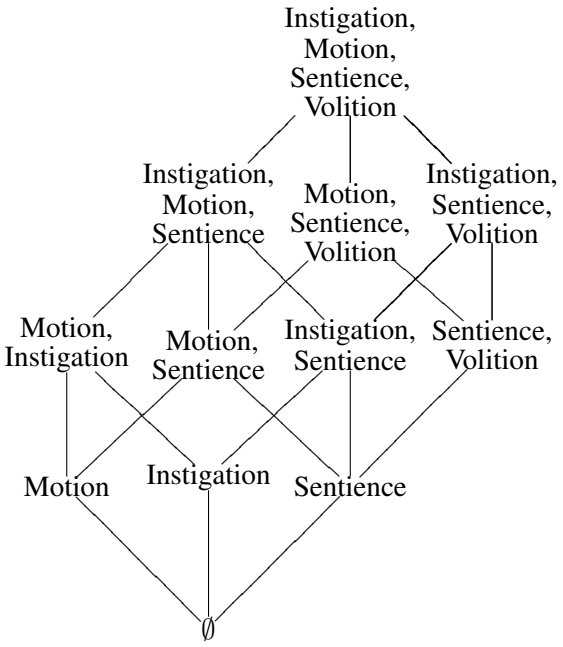


Figure 3.1: Agentivity properties organized via a lattice

is a lattice if every finite subset has a least upper bound and a greatest lower bound. This lattice then provides a structure upon which argument structures can be mapped. In the chapters that follow, this lattice will be used as a tool to account for both broad generalizations as well as language-particular phenomena involving thematic content and how it is marked by case.

In order to organize the primitives, it must first be established if any relations hold among them which would constrain the possible combinations. Among the agentivity properties, it is quickly seen that *volition* entails *sentience*[4]. In practical terms, this means that entailments that include *volition* also necessarily entail *sentience*.

Thus, taking *motion*, *instigation*, *sentience* and *volition* as atomic elements, it is a simple matter to construct a lattice which hierarchically organizes the possible combinations of these features, as seen in figure 3.1. As the atoms of the lattice concern properties of agentivity, I will refer to it for the moment as the agentivity lattice.

The four types of persistence and their combinations can be similarly ordered. The subcategories of *persistence*, according to the distinctions *beginning/end* and *existential/qualitative*, yield many logically impossible combinations which will con-

[4]Metaphorical usage of volition, e.g.,"The car doesn't want to start" should not pose any problems, since there is an obvious effect of personification, which then in turn entails (metaphorical) sentience.

strain the eventual number of complex configurations of features possible. Since there are four features, the total number of combinations is 16. For simplicity, I give a list in table 3.3, where I use the following abbreviations *existential persistence (beginning)*=EPB, *existential persistence (end)*= EPE, *qualitative persistence (beginning)* = QPB, and *qualitative persistence (end)* = QPE, and * marks impossible combinations.

Table 3.3:

	existential (beginning)	*existential (end)*	*qualitative (beginning)*	*qualitative (end)*
	+EPB	+EPE	+QPB	+QPE
*	+EPB	+EPE	−QPB	+QPE
	+EPB	+EPE	+QPB	−QPE
*	+EPB	+EPE	−QPB	−QPE
*	−EPB	+EPE	+QPB	+QPE
*	−EPB	+EPE	−QPB	+QPE
	−EPB	+EPE	+QPB	−QPE
*	−EPB	+EPE	−QPB	−QPE
*	+EPB	−EPE	+QPB	+QPE
*	+EPB	−EPE	−QPB	+QPE
	+EPB	−EPE	+QPB	−QPE
*	+EPB	−EPE	−QPB	−QPE
*	−EPB	−EPE	+QPB	+QPE
*	−EPB	−EPE	−QPB	+QPE
*	−EPB	−EPE	+QPB	−QPE
	−EPB	−EPE	−QPB	−QPE

There are two main principles of exclusion at work. If an entity exists in the beginning of the event, it does so with a certain amount of qualities, and thus it does not make sense to speak of existential persistence at the beginning of the event without qualitative persistence. Second, if an entity does not exist at the beginning (end) of an event, its qualities will not exist at the beginning (end) of the event either, and similarly for when an entity does not exist both at the beginning and at the end of an event. Five possible combinations remain:

Total Persistence (+EPB, +EPE, +QPB, +QPE): The entity persists existentially and qualitatively at the beginning and end of the event. This is the case in proto-typical transitive subjects, e.g., "Peter broke the dish", where the subject is unaffected by the action. Also, arguments typically display total persistence in states (e.g.,"Gene lives in the suburbs").

Qualitative Persistence (Beginning) (+EPB, +EPE, +QPB, −QPE): The entity exists before and after the event, but has undergone a qualitative change. This regularly corresponds to patientive arguments, such as the object of "Fred moved the couch".

Existential Persistence (Beginning) (+EPB, −EPE , +QPB , −QPE): The entity exists prior the event's happening, but ceases to after the event, as in verbs of destruction ('ruin', 'destroy'), or dying.

Existential Persistence (End) (−EPB, +EPE, +QPB, −QPE): The entity does not exist at the beginning of the event but does at the end, found in verbs of creation, ('bake', 'invent').

Total Non-Persistence (−EPB, −EPE, −QPB, −QPE) : The entity does not persist existentially either at the beginning or the end of the event. This category comes up for statements of non-existence ("There are no unicorns") and impersonal semelfactives ("A light flashed"). Cognate object constructions, such as "sing a song", fit under this rubric since the object only persists as long as the action of the predicate continues, but neither before nor after. Similarly, objects that have been incorporated, such as 'deer' in 'to go deer-hunting', are not seen as persisting existentially before or after the event.

These five combinations can then be ordered by inclusion as well, again viewing the positively marked persistence properties as atomic elements. First, *Total Non-Persistence* is vacuously included in every other combination since it does not have any positively marked members. Next, *Existential Persistence (Beginning)* is included in Affected which is in turn included in Total Persistence. Finally, *Existential Persistence (End)* is included in *Total Persistence*. These last two can be schematically represented as follows:

(14) (+EPB, −EPE , +QPB , −QPE)$\subseteq$ (+EPB, +EPE, +QPB, −QPE) $\subseteq$ (+EPB, +EPE, +QPB, +QPE)

(15) (−EPB, +EPE, −QPB, +QPE)$\subseteq$(+EPB, +EPE, +QPB, +QPE)

These features as well can be hierarchically organized in a lattice, as in figure 3.2.

We now possess two structures organizing the sets of properties resulting from the reformulation of Dowty's proto-properties. One of the advantages of working with lattices is that it is a simple matter to combine them by taking their Cartesian product. The Cartesian product of the agentivity and the persistence lattices is simply the set of all pairs with componentwise relations, inherited from the original lattices. Informally stated, it is a matter of inserting at each node of the persistence lattice the entirety of the agentivity lattice and then establishing the connections between all the nodes by inclusion.

However, the product of the two lattices is constrained by the conceptual impossibility of arguments designating entities which do not possess at least the feature *Existential Persistence (Beginning)* combining with agentivity properties such as *motion* or *sentience*.

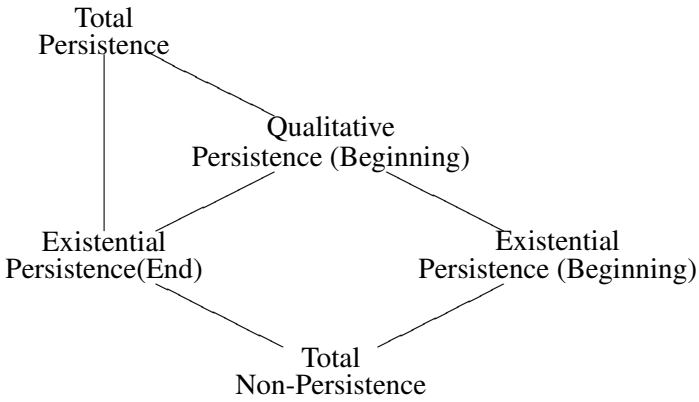


Figure 3.2: Persistence properties organized via a lattice

The arguments associated with the *Existential Persistence (End)* node are found as objects (never subjects unless under passivization, it seems) of verbs of creation, as noted above. It has been recognized since at least (Fillmore, 1968) that there is an asymmetry between typical transitive verbs and verbs of creation, as in the following:

(16) (Fillmore, 1968)

a. What John did to the table was ruin it.

b. * What John did to the table was build it.

Since the object is not yet existent, but a result of the activity denoted by the predicate, it is not permitted in the construction. Clearly, properties such as *instigation* and *motion* are not defined for arguments where the entity does not even exist yet. While these do not appear to be logical impossibilities, they are certainly conceptually implausible.

The node of *Total Non-Persistence* is also clearly deviant in comparison to the properties of regular agents and patients. Since arguments associated with that node do not exist at the beginning or end of the event, they are excluded as well from associating with any other properties.

Obeying these constraints, the product of the agentivity lattice and the persistence lattice is as displayed in figure 3.3. The resulting product is again a lattice, and from now on I refer to this larger lattice as the agentivity lattice. Note that the *Existential Persistence (Beginning)* branch of the lattice is related by inclusion to the *Qualitative Persistence (Beginning)* branch, which is included in the *Total Persistence* branch. The lines designating all the inclusion relations have been excluded for purposes of legibility.

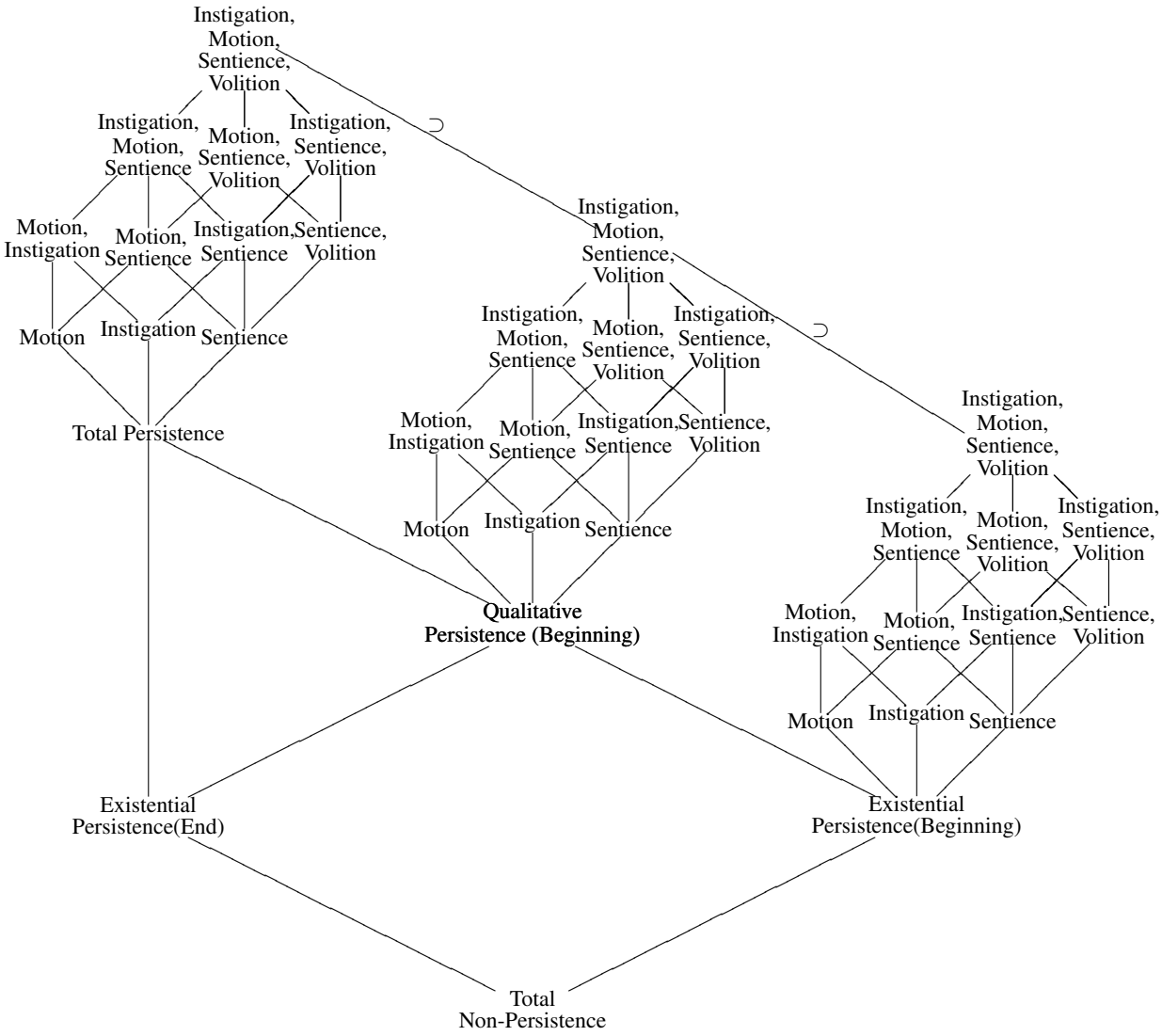


Figure 3.3: Product of Agentivity lattice and Persistence lattice

3.3.2 The Transitivity Region

The lattice supports the mapping of a wide variety of argument structures. However, as has been mentioned above, the transitive situation has a central status among argument structures, and one only finds Agents and Patients, properly speaking, when in the context of a transitive situation. A region of the lattice actually encodes the transitive situation. A pleasing by-product of this is the ability to characterize the notion found in (Hopper and Thompson, 1980) of "increases" and "decreases" in transitivity. Although the agentivity properties used allow for representing argument structures beyond transitive constructions, the ability to represent

the argument structures of transitive clauses in a unified manner is present in this framework as well.

The transitive situation minimally involves an agent committing an action and an object which undergoes the effects of that action. Arguments associated with the two nodes of *Existential Persistence (End)* and *Total Non-Persistence* violate the second condition, since any such argument would not exist at the beginning of the event as would be necessary to undergo the effects of the action. These two nodes are also structurally abnormal with respect to the lattice both in that they prevent the lattice from being completely symmetrical and in that they do not directly interact with the other features. Arguments associated with these two nodes also demonstrate peculiar behavior with respect to their interaction with definiteness, an issue which will be discussed in section 4.3.2. Those two nodes excluded, we are left with a symmetrical lattice, which encodes the typical transitive situation, which I will refer to as the transitivity region in what follows.

If one views vertical and horizontal axes alongside the lattice, as in figure 3.4, then the vertical axis encodes the degree of agentivity, while the horizontal encodes the degree of affectedness in terms of change in persistence. The upper-left-hand corner contains all the positive entailments, and the lower-right-hand corner is free from entailments, save initial existence. Thus, this framework encapsulates one of the primary generalizations of typological work on object structure: agents and patients of transitive clauses are in (direct) semantic opposition (Naess, 2004). Arguments located in between these two opposing poles are appropriately just those which possess a mixture of agentivity and patientivity properties, e.g., Experiencers, Benefactives, et al.

3.3.3 Lexical Classes

Before moving on to linking the agentivity lattice to case-marking, it is helpful to give a few examples of how different lexical classes, as delineated in (Levin, 1994), can be represented on the lattice, as in figure 3.5, in order to add some concrete examples to what may have been a too-abstract discussion so far.

1. "Change of State" : Break, Crack, Shatter...
2. "Contact/Effect" Hit, Cut, Crush, Smash...
3. "Change of Position": Roll, Bounce, Move...
4. Directed Motion: Come, Go, Rise, Enter...
5. Stimulus-Subject Psych Verbs: Please, Amuse, Astonish, Bore...
6. Experience-Subject Verbs: Like, Fear, Enjoy...

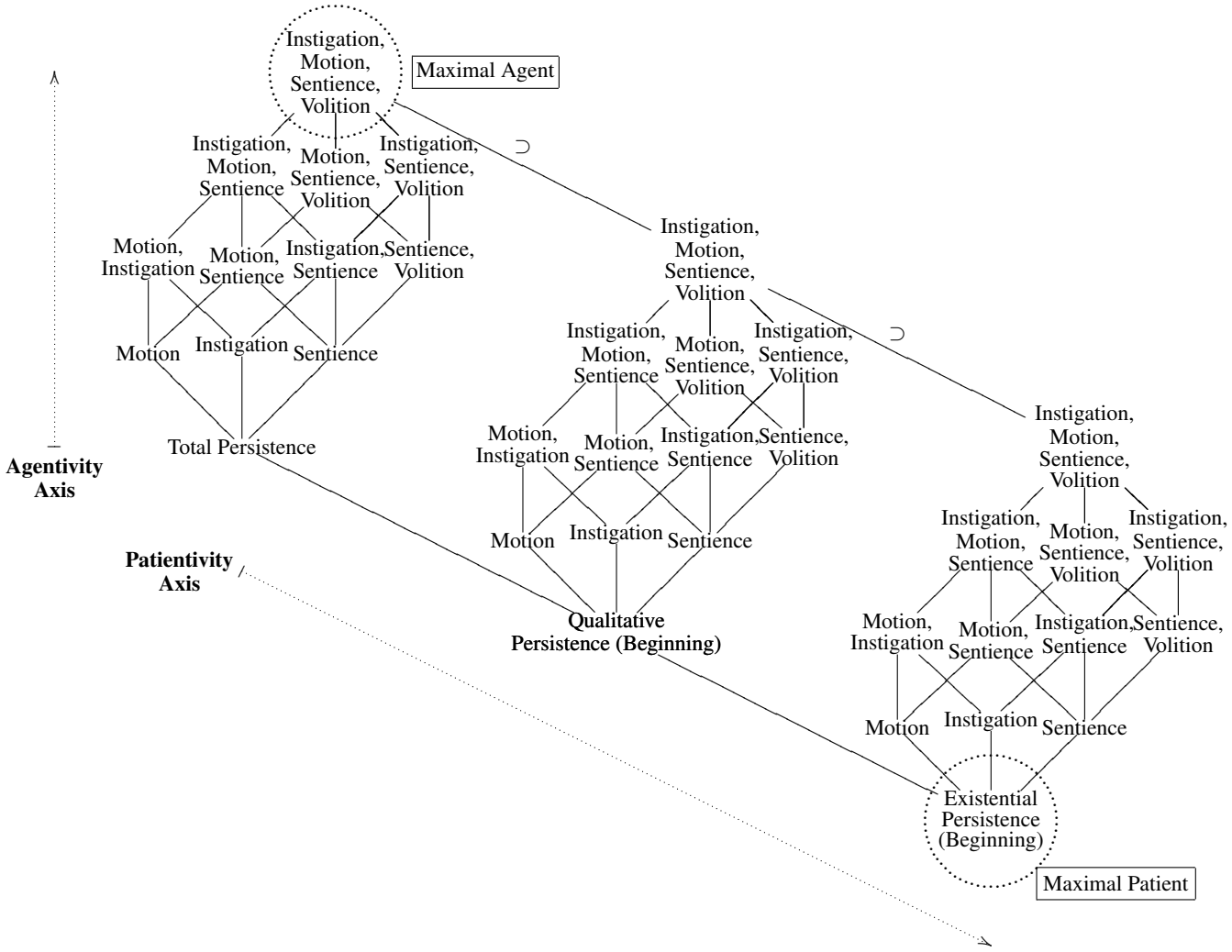


Figure 3.4: Transitivity Region

Having constructed the agentivity lattice, and demonstrating how a sampling of argument structures can be mapped onto it, I now turn to a series of applications; at the more general level of typological applications in the following chapter, and then more nuanced analyses will be presented for different languages in chapter 5.

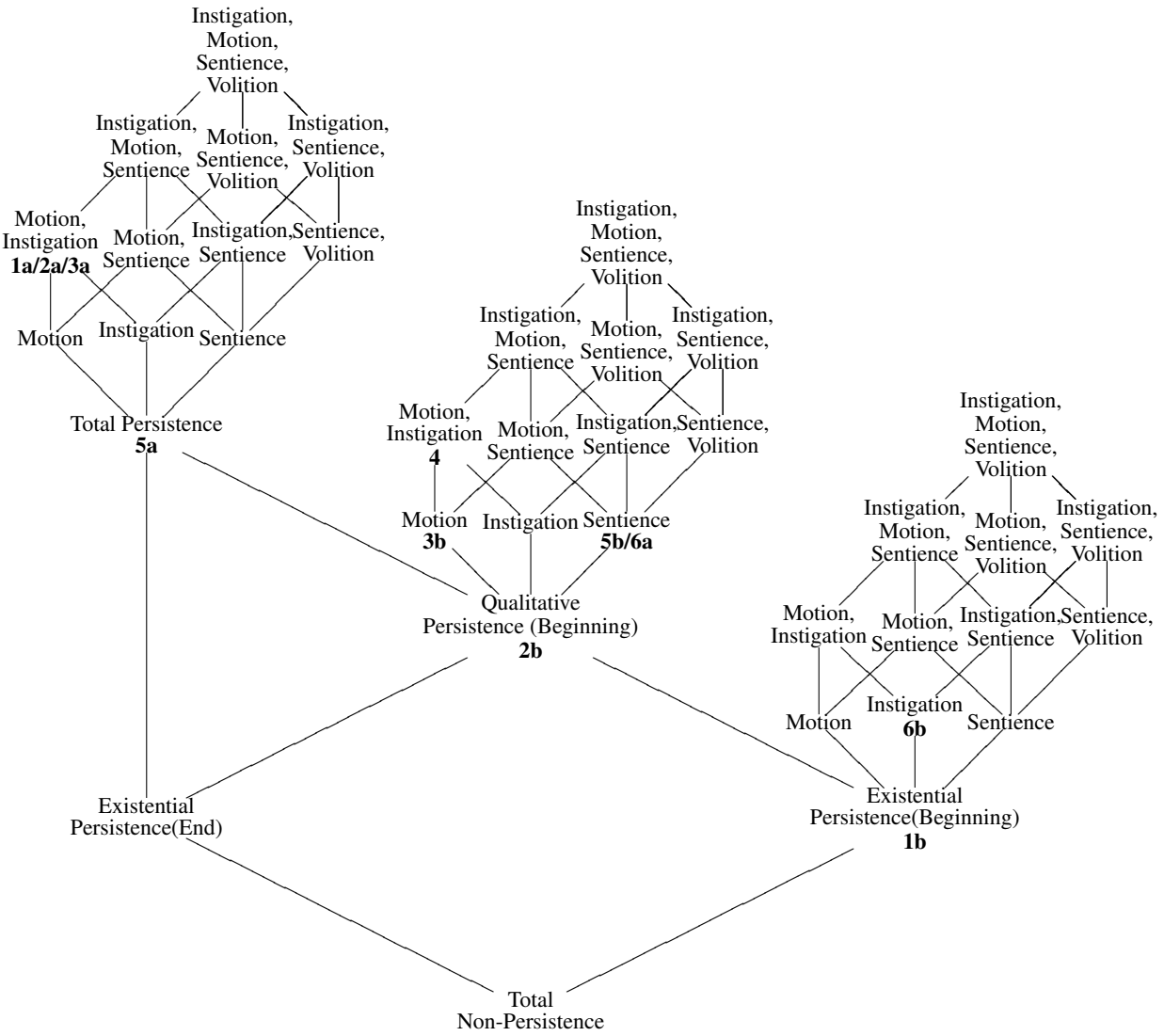


Figure 3.5: Mapping of Lexical Classes

Chapter 4

Typological Applications: Core Case-Marking Systems

I now turn to detailing how the agentivity lattice can be used as a tool to account for case-marking. This chapter considers core case-marking systems, i.e., systems that mark subjects and objects. The research conducted on Thematic Roles has demonstrated that subject and object selection are largely determined by the thematic content associated with the arguments of a given predicate. Core case-marking systems are responsible for marking subjects and objects in a clause. Clearly then, there is a relation between the thematic content and the eventual marking patterns in case languages. Subjects (and objects) are associated with agentivity properties, and thus a case marking subjects (objects) will be associated with the same agentivity properties. In this way, a case can be represented as a region of the agentivity lattice.

This approach results in two principal advantages. First, the general meaning of a case can be specified with respect to a region of the lattice. As opposed to other approaches which resort to listing the properties and qualities of subjects (objects), the region of the lattice gives a structured set of properties, which are couched in a context of opposition to other properties. The second, and related, advantage is that the approach accommodates both the indexical and discriminatory view of case-marking: a given region of the lattice will at once both specify the set of semantic properties associated with a case, satisfying the indexical view, and display the opposition between properties of subjects and objects, which is in turn what determines the use of case in the discriminatory view. Of course, discriminatory case-marking can be determined by other properties than those of agentivity, for instance, animacy and definiteness. This will be taken up in section 4.3, which demonstrates how the different parameters of agentivity, animacy and definiteness, in feature-based representation, can be unified in this framework to give a broader account of the factors underlying case-marking.

4.1 Transitivity and Markedness

There are different views on the functional nature of case-marking as discussed in section 3, and it will be recalled that the indexical view, as proposed by (Hopper and Thompson, 1980), takes *transitivity* as a central notion. (Hopper and Thompson, 1980) has been particularly influential in propounding the view of transitivity as a graded concept. Transitivity could grossly be seen as the propensity of two-place verbs to align one argument with an 'agent' and the other with the 'patient', and that there are then such things as 'transitive agents' and 'transitive objects'. Markedness patterns, considered here in terms of case, can then be seen to be founded upon the degree of transitivity of the arguments. The study of (Hopper and Thompson, 1980), and another in a similar vein, that of (Tsunoda, 1981), have wide typological predictive power. In this section, I demonstrate that results of these studies are consonant with, and substantiate the typological validity of, the agentivity lattice.

4.1.1 Hopper and Thompson's Transitivity Parameters

(Hopper and Thompson, 1980), through an analysis of case alternations cross-linguistically, demonstrate that some agents are more agentive than others, and similarly for patients. They propose a list of ten "transitivity parameters", listed in table 4.1, which indicate whether a clause is 'high' or 'low' in transitivity.

Table 4.1: Transitivity Parameters

	HIGH	LOW
A. Participants	2 or more participants, Agent and Object	1 participant
B. Kinesis	Action	Non-Action
C. Aspect	Telic	Atelic
D. Punctuality	Punctual	Non-Punctual
E. Volitionality	Volitional	Non-Volitional
F. Affirmation	Affirmative	Negative
G. Mode	Realis	Irrealis
H. Agency	Agent High in Potency	Agent Low in Potency
I. Affectedness of Object	Object Totally Affected	Object not affected
J. Individuation of Object	Object Highly Individuated	Object Non-Individuated

Most of these categories will be relevant in what follows; however, the important observation here is that these parameters operate at different levels of the clause: some are at the level of individual arguments (Individuation, Agency, Affectedness), some are at the level of the predicate (Kinesis, Participants) and some are at the level of the clause (Affirmation, Mode, and arguably Telicity). All of these categories are shown in (Hopper and Thompson, 1980) to effect case alternations, and so it must be noted that case assignment is a multi-dimensional operation, which is

influenced by a variety of semantic criteria. In chapter 5, it will be shown that case alternations can occur not only in response to individual criteria, but interactions between the parameters given by (Hopper and Thompson, 1980).

For the moment, it suffices to mention that the agentivity lattice already includes as primitives the parameters Participants, Kinesis, Volitionality, Agency and Affectedness of Object. Kinesis, the distinction between action and non-action, can again be captured by *Persistence*, since if there is no action, as in stative verbs, no change in *persistence* will result, and therefore, static predicates will be prototypically comprised of (an) argument(s) corresponding to the *Total Persistence* branch of the lattice, while predicates designating action will have at least one argument which corresponds to a branch of the lattice which is not *Total Persistence*. Volitionality is directly represented, as well as Agency by the properties *Instigation*, *Motion*, and *Sentience*. The parameter Participants can be modelled by mapping the different entailments corresponding to each of the participants onto the lattice. Affectedness of Object is captured by the different degrees of *Persistence*.

The Agency parameter is neatly captured by the fact that agents are upwards closed in the lattice while patients are downward closed. That is to say, if some node x of the agentivity lattice is considered an agent, then all the nodes higher than x are as well, and conversely, if some node y of the agentivity lattice is considered a patient, then all the nodes lower than y are as well[1]. As discussed in section 3.3.2 and shown in figure 3.4, when considering transitive predicates, and excluding the two special nodes of *Total Non-Persistence* and *Existential Persistence (End)*, the most potent agent is located on the top-left-corner and the most affected object is found on the lower right-hand corner. This gives a clear visualization of what maximally transitive argument structures are.

In this way, the lattice accounts for another generalization in the transitivity literature concerning core-case marking systems. It has been repeatedly noted that prototypical transitive clauses are those which are invariably handled by core case-markers, i.e., either nominative subjects and accusative objects or absolutive subjects and ergative objects. Further, these prototypical transitive clauses demonstrate a "maximal semantic distinction of arguments" (Naess, 2004). That is, core case-markers tend to discriminate between agents and patients, and when they are most distinct semantically, the core case-markers are assigned without interference, i.e., without the use of oblique cases. In contrast, in the case where, say, in an accusative system a subject is less agentive, as in the case of experiencer subjects, these are more likely to be realized as a marked construction, in this particular case, either by the dative (as in Hindi) or by surfacing as the object, (as in English, e.g., "The parade pleased Molly"), or by other grammatical means at the language's disposal.

[1]More formally: A subset U of a partially ordered set is upwards closed if x in U and $x \leq y$ implies that y belongs to U and, conversely, U is downwards closed if $x \geq y$ implies that y belongs to U.

Therefore, the agentivity lattice makes a clear prediction with respect to transitivity patterns. Pairs of arguments which are maximally distanced from each other on opposite corners of the transitive region of the lattice are most likely to be marked by core case-markers, while deviations from this pattern will correspond to a "lower" degree of transitivity and will be subject to non-canonical subject and object marking, depending on the strategy at work in the language at issue. In this way, the insights of (Hopper and Thompson, 1980) are accounted for.

4.1.2 Tsunoda's Effectiveness Condition

The prediction made by the agentivity lattice is borne out by correlating the lattice to other research in cross-linguistic transitivity patterns. The work of (Tsunoda, 1981), (Tsunoda, 1985) demonstrated that verb classes that were lower in transitivity were more marked cross-linguistically. He identified eight classes of verb types which he arranged in order of likelihood to pattern with the standard grammatical marking of transitive clauses:

Table 4.2:

effective action		perception		pursuit (III)	knowledge	feeling (VI)	relationship
+ result (I)	-result (II)	+attained (IV)	-attained (V)	search	know	like	possess
kill, break	hit, shoot	see, hear	look, listen				

Tsunoda's original proposal was that the left-most verb types were the highest in transitivity (whence the 'Effectiveness Condition') and the right-most verb types were lowest in transitivity, and that case-marking patterns correlated to this. This classification of verb types and transitivity patterns was recently taken up in (Malchukov, forthcoming), wherein it was noted that this hierarchy could be more profitably regarded as two sub-hierarchies, since the one set of verb types demonstrates decreased patientivity with respect to objects ('break' compared with 'search') and the other set demonstrates decreased agentivity with respect to the agent ('break' compared with 'like'). This reformulation is more precise (although note the absence of the "knowledge" and "relationship" categories), and yields the two sub-hierarchies below:

(17) a. Effective Action (Resultative) (I) << Contact (II) << Pursuit (III)
b. Effective Action (Resultative) (I) << Perception (IV, V)<< Emotion (VI)

Mapping the verb types of these sub-hierarchies shows in detail how the prediction of the agentivity lattice is borne out. The verb types of (17a) show a progression away from the maximally distinct positions of the resultative Effective Action verbs, visualized in figure 4.1.

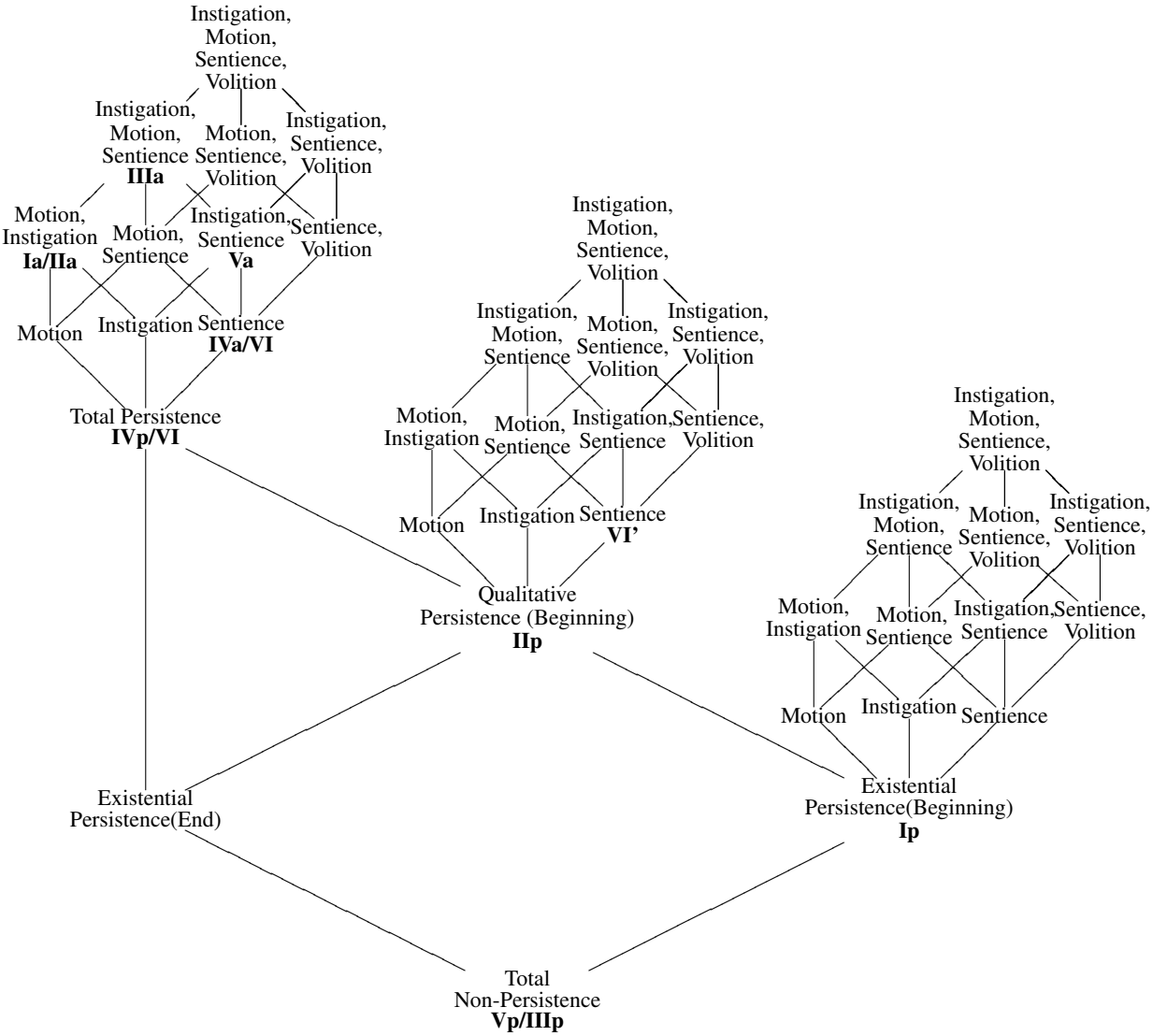


Figure 4.1: Mapping of Tsunoda's Effectiveness Condition

Contact verbs locate their agent arguments in the same node as Resultative Effective Action verbs (labelled in the figure **IIa** and **Ia**, respectively, where **a** is mnemonic for "agent" and **p** for "patient"), but differ in that the patient argument of Contact verbs (**IIp**) has a higher level of *persistence* than those of Resultative Effective Action (**Ip**). In different terms, the patient argument is less affected. Pursuit verbs similarly show a different level of *persistence*, but in contrast to Contact Verbs, their patient argument (**IIIp**) is located on the node of *Total Non-Persistence*. Pursuit verbs such as 'search' do not require that the entity searched for exists, as is evident from many philosophy papers wherein various agents search for unicorns. That Pursuit verbs deviate more strongly from the prototypical transitive paradigm than Contact verbs follows from the fact that the patient is not even guaranteed to exist, let alone be affected or undergo a change.

The verb types of (17b) show a similar pattern of progressive deviation. Attained Perception verbs have agentive arguments (**IVa**) which are lower on the lattice than those of Resultative Effective Action verbs and they have patient arguments (**IVp**) located on the *Total Persistence* node, which is again a deviation. Unattained Perception verbs show further deviation in that both admit of constructions where the patient argument (**Vp**) need not exist, 'look for' or 'listen for', a distinction which is not limited to English. The Emotion verbs in Tsunoda's categorization is a rather heterogenous group, lumping together both Experience-Stimulus constructions and Stimulus-Subject verbs, which results in multiple locations on the lattice. The two different possible mappings of their sentient argument (**VI** and **VI'**) depend on whether the sentient argument is affected (**VI'**) or whether the stimulus and experiencer are in a static relation (**VI**). For instance, "Jane fears ogres" need not indicate that Jane undergoes any change, while "Ogres frighten Jane" indicates that whenever the topic of ogres comes up, Jane becomes frightened. The latter is the more marked construction cross-linguistically, and indeed when mapped to the lattice, the sentient argument is located in an area of the lattice which is normally associated with patients, atop the $-$*qualitative persistence* branch.

Again, the predictions presented by the agentivity lattice are substantiated by the typological generalizations of (Tsunoda, 1981, 1985).

4.2 Mapping Core Case-Marking Systems

Having seen the principles at work behind the agentivity lattice, it is a rather simple matter to account for core case-marking systems, at least in a generalized picture.

4.2.1 Accusative and Ergative Marking Systems

Nominative/accusative marking systems generally align the agent with the subject (and therefore the nominative) and the patient with the non-subject position (and therefore the accusative).

While this division of agent and patient is generally followed in transitive clauses, there is more variation in intransitive clauses, where the subject is often both partially agentive and partially patientive, as is the case with unaccusatives, such as 'arrive', or middles, such as 'wash'.

The ergative/absolutive systems show the inverse pattern of marking from that of the nominative/accusative systems—the subject is aligned with the patient while the non-subject position is aligned with agent. The same reservations about unaccusativity and similar phenomena in accusative systems applies here for ergative systems. Both systems can be represented schematically by the lattice in figure 4.2, wherein the typical markings associated with two-argument transitive clauses are displayed.

The manner in which the lattice is constructed gives a clear visualization of the factors in play. While non-affected agents occupy the left-most vertical axis, and the affected non-agents occupy the lower horizontal axis. The general picture that should emerge here is that the top-left corner of the lattice (full agents) and the lower horizontal axis (non-agentive affected objects) are the most cross-linguistically predicable regions. If a language possesses a case marking system, these areas will be marked by the core syntactic cases, e.g., nominatives and accusative or ergatives and absolutives. The region in between the two axes is one of significant language variation. In this area, one finds experiencers, unaccusatives, unergatives and other such phenomena whose semantic status has remained controversial for several decades. Here, too, is where one finds the semantic correlates of oblique case-marking as will be taken up on the next chapter. This middle region is the more cross-linguistically unstable region. There is a large amount of case fluctuation with intransitives and passive verbs, and most commonly, if the case-marking of the construction differs from the standard core case-markers, the argument will be located in this less stable region. In the following chapter, I will demonstrate how to make these statements more precise with respect to language-particular case-marking systems. Yet, I now turn to agentive systems which anticipate these non-canonical case-marking strategies, since agentive marking systems divide up this unstable region into language-particular conceptions of "agents" and "patients".

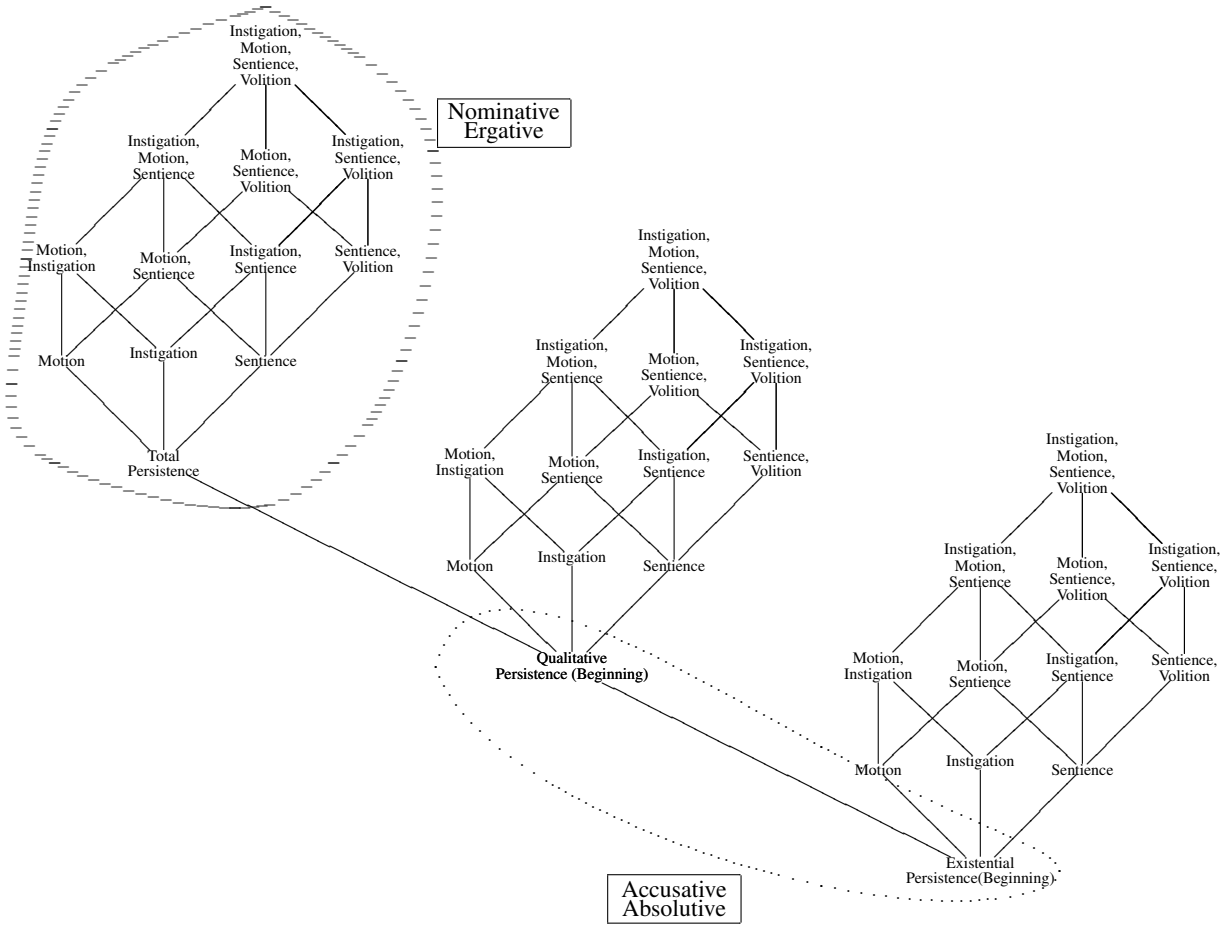


Figure 4.2: Accusative and Ergative Systems

4.2.2 Agentive Marking

The least frequent type of core case-marking considered gives the most thorough demonstration of the utility of the agentivity lattice for core case-marking. It will be recalled that in agentive marking systems the subject of intransitive verbs are marked as Agent with some verbs and as Patient with others, depending on the verb. These languages pose a particular problem for Dowty's argument selection principle. First, subject and object 'selection' do not occur based on a winner-take-all basis with the argument with the most proto-roles being entailed realized as the subject. It is relatively questionable whether the notion of subject that is found in the bulk of the literature is actually applicable to these languages. Second, the arguments that become realized as agents and patients do not bear out the predictions made by Dowty if the Argument Selection Principle was adjusted to be a principle which governed the selection of agent and patient marking, since different languages have particular requirements on what determines an agent or a patient. A group of Native American languages which use agentive marking systems has been studied in detail in (Mithun, 1991), and I will show how the agentivity lattice can account for her findings. In essence, while all these languages use agent and patient marking, what an agent or a patient *is* varies from language to language in ways that one cannot account for by conceiving of agents as those entailing the greatest number of proto-agent properties, as in (Dowty, 1991).

The following examples of the Guaraní language show how these systems function.

(18) GUARANÍ (Mithun, 1991)

a. **a**-gwerú aína
   I am bringing them now

b. **še**-rerahá
   It will carry **me** off.

c. **a**-xá
   I go

d. **šé**-rasí
   I am sick.

(18a) is a transitive clause, with the first person singular agent marked by the prefix *a-*. (18b) is also transitive, but here the 1st singular patient is marked by the prefix *še-*. In the intransitive clauses, (18c) and (18d), the subject is marked with either *a-* or *še-*, depending on the predicate. The relevant parameter in Guaraní is lexical aspect, under the analysis of Mithun. All predicates that are episodic tend to take agent markers while predicates that are static take patient marking.

(Mithun, 1991) also investigates Lakhota and Central Pomo, which also exhibit agentive marking systems. However, the divide between agentive and patientive

marking is not lexical aspect, but the parameter of agency in the form of instigation for Lakhota and the interaction of control and affectedness for Central Pomo.

Lakhota distinguishes cleanly between those who instigate and effect actions and those who don't by means of agent and patient markers in the first and second person pronouns (third persons are unmarked for pronouns). In certain two-argument constructions where neither participant qualifies as performing, then both are marked as patient—again, a pattern which would be difficult to account for under (Dowty, 1991)'s Argument Selection Principle. (In the following examples, ma='I',ni='you'.)

(19) LAKHOTA (Mithun, 1991)

a. iyé**nima**č^h eča
I look like **you**.

b. iyó**nima**kip^h i
I find **you** congenial.

c. í**nima**ta
I am proud of **you**.

Central Pomo appears to be similar, in that most predicates with a high level of agentivity are marked as such, regardless of aspect. However, there is an additional distinction made in Central Pomo with respect to control that distinguishes it from Lakhota. This difference between the two languages is most visible in verbs of uncontrolled action such as 'cough', 'hiccup', etc., where the performer is marked as agent in Lakhota, while the performer is marked as patient in Central Pomo, since the performer does not control the event, but rather succumbs to it. In (20), the alternation between agent and patient markers corresponds to an alternation between a controlled and an uncontrolled action.

(20) CENTRAL POMO (Mithun, 1991)

a. **ʔa** č^h ném
I ran into it.

b. **t̻o** č^h ném
I bumped into it (not watching).

It can be shown that the relevant distinction is one of control rather than volitional or non-volitional action, since verbs such as 'win at gambling', where the performer clearly has a desire to win, are still marked by the patient case, as in (21), since the performer does not control the event.

(21) CENTRAL POMO (Mithun, 1991)
t̻o t^{h}óʔča q'ya
I'm on a lucky streak (gambling).

Finally, patients in Central Pomo are not merely those participants who undergo any event, but those who are 'significantly affected'. Only stage-level predicates ('being cold', 'being sleepy', etc.) give rise to the patient marker, while individual-level predicates, which denote inherent properties ('be tall'), and predicates that are factive take the agentive marker. It should also be noted that Central Pomo permits double-patient, as well as double-agent constructions.

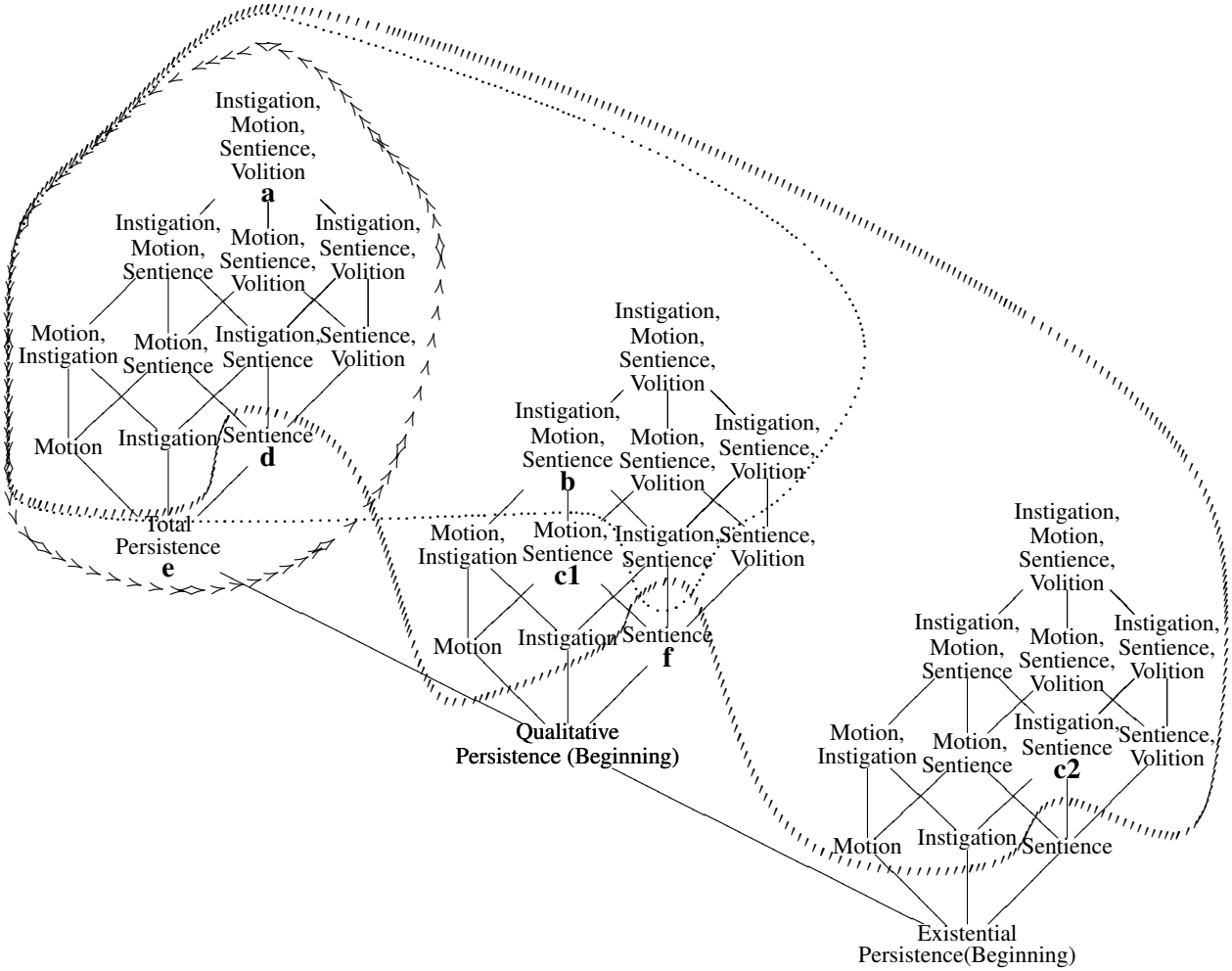
Table 4.3, reproduced from (Mithun, 1991), summarizes the different realizations of agent and patient marking in the languages discussed with respect to different predicate classes (where I=agent and II=patient).

Table 4.3:

		Guaraní	Lakhota	C. Pomo
a.	+event 'jump', 'go', 'run' +Perform/Effect/Instigate +Control	I	I	I
b.	+event 'hiccough', 'sneeze','vomit' +Perform/Effect/Instigate -Control	I	I	II
c.	+event 'fall', 'die','slip' -Perform/Effect/Instigate -Control	I	II	II
d.	-event 'reside', 'be prudent','be patient' +Perform/Effect/Instigate +Control	II	I	I
e.	-event 'be tall', 'be strong','be righthanded' -Perform/Effect/Instigate -Control -Affected	II	II	I
f.	-event 'be sick', 'be tired','be cold' -Perform/Effect/Instigate -Control +Affected	II	II	II

Clearly, as the table demonstrates, there are different notions of agent and patient in play. While the languages agree on predicate types (a.) and (f.), controlled motions and stage-level predicates, respectively, there is no total agreement elsewhere. However, these can be represented as continuous regions on the agentivity lattice, as in figure 4.3. These continuous regions of the agentivity lattice give a cohesive representation of what it means to be an agent or a patient in each of these languages.

The importance of this representation is to show that agentive marking systems, while not compatible with such notions as (Dowty, 1991)'s Argument Selection Principle, are compatible with the hierarchy of agentivity features that have been



Central Pomo Agent Marking: >>>>>
Lakhota Agent Marking: .....
Guaraní Agent Marking: ”””””

Figure 4.3: Agentive Systems

elaborated above.

4.3 Animacy, Definiteness and Differential Object Marking (DOM)

In contrast to the full case-marking systems that have been discussed up until now, there is another form of case-marking, known as Differential Object Marking (DOM), which is not exclusively determined by agentivity properties. Prototypical instances of DOM are those in which the subject and object arguments

are regularly unmarked, yet when certain conditions obtain, the object becomes marked. Recently, the research of (Aissen, 1999), (Aissen, 2003) has demonstrated the importance of the dimensions of animacy and definiteness (or in the terminology of (Hopper and Thompson, 1980), object individuation) to differential case-marking. In essence, objects which possess a higher degree of animacy and/or definiteness become marked, while those objects which have a lower degree of animacy and/or definiteness are left unmarked. An example comes from Hebrew, where definite objects are marked with an accusative case-marker, shown in (22).

(22) HEBREW (Hopper and Thompson, 1980)

a. David natan matana lərina
David gave present to.Rina
David gave a present to Rina

b. David natan et ha-matana lərina
David gave ACC DEF-present to.Rina
David gave the present to Rina

There are instance of DOM where the marking is sensitive to a wide variety of factors. For instance, (Lyons, 1999), based upon the work of (Poppe, 1970), states that accusative object marking in Khalkha Mongolian occurs with "personal pronouns, numerals, substantivized adjectives, proper nouns, human nouns, and nouns modified by a genitive or with a possessive suffix." I will limit myself animacy and definiteness with the goal of incorporating the work of (Aissen, 2003).

While the features under consideration so far have been event-based entailments that are intrinsic to the event depicted by the predicate, the animacy and definiteness features responsible for DOM are extrinsic to the event depicted by the verb. The verb 'hit' does not entail that the object argument be inanimate, animate, indefinite, or definite, but remains silent on the issue; only when the argument slots of a verb are instantiated by a nominal are these distinctions pertinent. Clearly, we have two different dimensions for whose interaction an account is necessary. While the agentivity lattice determines subject and object selection, animacy and definiteness features specify information about the subjects and objects that are realized in the clause.

In what follows, I reformulate the analysis of (Aissen, 2003) in terms of features so that the two dimensions can be integrated into a single account. As a result, the analysis above will be rendered consistent with the DOM phenomena, and the analysis will have then incorporated another transitivity parameter from (Hopper and Thompson, 1980). This unified framework will later be used for further applications in languages with full case-marking systems.

4.3.1 A Feature-Based Account of DOM

Aissen bases her account on two prominence scales relative to animacy and definiteness.

(23) Animacy Scale:
Human > Animate > Inanimate

(24) Definiteness Scale:
Pronoun > Name > Definite > Indefinite Specific > NonSpecific

Conjoining these two scales, Aissen derives a unified hierarchy, represented by a lattice, the top of which is occupied by Human Pronoun and the bottom by Nonspecific Inanimates. In justifying the definiteness scale, Aissen claims it can be founded upon the "extent to which the value assigned to the discourse referent introduced by the noun phrase is fixed... In the case of 1st and 2nd person pronouns, the value is fixed by the speech situation. That of the 3rd person is limited to a salient non-participant. In the case of proper names, the value is fixed by convention. In the case of definite descriptions, the hearer is not free to assign just any value to the discourse referent introduced by the noun phrase. Definites are subject to a familiarity requirement, meaning that the value is determined by previous discourse." She goes on to elucidate the value of specifics as where the "value must be chosen from a familiar set", as in 'two of the girls', or can be fixed if the speaker has a particular entity in mind. This definition of definiteness is not unproblematic, as I will discuss in section 4.3.3, but for now it will be assumed.

Taking the nominals' status within the discourse as the justification of the definiteness scale indicates that we should be able to reconstruct the scale via such properties. The remarks on the definiteness scale cited above lead to the following binary features:

(25) Utterance Context > Non-Utterance Context

(26) Given > Non-Given

(27) Referring > Non-Referring

(Non-)utterance context captures the distinction between participants in the discourse and non-participants, i.e., 1st and 2nd pronouns as opposed to 3rd pronouns or nouns. (However, the distinction between 1st and 2nd person pronouns and 3rd person pronouns does not appear to be relevant for object-marking in Aissen's account, yet it is very relevant for subject-marking in (Aissen, 1999).) *(Non-)given* distinguishes between old material, that which has already been introduced in the discourse, and new material. This corresponds to the general difference between

definites and indefinites, where the former are "determined by the previous discourse" and the latter introduce a new entity to the discourse. To account for specificity, we need something more general, above the level of the information structure of the discourse. For a nominal can be marked as specific if only because the speaker has a particular entity in mind. Thus, the relevant distinction is whether the nominal refers to a particular entity or not, whence *(non-)referring*.

One further distinction can be made with respect to the nominals role in the discourse structure. Pronouns and proper names share the trait of *uniquely* referring, a property known from the philosophy of language literature, e.g., (Kripke, 1972), as 'singular term'. Therefore, we add the following feature:

(28) Singular Term $>$ Non-Singular Term

Four binary features yields sixteen (2^4) possible classes, which is certainly more than wanted to reproduce the six classes ordered on the definiteness scale. However, the distinctions made by the features are not entirely independent of one another. For instance, the feature *utterance context* entails that of *referring*, for if one designates something in the utterance context, clearly that act is referential. Similarly, *utterance context* entails *given*, since the participant is "determined by the previous discourse" as a result of being a participant and entails *singular term* (abbreviated below as 'Sing'), since the reference is certainly unique. Further, *given* entails *referring*, since old material by its nature refers to an entity previously named in the discourse.

The above entailments serve as constraints on the classes obtained by combining the features, blocking impossible combinations such as *utterance* and *non-referring*. As a result, we are left with exactly six classes, that can be ordered as below, where (29a) gives the scale in informal terms and (29b) gives the scale in terms of features:

(29) a. NonSpecific $<$ Indefinite Specific $<$ Definite $<$ Proper Name $<$ 3rd Pronoun $<$ 1st and Second Pronoun

b. $\emptyset$ $<$ Ref $<$ Ref, Given $<$ Sing, Ref$<$ Sing, Ref, Given $<$ Utter, Sing, Ref, Given

The scale created as a hierarchy of features in (29b) is mostly ordered by inclusion, a class with more positive features will be higher than a class with fewer features. The only exception is the ranking of Proper Names above Definites, although both these classes have just two positive features. This can be justified on the grounds that singular terms, which refer uniquely, are bound more strongly to their referent than given terms, which are bound variables dependent on previous context.

The animacy scale can be derived similarly. Human-referring nominals can be distinguished from non-human nominals by a feature *human*, and similarly, animates

can be distinguished from inanimates by the feature *sentient*. However, an additional distinction between mobile inanimates and immobile animates is useful to add for later purposes, which can be achieved by the feature *motion*. The distinction between inanimates capable of motion and inanimates incapable of motion is necessitated by entities such as natural forces ('wind') and machines ('car'). (This distinction is further supported by the propensity for mobile inanimates to be subject to personification much more easily than immobile inanimates.) The relevant features then are as follows:

(30) Motion>Non-Motion

(31) Sentient>Non-Sentient

(32) Human>Non-Human

Three features in combination give eight (2^3) possible classes. These are constrained by the entailments *human* $\vDash$ *sentient*, and *sentient* $\vDash$ *move*. Ordering these classes by inclusion, the following scale in (33) is produced:

(33) a. Immobile Inanimate $<$ Mobile Inanimate $<$ Animate $<$ Human
b. $\emptyset$ $<$ Motion $<$ Motion, Sentient $<$ Motion, Sentient, Human

Having reconstructed the hierarchies used by Aissen in terms of features, establishing the partial order lattice in terms of features is immediate, following from the Cartesian product of the two scales as shown in figure 4.4.

4.3.2 The Unification of Agentivity, Animacy, and Definiteness

We now possess another lattice representing possible features associated with nominals with respect to animacy and definiteness. To combine the descriptive power of the above lattice with that of the agentivity lattice, it is again simply a matter of taking the Cartesian product of the Aissen lattice and the agentivity lattice. However, just as was the case for the product of the agentivity lattice and the persistence lattice, the totality of the product of the agentivity lattice and the Aissen lattice will be constrained by conceptual and logical impossibilities. To keep the graphical representations at a manageable size, I consider the Cartesian products of the smaller agentivity lattice and of the persistence lattice with the Aissen lattice separately.

There are no obstacles to any combination of the features of the definiteness scale and those of the agentivity lattice. That an argument entails, say, *motion* does not lead to conflicts should the nominal instantiating the argument be non-specific

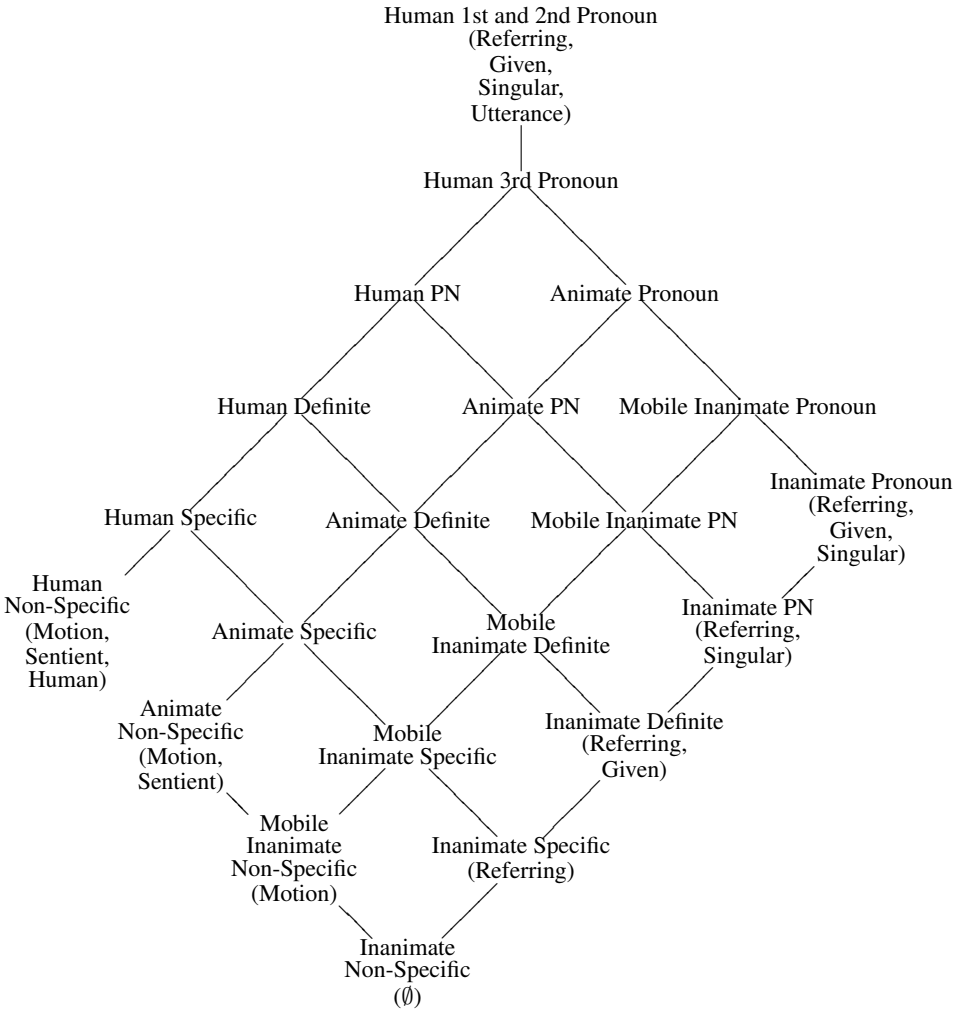


Figure 4.4: The Aissen lattice

or any other category on the definiteness scale. There are, however, constraints upon the product of the agentivity lattice and the animacy scale, but these follow straightforwardly. A nominal realizing an argument of a predicate with the agentivity feature *motion* is required to be at least a *mobile inanimate* on the animacy scale. Similarly, any nominal to be associated with the agentivity feature *sentient* will be required to be animate or human and *volition* will also require that the nominal be human[2]. These constraints guarantee that phrases such as "Gilbert moves mountains" or the "The plant wants to be watered" will be anomalous/metaphorical. The eventual product of the agentivity lattice and the animacy scale is shown in figure 4.5. (Again, motivated by keeping the graphical representation of legible size, I have not included the definiteness features.)

Constraints impose themselves as well on the product of the persistence lattice and the definiteness scale. It will be recalled from section 3.3.2 that the nodes *Total Non-Persistence* and *Existential Persistence (End)* differed from the other nodes of the persistence lattice in that an argument associated with these nodes would not exist at the beginning of the event. An object of a transitive situation is then excluded from these nodes, since the object of a transitive situation must be submitted to the action of the event, and this requirement presupposes existence at the beginning of the event. A similar situation appears with respect to the admission of nominals that are specific or higher on the definiteness scale to these nodes. A referring nominal instantiating an argument will exist with respect to the discourse, minimally for the speaker, prior to the depiction of the event. Thus, referring nominals are discordant with those nodes of the lattice which entail that the object does *not* exist before the event, namely, the nodes *Total Non-Persistence* and *Existential Persistence (End)*. This accords with what is known about the classes of predicates which map arguments to the *Total Non-Persistence* and *Existential Persistence (End)* nodes.

The types of predicates which locate their object arguments on these two nodes include a class of predicates known in the literature as "Effective Verbs", and whose objects are known as "Effected Objects", as opposed to affective verbs or objects (Hopper, 1985). Effective constructions, such as "light a fire" or "sing a song" differ from affective constructions in that they either "introduce new participants into the discourse, things which are "produced" through an action", or "report a unified event in which the verb and the object are not conceptually separable, but in which the object is in a sense incorporated into the verb (Hopper, 1985, p.85)." Effective objects include objects of verbs of creation and cognate/incorporated objects. Clearly, the former correspond to arguments associated with the node *Existential*

[2]This requirement on *volition* is too strong in that one does find cases of attributing acts of volition to animates for whom we have a high degree of empathy, e.g., dogs, cats, and so forth. A more fine-grained animacy scale which would subdivide the animate category into those animates for whom a given culture displays high degrees of empathy (e.g., dogs) and those for whom they don't (e.g., worms) would capture this; however, for the general picture developed here, it is of little consequence.

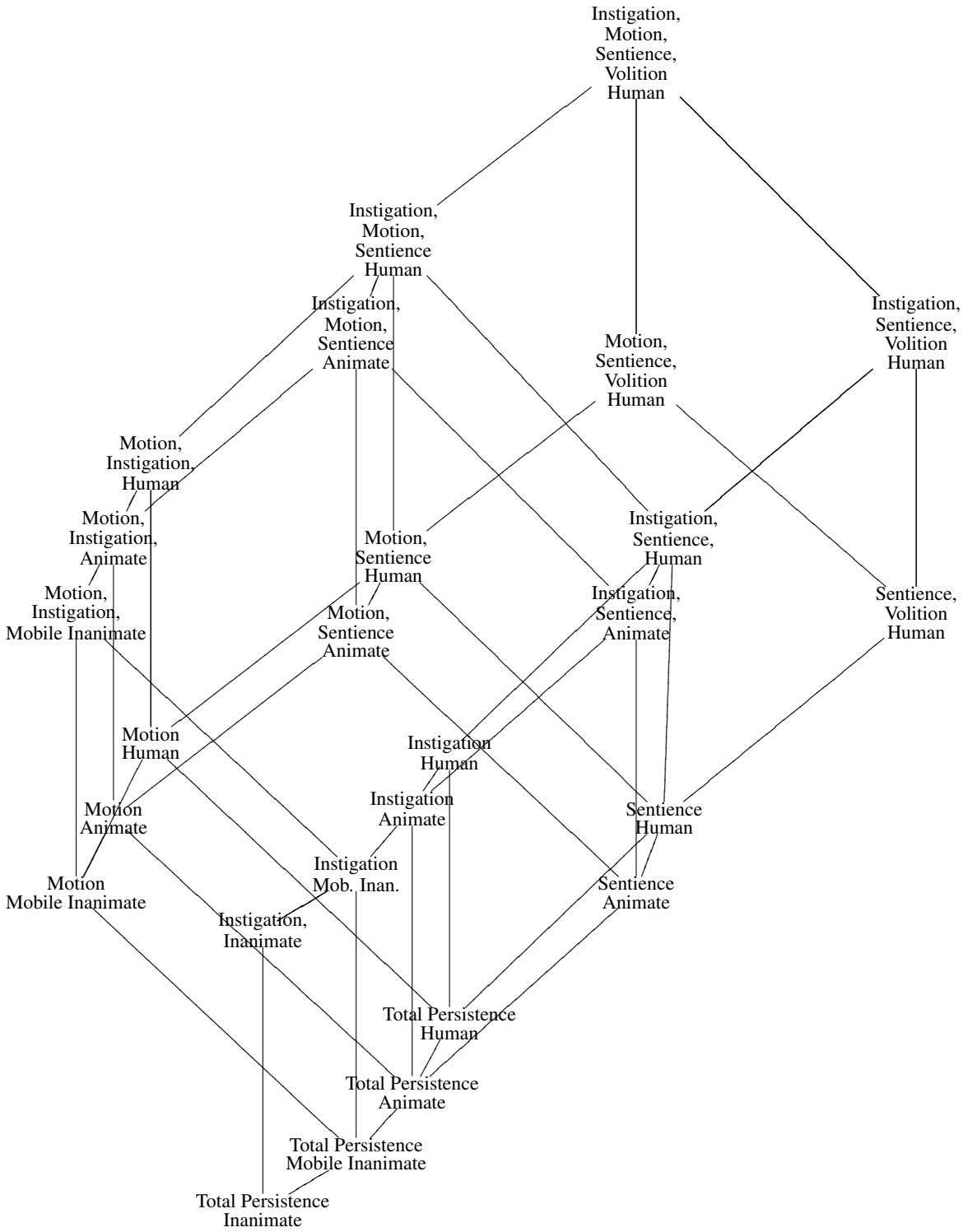


Figure 4.5: Product of Agentivity Lattice and Animacy Hierarchy

Persistence (End) and the latter to the node *Total Non-Persistence*. In both cases, there is an overwhelming tendency for the object to be non-referential, i.e., non-specific. This tendency is not surprising, since the very existence of the object is intertwined with the action of the verb. If the object was referential, this would indicate that the object existed prior to the event, at least for the speaker, and thus, disqualify the referring object from being an Effected object in the strong sense.

This correlation between Effective verbs and non-specific objects is substantiated by the fact that it is grammaticalized in a variety of languages. Effective verbs are typically those that permit object incorporation, and incorporated objects are necessarily non-specific. Further, in languages employing serial verb constructions, similar to those discussed in section 2.3, whose direct object markers are grammaticalized from the verb "take"—and retain the selectional features of "take"—are not permitted to co-occur with objects of Effective verbs.

Another class of predicates that map to the *Total Non-Persistence* and *Existential Persistence (End)* nodes are those which create opaque contexts. Verbs that create contexts that are modally opaque include most famously 'seek' or 'owe', for constructions such as 'seek a solution' or 'owe a beer' do not imply that a solution nor a beer exists. This can be represented on the lattice by locating the arguments of such objects on the *Total Non-Persistence* node. The class of opacity-creating predicates overlaps with Effective verbs in that verbs of creation are "temporally opaque" (von Stechow, 1999)—the object does not exist at the beginning of the event. Verbs which give rise to opaque contexts produce (at least) two interpretations, one which is specific (the wide-scope reading), and one which is non-specific (the narrow-scope reading). The semantics intrinsic to the predicate yields the narrow-scope reading, while a suitable discourse context can provide a wide-scope reading if the argument in question is referring.

The semantics of the classes of predicates described above, Effective verbs and narrow-scope interpretations, in so far as argument structure is concerned, are limited to non-referential objects, and the only other arguments which map to the nodes *Existential Persistence (End)* and *Total Non-Persistence* are similarly limited (e.g., those of negative existential statements). This is represented in the product of the agentivity lattice and the animacy/definiteness lattice by constraining the nodes *Existential Persistence (End)* and *Total Non-Persistence* to only the non-referring (i.e., non-specific) feature of the definiteness hierarchy.

Thus, the default interpretation of arguments located on the nodes *Total Non-Persistence* and *Existential Persistence (End)* are required to be non-specific. Of course, objects of Effective verbs can indeed be definite or even pronouns, as in "Ted will light the fire" or "Ted will light it" under appropriate circumstances. But, as stated above, then the nominal will have already been introduced in the discourse, and so it no longer qualifies as not existing previous to the event, nor as an Effected object in the strong sense. Upon instantiating the argument with a nominal, if the nominal is *referring* (or higher), then *Existential Persistence (Be-*

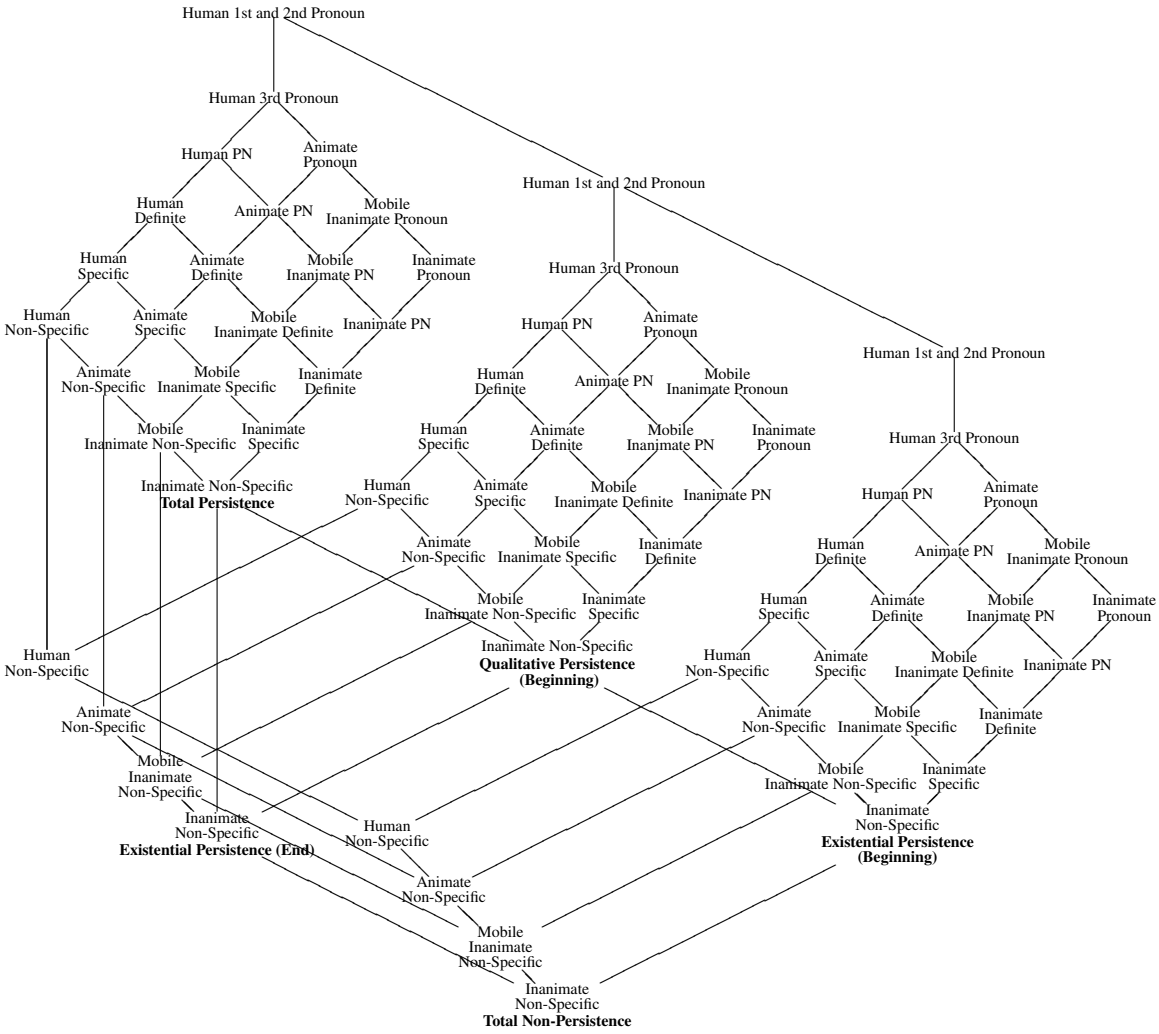


Figure 4.6: Product of Persistence Lattice and Aissen lattice

ginning) will be entailed. The nominal of the verb will be forced to be located in a higher node of the combined agentivity/definiteness lattice, and similarly in the case of wide-scope readings. This has the desirable consequence of increasing the transitivity of clause, which accords with the observation found in (Hopper and Thompson, 1980) that objects that are higher in individuation are indicative of clauses that are higher in transitivity. The resulting product of Aissen lattice and the persistence lattice is displayed in figure 4.6.

Now it is possible to view the application of a nominal argument to a predicate in terms of the product of the agentivity and Aissen lattices. This permits to capture the result of Aissen's account of DOM with respect to agentivity properties. The manner in which the arguments are marked will depend on the marking strategy of the language at hand. For the purpose of demonstration, consider the aforemen-

tioned example from Hebrew, repeated for convenience:

(34) HEBREW : (Hopper and Thompson, 1980)

a. David natan matana lərina
David gave present to.Rina
David gave a present to Rina

b. David natan et ha-matana lərina
David gave ACC DEF-present to.Rina
David gave the present to Rina

In (34a), the result for the object of the merge between the two lattices is an argument with the features [(+/−) *ref*, *existential persistence (beginning), existential persistence (end), qualitative persistence (beginning)*]. In contrast, the resulting set of features for (34b) is [*ref, given, existential persistence (beginning), existential persistence (end), qualitative persistence (beginning)*]. Since the case-marking strategy of Hebrew specifies that all object arguments which are marked *+ref, +given* are marked by the accusative marker 'et', the object of (34b) receives accusative case, while the object of (34a) does not. The territory of 'et' as a case-marker is simply the region of the combined agentivity/Aissen lattice where the feature *given* appears. In this manner, the agentivity lattice can be rendered consistent with the advances made by (Aissen, 2003).

These definiteness and animacy features discussed above are not only relevant for DOM, but are equally relevant for languages with full case-marking systems (see the application in section 5.4.1).

4.3.3 Limitations of DOM Analysis

While the analysis of (Aissen, 2003) elegantly captures a large amount of the DOM phenomenon, the unfortunately loose definition of definiteness causes large problems when attempting to extend her analysis to more nuanced data. First, Aissen's definition of definiteness is only based on the familiarity criterion, while there exists a second dimension of definiteness more related to quantification, one of uniqueness, or more broadly, inclusiveness. This second notion of definiteness can give rise to DOM effects as well, although this is not predicted by the analysis contained in (Aissen, 2003). Second, Aissen's analysis holds the qualities of nominals alone to be responsible for whether an object is marked or not. I would like to suggest that while the qualities of nominals are indeed the key component which gives rise to DOM, this is within the larger context of the argument structure in which the nominal is involved.

The first claim is exemplified by the fact that Aissen's definition of definiteness causes the definiteness hierarchy to breakdown with generics. This is conspicuous

in the case of Hebrew, which allows definite and indefinite generics, the former of which can be case marked, and apparently must be when in object position.

(Doron, 2003) notes that "definite nouns can uniformly refer to kinds (or generics), but this is not true of bare nouns." Bare nouns apparently can or cannot refer to kinds, as the context allows. (Doron, 2003) gives an example of a bare singular count noun in object position referring to a kind:

(35) calfonit xuma nefoca mi kav ha-roxav šel yam
Proxylocopa brown common from line (of)-the-latitude of sea(of)
ha-melax darom-a
the-salt south-ALL
The brown bee is common from the Dead Sea southward.

However, this is not always possible, as the following exhibits:

(36) a. elohim bara et ha-tanin b a-yom ha-xamii
god created ACC the-crocodile on the-day the-fifth
God made/created the crocodile on the fifth day. (obj/kind)
b. elohim bara tanin b a-yom ha-xamii
god created crocodile on the-day the-fifth
God made/created crocodile on the fifth day. (obj/*kind)

In (36a), the object of the verb can be either interpreted as a particular (specific) entity or as referring to the species. In contrast, (36b) only permits the reference to object reading. (Doron, 2003) also shows that this same distinction occurs in Russian, with respect to the same sentences.

According to Aissen's definition of definites, they "are subject to a familiarity requirement, meaning that the value is determined by previous discourse." For generics to be marked as definite, they should satisfy this description. However, the crocodile, or any kind so referred to, need not be determined by previous discourse, thus the anaphoric explanation must be rejected as a source of definiteness in (36a). Suppose the anaphoricity component is lifted, and only the familiarity claim is considered. In this case, one would then have to argue that kinds are inherently familiar from world knowledge. But there arises a further problem, since reference to kinds can be made by bare singulars, as in (35), as well as definite singulars, as in (36a), or even interchangeably, as in (37).

(37) bronza/ha-bronza humce'a lifney pliz/ha-pliz
bronze/the-bronze was-invented before brass/the-brass
Bronze was invented before brass.

In (37), a kind can be referred to both by a definite singular NP or a bare singular. (Note these are mass terms, but such is the case for count nouns as well (Doron,

2003).) If kinds are taken to be inherently familiar, then by the definition quoted above, they should always be definite. But this would seem to be invalidated by (37).

Further, it appears that it is only for certain predicates for which bare nouns cannot refer to kinds. Most of the examples discussed in (Doron, 2003) which demonstrate the phenomenon shown here in (36b), i.e., the inability for the bare singular in the object position to receive a kind interpretation, involve predicates which are familiar to our study as those which are modally or temporally opaque, e.g., 'investigate', 'create', 'invent'. This is suggests that the argument structure is also a factor in the interpretation of nominals as referring to kinds or objects, and hence is necessary to take into account for treating the full range of possibilities of object-marking.

There is a further problem that generics propose for Aissen's account. Aissen claims that the DOM hierarchy that she has proposed applies as well to subject-marking, and, in fact, this quality elevates her account above that of (Hopper and Thompson, 1980). Yet, while generics are typically occupants of the lowest rank of the definiteness hierarchy, since they are often indefinite and non-specific, generics happen to make excellent subjects. This seems to be a tendency in most languages, but in others it is the rule, for instance, Japanese only permits definite or, often indefinite, generic nominals as subjects (Lyons, 1999). This bipartion is not only relevant for subject, but appears with objects linked to various modal predicates. (Givón, 1978, 295) claims that an "object under the scope of [the sentence-scope modality NEG (negation)] can be either definite or non-referential, but never referential-indefinite." (Earlier, Givón makes it clear that he equates non-referential nominals with generics.)

Aissen's account of Persian also presents problems. In her characterization of DOM in Persian, she claims that all definites are case-marked by the suffix *-râ* and that *-râ* does not appear with non-specific inanimates. According to (Mahootian, 1997), there are exceptions to both of these generalizations.

First, certain verbs obligatorily do *not* take *-râ*, even if the object is very high on the proposed definiteness hierarchy. (Note that *-o* is a phonological variant of *-râ*.)

(38) a. dombal-e madær-æm mi-gærd-æm
after-EZ mother.1SG.PC DUR-turn-1s
I'm looking for my mother

b. * dombal-e madær-æm-o mi-gærd-æm
after-EZ mother.1SG.PC-OM DUR-turn-1s
I'm looking for my mother

(Mahootian, 1997) claims that "'my mother' can only be interpreted as definite but does not take *-râ* with the verb *dombal-e gæštæn*." (Mahootian, 1997) goes

on to propose that the restriction on this verb may have to do with both obligatory incorporation of the object, and that it is a compound verb, which would make the object the object of the preposition. If either of these are the case, it weighs against Aissen's claim that DOM is assigned independent of the verb. Again, it will be noted that the example chosen is one involving an opaque verb, 'look for'.

Second, while apparently Persian does indeed optionally assign object marking to inanimates as Aissen claims, this is contingent on the class of inanimates. In contrast to the marking pattern found with most inanimates, abstract nouns are (obligatorily) marked by *-râ* in object position. This is surprising with respect to Aissen's account since abstract nouns are clearly not referential and the claim was that non-specifics are not marked by *-râ*.

(39) taqæt-e duruqgui-o næ-dar-æm
tolerance-EZ lying-OM NEG-have-1SG
I can't tolerate lying

(40) esq-o ne-mi-š-e–xærid
love-OM NEG.DUR.become.3SG.bought
One can't buy love

The explanation of this construction given by (Mahootian, 1997, 202) is telling: "abstract nouns are considered universal and unique and are therefore followed by the definite direct object marker *-râ*." This is an instance of the other dimension of definiteness, entities which are unique or inclusive.

A final claim made in (Aissen, 2003) which needs adjustment is that specific indefinites are marked as a rule, notably partitives and *a certain X*. However, the case of *a certain X* appears to be more complicated. The suffix *-i* marks specificity and is glossed as 'a certain', and is claimed by (Mahootian, 1997) as marking [-definite], [+specific]. However, nouns so marked with *-i* can be referential or not, and the object marker *-râ* marks referentiality.

(41) ye ketab-i-o xærid-æm
a book.IND.OM bought.1SG
I bought a certain book

(Mahootian, 1997) notes that "without the object marker [*-râ*] the same sentence [i.e.,(41)] can be interpreted as referential or non-referential", that is, referentiality is marked by *-râ*, and is non-referentiality is left unmarked. It is important to note that *-râ* is not required with specific indefinites, as stated in (Aissen, 2003), but is not allowed with non-referential (generic) objects. Further, there is a class of nominals, viz. specific non-referential, not covered by the definiteness hierarchy that has been employed.

Thus, on the one hand, obligatory object marking occurs where referentiality is a non-issue, with abstract nouns, and on the other hand, *-râ* marks referentiality directly. Clearly, the range of phenomena which give rise to object marking in Persian are beyond what is stated in the definiteness hierarchy.

A better understanding of how the factors of definiteness play out typologically, both in terms of quantification and reference, will yield a more precise account of DOM. In addition, placing the play of these factors within a framework which integrates object-marking with argument structure is necessary to establish the link between verbal semantics and nominal reference. By combining the lattice used by Aissen with the agentivity lattice, the initial step has been taken. However, a full treatment of all the complexities raised, of course, lies beyond what can be done here, and we must content ourselves to move on to other issues.

4.4 Discriminatory and Indexical Case-Marking Strategies Reconsidered

Before turning to language-particular applications, it is worth dwelling upon a theoretical advantage that the framework of the agentivity lattice delivers. At the beginning of the last chapter, the discriminatory and indexical views on case-marking were discussed. It should now be seen that this framework accommodates both views. In mapping case to agentivity properties, the indexical view is satisfied, since arguments are aligned with specific semantic content. Yet, the structure provided by the agentivity lattice encodes the opposition between agent and patient. As a result, the opposition necessary for the discriminatory analysis is provided.

First, consider the semantic foundations of DOM. Objects which are extremely low in agentivity properties are semantically distinct from agentive subjects, and many languages do not require marking for such objects. However, the higher the object is in agentivity properties, i.e., the closer its proximity to agentive regions of the lattice, the greater the risk of confusion between object and subject, whence the greater need for case-marking. This observation leads to a greater understanding of why parameters such as animacy trigger discriminatory marking tactics, viz. DOM. Entities low on the animacy scale do not have access to the agentive regions of the animacy lattice, therefore, such entities will most likely remain semantically distinct from agentive subjects. Entities higher on the animacy scale, however, are capable of assuming properties such as *motion* or *sentience*, and therefore the need for discrimination of such entities instantiated as objects is greater.

Similarly, subjects which are very high in agentivity properties are semantically distinct from unagentive objects, and thus only subjects which can be lower in agentivity are at risk of being confused with objects. In terms of markedness, differential subject marking is often manifested as 1st and 2nd person pronouns

(unmarked) versus 3rd person pronouns (marked), as in Dyribal (Dixon, 1972) or many South Asian languages (Deo and Sharma, 2005). First, recalling that the canonical, and unmarked, subject will be high in agentivity, it can be seen from the various products of the lattices that 1st and 2nd personal pronouns will be highest in terms of the person/definiteness hierarchy, and further, since those in the utterance context will be human, they will therefore have access to the higher regions of the agentivity lattice. Thus, 1st and 2nd personal pronouns will typically coincide with higher regions of the lattice, and therefore accord with the canonical region of the subject, making it reasonable that 1st and 2nd person pronouns in subject position remain unmarked. In contrast, 3rd person pronouns can be not only human, but also animate or even inanimate, and thus, their access to the canonical region of the subject is more variable. 3rd person pronouns, then, will cover a greater region of the lattice that is lower in agentivity than the region of the canonical subject, which indicates that it is a reasonable strategy to mark 3rd person pronouns when they are used as subjects. Clearly, other factors contribute to the 1st and 2nd person pronouns being typical subjects, such as being worthy of topichood, yet the crucial point here is that they are so on a purely semantic level as well, which is predicted by the agentivity lattice.

The above has shown that the discriminatory view can be based on the semantic content of subject and object arguments, which is the foundation of the indexical view, and therefore, the agentivity lattice can accommodate both views. I now turn to analyses of how specific case systems function, in particular, examining how the semantics underlying canonical case-marking are employed in more nuanced uses.

Chapter 5

Language Particular Applications: Non-Canonical Case Marking

Having established the core case-marking patterns in terms of a hierarchized arrangement of agentivity properties, I now turn to less frequent, but perhaps more exciting uses of case. In section 2, the distinction was made between core case-markers, e.g., nominative and accusative, and peripheral case-markers, such as the dative or instrumental. These peripheral case-markers were seen to be associated with at least one central function. In actuality, it is frequent that extension of meaning and syncretism of case forms render many peripheral, as well as core, case-markers multi-functional. For instance, in Ancient Greek, the genitive, apart from its adnominal function of designating possession, acquired the function of the ablative (source) and the partitive, and several others, as well. Explaining the constraints on which functions have a tendency to cohere in a given case form is a serious challenge, and in what follows only part of the subject will be addressed. First, I will look at two examples of non-canonical subject-marking, "instrumental subjects" and "dative-experiencers". In contrast to the core case-marking systems discussed in the last chapter (where if a language had case, then it had at least the core cases), whether the use of the instrumental or the dative as subject is possible varies from language to language. Then the focus will be on case alternations, where arguments which would normally be marked by core case-markers are instead marked by a peripheral case, as is demonstrated by data from Hindi and Russian. These alternate markings in turn coincide with a different semantic interpretation than the interpretation given by the core case-marker. Finally, I will look at more exotic instances of case fluctuation in the phenomenon known as "case attraction" which applies to case assignment on relative clauses, studied here in relation to Ancient Greek.

The methodology is rather straight-forward. As discussed in section 2, case-marking typically develops from adpositions which in turn developed from serial verbs. Along the way, the eventual case-marker picks up additional functions, but most frequently there remains a central function. The genitive in Ancient Greek mentioned just above indeed retains its primary usage as a marker of inalienable possession. Therefore, the first step is to locate this primary function on the agentivity lattice, if applicable[1]. Second, the case-marker is identified with the semantic features of its location on the agentivity lattice. It is then incumbent on those features to provide an explanation for the alternation, both why that particular case is used and how the shift in semantic interpretation comes about.

First, sections 5.1, 5.2, and 5.3 will demonstrate the general methodology outlined above, and will rely only on the agentivity lattice. Mappings of cases' core functions will demonstrate the opposition in terms of agentivity properties which underlies case alternations. In section 5.4.1, the approach will be extended to include the parameter of definiteness, which will then provide an account of the accusative/genitive alternation in Russian. Finally, the treatment of case attraction in section 5.5 makes use of a case hierarchy, which can be shown to be grounded in the agentivity lattice.

5.1 Instrumental Subjects

One immediate application of the method just outlined is a treatment of instrumental subjects. Various languages permit the instrumental to ascend to the subject position while retaining their instrumental case-marking, as demonstrated in (42b).

(42) KEWA ((Franklin, 2001) taken from (Palmer, 1994))

a. áá-mé répena póá-a
man-AGT tree cut-did
The man cut the tree.

b. raí-mí tá-a
axe-INSTR hit-did
The axe hit it.

Such constructions are problematic for theories founded upon discrete thematic roles, as pointed out in (Palmer, 1994). If one posits a thematic role 'Agent' to be associated with subjects, then apparently it can be satisfied by instruments as well.

[1]There are cases where this approach is not feasible, since many cases have primary functions which fall outside the scope of this study; for instance, the initial meaning of the partitive in Finnish was of a quantifier, which does not find a place on the agentivity lattice, but rather with respect to features of object individuation.

Yet, instruments would have their own thematic role, 'Instrument', which is necessary to account for the use of instrumentals outside of subject position. Thus, either one would need to dilute the definition of the agent role to include instruments—but then why this agent role is not appropriate for other uses of the instrumental becomes unclear—or split the instrumental role into a pure instrumental role and an agentive instrumental role. The only escape seems to be a disassociation of thematic roles and morphological marking, which dissolves the foundation of what any sort of theory proposing general thematic roles needs to achieve—associating a discrete set of roles with syntactic and morphological manifestations.

These problems become irrelevant within the framework proposed here. The region of the lattice corresponding to the instrumental case can be localized in the following fashion. First, prototypical instruments are not sentient, so the possible region is already confined to the lower-third of the agentivity lattice. Second, prototypical instruments are viewed as persisting throughout the event, as in (42a). If the tree was cut with an axe, the axe persists throughout the cutting event; therefore, prototypical instrumentals would be located on the *Total Persistence* branch of the lattice. Instrumentals would appear equally capable of motion and instigation, or at least co-instigation along with an understood agent, therefore I include these two nodes and their combined node. The territory of the prototypical instrumental case is marked in figure 5.1.

The territory of the instrumental case overlaps the bottom third of the territory ascribed to quintessential subjects. Therefore, it is little surprising that non-sentient objects in the instrumental case are able to usurp the subject position—instrumentals are quite similar to "agents". It should be noted that similar results could be obtained with Dowty's Argument Selection Principle: an object used as a instrument would be entailed by more proto-agent properties than the affected object. However, locating the instrumental on the lattice shows the proximity of instruments to agents in a more conspicuous manner than the Argument Selection Principle could.

The realization of the instrumental case in subject position then depends on whether (i) the language in question disposes of an instrumental case and (ii) if structural case assignment is more highly valued than semantic case assignment. Often, when the subject of a clause is clearly what would be marked an instrumental in another syntactic position, it surfaces as an nominative argument in subject position as a result of the principles of case assignment in that language.

Further, it should be noted that the affinity between the instrumental and 'agent' has other effects as well. Diachronically, the instrumental case is often extended to serve as an ergative marker, as discussed in (Dixon, 2002).

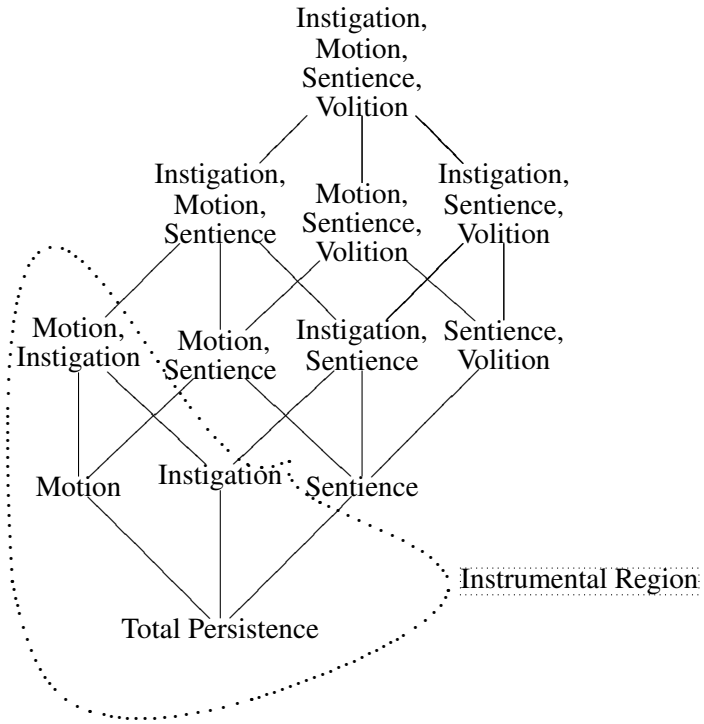


Figure 5.1: Region of the Instrumental Case

5.2 Dative Experiencers

The use of the dative case to mark 'experiencer' subjects is similarly explained. The core function of the dative is to mark the indirect object, which in ditransitive clauses is canonically a recipient, or a beneficiary, as in sentences of the type 'Alex gave the package to Suzy'. By the definitions of the agentivity properties above, it is clear that a recipient will be 'consciously involved' and be affected qualitatively by the event. As such, the entity marked by the dative will be ascribed the properties of *sentience* and be located on the *qualitative persistence (beginning)* branch of the lattice, as shown in figure 5.2.

Cross-linguistically, predicates which accept a dative experiencer subject are those which designate a physical or psychological state, such as 'being cold', or 'being sad', mental events such as 'imagine', as shown in (43).

(43) SPANISH (Rivero, 2004)

A Ana se le ocurren muchas ideas
Dat Ann 3.Refl Dat.Cl imagine.3Pl many ideas

Ann has many ideas. (Literally: Many ideas come to Ann's mind.)

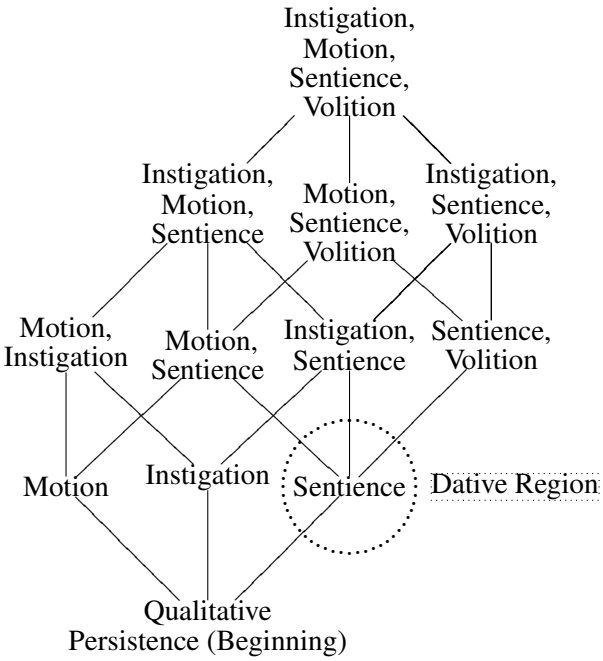


Figure 5.2: Region of the Dative Experiencer

The entailments associated with 'imagine' coincide with the region ascribed to the dative above. 'Imagine' requires the subject to be sentient and that the subject undergoes some sort of qualitative mental change. Again, the properties of the core usage of the dative are easily seen to carry over to non-core uses. If a language disposes of a dative case, and the language's syntactic assignment is adequately flexible, then the subject will be marked by the dative. Case assignments such as the dative experiencer have long been termed "quirky", but the above demonstrates that, rather than being quirky, these types of case assignment fall out naturally from the semantic properties associated with a case-marker and the semantic properties demanded by the verb. The observation regarding the similarity between recipients and experiencers is nothing new, the contribution here is providing a framework which makes this connection conspicuous.

5.3 Subject-Marking in Hindi

Subject-marking in Hindi/Urdu is interesting since it displays wide variety of cases which can be realized as subjects and a complex interaction between them. Hindi/Urdu possesses an ergative case, but it is controversial whether it possesses a split ergative system or if the ergative case is an extension of a nominative/accusative system (see (Davison, 1999), (Butt and King, 2005), for discussion). For the present study, it is sufficient to correlate the rich semantic contribution of case-marking to

the agentivity lattice.

(Masica, 1991) discusses in depth the problems of the term 'subject' with respect to Indo-Aryan languages. Many of the characteristics of the 'subject' do not completely correspond to one and the same NP in Indo-Aryan languages, and of course the problem obtains for other languages as well. Many of the regular properties of subject in Western languages are much less regular, a case in point being verb agreement. Despite this discord with an uncritical notion of 'subject', (Masica, 1991) is able to distinguish between NPs which are more subject-like and those which are less subject-like. At the high end of the scale are constructions where the 'subject' NP is in first position, is in nominative case, controls verbal agreement, etc. Less subject-like are, for instance, dative experiencer constructions.

Hindi/Urdu possesses six cases, as displayed in following table 5.1, reproduced from (Butt and King, 2005):

Table 5.1:

Clitic	Case	Grammatical Function	Morph. Effect
∅	nominative	subj/obj	none
ne	ergative	subj	oblique marking on NP
ko	accusative	obj	oblique marking on NP
	dative	subj/ind. obj	oblique marking on NP
se	instrumental	subj/obj/adjunct	oblique marking on NP
k-	genitive	subj (infinitives)	agrees with head noun
		specifier (adnominal)	none
me/par/tak/∅	locative	obj/adjunct	oblique marking on NP

The first four cases listed participate in case alternations in the subject position, to which I now turn. I will first treat the ergative, followed by the dative, and an alternation between them, providing explanations with respect to the lattice. Then, I will examine the uses of the instrumental case and its alternations.

5.3.1 The Ergative

Indo-Aryan languages do not appear to qualify as structurally ergative languages (Butt and Deo, 2001) of the type discussed in (4.2). However, in Hindi/Urdu the subject is obligatorily marked ergative in perfective transitive sentences and also appears with intransitive verbs with agentive subjects. There are, however, a rather large number of exceptions to this general pattern. (Davison, 1999) discusses two main groups of exceptions: (i) exceptional transitive verbs which may not take the ergative and (ii) exceptional intransitive verbs which normally take nominative case, but allow for the ergative case as well. An instance of the former sort of

exceptional transitive verbs is the pair *lag-*,'to strike', which is non-agentive and *maar-*, 'to beat', which is viewed as agentive. *Lag-* obligatorily takes the nominative while *maar-* takes the ergative.

The exceptional use of the ergative with intransitive verbs is normally optional and the decisive semantic criterion is generally volition, as exemplified by the alternation in (44).

(44) HINDI ((Tuite et al., 1985) found in (Butt and King, 2005))

a. ram k^{h}as-a
Ram.M.Sg.NOM cough-Perf.M.Sg
Ram coughed.

b. ram-ne k^{h}as-a
Ram.M.Sg.Nom.ERG cough-Perf.M.Sg
Ram coughed (purposefully).

One will recall similar distinctions made by languages which operate on an agentive case-marking systems discussed in section 4.2.

Yet, in addition, there are alternations which recall the notion of control, such as *jiit-*, which when taking a nominative subject means 'to win (a match)', but when with an ergative subject is glossed as 'to conquer'. Finally, there are verbs which are agentive, yet still require the nominative, such as *laa-*, 'to bring', while *lee-*, 'to take', obligatorily takes the ergative. While it is possible that all such exceptions could be reduced to specific semantic criteria, the more likely explanation is that there is a fair amount of idiomatization that takes place as well. For the purposes at hand, it is sufficient to state that in relevant contexts (that is, non-perfective contexts), the ergative marks volitionality. This is essentially the conclusion arrived at in (Butt and King, 2005). Therefore, it can be stated that when the verb is not in the perfect, if the subject is marked with the ergative case it is marked for volitionality, while if marked with the nominative case, it is unmarked for volitionality.

The region of the ergative (in non-perfective uses) is given in figure 5.3.

5.3.2 The Dative

The dative case in Hindi/Urdu is quite versatile. It primarily marks the indirect object (as per usual with the dative), but it is also a marker of definiteness/specificity for direct objects (referred to as the accusative case in those contexts), and appears in subject position with certain experiential and psychological predicates. The verbs which require their subject to be marked in the dative include the expected ones: physical sensations and conditions, psychological or mental states, but also those of wanting/needing, obligation or compulsion, and events not controlled by, but affecting, a subject, including such verbs as 'find', 'receive'.

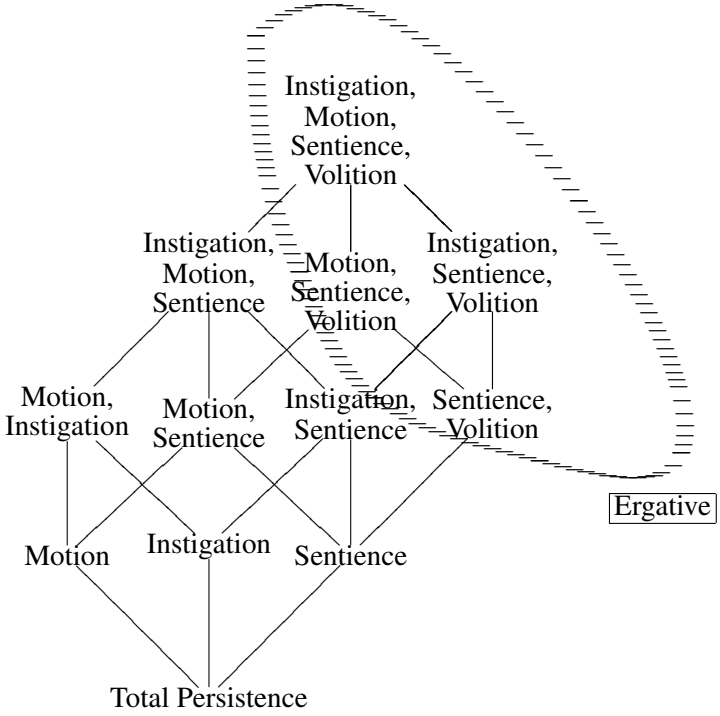


Figure 5.3: Region of the Ergative

(Masica, 1991) proposes that these verbs types can be adequately grouped by claiming that their subjects are non-volitional, and the opposition between the nominative and the dative is found in that the nominative is unmarked for volitionality, while the dative is marked for non-volitionality.[2] Thus, the dative and the ergative are in direct opposition as regards the feature *volition*, which will be crucial in the next section.

5.3.3 Ergative/Dative Alternation

For both the ergative and the dative, the opposition is typically with the nominative, and as discussed above, a central semantic criterion in both is volitionality. The ergative is marked for volitionality as opposed to the nominative which is unmarked for volitionality. The dative is marked for non-volitionality, while the nominative is unmarked for volitionality. In addition, there do exist instances of ergative-dative alternations, as in this nonfinite construction found in the Lahori and Delhi dialects of Hindi/Urdu:

(45) HINDI (Butt and King, 2005)

a. nadya.ne zu ja-na hɛ
Nadya.F.Sg.ERG zoo.M.Sg.OBL go-Inf.M.Sg be.Pres.3.Sg.
Nadya wants to go to the zoo.

b. nadya.ko zu ja-na hɛ
Nadya.F.Sg.DAT zoo.M.Sg.OBL go-Inf.M.Sg be.Pres.3.Sg.
Nadya has to go to the zoo.

The two sentences qualify to be a minimal pair since they differ only in the case endings. Here is an example where the semantic content of case can be seen in full force. The interpretations have a distinctly modal flavor, which correlates to the marking of (non-)volitionality: the dative signals that the subject must do the action while the ergative signals that the subject wants to do the action.

The mapping of the dative in section 5.2 was to the *sentience* node which did not extend to *volition* and was interpreted as marked for non-volition [3]. The dative stands in contrast to the ergative, which carries the feature *volition*. But these are precisely the properties needed to give rise to the above modal interpretations. The

[2]This interpretation would seem to contradict the fact that one of the above verb types that takes dative subject is 'wanting/needing'. Yet, (Platts, 1884) gives examples of the predicate named in (Masica, 1991), '*cahiye*', such as: "Is necessary, is needful or requisite, is proper or right; it behooves; should or ought ... What is not wanting (to me), what do I not want, I want everything" Meanings such as these do not stand in outright contradiction to a non-volitional interpretation.

[3]Technically, since I am working with privative opposition, the dative is unmarked for [Volition], but from the perspective of the use of the dative, it is not a large step to go from a form unmarked for volitionality to using it to mark a lack of volitionality. This is a complication that space does not afford to treat in detail.

respective regions of the ergative and the dative provide semantic content in terms of agentivity properties. While these agentivity properties are normally relative to a verbal construction, this alternation give an instance where the semantics of case-marking gives rise to direct interpretation of those properties. The ergative case in (45a) contributes the semantics of the feature *volition* directly, giving rise to an interpretation of desiring on the part of the case-marked subject. The dative case in (45b), which is used in opposition to the nominative or the ergative, which are unmarked or marked for *volition* respectively, weakly implies that the case-marked subject does not possess *volition* with respect to the event. Since the construction states that the subject will perform the action in any case, the interpretation of obligation arises is licensed.

Finally, it should also be noted that while wanting, as exemplified in (45a), is an active state, being obligated is affected state, one that is imposed on the obligated party. Here, too, the difference between the ergative's location on the *Total Persistence* branch and the dative's location on the *Qualitative Persistence (Beginning)* branch is significant, although less conspicuous in the case of modal interpretations as opposed to straight transitive clauses.

What is important to note is that the mappings of the dative and the ergative resultant from their more canonical uses provide the necessary features for less canonical uses. Clearly, many details remain to fully explain this alternation and the path from agentivity properties to interpretation. However, the importance of the above analysis is that foundations for connecting the general semantics of the case markers with the interpretations of the alternation are provided without further stipulation by the agentivity lattice.

5.3.4 The Instrumental

The final case which can mark subjects of finite clauses is the instrumental. It too is quite versatile, marking both subjects and adjuncts in a variety of relations.

Passive Agent

As far as its use as a subject marker, it is principally used as marking a demoted (or passive) agent. The passive in Hindi is formed with the verb *ja*, 'go' in tandem with the main verb in the perfect.

(46) HINDI (Butt and King, 2005)

cor (pʊlɪs-se) pakṛ-a
thief.M.Sg.Nom police.Inst catch-Perf.M.Sg
gɛ-ya/ja-ta
go-Perf.M.Sg./go-Impf.M.Sg

The thief was caught by the police.

In contrast to many other languages, the passive agent retains many properties of the subject, and most generally occurs in head position (Masica, 1991, 356). The previous location of the instrumental case on the lower region of the *Total Persistence* branch of the lattice accords with the general function of the passive agent, as a source of instigation of the event, while properties such as *volition* are generally not at issue for passive agents.

Instrumental of Incapacity

An interesting usage of the instrumental case that partially resembles the passive agent use is the instrumental of incapacity. However, it is not fully similar in distribution with the passive agent since the instrumental of disability can occur with intransitives, as in (48).

(47) HINDI (Butt and King, 2005)

nadya-se yə ʊrdu-k-i cɪʈ̪^{h}i paṛ^{h}-i nahi
Nadya.F.Sg.Inst this Urdu.Gen-F.Sg letter.F.Sg.Nom read-Impf.F.Sg not

go-Impf.F.Sg

Nadya does not have the ability to read this Urdu letter.

(48) HINDI (Butt and King, 2005)

ʊs-se cal-a nahi ja-e-g-a
Pron.Inst walk-Perf.M.Sg not go-Fut.M.Sg

She/he can't possibly walk. (in the context of a broken leg)

This construction depends on both the verb *ja*, 'go' and the passive construction. In its literal rendering, the verbal complex is V + 'not' + 'go'.

The location of the instrumental on the agentivity lattice captures this modal meaning rather elegantly. In a neutral case, i.e., the nominative, a sentence such as (48), 'He does not go walk', could have two meanings from the perspective of the agentivity properties—one where the action was not performed from lack of volition, and one where the action was not performed from lack of the necessary capacity, e.g., motion, sentience. An argument possessing certain agentivity properties, when under negation, will possess the negation of the agentivity properties. Thus, the nominative, when negated, would be able to have $-$*volition*, $-$*sentience* and so forth. However, the instrumental, since its region does not extend to the nodes of the agentivity lattice containing *volition*, only allows for the possibility of $-$*instigation* and/or $-$*motion*, features which speak of an entity's physical

capacities. Thus the negation of the instrumental case is amenable to describing incapacity in a manner not available to the nominative, and a fortiori to the ergative.

Similarly to the Ergative/Dative alternation, there is much more to be said about the rather complicated semantics of this construction, but the purpose of this analysis is to connect the usage of this construction with the semantics of the instrumental at a very fundamental level.

Instrumental Causee

Finally, in the context of causatives, the instrumental case, *se*, enters into an alternation, with the dative/accusative case, *ko*. The causee of such constructions is marked according to the lexical class of the verb: the bulk of verb classes require *se* to mark the causee, however, ingestives ('eat', 'drink'), verbs of motion, perception ('see', 'hear'), but also 'write', require *ko* to mark the causee, and certain verbs allow alternation between the two. (All examples are from (Butt, 2003).)

(49) a. anjʊm-ne paoda kaṭ-a
Anjum.F.Erg plant.M.Nom cut-Perf.M.Sg
Anjum cut a/the plant.

b. anjʊm-ne saddaf-se/*ko paoda kaṭ-a-ya
Anjum.F.Erg Saddaf.F.Inst/Acc plant.M.Nom cut-Cause-Perf.M.Sg
Anjum had Saddaf cut a/the plant.

(50) a. saddaf b^{h}ag-i
Saddaf.F.Nom run-Perf.F.Sg
Saddaf ran.

b. anjʊm-ne saddaf-ko b^{h}ag-a-ya
Anjum.F.Erg Saddaf.F.Acc run-Caus-Perf.F.Sg
Anjum chased Saddaf away (made her run).

(51) a. saddaf-ne k^{h}ana k^{h}a-ya
Saddaf.F.Erg food.M.Nom eat-Perf.M.Sg
Saddaf ate food.

b. anjʊm-ne saddaf-ko/*se k^{h}ana k^{h}il-a-ya
Anjum.F.Erg Saddaf.F.Acc/Inst food.M.Nom eat-Caus-Perf.M.Sg
Anjum made Saddaf eat food. (gave Saddaf food to eat)

(52) a. saddaf-ne masala cak^h-a
Saddaf.F.Erg spice.M.Nom taste-Perf.M.Sg
Saddaf tasted the seasoning.

b. anjʊm-ne saddaf-ko masala cak^h-va-ya
Anjum.F.Erg Saddaf.F.Acc spice.M.Nom taste-Caus-Perf.M.Sg
Anjum had Saddaf taste the seasoning.

c. anjʊm-ne saddaf-se masala cak^h-va-ya
Anjum.F.Erg Saddaf.F.Inst spice.M.Nom taste-Caus-Perf.M.Sg
Anjum had the seasoning tasted by Saddaf.

This alternation is normally explained in terms of 'affectedness'—causees marked with *ko* are more 'affected' than those marked with *se*. (Butt, 2003) has shown that there is a relation between this affectedness and aspect, namely that construction where the 'affected' agent is marked by *ko* are telic, while those marked with *se* are atelic. This alternation dates back to at least classical Sanskrit, and grammarians of Sanskrit have noted that the alternation has the following distinction: if the sense is that the causee is caused to act by someone else's impulse, the dative is used while if the causee is only the agent through which the event is acted out, the instrumental is used (see discussion and references in (Butt, 2003)). In sum, the dative has an additional force which signals the reaction on the part of the causee to the event instigated by the causer, and hence a lack of instigation on the part of the causee. The instrumental is not so restricted.

For present purposes, it is necessary to note that there is a semantic correspondence between the case of the causee and this notion of affectedness. The region that *ko* maps onto is the branch of the lattice which lies atop *Qualitative Persistence (Beginning)*, while the part of the lattice which *se* maps onto lies atop *Total Persistence*, in other words, the positioning of the instrumental case does not dispose arguments marked with the instrumental case to be viewed as changing, or affected. In contrast, the dative case is unmarked for instigation, which is precisely what one would expect in order to capture that the dative is used for expressing reaction to events instigated by others.

In all the above alternations, the core semantics of the general uses of individual cases can be seen to affect the extended uses of these same cases. Thus, the methodology proposed at the beginning of this chapter has led to a powerful explanatory device. Why certain cases are more appropriate for certain alternations can be explained on the basis of specific semantic properties rather than appealing to intuitive or descriptive reasons.

5.4 Object Marking in Russian

The case-marking system in Russian has been more intensely studied by Western linguistics than has that of Hindi. Russian has a rich system of cases which provide additional testing ground for the agentivity lattice. For our purposes, it will be more interesting to examine the alternations in the object position. The standard case for

marking the direct object is, unsurprisingly, the accusative. However, there is a fair amount of fluctuation as well. Two of the more challenging alternations are between the accusative and the instrumental, and between the accusative and the genitive, to which I now turn.

5.4.1 The Genitive/Accusative Alternation in Russian

An example of the genitive/accusative alternation is shown in (53):

(53) RUSSIAN (Wierzbicka, 1981)

a. Ivan ždet tramvaj
Ivan is-waiting-for tram.ACC
Ivan is waiting for the/a.certain tram.

b. Ivan ždet tramvaj-a
Ivan is-waiting-for tram.GEN
Ivan is waiting for a tram.

Prima facie, (53) appears to mark (in)definiteness, and has been claimed as a form of Differential Object Marking based on definiteness (Naess, 2004). I claim that this is only true indirectly: it is a result of the interaction between the definiteness of the NP and agency entailments on the verb.

Aside from this alternation, the more frequent use of the governed genitive is to express lack of existence. For instance, "when an existential predicate is negated, the entity whose presence is denied is expressed in the genitive" (Timberlake, 2004). Correlating this fact with the agentivity lattice, the governed genitive is used when existence of the object is not entailed, and therefore the genitive is associated with the lowest node of the lattice, *Total Non-Persistence*. In contrast, the accusative case marks objects of transitive clauses, and since these objects are generally affected in some way, they must be in existence before the event. Therefore, the region of the accusative covers at least the node *Existential Persistence (Beginning)*.

This alternation occurs with a small number of verbs, and in fact is limited to three classes: (i) those of potential contact, such as 'seek', 'await', 'demand', 'want' (ii) those of tenuous contact, such as 'reach', 'achieve', 'touch on', and (iii) those of avoidance where "possible contact is avoided", such as 'fear', 'avoid', 'be wary of'. (Timberlake, 2004). Classes i) and iii) are recognizably modal[4]. To want or fear something does not require that thing actually exists. When turning to model these verbs in terms of the above agentivity features, it is safe conclusion that neither *Existential Persistence(Beginning)* nor *Existential Persistence(End)* are entailed.

[4]Their equivalents in French, when used in a matrix clause, demand that the verb in the subordinate clause be put in the subjunctive, designating possibility, non-actuality or general irrealis.

It is important to note that the classes of verbs (i) and (iii), and less obviously (ii), coincide with what are termed "opacity-creating verbs". These verbs are most famous for being ambiguous between wide- and narrow-scope readings, as in this example:

(54) a. Peter wants to marry a Swede—although he has never met one.
b. Peter wants to marry a Swede—although she isn't willing.

In the narrow-scope usage, (54a), the Swede named is equivalent to a non-specific Swede—Peter will marry any Swede. In (54a), the wide-scope usage, there is a specific Swede to which reference is made.

While such verbs entail various agentivity properties in their subjects, they have no entailments for their objects. Note that with these verbs, the genitive marks the narrow-scope interpretation. Recalling that (Ioup, 1977) demonstrated that referring arguments only have wide-scope interpretations, clearly an individuated (referring) object is not consistent with the semantics of the genitive, but instead forces a wide-scope interpretation, which *is* consistent with the semantics of the accusative.

The proposed framework captures this quite naturally. NPs which are specific or higher on the definiteness hierarchy, hence *referring*, entail that the entity exists. Upon combining with the agentivity properties entailed by the predicate, the argument must then minimally possess the feature *existential persistence (beginning)*, which locates the object in the region of the accusative case. If the argument is non-specific (non-referring), it can remain on the lowest node of the lattice, since independent existence is not entailed—but then this locates the object in the region of the genitive case. Therefore, definiteness is the crucial factor underlying this alternation, but it is mediated by agency properties, which in turn explains the alternation's limited distribution.

Returning to the product of the agentivity and Aissen lattices of (4.3.1), it can be seen that this analysis can be read directly from the lattice. If the individual instantiating the argument of the predicate is referring, and thus entailing *existential persistence (beginning)*, there is simply no location within the region of the genitive, the *Total Non-Persistence* node, where the argument can be located, but is necessarily in the region of the accusative.

However, this alternation from the genitive back to the accusative is a relatively recent phenomena, and is more of a matter of degree than absolute rule. Specifically, the alternation is sensitive to the strength of modality involved in the predicate. (Timberlake, 2004) notes that 'seek, search for' is marked by the genitive only 30% of the time, while 'demand' weighs in at 90%, and 'wait' lies in the middle. The use of the accusative with 'fear' is limited to uniquely referring individuals. Thus, the degree of definiteness required to trigger the alternation is relative to the predicate, specifically, the strength of its modal force.

5.4.2 The Accusative/Dative Alternation in Russian

The instrumental case in Russian is used in a variety of contexts, one of which involves an alternation with the accusative.

(55) RUSSIAN (Malchukov, 2005)

a. On kruitil rulj
he rotate wheel-ACC

He rotated the wheel (consciously).

b. On kruitil rulj-om
he rotate wheel-INSTR

He rotated the wheel (unconsciously).

The claim in (Malchukov, 2005) is that the alternation which occurs formally on the object results in an interpretation of non-volitionality on the subject. While this is certainly correct, we shall extend this to show that it is mitigated by a change in aspectual category which in turn has ramifications on the sorts of agentivity that are interpretable with respect to the situation depicted.

The essence of the analysis is that the shift to the instrumental case involves a coercion into a non-dynamic activity, similar to 'stand' or other positional verbs. It will be recalled that the mapping of the instrumental case on the agentivity lattice is upon the branch of *Total Persistence*, that is, nominals marked with the instrumental case should be unchanging with respect to the event. Several qualities of instrumental marking support this, notably the ease with which they are able to ascend to subjecthood, wherein typical agentive subjects do not go through any change of state, in contradistinction to patientive objects. The object of the predicate 'rotate' in (55) would normally be affected, i.e., be located on the *Qualitative Persistence (Beginning)* branch of the lattice, since it has been moved. The choice of the instrumental case overwrites this value, locating the object argument on the *Total Persistence* branch. But then, one is left with a non-dynamic situation, since neither the subject nor the object undergoes a change in qualitative persistence. The instrumental in Russian assumes several roles which contribute to the determination of aspect, which support this conclusion. For instance, the instrumental is used to designate temporary states, as in "stal sud'ej" 'became a judge' (Jakobson, 1984, 80). (See details in (Timberlake, 2004).)

Further evidence comes from the aspectual tests given in (Smith, 1991, p.317) for Russian aspect, who discusses how dynamic and non-dynamic event types are realized in Russian. Dynamic situations are able to combine with the adverbials *ostorožno* ("carefully") or *vnimatel'no* ("attentively"). These adverbial modifiers clearly contradict the gloss given in 55 of "consciously/unconsciously", since one cannot rotate a wheel attentively and simultaneously unconsciously. (See also the discussion concerning states versus dynamic situations in (Comrie, 1976).)

Additionally, (Smith, 1991) notes that non-dynamic situations cannot be put into the imperfective. According to an informant, the use of the instrumental case in this context with the imperfective is interpretable, but dispreferred.

Thus, rather than positing that the accusative/instrumental alternation in the object has a direct effect on the agentivity of the subject, it is better seen as an alternation which effects the aspect of the verb, from dynamic to non-dynamic. This, in turn, produces a predicate which is incompatible with agentive qualities such as *volitionality*.

To explore the interconnections between case and aspect, while certainly a fascinating subject, falls beyond the scope of the project, yet, it is worth mentioning that the link between participants and aspect has been a blossoming topic in event semantics over the last several years, and the increased knowledge about the specific factor of participation detailed in this approach would be a fruitful area for further research.

5.5 Case Attraction in Ancient Greek

I now turn to a more involved case phenomenon affecting the realization of relative clauses. Above, the semantic content of agentivity features was seen to directly influence which case surfaced as subject or object. These semantic factors will also be shown to affect case agreement. Certain languages manifest 'case attraction', where the case of the relative pronoun agrees with the case of its antecedent rather than retaining the case that would be assigned by the verb. I will examine how this phenomenon is manifested in Ancient Greek

Case assigned to lexical items displays their syntactic function within the clause. Case assignment can also be subject to agreement constraints, e.g., an adjective modifying a noun must share the noun's case, if both are marked for case. When the agreement constraints are discordant with the functional role of case assignment, case conflict occurs. In general, relative pronouns in Ancient Greek agree with the case assigned by its syntactic function within its own clause, i.e., agreement with the antecedent is forsaken and the relative pronoun stands in the case necessitated by the phrase containing it. Yet, in Ancient Greek as well as certain other languages (Anglo-Saxon, Old High German, Latin), in certain contexts this conflict is resolved in the opposite fashion: agreement of the relative pronoun and the antecedent is prioritized and so the case of the pronoun agrees with the nominal, or the nominal abandons its assigned case in order to agree with the relative pronoun. Traditional grammarians attribute this alternation to the influence of other items in the clause, hence the modified lexical item is 'attracted' from its original case into another one as a result of this influence, as exemplified in (56) and (57)[5].

[5]The examples of case attraction phenomena were gathered from grammars (Cooper, 1998;

(56) ANCIENT GREEK: Xenophon, Anabasis, 1.7.3

andres axioi tēs eleutherías hês
Men.NOM worthy.NOM the.GEN freedom.GEN which.GEN
kektēsthe
possess.2nd.PL

Men worthy of-the freedom which you possess.

(57) ANCIENT GREEK: Plato, Apology, 29b

prò tôn kakôn hôn oîda
instead the.GEN evils.GEN which.GEN know.1.Sg

Instead of the evils which I know.

In other syntactic environments, the relative pronoun would stand in the accusative, *(hén)* for (56) and *há* in (57), designating that it was the direct object of the verb[6]. I now review the phenomena for which any theory purporting to treat attraction in Greek needs to give an account.

Attraction

In Greek, attraction of the relative pronoun to the case of its antecedent is both subject to conditions and optional. First, attraction canonically occurs when the relative pronoun is in the accusative and the antecedent is in the dative or genitive, as in (56). Indeed, there are examples of attraction where the relative pronoun stands in the nominative or the dative, but these are less frequent. When these conditions are met, it is more frequent that the relative pronoun is attracted than not. Traditional grammarians speculate that case attraction occurs when there is a strong connection in meaning between the antecedent and the relative clause (Smyth, 1920, 2524), and further, that a lack of attraction tends to add emphasis (Cooper, 1998, 51.10.2).

Proper attraction does not seem to occur with non-restrictive relative clauses. Under most analyses, non-restrictive relative clauses are taken to modify entire NPs rather than individual nouns. Accordingly, the interaction between the noun and the relative pronoun is not a local one, and the traditional grammarians' intuition that there is a closer link between a noun and an attracted pronoun than there is when attraction does not occur would appear to be vindicated if we suppose that attraction only occurs with restrictive relative clauses.

Kühner and Gerth, 1966; Smyth, 1920) and cross-checked against a corpus of the relative pronoun in Xenophon's Anabasis (Tufts).

[6] An interesting Early Modern English example of case infidelity is provided by Milton, cited in (Smyth, 1920, 2522), "Vengeance is his, or whose he sole appoints", where 'whose' appears rather than 'of whom'.

Inverse Attraction

Attraction goes in both directions in Ancient Greek. In different circumstances, it is not the relative pronoun which is provoked into another case, but in fact the antecedent which shifts case to accord with the case of the relative pronoun. Since the roles are reversed, this variety of attraction is known as 'inverse attraction'. Here, the antecedent, if not attracted, would stand most frequently in the accusative (but also the nominative can undergo inverse attraction, too). Inverse attraction often occurs when the antecedent is distanced from its governing verb in a focus position at the beginning of the construction.

(58) ANCIENT GREEK : Sophocles, Oedipus Rex, 449

ton andra touton hon palai xēteis houtos
the man.NOM this.ACC who.ACC long-ago search-2ndthis one.NOM
estin enthade
is here

The man who you long ago searched is here.

The demonstrative phrase in (58) (*tòn ándra toûton*), if unaltered, would have stood in the nominative (*tò ándron toûto*).

5.5.1 Distribution of Case Attraction

The languages which have been the source of discussion for case attraction provide little in the way of typological variation for the basic phenomena. If a language exhibits proper case attraction, it exhibits inverse attraction as well, as is the case in Latin, Greek, and Old High German[7]. In this section, I will concentrate on describing the exact data that needs to be accounted for.

Most attempts to explain case attraction have failed on one or more of the above-named phenomena (e.g., (Pittner, 1995)[8]) or have entirely ignored the complication of case attraction (Aissen, 1972; Adams, 1972). In a recent effort to match case attraction data to a version of Principles and Parameters theory, (Bianchi, 2000) actually makes a substantial amount of progress, although at the cost of proposing increasingly rococo underlying structures. Yet still, Bianchi's account is at best partial. While the general phenomena of attraction and inverse attraction are ostensibly accounted for, the rigid framework assumed does not provide a sound manner

[7] A notable exception is Anglo-Saxon, where one does not find inverse attraction. But this arises for entirely different reasons—the relative particle 'þe' is indeclinable, so it does not have a case with which to attract the nominal. (In fact, proper attraction affects the demonstrative pronoun that optionally appears next to the relative particle.)

[8] Her study on case attraction in Old High German dismisses inverse attraction as merely left-dislocation, which does not solve the problem.

of capturing the fact that attraction often does not occur. Further, it appears case attraction is sensitive to which cases are involved, a fact that is completely ignored in the study. Finally, the analysis only accounts for inverse attraction whereby the nominal in the accusative is affected; however, inverse attraction also affects nominals in the nominative in Ancient Greek, as in (58), which would be much more difficult to explain under her proposed analysis.

The first notion that must be cleared up is exactly what sorts of attractions are possible. Attraction of the relative pronoun most often occurs when the relative pronoun is in the accusative and the antecedent is in the dative or genitive, as is in the example above, repeated here for convenience as (59).

(59) ANCIENT GREEK : Xenophon, Anabasis, 1.7.3

andres axioi tēs eleutherias hês
Men.NOM worthy.NOM of-the freedom.GEN which.GEN
kektêsthe
possess.3rd.PL

Men worthy of the freedom which they possess.

The relative pronoun, had its case marked its relation to the main verb of the subordinate clause, would have stood in the accusative, designating the internal object of the thing possessed. The nominative and dative are less frequently attracted, for reasons we will soon see, but they too submit occasionally to attraction. For clarity, I will refer to this type of attraction as proper attraction.

Inverse attraction also affects the accusative most frequently, which is then coerced into a genitive or dative. However, it is possible with the nominative as well, which can be realized as an accusative. I summarize the possible combinations and attested attractions in table 5.2 below.

Table 5.2: Distribution of Case Attraction

antecedent	**relative pronoun**	**output pair**	**antecedent**	**relative pronoun**	**output pair**
nominative	nominative	no change	nominative	dative	no change attested
accusative	nominative	no change attested	accusative	dative	no change attested
dative	nominative	(dat, dat)*	dative	dative	no change
genitive	nominative	(gen, gen)*	genitive	dative	(gen, gen)*
nominative	accusative	(acc, acc)	nominative	genitive	(gen, gen)
accusative	accusative	no change	accusative	genitive	(gen, gen)
dative	accusative	(dat, dat)	dative	genitive	(gen, gen)*
genitive	accusative	(gen, gen)	genitive	genitive	no change

What is important to note is the types of attraction that are not found. One does *not* see a relative pronoun in the nominative attracting an antecedent in the genitive into the nominative. Further, case attraction does not coincide with the 'inherent case'

and ‘structural case’ distinction (Harbert, 1990). One might suppose that attraction is only instigated by antecedents or relative pronouns with inherent case (dative or genitive), and thus cannot be initiated by those with structural case (nominative or accusative). This will indeed accord with the data concerning proper attraction, but inverse attraction is permitted to be initiated by an accusative relative pronoun which influences a nominative antecedent, as in (60).

(60) ANCIENT GREEK : Isokrates 6. 48

politeian hoian einai xrē para monois
Constitution.ACC of-such-a-sort.ACC to-be.INF necessary for alone
êmin estin
us.DAT is

We alone have a constitution such as it ought to be.

This can be explained systematically if a case hierarchy which orders the cases is adopted, as was done in (Harbert, 1990):

nominative $<$ accusative $<$ dative $<$ genitive

It is important to note that this hierarchy can be adduced from the table of the distribution of case attraction. A comparison among the input/output pairs in Table 5.2 makes it evident that attraction only occurs in Ancient Greek when the relative pronoun or antecedent can take a case that is located higher up on the case hierarchy. In addition, it is identical to so-called markedness hierarchies of case found in the literature (cf. (Woolford, 2001)).

This hierarchy has been used by itself to explain case attraction (Harbert, 1990). Yet, there are two fundamental issues at stake when using this case hierarchy as an explanatory device for case attraction. First, claiming that a certain case is more marked than another leaves open the question of what actually underlies this markedness. In other words, what are the principles upon which the hierarchy is founded? Second, if it were only a matter of blindly applying the hierarchy to clauses conjoined by a relative pronoun, the disparity between the frequency of attraction from the accusative and from the nominative and dative is left unexplained. The first sort of attraction is the most frequent, indeed regular, while the latter two are rather rare. A more thorough investigation of the factors involved shows that the case hierarchy is actually part of a larger picture.

Agentivity and Prominence

Indeed, there appears to be a more functional reason for the occurrence of case attraction rather than just “degrees of obliqueness”. An examination of the argument structures of the examples showed that the pronouns that underwent proper

attraction referred to arguments which would have been quite low in agentivity. For instance, often the relative pronoun referred to the object of verbs such as 'legō' ('to say') or 'exō' ('to have'), which would not qualify as 'agents'. In fact, the level of agentivity of the attracted item appears to be a major condition for the possibility of undergoing attraction. No pronoun which referred to an accusative argument that would have been high in agentivity was found to undergo proper attraction.

Attraction of nominative and dative adheres to this same pattern. The relative pronoun referring to an argument in the nominative is attracted only when the argument is the subject of a passive or middle verb, where the grammatical subject of the verb is not an agent, as in (60).

Attraction from the dative as well only seems to occur when the argument represented by the pronoun refers to the theme or beneficiary, e.g., the verb 'bontheō' ('to help') takes an understood dative referring to the beneficiary. Similarly, attraction affects the direct object of the verb 'entetúxeka' ('meet with') in (61).

(61) ANCIENT GREEK : Plato, Republic 531e

olìgoi ôn egó entetúxeka
few.NOM who.GEN I.Nom meet.PERF

A few of those whom I have met with.

It can be adduced that proper attraction is contingent on the relative pronoun representing an argument low in agentivity. So it is with inverse attraction which was only observed with subjects that are low in agentivity: subjects of passive constructions, subjects of the "to be" copula, or unaccusatives.

Intuitively, this is what one would expect. It has often been remarked (cf. (Aissen, 1999) and references there) that the subject of a sentence is the least marked and most prominent argument. Conversely, the object, typically associated with arguments low in agentivity, is more marked yet less prominent. So it stands to reason that case attraction, which results in a case-marking which ranks higher on the case hierarchy, would most likely affect the class of arguments that is most apt to be marked, those low in agentivity.

In addition to this characteristic of low agentivity, all the instances of attraction share another characterization: all the attracted items are in positions which indicate high discourse prominence—either (topicalized) subjects or heads of relative clauses. Therefore, there is a generalization to be made here: attracted items are low in agentivity and high in discourse prominence. This gives cause to suspect that case attraction has a functional explanation—these two competing factors, low agentivity and high prominence, are disharmonious, and set the conditions for attraction to occur. After having mapped the cases of Ancient Greek to the lattice, I will return to this generalization and put it into a more precise formulation.

In what follows, I show why case attraction follows the ordering of the case hierarchy. It turns out that this hierarchy can be derived from the different regions the cases of Ancient Greek occupy on the agentivity lattice. That is, the case hierarchy is ordered by increasing levels of agentivity. Once this is shown, then one can also show that an element that is high in discourse prominence is more harmoniously realized by a case that is high in agentivity than by a case that is low in agentivity, thus giving an account for the origin and distribution of case attraction.

5.5.2 Mapping the Cases of Ancient Greek

The general methodological principle I have been following is that verbs have certain entailments of agency properties, cases are selected by verbs, and so the agency properties entailed by the verb should be represented in the semantics of a case.

As a preliminary to determining each cases' agentivity features on the lattice, it is instructive to refer to the study of (Hessinger, 1974). This study provides frequency counts of the different cases marking 'personal nouns' (personal pronouns, proper names and human-referring common nouns) versus non-personal nouns, as shown in table 5.3 (reproduced from (Hessinger, 1974)). The distribution of personal nouns with cases demonstrates each cases' propensity towards taking agentive arguments, since in general, arguments that are high in agentivity will be instantiated by personal nouns.

Table 5.3: The Frequencies of Greek Cases with Personal and Non-Personal Nouns

Case Ending	Personal	Non-Personal
Nominative	**71%**	**29%**
Accusative (Total)	**30%**	**70%**
Accusative (with Preposition)	19%	81%
Accusative (without Preposition)	34%	66%
Dative (Total)	**50%**	**50%**
Dative (with Preposition)	18%	82%
Dative (without Preposition)	66%	34%
Genitive (Total)	**46%**	**54%**
Genitive (with Preposition)	35%	65%
Genitive (without Preposition)	50%	50%

The interesting category for us is 'without preposition', which will include the instances of a case marking the object argument of a verb. These frequencies give a preliminary explanation of the frequencies of case attraction—the accusative is the most frequently attracted and the accusative without preposition is the case which is most frequently non-personal, i.e., inanimate and thereby low in agentivity.

The nominative and the accusative are in inverse proportion with respect to the percentage of personal nouns found. As would be expected, subjects tend to be agentive and therefore nominative arguments are more frequently realized by personal nouns, and the contrary for the accusative. As for the dative, the total usage is split evenly between personal and non-personal nouns. Yet, when the dative appears without a preposition, i.e., when it is governed by a predicate, it is more often a personal noun, which accords with where the dative has been located on the lattice so far., viz. *+sentience*. While there are a substantial number of non-personal tokens of the dative, it must be taken into account that the dative in Ancient Greek is actually a syncretic case, having absorbed the instrumental and locative functions as well—as will be discussed below. This study is not particularly revealing for our purposes with respect to the genitive, primarily since the "without Preposition" figures include both uses as a verbal argument and adnominal uses.

Turning to mapping the cases of Ancient Greek on the lattice, the accusative and the dative in Ancient Greek accord with the previous analyses: the accusative is the marker of the direct object par excellence, while the dative marks the indirect object, in its central usage "denotes that *to* or *for* which something is done" (Smyth, 1920). The accusative, then, is mapped to the region covering the nodes *Qualitative Persistence (Beginning)* and *Existential Persistence (Beginning)*, in keeping with the analysis of section 4.2. The dative appears as the object of such verbs as 'benefit', 'help', 'injure', 'meet', 'obey', 'pardon', 'trust'. Notice that in the usual use of these verbs, the object will be sentient and affected by the event, as we should expect by now. Therefore, the mapping of the core use of the dative is as in section 5.2, the *sentience* node within the *Qualitative Persistence (Beginning)* branch.

The genitive requires more detailed comments. First, the genitive in its most central usage marks possession, the possessor being put into the genitive case. In contrast to the accusative and dative, the genitive's main usage is adnominal, i.e., its head is a nominal, not a verb. As is typologically usual, the genitive does duty both for the notion of possession and to express partitivity. While the connection between the two merits study, since I am interested in how the genitive relates to agentivity properties, I leave aside the partitive usages.

Two further uses of the genitive reveal its propensity to mark arguments with high levels of agentivity. First, in most predicates where the object denotes the cause of the event, the object is put into the genitive. Verbs of emotion and perception (e.g., 'to hear') demonstrate this. Second, the passive construction in Ancient Greek puts the demoted agent in the genitive case, proceeded by the preposition *hupó*. Thus, when appearing as a verbal argument, excepting partitive uses, the genitive is highly agentive.

Finally, in terms of persistence, the adnominal genitive primarily denotes static relations, in which neither the head noun nor the genitive-marked noun undergo any change, e.g., inalienable possession, relations of source, of measure, or of quality,

ablative uses. When governed by a verb, the genitive also shows a propensity towards total persistence. For instance, as mentioned, 'to hear' takes its object in the genitive. The object heard will persist throughout the hearing event, while the hearer will be affected, and similarly, for verbs of emotion, where the causal entity is in the genitive. One does not see the genitive marking arguments that are affected or undergo change, unless it falls in with the partitive usage, e.g., 'to touch'[9]. Therefore, the genitive can be mapped, in its possessive uses to the node of the agentivity lattice containing the combination *Sentient* and *Total Persistence* while its agentive uses are mapped to the node containing the combination *Sentient*, *Instigation* and *Total Persistence*.

So far the nominative has been excluded from the discussion. It must be recalled that the nominative serves to mark subjects. Any attempt to associate the nominative with stable agentivity properties would be vitiated by the existence of nominative subjects of passive constructions. While the nominative does end up most frequently marking agentive arguments, this is only because subjects tend to be agentive. Patients are equally able to take the nominative. Since the nominative can mark any level of agentivity, which is *not* true for the other cases, it is clear that the nominative is not associated with any particular region of the lattice, in other terms, the nominative does not mark agentivity.

Functional Overlap of the Dative and the Genitive

Although the above has argued that the genitive case is to be the highest ranked among the cases in terms of agentivity properties, it is not the sole case to lay claim to agentive uses, since the dative also has a usage termed by traditional grammars as the 'dative of agent'.

There is a degree of overlap in the functions of the genitive and the dative, both can be used to express possession and agency; however, there are distinctions between their usages. With possession, in both types, the possessor is marked, but the possession marked by the genitive tends towards inalienable possession while possession marked by the dative tends towards alienable possession. "If the subject is a thing and the possessor in the genitive a person, a relation of property ownership is recognized. But such a recognition often bears an additional implication. That is that the owner is such that he may properly and naturally be said to possess such property. Hence these statements often bear strongly on the nature and character of the owner" (Cooper, 1998). Elsewhere it is claimed that "the dative of the possessor denotes that something is at the disposal of a person or has fallen to his share

[9]Note that this situation is the inverse of the dative-experiencer construction examined above in terms of markedness. In dative-experiencer constructions, the subject is more marked, and the object is generally unmarked (nominative). In Ancient Greek, the experiencer is unmarked, but the cause is marked. This extends to other verb classes which have a typological tendency towards non-canonical subject marking, such as 'want', 'need', 'lack', 'eat'.

temporarily... The dative answers the question *what is it that he has?*, the genitive answers the question *who is it that has something?*" (Smyth, 1920, 1480). The important point here is that the sense of inalienable possession is not only restricted to sentient beings, but also is unchanging, while alienable possession is potentially dynamic, e.g., one has acquired something.

There is a similar division between the genitive of agent and the dative of agent. Both supply the agent which has dropped out by way of passivization, but the dative of agent is the more restricted of the two. The dative essentially only appears when the verb is in the perfect or pluperfect tense, when the agent is animate, and even then it is only used when the subject of the verb is impersonal. This usage, although named the 'dative of agent', has much in common with the dative's more principal use of marking beneficiaries, i.e., "the person whose interest an action is done is put in the dative" ((Smyth, 1920, 1488). Therefore, the dative of agent does not diverge from the region of the lattice ascribed to the core usage of the dative. However, when the agent is a thing, the dative is used whether the subject is personal or impersonal, a usage which corresponds to the instrumental use of the dative. In contrast, the genitive of agent has no tense restrictions and is used when the subject of the verb is personal, although it is rarely used when the subject is personal. Tellingly, the genitive can exceptionally mark inanimate agents, but then, the agent undergoes personification. Similarly, the dative of agent can be exceptionally used when the subject is not personal, but this has the metaphorical effect of treating the animate subject as a thing in order to express scorn (Smyth, 1920, 1492). Recall that the dative is syncretic with respect to the instrumental case, which was analyzed above as associated with the lower nodes of the *Total Persistence* branch of the agentivity lattice. This region of the lattice, which falls below *sentience*, aligns with the usages of the dative of agent discussed above.

In summary, the following mappings have been established, corresponding to figure 5.4:

Genitive:
Possessive uses: *Sentient* and *Total Persistence*
Agentive uses: *Sentient*, *Instigation* and *Total Persistence*

Dative:
Possessive uses: *Sentient* and *Qualitative Persistence (Beginning)*
Agentive uses: *Instigation* and *Total Persistence*

Accusative:
Qualitative Persistence (Beginning) or *Existential Persistence (Beginning)*

It should not come as a surprise that the arguments marked by the genitive or dative are higher in agentivity than the others, for this is in line with what we know about these cases on a typological level. First, in ergative languages, the genitive and the instrumental (here represented by the dative) are prime candidates to be recruited

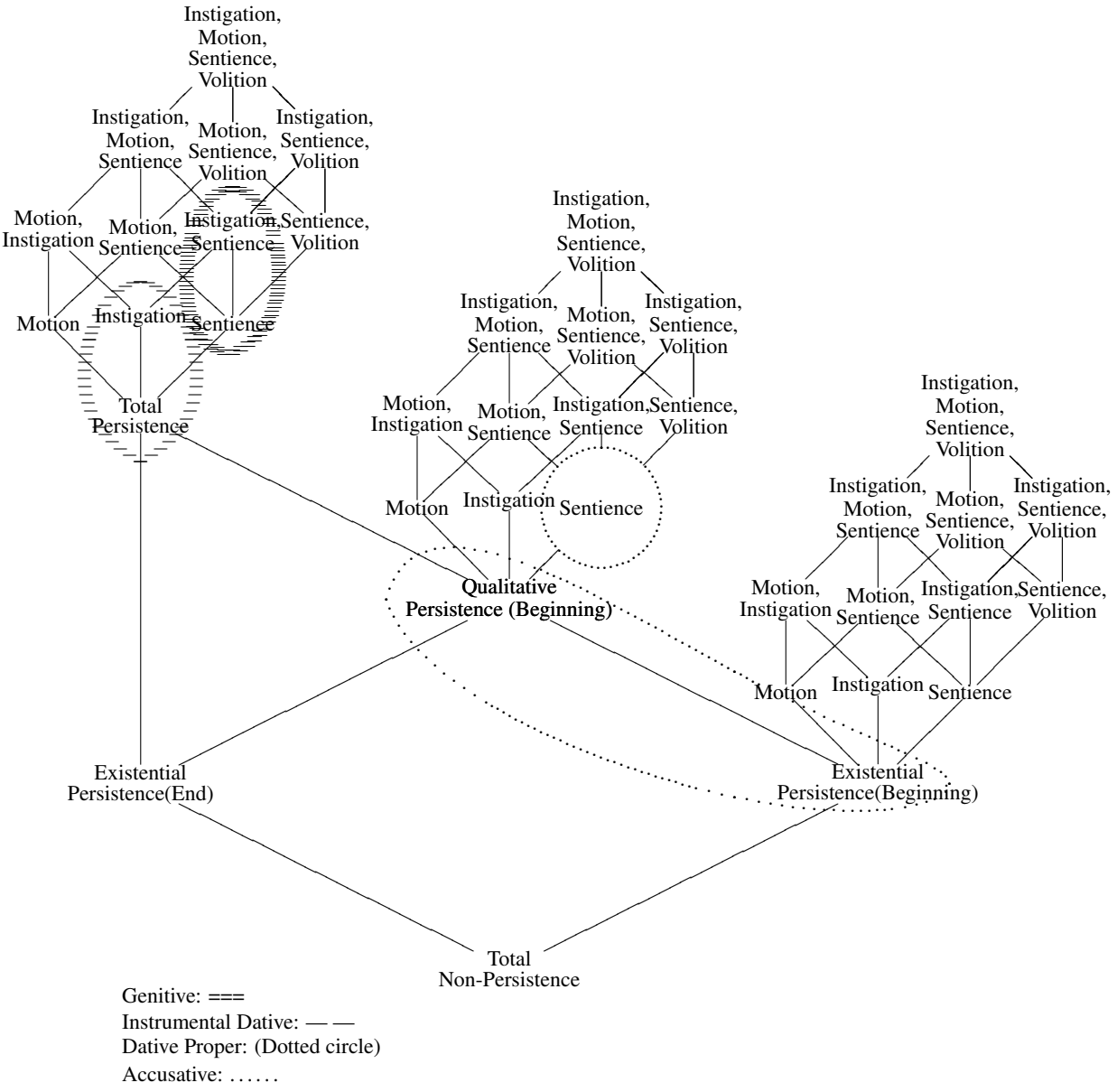


Figure 5.4: Cases of Ancient Greek

as markers of the ergative case. Also, it is frequent that the ablative case marker, a function which is subsumed by the genitive in Ancient Greek, develops into a causal marker, as is the regular circumstance in Australian languages (Dixon, 2002, p. 174). The similarities in agentivity properties make such grammaticalizations seem very natural indeed. Undoubtedly, the extension from genitive to ergative or ablative to cause is partially due to metaphorical extension and semantic bleaching. Yet, these agentivity properties can be seen as conditions on what makes a

good metaphorical extension. Secondly, since patients are assumed to be lowest in agentivity properties, and the accusative generally marks proto-typical patients in Ancient Greek, then any other case-marker will necessarily be higher in agentivity.

5.5.3 Deriving the Case Hierarchy

Since the lattice is ordered by inclusion, then the cases are also ordered by inclusion:

$$nominative \subset accusative \subset dative \subset genitive$$

But then, this translates directly into the case hierarchy:

$$nominative < accusative < dative < genitive$$

This result is independent of claims that some cases are inherently more marked or more oblique than others. That is, this case hierarchy is independently motivated as opposed to the case hierarchy appealed to in (Harbert, 1990).

Now, applying this case hierarchy to the problem of case attraction does not instantly yield the solution. First, there does not seem to be any one-to-one correspondence between a given lexical item's individual location on the agentivity lattice and attraction effects. Take one of the examples of inverse attraction, repeated as (62) for convenience.

(62) ANCIENT GREEK : Isokrates 6. 48

politeian hoian einai xrē para monois
Constitution.ACC of-such-a-sort.ACC to-be.INF necessary for alone
êmin estin
us.DAT is

We alone have a constitution such as it ought to be.

Recall that 'politean' ('constitution') would normally stand in the nominative since it is the subject of 'emin estin' ('have'— literally 'to be to us'). The pronoun 'hoian' ('of-such-a-sort') is assigned accusative case by the infinitive 'einai' ('to be'). It does not appear that 'of-such-a-sort', i.e., the instantiation of the entailments of 'to be', is any more agentive than 'constitution', the instantiation of the argument of 'to be (to us)'. In fact, the opposite could be argued, since 'to be to us/have' entails existence, while 'it is necessary to be' does not. So it does not seem that attraction is decided on an individual lexical item's agentivity value, but rather the value associated with the class of nominals that fall under its case. Thus, the cases' labels in the case hierarchy denote a class, and the prominence hierarchy is a relation on theses classes.

5.5.4 The Harmonic Alignment of Case

The generalization about case attraction proposed above stated that there was disharmony between high prominence in discourse and low agentivity and that this disharmony triggered case attraction. To render the competition between low agentivity and discourse prominence more precise, I adopt the notion of "harmonic alignment", which is used widely the framework of Optimality Theory (OT) (Prince and Smolensky, 1993). The essential idea is that a prominent element in one category combines most harmoniously with a prominent element in another category[10]. For example, subjects are more prominent than objects, and agents are more prominent than patients, so subjects will combine most felicitously with agents. Schematically, this can be represented as follows (from (Aissen, 1999)):

Prominence Scales:
Subject>Non-Subject
Agent>Patient

Harmonic Alignment:
Subject/Agent>Subject/Patient
Non-Subject/Patient>Non-Subject/Agent

Agentivity and discourse prominence can be put in terms of prominence scales as well, as represented below, following (Aissen, 1999):

Agent>Patient
X>x (where 'X' designates an element high in discourse prominence)

By harmonic alignment, we can derive:

Agent/X>Patient/X
Patient/x>Agent/x

Case attraction relates to the first of the two harmonic alignment scales, occurring in contexts where the relative pronoun or subject would be marked as "Patient/X". Since this situation is disharmonious, it is sought to be avoided. This is the motivation for case attraction to occur in the first place. Since the case hierarchy has been established as an agentivity hierarchy, this harmonic alignment scale can be expanded into the following:

[10]The full definition is given in (McCarthy, 2002, p.21) : Harmonic Alignment :
"Given a binary dimension D1 with a scale X>Y and another dimension D2 with a scale a>b>>z, the harmonic alignment of D1 and D2 is the following pair of harmony scales:

H_x = X/a$\succ$X/b$\succ$...$\succ$X/z
H_y = Y/z$\succ$...$\succ$Y/b$\succ$Y/a

The constraint alignment is the following pair of constraint hierarchies:

C_x = *X/z>> ... >>*X/b>>*X/a
C_y = *Y/a>>*Y/b>> ... >>*Y/z"

Genitive/X>Dative/X>Accusative/X>Nominative/X

This harmonic scale says that it if an element is high in discourse prominence, then it is more harmonious to be in the genitive case than in the dative case and so on.

A general solution to the case attraction puzzle for Ancient Greek can now be sketched. The status of being high in discourse prominence and low in agentivity is disharmonious and is to be avoided. It is assumed that there are two constraints that are in competition for case assignment of relative pronouns, such as the following (see a slightly different take on these constraints in (Fanselow et al., 1999)):

> FAITH-CASE: lexical items retain the case assigned to them in INPUT (i.e., their structurally assigned case)
>
> AGREE-CASE-Rel.Pronoun-Antecedent: Relative pronouns and their nominal antecedents agree in case

In a framework such as OT, these two constraints will be ranked in some order. If FAITH-CASE is more important than AGREE-CASE, the case of the relative pronoun will always display the case of its syntactic function within the relative clause[11]. In Ancient Greek, these two constraints are assumed to be unordered, so that whether the relative pronoun agrees with the antecedent or not is dependent on other factors, and in all cases at least one of the constraints is violated. These other factors are exactly the case hierarchy in harmonic alignment with the discourse prominence scale. Thus, if an item is disharmonious in that it is low in agentivity and high in discourse prominence, it seeks to become more harmonious by adopting a case with a higher agentivity level, made available by the antecedent in the instance of proper attraction, yet at the cost of violating FAITH-CASE. If the item cannot become more harmonious by agreeing with the case of the antecedent (or relative pronoun for inverse attraction), then it retains its case, since a shift in case would lead to greater disharmony. In this latter scenario, AGREE-CASE is violated, but FAITH-CASE is not.

There are several important advantages of this solution. First, proper attraction and inverse attraction are explained by the same mechanism, and the similarity felt to exist between the two phenomena is justified. Second, there is a functional explanation underlying case attraction which makes this solution more satisfactory than merely stating that cases prefer to agree with more oblique cases if possible, which one is forced to conclude if one relies solely upon the case hierarchy as an explanation. Further, this functional explanation gives a greater depth of explanation, demonstrating why attraction only occurs in this context and why it only affects items which are low in agentivity. Third, a theoretical advance has been made by independently deriving the case markedness hierarchy from agentivity proper-

[11] It is only very rarely the other direction, i.e., where the case of the relative pronoun regularly agrees with its antecedent. To the best of my knowledge, this is only found in Old Akkadian, Classical Arabic, and other older Semitic languages—cf. (Deutscher, 2001).

ties. The hierarchy can now be used with the understanding that it is a notational tool, which is founded upon the same semantic principles upon which argument selection has been claimed to be founded. No appeal to "greater obliqueness" or similarly vague concepts need be countenanced in order to make use of the case hierarchy. Finally, the above analysis is fully tractable in formal syntactic theories, such as OT, as I have shown in previous work (Grimm, 2005).

Chapter 6

Implications for Formal Semantics

The preceding chapters have been concerned with demonstrating the explanatory power of increased organization of the underlying factors of case assignment/realization. While the organizational tools have come from mathematics, i.e., lattices, the analyses have not been formulated within the framework of formal semantics. Rather, this chapter argues, the preceding data and analyses pose challenges for traditional formal semantics.

The rise of formal semantics in linguistics over the last several decades has led to increasing elegance of analyses, and an ability to treat complex notions such as quantification—notions which seemed out of reach in earlier, pre-Montogovian work on semantics. However, linguists working on semantics with data inspired by typology and those working in the tradition of formal semantics often appear to lack a common framework. This chapter will look at what challenges the previous analyses and data bring to bear on formal semantics, examining its insufficiencies in certain respects and finally proposing methods by which the typological can be brought in line with the logical and the benefits of such a move. To anticipate: there is a functional facet to the case alternation phenomena examined that formal semantics, in its standard, textbook form, is unable to capture. Further, the semantic properties discussed in the previous chapters need to be present in semantic representations in order to make sense of phenomena such as case alternations.

I will consider the brand of formal semantics found in the textbook (Heim and Kratzer, 1998), which concentrates on extensional semantics. This work adheres to the central tenets of formal semantics and makes an effort to cover as much ground with these central tenets as possible. The first sentence of the book makes its position clear: "To know the meaning of a sentence is to know its truth conditions," and most of the initial chapters are focused on developing tools from set theory and logic to calculate the truth conditions of sentences.

The use of truth conditions as the kernel of semantic analysis has become standard practice, if still somewhat controversial. It is not my aim here to challenge this, for truth conditions at least give an objective evaluation measure to semantic analyses[1]. The issue of interest in light of the work of the preceding chapters is whether the study of truth conditions, at least the purely extensional form outlined in textbook accounts, is sufficient. I will first outline (Heim and Kratzer, 1998)'s account of formal semantics and then look at some insufficiencies, both theoretical and empirical.

6.1 Extensional Semantics

(Heim and Kratzer, 1998) develop extensional semantics, which is putatively capable of treating the semantics of more banal sentences, such as "Jim likes Jane" and so on, while putting aside until the end of the book the complications of intensional sentences—those bringing about belief contexts, etc., which require extra machinery. It is not necessary to look at intensional semantics here, for most of the work above has been on case-marking in sentences of the plain extensional type.

(Heim and Kratzer, 1998) make use of three primary building blocks for their analysis. First, the denotations of expressions, or *extensions*, which are of three varieties: (i) elements of a domain D, i.e., individuals, (ii) elements of the set of truth values $\{0,1\}$, that is $\{$false, true$\}$, and (iii) functions from D to $\{0,1\}$. These denotations can be defined recursively to form an infinite set of denotations via the logic of type theory. The essential point is that individuals come from a homogenous set, at least in the presentation of (Heim and Kratzer, 1998). Throughout their presentation, the position is conservative with respect to these denotations, while in other work in formal semantics, the domain of individual entities has been given additional structure.

Second, predicates are understood in terms of functional application—that is, verbs, for instance, are taken to be functions which take noun phrases as arguments and give as an output a truth value. To take their example, the verb "smoke" takes a proper name "Ann" as an argument, and returns the value 1 (true) if "Ann smokes" is true in the model and 0 (false) if not. In standard notation, the interpretation of an expression is designated by brackets ($[\![\ ]\!]$) so the interpretation of "smokes" would be designated by $[\![\text{smokes}]\!]$.

Finally, (Heim and Kratzer, 1998, p. 49) relies on the Principle of Interpretability, which states that "all nodes in a phrase structure tree must be in the domain of the interpretation function $[\![\ ]\!]$." This essentially states that the top node of a phrase

[1] In the words of Barbara Partee, "What must not be forgotten is that when it comes to trying to evaluate or compare semantic analyses, even an oversimplified notion of truth-conditions provides a gigantic advance over reliance on intuitions about semantic representations whose real semantic content is unspecified.(Partee, 2005)"

structure tree must receive a denotation of truth values, and all other nodes of the subtrees must be interpretable as well, i.e., for each node, of its two daughters, one must be a function and one must be an argument and functional application must succeed.

With these three tools, the machinery of formal semantics can operate. However, the input to this machinery is specified via lexical entries. Lexical entries in formal semantics á la (Heim and Kratzer, 1998) are concerned with making conspicuous these sets of things, and no other qualities of the verbal semantics familiar from typological or lexical research are included. For instance, in the case of verbal predicates, "each verb denotes the set of those things that it is true of." The lexical entry of predicates also specifies the order of functional application in case the predicate has several arguments, and ties the predicate to the denotations of the arguments.

For instance, in (Heim and Kratzer, 1998, p.27), "'likes' is a *function from individuals to functions from individuals to truth-values*" (their emphasis). This is to say that given two individuals, x and y, like(x)(y) is true iff y likes x within the relevant domain. More formally, the lexical entry for 'likes' would be as below:

$$[\![\text{ likes }]\!] : \lambda x \in D_e.[\lambda y \in D_e.y \text{ likes } x]$$

Given the assumptions and aims of formal semantics, such definitions hold for simple predicates, such as *like* discussed above.

One reason for the success of formal semantics, as mentioned above, is its ability to proposed an objective evaluative measure on semantic description. Semantic descriptions that capture a lexical item's truth conditions are descriptively adequate, and those which do not are not. In more conservative conceptions of formal semantics, semantic theory and "meaning" are disassociated as demonstrated in this quote from Richmond Thomason's introduction to Montague's semantics ((Montague, 1974, p. 48), quoted in (Bach, 1986)):

> "But we should not expect a semantic theory to furnish an account of how any two expressions belonging to the same syntactic category differ in meaning."

Yet, much research elaborated in linguistics since that time has shown that what was recommend to be swept under the rug of "meaning" is actually quite pertinent for structural descriptions of syntax—experiencer constructions provide an immediate example, as do such famous lexical pairs such as 'fear'/'frighten'. The point here is that while a semantic theory founded upon truth conditions does indeed provide an evaluation metric, lexical entries and semantic rules based solely on calculating correct truth conditions do not end up being expressive enough to provide any explanation of certain facets of semantics, for our purposes, the semantics of case alternations.

Before turning to an examination of the empirical reach of (Heim and Kratzer,

1998) with respect to the data from the last chapter, it is worthwhile to consider some of the differences between formal semantics based on extensions and the approach I have advocated, proposing to make reference to semantic features/properties.

6.1.1 Uninterpretability

(Heim and Kratzer, 1998) claim that there is a strict division between what counts as uninterpretable and all other types of statements which are not true, e.g., presupposition failure, or just plain false. Their definitions are as follows:

(63) If α is *uninterpretable*, then it can be proved from the semantics alone that α is outside the domain of $[\![\ ]\!]$.

(64) If it is a contingent matter of fact that α is outside the domain of $[\![\ ]\!]$, then α is a presuppositional failure.

The claim is that these definitions distinguish between their examples "Ann laughed Jan" (uninterpretable) and "The escalator in South College is moving" (where in fact there is no escalator in South College, therefore a presupposition failure). But what about the status of the features discussed in previous chapters? Take for instance, the following sentence:

(65) The tree sees Edgar.

Anyone processing the phrase does not have to go check the relevant domain to see if the sentence is true or not. (65) is clearly anomalous, and intuitively, it does seem that (Dowty, 1991) was right that the property of sentience is entailed in the subject of 'see', since (65) appears conceptually impossible. Yet, since the semantics of (Heim and Kratzer, 1998) do not contain such properties, it cannot be proven "by the semantics alone" that (65) is outside the domain of the interpretation function. However, since (65) is conceptually impossible, it does not seem to be a "contingent matter of fact" that (65) is outside the domain of the interpretation function, since the phrase will always be false[2].

Further, the example of uninterpretability is not sacrosanct, and it seems to me that Construction grammarians would be quick to point out that there are phrases such as "Ann laughed Jan off the stage/out of the room" which are definitely interpretable[3]. An underlying assumption of (Heim and Kratzer, 1998) is that predicates are relations with a fixed arity, i.e., a fixed number of arguments. It is difficult to

[2] I disregard here the complexities of non-literal meanings—fiction, jokes, etc.

[3] The mention of Construction Grammar is due to the similarity between this phrase and the flagship phrase of "Sam sneezed the napkin off the table" (Goldberg, 1995) which, they argue, demonstrates that "sneeze" is not always an intransitive verb, but the number of arguments depends on the construction.

make this assumption hold with certain verbs that allow multiple constructions, e.g., "Colin kicked the wall" (2-place) versus "Colin kicked the ball to Sandy" (3-place).

It is noteworthy that (Heim and Kratzer, 1998)'s showcase examples of uninterpretability ("*Ann laughed Jan" and "*Greeted Ann") are both violations of fixed arities. Seeing as any serious attempt to capture a substantial fragment of even English will have to be more lenient with number of arguments assigned to a verb, the Principle of Interpretability becomes much weaker. The other alternative is multiple lexical entries for predicates such as "kick" and "sneeze". Yet, if a theory can provide a uniform analysis, it is theoretically preferable to one that must posit a proliferation of lexical entries.

6.1.2 Semantic Vacuity

Another theoretical choice that conflicts with my position is (Heim and Kratzer, 1998)'s stance that certain lexical items are to be taken as semantically vacuous. As an example, take their lexical entry for "fond of":

$$[\![\text{ fond of }]\!] : \lambda x \in D_e.[\lambda y \in D_e.y \text{ is fond of } x]$$

"Of" is taken to be semantically vacuous, that is, it does not contribute the semantics of "fond". For (Heim and Kratzer, 1998), what is at stake is finding the denotations of VPs such as "fond of Joe", which will be the set of individuals X for which each member x, 'x is fond of Joe' is true.

(Heim and Kratzer, 1998) claim that it is widely held that "certain occurrences of prepositions, such as 'of' in 'proud of John' or 'father of John"' are semantically vacuous. In essence, since such items do not make a contribution to the truth values of the larger expressions containing them, so the argument goes, they do not make a contribution to the semantics of their containing expression. But it is noteworthy that this is a very restricted view of what determines a semantic contribution. If semantics is restricted to analyzing truth conditions, then it does follow that "of" is semantically vacuous. However, it does not seem appropriate to state that "of" is *meaningless*.

According to the analyses presented in the above chapters, "of", which in many uses is functionally equivalent to uses of the genitive in, say, Ancient Greek, does have semantic content, i.e., a region on the agentivity lattice. While it is true that items such as "of" can have very general meanings, this is not equivalent to saying that there is no meaning. In the relational view of case and prepositions, it is significant that the marking is "proud of John" and not "proud for John". "Of" carries with it information about the type of relation that exists between the subject and the object, and at least one can state that the meaning of "of" includes that it does not have the meaning of other relational prepositions, such as "for".

6.1.3 Thematic Content

In (Heim and Kratzer, 1998), additional machinery is explicitly rejected in preference to deriving all the necessary results strictly from the above three tools and lexical entries. In particular, (Heim and Kratzer, 1998) discusses briefly the possibility of thematic content playing a role in semantics, before eventually dismissing the possibility. First, they consider the Θ-criterion of Government and Binding Theory as opposed to the Principle of Interpretability, which they take as primitive. Both are shown to exclude sentences such as "*Ann laughed Jan" or "*Greeted Ann". Since both sentences do not satisfy the conditions for functional application to work, they fail for the Principle of Interpretability, and therefore qualify as "uninterpretable". Since the Θ-criterion has at least one problematic construction that the Principle of Interpretability doesn't, the Principle of Interpretability is preferred.

Similarly, (Heim and Kratzer, 1998) claims that another addition of thematic content to semantic representations is superfluous. Their example is the analysis of (Grimshaw, 1990) stating that argument structure representations additionally capture prominence relations among arguments. The example discussed is "introduce", which is given here as two types entries, the first in (Grimshaw, 1990)'s framework and the second in (Heim and Kratzer, 1998)'s.

(66) a. introduce(agent(goal(theme)))
b. $\lambda x \in D_e.[\lambda y \in D_e.[\lambda z \in D_e z$ introduces x to $y]]$

The claim in (Heim and Kratzer, 1998) is that the lexical prominence of arguments is already ordered by the lexical entry of "introduce". Yet, determining lexical prominence on the basis of the denotation entry already relies on receiving detailed information about the order of the arguments, which is unproblematic in English and other languages with fixed word order. However, there are many languages with freer word order making use of full case marking where it is more natural to use such notions as grammatical roles to get the argument order in the first place. Thus, it is not surprising that a theory of grammatical roles was elaborated by Panini for Sanskrit, where the lexical prominence of arguments was not determined by the word order, but by case. Since grammatical roles, in some form, will often be necessary anyway, and (Heim and Kratzer, 1998)'s exclusion of thematic content is unwarranted, at least on any sort of universal basis.

Additionally, (Heim and Kratzer, 1998) discuss other constructions whose order of lexical prominence is not so easily covered by the order of denotations in the lexical entry—most conspicuously unaccusatives and unergatives. The conclusion is not very satisfactory, essentially stating that this goes beyond the scope of an introductory textbook. Their goal appears to be to let the denotations of the lexical entries do as much work as possible. This is of course theoretically desirable; yet,

it is doubtful if this is expressive enough. I now turn to some of the data previously discussed which I will argue is problematic for (Heim and Kratzer, 1998)'s stance.

6.2 Functionalism in Semantics

A larger issue looms over the above discussion. I have argued that there is a functional nature to case-marking, and a fortiori, to case alternations. Case-marking is used to mark certain semantic properties, as has been argued here in previous chapters and many other places, e.g., (Hopper and Thompson, 1980). As formal semantics is described in (Heim and Kratzer, 1998), the semantic properties discussed herein have no place in semantic representations. Yet, without reference to such properties, it is hard to even make sense of the functional facet of case-marking. Recalling that proper semantic representation of a phrase within their framework is equivalent to the proper representation of a truth conditions of the phrase, if these properties are not somehow calculated into the truth value of the phrase, they have no influence on the semantics of the phrase. The emphasis on extensions to the exclusion of other facets of semantics/"meaning" leads to deficiencies both on the level of typological semantics, or of "universals" in semantics, and in the treatment of individual languages.

On the typological level, the point of work such as (Hopper and Thompson, 1980) and (Tsunoda, 1981, 1985) is that there is a strong correlation between certain semantic properties of verbs and/or phrases and their structural manifestation, and this correlation appears typologically. By taking a minimal stance with respect to what is in a semantic representation, (Heim and Kratzer, 1998) do not allow any manner by which one can connect semantic representations with the observations of (Hopper and Thompson, 1980) and (Tsunoda, 1981, 1985).

As just discussed, the lexical entries for "likes" and "fond of" are identical in form, and so would be the situation with typical transitive predicates such as "break". That is to say that for "break" and for "like", the predicates will have the same form of semantic representation in (Heim and Kratzer, 1998), and they will only differ by virtue of denoting different sets of which the predicate is true of in the model. Yet, following (Tsunoda, 1981), these predicates belong to different classes which are realized in different ways and differ greatly in their level of transitivity, as he demonstrated on a cross-linguistic basis. These semantic differences are not merely theoretic, but have consequences on syntactic form. Without reference to concepts such as agentivity, there is no manner in which to account for these divergences of syntactic form.

Further, there are other semantically functional explanations that we have explored that are simply out of reach of a purely extensional semantics. One case in point is Differential Object Marking (DOM). DOM can be summarized as certain language particular rules. For instance, following (Aissen, 2003), in Dhaghari, the rule

would be stated as follows: if an object is animate (*sentient*), it is case-marked. A purely extensional semantics with an unsorted domain would have no method of specifying animacy in the semantics, therefore, this distinction would not be able to surface. And the generalization claimed in (Aissen, 2003), that more prominent objects are more marked, cannot be expressed in this form of formal semantics, since no properties of entities are considered, and therefore there is no foundation for a notion of "prominence". Many of semantic properties discussed in typology, in formal frameworks, can be exiled to the nebulous "syntax/semantics interface". However, animacy does not seem to be something which could reasonably be claimed as part of the interface, nor of syntax proper.

Typology teaches that certain entities, i.e., entities which are semantically distinct along relevant parameters, are marked differently cross-linguistically. It is essential that semantics is able to specify this in correct generalizations, and not in stipulative lexical entries. To take an issue not yet discussed, there is a clear distinction between lexical items which are *concrete* and *abstract*. This distinction is highly intuitive, and is relevant for the realization of such lexical items, for instance, abstract nouns are more restricted typologically in their realization as count nouns. Yet, there is no simple way to capture this with (Heim and Kratzer, 1998)'s assumptions about semantics.

Turning to language-particular data, some of the alternations examined in the last chapter also pose difficulties for a purely denotational semantics. For instance, the alternation in Hindi between the nominative and the ergative, repeated here for convenience, does not find a ready explanation in the framework of (Heim and Kratzer, 1998):

(67) HINDI ((Tuite et al., 1985) found in (Butt and King, 2005))

a. ram k^{h}as-a
Ram.M.Sg.NOM cough-Perf.M.Sg
Ram coughed.

b. ram-ne k^{h}as-a
Ram.M.Sg.Nom.ERG cough-Perf.M.Sg
Ram coughed (purposefully).

Recalling that the difference between (67a) and (67b) is that the former designates a non-volitional (uncontrolled) action while the latter is a volitional (controlled) action. In terms of denotations, both (67a) and (67b) should have a lexical entry such as the following:

$[\![cough]\!]$: $\lambda x \in D_e.x$ coughs

It will be recalled that (Heim and Kratzer, 1998) rely on three tools to derive their analyses—types of denotations, functional application, and the Principle of Interpretability—and any explanation of the alternation must come from one or

more of them. Yet, no explanation is forthcoming. First, as a result of the syntactic positions occupied by the nominative and the ergative NPs in (67a) and (67b), respectively, they should have the same logical type[4]. Functional application will operate without problems and (67a) and (67b) will both be interpretable. The question remains where the difference in interpretation, i.e., volitional/non-volitional, arises from within this framework of formal semantics, where all semantic interpretation relies on extensions. The distinction between (67a) and (67b) is clearly not purely syntactic, and must therefore find a place within the semantic representation. The minimal set-up of (Heim and Kratzer, 1998) does not provide a rich enough domain of entities, and, as seen immediately above, attempts to exclude any thematic content from it. Therefore, the sole possibility of explain case alternations such as (67) is to propose two lexical entries for "cough", one with the argument in the nominative and one with the argument in the ergative. One would receive two lexical entries:

1. $\lambda x \in D_e.x$ coughs$_{NOM}$
2. $\lambda x \in D_e.x$ coughs$_{ERG}$

There does not seem to be anything inherently wrong with including information about the case taken by a predicate in the lexical entry. (Historically, Frege does exactly this in the first example he gives of functional application in natural language (Frege, 1997).) What should indicate that proposing an ambiguity here between two types of verbs is less than optimal is that this ambiguity would have to be proposed for an entire class, as discussed in (5.3.1)—verbs which permit both a volitional and non-volitional reading. Thus, without reference to the *volitionality* feature, there is a proliferation of lexical entries, which could otherwise be explained by one feature. Clearly, a generalization is missed here.

A similar argument can be made for most of the other case alternations discussed above as well as many others, that is, this is not an isolated problem for their approach. I will only dwell on one other example. Consider the alternation in Russian between the accusative and the instrumental, repeated for convenience as (68).

(68) RUSSIAN (Malchukov, 2005)

a. On kruitil rulj
he rotate wheel-ACC

He rotated the wheel (consciously).

b. On kruitil rulj-om
he rotate wheel-INSTR

He rotated the wheel (unconsciously).

[4]In this simplified version, the type is individuals (*e*), but in Montague's formulation, the type would be generalized quantifier (*e*,(*e,t*)). For expository purposes, I have kept to the simpler type.

A lexical entry for "rotate" in the style of (Heim and Kratzer, 1998) would look like the following:

$$[\![\text{ rotate }]\!] : \lambda x \in D_e.[\lambda y \in D_e.y \text{ rotates } x]$$

In terms of the extension of the verb "rotate", "rotate"+ Accusative and "rotate" + Instrumental will be identical. Without further assumptions, this would to the conclusion that "rotate" + Accusative and "rotate" + Instrumental are equivalent. Yet, this conclusion will go against the intuition of Russian speakers that their is a significant difference. Again, there are ways around this within formal semantics, for instance to analyze it so that "rotate" has two different senses which select for different types.

Even if this difficulty is overcome, it would remain to explain why the instrumental is an appropriate choice to deliver this sense. In the way formal semantics has been practiced, looking for such explanations is not on the agenda. However, some researchers in formal semantics are making overtures to approaches present in lexical semantics, and attempting to grapple with some topics related to the above discussion, staying more or less within the general area of formal semantics ((Partee and Borschev, 2003) is a good example).

(Dowty, 1991) stated that the proto-roles solution was carried out assuming a model-theoretic framework. The preceding chapters have remained theory-neutral in order to emphasize that the analysis of agentivity parameters' influence on case does not depend on any given semantic theory; however, the resulting features, and the analyses, are tractable as well within the framework of formal semantics. It is hoped that this research can aid to elaborate a common framework which possess the benefits of formal semantics and whose empirical reach extends to the sorts of typological data contained within this study.

Chapter 7

Conclusion

Throughout this study, I have argued that the agentivity and persistence properties developed in chapter 3 are relevant to the treatment of case-marking. It is necessary to establish that there should be something such as case assignment on semantic principles in the first place. The regularity of case alternations discussed, and the association of these case alternations with specific lexical classes of predicates, bespeaks of a consistent semantics of case for which notions such as 'inherent case' (case only assigned in the lexicon) fail to account. The semantic properties of case that have been argued for here are the most fundamental properties that are associated with argument selection, and therefore arguments. That these properties should be associated with the semantics of case should be uncontroversial.

Associating agentivity properties with case-markers resolves several problems in one move. The inherited wisdom from work on Thematic Roles is that predicates select for certain semantic properties in their arguments, formerly described under the rubric of Thematic Roles. Once cases are associated with agentivity properties, the fact that different predicates select different cases for the same syntactic position no longer presents any mystery. If predicate *x* entails a certain grouping of agentivity properties in its object position, and case *c* possesses those properties, then *x* selects *c*. Yet, a different predicate, say *y*, may entail a different grouping of properties in its object position, which case *d* fulfills, and thus *y* selects *d*. Therefore, cases *c* and *d* may both appear in object position, depending on the semantic desiderata of the predicate. This general principle operates above the level of the lexicon, although most certainly there will be idiosyncratic case assignments for which appeal to the lexicon is necessary.

Additionally, this framework makes progress towards bringing into consonance two opposing views on case: that a case designates, and can be defined by, a general sense as opposed to the view that a case designates, and can be defined by, a range of uses, not necessarily connected. Examining the fundamental semantic properties of cases in their canonical uses has led to a greater understanding of the underlying

similarities between a case's canonical use and its non-canonical uses, connections which were explored in case variation on subjects in Hindi/Urdu.

The application of the agentivity lattice to case also resulted in grounding broad generalizations about case in specific semantic properties, in particular, a case hierarchy was derived for Ancient Greek. I have only claimed that this case hierarchy is language-particular rather than universal, and this should come as no surprise. Case hierarchies, as well as thematic hierarchies, come in a variety of forms and orders (see discussions in (Levin and Rappaport Hovav, 2004) and (Naess, 2004)) and no one hierarchy has proven satisfactory as a universal. Different languages, whose cases—not always the same—cover different ranges of uses, seem to require different case hierarchies. Further research could show that these agentivity properties, and perhaps other elements would be needed, can provide a universal basis for comparison between a language's distribution of its uses of case and its most appropriate case hierarchy—that is, construct a method for predicting the case hierarchy appropriate to a given language based on its uses of case.

Distinct from the framework's contribution to the semantics of case, there have been several advances in the organization of these properties over the pioneering version of agentivity properties found in (Dowty, 1991). In theoretical terms, the primitives used for the agentivity properties used here are, so to speak, more primitive than the proto-properties of (Dowty, 1991). The properties advocated here are simpler, yet still able to represent the more complex notions, such as causation, found in (Dowty, 1991). Further, the contexts reviewed where the proto-properties fail, e.g., causative middles (section 3.2.2) and agentive marking systems (section 4.2), pose no such problems for the more primitive agentivity properties, and thus, this framework's empirical reach is an improvement as well.

One of the most promising facets of the approach taken here is the possibility of establishing representations of different semantic parameters, such as agentivity, object individuation, and aspect, and modelling their interaction. The analyses of object-marking alternations in Russian provide the first steps towards capturing this interaction among different parameters. Much work must be done before this could be accomplished in any real sense—clearly, increased knowledge in regions such as aspect and definiteness is a prerequisite for implementing such a program.

Finally, this study has concentrated on fundamental semantic properties, and thus the detail of analysis reached was restricted for certain alternations, such as the Ergative/Dative alternation in Hindi. It is my hope that this study has laid some of the groundwork necessary for giving this and other alternations the full and detailed analyses that they require.

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